3.18 Water Supply

3.18.1 Affected Environment

Current Plan Area

The information in this chapter is based upon the *2009 Water System Plan Update* (Parametrix, Inc. 2009) prepared for the City of Sumner (City). The original Water System Plan was adopted in November 1993 and updated in 2002.

The City water system service area covers approximately 6,300 acres, 1,500 of which lie outside city limits. The service area is adjoined by the Bonney Lake, Valley (Alderton-McMillen), Puyallup, Pacific, Mountain View–Edgewood, and Tacoma water districts. Sumner has recently assumed the spring supply, water rights, and customers of the Fowler Mutual Water Company, located in northwest Sumner. The City also assumed the portions of the Webstone Water District located outside the City of Pacific in 2004.

Water Demand Projections

The *2009 Water System Plan Update* contains service area projections for growth and the corresponding water demand through the year 2029. Based on an annual growth rate declining from 4.4% in 2009 to 1.5% in 2029, the population is projected to be approximately 16,153 by 2029 (Table 3.18-1). Ultimate buildout conditions for the City would result in a service area population of approximately 21,000.

Table 3.18-1. Service Area Population Projection (Water System Plan)

Year	Population	Average Annual Population Change (%)
2009	9,881	4.4
2014	11,785	3.1
2019	13,435	2.4
2024	14,879	1.9
2029	16,153	1.5

Source: Parametrix Inc. 2009.

Average and Peak Daily Demand

A system demand increase based on the growth rates in Table 3.18-1 is used to calculate future water demands. Demand in 2009 was 1.71 million gallons per day (mgd) and is projected to be 2.74 mgd by 2029 (Table 3.18-2).

The peak daily demand utilizes a peaking factor that is calculated from recorded well production on historical peak days. Based on historical records comparing maximum daily production to average demand from 1999 to 2008, the average maximum-to-average factor for this period was 1.97. Future peak demand estimates, therefore, use 2.0 as the estimated peaking factor.

Table 3.18-2. Water Demand Projections (Million Gallons per Day)

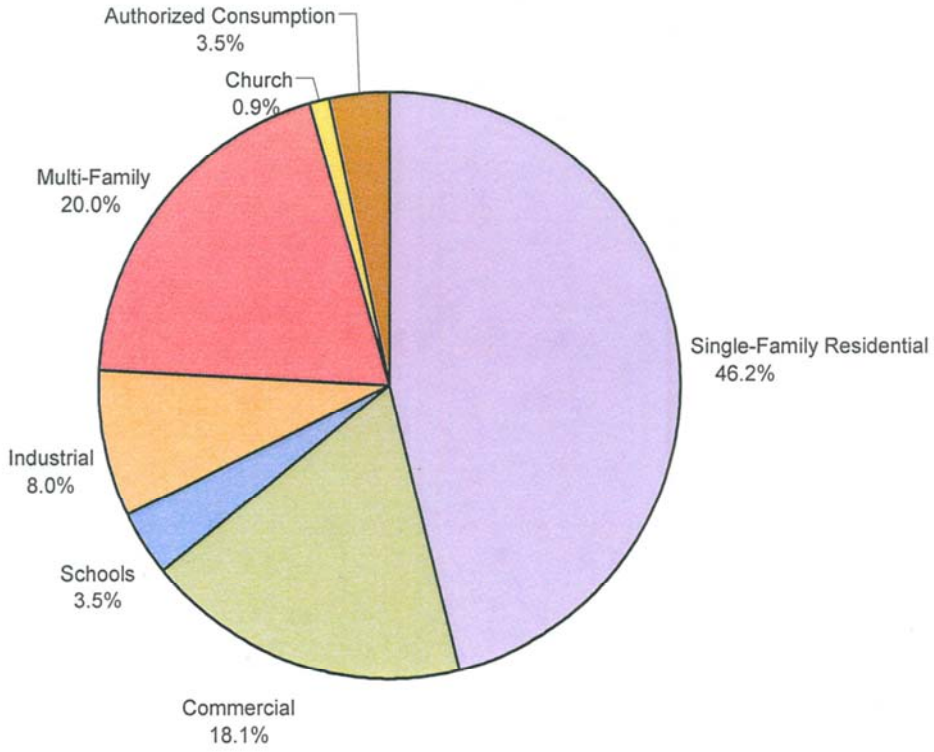
Year	Average Daily Demand	Peak Daily Demand
2009	1.71	3.42
2014	2.03	4.06
2019	2.30	4.60
2024	2.53	5.07
2029	2.74	5.48

Source: Parametrix Inc. 2009.

Historic Water Consumption

Service meters have been installed on all customer water connections in the City water system. Customers are divided in to seven separate classes: residential, commercial, schools, industrial, multifamily, church and motels. In 1997, the multifamily category was added to separate the previous combined classification of motels, apartments, and multifamily. Multifamily dwellings include both duplexes and apartments. Figure 3.18-1 shows the average annual water use percentage in each customer class from 1997 to 2008. Residential comprised approximately 46% of the total water usage within the city.

Figure 3.18-1. Water Use by Category



Source: Parametrix Inc. 2009.

The historical water demand from each source remained relatively constant between 1991 and 2008. Part of this "flatline" could be attributed to the closure of Beatrice Cheese and to system conservation measures.

A schematic of the City water system is in the *2009 Water System Plan Update* and shows size and location of pipes. The system consists of two pressure zones with a hydraulic head at elevation 234 mean sea level and significantly smaller zone at elevation 393. This second pressure zone was created by the construction of the Sumner Viewpoint development, location outside city limits, but within the water service area. Four springs (Sumner, Elhi, Weber, and County Springs) and three wells (South, West, and Dieringer) presently supply the system.

Table 3.18-3. Water Source Capacities

Pressure Zone	Source Name	Source Type	Source Capacity (Million Gallons per Day)
234 Zone	South Well	Artesian well	1.00[1]
234 Zone	West Well	Artesian well	0.36
234 Zone	Dieringer Well	Artesian well	0.36
234 Zone	Sumner Springs	Free-flowing spring	1.15[1]
234 Zone	County Springs	Free-flowing spring	0.71[2]
234 Zone	Elhi Springs	Free-flowing spring	0.13
Total			3.71

Source: Parametrix Inc. 2009.

[1] Source capacities based on historical station meter readings.

[2] Includes portions of Weber Springs.

Distribution System

The citywide distribution system consists of approximately 934 pipes in a range of sizes from 2 to 18 inches in diameter. The 84.5 miles of pipe also vary in age and material. Most of the pipe installed before 1960 is cast iron with packed joints or small diameter steel pipe. The pipe installed between 1960 and the mid 1980s is mostly asbestos cement pipe with O-ring rubber gasketed couplers. All new water mains installed since the mid-1980s consists of Class 52 ductile iron pipe. All three pipe materials have long life. The system has a sufficient number of inline valves to isolate small sections to reduce the number of services out of water during any repair. Detailed maps of the distribution network are maintained and updated by the City. These water system maps show pipe diameters, pipe material, location of hydrants, valves, and abandoned pipes, and give the year of installation for most pipes. The approximate length and percentage of each pipe size in the distribution network is listed in Table 3.18-4.

Table 3.18-4. City Water System Distribution Network Inventory (2009)

Pipe Sizes (Inches)	Length (Feet)	Percentage of Total System
2	6,282	1.4
3	1,339	0.3
4	6,177	1.4
6	110,920	24.9
8	144,590	32.4
10	3,701	0.8
12	150,829	33.8
14	11,391	2.6
16	5,217	1.2
18	5,557	1.2
Total	446,003	100.0

Source: Parametrix Inc. 2009.

Storage

The system has five storage tanks, though only four serve the Sumner service area at large. The fifth tank is exclusively associated with the recently constructed Sumner Viewpoint development. Because this tank is located at a higher hydraulic grade than the rest of the storage system and only serves the Sumner Viewpoint development, it is excluded from total storage capacity calculations of the system. The tanks are in good condition. A 2.0-million-gallon concrete post-tensioned cable wrap tank was constructed in 1998 to provide adequate fire flows to the new North Sumner Industrial area. The 1.0-million-gallon welded steel tank at Sumner Springs was refurbished and repainted inside and out in 2002. The 2.0-million-gallon welded steel south tank was repainted in 2005. Combined storage capacity for the four primary tanks is 5.068 million gallons. Inclusion of the Sumner Viewpoint tank increases this capacity to 5.398 million gallons.

Table 3.18-5. City Water System Storage Information

Name	Functions	Total Volume	Working Volume	Conditions
Sumner Springs Tank—built in 1956 (steel); repainted in 2002	Storage, chlorine contact	1.0 mg	1.05 mg	Good
County Springs Tank—built in 1986; cast in place concrete	Primarily chlorine contact	68,000 gal	66,000 gal	Good
South Tank—built in 1973 (steel)	Storage	2.0 mg	2.0 mg	Good
North Tank—built in 1998; concrete post-tensioned	Storage	2.0 mg	2.0 mg	Good
Sumner Viewpoint	Storage, higher pressure zone	330,000 gal	193,900 gal	Good

Source: Parametrix Inc. 2009.
mg = million gallons; gal = gallons

Table 3.18-6. Water Well Information

Name (Type)	Capacity (gpm)	Pump Head (Feet)	Static Water Surface
South Well	700	155	5 feet below base plate
West Well	250	170	7 feet below base plate
Dieringer Well	250	264	9 feet above base plate

Source: Parametrix Inc. 2009.
gpm = gallons per minute

Chlorination Facilities

Chlorination facilities are present at the Sumner Springs, County Springs, and Elhi Springs collection points, and at all three well collection points. These chlorination facilities are described in detail in the *2009 Water System Plan Update*. In general, the chlorination facilities are in good condition, with the exception of the South Well facility, which is in fair condition.

Wells

The City Water System is currently served by three wells. Both the South Well and West Well were installed in 1975. The South Well is used for domestic supply and the West Well for irrigation of the Sumner Cemetery and for fire flows. The West Well is used for domestic supply during low water supply times in the summer but is not used for regular supply. The West well is classified as a standby rather than an emergency supply and is considered a seasonal source. Water rights for the West Well are disputed, and no further improvements are planned at this location until the conclusion of a lawsuit before the Washington State Supreme Court regarding the Municipal Water Law.

The Dieringer Well was constructed in 1954, originally to serve the Dieringer School. The well and its associated water rights were acquired by the City in 1998, and improvements necessary to use the well were completed in 2004.

Meters

Service meters were installed at all customer connections starting in 1975 and continued through the early 1980s. System meters include six master meters and two station meters. Master meters are located at the connections of Sumner Springs, County Springs, and Elhi Springs with the distribution system and at all three wells. Station meters are located in the metering vaults upstream of Sumner and County Springs storage tanks.

Valves

The system contains hundreds of isolation valves that have been assigned a number on the City's water system maps. There are three air release valves, several pressure reducing valves, and no pressure sustaining valves in the system. Valves are exercised on a regular basis. Additional discussion of valves can be found in the *2009 Water System Plan Update*.

Hydrants

The system contains approximately 920 hydrants, all of which have been assigned a number on the City's water system maps. The Fire Department conducts flow tests periodically to assure proper hydrant operation.

Telemetry and Controls

The City's tanks and sources all utilize remote telemetry that is connected to the City Shops. The telemetry system has capacity to expand to over 500 remote units, and power hookups are available at Sumner Springs, County Springs, Elhi Springs, and all three wells. Permanent auxiliary power is not available at the well sites.

Interties

There is one intertie with the Puyallup system. The two Puyallup valves remain closed, except in emergencies. Through the portion of the City water system previously owned by Webstone, there are two interties to the City of Pacific.

Source Evaluation

Present and future source requirements are presented in Table 3.18-7. Required source is equal to peak day demand (see section 3.19.1). Total source capacity is equal to the total production from Sumner Springs (1.15 mgd), County Springs (0.71 mgd), Elhi Springs (0.13 mgd), Dieringer Well (0.36 mgd), West Well (0.36 mgd) and South Well (1.0 mgd) for a total of 3.72 mgd.

Table 3.18-7. Source Requirements

	2008	2009	2014	2019	2024	2029
Peak Day Demand (mgd)[1]	3.14	3.42	4.06	4.60	5.07	5.48
Existing Source Capacity[2]	3.72	3.72	3.72	3.72	3.72	3.72
Cumulative Existing Source Surplus (Deficiency)[2]	0.58	0.30	(0.34)	(0.88)	(1.35)	(1.76)

Source: Parametrix Inc. 2009.

[1] Calculated based on demand values in Chapter 3 of the *2009 Water System Plan Update*.

[2] Capacity of Sumner Springs = 1.15 mgd (million gallons per day), County Springs = 0.71 mgd, Elhi Springs = 0.13 mgd, Dieringer Well = 0.36 mgd West Well = 0.36 mgd, and South Well = 1.0 mgd.

Subtracting source capacity from peak day demand yields source surplus/deficiency. The current source has a surplus of approximately 0.58 mgd. The same analysis carried forth for 5-year intervals shows that the current water source will be insufficient to meet peak daily demand conditions by the end of 2012. The City is currently working on expansions to existing sources, development of new interties with adjacent providers, and acquisition of additional water rights. These efforts include a 450-gallon-per-minute (gpm) intertie with the City of Pacific, a 347-gpm intertie with the Mountain View–Edgewood Water District, improvements to spring sources, and construction of a new well. Combined, these improvements could provide an additional 3.31 mgd of source capacity by 2011. Construction of these improvements would eliminate the projected 2029 capacity deficit.

Storage

Five storage components are considered in the *2009 Water System Plan Update*: operation storage, equalization storage, standby storage, fire suppression storage, and dead storage. These five components are analyzed to determine if the City water system has enough storage too meet various demands.

The City's excess reservoir capacity serves as storage for peak day demands. Based on required storage calculations, the City had an excess storage capacity of 3.4 million gallons in 2008 and will have an estimated excess of 0.6 million gallons in the year 2030, assuming no source improvements are made and no additional sources are acquired. The City's existing source capacity, combined with available storage capacity, is therefore capable of supplying more capacity than estimated using the source capacity only.

The City currently has excess source capacity to meet the 3-day peak-day demands at a rate of 1.1 mgd. The City is still rigorously pursuing additional sources.

Level of Service

Water Quality

The Capital Facilities Element and the Capital Facilities Plan contain the policies relating to level of service (LOS) for the water system plan. The Capital Facilities Plan was adopted in March of 2003. It defined two LOS choices for water quality:

- LOS "A" Water quality meets both Primary and Secondary Public Health Standards.
- LOS "B" Water quality meets only Primary Drinking Water Standards.

For water quality, the City has chosen a LOS "A".

The west well may be added as an emergency backup supply. The water has manganese concentrations that exceed standards. This is a secondary standard that only affects the aesthetics. If this supply is used as a potable water supply, filters will be installed to remove manganese.

Water Delivery Reliability

Level of Service

The reliability of delivery of water to a service connection is very high with full redundancy. To meet LOS A described in Table 3.18-8, the water service would need to be connected to a looped pipeline of a minimum of 6-inch diameter. At peak hour use, the pressure in the main at the service must be at least 45 psi. With the largest supply source out of service, the remaining supply must be able to deliver the peak average daily demand. All water supplies relying on pumps with electric motors must have standby generators available in case of power outage. The system must have a sufficient number of valves to isolate a section that is no more than two city blocks in length (approx. 660 feet). Maintenance crews must be on call 24/7 and be able to muster a crew with material and equipment to any point in the system within two hours. LOS A and lesser levels are displayed in the following matrix. The minimum LOS for reliability is "B".

Table 3.18-8. Reliability Level of Service—Water System

	Level of Service			
Criteria	**A**	**B**	**C**	**F**
Conveyance Reliability; Loop (min. 6" pipe) System	95% + of services on loop lines	90% + of services on loop lines	80% + of services on loop lines	Less than 80% of services on loop lines
Source Reliability	Meets peak day w/ largest supply out	Meets peak day w/all supplies on	Meets 95% of peak-day use storage	Water restriction required
Distribution System Reliability; Isolation valves a min of 660 ft.	95% + of services meet this criteria	90% + of services meet this criteria	80% + of services meet this criteria	<80% of services meet this criteria
Power Backup for Supply Pumps;(standby generators)	100% of pumps with backup gen.	Sufficient backup for meeting MMADF	Sufficient backup for avg. daily flow	Less backup than needed for ADF
Emergency Response by Repair Crew	< 4 hrs. on 24-7 basis	< 8 hrs. on 24-7 basis	< 24 hrs on a 24-7 basis	> 24 hrs on a 24-7 basis

Source: City of Sumner 2009.

Policies

The Utilities Element of the *City of Sumner Comprehensive Plan* includes policies related to water system delivery that will meet the needs of the community's residential, commercial, and industrial community, including LOS standards for water supply.

Table 3.18-9 sets forth the minimum water flows required at the hydrant for adequate fire protection. The greater the housing density and the greater the hazard or industrial uses the greater the minimum flow and duration. The minimum flow for medium density residential and low density residential uses is 1,000 gpm for a duration of 2 hours. High-density residential and commercial land uses require a greater flow of 1,500 gpm and 2 hours duration. Typically, industrial requires

3,500 gpm with 3 hours duration, but some uses or older existing buildings require even greater flow and duration.

Table 3.18-9. Minimum Flows and Required Duration by Land Use

Use	Min. Flow (gpm)	Required Duration (Hours)
Medium and low density residential	1,000	2
High density residential and commercial	1,500	2
Industrial	3,500	3
Several existing buildings	4,500	4

Source: Parametrix Inc. 2009.
gpm = gallons per minute

Orton Junction Expansion Area

The Orton Junction expansion area is currently part of the City water service area, and the description of the water supply system for the current plan area would apply to this location, as well. Major water facilities within the Orton Junction expansion area include:

- an 18-inch diameter water main from the South Tank to the 166th Ave. E. and 78th St. E. intersection;
- a 12-inch diameter water line north on 166th Ave. E. from its intersection with 78th St. E.;
- a 12-inch-diameter water main along Orton Road/Riverside Road at the southern end of the expansion area;
- a 6-inch-diameter water line along 75th Street East at the southern end of the expansion area; and
- a 6-inch-diameter water line along Wahl Road; and
- various smaller distribution water lines serving existing customers in the area.

East Hill Reduction Area

Most of the East Hill reduction area lies within the water service area for the City of Bonney Lake, though private wells are common due to the low density of development in the area. No City water system infrastructure is currently located in the area (Parametrix, 2009).

3.18.2 Impact Analysis

Impacts Common to All Alternatives

Under all alternatives, increased population and employment would result in increased demand for water service, placing additional load on the current water supply system. As a result of this increased demand, distribution lines in the Orton Junction expansion area may need to be installed or resized to deliver adequate water flow. Based on the water demand projection methods described in Affected Environment, the City's water plan estimates daily demand at an average of approximately 171 gallons per capita for the period 2009–2029. This number was derived by dividing total projected daily demand by total population at 5-year increments during the planning

period. Therefore, it includes non-residential uses such as commercial establishments, industrial facilities, schools, and system loss.

Demand for water service would exceed supply when peak daily demand is greater than the current water supply capacity of 3.72 mgd. Based on a per capita demand of 171 gallons daily and a peaking factor of 2.0, demand would exceed supply at a service area population of 10,877. The eastern portion of the UGA, including the East Hill reduction area, lies within the service area for the City of Bonney Lake. The service area estimated 2009 population was 9,881, which results in a demand of approximately 1.69 mgd and peak demand of 3.38 mgd. Based on current supply, the system has demand surplus of approximately 0.34 mgd.

Impacts Specific to the UGA Expansion (Orton Junction) Alternative

The UGA Expansion Alternative would result in a 2030 population of 16,459 for city limits and UGA (including the Orton Junction expansion area). Growth forecast for the East Hill expansion area would not be served by the City water system, as this development would lie within the City of Bonney Lake service area. Discounting this growth, the UGA Expansion Alternative would result in a City water system 2030 population of approximately 13,970. As described under Impacts Common to All Alternatives, the City's per capita demand is 171 gallons daily. Based on this demand factor, the population increase associated with the UGA Expansion Alternative would result in a 2030 demand of 2.39 mgd and a peak daily demand of 4.78 mgd. Based on current supply information, this would result in a supply deficiency of 1.06 mgd. Implementation of the planned source improvements, well construction, and additional water rights, described under "Affected Environment," would increase source capacity to 7.03 mgd, resulting in a 2030 surplus of 2.25 mgd.

Development under the UGA Expansion Alternative would require additional water system infrastructure to be installed in the Orton Junction expansion area to serve new development. Completion of the planned source capacity improvements and water rights acquisitions will also be necessary to avoid water supply deficiencies.

Impacts Specific to the UGA Modification Alternative

The UGA Modification Alternative would result in a 2030 population of 14,706 for city limits and UGA. Growth forecast for the eastern portions of the UGA not included in the East Hill reduction area would not be served by the City water system, as this development would lie within the City of Bonney Lake service area. Discounting this growth, the UGA Modification Alternative would result in a City water system 2030 population of approximately 13,307. As described under "Impacts Common to All Alternatives," the City's per capita demand is 171 gallons daily. Based on this factor, 2030 demand under the UGA Modification Alternative would be 2.28 mgd, with a peak daily demand of 4.55 mgd. Based on current supply information, this would result in a supply deficiency of 0.83 mgd. Implementation of the planned source improvements, well construction, and additional water rights, described under "Affected Environment," would increase source capacity to 7.03 mgd, resulting in a 2030 surplus of 2.48 mgd.

Development under the UGA Modification Alternative would require additional water system infrastructure to be installed in the Orton Junction expansion area to serve new development. Completion of the planned source capacity improvements and water rights acquisitions will also be necessary to avoid water supply deficiencies. Because the East Hill reduction area currently receives

water from a mixture of private wells and the City of Bonney Lake water system, the removal of this area from the Sumner UGA would not affect the City's plans for the provision of future service.

Impacts Specific to the No Action Alternative

The No Action Alternative would result in a 2030 population of 15,495 for Sumner and its UGA. Growth forecast for the eastern portion of the UGA, including the East Hill expansion area, would not be served by the City water system, as this development would lie within the City of Bonney Lake service area. Discounting this growth, the No Action Alternative would result in a City water system 2030 population of approximately 13,009. As described under the Impacts Common to All Alternatives, the City's per capita demand is 171 gallons daily. Based on this factor, 2030 demand under the No Action Alternative would be 2.22 mgd, with a peak daily demand of 4.45 mgd. Based on current supply information, this would result in a supply deficiency of 0.73 mgd. Implementation of the planned source improvements, well construction, and additional water rights, described under "Affected Environment," would increase source capacity to 7.03 mgd, resulting in a 2030 surplus of 2.58 mgd.

3.18.3 Mitigation Measures

Incorporated Plan Features

- The City's Capital Facilities Element contains goals and policies regarding water systems, which would remain in place under all alternatives.

Applicable Regulations and Commitments

- The Washington State Department of Health requires water systems with 1,000 or more connections to submit water system plan updates every six years.
- Washington State Department of Ecology regulations apply to water rights and source development, including rules for the appropriate treatment of groundwater.
- The City has adopted the *2009 Water System Plan Update*.

Other Potential Mitigation Measures

- The City could implement an aggressive water conservation program for residential, commercial and industrial users.
- The City could expand the watershed protection by acquiring additional land around the existing watershed.
- The City could implement an impact fee or other financial methods to finance improvements as recommended in the *2009 Water System Plan Update*.
- The City could establish a policy for new and/or existing businesses to use water at the average per capita employee level. Those not able to meet the goal should be encouraged to conserve, reuse water, or develop new sources.
- In conjunction with developing additional sources, the City could develop a more detailed well head and groundwater protection program.

- The City should continue efforts to complete the planned improvements to long-range water supply, including construction of physical source improvements, additional wells, and the acquisition of additional water rights.

Significant Unavoidable Adverse Impacts

Future growth in the City of Sumner and its UGA will lead to increased demand for water services, though water reuse and recycling or demand management measures could partially reduce the need for additional water supply. With the implementation of the City's planned improvements to water source capacity, no significant unavoidable adverse impacts would occur.