

## Section 3. WATER DEMAND EVALUATION

*THIS SECTION DESCRIBES HOW WATER DEMANDS FOR ZONE 40 WERE ESTIMATED. CURRENT ESTIMATED WATER DEMANDS OF 24,807 AF/YEAR ARE EXPECTED TO INCREASE TO 103,710 AF/YEAR AT BUILD-OUT (WATER FORUM YEAR 2030), WITH MAXIMUM DAY DEMANDS INCREASING FROM APPROXIMATELY 44 MGD TO 185.20 MGD AT BUILD-OUT. WHEN SCWA'S WATER WHOLESALING OBLIGATIONS OUTSIDE OF ZONE 40 ARE CONSIDERED, TOTAL NEW WATER SUPPLY (I.E. THE AMOUNT OF WATER NEEDED FROM THIS POINT FORWARD) REQUIRED AT BUILD-OUT IS 93,435 AF/YEAR OR 118,242 AF/YEAR OR 211.15 MGD TOTAL CAPACITY FOR THE ENTIRE SYSTEM.*

### 3.1 Unit Water Demand Factors

Water demand estimates are calculated by multiplying the acres of each land use by appropriate unit water demand factors. The source of land use designation information can vary depending on available data. Land use information for Zone 40 included tentative maps, Specific Plans, Community Plans, General Plans, and the Sacramento Area Council of Local Governments (SACOG). As a result of on-going planning efforts by various land use authorities a portion of this data presented in this WSIP supersedes that shown in the WSMP. In areas where the land use designation did not correspond directly with the land uses categories given in the Master Plan, a judgment was made to classify the area in the closest category. **Table 3-1** provides a listing of the land use categories used in the WSMP and their corresponding unit water demand factors.

**Table 3-1. 2030 Unit Water Demand Factors**

Land Use Category	Abbreviation	Demand Factor <sup>a</sup> (AF/acre/year)
Rural Estates	RE	1.33
Single Family	SF	2.89
Multi-Family - Low Density	MFLD	3.70
Multi-Family - High Density	MFHD	4.12
Commercial	COM	2.75
Industrial	IND	2.71
Industrial – Unutilized	IUN	0.00
Public	PUB	1.04
Public Recreation	REC	3.46
Mixed Land Use	MLU	2.51
Right-of-Way	ROW	0.21
Water System Losses (7.5%)		

**Note:** a. Zone 40 WSMP, February 2005.

The unit water demand factors shown in **Table 3-1** are derived from the unit water demands developed for the 1995 Zone 40 Master Plan Update and the build-out water demands used in the Water Forum.

### 3.2 Demand Regions

The Project Area was broken up into demand areas representing logical areas of separation based on Community and Specific Plan Boundaries, project boundaries, rights-of-way, and political boundaries. The smallest unit of demand area is defined as a demand sub-region. These are shown in **Appendix C**. Over any given demand sub-region, the water demand is calculated by multiplying the area of each land use type that occurs over the demand region by the unit demand factors shown in **Table 3-1**. This means that a given demand sub-region can have multiple land uses used in the calculation of demands. The demand sub-regions are then aggregated into demand regions as illustrated in **Figure 3-1** and shown numerically in **Table 3-2**. Total annual demand is calculated to be **103,710 AF/year** and the total maximum day demand is **185.2 MGD**.

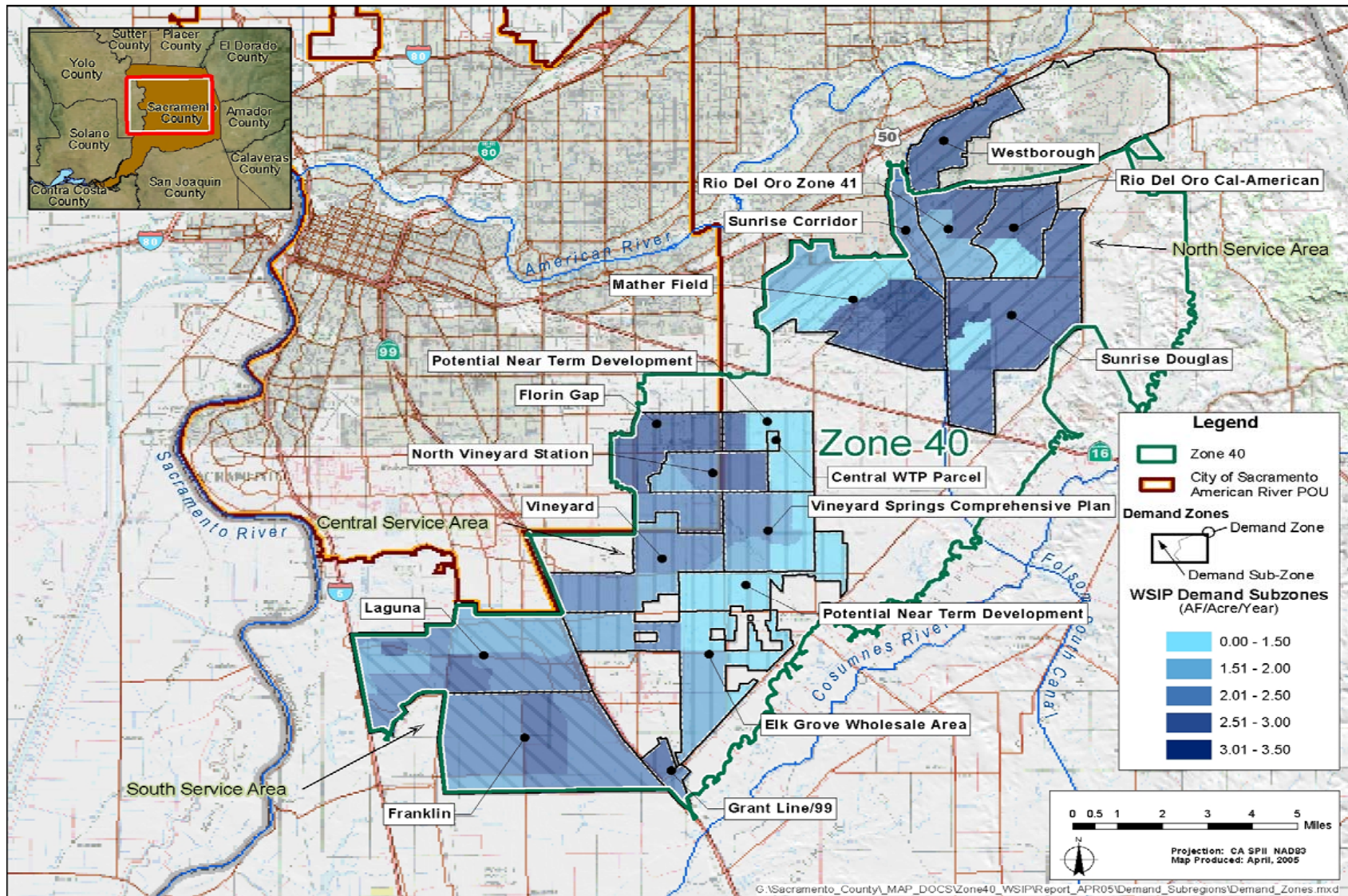
**Table 3-2. Zone 40 Existing and Build-Out Water Demand**

Service Area	Demand Region	Existing Demand <sup>a</sup>		Build-out Demand <sup>a</sup>	
		Annual Average (AF/year)	Max Day (MGD)	Annual Average (AF/year)	Max Day (MGD)
<b>NSA</b>	Mather Field	1,327	2.37	7,624	13.61
	Rio Del Oro - Cal Am Portion	-	-	3,917	6.99
	Rio Del Oro - Zone 40 Portion	-	-	4,872	8.70
	Sunrise Corridor	1,077	1.92	1,077	1.92
	Sunrise Douglas	-	-	15,492	27.66
	<b>NSA Total Demand</b>	<b>2,404</b>	<b>4</b>	<b>32,982</b>	<b>58.90</b>
<b>CSA</b>	Vineyard SWTP Parcel	-	-	113	0.20
	FRCD/EGWS	2,672	4.77	7,321	13.07
	Grantline/99	1,208	2.16	1,338	2.39
	Near Term Development Area	-	-	5,946	10.62
	Vineyard	3,476	6.21	7,264	12.97
	Vineyard Springs Comprehensive Plan	759	1.36	4,899	8.75
	Florin Vineyard (w/ some POU areas) <sup>b</sup>	-	-	8,243	14.72
	North Vineyard Station (w/ some POU areas)	-	-	3,971	7.09
	POU Area Only <sup>c</sup>	-	-	<b>10,644</b>	<b>19.01</b>
	<b>CSA Total Demand</b>	<b>8,115</b>	<b>14</b>	<b>39,095</b>	<b>69.81</b>
<b>SSA<sup>b</sup></b>	Laguna	12,403	22.15	14,289	25.52
	Franklin	1,885	3.37	17,344	30.97
	<b>SSA Total Demand<sup>d</sup></b>	<b>14,288</b>	<b>26</b>	<b>31,633</b>	<b>56.49</b>
<b>Total</b>		<b>24,807</b>	<b>44</b>	<b>103,710</b>	<b>185.20</b>

**Notes:**

- a. Demands shown include 7.5% system losses due to leakage and illegal connections to the water system.
- b. This demand is taken from the Florin Vineyard Community Plan Water Study attached as **Appendix B**.
- c. The POU Area demand is included in the North Vineyard Station and Florin Vineyard areas.
- d. Does not include water demand that may be necessary for RCCC.

Figure 3-1. Zone 40 Demand Regions



### 3.3 Reconciliation of WSIP and WSMP Water Demands

According to the WSMP, total annual water demand for the 2030 study area is 113,064 AF/year (this includes a recycled water demand of 4,400 AF/year which reduces potable water demands to 108,664 AF/year). Total annual water demand for the Project Area identified in this WSIP is estimated at 103,710 AF/year. While this difference may not seem substantial, significant service changes have been made as a result of agreements with Aerojet, Boeing, and Golden State that require a reevaluation of overall water demands within Zone 40. There are also other factors, primarily refined land use information, that were examined in order to better define water demands in each of the Zone 40 service areas. **Table 3-3** shows these changes in estimated water demand for each service area. The net change of 9,831 AF/year shown in **Table 3-3** is an overall decrease in Zone 40 water demand as estimated in the WSMP.

**Table 3-3. Differences in Water Demand between WSIP and WSMP**

Service Area	WSMP Build-out Demand (AF/year)	WSIP Build-out Demand (AF/year)	Difference (AF/year)
NSA	28,552	32,982	-4,430
CSA	48,801	39,095	9,706
SSA	36,188	31,633	4,555
<b>Zone 40</b>	<b>113,541</b>	<b>103,710</b>	<b>9,831</b>

### 3.4 Additional Water Demands

In addition to meeting water demands within Zone 40, SCWA has entered into agreements that require delivery of water to purveyors and environmental interests outside Zone 40. Details of these agreements are discussed below.

#### 3.4.1 Aerojet & Boeing Agreements

The Aerojet and Boeing agreements transfers ownership of remediated groundwater (and potentially Aerojet’s surface water contract with the City of Folsom) to SCWA to be used as a replacement supply for groundwater capacity lost by SCWA, Golden State and Cal-Am as a result of groundwater contamination. While the agreements are not specific on

how these replacement water supplies will be delivered to the affected purveyors or how much water is needed they do establish general criteria for how the water will be allocated. Of highest priority is satisfying all replacement water supply needs; secondly, potable water to meet Aerojet's new development water needs (i.e., Rio del Oro and Westborough); thirdly, potable water for other new development; and lastly environmental water.

### ***3.4.2 Golden State Water Company Agreement***

SCWA's agreement with Golden State specifies making available 5,000 AF/year of replacement water at their intake facilities on the Folsom South Canal. Golden State's allocation of additional replacement water will be determined annually in a meet-and-confer session with SCWA. Regardless of demonstrated need, Golden State's maximum allocation of replacement water supply in any year will not be greater than 15,200 acre-feet (less the 5,000 AF/year delivered to Golden State at the Folsom South Canal). Under the agreement, delivery of replacement water will be made at four predetermined locations. Zone 40's supply and conveyance system will be modified such that it can convey all (i.e., 10,200 AF/year) or a portion of the replacement water to these agreed upon points of delivery. The pattern of delivery of this water is assumed to be on a typical municipal demand curve. Upon completion of treatment and conveyance facilities for replacement water the agreement requires SCWA to acknowledge Golden State's right to use a portion of these facilities equal to the amount of replacement water allocated to Golden State.

### ***3.4.3 Cal-Am Agreement***

Currently, no separate replacement water supply agreement exists between SCWA and Cal-Am. However, it is the intent of SCWA to negotiate such an agreement with Cal-Am. During negotiations SCWA has been working cooperatively with the City to investigate ways to deliver POU surface water (or replacement water in dry years) to Cal-Am's service area that lies within the POU (this includes up to 5,000 AF/year of either POU or replacement water). This will allow groundwater currently being extracted in the POU area to be imported into areas affected by groundwater contamination.

**3.4.4 MOA For Management of Water and Environmental Resources Associated with the Lower Cosumnes River**

Under the terms of this agreement, SCWA will provide 5,000 AF/year of remediated groundwater or provide a contribution of a reasonable amount of capital towards the purchase of an alternative supply for the Cosumnes River Flow Augmentation Project. In any year that water is not required to fulfill the objectives of the Cosumnes River Augmentation Project SCWA reserves the right to use the 5,000 Acre Feet (AF) of water for other purposes. Remediated water will be conveyed down the Folsom South Canal for delivery to the Cosumnes River from October through December. The term of this agreement is for five years. No later than the fourth year those participating in the agreement will initiate negotiations for a renewal of the agreement taking into account any additional program elements that may have been identified during the process of implementing the agreement.

**3.4.5 Sacramento Municipal Utility District (SMUD) Dry Year Water Requirements**

SMUD's Water Forum PSA contains a provision related to the transfer of SMUD 2 water which requires SCWA to provide up to 10,000 AF/year of groundwater to SMUD to maintain operations at their Rancho Seco facility. The amount of water required by SMUD is based on hydrologic year type and the amount of cut back they may experience on their remaining CVP contract. Delivery of this water will be through the Folsom South Canal via raw surface water or groundwater supplies being pumped into the canal for use by SMUD.

Water to meet this demand can be taken from either the potable system or the raw water system. The decision of which option to use will depend on the capital and operational cost difference between the two choices. Intuitively, water taken from the potable system would have significant impacts on system water demands and design. Water taken from the raw water system (either surface water or groundwater) would have a minimal effect on the operation of the potable system and impacts could be reduced significantly.

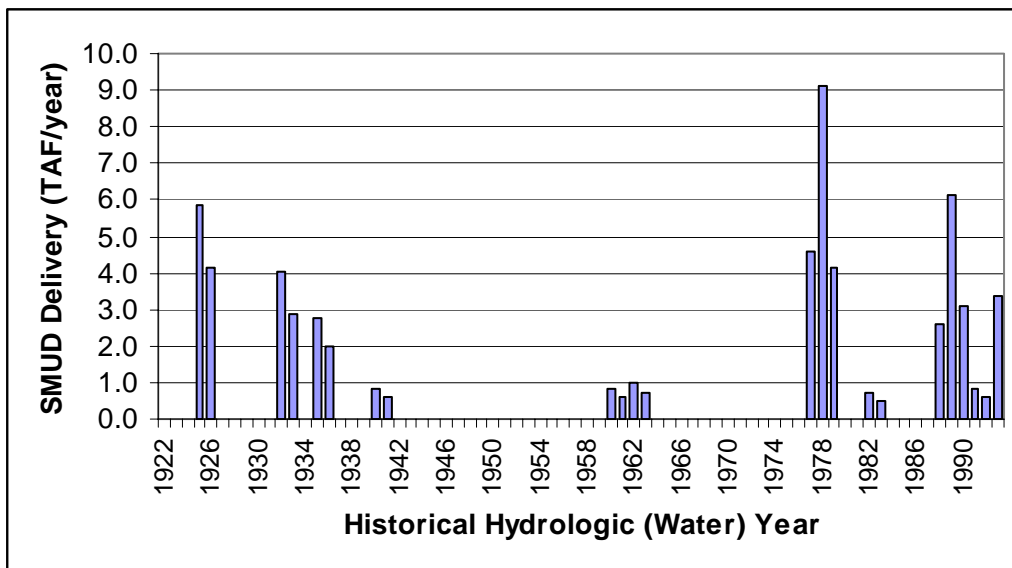
SMUD's dry year demands are determined based on the frequency of dry years when there would be a call for water. Modeling studies for FRWA's Freeport diversion and



pipeline project indicate that the frequency of SMUD demand is very low, occurring in only 20 percent of years, with the need for the full 10,000 AF/year occurring in only three percent of years (see **Figure 3-2**). For the purpose of this WSIP, monthly delivery pattern of SMUD dry year demand water is assumed to follow a uniform distribution.

It is expected that SMUD’s dry year demand’s can be met through the unused portions of the SMUD CVP assignment (through 2030). Whether the water can be diverted directly into the Folsom South Canal from the American River or if it will have to be diverted at Freeport is unknown at this time. If the diversion occurs at Freeport, capacity in East Bay Municipal Utility District’s (EBMUD) pipeline beyond the turnout for the Vineyard SWTP will be required if there is sufficient capacity in the pipeline. In these alternatives are unacceptable, water from the treated water system or groundwater will be needed to meet SMUD’s dry year demands. As this WSIP is written, there may be a SMUD alternative to taking Zone 40 water that will remove this additional demand from consideration. The WSIP does not evaluate this demand given this uncertainty and the significance if the demand is not realized.

**Figure 3-2. Frequency and Amount of SMUD Dry Year Demand**





### 3.4.6 Summary of New Water Demand in Zone 40

Based on identified water supply requirements, approximately **93,435** AF/year in new water demands will need to be met by the year 2030. **Table 3-4** provides details of the source of this demand. Of this amount, **78,903** AF/year is required to support growth within Zone 40 (see **Table 3-2**). The remaining **14,532** AF/year of new water demand is required to meet replacement water supply requirements for adjacent purveyors and possibly to develop a SMUD dry year demand supply (note: no amount is shown for SMUD or Cal-Am supply).

**Table 3-4. Summary of “New” Water Demand in Zone 40 at Build-out**

	Existing Demand (AF/year)	Increase in Annual Average Demand (AF/year)	Total Water Demand (AF/year)	Maximum Day Demand (MGD)
NSA	2,404	30,578	32,982	58.90
CSA	8,115	30,980	39,095	69.81
SSA	14,288	17,345	31,633	56.49
<b>New Water Demand in Zone 40</b>	<b>24,807</b>	<b>78,903</b>	<b>103,710</b>	<b>185.20</b>
Cal-Am Replacement Supply	-	-	-	-
Golden States Replacement Supply	0	10,200	10,200	18.21
SMUD Dry Year Supply	-	-	-	-
Westborough	0	4,332	4,332	7.74
<b>Additional Water Demand</b>	<b>0</b>	<b>14,532</b>	<b>14,532</b>	<b>25.95</b>
<b>Total Water Demand</b>	<b>24,807</b>	<b>93,435</b>	<b>118,242</b>	<b>211.15</b>

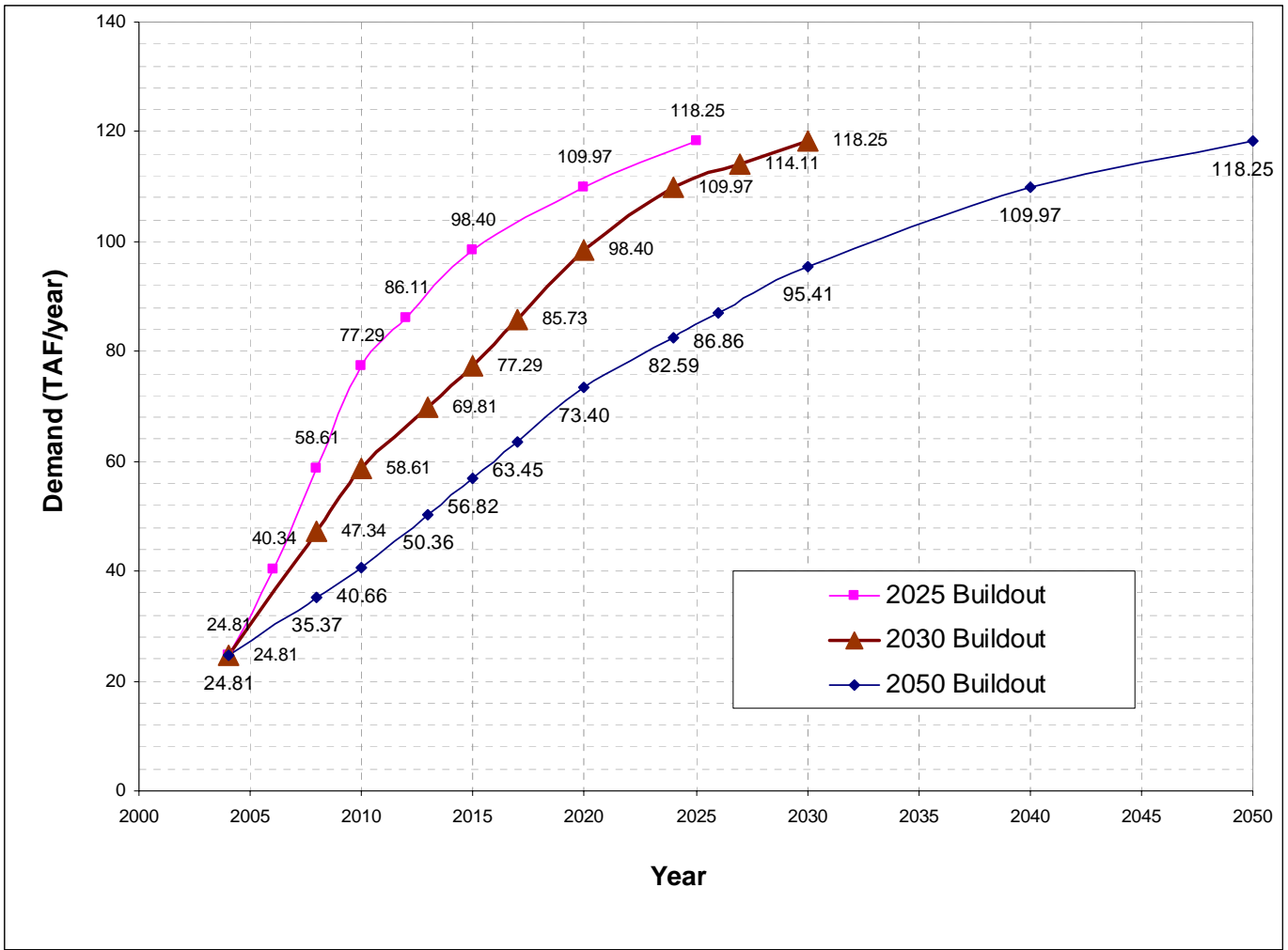
### 3.5 Water Demand Projections

In order to develop interim model conditions (i.e., 2005, 2010, etc.) between the baseline (2000) and build-out model (2030) projections of water demand growth need to be developed. The methodology used to project water demand is based on geographically based population projections from 2000 to 2025 provided by SACOG. These population projections are used to set the shape of the demand curve by proportionally applying the population projection trend to the water demands.

For example, if the population in an area is expected to increase sharply, the water demand curve will rise sharply, and so on. For consistency with the WSMP and WFA, build-out of Zone 40 is assumed to occur in 2030. Demands developed based on the methodology explained above are literally stretched to show build-out occurring in 2030 rather than 2025. Earlier or later build-out may require the acceleration or delay of construction of some facilities; however, major facilities such as the Vineyard SWTP are on fixed timelines and will most likely be constructed well before 2020.

For purposes of financing, the timeline for build-out is often stretched further to assume a slower pace of growth relating to less revenue in determining how water facilities are paid. The three different growth projections discussed in this WSIP are shown in **Figure 3-3**. Details of water demand projections for each demand region are in **Appendix C**. All three curves begin and end at the same build out demand of **118.2** thousand acre feet per year (TAF/year).

Figure 3-3. Zone 40 Total Demand Growth Curves



### 3.6 Distributing Water Demands

To perform hydraulic modeling, the water demand from each defined sub-region is assigned corresponding demand nodes in the hydraulic model. Generally, water demands are spread uniformly over the demand nodes associated with each sub-region (see **Figure 3-4**). Exceptions to the uniform distribution are made in circumstances where it is known that demands are not balanced within demand sub-region.

**Figure 3-4. Distribution of Water Demand to Model Nodes**

