

## 4. Planning Data and Demand

This chapter discusses planning data and Anacortes' demand forecast. The information is presented in three main sections: (1) the first section summarizes historical and projected demographic data for Anacortes; (2) the second section summarizes Anacortes' water use characteristics including production, consumption, water balance, and water use factors; and (3) the third section combines the demographics and the water supply characteristics to develop Anacortes' demand forecast for the next 20 years.

### 4.1. Demographics – Historical and Projected

Several demographic units were analyzed for this water system plan. The demographic units are described below, and information is provided about how the demographic units relate to the demand forecast. Table 4-1 presents the demographic numbers.

- **Population:** Not used for the demand forecast; however, the data are presented to meet Washington State Department of Health water system planning requirements. Note that these numbers are for Anacortes' Urban Growth Area, which is a smaller geographic area than the retail service area.
- **Single Family Households:** Not used for the demand forecast. This demographic unit was analyzed in anticipation of using it in the demand forecast. However, the customer categories used by Anacortes' Utility Billing Department do not lend themselves to calculating a water use factor for single family households. Therefore, these demographics are presented for information only. Note that these numbers are for Anacortes' Urban Growth Area, which is a smaller geographic area than the retail service area.
- **Multifamily Households:** Not used for the demand forecast. This demographic unit was analyzed in anticipation of using it in the demand forecast. However, the customer categories used by Anacortes' Utility Billing Department do not lend themselves to calculating a water use factor for multifamily households. Therefore, these demographics are presented for information only. Note that these numbers are for Anacortes' Urban Growth Area, which is a smaller geographic area than the retail service area.
- **Residential Accounts:** Key input to the demand forecast.
- **Commercial Accounts:** Key input to the demand forecast.
- **Employment:** Not used for the demand forecast. This demographic unit was analyzed in anticipation of using it in the demand forecast. However, the customer categories used by Anacortes' Utility Billing Department do not lend themselves to calculating a water use factor for employees. Therefore, these demographics are presented for information only. Note that these numbers are for Anacortes' Urban Growth Area, which is a smaller geographic area than the retail service area.

**Table 4-1 Demographics**

CALENDAR YEAR	PLAN YEAR	POPULATION <sup>1</sup>		SINGLE FAMILY HOUSEHOLDS (SF HH)				MULTIFAMILY HOUSEHOLDS (MF HH)				RESIDENTIAL ACCOUNTS <sup>5</sup>		COMMERCIAL ACCOUNTS <sup>5</sup>		EMPLOYMENT <sup>6</sup>	
		QTY	ANNUAL CHANGE	QTY	ANNUAL CHANGE	QTY	ANNUAL CHANGE	QTY	ANNUAL CHANGE	QTY	ANNUAL CHANGE	QTY	ANNUAL CHANGE	QTY	ANNUAL CHANGE	QTY	ANNUAL CHANGE
2000	n/a	14,557	n/a	5,184	n/a	n/a	n/a	1,367	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2001	n/a	14,840	1.9%	5,292	2.1%	n/a	n/a	1,382	1.1%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2002	n/a	14,910	0.5%	5,399	2.0%	n/a	n/a	1,397	1.1%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2003	n/a	15,100	1.3%	5,506	2.0%	n/a	n/a	1,412	1.1%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2004	n/a	15,470	2.5%	5,613	1.9%	n/a	n/a	1,428	1.1%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2005	n/a	15,700	1.5%	5,720	1.9%	n/a	n/a	1,443	1.1%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1.5%
2006	n/a	16,170	3.0%	5,828	1.9%	n/a	n/a	1,458	1.1%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	3.0%
2007	n/a	16,400	1.4%	5,935	1.8%	6,553	n/a	1,473	1.0%	1,927	n/a	6,505	n/a	994	n/a	7,951	1.4%
2008	n/a	16,723	2.0%	6,046	1.9%	6,566	0.2%	1,489	1.1%	1,986	3.0%	6,516	0.2%	986	-0.8%	8,107	2.0%
2009	n/a	17,052	2.0%	6,159	1.9%	6,689	1.9%	1,504	1.1%	2,007	1.1%	6,644	2.0%	1,005	2.0%	8,267	2.0%
2010	1	17,387	2.0%	6,275	1.9%	6,814	1.9%	1,520	1.1%	2,028	1.1%	6,775	2.0%	1,025	2.0%	8,429	2.0%
2011	2	17,729	2.0%	6,392	1.9%	6,942	1.9%	1,536	1.1%	2,049	1.1%	6,908	2.0%	1,045	2.0%	8,595	2.0%
2012	3	18,078	2.0%	6,512	1.9%	7,072	1.9%	1,553	1.1%	2,071	1.1%	7,044	2.0%	1,066	2.0%	8,764	2.0%
2013	4	18,434	2.0%	6,634	1.9%	7,205	1.9%	1,569	1.1%	2,093	1.1%	7,183	2.0%	1,087	2.0%	8,937	2.0%
2014	5	18,797	2.0%	6,759	1.9%	7,340	1.9%	1,586	1.1%	2,115	1.1%	7,324	2.0%	1,108	2.0%	9,113	2.0%
2015	6	19,166	2.0%	6,885	1.9%	7,478	1.9%	1,602	1.1%	2,137	1.1%	7,468	2.0%	1,130	2.0%	9,292	2.0%
2016	7	19,544	2.0%	7,014	1.9%	7,618	1.9%	1,619	1.1%	2,160	1.1%	7,615	2.0%	1,152	2.0%	9,475	2.0%
2017	8	19,928	2.0%	7,146	1.9%	7,760	1.9%	1,636	1.1%	2,183	1.1%	7,765	2.0%	1,175	2.0%	9,661	2.0%
2018	9	20,320	2.0%	7,280	1.9%	7,906	1.9%	1,654	1.1%	2,206	1.1%	7,918	2.0%	1,198	2.0%	9,851	2.0%
2019	10	20,720	2.0%	7,416	1.9%	8,054	1.9%	1,671	1.1%	2,229	1.1%	8,074	2.0%	1,222	2.0%	10,045	2.0%
2020	11	21,128	2.0%	7,555	1.9%	8,205	1.9%	1,689	1.1%	2,252	1.1%	8,232	2.0%	1,246	2.0%	10,243	2.0%
2021	12	21,543	2.0%	7,697	1.9%	8,359	1.9%	1,707	1.1%	2,276	1.1%	8,394	2.0%	1,270	2.0%	10,444	2.0%
2022	13	21,967	2.0%	7,841	1.9%	8,516	1.9%	1,725	1.1%	2,300	1.1%	8,560	2.0%	1,295	2.0%	10,650	2.0%
2023	14	22,399	2.0%	7,988	1.9%	8,675	1.9%	1,743	1.1%	2,325	1.1%	8,728	2.0%	1,321	2.0%	10,859	2.0%
2024	15	22,840	2.0%	8,138	1.9%	8,838	1.9%	1,761	1.1%	2,349	1.1%	8,900	2.0%	1,347	2.0%	11,073	2.0%

CALENDAR YEAR	PLAN YEAR	POPULATION <sup>1</sup>		SINGLE FAMILY HOUSEHOLDS (SF HH)				MULTIFAMILY HOUSEHOLDS (MF HH)				RESIDENTIAL ACCOUNTS <sup>5</sup>		COMMERCIAL ACCOUNTS <sup>5</sup>		EMPLOYMENT <sup>6</sup>	
		QTY	ANNUAL CHANGE	QTY	ANNUAL CHANGE	QTY	ANNUAL CHANGE	QTY	ANNUAL CHANGE	QTY	ANNUAL CHANGE	QTY	ANNUAL CHANGE	QTY	ANNUAL CHANGE	QTY	ANNUAL CHANGE
2025	16	23,290	2.0%	8,290	1.9%	9,003	1.9%	1,780	1.1%	2,374	1.1%	9,075	2.0%	1,373	2.0%	11,291	2.0%
2026	17	23,748	2.0%	8,446	1.9%	9,172	1.9%	1,798	1.1%	2,399	1.1%	9,253	2.0%	1,400	2.0%	11,513	2.0%
2027	18	24,215	2.0%	8,604	1.9%	9,344	1.9%	1,817	1.1%	2,424	1.1%	9,435	2.0%	1,428	2.0%	11,740	2.0%
2028	19	24,692	2.0%	8,765	1.9%	9,519	1.9%	1,837	1.1%	2,450	1.1%	9,621	2.0%	1,456	2.0%	11,971	2.0%
2029	20	25,177	2.0%	8,930	1.9%	9,698	1.9%	1,856	1.1%	2,476	1.1%	9,810	2.0%	1,485	2.0%	12,206	2.0%

1. Years 2000–2007 from Washington State Office of Financial Management (OFM) (2000 actual from U.S. Census; other years estimated). Note that these data match data in the City of Anacortes 2007 Comprehensive Plan. Years 2008–2029 extrapolated, based on 2005–2007 average annual change. These data are for Anacortes' Urban Growth Area (UGA).

2. Based on data from OFM. Years 2000 and 2007 from OFM. Years 2001–2006 interpolated. Years 2008–2029 extrapolated, based on 2005–2007 average annual change. Note that for SF, the 2007 and 2008 HH numbers are less than actual 2007 and 2008 connections from Anacortes. These data are for Anacortes' UGA.

3. Based on connection data from Anacortes. Years 2007 and 2008 from Anacortes connections. Years 2009–2029 extrapolated, based on 2005–2007 average annual change in OFM-based SF HH numbers.

4. Based on connection data from Anacortes. Years 2007 and 2008 from Anacortes connections. Years 2009–2029 extrapolated, based on 2005–2007 average annual change in OFM-based MF HH numbers.

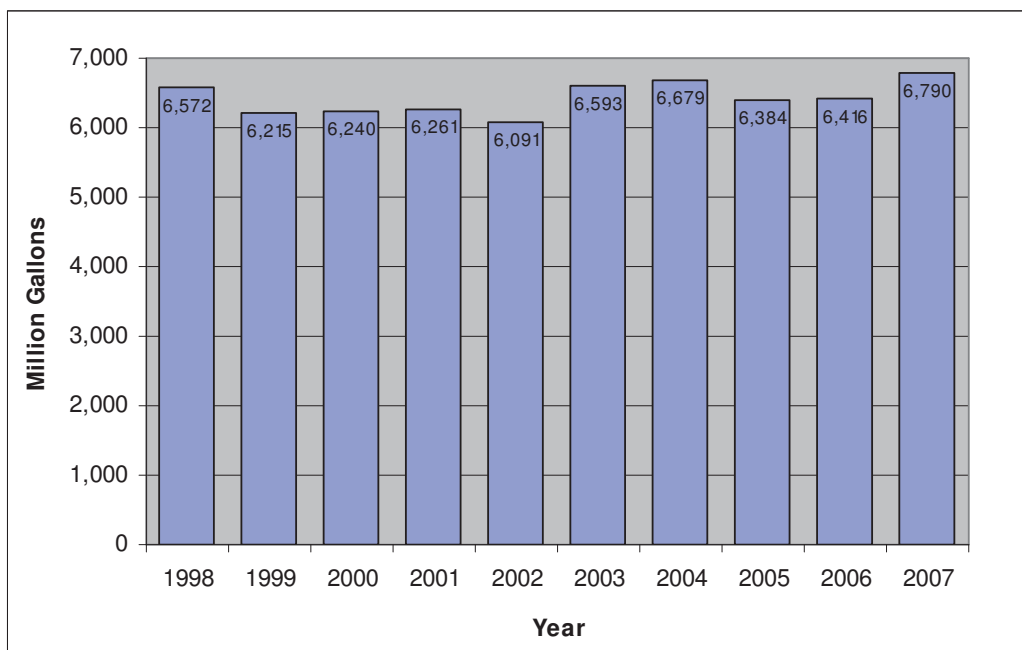
5. Based on connection data from Anacortes. Years 2007 and 2008 from Anacortes connections. Years 2009–2029 extrapolated, based on 2005–2007 average annual change in OFM-based population numbers.

6. Year 2004 from the City of Anacortes 2007 Comprehensive Plan. Years 2005–2029 extrapolated, based on annual change in OFM-based population numbers for the same years. These data are for Anacortes' UGA.

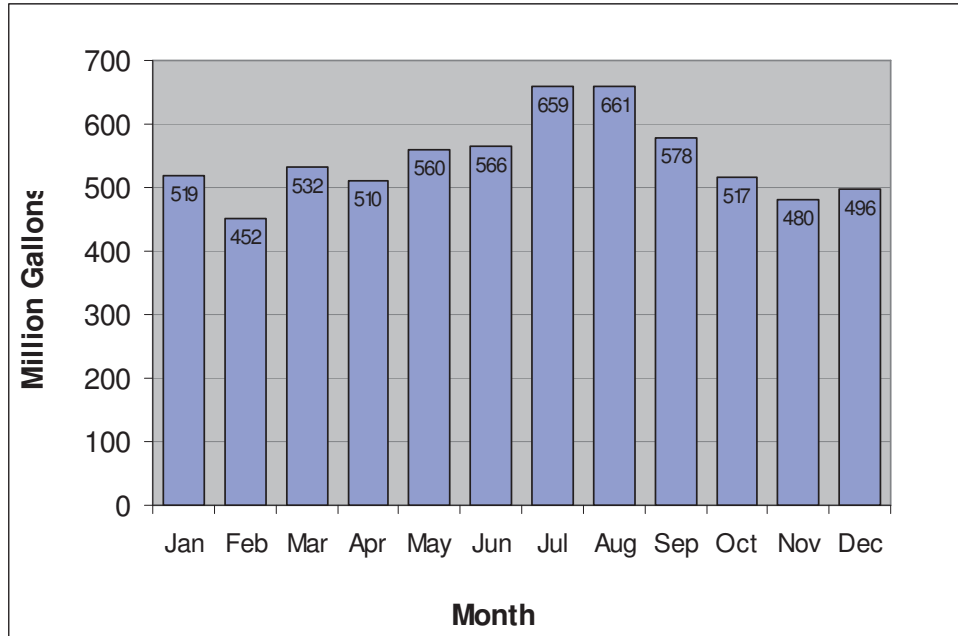
## 4.2. Water Use Characteristics

### 4.2.1. Production and Peaking Factor

Figure 4-1 shows a 10-year history of Anacortes’ water production. Water production has ranged from a low of 6,091 million gallons (MG) in 2002 to a high of 6,790 MG in 2007. The most recent 3-year average production by month is shown in Figure 4-2. The 2005–2007 average production was 6,530 mg. Production typically increases for most utilities in the summer months due to irrigation use. This is true for Anacortes; however, this peaking aspect is moderated since two large industrial customers (Shell and Tesoro), which constitute a large portion of the demand, have fairly consistent use across the year. Anacortes’ peaking factor reflects this situation. Table 4-2 shows the maximum day versus average day peaking factors from 1998 to 2007. The maximum day peaking factor has ranged from 1.3 to 1.5, has averaged 1.4 for the most recent three years, and the most commonly occurring value has been 1.5.



**Figure 4-1 Annual Water Production (1998-2007)**



**Figure 4-2 Monthly Distribution of Water Production (2005-2007 Average)**

**Table 4-2 Peaking Factor**

YEAR	AVERAGE DAY (mgd <sup>1</sup> )	PEAK DAY		PEAKING FACTOR
		(mgd)	DATE	
1998	18.0	27.2	11-Aug	1.5
1999	17.0	22.5	9-Sep	1.3
2000	17.1	24.9	4-Aug	1.5
2001	17.2	22.6	9-Aug	1.3
2002	16.7	25.2	15-Aug	1.5
2003	18.1	26.1	18-Aug	1.4
2004	18.3	27.4	23-Jul	1.5
2005	17.5	23.7	29-Jul	1.4
2006	17.6	24.5	25-Aug	1.4
2007	18.6	27.9	11-Jul	1.5
<b>2005-2007 Avg.</b>	<b>17.9</b>	<b>25.4</b>	<b>n/a</b>	<b>1.4</b>

1. million gallons per day

### 4.2.2. Customer Categories, Connections, and Consumption

Anacortes provides water to a wide variety of customer types. Anacortes has standard retail customers, but also retails water to two large industrial customers and wholesales water to several other water utilities. Anacortes’ customer categories are grouped as follows:

- Residential: Anacortes’ Utility Billing Department defines the residential customer category as single family residences and churches.
- Commercial: Anacortes’ Utility Billing Department defines the commercial customer category as multifamily residences and all non-residential retail consumers with the exception of churches and the refineries.
- Shell: This large retail industrial customer is located on March Point. As discussed in Chapter 2, for the purpose of this water system plan, the refineries are characterized as industrial retail customers due to their recent change in status in terms of no longer being considered a public water system. Anacortes considers Shell a “commercial/contractual” customer.
- Tesoro: Same as above.
- Oak Harbor: The City Oak Harbor, which Anacortes considers “a wholesale/contractual” customer.
- Skagit PUD: The Public Utility District No. 1 of Skagit County, which Anacortes considers a “wholesale/contractual” customer.
- La Conner: The Town of La Conner, which Anacortes considers a “wholesale/contractual” customer.
- Swinomish: The Swinomish Utility Authority, which Anacortes considers a “wholesale/contractual” customer.
- Del Mar: The Del Mar Community Service, Inc., which Anacortes considers a standard “wholesale” customer. This private community was incorporated in 1950 for the purpose of providing water service and recreational facilities to its members. It has legal standing as a State-approved and regulated Group A Water System.

Table 4-3 provides the number of connections for each category at the end of 2007. At that time, Anacortes had 7,546 connections, the majority of which were in the residential category.

**Table 4-3 Connections by Category**

CATEGORY	DEC 2007
Residential	6,505
Commercial	994
Shell	7
Tesoro	2
Oak Harbor	3
Skagit PUD	23
La Conner	3
Swinomish	8
Del Mar	1
<b>Total</b>	<b>7,546</b>

Table 4-4 provides the 2005-2007 average consumption, by customer category and by month. Figure 4-3 shows a portion of this graphically. Anacortes is unique in that it has two large industrial customers that comprise the bulk of the consumption. Shell and Tesoro collectively account for 69% of consumption. The rest of Anacortes' retail consumption (residential and commercial) collectively represents 10% of consumption. The remaining 21% of consumption is attributed to Anacortes' various wholesale customers.

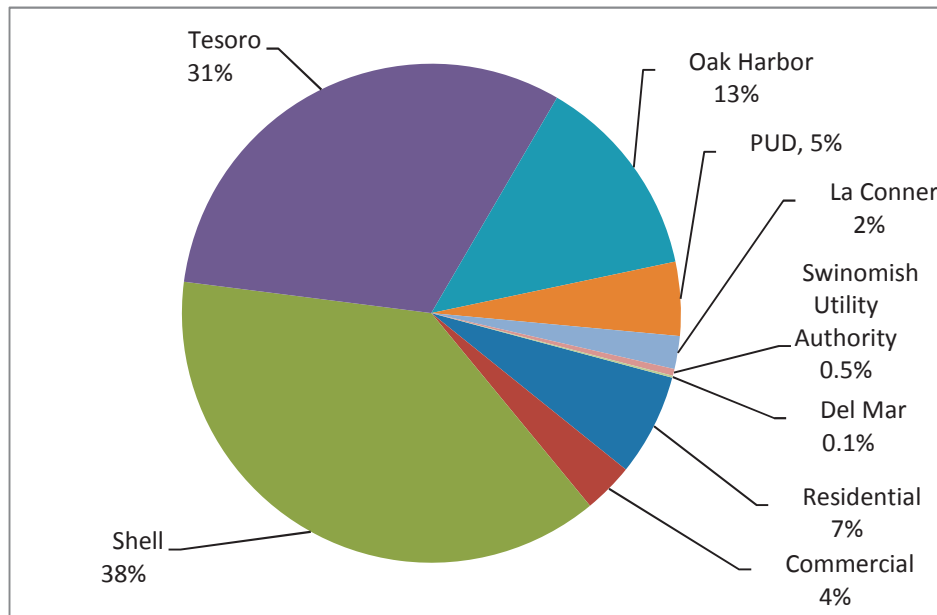
**Table 4-4 Water Consumption (2005-2007 Average, mg)**

CUSTOMER CATEGORY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL	% OF TOTAL
<b>Retail</b>														
Residential <sup>1</sup>	34	33	25	28	28	34	43	54	52	37	27	34	427	7%
Commercial <sup>2</sup>	16	17	17	17	19	18	18	19	19	20	16	15	211	3%
Shell	219	184	201	190	193	216	214	221	206	205	197	207	2,454	38%
Tesoro	180	148	184	170	187	172	170	166	170	174	150	156	2,028	31%
Subtotal	449	382	427	405	427	440	446	460	447	436	391	412	5,120	79%
<b>Wholesale</b>														
Oak Harbor	64	57	64	58	80	81	100	103	78	65	58	49	858	13%
Skagit PUD	16	8	26	18	17	20	32	54	47	34	20	18	309	5%
La Conner	8	7	8	8	12	13	18	20	14	10	9	8	137	2%
Swinomish	2	2	2	1	2	3	4	4	3	2	2	2	29	0.5%
Del Mar <sup>3</sup>	0.01	0	0	0.01	1	1	2	2	1	1	0	0	8	0.1%
Subtotal	90	75	100	86	112	118	155	183	144	112	89	77	1,341	21%
<b>Total<sup>2</sup></b>	<b>539</b>	<b>457</b>	<b>527</b>	<b>491</b>	<b>539</b>	<b>558</b>	<b>601</b>	<b>643</b>	<b>591</b>	<b>548</b>	<b>480</b>	<b>488</b>	<b>6,462</b>	<b>100%</b>

1. In accordance with Anacortes' Utility Billing Department, "Residential" is defined as single family residences and churches.

2. In accordance with Anacortes' Utility Billing Department, "Commercial" is defined as multifamily residences and all non-residential retail consumers with the exception of churches and the refineries.

3. Historically, Anacortes has provided water to Del Mar on a seasonal basis. Water sales to Del Mar generally drop off during the mid-winter and early spring months.



**Figure 4-3 Consumption by Customer Category (2005-2007 Average)**

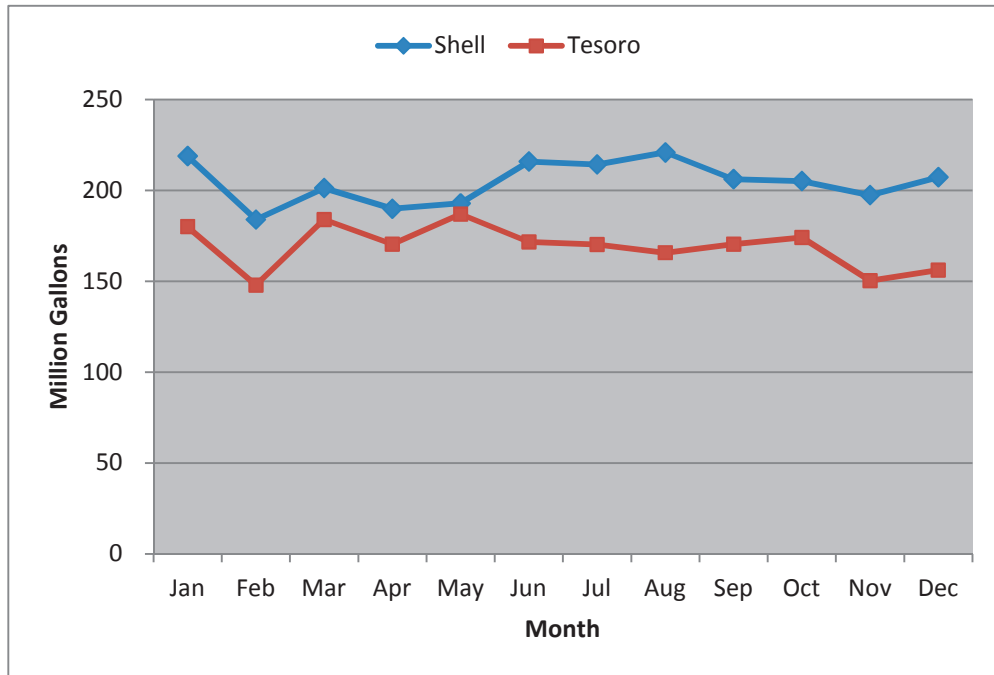
The peaking aspect of the production was discussed in Section 4.2.1. It can be useful to understand how each customer category contributes to peaking. To convey this information, the monthly distribution of consumption for each customer category has been graphed. The information is presented on three separate figures because there is a significant difference in volume between the smallest and largest customer categories. The information for the smaller volume categories would be obscured if all customer categories were presented on one figure.

Figure 4-4 shows the larger volume categories, which include Shell and Tesoro. This shows that while there is variation month to month, there is no traditional summer peak for Shell and Tesoro.

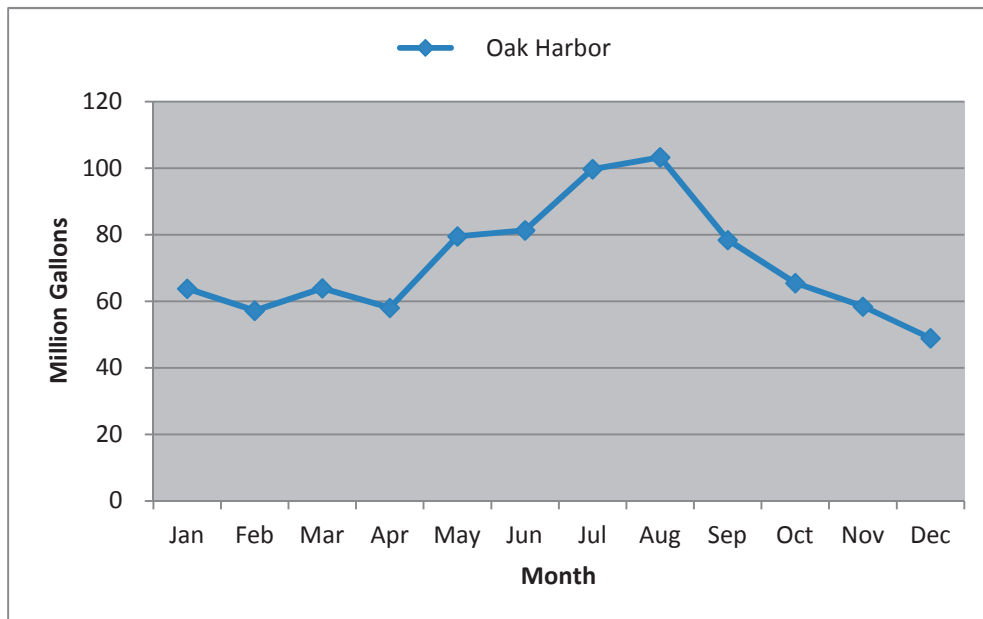
Figure 4-5 shows the medium volume categories, which are represented only by Oak Harbor, and shows a fairly traditional summer peak.

Figure 4-6 shows the smaller volume categories. Most of these smaller customer categories have a summer peak. The commercial category has very little peaking, which is to be expected because multifamily and non-residential customers typically irrigate less than single families.

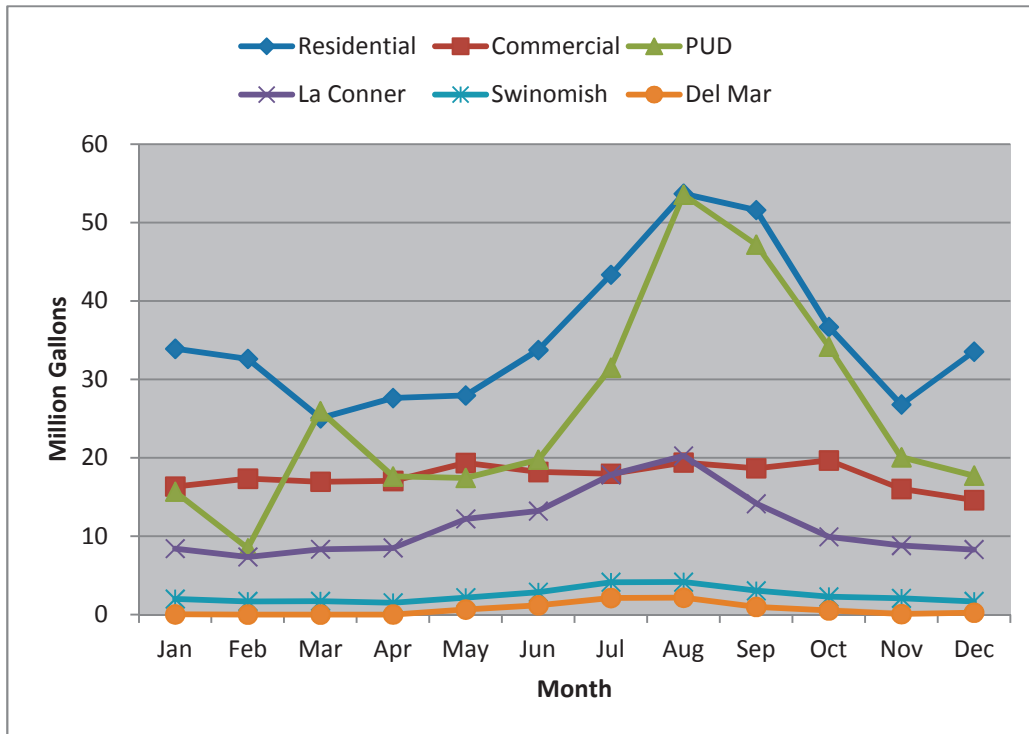




**Figure 4-4 Monthly Distribution of Consumption – Larger Volumes (2005–2007 Average)**



**Figure 4-5 Monthly Distribution of Consumption – Medium Volumes (2005–2007 Average)**



**Figure 4-6 Monthly Distribution of Consumption – Smaller Volumes (2005–2007 Average)**

Customers with large water demands are of interest because their demand could have significant impact on the overall demand for Anacortes. The 10 largest retail customers (excluding Shell and Tesoro) were examined for 2002 to 2007. Table 4-5 summarizes their 2005–2007 average consumption. No special treatment of the large customers was deemed necessary for the demand forecast. These large customers represent a very small portion (2.8%) of Anacortes’ production. Therefore, even large changes in their demand would not have a significant impact on production. These large customers do represent a higher percent of Anacortes’ retail residential and commercial consumption (28%), which traditionally could be a concern because it could impact modeling of the distribution system. However, the largest customer (General Chemical) is located on March Point outside of the distribution system. The second largest customer is Anacortes itself, which presumably will not have significant swings in its demand.

**Table 4-5 Largest Retail Customers (2005-2007 Average)**

#	NAME	ACCOUNT TYPE	MILLION GALLONS	% OF PRODUCTION	% OF RETAIL RESIDENTIAL AND COMMERCIAL CONSUMPTION
1	General Chemical Corp.	Commercial	58.8	0.9%	9%
2	City of Anacortes	Commercial	39.5	0.6%	6%
3	Sugiyu Int. Corp.	Commercial	22.3	0.3%	3%
4	Trident Seafoods Corp.	Commercial	20.6	0.3%	3%
5	Port of Anacortes	Commercial	8.1	0.12%	1.3%
6	Anacortes Housing Authority	Commercial	6.6	0.10%	1.0%
7	Washington State Ferries	Commercial	6.5	0.10%	1.0%
8	Anacortes School District	Commercial	6.0	0.09%	0.9%
9	Seabear	Commercial	4.6	0.07%	0.7%
10	Harvey	Commercial	3.9	0.06%	0.6%
11	Island Hospital	Commercial	3.6	0.06%	0.6%
<b>Total</b>			<b>180.4</b>	<b>2.8%</b>	<b>28%</b>

Notes:

1. This list was compiled from the 10 largest customers for 2005, 2006, and 2007. This summary has more than 10 customers because the same customers did not make the top 10 list each year.

### 4.2.3. Water Balance, Non-Revenue, and Leakage

Anacortes has experienced metering issues which have impacted their water balance, non-revenue water, and leakage numbers. In particular, the negative non-revenue water in 2007 and the negative non-revenue water numbers in earlier years are due to the metering issues. In previous years, the production meters at the Water Filtration Plant were not registering accurate data. Those meters have recently been replaced. In previous years, the software that interprets the meter data at the Shell and Tesoro plants was not working properly. The software problem has been resolved.

A water balance is an accounting for all water that is produced and purchased. Table 4-6 shows Anacortes' 2007 water balance. The table is a slightly modified version of the format recommended for use by the American Water Works Association's Water Loss Committee.

**Table 4-6 Water Balance (2007)**

	LEVEL 1	LEVEL 2	LEVEL 3	MILLION GALLONS	% OF WATER PRODUCED
Water Produced	Revenue Water	Billed Authorized Consumption	1. Billed Water Exported	1,388 <sup>1</sup>	20.4%
			2. Billed Metered Consumption	5,441 <sup>2</sup>	80.1%
			3. Billed Unmetered Consumption	0	0%
	Non-Revenue Water	Unbilled Authorized Consumption	4. Unbilled Metered Consumption	25 <sup>3</sup>	0.4%
			5. Unbilled Unmetered Consumption	0	0%
		Apparent Losses	6. Unauthorized Consumption	0	0%
			7. Customer Metering Inaccuracies	0	0%
		Real Losses	8. Known Leakage	0	0%
			9. Assumed Leakage	-64 <sup>4</sup>	-0.9%
<b>TOTAL</b>			<b>6,790<sup>5</sup></b>	<b>100%</b>	

1. Water sold to wholesale customers including Oak Harbor, Skagit PUD, La Conner, Swinomish, and Del Mar.
2. Water sold to retail customers.
3. This category represents water used for purposes such as flushing, firefighting, etc. For 2007, Anacortes staff documented 25 MG for this category.
4. Water Production minus all other categories. The negative assumed leakage in the 2007 water balance is due to metering issues and is not a true reflection of system leakage. In previous years, the production meters at the Water Filtration Plant were not registering accurate data. Those meters have recently been replaced. In previous years, the software that interprets the meter data at the Shell and Tesoro plants was not working properly. The software problem has been resolved.
5. Total water production.

The water balance allocates the Water Produced to different categories at three different levels.

Level 1 allocates the water to either Revenue Water or Non-Revenue Water. As implied by the names, Revenue Water generates income while Non-Revenue Water does not. This is helpful in understanding what percent of water production generates income for Anacortes. Additionally, non-revenue water needs to be factored into the demand forecast.

Level 2 splits Non-Revenue Water into the following three sub-categories, which are useful in identifying potential additional revenue sources and identifying the magnitude of leaks that could be fixed:

- **Unbilled Authorized Consumption:** Includes uses such as water system flushing, firefighting, and unbilled contractor use. Typically, it is standard practice not to charge for uses falling into this sub-category. However, it is always a prudent idea to review these uses to ensure that a legitimate revenue opportunity is not missed. Anacortes' 2007 unbilled authorized consumption is estimated at less than 1%.
- **Apparent Losses:** Includes unauthorized uses and customer meter inaccuracies, both of which are lost revenue opportunities. Anacortes' 2007 apparent losses are estimated to be zero.

- **Real Losses:** Includes various types of system leaks. A certain level of leakage is unavoidable; however, leakage beyond that level should be repaired to avoid unduly burdening both the natural resource and the physical infrastructure. Any amount that cannot be assigned to another category is considered a real loss under the American Water Works Association's protocol, as well as per the formula for calculating distribution system leakage under Washington State's new Water Use Efficiency Rule. Anacortes' real losses for 2007 are calculated to be -0.9%, however this is a reflection of the meter problems, rather than true leakage.

Level 3 simply further splits water into additional sub-categories.

Table 4-7 shows a longer history of some of the water balance elements, namely distribution system leakage and non-revenue water. The table shows numbers from 2000 to 2007. For 2005–2007, the average non-revenue water as a percent of billed consumption was calculated as 1.1% and the average distribution system leakage as a percent of production was calculated as 0.7%. However, as previously described, those numbers have been impacted by Anacortes' metering issues. Under Washington State's new Water Use Efficiency Rule, distribution system leakage must be 10% or less, based on a 3-year rolling average. The initial period for determining compliance with this distribution system leakage standard is based on 2007 to 2009 leakage numbers. Anacortes reported to DOH on June 30, 2010 that their 2007-2009 3-year average distribution system leakage was 4.0%, which is under the 10% threshold.

**Table 4-7 Distribution System Leakage and Non-Revenue Water <sup>1</sup>**

YEAR	WATER PRODUCED <sup>2</sup>	AUTHORIZED CONSUMPTION		DISTRIBUTION SYSTEM LEAKAGE <sup>5</sup>		NON-REVENUE WATER <sup>6</sup>	
		BILLED <sup>3</sup>	UNBILLED <sup>4</sup>	QTY	% OF PRODUCTION	QTY	% OF BILLED CONSUMPTION
2000	6,240	6,297	23	-80	-1.3%	-57	-0.9%
2001	6,261	6,257	23	-19	-0.3%	4	0.1%
2002	6,091	6,302	22	-233	-3.8%	-211	-3.3%
2003	6,593	6,693	24	-124	-1.9%	-100	-1.5%
2004	6,679	6,713	25	-58	-0.9%	-34	-0.5%
2005	6,384	6,209	23	152	2.4%	175	2.8%
2006	6,416	6,348	24	44	0.7%	68	1.1%
2007	6,790	6,829	25	-64	-0.9%	-39	-0.6%
<b>2005-2007 Average<sup>7</sup></b>	<b>6,530</b>	<b>6,462</b>	<b>24</b>	<b>44</b>	<b>0.7%</b>	<b>68</b>	<b>1.1%</b>

1. Anacortes has experienced metering issues which have impacted their water balance, non-revenue water, and leakage numbers. In particular, the negative non-revenue water and distribution system leakage water numbers are due to the metering issues. In previous years, the production meters at the Water Filtration Plant were not registering accurate data. Those meters have recently been replaced. In previous years, the software that interprets the meter data at the Shell and Tesoro plants was not working properly. The software problem has been resolved
2. These are the production numbers provided by City staff.
3. These are the consumption numbers provided by City staff.
4. This category represents unbilled authorized consumption, such as flushing, firefighting, etc. For 2007, Anacortes' staff documented 25 MG for this category. The volume for other years was estimated using the 2007 ratio of unbilled authorized consumption to water production.
5. Distribution system leakage is defined in the new Water Use Efficiency Rule as water production minus authorized consumption.
6. This calculation is water production minus the billed consumption.
7. Data is presented for 8 years to show a lengthy history; however, the average uses the most recent 3 years to focus on current trends.

#### 4.2.4. Water Use Factors and Equivalent Residential Units

Water use factors were calculated for two customer categories: residential and commercial. Table 4-8 shows the inputs and the results of the calculations. For the residential customer category, the water use factor is 183 gallons per day (gpd) per residential account. For the commercial customer category, the water use factor is 594 gpd per commercial account.

**Table 4-8 Water Use Factors and ERUs (2005-2007 Average)**

CUSTOMER CATEGORY	SALES (gpd) <sup>3</sup>	ACCOUNTS <sup>4</sup>	SALES PER ACCOUNT (gpd)	NUMBER OF ERUs <sup>6</sup>
Residential <sup>1</sup>	1,168,825	6,379	183 <sup>5</sup>	6,379
Commercial <sup>2</sup>	579,406	975	594	3,166

1. In accordance with Anacortes' Utility Billing Department, "Residential" is defined as single family residences and churches.
2. In accordance with Anacortes' Utility Billing Department, "Commercial" is defined as multifamily residences and all non-residential retail consumers with exception of churches and the refineries.
3. Data Source: "MONCON" spreadsheets provided by Anacortes' staff.
4. 2007 numbers provided by City staff. Back-calculated 2005 and 2006 from the 2007 number and the population growth rates between 2006 and 2007 (1.4%) and between 2005 and 2006 (3.0%).
5. This number, 183 gallons per day, is Anacortes' ERU. ERUs, or equivalent residential units, are a method of representing water use by non-residential customers as an equivalent number of residential customers. Anacortes' ERU is the average amount of water used by a single family household. The ERU is calculated by dividing single family water sales (or in this case "residential" sales) by the number of single family households.
6. The number of ERUs in any customer category is calculated by dividing that customer category's water sales by the ERU value.

Table 4-8 also shows the number of Equivalent Residential Units, or ERUs, in each customer category. ERUs are a method of representing water use by non-residential customers as an equivalent number of residential customers. An ERU is the amount of water used by a single family household. As such, Anacortes' ERU number is 183 gpd, which is the same as the residential water use factor. The number of ERUs for each customer category is obtained by dividing the consumption for a customer category by 183. Therefore, the residential customer category equates to 6,379 ERUs and the commercial category equates to 3,166 ERUs.

## 4.3. Demand Forecast

### 4.3.1. Demand Forecast Methodology

The methodology used to develop the demand forecast is shown graphically in Figure 4-7. The basic process is to combine demographic data with water use factors to develop the traditional retail demands (i.e., residential and commercial). The rest of the retail demands (i.e., Shell and Tesoro) are then developed. Demands are also developed for all wholesale customers and for non-revenue water. All these demands are summed to create the total average day demand. To generate the total maximum day demand, a peaking factor is applied to the average day demand.

More details on each step are provided below.

#### Step 1 Demographics

Demographics were developed per the methodology described in Section 4.1.

#### Step 2 Water Use Factors

Water use factors were developed per the methodology described in Section 4.2.4.

#### Step 3 Traditional Retail Demand

The demographic projections (from Step 1) were multiplied by the water use factors (from Step 2) to generate the demand for the residential and commercial customer categories.

#### Step 4 Other Retail Demand

The Shell and Tesoro oil refineries comprise the remaining retail demand. Below are details for each refinery:

- **Shell:** Data for 2008 reflect actual consumption. For 2009 to 2029, 6.8 mgd was used per guidance from Shell staff.
- **Tesoro:** Data for 2008 reflect actual consumption. For 2009 to 2029, the quantity stipulated in the 2005-2007 water supply contract is used, which is 2,235 MG or 6.1 mgd.

#### Step 5 Wholesale Demand

Demands for each of Anacortes' wholesale customers were developed as follows:

- **Oak Harbor:** The demands for Oak Harbor were based on information in the City of Oak Harbor's 2003 Water System Plan. That plan included a demand forecast for the year 2023 (3.7 mgd). Anacortes has records showing its sales to Oak Harbor in 2007 (2.4 mgd). For Anacortes' water system plan, the years between the 2007 sales and the 2023 demand forecast were interpolated. Years 2024–2029 were extrapolated based on the growth rate between 2022 and 2023, which is approximately 2%.



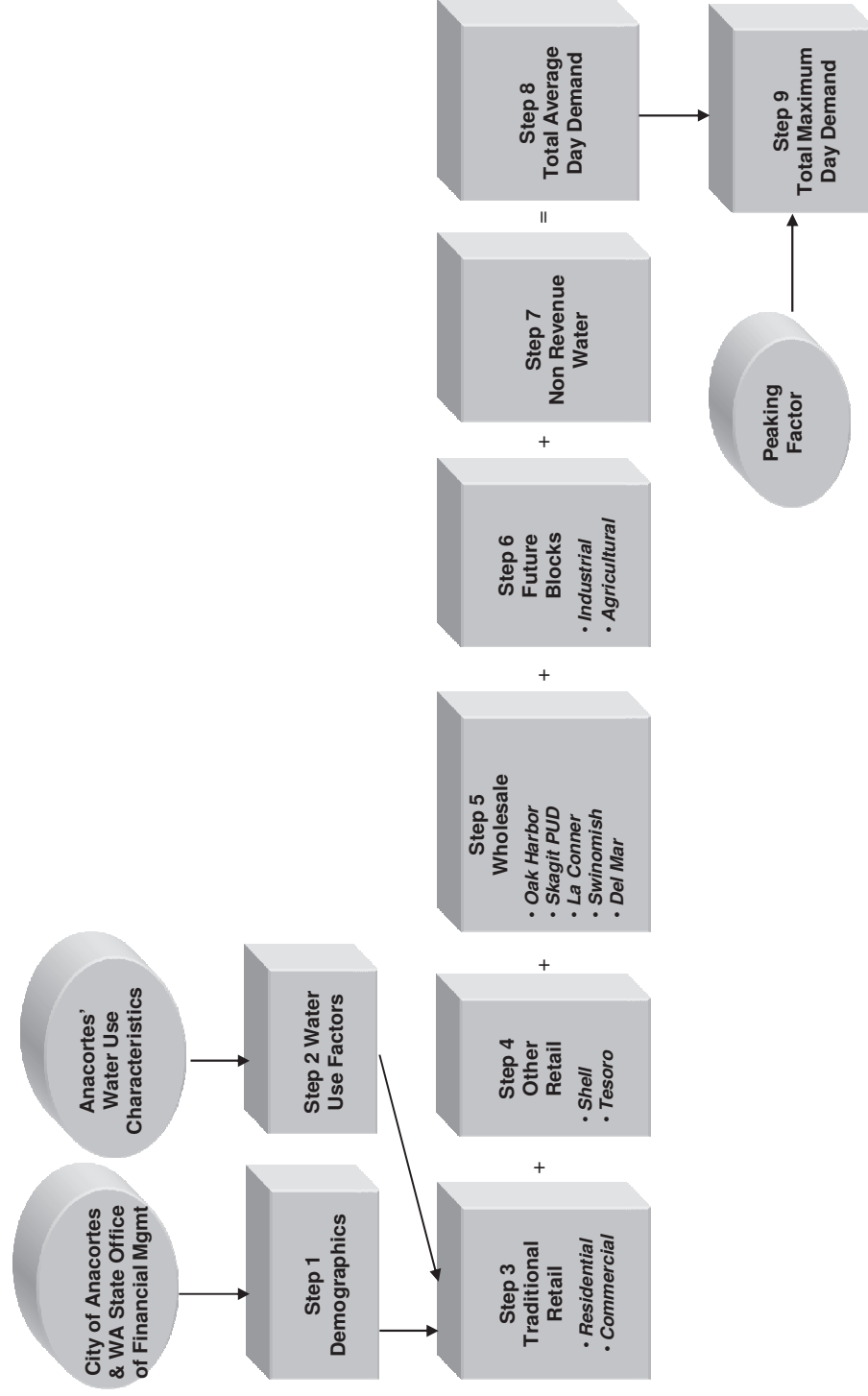


Figure 4-7 Demand Forecast Methodology

- **Skagit PUD:** For 2008-2010, the quantity stipulated in the current wholesale contract is used, which is 485 MG or 1.3 mgd. For 2011, 260 MG or 0.7 mgd was used since Skagit PUD expects to decrease their purchases to this amount from Anacortes due to changes in their system. For 2012-2029, the new 260 MG or 0.7 mgd contract amount is increased by the system-wide demand annual growth rates from Skagit PUD's 2007 Water System Plan, which range from 2.2% to 3.1% between 2012 and 2029.
- **La Conner:** For 2008–2010, the quantity stipulated in the current wholesale contract was used, which is 162 MG or 0.4 mgd. For 2011-2029, the methodology was to use either the current contract amount or the highest 2000-2007 demand, which ever is larger. For La Conner, this meant 0.5 mgd was used, which was the demand in 2003. Note that the demand forecast in La Conner's 2001 Water System Plan was not used since that demand forecast was higher than actual sales to La Conner in the earlier years.
- **Swinomish:** For 2008–2010, the quantity stipulated in the current wholesale contract was used, which is 42 MG or 0.12 mgd. For 2029 used 150% of the 2010 number, based on guidance from Swinomish utility staff. For 2011 to 2028, used a straightline interpolation between 2010 and 2029.
- **Del Mar:** Del Mar has historically used water from their own wells and Anacortes water. However, they are shifting to using 100% Anacortes water. Per guidance from Anacortes staff, 0.07 mgd was used for 2009 and 0.15 mgd for 2029. The intervening years were interpolated. 2008 was interpolated between the 2007 actual demand and the 2009 forecast.

## Step 6 Future Demand Blocks

Anacortes is preparing for the following two large potential draws on the system:

- **Industrial Block:** This is a placeholder for a potential future large industrial user. This demand was developed using 50% of the Shell demand.
- **Agricultural Block:** This is a placeholder for potential future agricultural water that might be provided by Anacortes. Since Skagit PUD provides agricultural water within the county, the volume of agricultural water provided by Skagit PUD was deemed an appropriate benchmark for additional agricultural water that might be provided by Anacortes. Therefore, this future agricultural block was developed using 100% of the 2007–2008 average agricultural water provided by Skagit PUD.

## Step 7 Non-Revenue Demand

Two components of non-revenue water were estimated.

The first component represents non-revenue water in Anacortes' retail service area (flushing, fire fighting, distribution system leaks, etc). That component is calculated as the sum of the residential and commercial demands multiplied by 10%, which is typical for non-revenue water as a percent of billed consumption for water utilities.

The second component represents transmission system leaks and is calculated as the sum of all other demands (refineries, wholesale customers, and future blocks) multiplied by 2%. This acknowledges some possible transmission system leakage, but does not plan for an unrealistically high amount of non-revenue water.

Note that Anacortes' historical non-revenue numbers were not used for the projections since the historical numbers are not reliable due meter problems. The problematic meters have recently been repaired.

### **Step 8 Total Average Day Demand (ADD)**

The average day demand was calculated by adding the demands from all preceding steps.

### **Step 9 Total Maximum Day Demand (MDD)**

To generate the total maximum day demand, a peaking factor was applied to the average day demand. A peaking factor of 1.5 was used, which is the most commonly occurring peaking factor experienced between 1998 and 2007.

### **Step 10 Conservation Adjustment**

The methodology outlined in Steps 1 through 9 creates a baseline demand forecast. This baseline forecast was then adjusted for conservation. (Note that the conservation adjustment step is not shown on Figure 4-7.)

The conservation adjustment was accomplished by reducing the water use factors in 2008–2014 to reflect the estimated savings from the conservation program described in Chapter 5. The residential water use factor shifts from 183 gpd per residential connection in 2007 to 181.1 gpd by 2014. The commercial water use factor shifts from 594 gpd per commercial connection in 2007 to 587.9 gpd by 2014.

Anacortes plans to continue conservation efforts beyond 2014. However, since the conservation goals beyond 2014 are not defined at this time, the water use factors were simply held constant for all years beyond 2014.

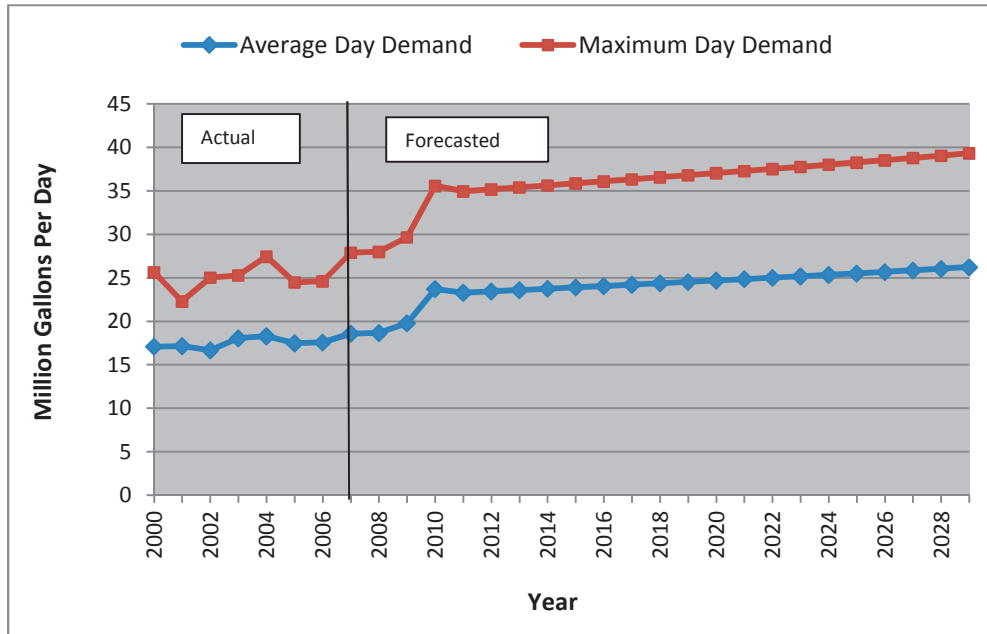
## **4.3.2. Demand Forecast Results**

The projected demands are provided in Table 4-9 and Table 4-10. Table 4-9 shows the demand without additional conservation while Table 4-10 incorporates conservation. Washington State's new Water Use Efficiency Rule requires that both these demand forecasts are included in the water system plan. These two demand forecasts are nearly identical since the conservation savings impacts only Anacortes' residential and commercial demands and those demands represent a small portion of the overall demands.

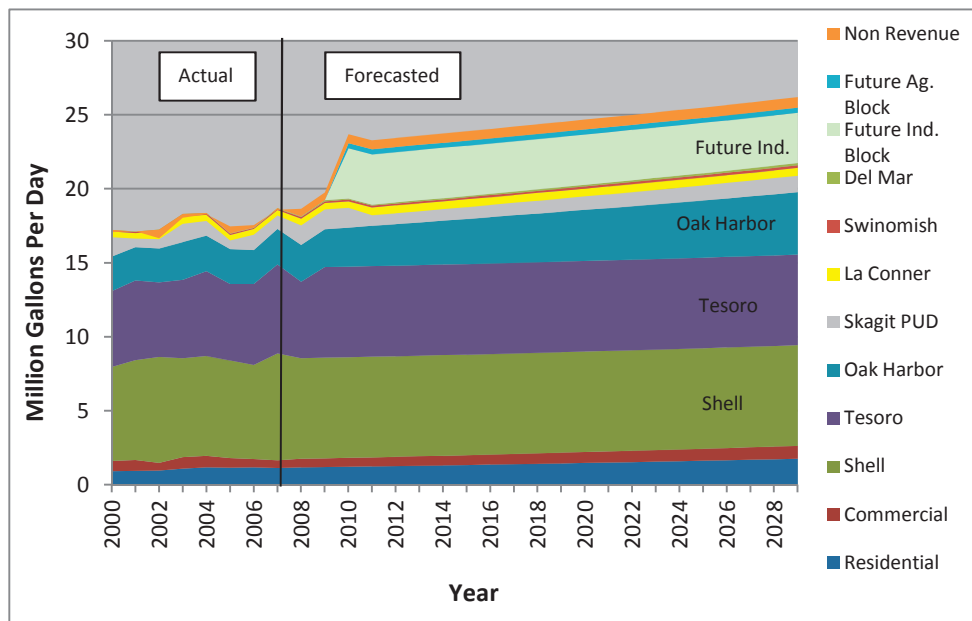
Results from the tables for key milestone years are as follows:

- **2010 (WSP Year 1) Average Day Demand:** 23.73 mgd without conservation; 23.72 mgd with conservation.
- **2029 (WSP Year 20) Average Day Demand:** 26.26 mgd without conservation; 26.23 mgd with conservation.
- **2010 (WSP Year 1) Maximum Day Demand:** 35.59 mgd without conservation; 35.58 mgd with conservation.
- **2029 (WSP Year 20) Maximum Day Demand:** 39.38 mgd without conservation; 39.34 mgd with conservation.

Figure 4-8 shows a graph of the average day and maximum day demands. Figure 4-9 shows the various components of the average day demand in order to provide information about the relative impact of each component. Both of these figures use the demand with additional conservation, since that is the demand Anacortes expects to experience.



**Figure 4-8 Demand Forecast Summary (With Conservation)**



**Figure 4-9 Demand Forecast ADD Details (With Conservation)**



5. Data for 2000 to 2008 are actual consumption. For 2009 to 2029, 6.8 mgd was used per guidance from Shell staff.
6. Data for 2000 to 2008 are actual consumption. For 2009 to 2029, the quantity stipulated in the 2005-2007 wholesale contract is used, which is 2,235 MG or 6.12 mgd.
7. For 2000-2007, this is actual consumption from Anacortes' Utility Billing Department. The remaining years are based on the City of Oak Harbor's 2003 Water System Plan, which includes a demand forecast for the year 2023. The years between 2007 and 2023 were interpolated. Years 2024-2029 were extrapolated based on the growth rate between 2022 and 2023, which was approximately 2%.
8. For 2000-2007, this is actual consumption from Anacortes' Utility Billing Department. For 2008-2010, the quantity stipulated in the current wholesale contract is used which is 485 MG or 1.3 mgd. For 2011, used 260 MG or 0.7 mgd since Skagit PUD expects to decrease their purchases to this amount from Anacortes due to changes in their system. For 2012-2029, the new 260 MG or 0.7 mgd contract amount is increased by the system-wide demand annual growth rates from Skagit PUD's 2007 Water System Plan, which ranges from 2.2% to 3.1% between 2012 and 2029.
9. For 2000-2007, this is actual consumption from Anacortes' Utility Billing Department. For 2008-2010, the quantity stipulated in the current wholesale contract is used, which is 162 MG or 0.4 mgd. For 2011-2029, either the current contract amount or the highest 2000-2007 demand is used, which ever is larger.
10. For 2000-2007, this is actual consumption from Anacortes' Utility Billing Department. For 2008-2010, the quantity stipulated in the current wholesale contract is used, which is 42 MG or 0.12 mgd. For 2029 used 150% of the 2010 number, based on guidance from Swinomish utility staff. For 2011 to 2028, used a straightline interpolation between 2010 and 2029.
11. Del Mar has historically used water from their own wells and Anacortes water. They are shifting to using 100% Anacortes water. For 2000-2007, this is actual consumption from Anacortes' Utility Billing Department. Used 0.07 mgd for 2009 and 0.15 mgd for 2029, per guidance from City staff. Interpolated years in between. For 2008 interpolated between 2007 actuals and 2009 forecast.
12. This is a placeholder for a potential future large industrial user. This demand was developed using 50% of the Shell demand.
13. This is a placeholder for potential future agricultural water that might be provided by Anacortes. Since Skagit PUD provides agricultural water provided by Skagit PUD. Therefore, this future agricultural block was developed using 100% of the 2007-2008 average agricultural water provided by Skagit PUD.
14. For 2000-2007, the actual non-revenue amount for each year is used. The wide range in non-revenue water between 2000 and 2007, including some negative numbers, is due to a meter problem. The problematic meters have recently been replaced. Anacortes' historical non-revenue numbers were not used for the projections. For 2008 forward, two components of non-revenue water is estimated. The first component represents non-revenue water in Anacortes' retail service area (flushing, fire fighting, distribution system leaks, etc). That component is calculated as the sum of the residential and commercial demands multiplied by 10%, which is typical for non-revenue water as a percent of billed consumption for water utilities. The second component represents transmission system leaks and is calculated as the sum of all other demands (refineries, wholesale customers, and future blocks) multiplied by 2%, which acknowledges some possible transmission system leakage, but does not plan for an unrealistically high amount of non-revenue water.
15. The sum of the retail, wholesale, future blocks, and non-revenue water.
16. For 2000-2007, the actual peaking factor for each year is used. For 2008 forward, a peaking factor of 1.5 (the most commonly occurring peaking factor between 1998 and 2007) is applied to the average day demand

**Table 4-10 Demand Forecast (With Additional Conservation)**

CALENDAR YEAR	RELEVANCE OF YEAR	DEMOGRAPHICS 1		WATER USE FACTORS (GPD) 2			DEMAND											MAXIMUM DAY DEMAND (MGD) 16		
		RESIDENTIAL ACCOUNTS	COMMERCIAL ACCOUNTS	PER RESIDENTIAL ACCOUNT	PER COMMERCIAL ACCOUNT	RETAIL						WHOLESALE			DEL MAR 11	FUTURE INDUSTRIAL BLOCK 12	FUTURE AGRICULTURAL BLOCK 13		NON REVENUE 14	TOTAL 15
						RESIDENTIAL 3	COMMERCIAL 4	SHELL 5	TESORO 6	OAK HARBOR 7	SKAGIT PUD 8	LA CONNER 9	SWINOMISH 10							
2000	Actual	n/a	n/a	n/a	n/a	0.94	0.69	6.36	5.11	2.35	1.28	0.40	0.09	0.02	n/a	n/a	n/a	-0.16	17.10	25.64
2001	Actual	n/a	n/a	n/a	n/a	0.95	0.75	6.75	5.37	2.26	0.59	0.38	0.09	0.02	n/a	n/a	n/a	0.01	17.15	22.30
2002	Actual	n/a	n/a	n/a	n/a	0.98	0.51	7.17	5.04	2.29	0.62	0.53	0.10	0.02	n/a	n/a	n/a	-0.58	16.69	25.03
2003	Actual	n/a	n/a	n/a	n/a	1.10	0.79	6.69	5.28	2.56	1.24	0.53	0.12	0.03	n/a	n/a	n/a	-0.27	18.06	25.29
2004	Actual	n/a	n/a	n/a	n/a	1.20	0.78	6.74	5.74	2.40	1.00	0.41	0.10	0.02	n/a	n/a	n/a	-0.09	18.30	27.45
2005	Actual	n/a	n/a	n/a	n/a	1.17	0.65	6.60	5.16	2.36	0.59	0.38	0.09	0.02	n/a	n/a	n/a	0.48	17.49	24.49
2006	Actual	n/a	n/a	n/a	n/a	1.18	0.56	6.36	5.48	2.29	1.04	0.38	0.06	0.02	n/a	n/a	n/a	0.19	17.58	24.61
2007	Actual	6,505	994	n/a	n/a	1.15	0.52	7.21	6.02	2.40	0.92	0.37	0.09	0.02	n/a	n/a	n/a	-0.11	18.60	27.90
2008	Non WSP Yr	6,516	986	182.7	593.0	1.19	0.58	6.79	5.18	2.48	1.33	0.44	0.12	0.05	n/a	n/a	n/a	0.51	18.67	28.01
2009	Non WSP Yr	6,644	1,005	182.4	592.1	1.21	0.60	6.80	6.12	2.56	1.33	0.44	0.12	0.07	n/a	n/a	n/a	0.53	19.78	29.67
2010	WSP - Yr 1	6,775	1,025	182.1	591.2	1.23	0.61	6.80	6.12	2.64	1.33	0.44	0.12	0.07	3.40	3.40	0.34	0.61	23.72	35.98
2011	WSP - Yr 2	6,908	1,045	181.9	590.3	1.26	0.62	6.80	6.12	2.73	0.71	0.53	0.12	0.08	3.40	3.40	0.34	0.60	23.31	34.96
2012	WSP - Yr 3	7,044	1,066	181.6	589.5	1.28	0.63	6.80	6.12	2.81	0.73	0.53	0.12	0.08	3.40	3.40	0.34	0.61	23.46	35.18
2013	WSP - Yr 4	7,183	1,087	181.4	588.7	1.30	0.64	6.80	6.12	2.89	0.76	0.53	0.12	0.09	3.40	3.40	0.34	0.62	23.61	35.41
2014	WSP - Yr 5	7,324	1,108	181.1	587.9	1.33	0.65	6.80	6.12	2.97	0.78	0.53	0.13	0.09	3.40	3.40	0.34	0.62	23.76	35.64
2015	WSP - Yr 6	7,468	1,130	181.1	587.9	1.35	0.66	6.80	6.12	3.05	0.80	0.53	0.13	0.09	3.40	3.40	0.34	0.63	23.91	35.87
2016	WSP - Yr 7	7,615	1,152	181.1	587.9	1.38	0.68	6.80	6.12	3.13	0.82	0.53	0.13	0.10	3.40	3.40	0.34	0.63	24.07	36.10
2017	WSP - Yr 8	7,765	1,175	181.1	587.9	1.41	0.69	6.80	6.12	3.21	0.84	0.53	0.14	0.10	3.40	3.40	0.34	0.64	24.23	36.34
2018	WSP - Yr 9	7,918	1,198	181.1	587.9	1.43	0.70	6.80	6.12	3.29	0.86	0.53	0.14	0.11	3.40	3.40	0.34	0.65	24.38	36.57
2019	WSP - Yr 10	8,074	1,222	181.1	587.9	1.46	0.72	6.80	6.12	3.38	0.89	0.53	0.14	0.11	3.40	3.40	0.34	0.65	24.54	36.81
2020	WSP - Yr 11	8,232	1,246	181.1	587.9	1.49	0.73	6.80	6.12	3.46	0.91	0.53	0.15	0.11	3.40	3.40	0.34	0.66	24.70	37.05
2021	WSP - Yr 12	8,394	1,270	181.1	587.9	1.52	0.75	6.80	6.12	3.54	0.93	0.53	0.15	0.12	3.40	3.40	0.34	0.67	24.86	37.29
2022	WSP - Yr 13	8,560	1,295	181.1	587.9	1.55	0.76	6.80	6.12	3.62	0.95	0.53	0.15	0.12	3.40	3.40	0.34	0.67	25.02	37.53
2023	WSP - Yr 14	8,728	1,321	181.1	587.9	1.58	0.78	6.80	6.12	3.70	0.97	0.53	0.15	0.13	3.40	3.40	0.34	0.68	25.18	37.78
2024	WSP - Yr 15	8,900	1,347	181.1	587.9	1.61	0.79	6.80	6.12	3.78	1.00	0.53	0.16	0.13	3.40	3.40	0.34	0.69	25.35	38.02
2025	WSP - Yr 16	9,075	1,373	181.1	587.9	1.64	0.81	6.80	6.12	3.87	1.02	0.53	0.16	0.13	3.40	3.40	0.34	0.69	25.52	38.28
2026	WSP - Yr 17	9,253	1,400	181.1	587.9	1.68	0.82	6.80	6.12	3.95	1.04	0.53	0.16	0.14	3.40	3.40	0.34	0.70	25.69	38.53
2027	WSP - Yr 18	9,435	1,428	181.1	587.9	1.71	0.84	6.80	6.12	4.04	1.06	0.53	0.17	0.14	3.40	3.40	0.34	0.71	25.86	38.80
2028	WSP - Yr 19	9,621	1,456	181.1	587.9	1.74	0.86	6.80	6.12	4.13	1.09	0.53	0.17	0.15	3.40	3.40	0.34	0.71	26.04	39.06
2029	WSP - Yr 20	9,810	1,485	181.1	587.9	1.78	0.87	6.80	6.12	4.23	1.11	0.53	0.17	0.15	3.40	3.40	0.34	0.72	26.23	39.34

1. From the demographics tables. Per Anacortes' Utility Billing Department: 1) "residential" is defined as single family residences and churches and 2) "commercial" is defined as multi-family residences and all non-residential retail consumers with the exception of churches and the refineries.  
 2. For 2008-2014, the water use factors from the water use factor table are reduced to match the estimated savings from Anacortes' 2008-2014 conservation program. For 2015-2029, the water use factors were held constant since conservation savings beyond 2014 have not been identified.  
 3. For 2000-2007, this is actual consumption from Anacortes' Utility Billing Department. For 2008 forward, this is the number of residential accounts multiplied by the water use per residential account.  
 4. For 2000-2007, this is actual consumption from Anacortes' Utility Billing Department. For 2008 forward, this is the number of commercial accounts multiplied by the water use per commercial account.  
 5. Data for 2000 to 2008 are actual consumption. For 2009 to 2029, 6.8 mgd was used per guidance from Shell staff.  
 6. Data for 2000 to 2008 are actual consumption. For 2009 to 2029, the quantity stipulated in the 2005-2007 wholesale contract is used, which is 2,235 MG or 6.12 mgd.

7. For 2000-2007, this is actual consumption from Anacortes' Utility Billing Department. The remaining years are based on the City of Oak Harbor's 2003 Water System Plan, which includes a demand forecast for the year 2023. The years between 2007 and 2023 were interpolated. Years 2024-2029 were extrapolated based on the growth rate between 2022 and 2023, which was approximately 2%.
8. For 2000-2007, this is actual consumption from Anacortes' Utility Billing Department. For 2008-2010, the quantity stipulated in the current wholesale contract is used which is 485 MG or 1.3 mgd. For 2011, used 260 MG or 0.7 mgd since Skagit PUD expects to decrease their purchases to this amount from Anacortes due to changes in their system. For 2012-2029, the new 260 MG or 0.7 mgd contract amount is increased by the system-wide demand annual growth rates from Skagit PUD's 2007 Water System Plan, which ranges from 2.2% to 3.1% between 2012 and 2029.
9. For 2000-2007, this is actual consumption from Anacortes' Utility Billing Department. For 2008-2010, the quantity stipulated in the current wholesale contract is used, which is 162 MG or 0.4 mgd. For 2011-2029, either the current contract amount or the highest 2000-2007 demand is used, which ever is larger.
10. For 2000-2007, this is actual consumption from Anacortes' Utility Billing Department. For 2008-2010, the quantity stipulated in the current wholesale contract is used, which is 42 MG or 0.12 mgd. For 2029 used 150% of the 2010 number, based on guidance from Swinomish utility staff. For 2011 to 2028, used a straightline interpolation between 2010 and 2029.
11. Del Mar has historically used water from their own wells and Anacortes water. They are shifting to using 100% Anacortes water. For 2000-2007, this is actual consumption from Anacortes' Utility Billing Department. Used 0.07 mgd for 2009 and 0.15 mgd for 2029, per guidance from City staff. Interpolated years in between. For 2008 interpolated between 2007 actuals and 2009 forecast.
12. This is a placeholder for a potential future large industrial user. This demand was developed using 50% of the Shell demand.
13. This is a placeholder for potential future agricultural water that might be provided by Anacortes. Since Skagit PUD provides agricultural water within the county, the volume of agricultural water provided by Skagit PUD was deemed an appropriate benchmark for additional agricultural water that might be provided by Anacortes. Therefore, this future agricultural block was developed using 100% of the 2007-2008 average agricultural water provided by Skagit PUD.
14. For 2000-2007, the actual non-revenue amount for each year is used. The wide range in non-revenue water between 2000 and 2007, including some negative numbers, is due to a meter problem. The problematic meters have recently been replaced. Anacortes' historical non-revenue numbers were not used for the projections. For 2008 forward, two components of non-revenue water is estimated. The first component represents non-revenue water in Anacortes' retail service area (flushing, fire fighting, distribution system leaks, etc). That component is calculated as the sum of the residential and commercial demands multiplied by 10%, which is typical for non-revenue water as a percent of billed consumption for water utilities. The second component represents transmission system leaks and is calculated as the sum of all other demands (refineries, wholesale customers, and future blocks) multiplied by 2%, which acknowledges some possible transmission system leakage, but does not plan for an unrealistically high amount of non-revenue water.
15. The sum of the retail, wholesale, future blocks, and non-revenue water.
16. For 2000-2007, the actual peaking factor for each year is used. For 2008 forward, a peaking factor of 1.5 (the most commonly occurring peaking factor between 1998 and 2007) is applied to the average day demand.