

## SECTION II

## SECTION II – BASIC PLANNING DATA

The objective of this Section is to define current and future water demands to plan for water needs within the service area. DOH specifically requires the analysis of demand estimates for six and twenty year planning periods. Water use data collection and water demand forecasts, as presented in this Section, are two of the three required elements of a conservation plan required by DOH and the Department of Ecology (DOE). The third element, a conservation program, is discussed in Section IV.

### CURRENT POPULATION

The City's most current comprehensive plan that outlines population and growth rate estimates was completed in 2005. The City is in a unique situation where the majority of the city limits is located within Cowlitz County and a portion of the city limits is located within Clark County. Clark County is required to plan in accordance with the Growth Management Act (GMA) and Cowlitz County is not. The City adopted an Urban Growth Management Program in 2002 which projects population growth through the year 2020 and identifies an Urban Growth Boundary. Through the Urban Growth Management Program the City adopted a 3.5% per year growth rate. This growth rate will be used to project future population in the area. Current census data from the Washington State Office of Financial Management (OFM) indicates that the 2010 population was 5,509 persons in the City Limits. For comparison the 2005 Comprehensive Plan projected a year 2010 population of 5,424.

A breakdown of the current number of service connections by customer class is shown in Table II-1. For practical data collection and planning purposes, references to "current" in this Water System Plan (WSP) indicate conditions for the year thru October of 2012.

Table II-1 Current Water System Customers by Class

Single Family Residential	Commercial	Multi Residential	Total
1,379	761	520	2,660

Of the 2,660 customers served by the City's water system 14 are located outside the City Limits. Customers located outside the City Limits are charged 150% of the inside rates.

## CURRENT WATER PRODUCTION

Effluent readings from the clearwell to the reservoir are taken daily at the water plant. Water production records for the most recent four-year period of January 2009 through October 2012 are utilized in this report. Table II-2 presents a summary of production data for each 12-month period for 2009-2011 and January thru October for 2012. Production data analysis spreadsheets are provided in Appendix B.

**Table II-2 Annual Net Water Production**

Period	Total Net Production (gallons)	Average Production (gpd)	Maximum Production (gpd)	Max. to Avg. Day Production
1/1/09 - 12/31/09	282,084,000	773,000	1,536,000	1.99
1/1/10 - 12/31/10	257,807,000	706,000	1,531,000	2.17
1/1/11 - 12/31/11	264,180,000	724,000	1,372,000	1.90
1/1/12 - 10/31/12	202,650,000	664,000	1,385,000	2.08

In the summer of 2011 a major leak was found and corrected that has resulted in a significant decrease in production. Because of that the 2012 average day production of 664,000 gpd will be utilized as the current average production day for this report. A ratio of 2.1 will be utilized for maximum day production to average day production for demand estimates in this WSP based on the average of the three most recent 12-month periods. This ratio is slightly more conservative than the DOH guideline for the suggested ratio of Maximum Day Demand (MDD) to Average Day Demand (ADD).

## CURRENT WATER DEMAND

The City collects water use data for almost all of its customers on a bi-monthly basis. Other meters are read on a monthly basis for special circumstances or by customer request. Data for 2010, 2011, and 2012 is provided in this analysis. A summary of total water use data by customer class is shown in Table II-3. Detailed analysis of water use by customer class is discussed later in this section. Supporting data and spreadsheets for water use data analysis is included in Appendix B.

**Table II-3 Average Annual Daily Water Use (gpd) by Customer Class**

Year	Residential	Commercial	Multi-Residential	Total
2010	235,259	294,049	72,749	602,057
2011	224,955	312,673	78,402	616,030
2012*	219,963	323,118	75,213	618,294

\*2012 average adjusted for partial year data

## **UNACCOUNTED FOR WATER**

Most public water systems experience some level of water loss, which is defined by DOH as unaccounted for water. Water loss can occur through leaks, under reporting by older service meters, un-metered services, system flushing or tank overflows. Exact water loss is difficult to determine since consumption data is only collected every 2-months, but typically, a range of UFW can be established with careful evaluation of production and consumption data.

Analysis of production and consumption data indicates that UFW ranges from 1% to 32%. The average bi-monthly water loss for the two year period is 11%. The city was reporting an increasing percentage of water loss the beginning of 2011 and a ruptured 8" main was found and repaired during the summer of 2011. This repair resulted in a large decrease in UFW. Therefore, the City will utilize an average UFW of 7.4% for demand projections based on data from the second half of 2011 and first half of 2012. The City has implemented water use data collection improvements that improve tracking and analysis of bi-monthly production and consumption data to better estimate UFW.

## **WATER DEMAND BY CUSTOMER CLASS**

DOH requires that all water systems determine water demand and system capacity in terms of Equivalent Residential Units (ERUs). An ERU is a unit of measure used to equate non-residential or multi-family residential water usage to a specific number of single-family residences. For example, if a system has sufficient physical capacity to serve 1,000 ERUs, then that system would have sufficient capability to meet the projected needs of 1,000 full-time single-family residences. That same system would also be able to serve any combination of commercial, industrial, and residential customers provided the quantity of water used does not exceed the projected needs of 1,000 full-time single-family homes (1000 ERUs).

It is important to realize that the quantity of water associated with an ERU is system-specific. The ERU level for one system may not apply to another system with differing demographics or water use patterns. An ERU "level of service" for any specific system may in itself change with time. As meter records are kept and evaluated over time for any given system, changes in the specific level of demand associated with changing water-use patterns will result in adjustments to the system's basic ERU level. Table II-4 identifies ERU demands for 2009 through 2012.

**Table II-4 Current ERUs by Customer Class**

Year	Single Family Accounts (ERUs)	ADD/ERU	Commercial ERUs	Multi-Residential ERUs	** Unaccounted for Water ERUs	Total ERUs
2009	1,283	199	1,654	439	945	4,321
2010	1,283	185	1,554	401	707	3,935
2011	1,277	177	1,731	443	754	4,208
2012	1,292	180	1,705	482	278	3,757

\*\* Unaccounted for water ERUs are based on the difference between water consumption and water production.

The average ADD per ERU value for 2009-2012 is 185 gallons per ERU will be used to project future demand. For comparison, DOH standards for calculating water demand uses the following equation where no metered data is available:

$$ADD = (8000/AAR) + 200$$

*ADD - average day demand (gpd/ERU)*

*AAR - average annual rainfall (in/yr)*

With an average annual precipitation for the area of 51 inches, the average residential water demand is calculated to be approximately 356 gallons per day per full time residential customer. The actual ADD per ERU for the system is 52% of the DOH guideline. This low residential use is a likely indication that current water rate policies are a significant conservation incentive. The MDD per ERU value is 248 gpd based on the data from 2009-2012. Current Peak Hour Demand (PHD) is 1,092 gpm, which is estimated using WSDM PHD equations for ERU demand.

### **FUTURE POPULATION**

Future population growth for this plan is based on population estimates in the 2005 Comprehensive Plan Update. That plan estimated a population of 6,044 in 2015, 7,179 in 2020, and 8,526 in 2025. The current OFM population estimate for 2012 is 5,590. For the years 2026 – 2032 population was assumed to increase 3.5% a year, which is the growth rate used in the 2005 Comp Plan. This information results in a service area population of 6,725 at the end of the six year planning period and 10,847 at the end of the twenty year planning period as shown in Figure II-1.

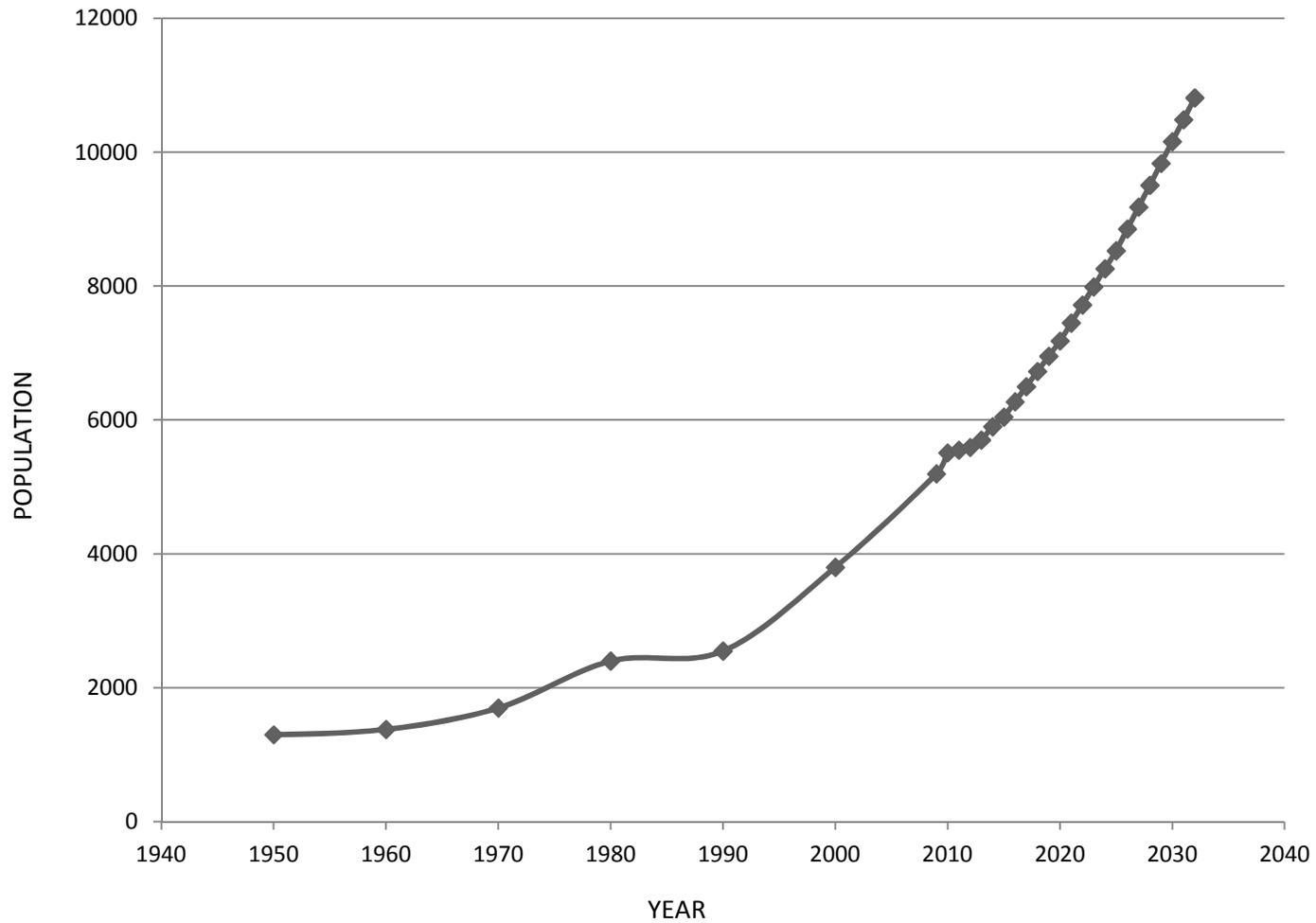
### **FUTURE WATER DEMAND**

Table II-5 presents estimated ERU demand per customer class for the 6-year and 20-year planning periods. The 3.5% growth rate is utilized for each customer class.



# City of Woodland Historic Growth and Population Forecasts

Figure II-1, Historical Growth and Population Forecasts for the City of Woodland



**Table II-5 Future ERUs by Customer Class**

Planning Period	Single Family Residential	Commercial	Multi-Residential	Unaccounted for Water ERU's	Total
Current(2012)	1,292	1,705	482	278	3,757
Six Year (2018)	1,591	2,051	544	334	4,520
20 Year(2032)	2,556	3,296	874	538	7,264

The demand estimates in Table II-6 are based on the ERU estimates and demand methodologies discussed above for current water demand. Table II-6 also includes ADD and MDD demands with conservation from the 2006 WSP for 2012 – 2024. Unaccounted for Water (UFW) is held constant at 7.4% during the planning periods for demand estimates without conservation. Reduction of unaccounted for water is addressed in the discussion of demand estimates with conservation below and in the Conservation program of Section IV. Detailed spreadsheets utilized for the demand analysis are provided in Appendix B.

**Table II-6 Water Demand Estimates w/o Conservation and 2006 WSP Demands**

Year	<sup>(1)</sup> Average Day Demand (ADD) (MGD)	2006 WSP ADD (MGD)	<sup>(2)</sup> Maximum Day Demand (MDD) (MGD)	2006 WSP MDD (MGD)	<sup>(3)</sup> Peak Hour Demand (PHD) (gpm)
2012	0.70	1.09	0.93	2.23	1,092
2013	0.71	1.12	0.95	2.31	1,112
2014	0.73	1.16	0.98	2.39	1,149
2015	0.75	1.19	1.01	2.47	1,176
2016	0.78	1.23	1.05	2.55	1,218
2017	0.81	1.27	1.08	2.63	1,260
2018	0.84	1.31	1.12	2.72	1,302
2019	0.86	1.35	1.16	2.81	1,344
2020	0.89	1.39	1.20	2.90	1,386
2021	0.93	1.44	1.24	3.00	1,436
2022	0.96	1.48	1.29	3.10	1,486
2023	0.99	1.53	1.33	3.21	1,536
2024	1.03		1.38		1,586
2025	1.06		1.42		1,636
2026	1.10		1.48		1,696
2027	1.14		1.53		1,757
2028	1.18		1.58		1,817
2029	1.22		1.64		1,877
2030	1.26		1.69		1,938
2031	1.30		1.75		1,998
2032	1.34		1.80		2,059

<sup>(1)</sup> System ERU's times 185 gpd/ERU

<sup>(2)</sup> System ERU's times 248 gpd/ERU

<sup>(3)</sup> PHD based on WSDOH formula using C=1.6 and F=225.

DOH requires demand estimates with conservation projections. Table II-7 compares projected demands from Table II-6 along with demands based on a conservation goal of reducing the current ADD of 185 gpd/ERU and MDD of 248 gpd/ERU by 3% each to 179 gpd/ERU and 241 gpd/ERU as discussed in the Conservation Program presented in Section IV. UFW is projected to be to 5% of total production in this table. DOH does not typically allow for design based on conservation until the conservation estimates are documented.

**Table II-7 Water Demand Estimates with and without Conservation Goals**

Year	Average Day Demand (ADD) (MGD)	ADD w/Conservation Goals (MGD)	Maximum Day Demand (MDD) (MGD)	MDD w/Conservation Goals (MGD)
2012	0.70	0.67	0.93	0.91
2013	0.71	0.69	0.95	0.92
2014	0.73	0.71	0.98	0.96
2015	0.75	0.73	1.01	0.98
2016	0.78	0.75	1.05	1.02
2017	0.81	0.78	1.08	1.05
2018	0.84	0.81	1.12	1.09
2019	0.86	0.84	1.16	1.13
2020	0.89	0.86	1.20	1.16
2021	0.93	0.90	1.24	1.21
2022	0.96	0.93	1.29	1.25
2023	0.99	0.96	1.33	1.29
2024	1.03	0.99	1.38	1.34
2025	1.06	1.03	1.42	1.38
2026	1.10	1.06	1.48	1.43
2027	1.14	1.10	1.53	1.48
2028	1.18	1.14	1.58	1.53
2029	1.22	1.18	1.64	1.58
2030	1.26	1.22	1.69	1.64
2031	1.30	1.26	1.75	1.70
2032	1.34	1.30	1.80	1.76