CHAPTER 2 - BASIC PLANNING DATA

2.1 EXISTING SERVICE AREA

The existing water system serves a combination of residential, commercial, industrial, and public users. The boundary of the Existing Service Area is shown in Figure 1-2. The Existing Service Area is approximately 1,460 acres, a majority of which is within the Selah City Limits. This figure also shows the areas served by the adjacent water systems of Selandia, High Valley, New Horizons, and Friday Point. Figure 3-1 Static Pressure Zone Map and Map A as provided in the back pocket of this Plan, show the existing Selah water system, including the general location of water mains, valves, fire hydrants, wells, booster stations, and reservoirs.

The Selah City Limits includes an area of approximately 2,782 acres. Existing zoning within the City is presented in Table 2-1, and is shown in Figure 2-1.

TABLE 2-1 EXISTING ZONING WITHIN SELAH CITY LIMITS

Land Use Category	Total Acreage*	Percent of Total
One-Family Residential (R-1)	1,707	61.4%
Two-Family Residential (R-2)	129	4.6%
Multi-Family Residential (R-3)	48	1.7%
Low Density Single Family (LDSF)	442	15.9%
Professional Business (B-1)	8	0.3%
General Business (B-2)	130	4.7%
Industrial (M-1)	182	6.5%
Planned Development (PD)	24	0.9%
Un-zoned**	112	4.0%
TOTAL	2,782	100.0%

* Source: Yakima County Geographic Information Services, September, 2013.
** Un-zoned areas include streets, alleys, right-of-ways, and other un-zoned areas within the City Limits boundary.

As shown in Table 2-1, One-Family Residential (R-1) is the largest zoned area within the City Limits, comprising approximately 1,707 acres or 61.4% of the land. The combined residentially zoned areas make up approximately 2,326 acres or 83.6% of the land within the City Limits. Most Business uses are along South 1st Street, Naches Avenue, Jim Clements Way, and Wenas Road, and total 138 acres (5.0% of the land within the City). Industrial development within Selah comprises approximately 182 acres (6.5% of the land within the City), and is generally adjacent to Railroad Avenue.

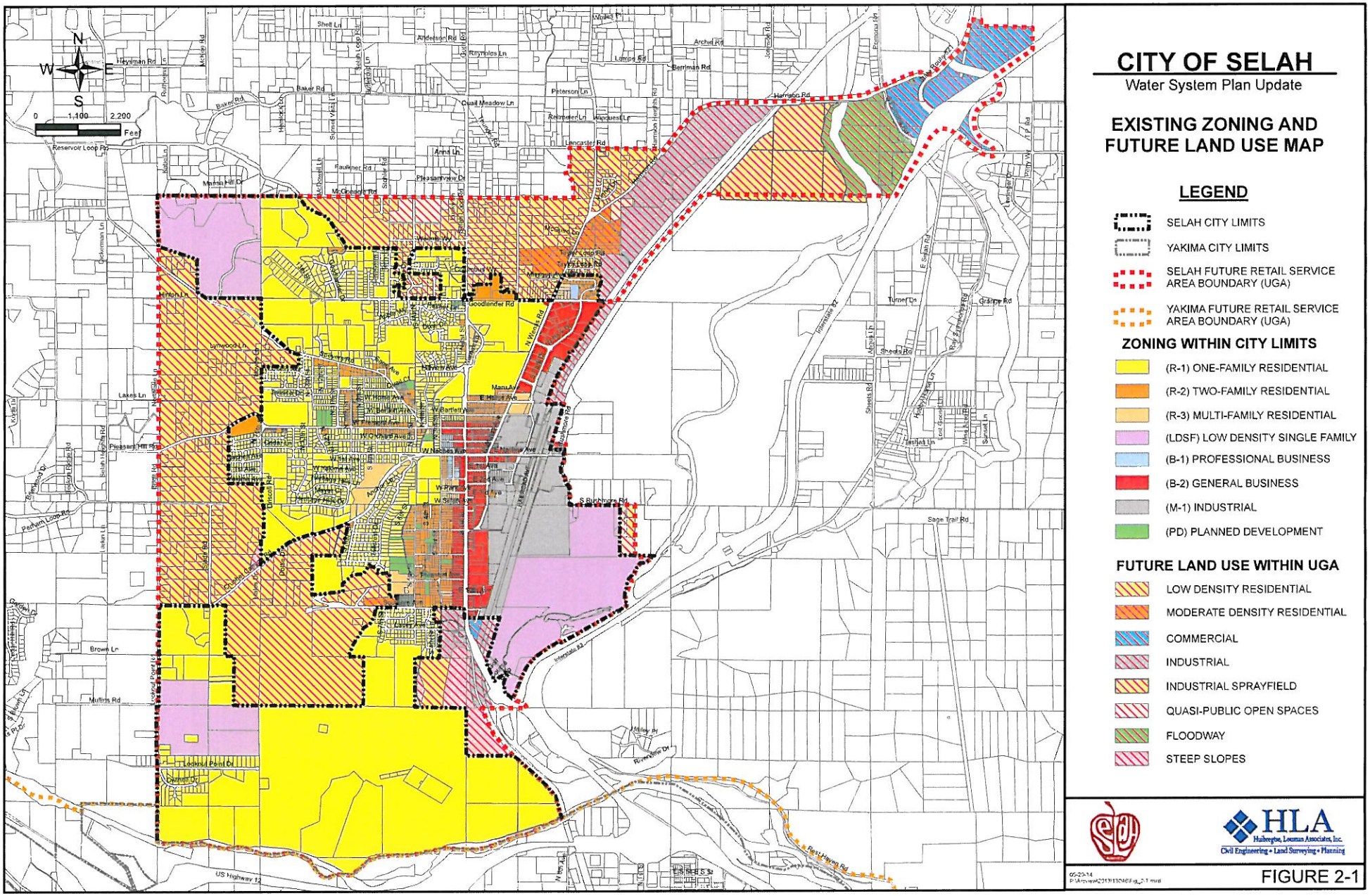
2.2 FUTURE SERVICE AREA

The Future Service Area for the City of Selah water generally corresponds to the City's Urban Growth Area (UGA), as adopted in the City's *GMA Comprehensive Plan*. The Future Service Area/UGA boundary is shown in Figure 1-2 and Figure 2-1. Future land use within the City's Urban Growth Area (UGA) boundary is also shown in Figure 2-1. The City of Selah UGA includes an area of approximately 1,699 acres. A breakdown of future land use within the UGA is provided in Table 2-2.

As part of the City's *GMA Comprehensive Plan*, Selah developed a future land use map for areas within the City Limits and the UGA. Future land use within the City Limits is consistent with existing zoning. A breakdown of the future land use within the UGA is presented in Table 2-2.

TABLE 2-2 FUTURE LAND USE WITHIN SELAH UGA		
Land Use Category	Total Acreage*	Percent of Total
Low Density Residential	1,097	64.6%
Moderate Density Residential	44	2.6%
Commercial	84	4.9%
Industrial	176	10.4%
Industrial Sprayfield	130	7.7%
Quasi-Public Open Space	33	1.9%
Floodway	84	4.9%
Steep Slopes	51	3.0%
TOTAL	1,699	100.0%
* Source: Yakima County Geographic Information Services, September, 2013.		

As shown in Table 2-2, Low Density Residential area is the largest future land use within Selah's UGA, comprising approximately 64.6% (1,097 acres) of the land within the UGA.



CITY OF SELAH

Water System Plan Update

EXISTING ZONING AND FUTURE LAND USE MAP

LEGEND

- SELAH CITY LIMITS
- YAKIMA CITY LIMITS
- SELAH FUTURE RETAIL SERVICE AREA BOUNDARY (UGA)
- YAKIMA FUTURE RETAIL SERVICE AREA BOUNDARY (UGA)

ZONING WITHIN CITY LIMITS

- (R-1) ONE-FAMILY RESIDENTIAL
- (R-2) TWO-FAMILY RESIDENTIAL
- (R-3) MULTI-FAMILY RESIDENTIAL
- (LDSF) LOW DENSITY SINGLE FAMILY
- (B-1) PROFESSIONAL BUSINESS
- (B-2) GENERAL BUSINESS
- (M-1) INDUSTRIAL
- (PD) PLANNED DEVELOPMENT

FUTURE LAND USE WITHIN UGA

- LOW DENSITY RESIDENTIAL
- MODERATE DENSITY RESIDENTIAL
- COMMERCIAL
- INDUSTRIAL
- INDUSTRIAL SPRAYFIELD
- QUASI-PUBLIC OPEN SPACES
- FLOODWAY
- STEEP SLOPES

HLA
Hattrup, Lowman Associates, Inc.
Civil Engineering • Land Surveying • Planning

05-29-14

FIGURE 2-1

2.3 POPULATION

According to the U.S. Census Bureau, the 2010 population of the City of Selah was 7,147, an increase of 13.3%, or 837 people since 2000. The resulting annual growth rate for the period 2000-2010 is approximately 1.33%. This ten-year growth rate is slightly lower than previous decades. Population trends in the City of Selah, Yakima County, and the State of Washington for the period 1910 through 2010 are presented in Table 2-3.

TABLE 2-3 POPULATION TRENDS

Year	City of Selah		Yakima County		State of Washington	
	Population	Percent Change	Population	Percent Change	Population	Percent Change
1910			41,709		1,141,990	
1920			63,710	52.7%	1,356,621	18.8%
1930	767		77,402	21.5%	1,563,396	15.2%
1940	1,130	47.3%	99,019	27.9%	1,736,191	11.1%
1950	2,489	120.3%	135,723	37.1%	2,378,963	37.0%
1960	2,824	13.5%	145,112	6.9%	2,853,214	19.9%
1970	3,311	17.2%	145,212	0.1%	3,413,244	19.6%
1980	4,500	35.9%	172,508	18.8%	4,132,353	21.1%
1990	5,113	13.6%	188,823	9.5%	4,866,692	17.8%
2000	6,310	23.4%	222,581	17.9%	5,894,121	21.1%
2010	7,147	13.3%	243,231	9.3%	6,724,540	14.1%

Source: U.S. Census Bureau

Every year, the Washington State Office of Financial Management (OFM) develops population estimates for the state, each county, and all cities. The OFM estimated that the total population within the City of Selah in 2012 was 7,290, which is approximately a 1.0% annual increase over the 2010 census value. Based on discussions with the City, Selah expects the population within the City to increase at a rate of 1.3% annually, similar to the previous ten-year period.

2.4 CURRENT AND FUTURE WATER SERVICES

2.4.1 Current Water Services

The location of the population of a purveyor whose water system includes multiple distribution pressure zones is critical in assessing the demands on the various water system components. The City generally determines the population location by identifying user categories and number of water services within each pressure zone. In addition to determining population locations and related residential water services, it is important to understand the location of all other water service users. Water services are divided into user categories as shown in Table 2-4.

TABLE 2-4 WATER USER CATEGORIES	
User Category	Code
Single-Family Residential	1
Commercial	2
Industrial	3
Political Subdivision	4
Outside Single-Family Residential	5
Apartment	6
Mobile Home Court	7
Irrigation Only	9
Federal State Govt.	10
Outside Commercial	11
City	99

The number of water services by user category per distribution pressure zone for the year 2012 is shown in Table 2-5 .

TABLE 2-5 YEAR 2012 WATER SERVICES BY USER CATEGORY PER PRESSURE ZONE								
User Category	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	Total
Single-Family Residential	1,043	593	346	118	16	0	0	2,116
Commercial	142	2	0	0	0	0	0	144
Industrial	25	0	0	0	0	0	0	25
Political Subdivision	7	2	0	0	0	0	0	9
Outside Single-Family Residential	9	24	2	0	0	0	0	35
Apartment	45	4	0	1	0	0	0	50
Mobile Home Court	2	0	0	0	0	0	0	2
Irrigation Only	29	4	0	1	0	0	0	34
Federal State Govt.	1	8	0	0	0	0	0	9
Outside Commercial	0	0	1	0	0	0	0	1
City	21	0	1	0	0	0	0	22
Total	1,324	637	350	120	16	0	0	2,447

2.4.2 Future Water Services

The number of residential water services within the City Limits is anticipated to increase consistent with the 1.3% population growth rate projection. However, increases in population per pressure zone will vary depending on the availability of undeveloped land, and potential for new home construction. Based on discussions with the City Planner and City Administration, residential construction will most likely occur within upper pressure zones. Locations of anticipated future residential water services for the years 2018, 2022, and 2032 were determined based on these discussions.

In reviewing future population and housing projections, the Selah City Council became aware of the impacts on the City's existing water rights and reservoir storage capacity that providing water service to residents of the City and the UGA would create. As a result, the Selah City Council determined the City would only provide water service to new customers within Selah's UGA under the following conditions:

1. All costs associated with providing water service, e.g., extending water mains to the site, shall be the responsibility of the proponent/developer;

2. The City maintains adequate water rights capacity per DOH's required "water rights self-assessment," to serve the proposed property/properties;

3. The City maintains adequate physical source and/or storage capacity to serve the proposed property/properties;

4. The proponent/developer shall transfer all potable water rights and irrigation water rights/shares associated with the property/properties to the City;

5. The proponent/developer shall "decommission" any and all groundwater wells on the property in accordance with the applicable Washington Administrative Code (WAC) requirements, unless a well is to become part of the City's water system; and

6. Service will not be provided to proposed structures which have fire flow requirements greater than the capacity of the system. The cost of upgrading the existing water system to meet fire flow requirements, required by a development shall be the responsibility of the developer, including, but not limited to:

    a. Upsizing existing water mains;
    b. Looping of the distribution system by installing new water mains; and
    c. Increasing storage and/or pumping capacities.

The population and number of residential services located outside the City Limits, but served by the City's water system, are expected to remain the same as experienced in the past. It is difficult to predict how population increases within the City and the UGA will affect increases in other user categories. The water service totals in remaining user categories were projected to increase at a rate similar to the population growth rate, and as determined by the City Planner and City Administration. The locations of these future services were determined based on the existing zoning and future land uses within the City. Future water services by user category per distribution pressure zone for the years 2018, 2022, and 2032 are shown in Table 2-6, Table 2-7, and Table 2-8, respectively.

TABLE 2-6 YEAR 2018 WATER SERVICES BY USER CATEGORY PER PRESSURE ZONE

User Category	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	Total
Single-Family Residential	1,043	692	378	158	16	0	0	2,287
Commercial	154	2	0	0	0	0	0	156
Industrial	27	0	0	0	0	0	0	27
Political Subdivision	7	2	0	0	0	0	0	9
Outside Single-Family Residential	9	24	2	0	0	0	0	35
Apartment	45	8	0	1	0	0	0	54
Mobile Home Court	2	0	0	0	0	0	0	2
Irrigation Only	32	4	0	1	0	0	0	37
Federal State Govt.	1	8	0	0	0	0	0	9
Outside Commercial	0	0	1	0	0	0	0	1
City	23	0	1	0	0	0	0	24
TOTAL	1,343	740	382	160	16	0	0	2,641

TABLE 2-7 YEAR 2022 WATER SERVICES BY USER CATEGORY PER PRESSURE ZONE								
User Category	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	Total
Single-Family Residential	1,043	763	428	158	16	0	0	2,408
Commercial	162	2	0	0	0	0	0	164
Industrial	28	0	0	0	0	0	0	28
Political Subdivision	8	2	0	0	0	0	0	10
Outside Single-Family Residential	9	24	2	0	0	0	0	35
Apartment	45	11	0	1	0	0	0	57
Mobile Home Court	2	0	0	0	0	0	0	2
Irrigation Only	34	4	0	1	0	0	0	39
Federal State Govt.	1	8	0	0	0	0	0	9
Outside Commercial	0	0	1	0	0	0	0	1
City	24	0	1	0	0	0	0	25
TOTAL	1,356	814	432	160	16	0	0	2,778

TABLE 2-8 YEAR 2032 WATER SERVICES BY USER CATEGORY PER PRESSURE ZONE								
User Category	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	Total
Single-Family Residential	1,043	803	592	276	26	0	0	2,740
Commercial	184	2	0	0	0	0	0	186
Industrial	32	0	0	0	0	0	0	32
Political Subdivision	10	2	0	0	0	0	0	12
Outside Single-Family Residential	9	24	2	0	0	0	0	35
Apartment	45	19	0	1	0	0	0	65
Mobile Home Court	2	0	0	0	0	0	0	2
Irrigation Only	39	4	0	1	0	0	0	44
Federal State Govt.	1	8	0	0	0	0	0	9
Outside Commercial	0	0	1	0	0	0	0	1
City	27	0	1	0	0	0	0	28
TOTAL	1,392	862	596	278	26	0	0	3,154

2.5 CURRENT WATER CONSUMPTION AND PRODUCTION

Current and historical metered water consumption and production data records are the preferred method for determining demand trends and establishing a basis for forecasting future demand. All water system sources and services in the City of Selah are metered. Production meters are typically read daily and consumption meters are read monthly, except for the months of November, December, January, and February, when consumption is estimated based on average day demand in the winter months.

2.5.1 Current Water Consumption

Currently, water consumption data is maintained by a computer database at Selah City Hall. Services are divided and billed based upon meter size and user category. User categories are as shown in Table 2-4. The City has separated the previous Multi-Family Residential and Government categories as shown in the *2008 Comprehensive Water Plan* into the following user categories: Apartment and Mobile Home Court, Political Subdivision, Federal Sate Government (Schools), and City, respectively.

The number of metered water services by user category for the period 2007 through 2012 is presented in Table 2-9.

TABLE 2-9 AVERAGE METERED WATER SYSTEM SERVICES BY USER CATEGORY 2007-2012

User Category	2007	2008	2009	2010	2011	2012	Average
Single-Family Residential	1,972	2,023	2,056	2,083	2,114	2,116	2,061
Commercial	129	133	140	141	142	144	138
Industrial	25	25	25	26	26	25	25
Political Subdivision	9	9	9	9	9	9	9
Outside Single-Family Residential	39	36	36	36	36	35	36
Apartment	46	47	46	48	48	50	47
Mobile Home Court	4	3	3	2	2	2	3
Irrigation Only	32	32	33	33	32	34	33
Federal State Govt.	9	9	9	9	9	9	9
Outside Commercial	1	2	1	1	1	1	1
City	23	24	26	25	23	22	24
TOTAL	2,289	2,342	2,385	2,413	2,442	2,447	2,386

The annual volume of water consumed (in million gallons per year) by user category for the period 2007 through 2012 is presented in Table 2-10, including six-year and three-year averages.

TABLE 2-10 ANNUAL WATER CONSUMPTION BY USER CATEGORY 2007-2012
(values are in million gallons per year)

User Category	2007	2008	2009	2010	2011	2012	2007-2012 Avg.	2010-2012 Avg.
Single-Family Residential	331.064	339.979	315.937	276.797	278.572	288.863	305.202	281.411
Commercial	32.026	38.808	42.746	37.764	32.780	35.395	36.586	35.313
Industrial	255.636	340.854	334.887	292.773	295.438	289.840	301.571	292.684
Political Subdivision	8.935	9.188	9.485	9.488	11.629	12.132	10.143	11.083
Outside Single-Family Residential	6.408	6.863	6.066	5.155	4.607	5.174	5.712	4.979
Apartment	29.850	29.482	27.383	24.566	24.789	27.292	27.227	25.549
Mobile Home Court	3.711	3.901	4.011	3.525	3.412	2.769	3.555	3.235
Irrigation Only	26.658	26.631	27.274	25.366	25.533	26.717	26.363	25.872
Federal State Govt.	6.634	7.576	5.761	5.200	4.711	4.983	5.811	4.965
Outside Commercial	0.339	0.613	0.726	0.172	0.230	0.300	0.397	0.234
City	50.598	66.694	64.386	63.192	71.790	62.161	63.137	65.714
TOTAL	751.858	870.588	838.662	743.997	753.492	755.624	785.704	751.038

The average day water consumption per service by user category (in gallons per service per day) for the period 2007 through 2012 including averages is presented in Table 2-11. It can be seen from Table 2-11 that the average day consumption per service for the Single-Family Residential user category has generally decreased from 2007 to 2012. From 2009 to 2010, consumption significantly decreased in most user categories as a result of implementing water use efficiency measures. The 2010-2012 average is generally lower than the 2007-2012 average as shown in Table 2-11.

TABLE 2-11 AVERAGE DAY WATER CONSUMPTION BY USER CATEGORY 2007-2012
(values are in gallons per service per day)

User Category	2007	2008	2009	2010	2011	2012	2007-2012 Avg.	2010-2012 Avg.
Single-Family Residential	460	459	421	364	361	373	406	366
Commercial	681	798	835	736	635	670	726	680
Industrial	28,015	37,252	36,823	31,251	31,434	31,676	32,742	31,454
Political Subdivision	2,720	2,789	2,887	2,915	3,540	3,717	3,095	3,391
Outside Single-Family Residential	455	520	462	392	356	409	432	386
Apartment	1,781	1,732	1,619	1,412	1,408	1,491	1,574	1,437
Mobile Home Court	2,490	3,553	3,663	4,138	4,674	3,783	3,717	4,199
Irrigation Only	2,282	2,280	2,259	2,080	2,164	2,174	2,206	2,139
Federal State Govt.	2,019	2,300	1,754	1,583	1,434	1,513	1,767	1,510
Outside Commercial	655	1,117	1,405	333	446	578	756	452
City	5,962	7,741	6,895	6,972	8,399	7,839	7,301	7,737

2.5.2 Maximum and Peak Consumption

Between the years 2007 and 2012, the largest annual consumption took place in 2008, with a total measured consumption of 870.6 million gallons (MG). The second largest annual consumption took place in 2009, with a measured consumption of 838.7 MG. Aside from these two years, annual consumption has remained below 800 MG. The maximum month of water consumption between 2007 and 2012 was experienced in June 2008 when 162.3 MG of water was consumed, approximately 2.2 times greater than the average monthly consumption in 2008. August 2009 was the second highest month of consumption between 2007 and 2012, when 115.9 MG was consumed. This maximum month consumption is approximately 1.6 times greater than the average monthly consumption in 2009. August 2009 provides a realistic representation of maximum and peak consumption for the six-year period, as the maximum month to average month ratio is consistent with most other years. A breakdown of water consumption by user category for August 2009 is shown in Table 2-12.

TABLE 2-12 MAXIMUM MONTH WATER CONSUMPTION, AUGUST 2009					
User Category	No. of Services	Maximum Month Consumption (gallons)	Average Day Consumption (gallons)	Maximum Month Consumption per Service (gallons)	Average Day Consumption per Service (gallons)
Single-Family Residential	2,059	57,656,588	1,859,890	28,002	903
Commercial	143	6,369,968	205,483	44,545	1,437
Industrial	25	28,296,092	912,777	1,131,844	36,511
Political Subdivision	9	1,196,800	38,606	132,978	4,290
Outside Single-Family Residential	36	1,232,704	39,765	34,242	1,105
Apartment	46	3,659,964	118,063	79,564	2,567
Mobile Home Court	3	400,180	12,909	133,393	4,303
Irrigation Only	49	7,141,904	230,384	145,753	4,702
Federal State Govt.	9	657,492	21,209	73,055	2,357
Outside Commercial	1	4,488	145	4,488	145
City	33	9,267,720	298,959	280,840	9,059
TOTAL	2,413	115,883,900	3,738,190	48,025	1,549

The maximum day of recorded water production in August 2009 occurred on August 4, 2009, when 4,727,000 gallons were pumped into the water system. Utilizing the percentage breakdown of demand per user category from the August 2009 consumption data, maximum day demand (MDD) was calculated as shown in Table 2-13.

Peak hour demand (PHD), also shown in Table 2-13, was calculated by multiplying the maximum day demand by a factor of 1.8 and dividing by 1,440 minutes per day. A peaking factor of 1.8 is considered reasonably conservative, and is consistent with the *2009 Water System Design Manual*, Table 5-1. Using the maximum day of water production to calculate the MDD and PHD for projection of future system demand will account for the highest possible demand on the system, based upon available historical data.

TABLE 2-13 MAXIMUM DAY AND PEAK HOUR WATER CONSUMPTION, AUGUST 4, 2009					
User Category	No. of Services	Maximum Day Demand (gallons)	Maximum Day Demand per Service (gallons)	Peak Hour Demand (GPM)	Peak Hour Demand per Service (GPM)
Single-Family Residential	2,059	2,191,860	1,065	2,740	1.3
Commercial	143	242,159	1,693	303	2.1
Industrial	25	1,075,698	43,028	1,345	53.8
Political Subdivision	9	45,497	5,055	57	6.3
Outside Single-Family Residential	36	46,862	1,302	59	1.6
Apartment	46	139,136	3,025	174	3.8
Mobile Home Court	3	15,213	5,071	19	6.3
Irrigation Only	49	271,505	5,541	339	6.9
Federal State Govt.	9	24,995	2,777	31	3.5
Outside Commercial	1	171	171	0	0.2
City	33	352,320	10,676	440	13.3
TOTAL	2,413	4,405,417*	1,826	5,507	2.3
* 4,727,000 gallons production less 6.80% DSL (2009 average DSL) to arrive at a maximum daily consumption of 4,405,417 gallons.					

2.5.3 Water Production

Annual water production by source well for the period 2007 through 2012 is presented in Table 2-14. Since 2008, total production has generally decreased.

TABLE 2-14 SELAH ANNUAL WATER PRODUCTION 2007-2012
(values are in million gallons)

Source	2007	2008	2009	2010	2011	2012
Well Nos. 3 & 4	268.921	336.737	275.784	114.998	0.036	0
Well No. 5	211.39	177.513	131.192	124.449	90.53	13.165
Well No. 6	339.006	287.57	317.747	364.738	214.994	257.8468
Well No. 7	0.048	113.476	175.159	47.169	111.573	378.9872
Well No. 8	0	0	0	177.844	408.819	190.324
TOTAL	819.365	915.296	899.882	829.198	825.952	840.323

2.5.4 Distribution System Leakage (DSL)

Table 2-15 shows annual water production, annual metered water consumption, and the difference between production and total consumption (DSL), including the DSL percentage. Water production from Selah's source wells for the period 2007 through 2012 totaled 5,130.0 million gallons. Metered consumption during that same time period totaled 4,714.2 million gallons. Estimated unmetered consumption includes water usage for fire-fighting, waterline breaks, and other related activities. The difference between production and metered consumption for that period was 415.8 million gallons, or 8.11% of total water production for the period. The average DSL for the past three years (2010-2012) is slightly higher at 9.71%.

TABLE 2-15 SELAH WATER PRODUCTION AND CONSUMPTION 2007-2012

Year	Production	Consumption	DSL	% DSL
2007	819,365,000	751,858,184	67,506,816	8.24%
2008	915,296,000	870,587,850	44,708,150	4.88%
2009	899,882,000	838,662,088	61,219,912	6.80%
2010	829,198,000	743,997,452	85,200,548	10.28%
2011	825,952,000	753,491,816	72,460,184	8.77%
2012	840,323,000	755,624,364	84,698,636	10.08%
TOTAL	5,130,016,000	4,714,221,754	415,794,246	8.11%
3-Year Average	831,824,333	751,037,877	80,786,456	9.71%

The City will continue to track the difference between production and total authorized consumption, and will work towards further reducing the volume of DSL through the implementation of supply-related water use efficiency measures. Water use efficiency measures are discussed in further detail in CHAPTER 4 of this Plan.

2.5.5 Current Equivalent Residential Units

An Equivalent Residential Unit (ERU) is defined as the amount of water consumed by a typical full-time single-family residence. The actual quantity of water represented by an ERU is related to the type of demand (average day or peak) being considered. As discussed previously, maximum day and peak hour demands were calculated from the maximum day of production in the second highest maximum month of consumption for the period between 2007 and 2012. As a result, the peaking factor from an average day demand (ADD) to a maximum day demand (MDD) is not the same for all service categories. Therefore,

ERU values for ADD, MDD, and PHD have been calculated as shown in Table 2-16. This ERU information is useful for forecasting and analyzing future water system demand.

Residential ADD per service values from the 2007 to 2012 period vary from a high of 460 gallons per service per day in 2007 to a low of 361 gallons per service per day in 2011 as shown in Table 2-11. Similar variation in consumption per service occurs in the other user categories. The City has generally seen consistent demands over the past three years, providing a suitable representation of existing conditions. The average ADD from each user category for the period 2010 through 2012 from Table 2-11 was used in producing Table 2-16.

The maximum day demand per service and peak hour demand per service provided in Table 2-16 are based upon the calculated demand for August 4, 2009, which was the maximum day of production for the second highest maximum month of consumption in the last six years.

TABLE 2-16 EQUIVALENT RESIDENTIAL UNIT FACTORS (ERUS)

User Category	ADD (2010-2012)		MDD (August 2009)		PHD (August 2009)	
	GPD/ Service[a]	ERUs	GPD/ Service[b]	ERUs	GPM/ Service[b]	ERUs
Single-Family Residential	366	1.0	1,065	1.0	1.33	1.0
Commercial	680	1.9	1,693	1.6	2.12	1.6
Industrial	31,454	85.9	43,028	40.4	53.78	40.4
Political Subdivision	3,391	9.3	5,055	4.7	6.32	4.7
Outside Single-Family Residential	386	1.1	1,302	1.2	1.63	1.2
Apartment	1,437	3.9	3,025	2.8	3.78	2.8
Mobile Home Court	4,199	11.5	5,071	4.8	6.34	4.8
Irrigation Only	2,139	5.8	5,541	5.2	6.93	5.2
Federal State Govt.	1,510	4.1	2,777	2.6	3.47	2.6
Outside Commercial	452	1.2	171	0.2	0.21	0.2
City	7,737	21.1	10,676	10.0	13.35	10.0

[a] ADD values based upon 2010 through 2012 average.
[b] Peak Day Demand is based upon calculated demand for August 4, 2009 as provided in Table 2-13.

2.6 FORECAST OF FUTURE WATER DEMAND

Water use is contingent upon a number of varying and uncertain factors, which makes forecasting future demand difficult. Of primary importance are the following factors:

1. Population;
2. Type of residential development (i.e., single-family, multi-family, rural, large or small lot);
3. Per capita income;
4. Types of commercial and industrial enterprises;
5. Climate;
6. Irrigation use of water; and
7. Price charged for water and type of rate structure (i.e. the base water quantity and cost for individual service meters).

Forecasting future system demands is based upon the projected number of single-family residential, outside single-family residential, apartment, mobile home court, commercial, outside commercial, industrial, political subdivision, federal state government, City, and irrigation only water services, and the annual average day, maximum day, and peak hour water demand.

As discussed previously, the population projections for the City of Selah were estimated based on discussions with the Selah City Planner and City Administration, and reviewing past population trends. Projections are based on an annual growth of 1.3%. Future water services are based upon the projected population growth within the City and the UGA. However, based upon impacts to Selah's existing water

rights and reservoir storage capacity, the City Council has determined the City will only provide water service to new customers within their UGA under specific conditions (previously specified within this Plan).

It is unlikely that all of this future population will be served by Selah's water system within the next twenty-year period. For this Plan, it is assumed that all of the future City population will be served by the City's water system in the year 2032, but only a limited portion of the future UGA population will be served by the City's water system.

Because Selah is in many ways a bedroom community to the City of Yakima, increases in population do not always correlate to increases in commercial businesses. Therefore, it is difficult to predict how population increases within the City and the UGA will affect increases in other user categories. However, the water service totals in remaining user categories were projected to increase at a rate similar to the population growth rate, and as determined by the City Planner and City Administration.

Other factors such as income, climate and water cost will be assumed to remain consistent with current trends. Climate does have a major influence on Selah's water consumption during summer months due to use of domestic water supply for irrigation purposes. However, the area's climate has generally remained consistent with historical averages.

2.6.1 Future ERUs and ADD

The number of water system services, ERUs, and ADD, are calculated from the current water services by user category as shown in Table 2-6, Table 2-7, and Table 2-8, and the average 2010 through 2012 demand per service for each user category, provided in Table 2-16.

The calculated future number of services, ERUs, and projected ADD for years 2018, 2022, and 2032 are presented in Table 2-17, Table 2-18, and Table 2-19, respectively. To accommodate the uncertainties in projecting future water demand and to account for system losses, a 10% contingency factor has been applied to the ADD projections, as shown.

TABLE 2-17 YEAR 2018 ERU AND ADD

User Category	No. of Services	ERUs/Service	ADD/Service (gallons)	Total ERUs	Total ADD (gallons)
Single-Family Residential	2,287	1.0	366	2,287.0	837,168
Commercial	156	1.9	680	289.9	106,135
Industrial	27	85.9	31,454	2,320.0	849,254
Political Subdivision	9	9.3	3,391	83.4	30,518
Outside Single-Family Residential	35	1.1	386	36.9	13,494
Apartment	54	3.9	1,437	212.0	77,595
Mobile Home Court	2	11.5	4,199	22.9	8,397
Irrigation Only	37	5.8	2,139	216.2	79,141
Federal State Govt.	9	4.1	1,510	37.1	13,590
Outside Commercial	1	1.2	452	1.2	452
City	24	21.1	7,737	507.2	185,677
Subtotal	2,641			6,013.9	2,201,422
10% Contingency					220,142
TOTAL	2,641			6,013.9	2,421,564

TABLE 2-18 YEAR 2022 ERU AND ADD					
User Category	No. of Services	ERUs/Service	ADD/Service (gallons)	Total ERUs	Total ADD (gallons)
Single-Family Residential	2,408	1.0	366	2,408.0	881,461
Commercial	164	1.9	680	304.8	111,577
Industrial	28	85.9	31,454	2,405.9	880,708
Political Subdivision	10	9.3	3,391	92.6	33,909
Outside Single-Family Residential	35	1.1	386	36.9	13,494
Apartment	57	3.9	1,437	223.8	81,906
Mobile Home Court	2	11.5	4,199	22.9	8,397
Irrigation Only	39	5.8	2,139	227.9	83,419
Federal State Govt.	9	4.1	1,510	37.1	13,590
Outside Commercial	1	1.2	452	1.2	452
City	25	21.1	7,737	528.4	193,414
Subtotal	2,778			6,289.6	2,302,327
10% Contingency					230,233
TOTAL	2,778			6,289.6	2,532,560

TABLE 2-19 YEAR 2032 ERU AND ADD					
User Category	No. of Services	ERUs/Service	ADD/Service (gallons)	Total ERUs	Total ADD (gallons)
Single-Family Residential	2,740	1.0	366	2,740.0	1,002,991
Commercial	186	1.9	680	345.7	126,545
Industrial	32	85.9	31,454	2,749.7	1,006,524
Political Subdivision	12	9.3	3,391	111.2	40,691
Outside Single-Family Residential	35	1.1	386	36.9	13,494
Apartment	65	3.9	1,437	255.2	93,402
Mobile Home Court	2	11.5	4,199	22.9	8,397
Irrigation Only	44	5.8	2,139	257.1	94,113
Federal State Govt.	9	4.1	1,510	37.1	13,590
Outside Commercial	1	1.2	452	1.2	452
City	28	21.1	7,737	591.8	216,624
Subtotal	3,154			7,148.7	2,616,822
10% Contingency					261,682
TOTAL	3,154			7,148.7	2,878,505

2.6.2 Future MDD and PHD

Future Maximum Day Demand (MDD) and Peak Hour Demand (PHD) for the water system were calculated for the years 2018, 2022, and 2032 using the projected number of services for each user category and the MDD per service for August 4, 2009 as discussed in Section 2.6.2. Calculated future MDD and PHD values for 2018, 2022, and 2032 are presented in Table 2-20, Table 2-21, and Table 2-22, respectively. To accommodate the uncertainties in projecting future water demand and to account for system losses, a 10% contingency factor has been applied to the MDD and PHD projections, as shown.

TABLE 2-20 YEAR 2018 MDD AND PHD							
User Category	No. of Services	ERUs/ Service	Total ERUs	MDD/ Service (gallons)	Total MDD (gallons)	Total PHD (GPM)	PHD/ Service (GPM)
Single-Family Residential	2,287	1.0	2287.0	1,065	2,434,572	3,043.2	1.3
Commercial	156	1.6	248.2	1,693	264,174	330.2	2.1
Industrial	27	40.4	1091.3	43,028	1,161,754	1,452.2	53.8
Political Subdivision	9	4.7	42.7	5,055	45,497	56.9	6.3
Outside Single-Family Residential	35	1.2	42.8	1,302	45,560	57.0	1.6
Apartment	54	2.8	153.4	3,025	163,334	204.2	3.8
Mobile Home Court	2	4.8	9.5	5,071	10,142	12.7	6.3
Irrigation Only	37	5.2	192.6	5,541	205,014	256.3	6.9
Federal State Govt.	9	2.6	23.5	2,777	24,995	31.2	3.5
Outside Commercial	1	0.2	0.2	171	171	0.2	0.2
City	24	10.0	240.7	10,676	256,232	320.3	13.3
Subtotal	2,641		4331.9		4,611,446	5,764	
10% Contingency					461,145	576	
TOTAL	2,641		4331.9		5,072,591	6,341	

TABLE 2-21 YEAR 2022 MDD AND PHD							
User Category	No. of Services	ERUs/ Service	Total ERUs	MDD/ Service (gallons)	Total MDD (gallons)	Total PHD (GPM)	PHD/ Service (GPM)
Single-Family Residential	2,408	1.0	2408.0	1,065	2,563,380	3,204.2	1.3
Commercial	164	1.6	260.9	1,693	277,721	347.2	2.1
Industrial	28	40.4	1131.8	43,028	1,204,782	1,506.0	53.8
Political Subdivision	10	4.7	47.5	5,055	50,553	63.2	6.3
Outside Single-Family Residential	35	1.2	42.8	1,302	45,560	57.0	1.6
Apartment	57	2.8	162.0	3,025	172,408	215.5	3.8
Mobile Home Court	2	4.8	9.5	5,071	10,142	12.7	6.3
Irrigation Only	39	5.2	203.0	5,541	216,096	270.1	6.9
Federal State Govt.	9	2.6	23.5	2,777	24,995	31.2	3.5
Outside Commercial	1	0.2	0.2	171	171	0.2	0.2
City	25	10.0	250.7	10,676	266,909	333.6	13.3
Subtotal	2,778		4539.8		4,832,717	6,041	
10% Contingency					483,272	604	
TOTAL	2,778		4539.8		5,315,988	6,645	

TABLE 2-22 YEAR 2032 MDD AND PHD							
User Category	No. of Services	ERUs/ Service	Total ERUs	MDD/ Service (gallons)	Total MDD (gallons)	Total PHD (GPM)	PHD/ Service (GPM)
Single-Family Residential	2,740	1.0	2740.0	1,065	2,916,803	3,646.0	1.3
Commercial	186	1.6	295.9	1,693	314,976	393.7	2.1
Industrial	32	40.4	1293.4	43,028	1,376,893	1,721.1	53.8
Political Subdivision	12	4.7	57.0	5,055	60,663	75.8	6.3
Outside Single-Family Residential	35	1.2	42.8	1,302	45,560	57.0	1.6
Apartment	65	2.8	184.7	3,025	196,606	245.8	3.8
Mobile Home Court	2	4.8	9.5	5,071	10,142	12.7	6.3
Irrigation Only	44	5.2	229.0	5,541	243,800	304.8	6.9
Federal State Govt.	9	2.6	23.5	2,777	24,995	31.2	3.5
Outside Commercial	1	0.2	0.2	171	171	0.2	0.2
City	28	10.0	280.8	10,676	298,938	373.7	13.3
Subtotal	3,154		5156.8		5,489,548	6,862	
10% Contingency					548,955	686	
TOTAL	3,154		5156.8		6,038,503	7,548	

2.6.3 Future Demand Summary and ERU/Physical Capacity

Table 2-23 summarizes the year 2012 and projected six-year, 10-year, and 20-year water demands for the City of Selah and compares the future demand to the City's current and future source capacity, and instantaneous and annual water rights.

TABLE 2-23 CURRENT AND FUTURE DEMAND, SOURCE CAPACITY AND WATER RIGHTS SUMMARY

Year	System Water Demand					Existing Source Capacity		Existing Water Rights*		
	# of ERUs (ADD)	Total Annual Demand	ADD	MDD	PHD	Max. Day Capacity	Pumping Capacity	Water Rights (Q_i)		Water Rights (Q_a)
		MG/Year	MGD	MGD	GPM	MGD	GPM	GPM	MGD	MG/Year
2012	5,573	744.643	2.040	4.273	5,341	7.920	5,500	5,500	7.920	1,550.95
2018	6,014	883.871	2.422	5.073	6,341	7.920	5,500	5,500	7.920	1,550.95
2022	6,290	924.384	2.533	5.316	6,645	7.920	5,500	5,500	7.920	1,550.95
2032	7,149	1050.654	2.879	6.039	7,548	7.920	5,500	5,500	7.920	1,550.95

* Refer to CHAPTER 4 for further discussion on existing water right capacity.

The system's current and future physical capacity (ERUs), in terms of water rights, source capacity, and storage capacity is summarized in Table 2-24 below. Further information on current water rights, source and reservoir capacities are provided in CHAPTER 3 and CHAPTER 4 of this Plan.

The water rights physical capacity in Table 2-24 is based upon comparing the ADD per ERU to the current and/or future total annual (Q_a) water right quantity and the MDD per ERU to the current and/or future total instantaneous (Q_i) water right quantity. Similarly, source physical capacity is based upon comparison of the MDD per ERU to the current and/or future well pump capacity. At a minimum, the total source capacity should be able to replenish depleted fire suppression storage in 72 hours while supplying

system MDD in order to eliminate the need for excessive equalizing storage capacity. The water sources should also be able to supply ADD with the largest source of supply out of service.

The storage physical capacity in Table 2-24 is based on two of the primary storage components, equalizing storage (ES) and standby storage (SB). Physical capacity of the City's reservoirs is not based upon operational storage (OS) or fire suppression storage (FSS) because these normally do not change with the number of ERUs. The DOH equations for determining storage physical capacity were simplified, based upon the characteristics of metered and calculated annual and peak demands for the City of Selah. Therefore, current and future equalizing and standby storage capacities were calculated from the following equations:

$$ES = (150 \text{ min.})[PHD(N) - Q_s]$$ (*2009 Water System Design Manual*, Page 117)

Where,
ES = Equalizing Storage (gallons)
PHD = Peak Hourly Demand per ERU (GPM) = 1.3 GPM from Table 2-16
N = Number of ERUs
Q_s = Total flow of all permanent sources (GPM)

$$SB = (200 \text{ gallons})(N)$$ (*2009 Water System Design Manual*, Page 117)

Where,
SB = Standby Storage (gallons), minimum recommended
N = Number of ERUs

Since N and ES are unknown, the above equations were rearranged and the equation for total storage (TS = OS+ES+SB+FSS) and 1.3 GPM for PHD per ERU was used to yield the following equation which solves for the existing and/or future ERU capacity (N):

$$N = \frac{TS - OS + 150Q_s - FSS}{395}$$

Where,
TS = Total Storage (gallons)
OS = Operational Storage (gallons)
FSS = Fire Suppression Storage (gallons)
N = Number of ERUs
Q_s = Total flow of all permanent sources (GPM)

Water systems can exclude the SB or FSS component, whichever is smaller, from a water system's total storage requirement. Because Selah has a rather high FSS volume requirement (1,440,000 gallons), the SB volume is nested within the FSS volume, as further discussed in Section 3.4 of this Plan. By nesting the SB volume ($SB + FSS = FSS$), the ERU capacity equation is reduced to the following:

$$N = \frac{TS - OS + 150Q_s - FSS}{195}$$

Table 2-24 summarizes the water system capacity, in ERUs, based on current water right, source, and storage capacity. Projected system demands and calculated system capacities shown in other tables of this Plan are based on demand per service and do not directly correlate to the calculated demand per ERU for all service categories under different demand conditions (e.g. ADD, MDD, PHD). Values shown in Table 2-24 are therefore, only estimates based upon calculated demands per ERU for ADD, MDD, and PHD from historical source and supply meter records. Further system analysis should be performed to determine the system's available capacity with regard to proposed development type (i.e. type of service category) to account for variations in average and peak demands of individual service categories.

TABLE 2-24 SUMMARY OF CURRENT AND FUTURE PHYSICAL CAPACITY (ERUS)

System Component	Current Capacity	Future Capacity	Demand/ ERU[a]	Existing ERU Capacity	Future ERU Capacity[b]	Existing Available ERU Capacity[c]	Future Available ERU Capacity[d]
Supply, Water Rights							
Annual (Q_a)[e]	1,551 MG	1,551 MG	0.15 MG	10,553	10,553	4,980	3,405
Instantaneous (Q_i)[e]	5,500 GPM	5,500 GPM	0.81 GPM	6,764	6,764	2,750	1,607
Source							
ADD	3,550 GPM	3,550 GPM	0.28 GPM	12,696	12,696	7,122	5,547
MDD	5,500 GPM	5,500 GPM	0.81 GPM	6,764	6,764	2,750	1,607
Storage (Effective)[f]							
Equalizing	3.731 MG	3.567 MG	Varies	12,803	11,962	8,789	6,805
Standby	3.731 MG	3.567 MG	200 Gal				

[a] Reference Table 2-17 and Table 2-20.
[b] Based on future system capacities with recommended system improvements in place.
[c] Existing available ERU capacity equals ERU capacity minus the Year 2012 number of ERUs.
[d] Future available ERU capacity equals future ERU capacity minus the Year 2032 number of ERUs.
[e] Annual demand is based on average day demand per ERU and instantaneous demand is based on maximum day demand per ERU.
[f] Reservoir storage ERU capacity is based upon the total system storage requirements and does not account for individual pressure zone requirements.

It can be seen from Table 2-24 that of the existing system components, water rights is currently the limiting factor in determining the physical capacity of the City of Selah water system. A water rights assessment is included in Section 4.5 of this Plan.

2.6.4 Current and Future Water Demand by Pressure Zone

In addition to forecasting future total water demand, it is important to forecast where in the system that demand will occur. Water services and corresponding water demands by pressure zone for the year 2012 are presented in Table 2-25. The numbers of services in Table 2-25 are based upon the 2012 actual number of services in each pressure zone, but the demand per service is based upon the ADD, MDD, and PHD values established for future projections, and does not reflect the actual 2012 consumption. The future number of water services and water demands by pressure zone for the years 2018, 2022, and 2032 are presented in Table 2-26, Table 2-27, and Table 2-28, respectively. The future demand projections include a 10% contingency factor to account for system losses, as shown in the respective tables.

TABLE 2-25 YEAR 2012 WATER DEMAND BY PRESSURE ZONE

Single-Family Residential	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	TOTAL
Number of Services	1,043	593	346	118	16	0	0	2,116
Annual Demand (gal/year)	139,737,119	79,447,854	46,355,746	15,809,185	2,143,618	0	0	283,493,522
Maximum Day Demand (GPD)	1,110,301	631,264	368,326	125,614	17,032	0	0	2,252,538
Peak Hour Demand (GPM)	1,388	789	460	157	21	0	0	2,816

Commercial	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	TOTAL
Number of Services	142	2	0	0	0	0	0	144
Annual Demand (gal/year)	35,359,141	498,016	0	0	0	0	0	35,857,157
Maximum Day Demand (GPD)	240,466	3,387	0	0	0	0	0	243,853
Peak Hour Demand (GPM)	301	4	0	0	0	0	0	305

Industrial	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	TOTAL
Number of Services	25	0	0	0	0	0	0	25
Annual Demand (gal/year)	287,802,884	0	0	0	0	0	0	287,802,884
Maximum Day Demand (GPD)	1,075,698	0	0	0	0	0	0	1,075,698
Peak Hour Demand (GPM)	1,345	0	0	0	0	0	0	1,345

Political Subdivision	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	TOTAL
Number of Services	7	2	0	0	0	0	0	9
Annual Demand (gal/year)	8,687,453	2,482,129	0	0	0	0	0	11,169,583
Maximum Day Demand (GPD)	35,387	10,111	0	0	0	0	0	45,497
Peak Hour Demand (GPM)	44	13	0	0	0	0	0	57

Outside Single-Family Residential	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	TOTAL
Number of Services	9	24	2	0	0	0	0	35
Annual Demand (gal/year)	1,269,985	3,386,626	282,219	0	0	0	0	4,938,830
Maximum Day Demand (GPD)	11,716	31,241	2,603	0	0	0	0	45,560
Peak Hour Demand (GPM)	15	39	3	0	0	0	0	57

Apartment	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	TOTAL
Number of Services	45	4	0	1	0	0	0	50
Annual Demand (gal/year)	23,666,590	2,103,697	0	525,924	0	0	0	26,296,212
Maximum Day Demand (GPD)	136,112	12,099	0	3,025	0	0	0	151,235
Peak Hour Demand (GPM)	170	15	0	4	0	0	0	189

Mobile Home Court	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	TOTAL
Number of Services	2	0	0	0	0	0	0	2
Annual Demand (gal/year)	3,073,388	0	0	0	0	0	0	3,073,388
Maximum Day Demand (GPD)	10,142	0	0	0	0	0	0	10,142
Peak Hour Demand (GPM)	13	0	0	0	0	0	0	13

Irrigation Only	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	TOTAL
Number of Services	29	4	0	1	0	0	0	34
Annual Demand (gal/year)	22,702,707	3,131,408	0	782,852	0	0	0	26,616,967
Maximum Day Demand (GPD)	160,687	22,164	0	5,541	0	0	0	188,391
Peak Hour Demand (GPM)	201	28	0	7	0	0	0	235

Federal State Govt.	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	TOTAL
Number of Services	1	8	0	0	0	0	0	9
Annual Demand (gal/year)	552,642	4,421,135	0	0	0	0	0	4,973,776
Maximum Day Demand (GPD)	2,777	22,218	0	0	0	0	0	24,995
Peak Hour Demand (GPM)	3	28	0	0	0	0	0	31

Outside Commercial	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	TOTAL
Number of Services	0	0	1	0	0	0	0	1
Annual Demand (gal/year)	0	0	165,523	0	0	0	0	165,523
Maximum Day Demand (GPD)	0	0	171	0	0	0	0	171
Peak Hour Demand (GPM)	0	0	0	0	0	0	0	0

City	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	TOTAL
Number of Services	21	0	1	0	0	0	0	22
Annual Demand (gal/year)	59,463,216	0	2,831,582	0	0	0	0	62,294,798
Maximum Day Demand (GPD)	224,203	0	10,676	0	0	0	0	234,880
Peak Hour Demand (GPM)	280	0	13	0	0	0	0	294

TOTAL SERVICES BY ZONE	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	TOTAL
Number of Services	1,324	637	350	120	16	0	0	2,447
Annual Demand (gal/year)	582,315,125	95,470,865	49,635,070	17,117,961	2,143,618	0	0	746,682,639
Maximum Day Demand (GPD)	3,007,489	732,483	381,777	134,180	17,032	0	0	4,272,961
Peak Hour Demand (GPM)	3,759	916	477	168	21	0	0	5,341

TABLE 2-26 YEAR 2018 WATER DEMAND BY PRESSURE ZONE

Single-Family Residential	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	TOTAL
Number of Services	1,043	692	378	158	16	0	0	2,287
Annual Demand (gal/year)	139,355,324	92,458,182	50,504,614	21,110,394	2,137,761	0	0	305,566,275
Maximum Day Demand (GPD)	1,110,301	736,652	402,391	168,195	17,032	0	0	2,434,572
Peak Hour Demand (GPM)	1,388	921	503	210	21	0	0	3,043

Commercial	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	TOTAL
Number of Services	154	2	0	0	0	0	0	156
Annual Demand (gal/year)	38,242,463	496,655	0	0	0	0	0	38,739,119
Maximum Day Demand (GPD)	260,787	3,387	0	0	0	0	0	264,174
Peak Hour Demand (GPM)	326	4	0	0	0	0	0	330

Industrial	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	TOTAL
Number of Services	27	0	0	0	0	0	0	27
Annual Demand (gal/year)	309,977,860	0	0	0	0	0	0	309,977,860
Maximum Day Demand (GPD)	1,161,754	0	0	0	0	0	0	1,161,754
Peak Hour Demand (GPM)	1,452	0	0	0	0	0	0	1,452

Political Subdivision	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	TOTAL
Number of Services	7	2	0	0	0	0	0	9
Annual Demand (gal/year)	8,663,717	2,475,348	0	0	0	0	0	11,139,065
Maximum Day Demand (GPD)	35,387	10,111	0	0	0	0	0	45,497
Peak Hour Demand (GPM)	44	13	0	0	0	0	0	57

Outside Single-Family Residential	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	TOTAL
Number of Services	9	24	2	0	0	0	0	35
Annual Demand (gal/year)	1,266,515	3,377,373	281,448	0	0	0	0	4,925,336
Maximum Day Demand (GPD)	11,716	31,241	2,603	0	0	0	0	45,560
Peak Hour Demand (GPM)	15	39	3	0	0	0	0	57

Apartment	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	TOTAL
Number of Services	45	8	0	1	0	0	0	54
Annual Demand (gal/year)	23,601,928	4,195,898	0	524,487	0	0	0	28,322,313
Maximum Day Demand (GPD)	136,112	24,198	0	3,025	0	0	0	163,334
Peak Hour Demand (GPM)	170	30	0	4	0	0	0	204

Mobile Home Court	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	TOTAL
Number of Services	2	0	0	0	0	0	0	2
Annual Demand (gal/year)	3,064,990	0	0	0	0	0	0	3,064,990
Maximum Day Demand (GPD)	10,142	0	0	0	0	0	0	10,142
Peak Hour Demand (GPM)	13	0	0	0	0	0	0	13

Irrigation Only	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	TOTAL
Number of Services	32	4	0	1	0	0	0	37
Annual Demand (gal/year)	24,982,817	3,122,852	0	780,713	0	0	0	28,886,382
Maximum Day Demand (GPD)	177,309	22,164	0	5,541	0	0	0	205,014
Peak Hour Demand (GPM)	222	28	0	7	0	0	0	256

Federal State Govt.	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	TOTAL
Number of Services	1	8	0	0	0	0	0	9
Annual Demand (gal/year)	551,132	4,409,055	0	0	0	0	0	4,960,187
Maximum Day Demand (GPD)	2,777	22,218	0	0	0	0	0	24,995
Peak Hour Demand (GPM)	3	28	0	0	0	0	0	31

Outside Commercial	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	TOTAL
Number of Services	0	0	1	0	0	0	0	1
Annual Demand (gal/year)	0	0	165,071	0	0	0	0	165,071
Maximum Day Demand (GPD)	0	0	171	0	0	0	0	171
Peak Hour Demand (GPM)	0	0	0	0	0	0	0	0

City	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	TOTAL
Number of Services	23	0	1	0	0	0	0	24
Annual Demand (gal/year)	64,948,439	0	2,823,845	0	0	0	0	67,772,284
Maximum Day Demand (GPD)	245,556	0	10,676	0	0	0	0	256,232
Peak Hour Demand (GPM)	307	0	13	0	0	0	0	320

SUBTOTAL SERVICES BY ZONE	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	TOTAL
Number of Services	1,343	740	382	160	16	0	0	2,641
Annual Demand (gal/year)	614,655,184	110,535,364	53,774,978	22,415,594	2,137,761	0	0	803,518,882
Maximum Day Demand (GPD)	3,151,841	849,970	415,841	176,761	17,032	0	0	4,611,446
Peak Hour Demand (GPM)	3,940	1,062	520	221	21	0	0	5,764

10% Contingency	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	TOTAL
Number of Services	1,343	740	382	160	16	0	0	2,641
Annual Demand (gal/year)	61,465,518	11,053,536	5,377,498	2,241,559	213,776	0	0	80,351,888
Maximum Day Demand (GPD)	315,184	84,997	41,584	17,676	1,703	0	0	461,145
Peak Hour Demand (GPM)	394	106	52	22	2	0	0	576

TOTAL SERVICES BY ZONE	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	TOTAL
Number of Services	1,343	740	382	160	16	0	0	2,641
Annual Demand (gal/year)	676,120,703	121,588,900	59,152,476	24,657,154	2,351,538	0	0	883,870,770
Maximum Day Demand (GPD)	3,467,025	934,967	457,426	194,437	18,736	0	0	5,072,591
Peak Hour Demand (GPM)	4,334	1,169	572	243	23	0	0	6,341

TABLE 2-27 YEAR 2022 WATER DEMAND BY PRESSURE ZONE

Single-Family Residential	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	TOTAL
Number of Services	1,043	763	428	158	16	0	0	2,408
Annual Demand (gal/year)	139,355,324	101,944,499	57,185,118	21,110,394	2,137,761	0	0	321,733,096
Maximum Day Demand (GPD)	1,110,301	812,234	455,617	168,195	17,032	0	0	2,563,380
Peak Hour Demand (GPM)	1,388	1,015	570	210	21	0	0	3,204

Commercial	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	TOTAL
Number of Services	162	2	0	0	0	0	0	164
Annual Demand (gal/year)	40,229,085	496,655	0	0	0	0	0	40,725,740
Maximum Day Demand (GPD)	274,334	3,387	0	0	0	0	0	277,721
Peak Hour Demand (GPM)	343	4	0	0	0	0	0	347

Industrial	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	TOTAL
Number of Services	28	0	0	0	0	0	0	28
Annual Demand (gal/year)	321,458,522	0	0	0	0	0	0	321,458,522
Maximum Day Demand (GPD)	1,204,782	0	0	0	0	0	0	1,204,782
Peak Hour Demand (GPM)	1,506	0	0	0	0	0	0	1,506

Political Subdivision	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	TOTAL
Number of Services	8	2	0	0	0	0	0	10
Annual Demand (gal/year)	9,901,391	2,475,348	0	0	0	0	0	12,376,739
Maximum Day Demand (GPD)	40,442	10,111	0	0	0	0	0	50,553
Peak Hour Demand (GPM)	51	13	0	0	0	0	0	63

Outside Single-Family Residential	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	TOTAL
Number of Services	9	24	2	0	0	0	0	35
Annual Demand (gal/year)	1,266,515	3,377,373	281,448	0	0	0	0	4,925,336
Maximum Day Demand (GPD)	11,716	31,241	2,603	0	0	0	0	45,560
Peak Hour Demand (GPM)	15	39	3	0	0	0	0	57

Apartment	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	TOTAL
Number of Services	45	11	0	1	0	0	0	57
Annual Demand (gal/year)	23,601,928	5,769,360	0	524,487	0	0	0	29,895,775
Maximum Day Demand (GPD)	136,112	33,272	0	3,025	0	0	0	172,408
Peak Hour Demand (GPM)	170	42	0	4	0	0	0	216

Mobile Home Court	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	TOTAL
Number of Services	2	0	0	0	0	0	0	2
Annual Demand (gal/year)	3,064,990	0	0	0	0	0	0	3,064,990
Maximum Day Demand (GPD)	10,142	0	0	0	0	0	0	10,142
Peak Hour Demand (GPM)	13	0	0	0	0	0	0	13

Irrigation Only	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	TOTAL
Number of Services	34	4	0	1	0	0	0	39
Annual Demand (gal/year)	26,544,243	3,122,852	0	780,713	0	0	0	30,447,808
Maximum Day Demand (GPD)	188,391	22,164	0	5,541	0	0	0	216,096
Peak Hour Demand (GPM)	235	28	0	7	0	0	0	270

Federal State Govt.	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	TOTAL
Number of Services	1	8	0	0	0	0	0	9
Annual Demand (gal/year)	551,132	4,409,055	0	0	0	0	0	4,960,187
Maximum Day Demand (GPD)	2,777	22,218	0	0	0	0	0	24,995
Peak Hour Demand (GPM)	3	28	0	0	0	0	0	31

Outside Commercial	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	TOTAL
Number of Services	0	0	1	0	0	0	0	1
Annual Demand (gal/year)	0	0	165,071	0	0	0	0	165,071
Maximum Day Demand (GPD)	0	0	171	0	0	0	0	171
Peak Hour Demand (GPM)	0	0	0	0	0	0	0	0

City	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	TOTAL
Number of Services	24	0	1	0	0	0	0	25
Annual Demand (gal/year)	67,772,284	0	2,823,845	0	0	0	0	70,596,129
Maximum Day Demand (GPD)	256,232	0	10,676	0	0	0	0	266,909
Peak Hour Demand (GPM)	320	0	13	0	0	0	0	334

SUBTOTAL SERVICES BY ZONE	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	TOTAL
Number of Services	1,356	814	432	160	16	0	0	2,778
Annual Demand (gal/year)	633,745,412	121,595,142	60,455,483	22,415,594	2,137,761	0	0	840,349,392
Maximum Day Demand (GPD)	3,235,230	934,626	469,068	176,761	17,032	0	0	4,832,717
Peak Hour Demand (GPM)	4,044	1,168	586	221	21	0	0	6,041

10% Contingency	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	TOTAL
Number of Services	1,356	814	432	160	16	0	0	2,778
Annual Demand (gal/year)	63,374,541	12,159,514	6,045,548	2,241,559	213,776	0	0	84,034,939
Maximum Day Demand (GPD)	323,523	93,463	46,907	17,676	1,703	0	0	483,272
Peak Hour Demand (GPM)	404	117	59	22	2	0	0	604

TOTAL SERVICES BY ZONE	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	TOTAL
Number of Services	1,356	814	432	160	16	0	0	2,778
Annual Demand (gal/year)	697,119,953	133,754,656	66,501,031	24,657,154	2,351,538	0	0	924,384,332
Maximum Day Demand (GPD)	3,558,753	1,028,088	515,975	194,437	18,736	0	0	5,315,988
Peak Hour Demand (GPM)	4,448	1,285	645	243	23	0	0	6,645

TABLE 2-28 YEAR 2032 WATER DEMAND BY PRESSURE ZONE

Single-Family Residential	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	TOTAL
Number of Services	1,043	803	592	276	26	0	0	2,740
Annual Demand (gal/year)	139,355,324	107,288,902	79,097,173	36,876,385	3,473,862	0	0	366,091,646
Maximum Day Demand (GPD)	1,110,301	854,815	630,200	293,809	27,678	0	0	2,916,803
Peak Hour Demand (GPM)	1,388	1,069	788	367	35	0	0	3,646

Commercial	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	TOTAL
Number of Services	184	2	0	0	0	0	0	186
Annual Demand (gal/year)	45,692,294	496,655	0	0	0	0	0	46,188,949
Maximum Day Demand (GPD)	311,590	3,387	0	0	0	0	0	314,976
Peak Hour Demand (GPM)	389	4	0	0	0	0	0	394

Industrial	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	TOTAL
Number of Services	32	0	0	0	0	0	0	32
Annual Demand (gal/year)	367,381,167	0	0	0	0	0	0	367,381,167
Maximum Day Demand (GPD)	1,376,893	0	0	0	0	0	0	1,376,893
Peak Hour Demand (GPM)	1,721	0	0	0	0	0	0	1,721

Political Subdivision	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	TOTAL
Number of Services	10	2	0	0	0	0	0	12
Annual Demand (gal/year)	12,376,739	2,475,348	0	0	0	0	0	14,852,086
Maximum Day Demand (GPD)	50,553	10,111	0	0	0	0	0	60,663
Peak Hour Demand (GPM)	63	13	0	0	0	0	0	76

Outside Single-Family Residential	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	TOTAL
Number of Services	9	24	2	0	0	0	0	35
Annual Demand (gal/year)	1,266,515	3,377,373	281,448	0	0	0	0	4,925,336
Maximum Day Demand (GPD)	11,716	31,241	2,603	0	0	0	0	45,560
Peak Hour Demand (GPM)	15	39	3	0	0	0	0	57

Apartment	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	TOTAL
Number of Services	45	19	0	1	0	0	0	65
Annual Demand (gal/year)	23,601,928	9,965,258	0	524,487	0	0	0	34,091,673
Maximum Day Demand (GPD)	136,112	57,469	0	3,025	0	0	0	196,606
Peak Hour Demand (GPM)	170	72	0	4	0	0	0	246

Mobile Home Court	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	TOTAL
Number of Services	2	0	0	0	0	0	0	2
Annual Demand (gal/year)	3,064,990	0	0	0	0	0	0	3,064,990
Maximum Day Demand (GPD)	10,142	0	0	0	0	0	0	10,142
Peak Hour Demand (GPM)	13	0	0	0	0	0	0	13

Irrigation Only	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	TOTAL
Number of Services	39	4	0	1	0	0	0	44
Annual Demand (gal/year)	30,447,808	3,122,852	0	780,713	0	0	0	34,351,373
Maximum Day Demand (GPD)	216,096	22,164	0	5,541	0	0	0	243,800
Peak Hour Demand (GPM)	270	28	0	7	0	0	0	305

Federal State Govt.	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	TOTAL
Number of Services	1	8	0	0	0	0	0	9
Annual Demand (gal/year)	551,132	4,409,055	0	0	0	0	0	4,960,187
Maximum Day Demand (GPD)	2,777	22,218	0	0	0	0	0	24,995
Peak Hour Demand (GPM)	3	28	0	0	0	0	0	31

Outside Commercial	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	TOTAL
Number of Services	0	0	1	0	0	0	0	1
Annual Demand (gal/year)	0	0	165,071	0	0	0	0	165,071
Maximum Day Demand (GPD)	0	0	171	0	0	0	0	171
Peak Hour Demand (GPM)	0	0	0	0	0	0	0	0

City	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	TOTAL
Number of Services	27	0	1	0	0	0	0	28
Annual Demand (gal/year)	76,243,819	0	2,823,845	0	0	0	0	79,067,664
Maximum Day Demand (GPD)	288,262	0	10,676	0	0	0	0	298,938
Peak Hour Demand (GPM)	360	0	13	0	0	0	0	374

SUBTOTAL SERVICES BY ZONE	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	TOTAL
Number of Services	1,392	862	596	278	26	0	0	3,154
Annual Demand (gal/year)	699,981,715	131,135,444	82,367,537	38,181,585	3,473,862	0	0	955,140,144
Maximum Day Demand (GPD)	3,514,441	1,001,405	643,650	302,375	27,678	0	0	5,489,548
Peak Hour Demand (GPM)	4,393	1,252	805	378	35	0	0	6,862

10% Contingency	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	TOTAL
Number of Services	1,392	862	596	278	26	0	0	3,154
Annual Demand (gal/year)	69,998,172	13,113,544	8,236,754	3,818,159	347,386	0	0	95,514,014
Maximum Day Demand (GPD)	351,444	100,140	64,365	30,237	2,768	0	0	548,955
Peak Hour Demand (GPM)	439	125	80	38	3	0	0	686

TOTAL SERVICES BY ZONE	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	TOTAL
Number of Services	1,392	862	596	278	26	0	0	3,154
Annual Demand (gal/year)	769,979,887	144,248,988	90,604,291	41,999,744	3,821,249	0	0	1,050,654,158
Maximum Day Demand (GPD)	3,865,885	1,101,545	708,015	332,612	30,445	0	0	6,038,503
Peak Hour Demand (GPM)	4,832	1,377	885	416	38	0	0	7,548