Chapter 2 – System Overview - Contents

2.1 Ownership and Management ................................................................................................... 2-1
2.2 History ......................................................................................................................................... 2-2
2.3 Service Area ................................................................................................................................ 2-3
   Environment and Land Use ........................................................................................................ 2-3
   Service Area System Information .......................................................................................... 2-9
2.4 Facilities Inventory ...................................................................................................................... 2-12
   Source of Supply ...................................................................................................................... 2-12
   Storage ........................................................................................................................................... 2-13
   Transmission and Distribution ................................................................................................. 2-13

Tables
Table 2.1. System Profile ................................................................................................................. 2-1
Table 2.2. City of Olympia Water Supply Sources ..................................................................... 2-13
Table 2.3. Olympia Water Distribution System Pressure Zones .............................................. 2-13

Figures
Figure 2.1. Water System Service Area, Olympia ......................................................................... 2-14
Figure 2.2. Olympia and Urban Growth Area Current Zoning .................................................. 2-15
Figure 2.3. Olympia and Urban Growth Area Future Land Use ............................................... 2-16
Figure 2.4. Location of Major Water System Components .......................................................... 2-17
Figure 2.5. Water System Profile ................................................................................................. 2-18

Appendices – (CD only)
2-1 Amendment to Extend Service Area
2-2 Intergovernmental agreement with City of Lacey. Intergovernmental Agreement for Sale of Water (2007 and 2010 Amendment No. 1)
2-3 Intergovernmental agreement with City of Lacey. Draft Mutual aid agreement (being negotiated).
2-4 Intergovernmental agreement with City of Tumwater. Mutual Aid Agreement Between the Cities of Tumwater and Olympia For the Use of Emergency Water System Interties (2001)
2-6 Intergovernmental agreement with Thurston PUD No. 1 – Amendment No.2 to Intergovernmental Agreement for Sale of Water, Assignment of Water System Accounts, and Management of Water System (2007)
2-7 Intergovernmental agreement with U.S. Army (Fort Lewis). Department of the Army Mutual Aid Agreement (2005)
2-8 Water Facilities Inventory (DOH WFI)
2. System Overview

This chapter gives an overview of Olympia’s water system, including the ownership and management, history, service area environment and land use; service area boundaries, customers and neighboring purveyors. It also generally describes the system infrastructure: supply, storage and transmission/distribution.

Olympia is located in Thurston County, at the southern tip of Puget Sound. It is approximately 65 miles south of Seattle, 105 miles north of Portland, and 45 miles east of Aberdeen. As the state capitol as well as the county seat, its activity is fueled to a great extent by government activity. The adjacent cities of Lacey and Tumwater contribute to the metropolitan nature of the area.

2.1 OWNERSHIP AND MANAGEMENT

The City of Olympia owns and operates a public water supply system that serves customers within its Water Service Area. Key facts about the Utility are shown in Table 2.1. The City does not own or manage more than one public water system and therefore is not a satellite management agency.

Olympia’s public utilities are managed within the Public Works Department, which is organized into four lines of business (Water Resources, Waste Resources, Transportation and Technical Services). The three water-related utilities (Drinking Water, Wastewater and Storm and Surface Water) are managed under the leadership of the Water Resources Director.

The Drinking Water Utility encompasses Planning and Implementation, Water Operations, Pump Stations and Water Quality. The Utility is supported by Public Works Technical Services, which includes Engineering, Data Management, Facilities and Fleet services. The Utility develops its own annual operating budget and capital facilities program, with assistance from the Public Works Finance Manager.

<table>
<thead>
<tr>
<th>Table 2.1. System Profile</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Water System Name</strong></td>
</tr>
<tr>
<td><strong>Water system identification number</strong></td>
</tr>
<tr>
<td><strong>Water system classification</strong></td>
</tr>
<tr>
<td><strong>Type of ownership</strong></td>
</tr>
<tr>
<td><strong>System contact person</strong></td>
</tr>
<tr>
<td><strong>Service area population (2007)</strong></td>
</tr>
<tr>
<td><strong>Number of metered service connections (2007)</strong></td>
</tr>
<tr>
<td><strong>Capacity of distribution storage tanks</strong></td>
</tr>
<tr>
<td><strong>Supply sources</strong></td>
</tr>
</tbody>
</table>
2. System Overview

2.2 HISTORY

Historical accounts of water service to Smithville, as Olympia was originally known, are vague. The earliest accounts describe a combined creek and groundwater source emanating from the Moxlie Creek watershed. When peak system demands began to exceed the supply capacity in 1945, the City developed the current McAllister Springs source. McAllister Springs is the headwaters for McAllister Creek, which flows into the Nisqually Delta, just south of the Nisqually River.

The City purchased the property in 1941, and constructed the pump house and pipeline in 1946 and 1947. In 1949, Olympia began pumping water from McAllister Springs. The Moxlie Creek watershed was maintained as an alternate source until it was abandoned in the mid-1950s. McAllister Springs still provides the major portion of Olympia’s water, along with six supply wells. In partnership with the Nisqually Indian Tribe, the City is seeking to replace McAllister Springs with an upgradient wellfield to avoid the need for ultra-violet treatment at the Springs, avoid risk of contamination from transportation spills and anticipate the potential effects of saltwater intrusion due to sea level rise. Also, the output of the Springs is declining and the City is periodically unable to use its full water rights there.

McAllister Springs and Creek have great cultural and historical significance to the Nisqually people. The Springs are within the aboriginal territory of the Nisqually, a Salish-speaking group that lived in villages along the banks of the Nisqually River and its tributaries, including McAllister Creek. McAllister Creek was also known as Medicine Creek, in reference to its spiritual importance for the Nisqually, and was the place where the 1854 Treaty of Medicine Creek was signed.

2.3 SERVICE AREA

Olympia’s water service area includes the incorporated City limits and its Urban Growth Area (UGA). There are several exceptions, The Evergreen State College, the area around 11th Ave NW in West Olympia, McLane Elementary School and the regional Fire Training Center off Delphi Road, a few parcels North of 26th Ave NE that lie outside the UGA and some locations in Lacey and Tumwater where Olympia is serving accounts that were connected prior to the Coordinated Water System Plan. Figure 2.1 identifies Olympia’s service area boundaries. This figure also shows the 20 direct service connections off our 36 inch main that lie outside Olympia’s service area. These are historic connections, which pre-date the Coordinated Water System Act of 1977. Olympia has an informal agreement with Lacey and Thurston PUD No.1 to move these connections off the 36 inch main and into their systems as it makes sense to do so.

Figure 2.1 also shows the existing/retail and future zones within Olympia’s water service area. The existing/retail zone is generally those areas where we currently provide service, or where service is immediately available. The future zone is areas where we do not yet provide services, but they lie within our water service area. The following sections describe the natural environment and land use in the service area, and system information including wholesale and retail customers, neighboring purveyors and interties.
2. System Overview

Environment and Land Use

This section reviews the topography, hydrogeology and land use of north Thurston County and the Utility service area.

Topography

Olympia lies within a basin called the Puget Sound lowlands, which was formed by glacial action and erosion and sediment deposits since the last ice age. The landscape is generally low-lying, with topography ranging from sea level along the shoreline of Puget Sound to more than 360 feet above sea level to the south near Fort Lewis and above 460 feet at Tumwater Hill. Olympia’s west side rises rapidly from Puget Sound and Capitol Lake before leveling off and forming a portion of the Cooper Point Peninsula.

Land elevation within and between neighborhoods varies appreciably. To address this issue, the service area is divided into pressure zones. Storage tanks and booster pumps are constructed to ensure adequate water pressure for all customers regardless of their location.

The region is dissected by the Nisqually and Deschutes Rivers, with numerous tributary streams, glacial lakes, ponds, wetlands and springs. Most of Olympia is at the mouth of a watershed drained by the Deschutes River, discharging into Puget Sound’s Budd Inlet. Near its confluence with Budd Inlet, the river flows through Capitol Lake, an artificial lake created in 1951 by a dam on the Deschutes River. The lake separates the downtown business district from Olympia’s west side.

A portion of west Olympia, the Green Cove Creek basin, is in the Eld Inlet watershed, and a portion of east Olympia drains into Woodard Creek in the Henderson Inlet watershed. McAllister Springs, the City’s primary water source, is within the Nisqually River watershed.

Large portions of the north Thurston region are rural with coniferous forests and open prairies, with urban areas centered around Olympia/Lacey/Tumwater, Yelm and several smaller towns.

Hydrogeology

Following is a general description of hydrogeology in the service area. See Chapter 8, Groundwater Protection, for more specific hydrogeology of designated Drinking Water (wellhead) Protection Areas, and Appendix 8-1 for Golder & Associates 2008 assessment of hydrogeologic conditions. Understanding of the regional geology and hydrogeology has evolved during the last 10 years, as the need to better manage Thurston County’s water resources has increased, and improved investigative and analytical techniques have been applied.

Geology in Olympia and the rest of Thurston County is the result of substantial glacial activity in Puget Sound. Receding glaciers left the land dotted with lakes and ponds. Materials deposited during successive glacial periods vary from fine-grained sand and clay to large-sized gravel. These materials are dispersed throughout the area in a complex series of formations.
created by thousands of years of land, water and ice movement. Many of the formations are
highly permeable, with the capacity to absorb 50-plus inches of annual precipitation.

Olympia’s most productive aquifers are in these areas, but they are also extremely vulnerable to
contamination. Several minor incidents of groundwater contamination have occurred in recent
years in northern Thurston County. Studies have documented steadily increasing levels of
nitrogen in the groundwater, particularly in the area around the Shana Park Well 11 (S10), due
to soluble lawn and turf fertilizers and on-site sewage systems.

This section highlights key points from Golder’s report relevant to understanding of Olympia’s
drinking water aquifers and delineation of Drinking Water Protection Areas presented in
Chapter 8.

Geology and Hydrogeology

In 2007, a re-evaluation of bedrock showed a generally thinner, shallower bedrock depth
toward the northeast. Differences in interpretations related to Olympia’s aquifers are:

- Generally thinner sediments in the McAllister area (between 500 and 600 feet, rather
  than between 700 and 1,200 feet)
- Recognition of a local bedrock high point near Chambers Lake in the East Olympia area,
  with bedrock as shallow as 450 feet below ground surface.
- Identification of a bedrock trough to the east of the West Olympia area where the depth
  increases to 500 feet.

Understanding of the stratigraphy (layering) of the unconsolidated and semi-consolidated
sediments has evolved significantly over the past ten years. Traditionally, strata were
considered to be relatively continuous laterally across the region, except in river valleys. Recent
reinterpretations show subsurface conditions to be much more complex.

Following is a general description of the various hydrostratigraphic units (layers) under the
current interpretation. See Chapter 8 for maps showing these layers for each Drinking Water
Protection Area, and Appendix 8-1 for details.

- **Post-Vashon (Holocene) Alluvial and Deltaic Sediments.** Along shallow valley
  bottoms of the main streams. Minimally significant in storing or transmitting
  groundwater.

- **Vashon Recessional Outwash (Qgo, Qgos).** Permeable sand and gravel deposits that
  make up the unconfined water table aquifer in large parts of the region, but may not
  always contain groundwater. Supports wells for mostly small, domestic use. Shana Park
  Well is completed in this aquifer, as well as the Qga.

- **Vashon Glacial Till (Qgt).** Sand, gravel and boulders encased in a silt-clay matrix.
  Commonly referred to as “hardpan” where laid down beneath heavy glacial mass, but
  less compact where formed by ice melting. Exposed in many parts of the region, notably
  above incised stream valleys and in upland areas. Generally acts as an extensive
  confining bed with occasional permeable windows.
2. System Overview

- **Vashon Advance Outwash (Qga).** Fine- to coarse-grained sand and gravel, laterally extensive in the region, but exposed only along steep river and Puget Sound bluff faces. The main aquifer for most small-scale private wells; supplies several larger-yielding municipal and industrial wells. Shana Park Well 11 (S10) and Kaiser Well 1 (S03) are completed in this aquifer.

- **Pre-Vashon Glaciolacustrine Deposits (Qpf).** Laminated clayey and silty sediments, with low permeability. Confining layer between the overlying Vashon and underlying pre-Vashon aquifers.

- **Pre-Vashon Gravel (Qpg).** Coarse, stratified sand and gravel, laterally extensive and exposed along the bottom of the Nisqually River between the confluence with the McAllister Valley and Muck Creek. Rarely more than 50 feet thick (between 15 and 70 feet), but forms the principal economic (mostly confined) aquifer in the area tapped by wells. Primary supply source for the City’s Allison Springs Well 13 (S09) and Well 19 (S11), Hoffman Well 3 (S08) and Indian Summer Well 20 (S12).

- **Undifferentiated Quaternary and Tertiary Deposits (TQu).** Fine- to coarse-grained unconsolidated sediments extending to bedrock. Consists of a sequence of aquifers and confining beds, tapped locally by only a few water wells.

- **Bedrock.** Relatively impermeable sedimentary sandstone, siltstone and claystone, and some igneous bodies of andesite and basalt. Does not contribute to the regional groundwater flow system, although some private wells produce groundwater from these layers.

Two locally defined aquifer units, the Unconfined McAllister Gravel (Qmg) and Deschutes Valley Aquifer (DVA) systems supply Olympia’s water. Both McAllister Springs and the planned Wellfield are supplied by the deep and productive Qmg. The future Briggs Well (S13) will be supplied by the DVA system.

**Groundwater Conditions**

The following summarizes the information on groundwater flow, and regional recharge and discharge from Golder’s report.

**Groundwater Flow**

Regional groundwater flow occurs in the three primary aquifers (Qga, Qpg and TQu), whereas local flow occurs in the mostly perched Qgo unit and in the highly transmissive McAllister Gravel aquifer (Qmg) located in the McAllister-Nisqually area. Where present, the intervening till and fine-grained lacustrine units act to hydraulically separate the aquifers, resulting in piezometric head differences of more than 100 feet between the water table and TQu aquifers in some areas.

Regionally, groundwater flows from the upland recharge areas in the southern part of Thurston County toward the north, where groundwater discharges to Puget Sound, the main rivers (the Nisqually and Deschutes), natural springs and seeps, numerous shallow lakes and streams.
Groundwater elevations up to 400 feet mean sea level (msl) occur in the area south of Rainier and Yelm. Conversely, groundwater levels are as low as a few feet above msl along the Puget Sound and less than 20 feet above msl in the upper part of the McAllister Valley.

The regional flow pattern is disrupted in several areas where local groundwater mounds exist due to shallower till units, and local convergence of groundwater occurs due to higher permeable units, as in the McAllister area.

**Regional Recharge**

The primary regional source of groundwater is infiltration of precipitation (or precipitation-derived) recharge. Locally, seepage from rivers, streams and lakes also provides a source of groundwater where surficial soils are sufficiently permeable to allow the vertical movement of water to the water table. Also, some relatively minor return flow of groundwater pumped by individual private wells occurs via onsite sewage systems in areas that are not sewered. Some inflow of groundwater into the area also occurs from the south of Fort Lewis.

**Regional Discharge**

The main discharge of groundwater occurs as subsurface outflow to Puget Sound, seepage to support the main rivers, lakes and streams, discharge at natural springs and groundwater pumping. Most of these are non-point flows and therefore are difficult to measure directly. However, records of discharge at some of the main features (such as McAllister Spring and the municipal wells) do allow local water budgets to be estimated.

**Groundwater Quality**

The regional quality of the groundwater is considered good, and has been characterized as calcium magnesium bicarbonate. Water chemistry issues that may be found in localized areas are:

- **Iron and Manganese.** Elevated levels of iron and manganese have been reported in numerous wells.

- **Nitrates.** The principal sources of nitrates to groundwater in the region are associated with on-site sewage systems, and soluble fertilizer application.

- **Chloride.** Due to the proximity to Puget Sound, the deeper groundwater in aquifers that are in continuity with the saltwater body is at risk from seawater intrusion under excessive pumping pressure. Although none of the City’s wells have exhibited elevated chlorides (the most common indicator of advancing saline waters), this risk should continue to be considered as groundwater development increases in the region.

See Chapter 8 for potential sources of contamination in Drinking Water Protection Areas. See Chapter 12 for information on how the Utility maintains quality of water at the tap.
Climate

Due to its elevation and location on Puget Sound, Olympia's climate is characterized by warm dry summers and cool wet winters. Winter weather in Olympia is temperate, wet and generally overcast. Summer weather is moderate and comparatively dry. The average annual range in temperature is relatively narrow, from an average low of 39 degrees F to an average high of 60 degrees.

During the wet season, generally from October to May, storms usually arrive from the southwest and continue toward the Olympic Peninsula. An occasional Arctic storm brings freezing temperatures, hail or sleet, freezing rain or snow. The coast range and Olympic Mountains protect the area from strong Pacific storms during the fall and winter. An average annual rainfall of about 51 inches can be attributed to the onshore effects of maritime disturbances originating in the Pacific Ocean.

Climate Change Trends

The warming climate is projected to cause changing weather patterns. In general, the Washington Department of Ecology (Ecology) expects western Washington to experience milder, wetter winters and drier, hotter summers. The water system will potentially be affected by changing levels of precipitation and rising sea level in Puget Sound. For details, see Ecology’s climate change website, http://www.ecy.wa.gov/climatechange/effects.htm.

In preparing the water demand forecast for this Plan (Chapter 3), the Utility has developed estimates that take into account a range of potential changes in temperature and precipitation. The University of Washington Climate Impacts Group (CIG) has measured observed effects of global climate change in the Pacific Northwest and Puget Sound, and projected potential future trends. The CIG’s findings as of 2007 are summarized below, as cited in a September 2007 report on Olympia’s Response to the Challenge of Climate Change (City of Olympia, 2007).

Rising Temperature

Since 1920, average annual temperature in the Pacific Northwest has increased 1.5 degrees Fahrenheit, with the largest changes during winter months. The rate of warming is expected to accelerate; the best estimate is a rate of over three times the increase of 0.15 percent per decade observed during the 20th century. Estimates range from increases of 0.7 to 3.2 degrees by the 2020s, 1.4 to 4.6 degrees by the 2040s, and 2.9 to 8.8 degrees by the 2080s. (Olympia’s water demand forecast more conservatively assumes temperature changes 1.8 to 5.4 degrees F above historic levels by 2020 and 2.4 to 7.2 degrees higher by 2040, based on the CIG’s 2002 forecasts for the Portland (OR) Water Bureau.)

Precipitation Increases

Since 1973, cool season precipitation in the Pacific Northwest has been more variable from year to year. Snow water equivalent declined between 1950 and 2000, especially in low and middle elevations, due to increase in temperature and declines in precipitation. Regional climate
models predict more precipitation relative to historic and annual averages, generally more precipitation in winter and less in summer; the result would be a shift towards higher winter flows and lower spring/early summer flows.

Average annual precipitation in the Pacific Northwest is expected to change –4 to 7 percent by the 2020s, -4 to 9 percent by the 2040s, and -2 to +1 percent by the end of the century (2070-2100). Most of the increase in precipitation is expected in the winter months. (Olympia’s water demand forecast assumes seasonal increases in precipitation ranging from 70 percent to 160 percent of historical records in 2020, and from 75 percent to 140 percent of historical records in 2040, also based on the CIG’s 2002 forecasts for the Portland (OR) Water Bureau.)

**Sea Level Rise**

A 1993 City of Olympia report found that sea level is already rising in Olympia by about one foot per century due to post-ice age warming of the oceans and subsidence of the land (City of Olympia, 1993). This rate is expected to increase with rising global temperatures. In a January 2008 report, the University of Washington Climate Impact Group (CIG) recommends that for decisions with long timelines and low risk tolerance, such as coastal development and public infrastructure, local policymakers should consider low-probability, high-impact estimates of sea level rise.

For the Puget Sound Basin, the CIG’s estimate is 22 inches by 2050 and 50 inches by 2100. This estimate combines the International Panel on Climate Change (IPCC) high greenhouse gas emissions scenario with higher estimates of ice loss from Greenland and Antarctica, seasonal changes in atmospheric circulation in the Pacific, and vertical land subsidence (CIG, 2008).

**Potential Climate Change Impacts**

Projected climate change could affect the Utility in two ways:

**Saltwater intrusion from rising sea level.** The City’s primary drinking water source at McAllister Springs is subject to saltwater intrusion from rising sea levels. The City is planning a new wellfield upgradient of the Springs, which will mitigate this risk (see Chapter 5).

**Increased demand due to rising summer temperatures.** Under current climate conditions, water use increases as summer temperatures rise. If summers in Olympia become hotter and drier, demand for water may increase correspondingly. In developing its 50-year demand forecast, the Utility believed it prudent to anticipate this potential trend. Therefore, the Utility has analyzed water demand under two climate scenarios. One assumes a 5 percent increase in maximum day demand; the other a 10 percent increase. (See Chapter 3 for details.)

While changes in climate are expected to occur gradually over many years, the Utility’s focus on water conservation and use of reclaimed water should help counteract increases in demand for potable water.
Land Use and Zoning

This section characterizes the current land use and future zoning of the Utility’s service area. See Chapter 8, Groundwater Protection, for land use and zoning in designated drinking water protection areas; and Chapter 11, Transmission and Distribution Infrastructure, for information on land use by pressure zone.

Current Land Use and Zoning

Residential and commercial properties are developing rapidly in Olympia, its urban growth area (UGA), and the adjacent cities. Olympia is permitting relatively large subdivisions at an increasing rate, with approximately 300 - 500 homes constructed per year. Many of these are being constructed at land use densities of five to seven units per acre compared to historical densities of four to five units per acre.

Southeast Olympia and the associated UGA are currently experiencing the greatest development pressure. Areas of northwest Olympia and, to a lesser extent, northeast Olympia, are also developing rapidly. Figure 2.2 shows current zoning.

Future Land Use

The best projection of future land use is in the designations given by Olympia’s Comprehensive Plan as amended December 2007 (Figure 2.3). The Plan is designed to accommodate 20-year projected growth as required by the Growth Management Act. Generally, the City is moving toward infilling areas already characterized by urban development, phasing urban development facilities outward from core areas, and requiring new development to be configured to allow for future infill. The Plan aims to bolster the downtown area as the city center, with major arterial street corridors evolving into mixed use, high-density areas, and regional shopping and service areas continuing to develop around the Capital Mall and Lilly Road.

Service Area System Information

Within Olympia’s service area, water is available to all new retail customers through main extensions or by connecting to existing mains. As of 2007, the service area population was approximately 53,220, and the Utility had 18,827 metered service connections.

The City also serves two wholesale customers: the City of Lacey and Thurston Public Utility District (PUD) No. 1, which owns the Tanglewilde – Thompson Place water system in the City of Lacey’s UGA.

Water service consists of the sale of potable water to residential, commercial, industrial, and institutional customers, as well as the use of water for fire protection. Reclaimed water is distributed to several customers in downtown Olympia.

The service area is divided into seven pressure zones. Water demand calculations for each pressure zone, as shown in Chapter 3, take into account population growth and development.
The infrastructure improvements described in this Plan (Chapters 9-11) will ensure that the City has sufficient capacity to provide water service in a safe and reliable manner.

**Neighboring Purveyors**

The water service areas of Lacey and Tumwater border Olympia’s service area to the east and south. Both cities are currently in the process of updating their water system plans.

Within the boundaries of Olympia’s service area there are 12 known small public water systems serving a total of about 1,500 people.

**Service Area Agreements**

Water service areas in North Thurston County are designated in the Coordinated Water System Plan (CWSP, 1986 and 1996 Area Wide Supplement). The CWSP has not been updated to reflect the 2005 agreement under which the City no longer provides retail service to the Tanglewilde and Thompson Place areas within Thurston PUD No. 1.

In July 2006 the City requested an amendment to its 2004 Water System Plan to support a planned extension of the City's water service area outside of its Urban Growth area. The extension provides water service to the new McLane Fire District 9 facility on the northwest corner of Delphi and Mud Bay Roads. Thurston County signed the required local government consistency statement, and the Washington State Department of Health (DOH) approved this amendment in August 2006. The service area was also updated and approved as part of this Plan update. **Appendix 2-1.**

Olympia also has intergovernmental agreements with the Cities of Lacey and Tumwater, Thurston PUD No. 1, and Fort Lewis, which are described below:

- **City of Lacey.** Under the 2007 Intergovernmental Agreement for Sale of Water (Appendix 2-2), Olympia agrees to sell Lacey up to 2 million gallons per day during November through June and up to 1 million gallons per day during July through October. Olympia may temporarily interrupt or reduce delivery of water to Lacey in event of emergency or need for maintenance or repair. This is a two-year agreement with a possible two-year extension. A mutual aid emergency agreement is being negotiated with City of Lacey (Appendix 2-3).

- **City of Tumwater.** Under the 2001 Mutual Aid Agreement Between the Cities of Tumwater and Olympia For the Use of Emergency Water System Interties (Appendix 2-4), each City agrees to provide potable water service to the other for use in fire fighting, drinking water and personal hygiene. It will be activated only in the event of an emergency proclamation by the city requesting assistance.

- **Thurston PUD No. 1.** In 2005, Olympia signed a 20-year agreement with Thurston PUD No. 1, Intergovernmental Agreement for Sale of Water, Assignment of Water System Accounts, and Management of Water System (Appendix 2-5), which terminated the 1996 agreement under which Olympia had operated the PUD system. Since then Olympia has continued providing water but the PUD operates its own system. The agreement was amended in 2007, to specify the quantity and price of water to be supplied, and committing the City
to provide sufficient water to serve ultimate buildout of the (PUD’s) service area (see Appendix 2-6).

• **Fort Lewis.** Under this 2005 mutual aid agreement, the U.S. Department of the Army at Fort Lewis and the City of Olympia agree to assist each other in fire prevention and the protection of life and property from fire and fire fighting and other emergencies, including response to hazardous materials spills. The Fort Lewis Fire Department staff is fully trained and equipped to respond to any size of spill. (See Chapter 8, spill response planning.)

Emergency supply agreements are authorized under Chapter 38.52 RCW, Emergency Management. Sale of water to another municipality is authorized by Chapter 29.34 RCW, RCW 35.92.170 and RCW 35.92.200.

**Interties**

Olympia sells water wholesale to the City of Lacey through a booster pump station from the 36-inch main located at Pacific Avenue and Mountainaire Road, west of Marvin Road. There are also two emergency interties with the Lacey system: one on Sleater-Kinney Road Southeast near McDonalds and another off Sleater-Kinney Road Northeast and Sixth Avenue Northeast near North Thurston High School.

Olympia has two emergency interties with the City of Tumwater: one at the intersection of Capitol Boulevard and Carlyon Avenue Southeast, the other at the intersection of the Mottman Road and Crosby Boulevard Southwest.

There are two interties providing wholesale water to North Thurston PUD No. 1: one at Pacific Avenue and Seahawk Street Southeast and the other at Pacific Avenue and Steilacoom Road.

For details on the emergency interties with Lacey and Tumwater see Chapter 11 and the Emergency Response Plan. Figure 2.4 shows the general location of these interties and these interties are included in the Water Facilities Inventory Form in Appendix 2-8.

**Service Area Boundaries**

With a few exceptions, the public utility service areas for Olympia, Lacey and Tumwater are contiguous with the Urban Growth Area boundary, as shown in Figure 2.1. The service area boundary establishes the limits of City water service responsibilities through direct connection.

Outside the UGA, Olympia also provides retail water service to The Evergreen State College, in accordance with a 1969 agreement; and small areas off Overhulse Road on the west side, as a result of a court order. Several customers are served directly off the 36-inch transmission main from McAllister Springs.

Olympia provides wholesale water service to the City of Lacey to supplement its own sources, and to Thurston PUD No. 1, which includes the Tanglewilde and Thompson Place subdivisions. The growth potential and water use rates of these areas were considered during Plan development to assist the City in determining its future source needs and planning its operations programs.
Olympia operated and maintained Thurston PUD No. 1’s water system beginning in 1964. In June 2005, the PUD assumed operation and maintenance responsibilities and became a wholesale customer of Olympia’s Water Utility.

### 2.4 FACILITIES INVENTORY

Olympia’s water system consists of a series of springs, wells, pumps, storage tanks and transmission and distribution lines. This section presents an overview of Olympia’s water system facilities. The Water Facilities Inventory submitted to DOH is in Appendix 2-8.

**Figure 2.4** is a schematic showing the major components of Olympia’s water system and where they are located.

**Figure 2.5** is a water system profile schematic showing the elevations of major system components. The wells, reservoirs, booster pump stations, and other related facilities are described in Chapters 9-11.

### Source of Supply

Olympia is dependent on both surface and groundwater to meet its drinking water needs. McAllister Springs is the primary source of water for all City customers. From May through October daily water use doubles and sometimes nearly triples, mostly due to outdoor water use. During these months the City uses up to six wells to supplement McAllister Springs.

Protection areas are designated for each source. Hydrogeology, boundary delineations, land use and zoning for each area are described in Chapter 8, Groundwater Protection.

McAllister Springs provides approximately 84 percent of the total source capacity for the City. McAllister Springs is unfiltered surface water and therefore subject to more stringent surface water treatment requirements. It is located about 10 miles east of the City off the Old Pacific Highway near the mouth of the Nisqually River. At the Springs, water bubbles up from the ground and is pumped to the Meridian Storage Tanks, less than a mile to the southeast. A 36-inch transmission main takes the water on a nine-mile journey, mostly beneath Pacific Avenue, into the storage tanks on Fir Street and Seventh Avenue. From there it is pumped and piped throughout the City.

The balance of the City water is provided seasonally by six wells. East Olympia is served by Shana Park Well 11 (S10), Hoffman Well 3 (S08) and Indian Summer Well 20 (S12). West Olympia is served by Allison Springs Wells 13 and 19 (S09 and S11) and Kaiser Road Well 1 (S03).

**Table 2.2** summarizes basic information about each source. For details, see Chapter 5 and Chapter 9.

Five booster pump stations feed various parts of the City with water from McAllister Springs (see Chapter 11).
Table 2.2. City of Olympia Water Supply Sources

<table>
<thead>
<tr>
<th>Source</th>
<th>Location &amp; Approximate Area of Drinking Water Protection Area</th>
<th>Share of Production</th>
</tr>
</thead>
<tbody>
<tr>
<td>McAllister Springs</td>
<td>North Thurston County south of Nisqually Delta</td>
<td>84.0%</td>
</tr>
<tr>
<td>Hoffman Well 3</td>
<td>Southeast Olympia, Lacey urban growth area and Thurston County</td>
<td>5.2%</td>
</tr>
<tr>
<td>Shana Park Well 11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indian Summer Well 20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Allison Springs Wells 13 and 19</td>
<td>West Olympia and Thurston County</td>
<td>10.8%</td>
</tr>
</tbody>
</table>

Storage

Eleven storage tanks serve seven pressure zones throughout the City, with a total capacity of 30.88 million gallons. Five are steel and six are concrete. The Meridian Storage Tanks, located west of McAllister Springs, provide 8 million gallons of storage. (See Chapter 10 for details.)

Transmission and Distribution

The transmission and distribution system is a network of 275 miles of pipe, ranging from ¾-inch to 36 inches in diameter and ranging in age from new to nearly 80 years old. The pipes are made of various materials, including galvanized steel, polyvinyl chloride (PVC), asbestos cement, concrete, ductile iron, steel, high-density polyethylene and plastic.

Because of the topography and extent of the service area, as well as the arrangement of storage tanks and other facilities, Olympia’s water distribution system has been divided into seven pressure zones, listed in Table 2.3. For details, see Chapter 11.

Figure 2.2 shows the boundaries of the seven pressure zones within Olympia’s retail service area. The pressure zones are designated with numbers that correspond to the overflow elevation (highest water level in the reservoir as measured from mean sea level) of the reservoir(s) that feeds that particular zone. For example, Zone 417 is served by the Hoffman Reservoir, which has a maximum water level in the reservoir of 417 feet above mean sea level. For details on pressure zones see Chapter 10, Storage Infrastructure and Chapter 11, Transmission and Distribution Infrastructure.

Table 2.3. Olympia Water Distribution System Pressure Zones

| Zone | Pressure Control Facility | Maximum HGL
|------|---------------------------|------------|
| 417  | Fones Rd. & South Sound Booster Pump Stations/Shana Park, Hoffman and Indian Summer wells | 417
| 338  | Boulevard Storage Tank /pressure-reducing valve from Zone 417 | 338
| 347  | Eastside Booster Pump Station | 347
| 247  | 36-inch gravity line from Meridian Storage Tanks | 264
| 226  | Fir Street Storage Tanks | 226
| 298  | Allison Springs wells | 298
| 380  | West Bay Booster Pump Station | 380

1. Maximum hydraulic grade line (HGL) is the overflow elevation of the tank(s) serving the zone.
FIGURE 2.1
Water System Service Areas, Olympia and Neighboring Cities

Water System Service Areas
- Olympia
- Other Jurisdictions

City Boundaries
- City Limits
- Urban Growth Boundaries

36" Transmission Main
Red stars indicate services off of 36" Main

Services off 36" Main

2009 Water System Plan
Olympia and Urban Growth Area - Current Land Use

Legend
- Residential Very High Density - 14.5 or more du/acre
- Residential High Density - 6.5 to <14.5 du/acre
- Residential Moderate Density - 3.5 to <6.5 du/acre
- Residential Low Density - 0 to <3.5 du/acre
- Vacant Land
- Commercial
- Parks, Preserves, & Open Space
- Natural Resources (Public and Private)
- Water Bodies
- Roads, Railroads, & Rights of Way
- Industrial
- Government/Institutional
- OLYMPIA
- URBAN GROWTH AREA
- Water Body
- Stream