Water Management and Conservation Plan

Prepared for

City of Newberg, Oregon

August 2019

Prepared by

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Acronyms

ADD	Average day demand
AWWA	American Water Works Association
cfs	Cubic feet per second
EOP	Emergency Operations Plan
FFA	Future Farmers of America
FTE	Full time employee
FY	Fiscal year
gpcd	Gallons per capita per day
gpm	Gallons per minute
GR	Groundwater Registration
MDD	Maximum day demand
MG	Million gallons
mgd	Million gallons per day
MMD	Maximum month demand
MU	Municipal (water right)
OAR	Oregon Administrative Rules
ORS	Oregon Revised Statute
OWRD	Oregon Water Resources Division
PSU	Portland State University
UGB	Urban Growth Boundary
URA	Urban Reserve Area
WMCP	Water Management and Conservation Plan
WMP	Water Master Plan
WTP	Water treatment plant
WWTP	Waste water treatment plant

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Executive Summary

The City of Newberg (City) presents its 2019 Water Management and Conservation Plan (WMCP) to the Oregon Water Resources Department (OWRD) and interested parties. The City is submitting this plan as an update to its 2009 WMCP as required by OWRD in OWRD's final order that approved the 2009 WMCP. This 2019 WMCP substantially revises the City's 2009 WMCP with information to fully meet the Oregon Administrative Rules (OAR), Chapter 690, Division 86 (December 2018).

This WMCP describes the City's management of its existing water rights and presents a comprehensive strategy for meeting its municipal water supply needs during the next 20 years.

Meeting the WMCP Criteria

Approval of this WMCP is contingent upon the City meeting the criteria outlined under OAR 690-086-0130. Accordingly, the City has prepared a concise statement addressing each of the review criteria as described below.

- Inclusion of specific elements under OAR 690-086-125: The current plan includes specific sections that address each WMCP element – a description of the City's water supply system and history, an updated conservation plan, a updated curtailment plan, and a 20-year supply strategy, as well as a list of affected local governments to which the plan has been made available and a proposed schedule for update in 2029. A draft of Newberg's plan was made available to all affected local governments. One response was received and this draft WMCP was updated to reflect the respondent's comments.

- Projections of future water needs: The City is projecting an increase in demand during the next 20 years as a result of forecasted population growth and commensurate economic expansion. The City's historical maximum day demand (MDD) recorded between 2013 and 2017 was 4.8 million gallons per day (mgd) and by 2039, demand is forecast to increase to 8.3 mgd. Future population and economic growth are based on analyses from regional planning efforts and have been reviewed for consistency with comprehensive plans developed by the Newberg Community Development Department and Marion and Yamhill Counties. The City intends to meet demand using existing water rights and without appropriation from its extended permit.

- Water conservation measures under OAR 690-086-0150: The City has a water conservation program that is designed to incorporate each of the elements noted under OAR 690-086-0150 (4). Through development of this WMCP, the City has expanded its conservation program to include new conservation measures, such as developing outdoor and indoor water conservation brochures or flyers for posting at public locations. A summary of this and other measures and related benchmarks are outlined in **Exhibit ES-1**.

- Identification of resource issues: The City relies wholly on groundwater sources to meet

demand. The City's groundwater sources are not in an area designated as a critical groundwater area. The City's surface water sources Otis and Gardner Springs, authorized under water right Certificate 2389, are tributaries of the Willamette River. The Willamette River is on DEQ's 303(d) list of water quality impaired water bodies for the Newberg area and contains endangered or sensitive aquatic species, as detailed in Section 4.

- Curtailment plan: The City presents an updated curtailment plan based on the City's Municipal Code Sections 13.15.230 through 13.15.290. The curtailment plan presented in this WMCP builds upon the ordinance and makes additions to the ordinance in order to meet the requirements of OAR 690-086-0160. The curtailment plan includes four stages of alert, triggers for each stage, and curtailment actions that will promote conservation practices and curtail usage, taking into account state water law and local conditions.

- Authorization for appropriation: As part of this submittal, the City has developed a schedule for using water under its water rights to serve its anticipated 20-year demand. The City is not seeking any new rights and is not seeking authorization to appropriate water under its extended permit. Newberg projects that the authorized rates of appropriation for its certificated rights (10.7 cubic feet per second [cfs], 6.9 mgd), combined with the partial perfection certificate to be issued for extended Permit G-17583 (13.2 cfs, 8.5 mgd), totaling 23.9 cfs (15.4 mgd), will meet Newberg's projected future MDD of 12.9 cfs (8.3 mgd) by the year 2039.

Exhibit ES-1. City of Newberg Conservation Benchmarks.

Conservation Measures	Five-Year Benchmarks
Annual Water Audit	The City will continue to conduct annual water audits.
	In 2019, the City will begin to account for authorized metered non-revenue public uses (such as flushers, vactors, street sweepers, and hydrant and water line flushing) in its annual water audits.
System-wide Metering	The City will continue to require installation of meters on all new water connections.
Meter Testing and Maintenance	The City will continue to track the performance of new meters installed throughout the system and to maintain records on meters that are removed from service.
Water Rate Structure and Billing Practices that Encourage Conservation	The City will continue to bill customers based, in part, on the volume of water consumed on a monthly basis.
	The City will continue to provide historical water consumption information on water bills.
	In the next year, the City will begin including water conservation messages in at least three water bills per year, one of which will be at the beginning of the irrigation season and will encourage outdoor water conservation.
Water Loss Analysis	The City will continue its leak detection and water line replacement program.
	Over the next five years, the City will implement water line replacement efforts according to the roadmap provided by the City's updated (2017) Water Master Plan and Capital Improvement Plan.
	Within two years of approval of this WMCP, the City shall provide OWRD with a description and analysis identifying potential factors for the water loss and selected actions for remedy. If the selected actions do not reduce water loss to less than 10 percent within five years of approval of the WMCP, the City will take additional leak detection and repair measures.
Public Education	The City will continue its public education program, including presentations for schools and professional groups, outreach at community events, and website updates.
	Following the establishment of new water rates approximately every two years, the City will send a letter to the top 10 water consumers informing them of the new rates and recommending water conservation, particularly outdoor water conservation during the summer months.
	In the next five years, the City will develop both an outdoor water conservation and an indoor water conservation brochure or flyer for posting at public locations, such as the library, Chehalem Cultural Center, and Parks and Recreation facilities.
Technical and Financial Assistance Programs	The City will continue to offer free water conservation kits to customers.
	The City will continue its program to assist low-income residents with water conservation.
	The City will continue to provide leak detection information on its website and leak detection support to interested customers.
	In the next five years, the City will add a link on its website that guides customers through a home water audit.
Supplier Financed Retrofit or Replacement of Inefficient Fixtures	The City will continue to distribute free water conservation kits that include water-efficient fixtures.
Water Reuse, Recycling, and Non-potable Opportunities	The City will continue to operate the Reuse System and to develop plans for expanding this system.
	The City will submit to OWRD reclaimed water registrations to address use of reclaimed water through its Reuse System.
	The City will continue its efforts to install a non-potable water ("purple-pipe") system in the two major planned developments in the northeast quadrant of the city, north of Highway 99, and to connect that new purple pipe system to an existing purple pipe system.
Other Conservation Measures	The City will continue to maintain the WaterWise Garden in coordination with the Parks and Recreation District.

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1. Municipal Water Supplier Plan Elements

This section satisfies the requirements of OAR 690-086-0125.

This rule requires a list of affected local governments to whom the plan was made available, and a proposed date for submittal of an updated plan.

1.1 Introduction

The City of Newberg (City) is located in northeast Yamhill County along Highway 99W. The City's strong economy, livability, and proximity to the Portland metro region has produced steady growth over time. The City considers one of the cornerstones of livability and economic growth to be access to a high-quality, sustainable municipal water supply. As such, the City has a robust water management and conservation program.

This Water Management and Conservation Plan (WMCP) is a working document intended to:

- Guide development and implementation of water management and conservation measures that promote efficient water use.
- Assess the City's future water needs and timelines, and ensure the City is prepared to meet future demands.

1.2 Plan Requirement

On January 26, 2009, the Oregon Water Resources Department (OWRD) issued a final order approving the City's first WMCP, but limited the City's access to 17.64 cubic feet per second (cfs) of the total authorized rate of 20 cfs under Permit G-13876, which has been superseded by extended Permit G-17583. The Final Order approving the City's WMCP requires that Newberg submit an updated WMCP by July 17, 2019. This WMCP represents an update to the City's previous WMCP.

This WMCP meets all the requirements of the Oregon Administrative Rules (OAR) adopted by the Oregon Water Resources Commission in November 2018 (OAR Chapter 690, Division 86) regarding WMCPs.

1.3 Plan Organization

This WMCP is organized into the following sections, each addressing specific sections of OAR Chapter 690, Division 86. Section 2 is a self-evaluation of the City's water supply, water use, water rights, and water system. The information developed for Section 2 is the foundation for the sections that follow. The latter WMCP sections use this information to consider how the City can improve its water conservation and water supply planning efforts. The WMCP also includes **Appendices A through D** as supporting information.

Section	*Requirement*
Section 1 – Water Supplier Plan	*OAR 690-086-0125*
Section 2 – Water Supplier Description	*OAR 690-086-0140*
Section 3 – Water Conservation Element	*OAR 690-086-0150*
Section 4 – Water Curtailment Element	*OAR 690-086-0160*
Section 5 – Water Supply Element	*OAR 690-086-0170*

1.4 Affected Local Governments

OAR 690-086-0125(5)

The following local governmental agencies are considered "affected local governments" under OWRD's WMCP administrative rules:

- City of Newberg
- Yamhill County
- Marion County

Thirty days before submitting this WMCP to OWRD, the City made the draft WMCP available for review by each affected local government listed above, and included a request for comments related to consistency with the local government's comprehensive land use plan.

In addition, the City provided the following water providers with a copy of the draft WMCP as a courtesy.

- Chehalem Springs Water Association
- Chehalem Terrace Water Company
- Chehalem Valley Water Association
- Northwest Newberg Water Association
- Sam Whitney Water District
- Sunny Acres Water District
- West Sheridan Street Water Association
- Ramsey Terrace Water District

The City's letters to the affected local governments and other entities and comments received are in **Appendix A**.

1.5 Plan Update Schedule

OAR 690-086-0125(6)

The City anticipates submitting an update of this WMCP within 10 years of the final order approving this WMCP. As required by OAR Chapter 690, Division 86, a progress report will be submitted within 5 years of the final order.

1.6 Time Extension

OAR 690-086-0125(7)

The City is not requesting additional time to implement metering or a previous benchmark.

2. Municipal Water Supplier Description

This section satisfies the requirements of OAR 690-086-0140.

This rule requires descriptions of the City's water sources, water delivery area and population, water rights, and adequacy and reliability of the existing water supply. The rule also requires descriptions of the City's customers and their water use, the water system, interconnections with other water suppliers, and quantification of system water loss.

2.1 Water Sources

OAR 690-086-0140(1)

The City relies on groundwater to meet its municipal potable water demands. The six active wells used to meet demand are located at the City's wellfield south of the city limits and across the Willamette River from Newberg's water service area. **Exhibit 2-1** identifies the location of the City's wells.

The City supplies non-potable water to the public Chehalem Glenn Golf Course via two separate sources. The City maintains a non-potable water distribution system sourced from Otis Springs, which is located east of the City and immediately north of Highway 99W. This spring water is pumped to a pond on the golf course property for irrigation use. The City also supplies treated effluent from its wastewater treatment plant (WWTP) to the golf course pond for irrigation use.[1]

Historically, the City maintained four natural spring sources north of the city center that were part of the City's original water system. In 2016, the City transferred ownership, operation, and maintenance of the four spring sources to the Chehalem Springs Water Association through a conveyance agreement. Through this agreement, the City retains ownership of the parcels where the springs are located and leases these parcels to the Chehalem Spring's Water Association. Applicable portions of the agreement are found in **Appendix B**.

2.2 Service Area Description and Population

OAR 690-086-0140(2)

The City's current water service area includes all properties within city limits, some customers outside the city limits, and seven independent water districts, also located outside of city limits. The City's retail customers served outside the city limits are located on properties along Highway 99W east of Providence Newberg Medical Center, such as Rex Hill Winery, and residents of Aspen Estates along Highway 240 west of Chehalem Creek. The City's seven water district customers are independent water systems: Chehalem Terrace Water Company, Chehalem Valley Water Association, Northwest Newberg Water Association, Sam Whitney Water District, Sunny Aces Water District, West Sheridan Street Water Association, and Ramsey Terrace Water District. Portions of these private water systems' service areas are within the City's urban growth boundary (UGB) and Urban Reserve Areas (URAs). **Exhibit 2-1** depicts the City's service area.

[1] The City's use of reclaimed water to irrigate the golf course is authorized by the City's National Pollutant Discharge Elimination System permit number 100988,

Portland State University's (PSU) estimate of the City's population within city limits in 2018 was 23,795 and the City estimates that the population of retail customers outside city limits in 2018 is 223, based on 85 customer connections and 2.62 people per household from U.S. Census Bureau data. The estimated total population of the seven water districts outside city limits in 2018 was 454, which is based on connection counts and populations reported by the individual water districts. (Connection counts were converted to population using the 2.62 people per household factor). Therefore, the total estimated retail service area population is 24,472.

2.3 Interconnections with Other Systems

OAR 690-086-0140(7)

The City currently has no interconnections with other municipal supply systems, however, it has interconnections with seven independent water systems. These systems do not have separate sources of supply and rely solely on the City's water supply to meet their customers' demands.

2.4 Intergovernmental Agreements and Contracts

OAR 690-086-0140(1)

The City currently provides water to seven independent water systems located adjacent to the City. These systems do not have water supply sources independent from Newberg. No formal agreements are in place between Newberg and these water systems.

The City holds an agreement with the Chehalem Springs Water Association, as previously noted; applicable portions of this agreement are found in **Appendix B**.

2.5 Records of Water Use

OAR 690-086-0140(4) and (9)

2.5.1 Terminology

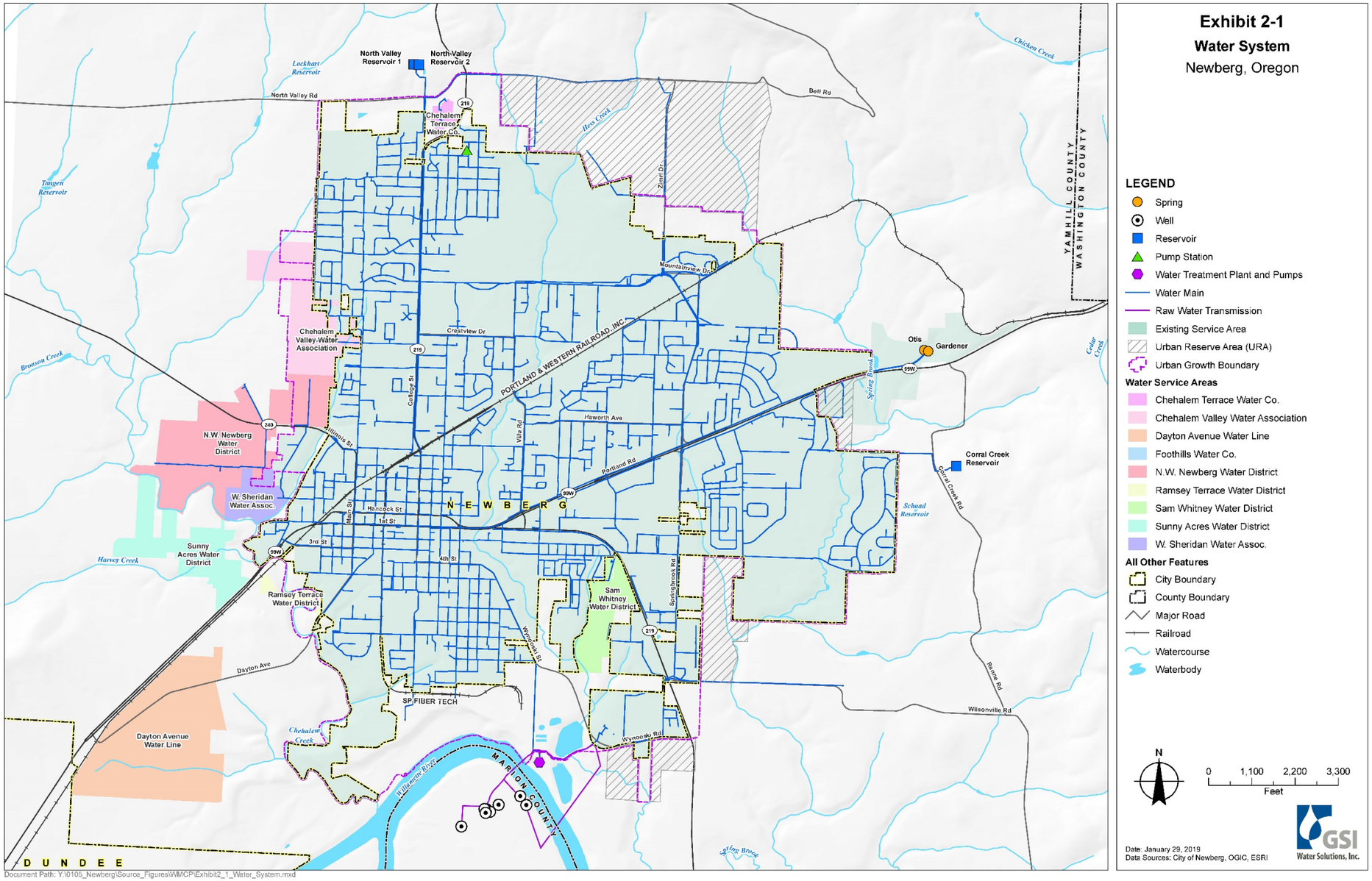
Authorized consumption: the metered and approved unmetered water uses within the system.

Process water: the raw water used to backwash filters and to accomplish other water treatment plant (WTP) processes, which is then conveyed to the WWTP and subsequently discharged to the Willamette River.

Raw water demand (i.e., raw water production): the quantity of water appropriated from the City's wells.

Finished water production: the quantity of finished (i.e., treated) water delivered to the water distribution system from the City's WTP regardless of storage volumes.

Exhibit 2-1. City of Newberg Current and Future Service Area.



Document Path: Y:\0105_Newberg\Source_Figures\WMCP\Exhibit2_1_Water_System.mxd

Note: The Water Treatment Plant includes four pumps.

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System demand or finished water demand: the quantity of finished (i.e., treated) water delivered to the water distribution system from the City's WTP, adjusted for changes in distribution reservoir storage volumes. Finished water demand includes authorized metered consumption (such as by City water customers and the non-revenue use of hydrant flushing), authorized metered non-revenue public uses (flushers, vactors, street sweepers, and hydrant and water line flushing), authorized unmetered uses, and water lost to leaks.

Generally, water suppliers express demand and consumption in units of million gallons per day (mgd). They may also be expressed in cfs or gallons per minute (gpm). One mgd is equivalent to 1.55 cfs or 694 gpm. For annual or monthly values, a quantity of water typically is reported in million gallons (MG). Water use per person (per capita use) is expressed in gallons per person (per capita) per day (gpcd).

The following terms are used to describe specific values of system demands:

- **Average day demand (ADD)** equals the total annual system demand divided by 365 (or 366) days.
- **Maximum day demand (MDD)** equals the highest system demand that occurs on any single day during a calendar year. MDD is an important value for water system planning. The supply facilities (treatment plants, pipelines, reservoirs) and water rights must be capable of meeting the MDD.
- **Maximum monthly demand** (MMD) in MG equals the highest total monthly demand of the 12 months of a calendar year. MMD in mgd equals the average day demand of the one month with the highest total demand of the 12 months of a calendar year.
- **Monthly demand** refers to demand during a calendar month. This demand can be expressed as the total volume of water produced in a month.
- **Peaking factors** are the ratios of one demand value to another. The most common peaking factor is the ratio of MDD to ADD.
- **Summer (or peak) season** refers to the months of the year with typically the greatest demand: June, July, August, and September.
- **Winter season** refers to the months of the year with typically the least demand: December, January, February, and March.

2.5.2 Historical Raw Water Demands

OWRD requires reporting of demand data for the previous 5 years, if available. The City's raw water demands from 2013 through 2017 are presented in **Exhibit 2-2**. The raw water demand data were collected at the City's wells.

Exhibit 2-2. Historical Annual Raw Water Demand, Average Day Demand, Maximum Day Demand, Maximum Month Demand, and Peaking Factors. 2013-2017.

Year	Annual Water Demand (MG)	ADD (mgd)	MDD (mgd)	Peaking Factor (MDD: ADD)	MMD (mgd)	MMD (MG)
2013	877.9	2.41	4.91	2.04	4.08	126.6
2014	854.8	2.34	5.24	2.24	4.22	130.8
2015	926.8	2.54	5.16	2.03	4.39	136.2
2016	930.8	2.54	5.01	1.97	4.21	130.5
2017	994.9	2.73	5.55	2.04	5.35	165.7
Average	917.0	2.5	5.17	2.06	4.5	138.0
Highest	994.9	2.7	5.55	2.24	5.3	165.7

Notes:
ADD = average day demand
MDD = maximum day demand
MMD (MG) = highest total monthly demand of the 12 months of a calendar year
MMD (mgd) = average day demand in the month with maximum demand
MG = million gallons
mgd = million gallons per day

The remainder of Section 2 focuses on finished water demand given that comparing finished water demand to metered consumption provides the most refined water loss estimates. The difference between annual raw water demand and annual finished water demand is process water, which is the raw water used to backwash filters and to accomplish other WTP processes that is then conveyed to the WWTP and subsequently discharged to the Willamette River.

2.5.3 Historical Finished Water Demands

2.5.3.1 Annual and Daily Demands

The City's finished water demands from 2013 through 2017 are presented in **Exhibit 2-3**. The finished water demand data are based on data from the City's finished water meter at the WTP, adjusted for changes in distribution reservoir storage volumes.

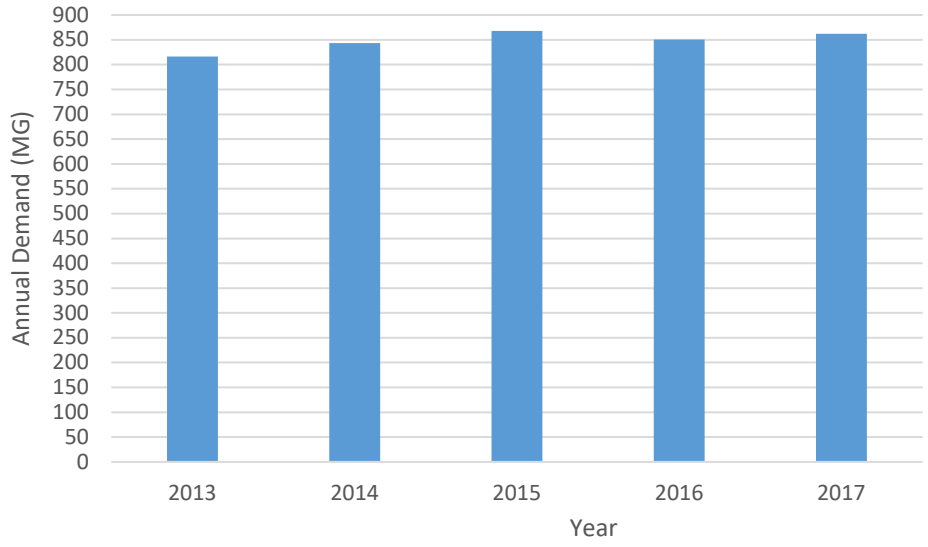
Exhibit 2-3. Historical Annual Finished Water Demand, Average Day Demand, Maximum Day Demand, Maximum Month Demand, and Peaking Factors. 2013-2017.

Year	Annual Demand (MG)	ADD (mgd)	MDD (mgd)	Date of MDD	Peaking Factor (MDD: ADD)	MMD (MG)	MMD (mgd)	MMD Month
2013	816.7	2.24	4.39	7-Aug	1.96	117.1	3.78	July
2014	843.3	2.31	4.43	12-Aug	1.92	120.2	3.88	August
2015	867.8	2.38	4.75	31-Jul	2.00	128.7	4.15	July
2016	850.6	2.32	4.50	19-Aug	1.94	121.7	3.93	August
2017	862.1	2.36	4.81	3-Aug	2.04	127.1	4.10	August
Average	848.1	2.32	4.58	-	1.97	122.9	3.97	-
Highest	867.8	2.38	4.81	-	2.04	128.7	4.15	-

Notes:
ADD = average day demand
MDD = maximum day demand
MMD (MG) = highest total monthly demand of the 12 months of a calendar year
MMD (mgd) = average day demand in the month with maximum demand
MG = million gallons
mgd = million gallons per day

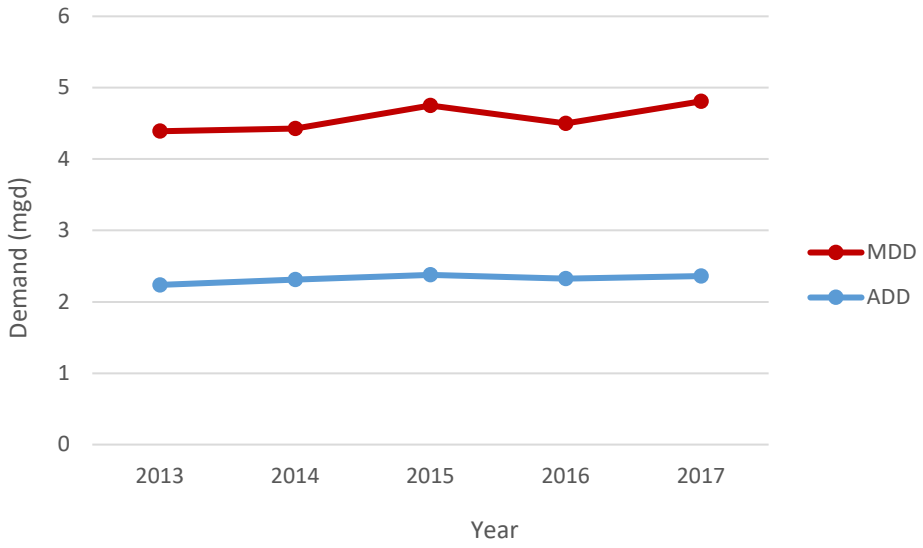
Annual finished water demand increased from 2013 through 2015, decreased slightly in 2016, and then rose in 2017 to nearly the 2015 annual demand, as shown in **Exhibit 2-4.** The increase in demands in 2015 and 2017 correspond with the hotter and drier summers in those years.

Exhibit 2-4. Annual Demand (MG), 2013-2017.



The City's ADD remained relatively stable and MDD fluctuated slightly from 2013 through 2017, as shown in **Exhibit 2-5.** Similar to annual demand, the highest MDDs occurred in 2015 and 2017.

Exhibit 2-5. Average Day Demand (ADD) and Maximum Day Demand (MDD), 2013-2017.



MDDs are central to water system planning given that water rights and water supply infrastructure (e.g., WTPs and reservoirs) must be capable of meeting MDDs. MDD exceeding the combined supply capacity on a given day reduces finished water storage levels and MDD exceeding the combined supply capacity for several consecutive days may cause a water shortage.

MDD is strongly affected by weather patterns and economic conditions. Especially hot and/or dry weather can lead to more intense irrigation that increases the MDD. Weather patterns that can cause fluctuations in MDD from year to year include: maximum temperatures, the number of consecutive days with high temperatures, the timing of high temperatures in the summer, total rainfall levels during the summer, and consecutive days without rainfall. Economic conditions can affect MDD by influencing customers' spending on irrigation, the building of new homes with landscapes needing intense irrigation for plant establishment, and the opening or closing of facilities that use water in their operations.

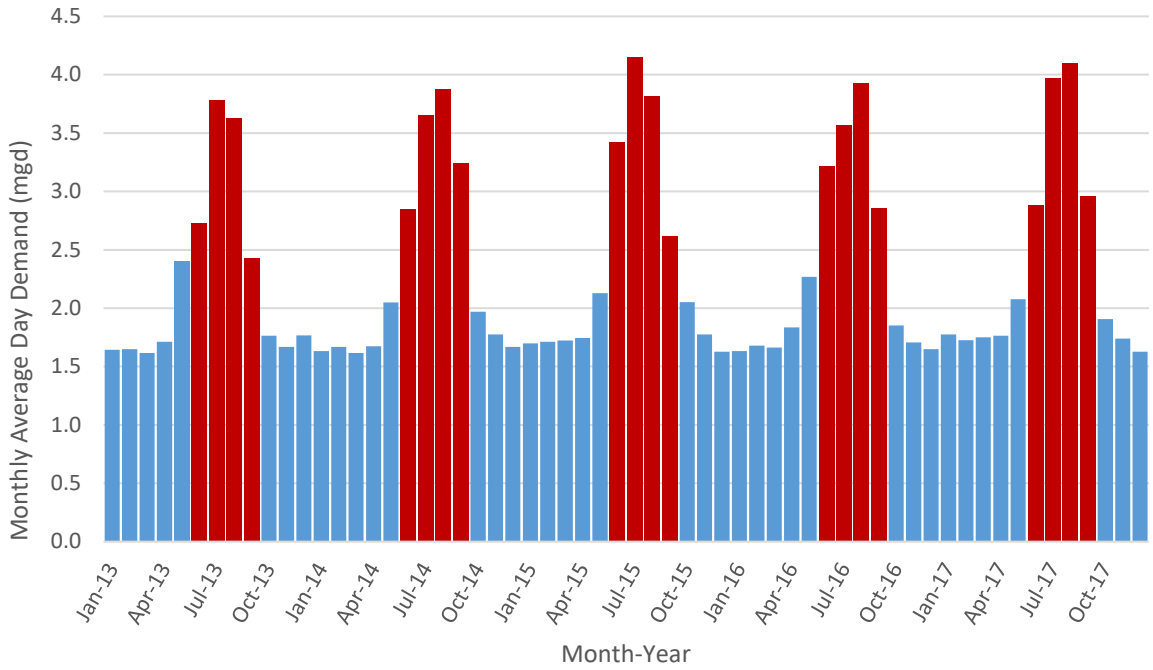
2.5.3.2 Peaking Factors

Peaking factors are the ratios of one demand value to another. The ratio of MDD to ADD is the most common peaking factor and often used to estimate peak demands when only ADDs are known or measured, to conduct hydraulic modeling of the system, and to forecast demand. As shown in **Exhibit 2-3**, the City's MDD to ADD peaking factor for finished water averaged 1.97 from 2013 through 2017 and peaked at 2.04 in 2017. The City's average peaking factor is similar to other water providers in the region, such as City of Hillsboro (average of 1.85, City of Hillsboro 2017 WMCP), the City of Dayton (average of 1.9, City of Dayton 2013 WMCP), and Tualatin Valley Water District (average of 1.95, Tualatin Valley Water District 2015 WMCP).

2.5.3.3 Monthly Demand

Exhibit 2-6 presents monthly ADD from 2013 through 2017, which was consistently highest June through September (highlighted in red) primarily as a result of outdoor water use, such as irrigation. The highest monthly ADD of 4.15 mgd and the maximum month demand as a volume of 128.7 MG both occurred in 2015, as shown in Exhibit 2-2.

Exhibit 2-6. Monthly Average Day Demand (mgd), 2013-2017.

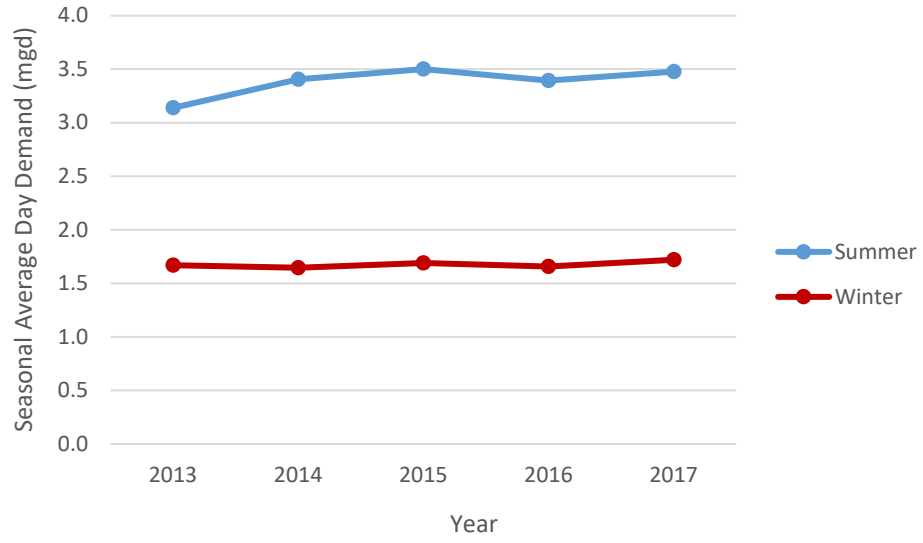


Red = Peak (summer) season months (June through September)
Blue = Non-peak season months (October through May)

2.5.3.4 Seasonal Demands

Exhibit 2-7 compares ADD in the summer (June to September) to ADD in winter (December through March) from 2013 through 2017. Summer ADD was approximately double Winter ADD during this time period. Water use during both seasons was relatively steady over time with only slight peaks in 2015 and 2017.

Exhibit 2-7. Seasonal Average Day Demand (mgd), 2013-2017.



Summer = June to September
Winter = December to March

2.6 Customer Characteristics and Use Patterns

OAR 690-086-0140(6)

2.6.1 Customer Description

The City has seven potable water customer categories: Single Family, Multi-family, Commercial, Industrial, Outside City, Other-government, and Irrigation. The Outside City customer category consists of 85 single-family residential customers outside of city limits, seven water districts, and a commercial customer with two meters. The Other-government customer category consists of University and Public Agency customers. **Exhibit 2-8** shows the number of connections (based on a monthly average) and percentage of total connections by customer category in 2017.

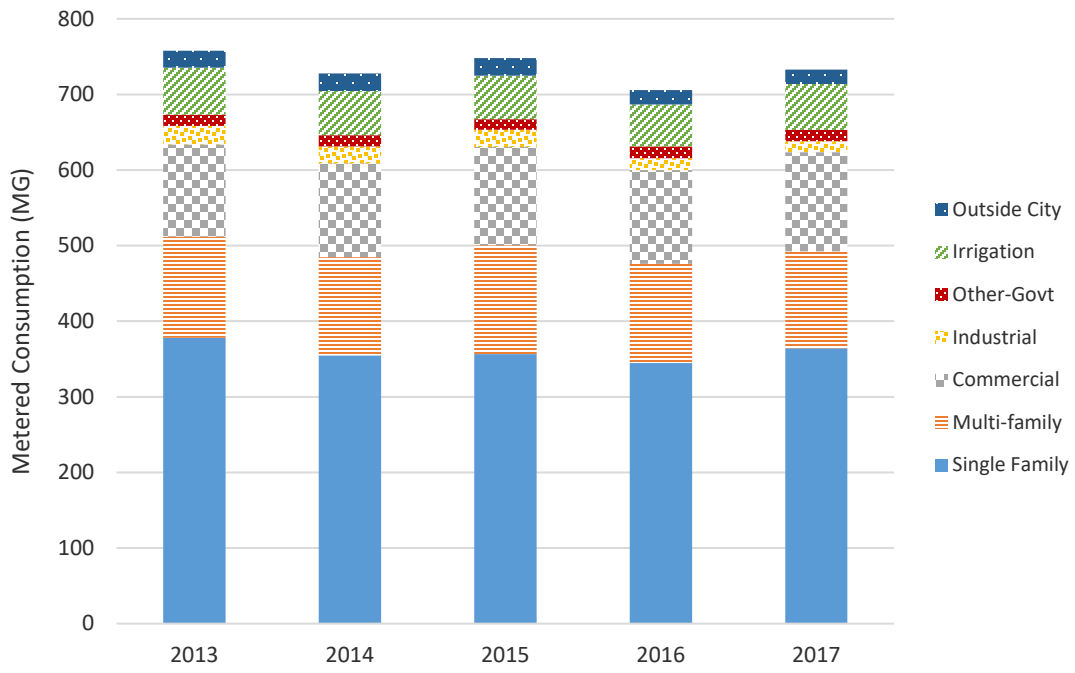
Exhibit 2-8. Connections by Customer Category, 2017.

Customer Category	Number of Connections (#)	Percentage of Total Connections (%)
Single Family	5,750	85.5
Multi-family	284	4.2
Commercial	418	6.2
Industrial	24	0.4
Other-Government	27	0.4
Irrigation	125	1.9
Outside City	94	1.4
Total	6,722	100

2.6.2 Annual Consumption

Annual metered water consumption has fluctuated during the past 5 years, ranging from 705.7 to 757.7 MG, as shown in **Exhibit 2-9.** From 2013 through 2017, total consumption was greatest in 2013 followed by more modest peaks in 2015 and 2017.

Exhibit 2-9. Annual Metered Water Consumption, 2013-2017.



Customer category consumption trends from 2013 through 2017 are shown in **Exhibit 2-10**. Single Family consumption peaked in 2013 while Multi-family consumption peaked in 2015. Commercial consumption has been relatively steady while Industrial consumption decreased markedly in 2016 as a result of a paper mill closing that year. The remaining three customer categories showed minor fluctuations in consumption during this 5-year period.

Exhibit 2-10. Annual Water Consumption by Customer Category, 2013-2017.

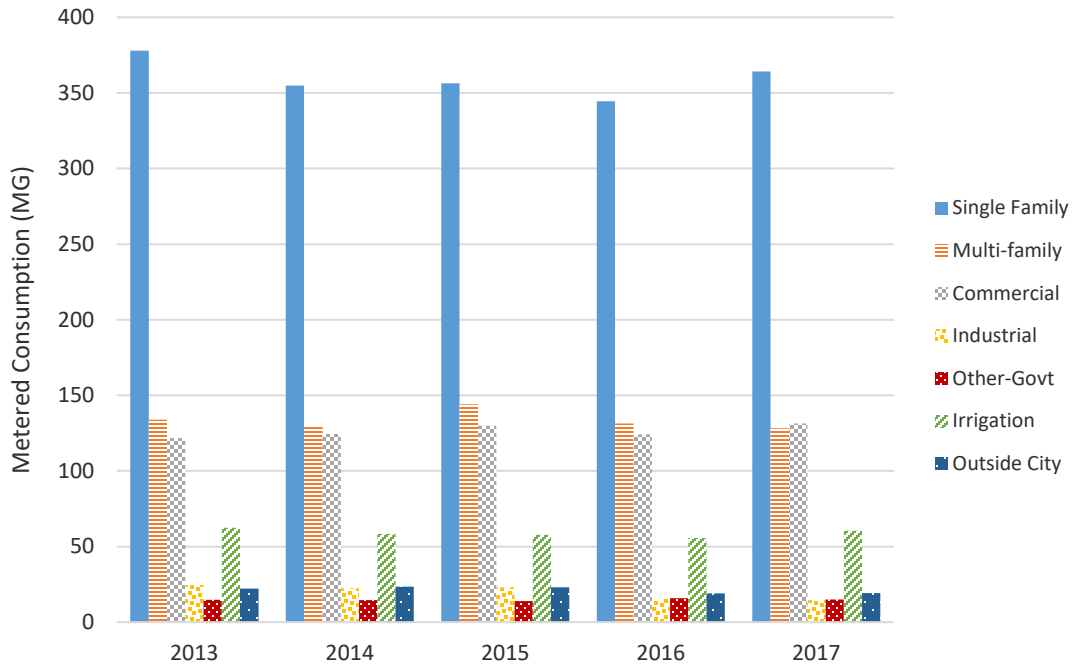
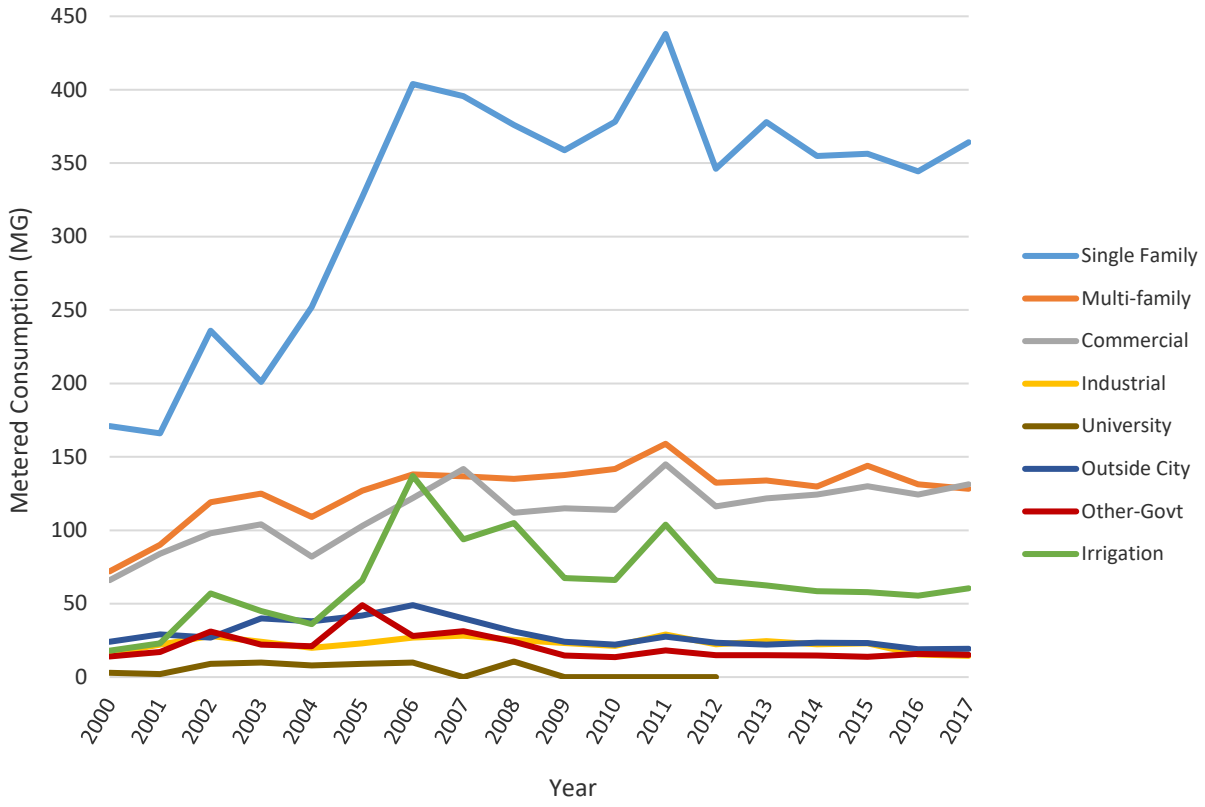


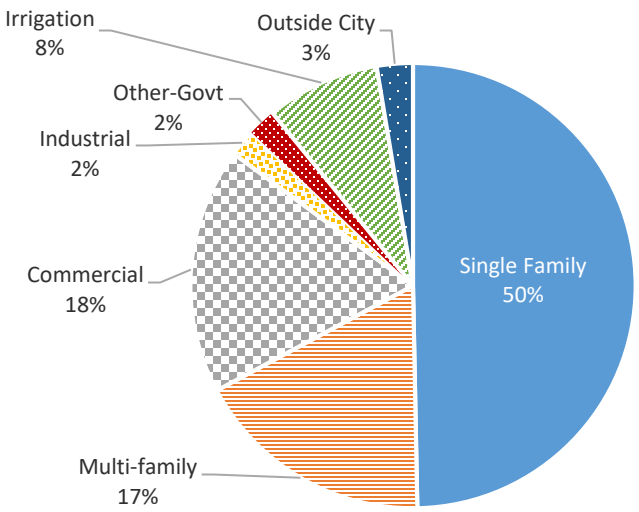
Exhibit 2-11 compares consumption by customer category for the years 2000 through 2017, which consists of 2000 through 2006 data (from the 2006 WMCP), 2007 through 2012 data (from the 2014 WMCP Progress Report), and 2013 through 2017 data (from this 2018 WMCP Update). The City eliminated the University customer category in 2013, instead including University consumption as part of the Other-Government category. The exhibit shows that Single Family and Irrigation consumption increased to a large degree from 2004 through 2006, decreased a little bit through 2010, and following some fluctuations around 2011 and 2012 have been relatively stable. Multi-family and Commercial customer categories show a modest increasing trend over time.

Exhibit 2-11. Comparison of Metered Consumption by Customer Category, 2000-2017.



As shown in **Exhibit 2-12**, residential customers inside and outside the City limits consumed the highest percentage of water at 53 percent (Single Family plus Outside City customer categories) in 2017. Consumption by Commercial and Multi-family customers had the other highest percentages, with 18 percent and 17 percent, respectively. Their level of consumption is sizable considering that in 2017 Commercial and Multi-family connections represented only 6.2 percent and 4.2 percent of total connections, respectively. Irrigation customers also represented a sizable portion of annual water use, with 8 percent of total consumption, and the number of irrigation connections only represented 1.9 percent of total connections in 2017. Given that a small number of connections results in a relatively large level of consumption for these three customer categories (Commercial, Multi-family, and Irrigation), opportunities likely exist to reduce the consumption levels. Section 3 addresses water conservation opportunities.

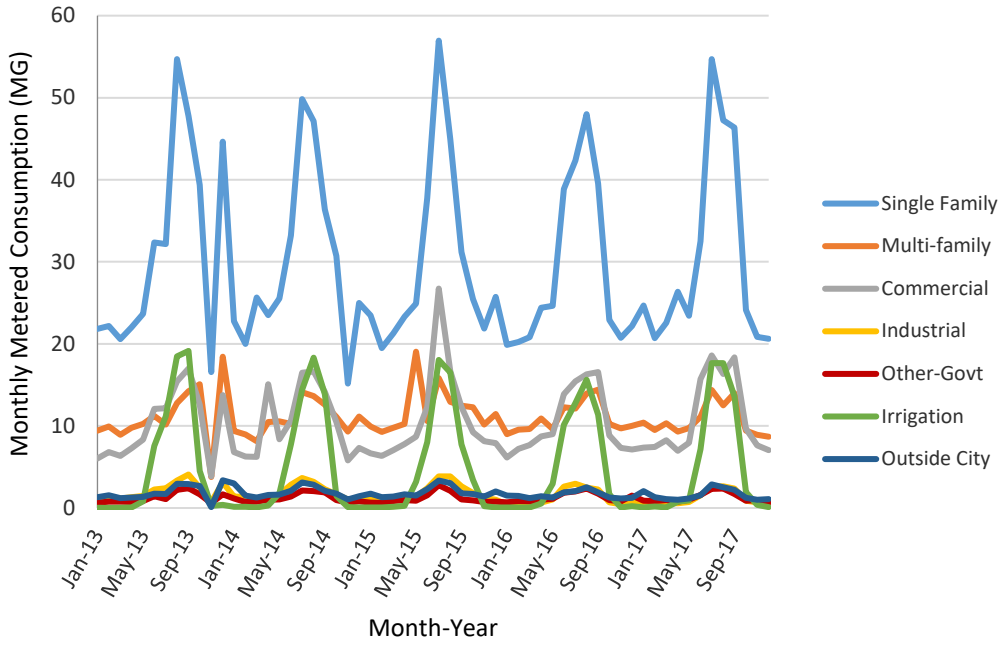
Exhibit 2-12. Percent Annual Water Consumption by Customer Category, 2017.



2.6.3 Monthly Consumption

Exhibit 2-13 shows monthly consumption by customer category from 2013 through 2017. Monthly consumption generally increased at least a little for all customer categories in the summer months, with the Single Family and Irrigation customer categories having the most pronounced increases. The City attributes these increases in consumption largely to irrigation. The more than doubling of water consumption in the summer months by Single Family customers suggests that targeting outdoor water conservation outreach efforts at Single Family Customers could yield notable water savings.

Exhibit 2-13. Monthly Metered Consumption by Customer Category, 2013-2017.

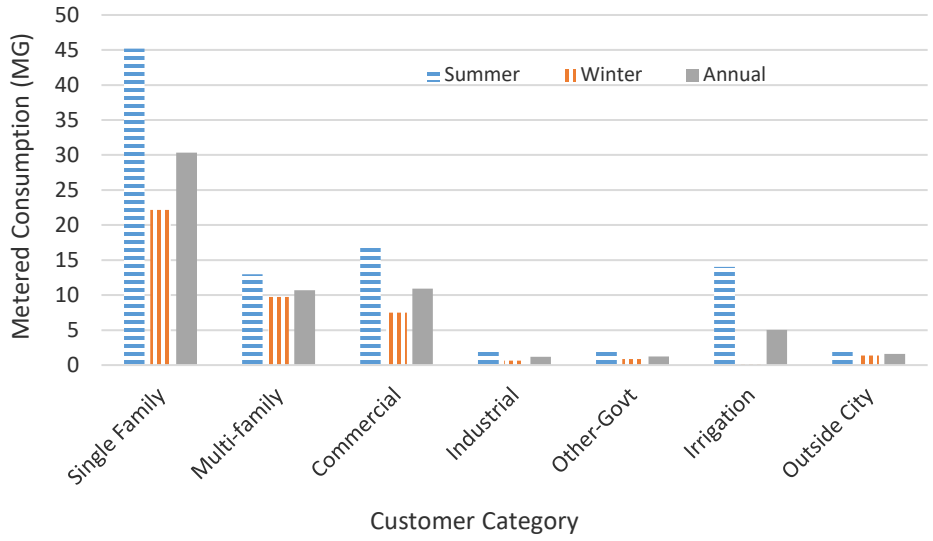


2.6.4 Seasonal Consumption

Exhibit 2-14 presents the City's average monthly consumption by season and customer category in 2017. The City's average summer season (June through September) consumption was 96.1 MG and average winter season (December through March) consumption was 42.3 MG, resulting in a summer consumption being 2.3 times greater than winter. This ratio is within the typical range for utilities in the Willamette Valley.

The summer season to winter season ratios more than doubled for Single Family, Commercial, Industrial, Other-Government, and Irrigation customers. Outdoor water conservation outreach to these customers could be particularly effective at helping reduce the volume of consumption during summer months.

Exhibit 2-14. Seasonal Average Water Consumption by Customer Category, 2017.



Summer = June to September
Winter = December to March
Annual= January to December

2.6.5 Top 10 Water Users

Exhibit 2-15 presents consumption by the City's top 10 water users in 2017, considering potable and non-potable water users. The greatest water user was the golf course in 2017, which uses non-potable water. The remaining top water users consisted of potable water customers, primarily commercial and multifamily customers, and these users represented approximately 9 percent of total potable water consumption in 2017.

Exhibit 2-15. Largest Water Users, 2017.

Customer Category	Annual Consumption (MG)	Percent of Annual Consumption (%)
Non-potable (Golf Course)	*41.2*	-
Multi-family	13.5	1.84
Commercial	13.1	1.79
Commercial	8.0	1.09
Multi-family	6.6	0.90
Multi-family	6.1	0.83
Commercial	5.1	0.69
Outside City	4.8	0.65
Multi-family	4.4	0.60
Multi-family	4.1	0.56
Top Potable Users Total	65.7	8.95
System-wide Potable Total	732.9	

2.7 Water Losses

OAR 690-086-0140(9)

The City's water loss was 14.1 percent in 2017 and averaged 12.9 percent from 2013 through 2017, as shown in **Exhibit 2-16**. The City calculated water loss as the difference between the annual finished water demand and metered water consumption plus consumption at hydrant meters. Thus, water loss consists of unbilled authorized metered consumption, unbilled authorized unmetered consumption, apparent losses (i.e., unauthorized consumption, meter inaccuracies, and data handling errors), and real losses (i.e. system leakage). (The City is not aware of any unauthorized consumption.) System leakage, as the name implies, is water loss from deteriorating or compromised pipes, pipe joints, service connections, valves, etc. Generally, with accurate record keeping and metering of water, the percentage of water loss approaches the net volume lost to actual leakage. Based on data from the City's 2014 Progress Report, the City estimates that other authorized metered non-revenue public water uses (flushers, vactors, street sweepers, and hydrant and water line flushing) represent an average of 1.1 percent of water loss from 2003 through 2017. Construction trucks are metered and billed within the Hydrant meter category. The City attributes most of the remainder of water loss to real water losses. Efforts to reduce water loss are described in Section 3. As previously described in Section 2.5.2, the difference between raw water demand and finished water demand is process water.

Exhibit 2-16. Water Loss, 2013-2017.

Year	Finished Water Demand (MG)	Metered Consumption (MG)	Hydrant Meters (MG)	Water Loss (MG)	Water Loss (%)
2013	816.7	757.7	0.60	58.4	7.2
2014	843.3	727.8	1.42	114.1	13.5
2015	867.8	748.1	2.33	117.3	13.5
2016	850.6	705.7	6.64	138.2	16.3
2017	862.1	732.9	7.72	121.4	**14.1**
Average					**12.9**

2.8 Water Rights

OAR 690-086-0140(5)

The City holds six groundwater rights and one surface water right that authorize the use of water for municipal purposes. As discussed below, the surface water right does not, however, provide water supply for the City's municipal water system. **Exhibits 2-17 and 2-18** provide information about the City's water rights.

2.8.1 Groundwater

The City's groundwater rights include one groundwater registration, four water right certificates, and one water use permit. The City's groundwater registration (GR-63) allows for the use of up to 1,000 gpm (2.23 cfs) from Well 1 and up to 1,000 gpm (2.23 cfs) from Well 2,

with claimed priority dates of September 1951 and May 1948, respectively. Because of declining yields, the City does not use Wells 1 and 2.

The City's municipal groundwater right certificates authorize the use of up to a total of 10.7 cfs. Certificate 48100 authorizes the use of up to 2.68 cfs from Well 4, and has a priority date of July 20, 1970. Certificate 68620 authorizes the use of up to 3.0 cfs and Certificate 82595 authorizes the use of up to 1.01 cfs from Well 5. These rights have priority dates of August 6, 1970, and March 28, 1980, respectively. Certificate 82600 authorizes the use of up to 4.01 cfs from Well 6, and has a June 23, 1980, priority date.

The City's groundwater permit (extended Permit G-17583) authorizes the use of up to 20 cfs. The permit was originally issued as Permit G-13876. It authorized appropriation from a collector well and had a development deadline of October 1, 2005. On May 31, 2002, OWRD approved Permit Amendment T-9098, which added Wells 7, 8, 9, 10, and 11 as authorized points of appropriation. On December 8, 2006, OWRD issued a final order approving an extension of time for Permit G-13876 (as modified by Permit Amendment T-9098). The final order extended the deadline for completing construction of the water system to October 1, 2054, and the deadline for full beneficial use to October 1, 2055. The final order limited diversion of water under the permit to 6.22 cfs until the limit was modified by a final order approving a WMCP. On January 26, 2009, OWRD issued a final order approving the City's WMCP and authorizing access to up to 17.64 cfs under the permit. On May 5, 2016, OWRD approved Permit Amendment T-12202, which changed the authorized location of Well 9, and issued superseding extended Permit G-17583, which incorporates the changes made by the above-described permit amendments and the extension of time.

The City submitted a claim of beneficial use for partial perfection of extended Permit G-19583 for a rate of 13.2 cfs (8.5 mgd).

2.8.2 Surface Water

Historically, the City's municipal water supply included water from multiple springs. After the City developed its wellfield, groundwater became the City's primary source of supply for its municipal distribution system. In 2015, the City conveyed ownership, operation, and maintenance of Snider, Skelton, Atkinson, and Oliver Springs and the related treatment, piping, water rights, and easements to the Chehalem Springs Water Association. (See the conveyance agreement in **Appendix B**.) The water rights associated with these springs (Certificate 5456, 5466 and 6829, and Surface Water Registration SW-641) are currently in the City's name; however, as the necessary water rights transactions related to these rights are completed, the City will be submitting ownership updates and an assignment to reflect that the water rights are held by the Chehalem Springs Water Association.

The City retained surface water right, Certificate 2389, which authorizes the use of up to 4.0 cfs from Gardner and Otis Springs for municipal purposes. The City does not, however, put water from the springs into its municipal water supply system. Otis Spring is used as part of the City's non-potable water system, which currently is used to irrigate Chehalem Glenn Golf Course. The City does not deliver spring water through its municipal distribution system for municipal customer supply under this water right. Accordingly, this right will not be discussed further in this WMCP. Certificate 2389 is further described in Exhibit 2-18.

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Exhibit 2-17. Water Rights Held by the City of Newberg for Use in Its Municipal Water System.

Source	Application	Permit	Certificate	Transfer / Permit Amendment	Claim	Priority Date	Type of Beneficial Use	Authorized Completion Date	Authorized Rate	Maximum Rate of Withdrawal to Date	2017 Average Withdrawal		Five-Year (2013-2017) Average Withdrawal		Comments
											Average Monthly Diversion (MG/month)	Average Daily Diversion (mgd)	Average Monthly Diversion (MG/month)	Average Daily Diversion (mgd)	
Well 1	-	-	-	-	GR-63	September 1951	Municipal	N/A	2.23 cfs/1.44 mgd	2.23 cfs/1.44 mgd	0.00	0.00	0.30	0.01	Due to declining yields, Well 1 is not currently in service.
Well 2						May 1948	Municipal		2.23 cfs/1.44 mgd	2.23 cfs/1.44 mgd	0.00	0.00	0.00	0.00	Due to declining yields, Well 2 is not currently in service.
Well 4	G-5254	G-5276	48100	-	-	July 20, 1970	Municipal	N/A	2.68 cfs/1.73 mgd	2.68 cfs/1.73 mgd	0.51	0.02	3.85	0.13	Well 4 does not currently produce water at the maximum authorized rate.
Well 5	G-9638	G-10067	82595	-	-	March 28, 1980	Municipal	N/A	1.01 cfs/0.65 mgd	1.01 cfs/0.65 mgd	6.36	0.21	3.84	0.13	Well 5 does not currently produce water at the maximum authorized rate.
	G-5277	G-5277	~~48101~~ 68620	~~T-4547~~ (Transfer)	-	August 6, 1970	Municipal	N/A	3.0 cfs/1.94 mgd	3.0 cfs/1.94 mgd					Well 5 does not currently produce water at the maximum authorized rate.
Well 6	G-9805	G-10068	82600	-	-	June 23, 1980	Municipal	N/A	4.01 cfs/2.59 mgd	4.01 cfs/2.59 mgd	11.66	0.38	18.4	0.61	Well 6 does not currently produce water at the maximum authorized rate.
Well 7 Well 8 Well 9 Well 10 Well 11 Collector Well	G-12515	~~G-13876~~ G-17583	Pending Claim of Beneficial Use for partial perfection	T-9098 T-12202 (Permit amendments)	-	May 3, 1991	Municipal	-	13.2 cfs/8.5 mgd(1)	13.2 cfs/8.5 mgd	64.38	2.12	50.0	1.64	Wells 7, 8 and 9 do not currently produce water at the maximum authorized rate. Well 10, 11 and the collector well have not been constructed to date. The City currently has access 17.64 cfs (11.40 mgd). City has submitted a Claim of Beneficial Use and partial perfection request for 13.2 cfs.
			-					10/1/2054 to complete construction; 10/1/2055 to complete use of water.	6.8 cfs/4.4 mgd(1)	0 cfs/0 mgd					

(1) The development limitation on this right is currently 17.64 cfs/11.4 mgd.

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Exhibit 2-18. City of Newberg Water Rights Not Used in its Municipal Water System.

Source	Application	Permit	Certificate	Priority Date	Use	Authorized Completion Date	Authorized Rate (cfs)	Comments
Gardner and Otis Springs	S-1646	S-915	2389	August 23, 1911	MU, including domestic, fire protection and manufacturing	N/A	4.0	Otis Spring is used only for non-potable water for irrigation (at Chehalem Glenn Golf Course and in City's "purple pipe" system). Gardner Spring is not currently in use.

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2.9 Aquatic Resource Concerns

OAR 690-086-140(5)

Newberg's groundwater source for municipal water supply is not located within a Critical Groundwater Area.

The City's surface water sources for Certificate 2389 are two springs, Gardner and Otis Springs. The springs are tributaries of the Willamette River. In the Newberg area, at approximately River Mile (RM) 50, the Willamette River is on DEQ's 303(d) list of water quality limited streams for the following parameters: Aldrin, DDE 4, 4, dieldrin, dioxin, iron, PCBs, dissolved oxygen, lead, E. coli, temperature, and mercury.

The list of water quality impairments in the Willamette River can be found on DEQ's web page for "Oregon's 2012 Integrated Report--Assessment Database and 303d List" at http://www.oregon.gov/deq/wq/Pages/2012-Integrated-Report.aspx.

Exhibit 2-19 shows the listed fish species in the Willamette River at RM 50.

Exhibit 2-13. Fish Species occurring within the Willamette River (approx. RM 50) that are listed under the Oregon Sensitive Species List or Federal Endangered Species Act

Species	Common Name	Evolutionarily Significant Unit (ESU) (if applicable)	Federal Listing	State Listing
Oncorhynchus mykiss	Winter Steelhead	Upper Willamette River ESU	Threatened	Sensitive "Vulnerable"
Oncorhynchus tshawytscha	Spring Chinook salmon	Upper Willamette River ESU	Threatened	Sensitive "Critical"
Oncorhynchus tshawytscha	Fall Chinook salmon	Lower Columbia River ESU; Upper Willamette River ESU	Threatened	Not applicable (Not Listed)
Oncorhynchus clarkii clarkii	Coastal Cutthroat Trout	Lower Columbia SMU, including up to Willamette Falls	N/A	Sensitive-"Vulnerable" (below Willamette Falls)
Oncorhynchus kisutch	Coho	Lower Columbia River, including up to Willamette Falls	Threatened	Endangered
Lampetra tridentata	Pacific lamprey	Not applicable	Petitioned for listing	Sensitive "Vulnerable"
Lampetra richardsoni	Western Brook lamprey	Not applicable	Not applicable	Sensitive "Vulnerable"
Thaleichthys pacificus	Pacific Eulachon	Not applicable	Threatened	Sensitive "Vulnerable"

2.10 Evaluation of Water Rights and Supply

OAR 690-086-0140(3)

The City obtains its municipal water supply from groundwater, and its wellfield appropriates water from an alluvial aquifer. The reliability of the City's groundwater rights is affected by the capacity of the groundwater resource, the City's water supply wells, and its WTP.

The total wellfield capacity is sensitive to changes in groundwater levels because the aquifer is relatively shallow. The aquifer demonstrates natural variation in groundwater level because of changes in the water levels in the adjacent Willamette River and seasonal variations in precipitation. (Groundwater levels are higher in the winter and lower in the summer.) Finally, the groundwater level in the City's source aquifer is affected by the rate and volume at which water is pumped from the wellfield. The fluctuations in groundwater levels can affect the reliability of the City's groundwater rights.

The City's groundwater registration (GR-63) allows the use of up to 1,000 gpm from Well 1 and 1,000 gpm from Well 2, for a total of 2,000 gpm. Because of declining yields, Wells 1 and 2 are currently not in operation. Further, the ultimate long-term reliability of the groundwater registration will be determined only through a groundwater adjudication. Therefore, until a groundwater adjudication is completed, the City does not consider the groundwater supply claimed in GR-63 to be secure.

The City's Certificate 48100 authorizes appropriation of up to 2.68 cfs of groundwater from Well 4. As previously described, the alluvial aquifer from which the City's wellfield appropriates water is sensitive to multiple factors. Additionally, Well 4 produces some sand during operation and has declined in capacity during its operational history. During periods of high water demand and low flows in the Willamette River, the City can expect Well 4 to have a capacity of 350 gpm (0.78 cfs). The City operates Well 4 as a supplemental supply.

The City's use of groundwater from Well 5 is authorized by Certificate 68620 (which authorizes the use of up to 3.0 cfs) and Certificate 82595 (which authorizes the use of up to 1.01 cfs). Well 5 experiences interference from pumping at Well 6, and, to a lesser extent, at Wells 7 and 8. Well 5 has declined in capacity during its operational history. During periods of high water demand and low flows in the Willamette River, the City can expect Well 5 to have a capacity of 400 gpm (0.89 cfs). The City operates Well 5 as a supplemental supply.

Certificate 82600 authorizes the appropriation of groundwater from Well 6 at a rate of up to 4.01 cfs. Because of its central location in the wellfield, Well 6 experiences interference from pumping at all of the City's operational wells. During periods of high water demand and low flows in the Willamette River, the City can expect Well 6 to have a capacity of 900 gpm (2.0 cfs).

Finally, the City also holds extended Permit G-17583, which authorizes the use of up to 20 cfs from Wells 7, 8, 9, 10, and 11, and a collector well. The City's use of groundwater under this permit is, however, currently limited to 17.64 cfs by the final order approving the City's previous WMCP. Wells 7, 8, and 9 are the only authorized points of appropriation included in the permit that have been constructed to date. As with the City's other wells, their capacities are affected by multiple factors, including interference with other wells in the City's wellfield. During periods of high water demand and low flows in the Willamette River, the City can expect Well 7 to have a capacity of 1,000 gpm (2.23 cfs), Well 8 to have a capacity of 1,700 gpm (3.79 cfs), and Well 9 to have a capacity of 1,800 gpm (4.01 cfs).

To understand its total wellfield capacity, the City, as part of its recently completed Water Master Plan (WMP)[2], developed estimates of its firm, maximum source capacity for 1 and 3 days during typical maximum demand scenarios. To calculate its firm capacity, the City assumed that Well 8 was out of service. Under this scenario, the City's firm source capacities during the summer were estimated to be 8.5 mgd (13.1 cfs) for 1 day, and 8.4 mgd (13.0 cfs) for 3 days.

The overall reliability of the City's groundwater rights is affected by the capacity of its WTP. The WTP currently has a capacity of 9 mgd (13.9 cfs), but is generally operated at a maximum capacity of approximately 8 mgd (12.4 cfs) because of undersized piping between the raw water transmission mains and the settling basin. This capacity is slightly less than the City's firm source capacity during the summer.

The City's 2017 WMP notes that the City's raw water transmission mains may be susceptible to seismic events and earth movement, and the wellfield is susceptible to flooding (which last occurred in 1996). To address these concerns of system reliability, the City is investigating opportunities to develop supply capacity on the north side of the Willamette River (the wellfield currently is located on the south side of the river and the WTP on the south side). A new source of supply on the north side of the river would reduce the need for transmission across the Willamette River. Moreover, a supply on the north side would serve as a backup source in the event of flooding at the City's current wellfield.

2.11 System Description

OAR 690-086-140(8)

A schematic of the City's water system is identified in Exhibit 2-1 (page 2-3). The exhibit includes primary infrastructure components. These components are described below.

As previously discussed, the City relies on groundwater as its source of supply. The City's wells are located within a wellfield located south of the city limits and across the Willamette River. The six active wells are listed in **Exhibit 2-19** along with the year of construction of the wells.

Exhibit 2-19. City of Newberg Wells.

Well Number	Year Constructed
4	1970
5	1980
6	1980
7	2001
8	2007
9	2016

Source: City of Newberg *Water Master Plan* (2017), Murraysmith

Water is transported from the wellfield to the WTP on the north side of the Willamette River via a 24-inch-diameter cast iron raw water transmission main and a 30-inch-diameter high density polyethylene raw water transmission main. The 24-inch-diameter main is suspended from the former Highway 219 bridge, which is now maintained by the City for the sole purpose of

[2] City of Newberg Water Master Plan, May 2017 (Murraysmith)

carrying the transmission main from the wellfield to the WTP. The 30-inch-diameter main runs beneath the Willamette River downstream from the former Highway 219 bridge.

The City's WTP was constructed in 1953 and expanded and/or upgraded in 1961, 1970, 1980, 1997, and 2006. Currently, the WTP is a conventional filtration facility with treatment processes for dissolved iron, corrosion control, and disinfectant. The WTP has a nominal capacity of 9 mgd (13.9 cfs), however, it is generally operated at 8 mgd (12.4 cfs) because of undersized piping between the raw water transmission mains and the settling basin.

The City has two pressure zones. Most of City customers are in Pressure Zone 1 and the remainder are in Zone 2. The City maintains three reservoirs with a total combined storage capacity of approximately 12 MG, all of which are located in Pressure Zone 1. Two reservoirs, North Valley Reservoirs 1 and 2, are located north of the UGB and west of Highway 219. The North Valley Reservoirs share a single site and each have a storage capacity of 4 MG. The Corral Creek Reservoir is located east of the UGB and directly east of NE Corral Creek Road, and has a storage capacity of 4 MG. The City's reservoirs are further described in **Exhibit 2-20**.

Exhibit 2-20. City of Newberg Reservoirs.

Reservoir Name	Capacity (MG)	Year Built
North Valley 1	4.0	1960
North Valley 2	4.0	1978
Corral Creek	4.0	2003

Source: City of Newberg *Water Master Plan* (2017), Murraysmith

Constant water system pressure is maintained in the City's two pressure zones using seven pumps. Four pumps are housed at the City's WTP and serve the City's Pressure Zone 1. The City refers to these pumps as the High Service pumps. Three pumps are located at the Oak Knoll Pump Station and serve the City's Pressure Zone 2. The City's pump are further described in **Exhibit 2-21**.

Exhibit 2-21. City of Newberg Pumps.

Pump Count	Capacity (gpm)	Installation Year
High Service Pumps		
1	2,800	2005
2	2,800	2005
3	1,300	1980
4	2,800	2005
Oak Knoll Pump Station Pumps		
1	10	2000
2	250	2000
3	1,000	2000

Source: City of Newberg *Water Master Plan* (2017), Murraysmith

3. Municipal Water Conservation

This section addresses the requirements of OAR 690-086-0150(1) – (6).

This rule requires a description of specific required conservation measures and benchmarks, and additional conservation measures implemented by the City.

3.1 Current Conservation Measures

OAR 690-086-0150(1) and (3)

3.1.1 Progress Report

This is the City's third WMCP. OWRD approved the City's previous WMCP on January 26, 2009. The previous WMCP described the existing conservation measures and presented 5-year benchmarks for conservation measures. **Exhibit 3-1** provides a status update on the 5-year benchmarks in the 2009 WMCP. Note: OWRD updated its WMCP rules in December 2018, and consequently, **Exhibit 3-1** provides a progress report on required benchmarks under the old rules and using the old rule numbers. The remainder of Section 3 is in accordance with the updated rules.

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Exhibit 3-1. Progress Report for the 2007 WMCP Water Conservation Benchmarks.

Section Requirement	Sub-section Requirement	2007 Benchmarks	2018 Benchmark Status
OAR 690-086-150 (4) A description of the specific activities, along with a schedule that establishes five-year benchmarks, for implementation of each of the following conservation measures that are required of all municipal water suppliers:	(a) An annual water audit that includes a systematic and documented methodology for estimating any un-metered authorized and unauthorized uses	The City will continue to be watchful for unauthorized, unmetered water users.	The City continues to be watchful for unauthorized, unmetered water users. City staff in the field has been advised to notify the City's Public Works department of any suspicious water usage.
		The City will properly collect the data from both the production and customer meters and collect data on unmetered uses (line flushing, fire department activities, etc.). This data will then be properly analyzed to develop a clear understanding as to the amount of unaccounted for water and where suspected leaks or other problems may be.	The City collects water demand data from its meters and metered consumption data. Many previously unmetered uses are now metered, such as line flushing. To improve accounting for annual water audits, the City implemented a new asset management system in November 2018 that is capable of tracking authorized metered non-revenue public water uses (flushers, vactors, street sweepers, and hydrant and water line flushing). Consequently, the City will be able to report actual values for authorized metered non-revenue public water uses in future annual water audits rather than estimates. The City properly analyzes data to determine unaccounted-for water (i.e. water loss) and to look for signs of potential leaks.
		Over the next five years, the annual water audit will track system leakage and unaccounted-for water separately for the Main Distribution System and the Riparian Distribution System. This will include analysis of water flowing into the spring distribution system and the extent of water discharged from the springs into the natural swale.	The City completed annual water audits consistent with this benchmark. Snider and Skelton Springs system and Oliver Springs system were outfitted with new magnetic flow meters. The City monitored water that flows into the Snider and Skelton Springs system and Oliver Springs system, as well as customer meters. The City also accounted for water flowing into the Snider/Skelton Springs system and Oliver Springs system that was not utilized by customers and returned to the natural swale. In July 2016, the City signed an agreement conveying the Springs Water System (Snider Spring, Skelton Spring, Atkinson Spring, and Oliver Springs), including infrastructure and all water rights appurtenant to the property containing the springs, to the Chehalem Springs Water Association. (Chehalem Springs Water Association contracts with Hiland Water to manage the water system.) Consequently, the City no longer manages these springs.
	(b) If the system is not fully metered, a program to install meters on all un-metered water service connections.	The City will meter any unmetered connections as they are identified (i.e. Over the next five years, Newberg will continue its efforts to identify all unmetered water users that need to be metered.)	The City has not identified any unmetered water users since 2007 and remains unaware of any unmetered connections. City staff continually monitors for any unmetered connections when they are in the field and any connection found to be unmetered will be corrected immediately.
		The City will continue to require meters for all development within the City.	This remains the City's ongoing policy.
	(c) A meter testing and maintenance program	The City will track the performance of new meters installed throughout the system and maintain records on meters that are removed from service.	All water demand meters at the WTP have been upgraded and all residential meters have been replaced since 2007. The City tested the accuracy of approximately 50 meters before those meters were replaced and they had an average of 80 percent accuracy. The City checked the accuracy of some new customer meters upon customer requests and found that the new meters were over 99 percent accurate. The City continues to track the performance of new meters installed throughout the system and to maintain records on meters that are removed from service.
		The City will develop a residential meter evaluation program for residential meters to assess their accuracy and candidacy for replacement, so that their optimum life and a cost-effective replacement program can be determined. The data can also be statistically analyzed to identify collective biases in the residential meters and adjust customer use accordingly in annual water audits. The City intends to remove and test a representative sample of smaller meters to determine if their accuracy meets the AWWA standards and if an earlier replacement program is warranted.	To address concerns about the accuracy and candidacy for replacement of residential meters, the City added telemetry hardware to existing meters, completing the project in 2014.
		The City will also compare usage rates on a monthly basis to determine if the meter is under or over reporting consumption. This schedule of constantly monitoring of the meters will be reevaluated once the meters are at least 15 years old.	To address concerns about the accuracy and candidacy for replacement of residential meters, the City added telemetry hardware to existing meters, completing the project in 2014. Monthly usage rates are reviewed by Public Works Maintenance Staff on an ongoing basis.

Exhibit 3-1. Progress Report for the 2007 WMCP Water Conservation Benchmarks Continued.

Section Requirement	Sub-section Requirement	2007 Benchmarks	2018 Benchmark Status
	(d) A rate structure under which customers' bills are based, at least in part, on the quantity of water metered at the service connections	Continue to support a conservation oriented water rate structure.	Water bills are comprised of a service charge, meter charge based on meter size, and a volume charge based on the amount of water consumed. It remains the City's ongoing policy to bill customers based, in part, on the volume of water used, thereby supporting a conservation-oriented water rate structure.
	(e) If the annual water audit indicates that system leakage exceeds 10 percent, a regularly scheduled and systematic program to detect leaks in the transmission and distribution system using methods and technology appropriate to the size and capabilities of the municipal water supplier;	The City is implementing accounting, data collection, and data management procedures that will significantly reduce the amount of unaccounted-for water in the Riparian Water Distribution System. Over the next five years, the City will develop a plan to better understand the spring system and to identify options to address any concerns found. Specifically, the City will take the following steps over the course of the next five years:	In 2009 & 2010, the Snider and Skelton Springs system (formally referred to as the Riparian Water Distribution System) and Oliver Springs system were separated from the main City system and individual potable water systems were created. The City installed new meters at each source and made upgrades to meter boxes and chlorine contact times. The City monitored and recorded monthly raw water entering into each potable water system until 2016, when the City signed an agreement conveying the Springs Water System to the Chehalem Springs Water Association, as described above.
		Evaluate the existing condition of the Springs and distribution system. The 2005 Springs Evaluation will be used as a reference where appropriate.	The condition of the springs and distribution system was reviewed on an annual basis and upgrades/repairs were made as necessary until 2016 when the City signed an agreement conveying the Springs Water System to the Chehalem Springs Water Association.
		Generate a qualitative and quantitative description of the water flow from the Springs to the point where water exits the system, and identification of where the water flows after exiting the system.	This benchmark was completed with the installation of new meters and overflow diversion points.
		Identify options to improve the riparian system including an assessment for each spring system.	Improvements were made in conjunction with Oregon Health Authority and Water System Surveys conducted by the State of Oregon. The surveys identified deficiencies that may exist, and the most recent survey showed few deficiencies, because the City addressed many of the deficiencies identified.
		Identify the extent of system leakage and unaccounted for water, and if leakage and unaccounted for water is 10% or greater, develop a systematic program to detect leaks in the transmission and distribution system.	In July 2016, the City signed an agreement conveying the Springs Water System, including infrastructure and all water rights appurtenant to the property containing the springs, to the Chehalem Springs Water Association, as described above. Consequently, the City no longer manages nor tracks unaccounted-for water in the Springs Water System.
		Identify the amount of water that is not being returned to the hydrologic system.	This benchmark was accomplished. Snider and Skelton Springs system and Oliver Springs system were outfitted with new magnetic flow meters. The City monitored water that flows into the Snider and Skelton Springs system and Oliver Springs system, as well as customer meters. The City also accounted for water flowing into the Snider/Skelton Springs system and Oliver Springs system that was not utilized by customers and returned to the natural swale. In July 2016, the City signed an agreement conveying the Springs Water System, including infrastructure and all water rights appurtenant to the property containing the springs, to the Chehalem Springs Water Association. Consequently, the City no longer manages these springs.
		Perform repairs to the spring boxes, metering, and monitoring system.	This work was performed at the Snider and Skelton Springs system and the Oliver Springs system.

Exhibit 3-1. Progress Report for the 2007 WMCP Water Conservation Benchmarks Continued.

Section Requirement	Sub-section Requirement	2007 Benchmarks	2018 Benchmark Status
		The City has an ongoing water line replacement program with a $45,000 annual budget. The goal is to replace leaking and undersized lines, and those lines that are most prone to failure. New lines are also added to complete looping of the pipes to eliminate dead-end sections. The result of this program is a reduction in leakage and a reduced need for flushing because dead-end sections are eliminated. Maintain and continue this program.	This program is ongoing. The City updated its Water Master Plan and Capital Improvement Plan in 2017, which address water line replacement. The budget for the program varies annually, and the annual budget in 2019 is projected to be over $300,000.
		The City is implementing a monthly program to track water production, demand, and billable consumption to gain insight into unaccounted-for water.	See OAR 690-086-150 (4)(a) response.
	(f) A public education program to encourage efficient water use and the use of low water use landscaping that includes regular communication of the supplier's water conservation activities and schedule to customers	The City is planning an approximately 2,500 square foot Xeriscape garden, with native, drought tolerant, water wise, wildlife friendly vegetation. While the types have yet to be finalized there will most probably be some Mountain Hemlock, Blue Blossom, Oregon Grape, Flowering Currant, Aster, Oregon Iris, California Fescue. The garden will be design around plant varieties that will give it year-round beauty. Additionally signage and kiosks will provide plant identification and resources for visitors.	The WaterWise Garden was completed between FY 2008-2009 and FY 2010-2011. The garden has native plants, is a certified backyard habitat, uses minimal irrigation, and contains a kiosk with an eco-roof. The kiosk has landscape water conservation information. The WaterWise Garden has 9 permanent signs that discuss different aspects of water conservation, one of which includes information about native plants.
OAR 690-086-150 (5) If the supplier proposes to expand or initiate the diversion of water under an extended permit for which resource issues have been identified under OAR 690-086-0140 (5)(i), a description of the specific activities, along with a schedule that establishes five-year benchmarks, for implementation of:	(a) A system-wide leak repair or line replacement program to reduce system leakage to no more than 15 percent are sufficient information to demonstrate that system leakage currently is no more than 15 percent.	If the improved water audit data show unaccounted for water is greater than 15%, the City will develop a focused program to detect leakage and replace waterlines where appropriate.	Water loss in the City's distribution system was 14.1 percent in 2017. The City will continue to implement its water line replacement program and to monitor for leaks in the system by conducting regular visual inspections of pipelines and tracking monthly customer consumption levels for atypical changes that could indicate a leak.
		The City will maintain the water pipe maintenance program that has resulted in less than 10 percent system-wide leakage in the Main Distribution System. In the event that leakage and unaccounted for water is found to be 10% or greater, Newberg will develop a systematic program to detect leaks in the transmission and distribution system and take other necessary steps. As described in 4(e), The City has an ongoing water line replacement program with a $45,000 annual budget. The goal is to replace leaking and undersized pipes, and those pipes that most prone to failure. New pipes are also added to complete looping in the system to eliminate dead-end sections, reducing leakage and the need for flushing.	Water loss in the City's distribution system was 14.1 percent in 2017. The City has a regularly scheduled and systematic leak detection and water line replacement program to address water loss. The City updated its WMP and Capital Improvement Plan in 2017, which provide a roadmap for the City's water line replacement efforts, and the City continues to budget for water line replacement annually. The goals of the water line replacement program are: (1) to reduce leakage by replace leaking and undersized lines and those lines that are most prone to failure, and (2) to reduce the need for flushing by adding new lines that complete looping of the pipes and thereby eliminate dead-end sections. The City also conducts regular visual inspections of pipelines to monitor for leaks and monitors monthly customer consumption levels for atypical changes that could indicate a leak.
		Over the next five years, the City will upgrade the measurement and accounting procedures used to track water distribution and consumption in the smaller Riparian Distribution System to obtain an accurate account of water actually consumed, water discharged to the natural swale, and unaccounted for water.	See OAR 690-086-150 (4)(e) response.
		The City has installed two new master meters at the water treatment plant and will check and calibrate them every 5 years, or more frequently if conditions warrant.	All master meters at the WTP were upgraded in 2007. The City verifies the accuracy of these meters (by comparing them against well field and influent meters) annually.
		The City will continue to install meters for all new customers, and on any existing connections that are identified as unmetered.	See OAR 690-086-150 (4)(b) response.

Exhibit 3-1. Progress Report for the 2007 WMCP Water Conservation Benchmarks Continued.

Section Requirement	Sub-section Requirement	2007 Benchmarks	2018 Benchmark Status
		As described in 4(a), The City plans to conduct annual water audits to measure unaccounted-for water and estimate leakage rates.	See OAR 690-086-150 (4)(a) response.
		The City will implement a program to accurately monitor water flowing into and out of the Oliver Spring Distribution System to obtain an accurate representation of water use and unaccounted-for water in this system.	See OAR 690-086-150 (4)(e) response.
OAR 690-086-150 (6) If the supplier serves a population greater than 1,000 and proposes to expand or initiate diversion of water under an extended permit for which resource issues have been identified under OAR 690-086-0140(5)(i), or if the supplier serves a population greater than 7,500, description of the specific activities, along with a schedule that establishes five-year benchmarks, for implementation of each of the following measures; or documentation showing implementation of the measures is neither feasible nor appropriate for ensuring the efficient use of water and the prevention of waste	(a) A system-wide leak repair or line replacement program to reduce system leakage to 15 percent and if the reduction of system leakage to 15 percent is found to be feasible and appropriate, to reduce system leakage to 10 percent	The City will upgrade measurement, accounting, data collection, and data management procedures that will significantly reduce the amount of unaccounted-for water in the Riparian Water Distribution System.	See OAR 690-086-150 (4)(e) response.
		Continue to monitor the difference between water distributed to the system and water billings, and take steps to identify new leaks when an increasing difference indicates they exist.	See OAR 690-086-150 (4)(a) response and OAR 690-086-150 (5)(a) response.
		The City will maintain the water pipe maintenance program that has resulted in less than 10 percent system-wide leakage in the Main Distribution System. In the event that leakage and unaccounted for water is found to be 10% or greater, Newberg will develop a systematic program to detect leaks in the transmission and distribution system and take other necessary steps.	See OAR 690-086-150 (5)(a) response.
		As described in 4(e), The City has an ongoing water line replacement program with a $45,000 annual budget. The goal is to replace leaking and undersized pipes, and those pipes that most prone to failure. New pipes are also added to complete looping in the system to eliminate dead-end sections, reducing leakage and the need for flushing.	See OAR 690-086-150 (5)(a) response.
		Over the next five years, the City will upgrade the measurement and accounting procedures used to track water distribution and consumption in the smaller Riparian Distribution System to obtain an accurate account of water actually consumed, water discharged to the natural swale, and unaccounted for water.	See OAR 690-086-150 (5)(a) response.
		The City has installed two new master meters at the water treatment plant and will check and calibrate them every 5 years, or more frequently if conditions warrant.	See OAR 690-086-150 (5)(a) response.
		The City will continue to install meters for all new customers, and on any existing connections that are identified as unmetered.	See OAR 690-086-150 (5)(a) response.

Exhibit 3-1. Progress Report for the 2007 WMCP Water Conservation Benchmarks Continued.

Section Requirement	Sub-Section Requirement	2007 Benchmarks	2018 Benchmark Status
		As described in 4(a), The City plans to conduct annual water audits to measure unaccounted-for water and estimate leakage rates.	See OAR 690-086-150 (5)(a) response.
		The City will implement a program to accurately monitor water flowing into and out of the Oliver Spring Distribution System to obtain an accurate representation of water use and unaccounted-for water in this system.	See OAR 690-086-150 (5)(a) response.
	(b) Technical and financial assistance programs to encourage and aid residential, commercial, and industrial customers in implementation of conservation measures;	Continue to provide public education to highlight the importance of water conservation.	Technical Assistance/Public Education -- The City provided the following: • Mad Science Presentations – 1 in FY 2009-2010 and approximately 2 per year from FY 2010-2011 to present • Water Treatment Plant tours: approximately 3-5 tours annually, 20 tours from 2013-2017; groups who tour include Engineering Students from George Fox, Leadership Newberg, and professional organizations, like AWWA. • Table at Public Works Day (approximately 500 kids attend this event annually) and the Old Fashion Festival each year. The booth provides information about conserving water and often distributes water bottles or t-shirts reminding people to conserve. • FFA & Farmers Market – The City provided an FFA presentation in FY 2012-2013 and local farmer's market presentations (3 in FY 2010-2011, 1 in FY 2011-2012,and 1 in FY 2012-2013), but no longer has presentations/booths at these locations • Tours of the WaterWise garden until FY 2010-2011. • Annual Water Quality Report promotes water conservation and advertises water conservation kits • The City provides an annual message in the November utility bill that states “Winter averaging has begun. Conserve water from 11/1/2017 to 2/28/2018 to lower your sewer bills from April thru October.” • The City created 8 Web pages between 2010 and 2014 regarding indoor and outdoor water conservation. The City’s updates its indoor and outdoor water conservation webpages on an as-needed basis when information changes (at least once a year). • When the City was a member of the Regional Water Providers Consortium (FY 2009-2010 to FY 2011-2012), the City: attended meetings; had an annual booth at the Yard, Garden, and Patio Show; participated in a Gardentime TV spot promoting outdoor water conservation in 2011; and assisted at the Clean Water Festival in FY 2011-2012. Financial Assistance: The City started a program (FY 2010-2011) in conjunction with Energy Trust that provides financial assistance, an indoor water audit, and free conservation kits for low-income residents. The City paid for a bus for a class to attend the Clean Water Festival in 2014, as well.

Exhibit 3-1. Progress Report for the 2007 WMCP Water Conservation Benchmarks Continued.

Section Requirement	Sub-Section Requirement	2007 Benchmarks	2018 Benchmark Status
	(c) Supplier financed retrofitting or replacement of existing inefficient water using fixtures, including distribution of residential conservation kits and rebates for customer investments in water conservation;	Over the next five years, the City will continue to distribute indoor water conservation kits and water conservation hose nozzles, as well as provide flyers and brochures dealing with indoor water conservation and selecting landscaping that requires less water.	The City continues to give out water conservation kits, adult education materials, and student education materials. The water conservation kits offered by the City include the following items: one 1.5 gpm showerhead, one 5-minute shower timer, two 1 gpm bathroom faucet aerators, one 1.5 gpm kitchen sink swivel faucet aerator, one roll of plumbing tape to ensure a leak free connection, two toilet dye tablets for identifying toilet leaks, one fill cycle diverter, one drip gauge, and one hose nozzle. The City gave out a total of 117 water conservation kits from 2013 through 2018, broken out by year as follows: • 2013: 20 kits • 2014: 26 kits • 2015: 20 kits • 2016: 33 kits • 2017: 7 kits • 2018: 13 kits
	(d) Adoption of rate structures, billing schedules, and other associated programs that support and encourage water conservation;	Continue current billing practices. The City currently bills on a monthly cycle.	This remains the City's ongoing billing practice.
		During the next year the City will explore revising its water rates to further encourage water conservation.	This effort is ongoing. The City reviews its water rate structure every 2-3 years. Rate review committee members include citizens and City Staff that work together to promote water conservation. The water rate structure has not changed since 2007, but rates for larger users have gone up notably over time.
	(e) Water reuse, recycling, and non-potable water opportunities; and	The City will look for additional reuse and recycling opportunities.	The City of Newberg has both a Reuse System and a Springs System (Otis Springs) that can be used for non-potable water. The Reuse System is a system that uses recycled water from the wastewater treatment plant to supply irrigation needs of 300,000 - 400,000 gallons per day during the summer. Currently, the reuse system serves the Chehalem Glenn Golf Course, a subsidiary of the Newberg Parks & Recreation Department. The Chehalem Glenn Golf Course is the sole customer, because it has holding ponds on the golf course that the reuse system fills and the golf course then uses. For the City to serve additional customers, it needs to add an additional reuse reservoir and piping. Given that irrigation customers have expressed interest in obtaining reuse water as soon as it is available, the City has long-term plans for an expanded water reuse system. The Springs System, which uses water from Otis Springs, currently serves the Chehalem Glenn Golf Course with non-potable water (at the beginning and end of the irrigation season when the Reuse System does not fill ponds at the golf course) and is anticipated to serve two major planned developments in the northeast quadrant of the City with non-potable water. The City then intends to connect the purple pipe system that will serve the two major developments to an existing but unused purple pipe system.
	(f) Any other conservation measures identified by the water supplier that would improve water use efficiency.	The City is planning an approximately 2,500 square foot Xeriscape garden, with native, drought tolerant, water wise, wildlife friendly vegetation. While the types have yet to be finalized there will most probably be some Mountain Hemlock, Blue Blossom, Oregon Grape, Flowering Currant, Aster, Oregon Iris, California Fescue. The garden will be design around plant varieties that will give it year-round beauty. Additionally signage and kiosks will provide plant identification and resources for visitors.	See OAR 690-086-150(4)(f) response.

Exhibit 3-1. Progress Report for the 2007 WMCP Water Conservation Benchmarks Continued.

Section Requirement	Sub-Section Requirement	2007 Benchmarks	2018 Benchmark Status
		As Newberg evaluates options for contracting with the various water districts and associations that it provides water to, the City will consider requiring those entities to provide information concerning their water use and conservation efforts.	No new water districts have been added. In fact, the City currently has reduced the number of external suppliers it provides water to since finalizing the 2007 WMCP. All water districts are advised of City conservation policies/efforts.
		Within three years of being hired (and within five years of approval of this WMCP), the City's new water conservation environment technician will meet with all major water users at their site, tour their water consumption activities, and report on recommended water conservation improvements in their operations.	The City has a staff member dedicating 0.2 FTE to overseeing the WMCP and water conservation efforts. The City's major water users are irrigation customers, and as stated above, the City is investigating the possibility of expanding its water reuse system to provide reuse water to irrigation customers.

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3.1.2 Current Conservation Measures

The City implements a variety of water management and conservation measures, which include the following:

- Conducting annual water audits.
- Billing water customers based, in part, on the quantity of water metered at the service connection.
- Distributing water conservation kits that include such items as a water-efficient showerhead, water-efficient faucet aerators, a shower timer, leak detection tablets, and a hose nozzle.
- Annually hosting a booth promoting water conservation at Public Works Day and the Old Fashion Festival.
- Assisting with identifying and fixing leaks by providing information on the City's website and providing maintenance staff support upon request.
- Operating a system that uses recycled water from the WWTP for irrigation.
- Planning for a "purple pipe" system that will serve two planned developments non-potable water from Otis Springs for irrigation purposes.

3.2 Use and Reporting Program

OAR 690-086-0150(2)

The City's water measurement and reporting program complies with the measurement and reporting standards in OAR Chapter 690, Division 85.

The City currently measures water demand at its wells and Otis Springs using ultrasonic meters.

The City submits monthly water use measurements to OWRD on an annual basis. Reporting is for the previous water year (October 1 to September 30). The City's water use records can be found at http://apps.wrd.state.or.us/apps/wr/wateruse_report/

3.3 Required Conservation Programs

OAR 690-086-0150(4)

OAR 690-086-150(4) requires that all water suppliers establish 5-year benchmarks for implementing the following water management and conservation measures:

- Annual water audit
- System-wide metering
- Meter testing and maintenance
- Unit-based billing
- Leak detection and repair (if system leakage exceeds 10 percent)
- Public education

During the next 5 years, the City plans to initiate, continue, or expand the following conservation measures that are required of all municipal water suppliers when a condition of a water use permit, permit extension, or another order or rule requires a WMCP.

3.3.1 Annual Water Audit

OWRD defines a water audit as an analysis of the water system that includes a thorough accounting of all water entering and leaving the system to identify leaks in the system and authorized and unauthorized water uses, either metered or estimated. The water audit also includes analysis of the water supplier's own water use.

The City conducts annual water audits of its water distribution system. The City's water loss was 14.1 percent in 2017 and averaged 12.9 percent from 2013 through 2017. As described in Section 2.7, the City calculated water loss as the difference between the annual finished water demand and metered water consumption plus consumption at hydrant meters. Thus, water loss consists of unbilled authorized metered consumption, unbilled authorized unmetered consumption, apparent losses (i.e., unauthorized consumption, meter inaccuracies, and data handling errors), and real losses (i.e. system leakage). (The City is not aware of any unauthorized consumption.) System leakage, as the name implies, is water loss from deteriorating or compromised pipes, pipe joints, service connections, valves, etc. Based on data from the City's 2014 Progress Report, the City estimates that other authorized metered non-revenue public water uses (flushers, vactors, street sweepers, and hydrant and water line flushing) represent an average of 1.1 percent of water loss from 2003 through 2017. Construction trucks are metered and billed within the Hydrant meter category. The City attributes most of the remainder of water loss to real water losses. Efforts to reduce water loss are described throughout Section 3. As previously described in Section 2.5.2, the difference between raw water demand and finished water demand is process water.

To improve accounting for annual water audits, the City implemented a new asset management system in November 2018 that is capable of tracking authorized metered non-revenue public water uses (flushers, vactors, street sweepers, and hydrant and water line flushing). Consequently, the City will be able to report actual values for authorized metered non-revenue public water uses in future annual water audits rather than estimates.

Five-Year Benchmarks: The City will continue to conduct annual water audits. In 2019, the City will begin to account for authorized metered non-revenue public uses (such as flushers, vactors, street sweepers, and hydrant and water line flushing) in its annual water audits.

3.3.2 System-wide Metering

The City's water connections are fully metered and the City installs meters at all new water connections. City staff members continually monitor for any unmetered connections when they are in the field and any connection found to be unmetered will be corrected immediately.

Five-Year Benchmarks: The City will continue to require installation of meters on all new water connections.

3.3.3 Meter Testing and Maintenance

All master meters at the WTP were upgraded in 2007, and the City verifies the accuracy of these meters (by comparing them against wellfield and influent meters) annually. The City completed a project to add telemetry hardware to all customer meters in 2014. The City checked the accuracy of some new customer meters upon customer requests and found that the new meters were more than 99 percent accurate. The City continues to track the performance of new meters installed throughout the system and to maintain records on meters that are removed from

service.

Five-Year Benchmarks: The City will continue to track the performance of new meters installed throughout the system and to maintain records on meters that are removed from service.

3.3.4 Water Rate Structure

The City's customer water bill is comprised of a service charge, meter charge, and a volume charge. The service charge helps the City recover costs related to utility billing and customer service activities. The meter charge, which is based on meter size, helps recuperate distribution system maintenance and replacement expenses and debt service. The volume charge is based on the volume of water consumed. Thus, the City continues to bill customers based, in part, on the volume of water used. **Exhibit 3-2** shows the City's water service charges (effective August 7, 2018).

Exhibit 3-2. Water Service Charges Effective August 7, 2018.

Service Charge ($/month)	$2.18
Meter Charge ($/month) by Size (inches)	
¾	$12.95
1	$22.02
1.5	$42.74
2	$68.64
3	$129.50
4	$216.27
6	$431.24
8	$690.24
10	$1,078.74
Non-potable Meter Charge ($/month) by Size (inches)	
4	$57.47
8	$180.84
Volume Charge ($/ccf) by Customer Category	
Single Family Residential	$4.00
Multi-family Residential	$3.27
Commercial	$3.94
Industrial	$4.15
Irrigation	$7.20
Outside City	$6.01
Public Agency	$4.11
Non-potable	$2.51

Five-Year Benchmarks: The City will continue to bill customers based, in part, on the volume of water consumed on a monthly basis.

3.3.5 Water Loss Analysis

The City's water loss was 14.1 percent in 2017 and averaged 12.9 percent from 2013 through 2017. As described under Section 3.3.1, the City attributes most of the water loss to real water losses. The City has a leak detection and water line replacement program to address water loss. The City updated its WMP and Capital Improvement Plan in 2017, which provide a roadmap for the City's water line replacement efforts, and the City continues to budget for water line

replacement annually. The goals of the water line replacement program are: (1) to reduce leakage by replace leaking and undersized lines and those lines that are most prone to failure, and (2) to reduce the need for flushing by adding new lines that complete looping of the pipes and thereby eliminate dead-end sections. The City also conducts regular visual inspections of pipelines to monitor for leaks and monitors monthly customer consumption levels for atypical changes that could indicate a leak. The City understands that OAR 690-086-0150(4)(e)(A) and (B) requires the City to provide a description and analysis identifying potential factors for loss and selected actions for remedy to OWRD within two years of approval of this WMCP, and if the selected actions do not reduce water loss to less than 10 percent within five years of approval of the WMCP, the City will have to take additional leak detection and repair measures.

Five-Year *Benchmarks:* The City will continue its leak detection and water line replacement program. During the next 5 years, the City will implement water line replacement efforts according to the roadmap provided by the City's updated (2017) WMP and Capital Improvement Plan. Within two years of approval of this WMCP, the City shall provide OWRD with a description and analysis identifying potential factors for the water loss and selected actions for remedy. If the selected actions do not reduce water loss to less than 10 percent within five years of approval of the WMCP, the City will take additional leak detection and repair measures.

3.3.6 Public Education

The City promotes water conservation through publications, school presentations, and public events. The City provides indoor and outdoor water conservation information on its website and in its Annual Water Quality Report, both of which also promote the availability of free water conservation kits. The website also discusses such topics as irrigation system maintenance, water needs of lawns, why saving water is important, leak detection, and free water assessments for low income customers, and it suggests supporting documents and web links to explore for additional information (such as the publication Water-Efficient Plants for the Willamette Valley). The City annually sponsors approximately two Mad Science presentations that discuss water conservation in elementary schools. The City annually hosts a booth at Public Works Day and the Old Fashion Festival that promotes water conservation and offers approximately three to five tours of the WTP annually, which are typically for professional groups. The City has adult education and student education materials for these events.

Five-Year Benchmarks: The City will continue its public education program, including presentations for schools and professional groups, outreach at community events, and website updates. Following the establishment of new water rates every 2 or 3 years, the City will send a letter to the top 10 water consumers informing them of the new rates and recommending water conservation, particularly outdoor water conservation during the summer months. In the next 5 years, the City will develop both an outdoor water conservation and an indoor water conservation brochure or flyer for posting at public locations, such as the library, Chehalem Cultural Center, and Parks and Recreation facilities.

3.4 Additional Conservation Measures

OAR 690-086-0150(5)

OAR 690-086-0150(6) requires municipal water suppliers that serve a population greater than 1,000 and propose to expand or initiate the diversion of water under an extended permit for which resource issues have been identified, or if the population served is greater than 7,500, to provide a description of the specific activities, along with a 5-year schedule to implement several additional conservation measures. This rule applies to the City given that it has a population greater than 7,500.

3.4.1 Technical and Financial Assistance Programs

The City offers free water conservation kits that include the following items: one 1.5 gpm showerhead, one 5-minute shower timer, two 1 gpm bathroom faucet aerators, one 1.5 gpm kitchen sink swivel faucet aerator, one roll of plumbing tape to ensure a leak free connection, two toilet dye tablets for identifying toilet leaks, one fill cycle diverter, one drip gauge, and one hose nozzle. The water conservation kits are distributed at City Hall to enable tracking of their distribution.

The City provides leak detection technical assistance through its website, which includes links to online videos and a leak detection book. The City's maintenance staff works with homeowners upon request to troubleshoot water leaks, as well.

The City has a program (in conjunction with Energy Trust) that provides financial assistance in the form of water bill vouchers or credits, a free indoor water audit, and free conservation kits for low-income residents.

Five-Year Benchmarks: The City will continue to offer free water conservation kits to customers. The City will continue its program to assist low-income residents with water conservation. The City will continue to provide leak detection information on its website and leak detection support to interested customers. In the next five years, the City will add a link on its website that guides customers through a home water audit.

3.4.2 Supplier Financed Retrofit or Replacement of Inefficient Fixtures

As described above, the City's free water conservation kits include a water-efficient showerhead, water-efficient faucet aerators, and a hose nozzle that can regulate flow.

Five-Year Benchmarks: The City will continue to distribute free water conservation kits that include water-efficient fixtures.

3.4.3 Rate Structure and Billing Practices that Encourage Conservation

As previously described, the City's customer water bill is comprised of a service charge, meter charge based on meter size, and a volume charge based on the amount of water consumed. Thus, the City continues to bill customers based, in part, on the volume of water used. Customers are billed on a monthly basis, providing timely feedback on water consumption. In addition, water bills include historical water consumption, providing customers a tool for evaluating how their consumption practices may be affecting their water bills from month-to-month. The City also provides an annual message on the utility bill in November that states

"Winter averaging has begun. Conserve water from 11/1/2017 to 2/28/2018 to lower your sewer bills from April thru October."

Five-Year Benchmarks: The City will continue to bill customers based, in part, on the volume of water consumed on a monthly basis. The City will continue to provide historical water consumption information on water bills. In the next year, the City will begin including water conservation messages in at least three water bills per year, one of which will be at the beginning of the irrigation season and will encourage outdoor water conservation.

3.4.4 Water Reuse, Recycling, and Non-potable Opportunities

The City has both a Reuse System and a Springs System (Otis Springs) that can be used for non-potable water. The Reuse System is a system that uses recycled water from the WWTP to supply irrigation needs of 300,000 to 400,000 gallons per day during the summer under its NPDES permit. Currently, the reuse system serves the Chehalem Glenn Golf Course, a subsidiary of the Chehalem Parks & Recreation Department. The Chehalem Glenn Golf Course is the sole customer because it has holding ponds on the golf course that the reuse system fills and the golf course then uses. For the City to serve additional customers, it needs to add an additional reuse reservoir and piping. Given that irrigation customers have expressed interest in obtaining reuse water as soon as it is available, the City has long-term plans for an expanded water reuse system. The Springs System, which uses water from Otis Springs, currently serves the Chehalem Glenn Golf Course with non-potable water (at the beginning and end of the irrigation season when the Reuse System does not fill ponds at the golf course) and is anticipated to serve two major planned developments in the northeast quadrant of the City, north of Highway 99, with non-potable water. The City then intends to connect the purple pipe system that will serve the two major developments to an existing, but unused, purple pipe system.

Five-Year Benchmarks: The City will continue to operate the Reuse System and to develop plans for expanding the Reuse System. The City will submit to OWRD reclaimed water registrations to address use of reclaimed water through its Reuse System. The City will continue its efforts to install a non-potable water ("purple-pipe") system in the two major planned developments in the northeast quadrant of the city, north of Highway 99, and to connect that new purple pipe system to an existing purple pipe system.

3.4.5 Other Conservation Measures
OAR 690-086-0150(3)

The City created a 2,500 square foot WaterWise Garden to demonstrate to customers how they can make their landscapes more water-efficient. The demonstration garden has native plants, is a certified backyard habitat, uses minimal irrigation, and contains a kiosk with an eco-roof. The kiosk has landscape water conservation information. The WaterWise Garden has nine permanent signs that discuss different aspects of water conservation, one of which includes information about native plants.

Five-Year Benchmarks: The City will continue to maintain the WaterWise Garden in coordination with the Parks and Recreation District.

Exhibit 3-3 presents a summary of the City's 5-year water conservation benchmarks.

Exhibit 3-3. Summary of Water Conservation Five-Year Benchmarks.

Conservation Measures	Five-Year Benchmarks
Annual Water Audit	The City will continue to conduct annual water audits.
	In 2019, the City will begin to account for authorized metered non-revenue public uses (such as flushers, vactors, street sweepers, and hydrant and water line flushing) in its annual water audits.
System-wide Metering	The City will continue to require installation of meters on all new water connections.
Meter Testing and Maintenance	The City will continue to track the performance of new meters installed throughout the system and to maintain records on meters that are removed from service.
Water Rate Structure and Billing Practices that Encourage Conservation	The City will continue to bill customers based, in part, on the volume of water consumed on a monthly basis.
	The City will continue to provide historical water consumption information on water bills.
	In the next year, the City will begin including water conservation messages in at least three water bills per year, one of which will be at the beginning of the irrigation season and will encourage outdoor water conservation.
Water Loss Analysis	The City will continue its leak detection and water line replacement program.
	Over the next five years, the City will implement water line replacement efforts according to the roadmap provided by the City's updated (2017) Water Master Plan and Capital Improvement Plan.
	Within two years of approval of this WMCP, the City shall provide OWRD with a description and analysis identifying potential factors for the water loss and selected actions for remedy. If the selected actions do not reduce water loss to less than 10 percent within five years of approval of the WMCP, the City will take additional leak detection and repair measures.
Public Education	The City will continue its public education program, including presentations for schools and professional groups, outreach at community events, and website updates.
	Following the establishment of new water rates approximately every two years, the City will send a letter to the top 10 water consumers informing them of the new rates and recommending water conservation, particularly outdoor water conservation during the summer months.
	In the next five years, the City will develop both an outdoor water conservation and an indoor water conservation brochure or flyer for posting at public locations, such as the library, Chehalem Cultural Center, and Parks and Recreation facilities.
Technical and Financial Assistance Programs	The City will continue to offer free water conservation kits to customers.
	The City will continue its program to assist low-income residents with water conservation.
	The City will continue to provide leak detection information on its website and leak detection support to interested customers.
	In the next five years, the City will add a link on its website that guides customers through a home water audit.
Supplier Financed Retrofit or Replacement of Inefficient Fixtures	The City will continue to distribute free water conservation kits that include water-efficient fixtures.
Water Reuse, Recycling, and Non-potable Water Opportunities	The City will continue to operate the Reuse System and to develop plans for expanding this system.
	The City will submit to OWRD reclaimed water registrations to address use of reclaimed water through its Reuse System.
	The City will continue its efforts to install a non-potable water ("purple-pipe") system in the two major planned developments in the northeast quadrant of the city, north of Highway 99, and to connect that new purple pipe system to an existing purple pipe system.
Other Conservation Measures	The City will continue to maintain the WaterWise Garden in coordination with the Parks and Recreation District.

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4. Municipal Water Curtailment Element

This section satisfies the requirements of OAR 690-086-0160.

This rule requires a description of past supply deficiencies and current capacity limitations. It also requires inclusion of stages of alert and the associated triggers and curtailment actions for each stage.

4.1 Introduction

Curtailment planning is the development of measures to reduce demand during supply shortages. The City has identified four primary events that could lead to supply shortages that could reduce the WTP production and distribution system capacities, including prolonged drought, flooding, earthquake and ground movement, or source contamination. These events could cause equipment malfunctions, infrastructure damage, and an unhealthy water supply, among other impacts. The goal of this curtailment plan is to provide objective criteria that trigger actions to ensure sufficient water is available to meet the water demands of the water supply system and help ensure the health, safety, and welfare of the community.

The City's existing curtailment plan was codified in 1998 in the City's Municipal Code Sections 13.15.230 through 13.15.290. These sections of the code can be found in **Appendix C**. The curtailment plan presented below is based on this Municipal Code and modified to fully comply with the requirements of OAR 690-086-0160.

4.2 History of Curtailment Episodes

OAR 690-086-0160(1)

The City has not experienced any water shortage or curtailment events during the last 10 years. However, despite the lack of shortage or curtailment events, the City has been proactive in its efforts during this time to help avoid water supply shortages by implementing water system infrastructure upgrades. Some of these upgrades are described below.

- In 2016, the City added Well 9, which increased system capacity while, at the same time, provided an additional location from which to appropriate water in the event that other wells become inoperable.
- In 2014, the City upsized the pump for Well 8, increasing the well's production capacity to approximately 2,300 gpm (3.3 mgd). Well 8 has the City's only well house constructed with mooring piles, which allow City staff members to dock a boat at the well if needed in case of a flood.
- Currently, Well 6 can be run off a portable generator owned by the City in the event of an electrical power failure.
- The City has two transmission water mains to convey raw water from its wellfield to its WTP, which is located across the Willamette River from the wellfield. One main was installed under the river and the other is located on a bridge spanning the river. In the event one of these mains cannot be used, the other could continue to supply raw water to the WTP.

- The capacity of the City's reservoirs permit the City to meet system demand for approximately 2 days at a rate of demand equivalent to current MDDs and approximately 5 days of ADDs. Should the WTP become inoperable, the City could rely on meeting demand temporarily solely from its reservoirs.
- The City recently performed seismic upgrades to Reservoir Number 2.

In addition to these and other system resiliency measures, the City is taking steps to address other infrastructure and supply vulnerabilities. For example, as described in Section 2, the City is investigating opportunities to develop supply capacity on the north side of the Willamette River to reduce dependence on the transmission lines running across the Willamette River. The City considers these transmission lines vulnerable to seismic events and land movement per the City's 2017 WMP. Moreover, a supply on the north side would be located in an area less prone to flooding compared to the City's current wellfield. The City is currently initiating a new resiliency study to explore these issues.

Because of City relies on one source of water (groundwater), a long-term drought or source contamination could compromise the City's ability to meet system demands. In cases of severe drought or wide-spread source contamination, the City may need to enact one of its latter stages of curtailment, described below, to meet the basic health and safety needs of its customers. Events with lesser impacts could require enactment of the earlier curtailment stages.

4.3 Curtailment Program

OAR 690-086-0160(2) and (3)

The City has adopted a four-stage curtailment plan to be invoked in the event of a water supply shortage. These stages could be initiated and implemented in progressive steps or a later stage could be implemented directly. The plan includes both voluntary and mandatory measures, depending upon the cause, severity, and anticipated duration of the shortage.

Exhibit 4-1 presents the four curtailment stages, as well as their initiating conditions (i.e., triggers). Initiation of a curtailment stage is based on the specific circumstances of the actual event. The decision to implement curtailment will also consider the knowledge and judgment of staff members familiar with the water system. Staff members may evaluate such considerations as assessments of system damage or contamination, duration of repair, costs, fire hazards, and weather forecasts.

The City's curtailment plan has four curtailment stages, which increase in severity:

1. Water Alert Status
2. Serious Water Shortage
3. Critical Water Shortage
4. Emergency Water Shortage (Minimum Fire Protection Level)

These four curtailment stages will be triggered by the criteria presented in **Exhibit 4-1**. This exhibit also describes the goal of each stage in terms of the percent of reduction of finished water production and distribution system capacities.

Exhibit 4-1. Curtailment Stages and Potential Initiating Conditions.

Curtailment Stage	Potential Initiating Conditions*
1. Water Alert	Daily water demand between 80%-99% of maximum finished water production or distribution system capacities.
2. Serious Water Shortage	Daily water demand is equivalent to maximum finished water production or distribution system capacities.
3. Critical Water Shortage	Daily water demand is up to 120% of maximum finished water production or distribution system capacities.
4. Emergency Water Shortage (Minimum Fire Protection Level)	Daily water demand is > 120% of maximum finished water production or distribution system capacities.

*Finished water production capacity is equivalent to the rate at which the WTP can produce finished water. Distribution system capacity includes the capacity of distribution lines, pump stations, and reservoirs.

4.4 Curtailment Actions

OAR 690-086-0160(4)

Stage 1—Water Alert Status

The Stage 1—Water Alert Status is activated when system demands are between 80 to 99 percent of maximum finished water production capacity of the WTP or between 80 to 99 percent of the maximum capacity of the distribution system.

Under Stage 1—Water Alert Status, the City will issue a notice using the City's social media platforms requesting voluntary reduction in water use by all customers. The notice will include a description of the current water situation, the reason for the requested conservation measures, and a warning that mandatory restrictions will be implemented if voluntary measures are not sufficient to achieve water use reduction goals. The notice also will direct customers to the City's webpage for conservation information and tips. A similar notice could be issued through local media (newspaper, radio, or TV); however, if the drought is regional, the media may already be alerting users of water shortage concerns. Therefore, the City's Stage 1 plan does not automatically involve news releases or paid media announcements.

When Stage 1 is triggered, the City will also ask customers to voluntarily comply with the following:

1. Minimize landscape watering between 10:00 am and 6:00 pm, the period of highest water loss due to evaporation.
2. Water landscapes on alternate days (even numbered addresses water on even numbered days and odd numbered addresses on odd numbered days).
3. Implement other conservation measures as listed on the City's website.
4. Discourage serving water to restaurant customers unless water is requested by the customer. (This action does not provide significant water savings, but is useful for generating awareness of the need to curtail water use.)

Examples of the City's methods of communication with its customers includes the following.

- For events that are anticipated to require long-term voluntary curtailment, the City may provide notice on water bills. Beginning with the first water bill following issuance of the curtailment stage and continuing until curtailment is cancelled, describe the need to curtail use on each monthly water bill. This brief note is an effective means to keep customers aware of the curtailment status.
- Contact potential partners in water conservation, including local businesses that are the most affected (e.g., commercial car wash businesses, nurseries, etc.).
- Use City's social media platforms to keep the public informed of curtailment need and actions they can take to reduce water use.

Stage 2—Serious Water Shortage Status

The Stage 2—Serious Water Shortage Status is activated when system demands are equivalent to the maximum finished water production capacity of the WTP or equivalent to the maximum capacity of the distribution system.

Under Stage 2—Serious Water Shortage Status, City customers will be notified of the following mandatory water restrictions:

1. Water landscapes only between 6:00 pm and 10:00 am.
2. Water landscapes only when allowed by the odd/even schedule, as described under Stage 1.
3. No water for washing motorbikes, motor vehicles, boat trailers, or other vehicles except at a commercial washing facility that recycles wash water. (Exceptions include vehicles that must be cleaned to maintain public health and welfare, such as food carriers and solid waste transfer vehicles.)
4. Limit City uses of water and discontinue hydrant flushing, reduce nonessential cleaning using water, and curtail temporary access (e.g., for construction-related activities) to water at hydrants.
5. No water to wash sidewalks, walkways, driveways, parking lots, tennis court, and other hard-surfaced areas.
6. No water to wash buildings and structures, except as needed for painting or construction.
7. No water for a fountain or pond for aesthetic or scenic purposes, except for recalculating systems and where necessary to support fish life.
8. No water for dust control unless absolutely necessary.
9. No water for gutter cleaning.

In addition to the above mandatory water use restrictions, during a irrigation season Stage 2—Serious Water Storage Status, the City may ask the top 10 irrigators to limit watering to 3 days per week, specifying which days each of the customers can irrigate. The intention of this measure enables the City to ensure that these irrigators do not irrigate at the same time, thereby stressing the water system. The Water Conservation Coordinator keeps a list of large irrigators, and will initiate contact with them.

Stage 3—Critical Water Shortage Status

The Stage 3—Critical Water Shortage Status is activated by the City when system demands are between 101 and 120 percent of the maximum finished water production capacity of the WTP or equivalent to the maximum capacity of the distribution system.

Stage 3—Critical Water Shortage Status includes the following measures:

1. Perform the actions indicated for Stage 1.
2. Perform the actions indicated for Stage 2.
3. Replace the restriction of odd/even watering from Stage 2 with a prohibition on all outdoor watering (exceptions include new lawn, grass or turf planted after March 1 of the calendar year in which restrictions are imposed, sod farms, high-use athletic fields or park and recreation areas specifically designated by the City Council).
4. No water to fill, refill, or add to any indoor or outdoor swimming pools or hot tubs, except if one of the following conditions is met: the pool is used for a neighborhood fire control supply, the pool has a recycling water system, the pool has an evaporative cover, or the pool's use is required by a medical doctor's prescription.
5. No water from hydrants for construction-related activities (except on a case-by case basis), fire drills, or any purpose other than fire-fighting.
6. Implement limitations on commercial uses of water, depending on the severity of the shortage.
7. Issue public service announcements to notify customers of the severity of the conditions.
8. Provide reminders to violators, using door hangers. Keep records of violations and the fines that are collected.

Stage 4—Emergency Water Shortage Status (Minimum Fire Protection Level)

The Stage 4—Emergency Water Shortage Status is activated when system demands exceed 120 percent of the maximum finished water production capacity of the WTP or exceed the maximum capacity of the distribution system. The activities are to include all of the actions for Stages 1, 2, and 3, as well as the following:

1. Prohibit all outside water use. The only exceptions will be those specifically identified by the City Manager or Mayor.
2. Prohibit all nonessential water use. Only exceptions will be those specifically identified by the City Manager or Mayor.
3. Prohibit nonessential water use by all industrial and commercial customers.
4. Contact the Oregon Drinking Water Program, Department of Human Services, and request their assistance in responding to the problem.
5. Notify the local news media, if appropriate, to ask for their assistance in notifying customers.

The City of Newberg has an Emergency Operations Plan (EOP), published December 2013, which outlines the City's approach to emergency response and enhances the City's ability to protect the safety, health, and welfare of its citizens. The EOP covers a variety of incident types

including the City's intended response to a drought and seismic activity. In the event of one of these incidents, the City would implement the EOP.

The City will continue to investigate and develop specific backup plans for a Stage 4—Emergency Water Shortage Status situation. These plans may include renting a water hauling truck, purchasing water from neighboring communities or sending water customers to a pre-designated water distribution location, and supplying customers with bottled water. In addition, the City may activate its 14 portable Hurricane Water Purification Units. These units can be run on gravity or generators and can be used to treat non-potable water for human consumption.

4.5 Authority

The Mayor or City Manager is empowered to declare a water crisis state of emergency and enact this curtailment plan. The Mayor or City Manager has the authority to decrease or increase the curtailment stages or terminate curtailment activities.

4.6 Drought Declaration

If a declaration of a severe drought is declared by the Governor per ORS 536.720, the Oregon Water Resources Commission may order political subdivisions within any drainage basin or subbasin to implement a water conservation or curtailment plan or both, approved under ORS 536.780. The conservation and curtailment elements of this WMCP meet these requirements. If the City is within a severe drought area declared by the Governor, such as Yamhill County, the City will consider whether curtailment measures are needed to meet system demands. Regardless of whether curtailment is needed, the City will encourage customers to conserve water.

5. Municipal Water Supply

This section satisfies the requirements of OAR 690-086-0170.

This rule requires descriptions of Newberg's current and future water delivery areas and population projections, demand projections for 10 and 20 years, and the schedule for when Newberg expects to fully exercise its water rights. The rule also requires comparison of Newberg's projected water needs and the available sources of supply, an analysis of alternative sources of water, and a description of required mitigation actions.

5.1 Delineation of Service Areas

OAR 690-086-0170(1)

Newberg's current and future service area are shown in **Exhibit 2-1**. The City's current water service area includes all properties within city limits, some retail customers outside the city limits, and seven independent water districts. The City's 2017 WMP describes an expanded service area during the 20-year planning period of this WMCP. Specifically, the City predicts build-out up to its current UGB. Areas within the City's URA are not anticipated to be developed within the 20-year planning horizon of this WMCP, and therefore, are not considered in the population or demand forecasts described below.

5.2 Population Projections

OAR 690-086-0170(1)

Exhibit 5-1 presents the City's population projections. The population forecast for this WMCP draws on the population forecast presented in the City's 2017 WMP. The WMP relied on a report published in 2012 by the Population Research Center at PSU titled *2012 Population Forecasts for Yamhill County, its Cities and Unincorporated Areas 2011 to 2035*. This PSU report forecasts Newberg's population for the years 2020, 2030, and 2035 using the City's average annual percentage growth rate from 2000 through 2011 of 1.9 percent. For this WMCP, the City interpolated population for the year 2029 and extrapolated population for 2039 using the population growth rate of 1.9 percent presented in PSU's report.

Exhibit 5-1. Population Projections for Newberg's Service Area.

Year	2029	2039
Projected Population	34,697	41,200

5.3 Demand Forecast

OAR 690-086-0170(3)

5.3.1 Demand Forecast Methodology

Newberg's 2017 WMP included a forecast of demand through 2035. The demand forecast presented in this WMCP is consistent with the forecast presented in the City's WMP. Because the WMP forecasts demand to 2035 only and the 20-year planning period for this WMCP is 2039, the City employed the same forecasting methodology and used the same factors described in the WMP to forecast demand through 2039. Namely, for the WMP, the City took an average of annual historical demand rates and annual average population counts to calculate an average per capita demand of 101 gallons per cap per day (gpcd). For this WMCP, the City applied this rate of 101 gpcd to the population forecasts previously presented herein to obtain future ADDs. These future ADDs were multiplied by the City's average historical peaking factor of 2.0 noted in the WMP (and as shown in Exhibit 2-3) to obtain future MDD for this WMCP. The applicable portions of the City's WMP are provided in **Appendix D**.

5.3.2 Demand Forecast Results

Exhibit 5-2 presents Newberg's forecast of demand through 2039. By 2039, demand is forecast to increase to 12.9 cfs (8.3 mgd) in 2039 in light of the anticipated population increase and commensurate economic expansion. The City's historical MDD recorded between 2013 and 2017 was 4.8 mgd. Implicit in this forecast is a prediction by the City that the proportions of consumption of the customer categories will remain constant during the planning period.

Exhibit 5-2. Population and Demand Forecast.

Year	Service Area Population	ADD (mgd)	MDD (mgd)	MDD (cfs)
2029	34,697	3.5	7.0	10.8
2039	41,200	4.2	8.3	12.9

5.4 Schedule to Exercise Permits and Comparison of Projected Need to Available Sources

OAR 690-086-0170(2) and (4)

The City's long-term water supply planning strategy is to rely on its existing water right certificates and permit to meet its forecasted water demands. The City's certificated water rights include Certificates 48100, 68620, 82595, and 82600 which authorize use of up to 10.7 cfs (6.9 mgd). The City's extended Permit G-17583 authorizes access up to 17.64 cfs of the maximum allowable diversion rate of 20 cfs. As previously described, the City developed 13.2 cfs of extended Permit G-17583 and has submitted a claim of beneficial use and partial perfection request for this right.

For long-term planning purposes, the City considers its groundwater registration (GR-63) unsecure. OWRD must conduct an adjudication of the claims and the circuit court must issue a decree before OWRD can issue water right certificates confirming the groundwater use claimed in this groundwater registration. A groundwater adjudication for this area has not yet been

initiated. Given the unsecured status of this groundwater claim, for the purposes of this WMCP the City does not include the GR in its calculation of available and secure water to meet future demands.

Newberg projects that the authorized rates of appropriation for its certificated rights, combined with the partial perfection certificate to be issued for *extended* Permit G-17583, will meet system demands over the 20-year planning period. Specifically, Newberg's future MDD is anticipated to reach 12.9 cfs (8.32 mgd) by the year 2039 compared to the City's combined rates of its certificated rights and pending partial perfection certificate of 23.6 cfs (10.7 cfs + 13.2 cfs = 23.9 cfs, or 15.4 mgd). Therefore, at this time, Newberg is not requesting access to additional (green light) water under *extended* Permit G-17583.

The City intends to fully develop the remaining portion of *extended* Permit G-17583 by 2055, consistent with the City's approved extension of time for *extended* Permit G-17583 approved by OWRD on December 8, 2006.

5.5 Alternative Sources

OAR 690-086-0170(5)

OAR 690-086-0170(5) requires an analysis of alternative sources of water if any expansion or initial diversion of water allocated under existing permits is necessary to meet Newberg's demand forecast and redundancy needs. As described above, Newberg currently does not intend to expand diversion of water allocated under its only existing permit, extended Permit G-17583, during this WMCP 20-year planning period. Consequently, this rule does not apply.

5.6 Quantification of Projected Maximum Rate and Monthly Volume

OAR 690-086-0170(6)

OAR 690-086-0170(6) requires a quantification of the maximum rate of withdrawal and maximum monthly use if any expansion or initial diversion of water allocated under an existing permit is necessary to meet demands in the 20-year planning horizon. As described above, Newberg currently does not intend to expand diversion of water allocated under extended Permit G-17583 during this WMCP 20-year planning period. Consequently, this rule does not apply.

5.7 Mitigation Actions under State and Federal Law

OAR 690-086-0170(7)

Under OAR 690-086-0170(7), for expanded or initial diversion of water under an existing permit, the water supplier is to describe mitigation actions it is taking to comply with legal requirements of the Endangered Species Act, Clean Water Act, and other applicable state or federal environmental regulations.

As described above, Newberg currently does not intend to expand diversion of water allocated under extended Permit G-17583 during this WMCP 20-year planning period. Consequently, this rule does not apply. Regardless, Newberg currently is not required to take any mitigation actions under state or federal law associated with extended Permit G-17583.

5.8 New Water Rights

OAR 690-086-0170(8)

Under OAR 690-086-0170(8), if a municipal water supplier finds it necessary to acquire new water rights within the next 20 years to meet its projected demand, an analysis of alternative sources of the additional water is required. The analysis must consider availability, reliability, feasibility and likely environmental impacts and a schedule for development of the new sources of water.

Newberg currently does not intend to acquire new water rights to meet demands within the next 20 years, so the provisions of this section are not applicable.

Appendix A

Letters to Local Governments and Comments

GSI Water Solutions, Inc.

February 6, 2019

Doug Rux
Community Development Director
City of Newberg
City Hall
414 E First St
Newberg, OR 97132

Subject: Water Management and Conservation Plan for the City of Newberg

Dear Mr. Rux:

The City of Newberg (City) has developed a draft Water Management and Conservation Plan (WMCP) to fulfill the requirements of Oregon Administrative Rules Chapter 690, Division 86 of the Oregon Water Resources Department.

Under these rules, the water supplier will make its draft WMCP available for review by affected local governments and seek comments related to consistency with the local governments' comprehensive land use plans. We have provided you with an electronic version of the Port's draft WMCP for your review.

Please provide comments to me within 30 days from the date of this letter. If the WMCP appears consistent with your Comprehensive Land Use Plan, a letter or email response to that effect would be appreciated.

If you have any questions, please feel free to contact me at 541-257-9001. Thank you for your interest.

Sincerely,

Adam Sussman
Principal Water Resources Consultant
asussman@gsiws.com

Enclosure

GSI Water Solutions, Inc.

February 6, 2019

Ken Friday
Planning Director
Yamhill County
525 NE 4th St
McMinnville, OR 97128

Subject: Water Management and Conservation Plan for the City of Newberg

Dear Mr. Friday:

The City of Newberg (City) has developed a draft Water Management and Conservation Plan (WMCP) to fulfill the requirements of Oregon Administrative Rules Chapter 690, Division 86 of the Oregon Water Resources Department.

Under these rules, the water supplier will make its draft WMCP available for review by affected local governments and seek comments related to consistency with the local governments' comprehensive land use plans. We have provided you with an electronic version of the Port's draft WMCP for your review.

Please provide comments to me within 30 days from the date of this letter. If the WMCP appears consistent with your Comprehensive Land Use Plan, a letter or email response to that effect would be appreciated.

If you have any questions, please feel free to contact me at 541-257-9001. Thank you for your interest.

Sincerely,

Adam Sussman
Principal Water Resources Consultant
asussman@gsiws.com

Enclosure

GSI Water Solutions, Inc.

February 6, 2019

Joe Fennimore
Planning Director
Marion County
PO Box 14500
Salem, OR 97301

Subject: Water Management and Conservation Plan for the City of Newberg

Dear Mr. Fennimore:

The City of Newberg (City) has developed a draft Water Management and Conservation Plan (WMCP) to fulfill the requirements of Oregon Administrative Rules Chapter 690, Division 86 of the Oregon Water Resources Department.

Under these rules, the water supplier will make its draft WMCP available for review by affected local governments and seek comments related to consistency with the local governments' comprehensive land use plans. We have provided you with an electronic version of the Port's draft WMCP for your review.

Please provide comments to me within 30 days from the date of this letter. If the WMCP appears consistent with your Comprehensive Land Use Plan, a letter or email response to that effect would be appreciated.

If you have any questions, please feel free to contact me at 541-257-9001. Thank you for your interest.

Sincerely,

Adam Sussman
Principal Water Resources Consultant
asussman@gsiws.com

Enclosure

GSI Water Solutions, Inc.

February 6, 2019

Tina Stringfield
Chehalem Terrace Water District
c/o Hiland Water
PO Box 699
Newberg, OR 97132

Subject: Water Management and Conservation Plan for the City of Newberg

Dear Ms. Stringfield:

The City of Newberg (City) has developed a draft Water Management and Conservation Plan (WMCP) to fulfill the requirements of Oregon Administrative Rules Chapter 690, Division 86 of the Oregon Water Resources Department.

Given the relationship between the City and your water district, we are providing you with an electronic copy of the draft WMCP as a courtesy. If you have any questions, please feel free to contact me at 541-257-9001 or asussman@gsiws.com.

Sincerely,

Adam Sussman
Principal Water Resources Consultant

Enclosure

GSI Water Solutions, Inc.

February 6, 2019

Maureen Rogers
Chehalem Valley Water District
PO Box 514
Newberg, OR 97132

Subject: Water Management and Conservation Plan for the City of Newberg

Dear Ms. Rogers:

The City of Newberg (City) has developed a draft Water Management and Conservation Plan (WMCP) to fulfill the requirements of Oregon Administrative Rules Chapter 690, Division 86 of the Oregon Water Resources Department.

Given the relationship between the City and your water district, we are providing you with an electronic copy of the draft WMCP as a courtesy. If you have any questions, please feel free to contact me at 541-257-9001 or asussman@gsiws.com.

Sincerely,

Adam Sussman
Principal Water Resources Consultant

Enclosure

GSI Water Solutions, Inc.

March 5, 2019

Ron Dingman
NW Newberg Water Association
PO BOX 742
Newberg, OR 97132

Subject: Water Management and Conservation Plan for the City of Newberg

Dear Mr. Dingman:

The City of Newberg (City) has developed a draft Water Management and Conservation Plan (WMCP) to fulfill the requirements of Oregon Administrative Rules Chapter 690, Division 86 of the Oregon Water Resources Department.

Given the relationship between the City and your water district, we are providing you with an electronic copy of the draft WMCP as a courtesy. If you have any questions, please feel free to contact me at 541-257-9001 or asussman@gsiws.com.

Sincerely,

Adam Sussman
Principal Water Resources Consultant

Enclosure

GSI Water Solutions, Inc.

February 6, 2019

Leslie Dale
Sam Whitney Water District
PO Box 248
Newberg, OR 97132

Subject: Water Management and Conservation Plan for the City of Newberg

Dear Ms. Dale:

The City of Newberg (City) has developed a draft Water Management and Conservation Plan (WMCP) to fulfill the requirements of Oregon Administrative Rules Chapter 690, Division 86 of the Oregon Water Resources Department.

Given the relationship between the City and your water district, we are providing you with an electronic copy of the draft WMCP as a courtesy. If you have any questions, please feel free to contact me at 541-257-9001 or asussman@gsiws.com.

Sincerely,

Adam Sussman
Principal Water Resources Consultant

Enclosure

GSI
Water Solutions, Inc.

February 6, 2019

Sunny Acres Water District
PO Box 3104
Newberg, OR 97132

Subject: Water Management and Conservation Plan for the City of Newberg

To whom it may concern:

The City of Newberg (City) has developed a draft Water Management and Conservation Plan (WMCP) to fulfill the requirements of Oregon Administrative Rules Chapter 690, Division 86 of the Oregon Water Resources Department.

Given the relationship between the City and your water district, we are providing you with an electronic copy of the draft WMCP as a courtesy. If you have any questions, please feel free to contact me at 541-257-9001 or asussman@gsiws.com.

Sincerely,

Adam Sussman
Principal Water Resources Consultant

Enclosure

GSI Water Solutions, Inc.

February 6, 2019

W Sheridan Street Water District
1100 W Sheridan St
Newberg, OR 97132

Subject: Water Management and Conservation Plan for the City of Newberg

To whom it may concern:

The City of Newberg (City) has developed a draft Water Management and Conservation Plan (WMCP) to fulfill the requirements of Oregon Administrative Rules Chapter 690, Division 86 of the Oregon Water Resources Department.

Given the relationship between the City and your water district, we are providing you with an electronic copy of the draft WMCP as a courtesy. If you have any questions, please feel free to contact me at 541-257-9001 or asussman@gsiws.com.

Sincerely,

Adam Sussman
Principal Water Resources Consultant

Enclosure

GSI Water Solutions, Inc.

February 6, 2019

Sterling Parker
Ramsey Terrace Water District
10850 NE Stevenson Rd
Newberg, OR 97132

Subject: Water Management and Conservation Plan for the City of Newberg

Dear Mr. Parker:

The City of Newberg (City) has developed a draft Water Management and Conservation Plan (WMCP) to fulfill the requirements of Oregon Administrative Rules Chapter 690, Division 86 of the Oregon Water Resources Department.

Given the relationship between the City and your water district, we are providing you with an electronic copy of the draft WMCP as a courtesy. If you have any questions, please feel free to contact me at 541-257-9001 or asussman@gsiws.com.

Sincerely,

Adam Sussman
Principal Water Resources Consultant

Enclosure

City of Newberg

Community Development Department
P.O. Box 970 ▪ 414 E First Street ▪ Newberg, Oregon 97132
503-537-1240 ▪ Fax 503-537-1272 ▪ www.newbergoregon.gov

February 25, 2019

Adam Sussman
GSA Water Solutions, Inc.
1600 SW Western Blvd, Suite 240
Corvallis, OR 97333

RE: Draft Newberg Water Management and Conservation Plan

Dear Mr. Sussman,

I have reviewed the Draft Newberg Water Management and Conservation Plan for consistency with the Newberg Comprehensive Plan and 2017 Water Master Plan. The Draft Newberg Water Management and Conservation Plan is consistent with those documents.

I have noted a few suggested changes to some of the language in the Draft Newberg Water Management and Conservation Plan specifically on pages ES-3, 2-14 and 3-16 for your consideration.

If you have any questions please contact met doug.rux@newbergoregon.gov or 503.537.1212.

Doug Rux
Community Development Director

Attachment: 1. Draft Newberg Water Management and Conservation Plan with Comments

Exhibit ES-1. City of Newberg Conservation Benchmarks.

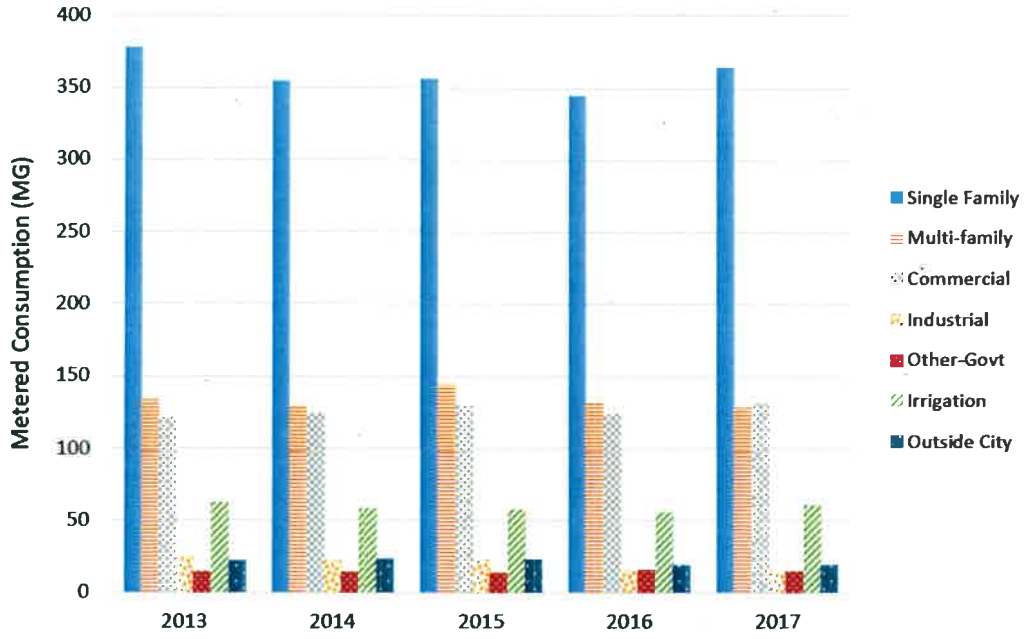
Conservation Measures	Five-Year Benchmarks
Annual Water Audit	The City will continue to conduct annual water audits.
	In 2019, the City will begin to account for authorized metered non-revenue public uses (such as flushers, vactors, street sweepers, and hydrant and water line flushing) in its annual water audits.
System-wide Metering	The City will continue to require installation of meters on all new water connections.
Meter Testing and Maintenance	The City will continue to track the performance of new meters installed throughout the system and to maintain records on meters that are removed from service.
Water Rate Structure and Billing Practices that Encourage Conservation	The City will continue to bill customers based, in part, on the volume of water consumed on a monthly basis.
	The City will continue to provide historical water consumption information on water bills.
	In the next year, the City will begin including water conservation messages in at least three water bills per year, one of which will be at the beginning of the irrigation season and will encourage outdoor water conservation.
Water Loss Analysis	The City will continue its leak detection and water line replacement program.
	Over the next five years, the City will implement water line replacement efforts according to the roadmap provided by the City's updated (2017) Water Master Plan and Capital Improvement Plan.
	Within two years of approval of this WMCP, the City shall provide OWRD with a description and analysis identifying potential factors for the water loss and selected actions for remedy. If the selected actions do not reduce water loss to less than 10 percent within five years of approval of the WMCP, the City will take additional leak detection and repair measures.
Public Education	The City will continue its public education program, including presentations for schools and professional groups, outreach at community events, and website updates.
	Following the establishment of new water rates approximately every two years, the City will send a letter to the top 10 water consumers informing them of the new rates and recommending water conservation, particularly outdoor water conservation during the summer months.
	In the next five years, the City will develop both an outdoor water conservation and an indoor water conservation brochure or flyer for posting at public locations, such as the library, Chehalem Cultural Center, and Parks and Recreation facilities.
Technical and Financial Assistance Programs	The City will continue to offer free water conservation kits to customers.
	The City will continue its program to assist low-income residents with water conservation.
	The supp… …nfor…
	In th… …ts w… …e wate…
Supplier Financed Retrofit or Replacement of Inefficient Fixtures	The … …nse… fixtu…
Water Reuse, Recycling, and Non-potable Opportunities	The … …em a… system.
	The City will continue its effort… …install a non-potable water ("purple-pipe") system in the two major planned developments and to connect that new purple pipe system to an existing purple pipe system.
Other Conservation Measures	The City will continue to maintain the WaterWise Garden in coordination with the …rks and Recreation District.

ruxd
Note
In the NE quadrant of the city north of Hwy 99W

ruxd
Note
Chehalem Park & Recreation District

Customer category consumption trends from 2013 through 2017 are shown in **Exhibit 2-10.** Single Family consumption peaked in 2013 while Multi-family consumption peaked in 2015. Commercial consumption has been relatively steady while Industrial consumption decreased markedly in 2016 as a result of a mill closing that year. The remaining three customer categories showed minor fluctuations in consumption during this 5-year period.

Exhibit 2-10. Annual Water Consumption by Customer Category, 2013-2017.



ruxd
Note

the mill only had limited connection for water that served the office building. Not sure you can correlate the mill closer to the reduction in industrial consumption.

"Winter averaging has begun. Conserve water from 11/1/2017 to 2/28/2018 to lower your sewer bills from April thru October."

Five-Year Benchmarks: The City will continue to bill customers based, in part, on the volume of water consumed on a monthly basis. The City will continue to prov consumption information on water bills. In the next year, the City conservation messages in at least three water bills per year, one of beginning of the irrigation season and will encourage outdoor wat

ruxd
Note
Change to Chehalem Park & Recreation District

3.4.4 Water Reuse, Recycling, and Non-potable Opportunit

The City has both a Reuse System and a Springs System (Otis Sprir potable water. The Reuse System is a system that uses recycled wa irrigation needs of 300,000 to 400,000 gallons per day during the summer. Currently, the reuse system serves the Chehalem Glenn Golf Course, a subsidiary of the berg Parks & Recreation Department. The Chehalem Glenn Golf Course is the sole customer because it has holding ponds on the golf course that the reuse system fills and the golf course then uses. For the City to serve additional customers, it needs to add an additional reuse reservoir and piping. Given that irrigation customers have expressed interest in obtaining reuse water as soon as it is available, the City has long-term plans for an expanded water reuse system. The Springs System, which uses water from Otis Springs, currently serves the Chehalem Glenn Golf Course with non-potable water (at the beginning and end of the irrigation season when the Reuse System does not fill ponds at the golf course) and is anticipated to serve two major planned developments in the northeast quadrant of the City with non-potable water. The City then intends to connect the purple pipe system that will serve the two major developments to an existing, but unused, purple pipe system.

Five-Year Benchmarks: The City will continue to operate the Reuse System and to develop plans for expanding the Reuse System. The City will continue its efforts to install a non-potable water ("purple-pipe") system in the two major planned developments and to connect that new purple pipe system to an existing purple pipe system.

3.4.5 Other Conservation Measures
OAR 690-086-0150(3)

The City created a 2,500 square foot WaterWise Garden to demonstrate to customers how they can make their landscapes more water-efficient. The demonstration garden has native plants, is a certified backyard habitat, uses minimal irrigation, and contains a kiosk with an eco-roof. The kiosk has landscape water conservation information. The WaterWise Garden has nine permanent signs that discuss different aspects of water conservation, one of which includes information about native plants.

Five-Year Benchmarks: The City will continue to maintain the WaterWise Garden in coordination with the Parks and Recreation District.

Exhibit 3-3 presents a summary of the City's 5-year water conservation benchmarks.

Appendix B

Intergovernmental Agreement with Chehalem Springs Water Association

Agreement for the Conveyance of the Springs Water System

City of Newberg and Chehalem Springs Water Association

July 1, 2016

AGREEMENT FOR THE CONVEYANCE OF THE SPRINGS WATER SYSTEM

This Agreement for the Conveyance of the Springs Water System ("Agreement") is entered into between the City of Newberg, a municipal corporation, and the Chehalem Springs Water Association, an Oregon domestic nonprofit corporation (individually, a "Party;" collectively, the "Parties").

RECITALS

A. The City of Newberg ("City") owns and operates a municipal water supply system known as the Springs Water System.

B. The Springs Water System currently relies on four springs known as the Snider Spring, Skelton Spring, Atkinson Spring, and Oliver Spring that were part of the City's original water system.

C. The City subsequently established a well field to provide the City with municipal water and in recent years disconnected the Springs Water System from the City Water System.

D. While the City no longer uses the Springs Water System, a number of properties located outside the City continue to receive water from the Springs Water System.

E. Because the Springs Water System provides water almost exclusively to property located outside the City, the City desires to convey the ownership, operations, and maintenance of the Springs Water System to the current users.

F. The property owners who receive water from the Springs Water System similarly seek to own and operate the Springs Water System and established the Chehalem Springs Water Association, an Oregon domestic nonprofit corporation ("Association") for that purpose.

G. The City intends to transfer and the Association intends to receive all of the facilities, assets and liabilities of the Springs Water system including the easements, water rights, treatment and transmission facilities, equipment and documents described in this Agreement.

H. The City intends to retain the real property upon which the individual Springs are located and the Association intends to lease those properties from the City, as described in this Agreement.

I. Following notice and a public hearing in accordance with ORS 221.725, the City Council approved Resolution No. 2015-3206 directing the City Manager to negotiate and execute this Agreement.

TERMS

1. Purpose. The purpose of this Agreement is to convey ownership of the Springs Water System to the Association, and to relieve the City from any future responsibility arising from the ownership, operation or maintenance of the system.

2. System Assets. As used in this Agreement, the Springs Water System includes:

   a. The individual parcels of real property that contain the Snider Spring, Skelton Spring, Atkinson Spring, and Oliver Spring, and where treatment (if any) occurs and the water is diverted into a transmission line.

   b. Any easements, including both access and utility easements however described, whether recorded or unrecorded, established or acquired for the purpose of installing, operating and maintaining the Springs Water System.

   c. The diversion and treatment facilities, transmission lines and distribution lines, except the SCADA and communications equipment described in Section 5.

   d. The individual water meters on properties that receive water from the Springs Water System.

   e. All access and utility easements in the City's possession necessary for the operation and maintenance of the Springs Water System.

   f. The equipment described in Exhibit A to this Agreement.

   g. All water rights, including water permits and certificates, appurtenant to the real property containing the Snider Spring, Skelton Spring, Atkinson Spring, and Oliver Spring.

   h. All customer accounts for Springs Water System users in existence on the effective date of this Agreement.

3. City Obligations. The City will:

   a. Assist in the preparation and execution of the watershed lease agreement for the real property, shown as Exhibit B to this Agreement, leasing to the Association the parcels that contain the Snider, Skelton, Atkinson Spring, and Oliver Springs.

   b. Provide copies of the water right permits and certificates for the individual springs in the City's possession. Commence and complete the State of Oregon Water Resources Department (OWRD) process to effect transfer and change of

ownership for the water right permits and certificates from the City to the Association for Skelton (5456), Atkinson (5466), and Oliver (6829) Springs. Water right certificates known to the City are attached as Exhibit C to this Agreement.

A 1993 water right certificate application is pending with the State of Oregon for the adjudication of the 1905 Snider Spring water right permit (SWR-641). The City will complete the OWRD process to effect change in ownership and execute the forms necessary to transfer ownership of the Snider Spring water right certificate from the City to the Association. The State of Oregon indicated that they would process the change of ownership form and update the 1993 application to reflect that the Association is the owner of the pending water right.

c. Provide copies of any easements in the City's possession for the Springs Water System, including utility easements for the transmission lines and access easements for the individual Springs parcels. The City will record all easements with the Yamhill County Clerk and the easements will be transferred to the Association by a global assignment of easement interests or a deed, as approved by the Association. The City will complete the pending litigation known as Constance Farrar v. City of Newberg, Yamhill County Circuit Court case number 15CV29065 as it relates to establishing waterline easement rights over the Farrar property.

d. Establish a line-of-credit as described in Exhibit D to serve as a reserve account for the Association for a period not to exceed 24 months from the effective date of this Agreement to assist with initial administrative and operational costs.

e. Provide electronic copies for the prior three calendar years of all customer records for those properties that receive water from the Springs Water System on the effective date of this Agreement.

f. Provide written notice to all current customers of the Springs Water System of the change in system ownership, operations, and maintenance, including the contact information for the Association.

g. Notify the Oregon Water Resources Department of the change in ownership and contact information for the Association.

h. For a period of one year, the City will reasonably assist the Association staff or contractor as necessary to familiarize the staff or contractor with the location and condition of System assets and facilities, and the maintenance and operation of the facilities. The City expressly anticipates that such assistance will not exceed four staff hours per week. The City will respond to a request for assistance within one business day, except in case of an emergency, in which case the City will respond as quickly as possible under the circumstances.

i. Provide copies of Operations and Maintenance ("O&M") records, schedules and protocols as necessary for the Association to assume responsibility for the maintenance and operation of the Springs Water System.

j. The City will turn over all records (or copies) relevant to operation of the Springs System in its possession.

k. Reasonably cooperate and coordinate with the Association in any legal action between the Association and a third-party with respect to the real property, easements or other property interest subject to this Agreement.

4. Association Obligations. The Association will:

a. Designate a person(s) to coordinate with City staff regarding the location and condition of System assets, and the operation and maintenance of the facilities.

b. Acquire new contracts for water service from each customer as needed.

c. Reasonably cooperate and coordinate with the City in any legal action between the City and a third-party with respect to the real property, easements or other property interest subject to this Agreement.

5. Transition Provisions. The Parties recognize that the transition from City administration and operation of the Springs Water System to Association administration and operation will require certain close-out and notice activities. Accordingly, the Parties anticipate the transition will include substantially the following steps, as may be modified and supplemented by the City Public Works Director and the Association.

a. Within 60 days of the effective date of this Agreement, the City will:

A. Conduct a final meter reading of all Springs customer accounts and bill the customers accordingly. The City is entitled to all amounts billed to Springs customers for water provided up to and including the date of the final meter reading.

B. Provide the written notice described in Section 3.f above to all Springs customers.

C. Conduct a walk through to the spring sites with Association representatives, agents and contractors.

b. Within 30 days of the days of the effective date of this Agreement, the City will provide the Association with the customer records described in Section 3.e above.

c. Beginning the day after the City conducts the final meter reading, the Association will be responsible for all water service to the Springs customers.

d. After the City provides the final water bill to Springs customers, the Association will be responsible for all future billing and collections for water service to Springs customers.

6. Equipment and Facilities. The Parties agree that on the effective date of this Agreement, ownership of the treatment and transmission facilities and appurtenances, customer meters and related equipment of any sort is transferred to the Association, which assumes all responsibility for the facilities and equipment. Thereafter, the City shall have no continuing obligation for the operation and maintenance of the Springs Water System. The City may, in its sole discretion, and consistent with the obligations set forth in Section 3.h above, consult and cooperate with the Association and any contractor designated by the Association to ensure the Springs Water System continues to operate effectively during the transition and that the Association or contractor is adequately prepared to provide on-going water service and maintenance thereafter.

   The City will retain ownership of and remove the existing SCADA and proprietary communications equipment from each of the springs prior to conveying the Springs Water System to the Association.

7. Oliver Property Line Adjustment. The Oliver Spring is located on a parcel of land recorded at Book No. 31, Page 465, the "Oliver Parcel", which is owned by the City. The City also owns Parcel 3, Partition Plat 92-09, which is located adjacent to the Oliver Parcel. The Oliver Parcel and Parcel 3 are depicted on Exhibit E to this Agreement.

   The City anticipates preparing and filing an application for a property line adjustment ("PLA") with Yamhill County ("County") to adjust the property line between the Oliver Parcel and Parcel 3. However, the PLA will not be filed prior to the effective date of this Agreement. In order to accomplish the PLA the Parties agree to the following:

   a. The City will prepare and file the PLA application with the County. The City is responsible for all administrative tasks related to the application including completing the application, providing any necessary surveys and other engineering reports, and paying the filing fee (if any).

   b. The City is responsible for managing the County land-use review process, including preparing and submitting any documents that may be required by the County and attending any public hearings.

   c. The Association agrees to reasonably coordinate with the City to support the PLA application if requested, including but not limited to providing any written materials requested by the City and attending and testifying in favor of the application at any public hearing(s).

   d. The approximate area of 4 acres shown on Exhibit E subject to the property line adjustment will not be included as part of the real property lease from the City to

the Association. If the PLA is denied, then the Parties will amend the Lease to reflect what, if any area of the approximate 4 acres will be part of the lease so as to insure access to the Oliver Spring and the ability to operate, maintain, repair and replace the water system facilities.

The City does not make any representations or warranties as to its ability to obtain approval of the PLA but will make reasonable, good-faith efforts to do so.

8. Emergency and Mutual Aid Water. In the event of an emergency affecting water quality or quantity or other circumstance that presents an imminent threat to a Party's ability to provide potable water to its customers and residents, or in the case of mutual aid during scheduled periods of operation, maintenance, repair or replacement of a Party's system requires short term provision of water by the other Party, the Parties each agree for itself, its heirs, successors and assigns, to provide water to the other Party to the extent such water is available.

   The Parties further agree:

   a. Water provided under this section is intended to be provided on a short term basis and will be delivered in a manner determined by the Party providing the water.

   b. The Party providing water under this section may charge the receiving Party for the water at an amount equal to the providing Party's cost of production and delivery to the connection point of the receiving Party's system.

   c. The Party providing water under this section is not required to build, construct, finance, install or otherwise provide structures, facilities or other infrastructure to deliver the water, nor transport water by vehicle.

   d. Where mutual aid water is necessary and can be scheduled, the Party seeking water will provide 30 days notice to the other Party and the Parties will then determine the specific terms and duration of the provision of mutual aid water.

9. Future Connection to City Water. The Parties agree that current Springs Water System customers will disconnect from the Springs Water System and connect to the City water system under the following circumstances:

   a. A property served by the Springs Water System and located within the City's urban growth boundary or the City's urban reserve area will connect to the City water system pursuant to applicable City regulations when the property annexes into the City.

   b. A property served by the Springs Water System that is located inside the City boundary will connect to the City water system pursuant to applicable City

regulations when the property is partitioned or subdivided. This requirement applies to all lots or parcels created by the partition or subdivision.

c. The City shall be solely responsible to contact the affected property owner and coordinate all aspects of annexation. The City shall provide not less than 30 days notice to the Association of the anticipated date for cutover of service from the Association to the City and coordination of final Association billing and to mitigate other water system impacts.

10. Notice. Any notice required under this Agreement shall be sent to:

a. City of Newberg
c/o Public Works Director
414 E. First Street
Newberg, OR 97132

b. Chehalem Springs Water Association
c/o Michael Roos
P.O. Box 444
Newberg, OR 97132

11. Consideration, Condition of Property and Title. The Parties agree:

a. Consideration for the real property to be leased under this Agreement consists solely of the mutual promises and obligations set forth in this agreement.

b. The Association accepts the real property to be leased under this Agreement "as is" in its present condition, and the City makes no warranties regarding the condition of the real property.

c. The Association accepts the terms of the access and waterline easements conveyed under this Agreement "as is" in their present condition, and the City makes no warranties regarding the location, suitability, or rights of use of the access and waterline easements. The City will provide satisfactory proof of recorded easements or access to the entire water system to the Association as a condition of closing. Closing shall constitute acceptance by the Association and except as identified in paragraph 3.c, the City shall have no further duty other than the duty of cooperation.

d. The City will lease the property to the Association as described in Exhibit B, Watershed Lease Agreement.

12. Representations and Warranties. The City makes no representations, warranties or covenants except as outlined in this Agreement regarding the condition of the real property, treatment facilities and transmission lines for their intended use; the individual

water meters on properties that receive water from the Springs Water System; the access and utility easements; the appurtenances and other equipment; the water rights, including water permits and certificates; the customer accounts for Springs Water System users in existence on the date of this Agreement.

13. Liability. The Parties agree:

    a. Prior to the effective date of this Agreement, the Association shall not be liable for any claim, suit or other action relating to the Springs Water System. The City shall be liable for any claim, suit or other action relating to the Springs Water System arising from acts or omissions occurring prior to the effective date of this Agreement and any damages arising therefrom and shall hold harmless and indemnify the Association from any damages or costs of any kind asserted against the Association by any such claim, subject to the limitations of the Oregon Tort Claims Act.

    b. On and after the effective date of this Agreement:

        A. The Association shall be solely liable for any claims, suits, or other actions relating to the Springs Water System arising from Association acts or omissions occurring on or after the effective date of this Agreement and any damages arising therefrom.

        B. In any action filed on or after the effective date of this Agreement that alleges damages attributable to Association acts or omission and in which the City is named as a party, the Association agrees to indemnify the City for any costs incurred by the City in defending the action and any damages assessed against or loss incurred by the City.

    c. Each party will indemnify and hold the other harmless for any negligence, act or omission of the Party, its officials, employees and agents. A Party shall not be indemnified for its own negligence. The City's obligations under this section are subject to the limitations of the Oregon Tort Claims Act for those claims included within the Act.

GENERAL TERMS AND CONDITIONS

14. Effective Date. This Agreement is effective on the last date signed by the Parties below and remains in effect unless and until terminated as described herein.

15. Termination. This Agreement terminates five (5) years from the effective date; provided, however, the provisions of Exhibit B, Watershed Lease Agreement, and Sections 3 b, c and k; 4 c; 7, 8, 9 and 13 of this Agreement shall survive termination.

16. Public Records. Nothing in this Agreement is intended and shall not be interpreted to require the City to disclose any documents or other information that is or may be exempt from disclosure under ORS chapter 192.

17. Agreement Binding on Successors. This Agreement is binding on the Parties, however organized, and any assigns or successors in interest.

18. Additional Documents. Grantor and Grantee agree to execute such additional documents consistent with this Agreement as may be reasonable and necessary to carry out the provisions of this Agreement, including Exhibit B, Watershed Lease Agreement and any documents necessary to obtain the PLA.

19. Entire Agreement. This Agreement constitutes the entire agreement between the City and Association pertaining to the subject matter contained in it and supersedes all prior and contemporaneous agreements, representations, and understandings.

20. Modification; Waiver. This Agreement may not be supplemented, modified or amended except by the written agreement of the parties. The waiver of any of provision of this Agreement shall not be deemed or constitute a waiver of any other provision, whether or not similar, nor shall any waiver constitute a continuing waiver. A waiver is not binding unless executed in writing by the Party making the waiver.

21. Counterparts. This Agreement may be executed in counterparts, each of which shall be deemed an original and which together shall constitute one and the same agreement.

22. Severability. Each provision of this Agreement is severable from any and all other provisions of this Agreement. Should any provision(s) of this Agreement be for any reason unenforceable, the balance shall nonetheless be of full force and effect.

23. Governing Law. This Agreement shall be governed by and construed in accordance with the laws of the State of Oregon without regard to the conflict of law provisions thereof. Any litigation between the Parties arising under this Agreement shall be subject to the jurisdiction of Yamhill County Circuit Court and each Party is responsible for its own attorney fees and costs.

24. Signature Authority. By signing this Agreement below, the person executing the Agreement on behalf of each Party represents that the person has actual authority to bind the person's respective Party.

IN WITNESS WHEREOF, and pursuant to official action of their respective governing bodies, the Parties have caused their respective officers to execute this Agreement on their behalf.

Signatures follow on next page.

City of Newberg, Oregon

Joe Hannan
City Manager

6/28/16
Date
Authorized by Resolution No. 2015-3206

Chehalem Springs Water Association

Name

Authorized Member
Title

28 June 2016
Date

Approved as to form:

Truman A. Stone
City Attorney

Approved as to form:

Association Attorney

Appendix C

Municipal Code, Curtailment Plan

13.15.230 Curtailment policy.

A. The policy of the city is to curtail water use during drought conditions to ensure that the city has adequate fire flow and supply for essential service requirements. The purpose of this section is to curtail water use during times of critical water shortages due to severe droughts, reduction in treatment or pumping capability, equipment malfunctions, or other emergency situations where there may be an insufficient water supply. The mayor or city manager is empowered to declare a water crisis state of emergency if, in the opinion of the mayor or city manager, the adequacy of the water supply for the city is sufficiently endangered to create a risk of danger to the health, safety and welfare of the people of the city.

B. Implementation of this policy shall include the following actions and such other actions as are deemed to be necessary subject to the judgement of the mayor or city manager:

1. The city shall restrict water use by all customer classes by using some or all of the following methods subject to the severity of the water shortage as determined by the city manager or a designee, and subject to the approval of the mayor or city manager and notification as provided for in NMC 13.15.250.

2. Curtailing water use shall include some or all of the following activities:

a. Sprinkling, watering or irrigation of shrubbery, trees, lawns, grass, ground covers, plants, vines, gardens, vegetables, flowers or any other vegetation. On request, the public works director may approve exceptions for new landscaping that previously has been planted, but not established.

b. Washing automobiles, trucks, trailers, trailer houses, motorbikes, boats, or any other type of mobile equipment.

c. Washing sidewalks, driveways, parking lots, tennis courts, filling station aprons, porches and other hard surface areas.

d. Washing the exteriors of dwellings; washing the exteriors or interiors of office buildings.

e. Operating any ornamental fountain, scenic or recreational pond or lake or other structure using water similarly, except for the minimum quantity necessary to support fish life.

f. Filling, refilling or adding water to any swimming or wading pool or hot tub not employing a filter and recirculating system nor evaporation covers, except where the use of the pool or hot tub is required by a doctor.

g. Permitting the escape of water through defective plumbing.

h. Using water for construction projects.

i. Serving customers water in a restaurant unless requested. [Ord. 2495, 5-18-98. Code 2001 § 52.47.]

Penalty: See NMC 13.15.290.

13.15.240 Emergency powers.

As provided in this chapter, the city expressly reserves the right to discontinue furnishing water to any and all water users, and consumers outside the corporate limits of the city, in the event of water shortage or other public emergency or catastrophe. Any water-saving measures that in the opinion of the mayor or city manager are reasonable and necessary to protect the health, safety and welfare of the people of the city may be implemented to address the emergency. These measures shall be in writing, and shall state the effective time and date of the measure. [Ord. 2495, 5-18-98. Code 2001 § 52.48.]

13.15.250 Notification.

A. If a water shortage is anticipated to occur or actually occurs, the public works director or designee shall inform the mayor or city manager when water consumption exceeds production and available water storage is approaching the minimum quantity required by the city to meet fire protection and other essential demands.

B. Upon notification, the mayor or city manager shall see that the following actions are taken:

1. On receipt of this notification, the mayor or city manager may impose the water curtailment measures deemed necessary to address the situation pursuant to NMC 13.15.230, effective immediately or at the date and time indicated in the notice. The water curtailment measures shall be in writing and prepared for general release to the city water utility customers, city council and other interested parties.

2. Notification in accordance with this article shall then commence as follows:

a. The mayor or city manager, or a designee, shall notify each city council member by telephone, with a written statement to follow, or in writing, of the curtailment measures within six hours.

b. The curtailment measures shall be publicly announced by any means reasonably necessary to give notice to the city water utility customers.

3. Each announcement shall state the action taken by the mayor or city manager, including the time the curtailment measures became or will become effective and the announcement shall specify the particular curtailment measures to be imposed. Any water user aggrieved by the proposed curtailment shall immediately, upon notice, contact the mayor or city manager to discuss and resolve the grievance.

4. Whenever the mayor or city manager finds that the conditions which gave rise to the water curtailment measures no longer exist, the mayor or city manager may declare the curtailment measures terminated in whole or in part, effective immediately on announcement. The announcement shall be in writing. The mayor or city manager shall notify the city council pursuant to this article and take whatever actions are necessary to give notice to the city water utility customers. [Ord. 2495, 5-18-98. Code 2001 § 52.49.]

13.15.260 Exception to maintain sanitation.

The city public works director or a designee, after written notice to the mayor or city manager, shall have the authority to permit a reasonable use of water in any case necessary to maintain adequate health, safety and sanitation standards. [Ord. 2495, 5-18-98. Code 2001 § 52.50.]

13.15.270 Length of the curtailment measures.

The length of curtailment measures established by the mayor or city manager shall remain in effect until terminated by announcement of the mayor or city manager in accordance with this article. [Ord. 2495, 5-18-98. Code 2001 § 52.51.]

13.15.280 Authority of officer.

Any police officer or other employee of the city may enter upon the premises of any person for the purpose of reducing the flow of any water used contrary to the provisions of this article, providing that the measures shall not be taken until the following have occurred:

A. The person in violation has been cited once for a violation of this article.

B. The person has had served upon them written notice to cease and desist any further violation of any measures imposed under this article. [Ord. 2495, 5-18-98. Code 2001 § 52.52.]

Article IV. Penalty

13.15.290 Penalty.

A. Any person, firm or corporation or any agent or employee of any person, firm or corporation violating the provisions of NMC 13.15.010 through 13.15.200 shall have committed a city Class 2 civil infraction and shall be processed in accordance with the procedure set forth in the uniform civil infraction procedure ordinance, Chapter 2.30 NMC. Each day of continuing violation shall constitute a separate offense.

B. Violation of a duly written and noticed water curtailment measure or NMC 13.15.210 et seq. shall be a city Class 3 civil infraction and shall be processed in accordance with the procedure set forth in the uniform civil infraction procedure ordinance, Chapter 2.30 NMC. Each day in which any such violation shall continue shall be deemed a separate offense. [Ord. 2553, 1-7-02; Ord. 2495, 5-18-98; Ord. 2163, 4-1-85; Ord. 2146, 7-9-84; Ord. 1040, 10-15-48. Code 2001 § 52.99.]

Appendix D

Water Master Plan, Population and Demand Forecast Portion

Water Master Plan

City of Newberg, Oregon

May 2017

murraysmith

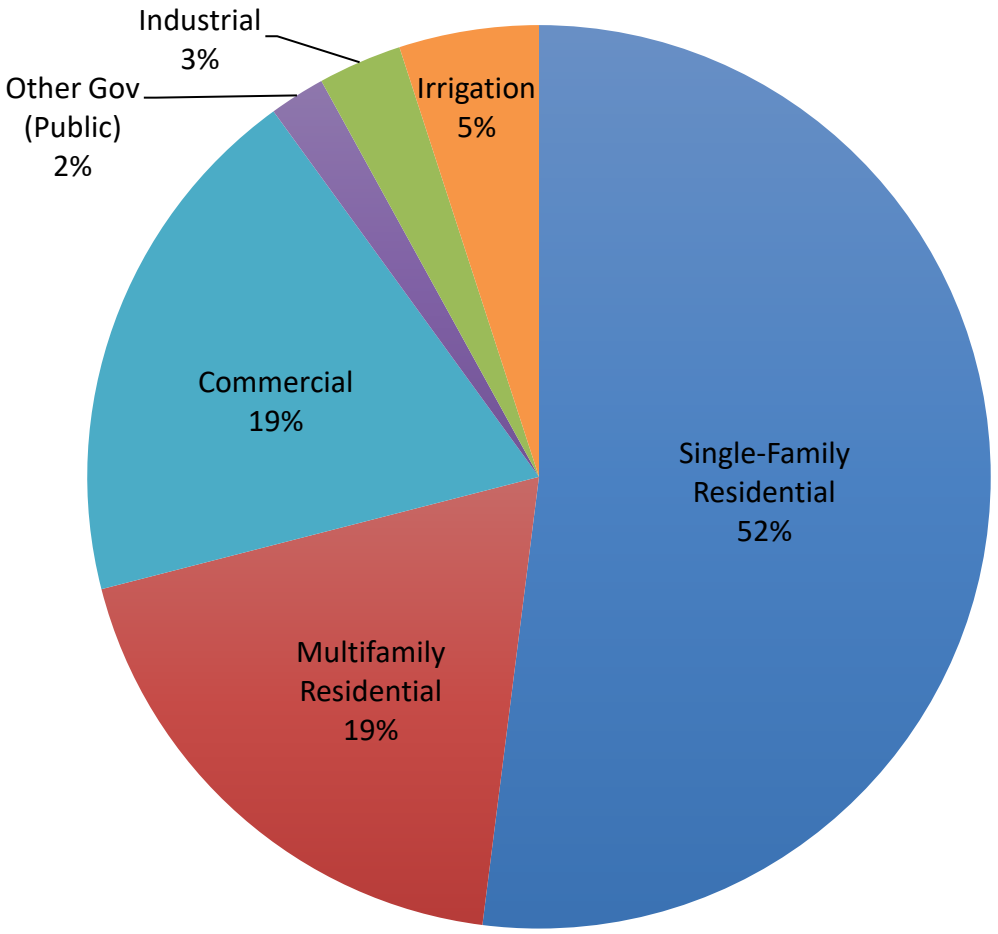
GALARDI ROTHSTEIN GROUP

GSI Water Solutions, Inc.

correlate with the City's Single-Family (3/4- and 1-inch meters) and Commercial (2-inch and larger meters) customer types.

Percentages of current water consumption by customer type are calculated based on 2015 City water billing records. As illustrated on **Figure 2-1**, the majority of water consumption in Newberg, approximately 71 percent, is by residential customers.

Figure 2-1
Current Annual Water Consumption by Customer Type



Future Population and Water Demand Forecast

Estimates of future growth and related water demand within the Newberg UGB are developed using the best available information for the City's service area including adopted population forecasts from the PSU PRC's *2012 Population Forecasts for Yamhill County, its Cities and Unincorporated Areas 2011 to 2035* report and historical per capita water demands presented in **Table 2-1**. Future system-wide water demands are forecast at 5-, 10- and 20-years.

Historical per capita average daily water demands (ADD) range from 99 to 104 gpcd. An average per capita demand of 101 gpcd is used to forecast ADD based on population projections. Based on 2010 US Census data the average number of persons per household in Newberg is approximately 2.66.

Future MDD is projected from estimated future ADD based on the current average ratio of MDD:ADD, also referred to as a peaking factor. From current water demand data shown in **Table 2-1**, the MDD:ADD peaking factor for the Newberg system is approximately 2.0. Future PHD is similarly projected from future MDD, the PHD:MDD peaking factor is approximately 1.7. Forecasted water demands are summarized in **Table 2-3**.

Table 2-3
Future Water Demand Summary

Year	Forecast Population	ADD (mgd)	MDD (mgd)	PHD (mgd)
2020	28,250	2.86	5.72	9.72
2025	32,213	3.26	6.52	11.08
2035	38,490	3.89	7.78	13.23

Future Demand by Pressure Zone

Forecasted future water demands are allocated to existing and proposed future pressure zones based on an ideal service pressure range of 40 to 80 pounds per square inch (psi) and existing ground elevations in potential water service expansion areas within the UGB and North Hills URA. Existing and proposed pressure zone boundaries for the study area are illustrated on **Plate 1** in **Appendix A**. Estimated future water demands by pressure zone are summarized in **Table 2-4**.

The City's existing Pressure Zone 1 provides service up to approximately 310 feet elevation. As properties within the UGB and above Zone 1 service elevations begin to develop, a higher-elevation Pressure Zone 3 will be required northeast of the city center. For the purposes of this WMP, it is assumed that the proposed Zone 3 would serve customers between 310 and 440 feet elevation ultimately including most of the North Hills URA. Properties in the North Hills URA above 440 feet are assumed to be served from a future Zone 4 which is not analyzed for the purposes of this Master Plan. The City has purchased property north of Bell Road near the intersection with Zimri Drive as a future storage reservoir site to serve higher-elevation development within the UGB and North Hills URA.

It is assumed that Zone 2 customers will continue to be served by constant pressure through the 20-year planning horizon. Beyond the 20-year planning horizon, Zone 2 customers may ultimately be served by gravity from the proposed Bell Road Reservoir, as development warrants.