Water Management and Conservation Plan

Prepared for

City of Fairview, Oregon

February 2017

Prepared by

GSI Water Solutions, Inc.
1600 SW Western Blvd., Suite 240 Corvallis, OR 97333
P: 541.753.0745 F: 541.754.4211
info@gsiws.com www.gsiws.com

This page intentionally left blank.

Oregon
Kate Brown, Governor

Water Resources Department
North Mall Office Building
725 Summer St NE, Suite A
Salem, OR 97301
Phone (503) 986-0900
Fax (503) 986-0904
www.wrd.state.or.us

February 22, 2017

City of Fairview
Attn: Allan Berry – Public Works Director
1300 NE Village St.
Fairview, OR 97024

Subject: Water Management and Conservation Plan

Dear Mr. Berry:

Enclosed, please find the final order approving your water management and conservation plan and authorizing the diversion of up to 1.1cfs (*out of total permitted 2.2 cfs*) of water under extended Permit G-7029.

The attached final order specifies that the City of Fairview's (City) plan shall remain in effect until **February 22, 2027**. Additionally, the City is required to submit a progress report to the Department by **February 22, 2022**, detailing progress made toward the implementation of conservation benchmarks scheduled in the plan. Finally, the City must submit an updated Water Management and Conservation Plan to the Department by **August 22, 2026**.

NOTE: *The deadline established in the attached final order for submittal of an updated Water Management and Conservation Plan (consistent with OAR Chapter 690, Division 086) shall not relieve the City of Fairview from any existing or future requirement(s) for submittal of a water management and conservation plan at an earlier date as established through other final orders of the Department.*

We appreciate your cooperation in this effort. Please do not hesitate to contact me at 503-986-0883 or *chris.c.kowitz@oregon.gov* if you have any questions.

Sincerely,

Chris Kowitz
Water Management and Conservation Analyst
Water Right Services Division

Enclosure

cc: WMCP File
Application #G-7563 (Permit #G-7029)
Amy Kim, District #20 Watermaster (*via e-mail*)
GSI Water Solutions, Inc. Attn: Adam Sussman 1600 SW Western Blvd., Suite 240 Corvallis, OR 97333

BEFORE THE WATER RESOURCES DEPARTMENT
OF THE
STATE OF OREGON

In the Matter of the Proposed Water Management and Conservation Plan for City of Fairview, Multnomah County	)))	FINAL ORDER APPROVING A WATER MANAGEMENT AND CONSERVATION PLAN

Authority

OAR Chapter 690, Division 086, establishes the process and criteria for approving water management and conservation plans required under the conditions of permits, permit extensions and other orders of the Department. An approved water management and conservation plan may authorize the diversion and use of water under a permit extended pursuant to OAR Chapter 690, Division 315.

Findings of Fact

1. The City of Fairview (City) submitted a Water Management and Conservation Plan (plan) to the Water Resources Department (Department) on June 29, 2016. The required statutory fee for review of the plan was received by the Department on June 29, 2016. The plan was required by a condition set forth under the City's previously approved plan (Sp. Or. Vol. 70, Pg. 684) issued on November 30, 2006 and a condition set forth in the final order issued on August 29, 2014 approving an extension of time for Permit G-7029.

2. The Department published notice of receipt of the plan on July 5, 2016, as required under OAR Chapter 690, Division 086. No comments were received.

3. The Department provided written comments on the plan to the City on September 27, 2016. In response, the City submitted a revised plan on January 16, 2017.

4. The Department reviewed the revised plan and finds that it contains all of the elements required under OAR 690-086-0125 and OAR 690-086-0130.

5. The plan presents 10-year and 20-year projections of future water needs. Based on these projections, the plan demonstrates a need for 1.1 cfs (*out of total permitted 2.2 cfs*) of water available under Permit G-7029 to help meet overall projected demands in 2028 (approximately 10 years from present). These projections are reasonable and consistent with the City's land use plan.

This is a final order in other than a contested case. This order is subject to judicial review under ORS 183.484. Any petition for judicial review must be filed within the 60-day time period specified by ORS 183.484(2). Pursuant to ORS 536.075 and OAR 137-004-0080, you may petition for judicial review or petition the Director for reconsideration of this order. A petition for reconsideration may be granted or denied by the Director, and if no action is taken within 60 days following the date the petition was filed, the petition shall be deemed denied.

6. The City's system is fully metered and the rate structure includes a base rate and volumetric charge. Due to billing software and/or meter data collection issues, non-revenue water is unknown at this time.

7. The revised plan includes 5-year benchmarks for the continuation of the following Conservation Measures: annual water audits; meter testing and repair; requiring all new connections to the water system to be metered; prompt repair of leaks when they are detected and providing a credit to customers who promptly repair leaks on their side of the meter; monthly billing that includes historic water use information; billing customers, in part, on the quantity of water metered at the service connection; outreach and conservation programs for schools; and distribution of water conservation information at the Summer on the Green Festival and on the City website.

8. The plan includes 5-year benchmarks for the implementation of the following Conservation Measures:

    a. Annual Water Audit 5-year benchmark

        i. In the next year, the City will synchronize SCADA system demand data collection with meter readings/billing dates. The City will also investigate the translation of data between AMR meters and Incode, as well as other aspects of the AMR system to rule out data issues related to the AMR system. Specifically, the City will hold training sessions administered by the City's AMR supplier to ensure accurate and consistent data collection and reporting.

        ii. In the next year, the City will begin to conduct monthly water audits to determine whether the City's heightened scrutiny of its billing software and improved recording of metered consumption resolves the negative unaccounted-for water issue.

        iii. The City will annually report to OWRD on the progress in resolving the negative unaccounted-for water until the issue is resolved.

        iv. If the negative unaccounted-for water persists after two years, then the City will analyze its process of calculating daily demand, which considers well production, and the filling and draining of Reservoir 2 (Glisan).

        v. In the next year, the City will investigate how to best classify several City accounts to improve water auditing.

        vi. In the next year, the City will consider transferring the responsibility of taking meter readings for Rockwood People's Utility District (RWPUD) customers in City limits to the RWPUD, which will simplify the City's water audit.

    b. Meter Testing and Maintenance

        i. During the next 2 years, the City will develop a replacement program for meters within its system that are 20 to 25 years old.

ii. The City will continue testing 2-inch and larger meters every other year.

c. Leak Detection Program

i. Within 2 years, the City will develop and submit to OWRD a leak detection program to be implemented if not successful in addressing the negative unaccounted-for water issue within 5 years and/or if unaccounted-for water is determined to be greater than 10 percent.

d. Public Education

i. The City will continue to promote the Backyard Habitat Certification Program as a means to reduce irrigation in the peak season.

ii. During the next 5 years, the City will have a booth at a minimum of one community event annually, such as the Summer on the Green Festival, and will distribute 200 conservation brochures.

iii. During the next 5 years, the City will work with high school Spanish students to have its conservation brochures translated into Spanish, which will make this conservation information more easily available to a portion of the City's customers.

iv. During the next five years, the City will contact elementary schools to determine ways that the City can support water conservation education.

e. Technical and Financial Assistance Programs

i. During the next 5 years, the City will distribute 200 indoor and outdoor conservation kits annually (100 each) to its customers. The kits will include conservation items that provide its customers with technical assistance, such as leak detection dye tablets, watering gauges, hose timers, and information about outdoor conservation.

ii. During the next 5 years, the City will evaluate the feasibility of purchasing software that would allow customers to log onto a Web site to view their daily water consumption. Access to this information would allow customers to more easily identify whether they have a leak.

f. Supplier-Financed Retrofit or Replacement of Inefficient Fixtures

i. During the next 5 years, the City will distribute 200 indoor and outdoor conservation kits annually (100 each) to its customers. The kits will include conservation items that allow its customers to replace inefficient fixtures, such as water-efficient shower heads, kitchen and bathroom faucet aerators, and hose nozzles. The target population for these items will continue to be residents living in the older portion of the City because newer homes already have efficient fixtures. The kits will be available at City Hall and will be provided at the Summer on the Green Festival.

g. Rate Structure and Billing Practices that Encourage Conservation

i. The City will continue to charge based in part on the amount of water used, and will bill customers on a monthly basis and based in part on the quantity of water metered at the service connection.

ii. The City will continue to provide information about the customer's historical water use.

iii. In the next 5 years, the City will conduct a more thorough evaluation of the feasibility of using inverted block rates and seasonal block rates.

h. Water Reuse, Recycling, and Non-potable Opportunities

i. During the next 5 years, the City will investigate the ability to store stormwater from Fairview Creek to use for park irrigation purposes.

i. Other Conservation Measures

i. During the next 5 years, the City will investigate the opportunity to hire an intern to promote xeriscaping.

9. The revised plan identifies six groundwater rights and two non-municipal surface water rights (Fairview Creek) as the sources of the City's water rights. The revised plan accurately and completely describes the listed fish species that occur in Fairview Creek in the vicinity of the City's point of diversion as well as the water quality parameters for which this portion of Fairview Creek has been 303(d) listed by the Oregon Department of Environmental Quality. The City's groundwater sources are not in a designated critical groundwater area.

10. The water curtailment element included in the plan satisfactorily promotes water curtailment practices and includes a list of four stages of alert with concurrent curtailment actions.

11. The diversion of water under Permit G-7029 will be increased during the next 20 years and is consistent with OAR 690-086-0130(7), as follows:

a. As evidenced by the 5-year benchmarks described in Findings of Fact #7 and #8, the final revised plan includes a schedule for the continuation and/or implementation of conservation measures that would provide water at a cost that is equal to or lower than the cost of other identified sources;

b. Considering the current production limitations and/or poor water quality from existing sources, the need to provide resiliency and redundancy in the water system, and that water savings alone from identified conservation and curtailment measures cannot fully meet they City's water demand projections, access to an increased diversion of water under Permit G-7029 is the most feasible and appropriate alternative to the supplier.

c. The City is not legally required to provide mitigation or address limitations or restrictions on the development of permits as no resource issues were identified under OAR 690-086-0140(5)(i).

Conclusion of Law

The Water Management and Conservation Plan submitted by the City of Fairview is consistent with the criteria in OAR Chapter 690, Division 086.

Now, therefore, it is ORDERED:

Duration of Plan Approval:

1. The City of Fairview's Water Management and Conservation Plan is approved and shall remain in effect until **February 22, 2027** unless this approval is rescinded pursuant to OAR 690-086-0920.

Development Limitation:

2. The limitation of the diversion of water under Permit G-7029 established by the extension of time approved on August 29, 2014 is removed, and, subject to other limitations or conditions of the permit, the City of Fairview is now authorized to divert up to 1.1 cfs (*out of the total permitted 2.2 cfs*) under Permit G-7029.
3. Failure to meet the conservation benchmarks listed below may result in the reduction of the quantity of water authorized for diversion under Permit G-7029 during review of the City's next plan update.
    a. Annual water audit (Finding of Fact 8(a))
    b. Leak detection (Finding of Fact 8(c))

Plan Update Schedule:

4. The City of Fairview shall submit an updated plan meeting the requirements of OAR Chapter 690, Division 086 within 10 years and no later than **August 22, 2026**.

Progress Report Schedule:

5. The City of Fairview shall submit a progress report containing the information required under OAR 690-086-0120(4) by **February 22, 2022**.

Other Requirements for Plan Submittal:

6. The deadline established herein for the submittal of an updated Water Management and Conservation Plan (consistent with OAR Chapter 690, Division 086) shall not relieve the City of Fairview from any existing or future requirement(s) for submittal of a Water Management and Conservation Plan at an earlier date as established through other final orders of the Department.

Dated at Salem, Oregon this 22 day of February, 2017.

Dwight French
Water Right Services Division Administrator, for
Thomas M. Byler, Director
Oregon Water Resources Department

FEB 22 2017

Mailing date: _____

Section **Page**
SECTION 1 Municipal Water Supplier Plan 1-1
Introduction 1-1
Plan Requirement 1-1
Plan Organization 1-1
Affected Governments 1-2
Plan Update Schedule 1-2
Time Extension 1-2
SECTION 2 Water Supplier Description 2-1
Water Sources 2-1
Interconnections with Other Systems 2-1
Intergovernmental Agreements 2-2
Service Area Description and Population 2-2
Records of Water Use 2-5
Historical Water Demands 2-6
Customer Characteristics and Use Patterns 2-9
Unaccounted-for Water 2-13
Water Rights 2-15
Evaluation of Water Rights/Supply 2-21
System Description 2-22
SECTION 3 Water Management and Conservation 3-1
Current Conservation Measures 3-1
Use and Reporting Program 3-5
Required Conservation Programs 3-5
Five-Year Benchmarks for Required Conservation Measures 3-5
Expanded Use under Extended Permits 3-10
Additional Conservation Measures 3-10
SECTION 4 Municipal Water Curtailment Plan 4-1
Introduction 4-1
History of System Curtailment Episodes 4-1
Curtailment Event Triggers and Stages 4-1
Authority and Enforcement 4-2
Curtailment Plan Implementation 4-2
SECTION 5 Water Supply 5-1
Delineation of Service Areas 5-1
Population Projections 5-1
Demand Forecast 5-2
Schedule to Exercise Permits and Comparison of Projected Need to Available Sources 5-6
Alternative Sources 5-7
Quantification of Projected Maximum Rate and Monthly Volume 5-9
Mitigation Actions under State and Federal Law 5-9
New Water Rights 5-9

Exhibits

Exhibit 2-1. City of Fairview Current and Future Service Area Map and System Schematic

Exhibit 2-2. Annual Demand, Average Day Demand, Maximum Day Demands, Monthly Demands, and Peaking Factors, 2009-2014

Exhibit 2-3. Annual Demand (MG), 2009-2014

Exhibit 2-4. Average Day Demand and Maximum Day Demand (mgd), 2009-2014

Exhibit 2-5. Monthly Average Day Demand (mgd), 2009-2014

Exhibit 2-6. Historical Seasonal Average Day Demand (mgd), 2009-2014

Exhibit 2-7. Number of Accounts by Customer Category, as of December 31, 2014

Exhibit 2-8. Annual Water Use by Customer Category, 2011-2014

Exhibit 2-9. Percent Annual Water Use by Customer Category, 2014

Exhibit 2-10. Monthly Metered Consumption by Customer Category, 2011-2014

Exhibit 2-11. Seasonal Water Consumption by Customer Category, 2014

Exhibit 2-12. Unaccounted-for Water, 2011-2014

Exhibit 2-13. Revised Unaccounted-for Water, 2014-2015

Exhibit 2-14. City of Fairview Municipal Water Rights

Exhibit 2-15. Non-Municipal Water Rights Held by the City of Fairview

Exhibit 2-16. Listed Fish Species in the Lower Columbia River, Mainstem Columbia River, and Fairview Creek Drainages

Exhibit 2-17. Municipal Well Characteristics

Exhibit 2-18. Summary of System Reservoirs

Exhibit 2-19. Summary of System Pump Station

Exhibit 2-20. Summary of System Pipelines

Exhibit 3-1. Progress Report on Conservation Measures

Exhibit 3-2. Monthly Service and Consumption Charges

Exhibit 4-1. Curtailment Stages 1 through 4

Exhibit 5-1. Population Projections

Exhibit 5-2. Projected Maximum Day Demands

Exhibit 5-3. Projected Maximum Day Demands

Exhibit 5-4. Projected Maximum Day Demands with 5 Percent Conservation

Appendices

A Letters to Local Governments and Comments

SECTION 1

Municipal Water Supplier Plan

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.

Introduction

The City of Fairview (City), incorporated in 1908, is a bustling community 15 miles east of the City of Portland. The City has historically been a farming and residential community. One of City's largest businesses, Townsend Farms, is a third generation family-owned business that is one of Oregon's largest berry producers. The City's natural features (Fairview Creek, Fairview Lake, Blue Lake, and the Columbia River), recreational opportunities, and historical sites make the City one of the more desirable locations to live in East Multnomah County. The City considers sustainable water management to be critical for continuing to attract and to maintain residents and businesses.

The purpose of this Water Management and Conservation Plan (WMCP, or Plan) is to guide development and implementation of water management and conservation programs that encourage sustainability, as well as to analyze the City's future water needs. This WMCP is a working document that the City plans to use in its future water planning.

Plan Requirement

The Oregon Water Resources Department (OWRD) issued a final order approving the City's current WMCP on November 30, 2006, which included a requirement to submit an updated WMCP to OWRD by July 1, 2016. In addition, OWRD issued a final order on August 29, 2014, that approved an extension of time for Permit G-7029. The final order limits groundwater use under the permit to 0.76 cubic foot per second (cfs) until that limitation is removed by a final order approving the City's WMCP, and requires the City to submit a WMCP within 3 years of the most recent final order (August 29, 2017). The City intends to meet both final order requirements through this updated WMCP.

This WMCP meets all of the requirements of the Oregon Administrative Rules (OAR) adopted by the Water Resources Commission in November 2002 (OAR Chapter 690, Division 86) regarding WMCPs.

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 later sections use this information to consider how the City can improve its water management and conservation, and water supply planning efforts. The WMCP also includes appendices with supporting information.

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

The City has relied on information from the following sources to prepare this plan:

- City of Fairview staff
- City of Fairview draft Water System Master Plan Update (January 2016)
- City of Fairview's WMCP approved in 2006 WMCP
- Portland State University Population Research Center
- OWRD

Affected Governments

OAR 690-086-0125(5)

The following local governments may be affected by this WMCP:

- City of Fairview
- Multnomah County
- Metro

Thirty days before submitting this WMCP to OWRD, the City made the draft plan available for review by each affected local government listed above along with a request for comments related to consistency with the local government's comprehensive land use plan. The letters requesting comment and comments received are presented in **Appendix A**. The City also provided a courtesy copy of the WMCP to the Rockwood Water People's Utility District (RWPUD), Interlachen Water People's Utility District (IWPUD), City of Troutdale, and City of Wood Village before submittal.

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.

Time Extension

OAR 690-086-0125(7)

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

SECTION 2

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 leakage.

Water Sources

OAR 690-086-0140(1)

The City's current municipal water source is groundwater. The City has five groundwater supply wells (Wells 5, 6, 7, 8, and 9) that can be used to meet water demands. Two of the City's water supply wells were installed in the 1970s (Wells 5 and 6). Well 7 was installed in 1997. Well 8 and Well 9 were added to the system in 2002 and 2010, respectively. The City has monitored Well 6 for the presence of halogenated volatile organic compounds because tetrachloroethylene (PCE) and ethylene dibromide (EDB) historically have been detected in raw water from the well at concentrations greater than the Maximum Contaminant Levels (MCLs) for drinking water, promulgated by the U.S. Environmental Protection Agency (EPA). The well is not available for use because of the presence of these contaminants at concentrations exceeding MCLs and lack of treatment.

All but one of the City's groundwater wells (Well 7) are completed in the Sand and Gravel Aquifer (SGA) unit of the lower Troutdale Formation in the Portland Basin. The SGA is the major aquifer used by other nearby municipalities in the Portland Basin, including the City of Portland. The SGA consists of varying proportions of loose to moderately cemented sand and gravel, inter-fingered with finer-grained sediments, which represent alluvial deposits from the ancestral Columbia River and rivers draining the Cascade Range in Oregon. The City's Well 7 is completed in the Troutdale Sandstone Aquifer (TSA), which is encountered at shallower depths and separated from the deeper SGA by low permeability clay and silt sediments of the Confining Unit 2.[1]

The City also holds two non-municipal use water rights (Certificates 90061 and 90062) related to the storage of non-potable water from Fairview Creek in Fairview Reservoir for aesthetics, recreation, and wildlife habitat. The City does not deliver water through its municipal distribution system for municipal customer supply under either of these water rights.

Interconnections with Other Systems

OAR 690-086-0140(7)

The City maintains interconnections with the RWPUD, City of Troutdale, City of Wood Village, and IWPUD (the unincorporated area of Interlachen in Multnomah County, which

[1] Hartford, S.V. and McFarland, W.D. Lithology, thickness, and extent of hydrogeologic units underlying the east Portland area, Oregon: U.S. Geological Survey Water-Resources Investigations Report. 1989.

is served by IWPUD, is included in the City's service area and demand projections; see Service Area Description and Population). Only the RWPUD interconnection is metered, but according to the City's 2016 Water System Master Plan, it reportedly has never been used.

Intergovernmental Agreements

OAR 690-086-0140(1)

The City has an intergovernmental agreement with RWPUD regarding the area within City limits that they agreed will be served water by RWPUD: the southwestern corner of the City, which is west of Fairview Parkway and south of I-84. Customers in this area are not connected to the City's water system. In terms of asset management, RWPUD maintains, owns, and operates the water system facilities in this area of the City, except for the commercial water meters. Residential customers are billed directly by RWPUD, but commercial water users are billed by the City.

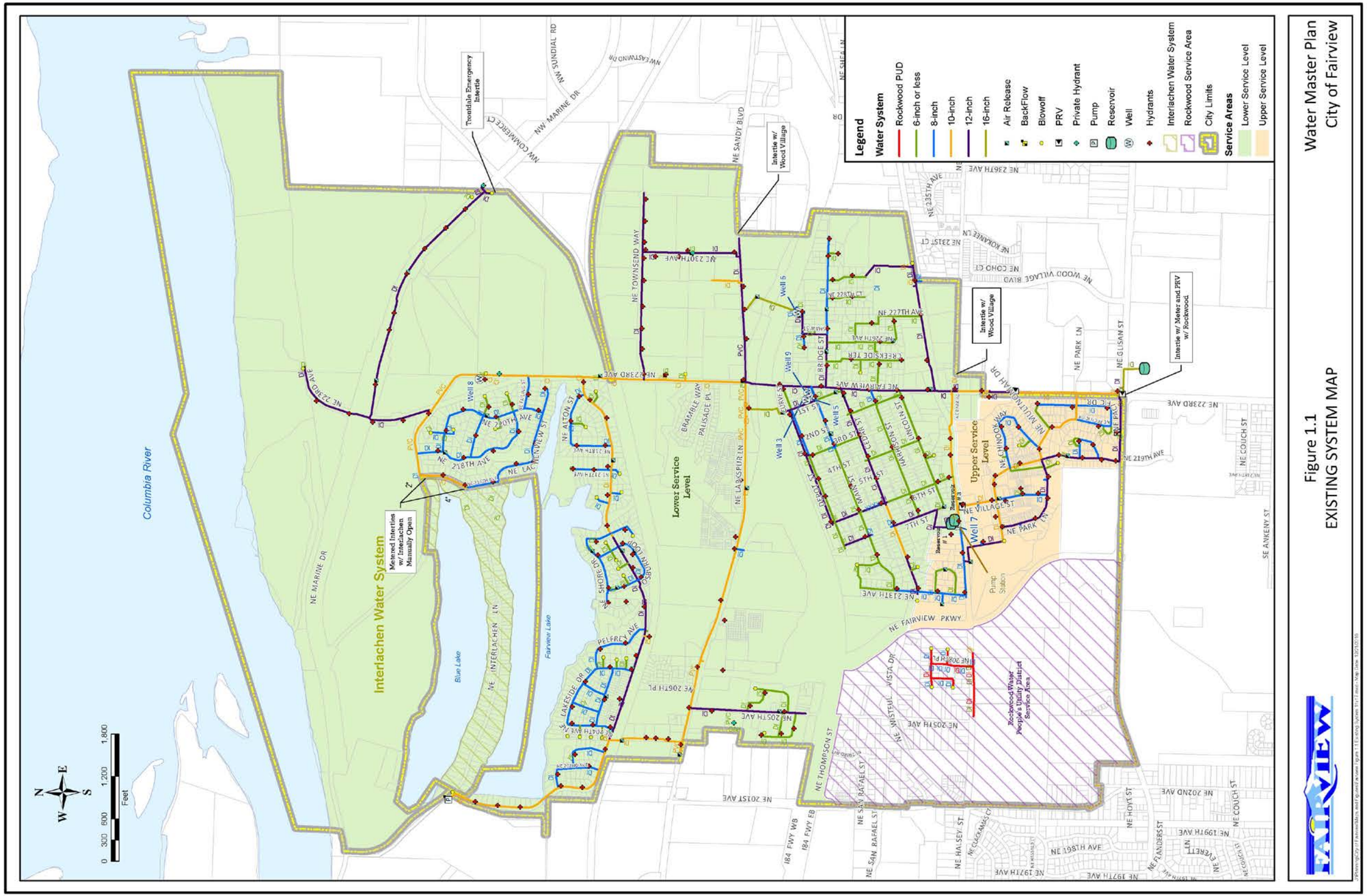
Service Area Description and Population

OAR 690-086-0140(2)

Exhibit 2-1 shows the City's current water service area. The current water service area is the area north of Glisan Street, east of NE 201st Avenue, south of the Columbia River, and west of NE 230th Avenue within City limits, excluding the southwestern corner of the City west of Fairview Parkway and south of I-84 (referred to as Region 1 in the City's Comprehensive Plan), which is served by RWPUD.

According to Portland State University's Population Research Center, the City's population within City limits in 2014 was 8,935. However, this estimate includes the properties located in Region 1 of the City that are served by RWPUD. The 2006 Capital Improvement Evaluation estimated that approximately 1,200 City residents were served by RWPUD in 2005. Given the relatively little to no growth in this area of the City since 2005, the City assumed that the same number of residents was served by RWPUD in 2014. Thus, the City estimates that its service area population in 2014 was 7,735 (8,935-1,200=7,735).

Exhibit 2-1. City of Fairview Current and Future Service Area Map and System Schematic.



This page intentionally left blank.

Records of Water Use

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

Terminology

Demand refers to water entering the water distribution system, which takes into account the total gallons of water pumped from the City's wells. Demand includes metered consumption, unmetered uses, and water lost to leakage. For the purposes of this WMCP, the terms "demand" and "production" are synonymous.

Consumption refers to the portion of water use that is metered. Generally, demand and consumption in municipal systems are expressed in units of million gallons per day (mgd). They also may be expressed in cubic feet per second (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 is typically reported in million gallons (MG). Water use per person (per capita use) is expressed in gallons per person (per capita) per day (gpcd).

This WMCP uses the following terms to describe specific values of system demands:

- Average day demand (ADD) equals the total annual system input (demand) divided by the number of days in the year, usually 365 days.
- Maximum day demand (MDD) equals the highest system demand that occurs on any single day during a calendar year.
- 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 1 month with the highest total demand of the 12 months of a calendar year.
- Peaking factors are the ratios of one demand value to another. The most common and important peaking factor is the ratio of the MDD to the ADD.

Historical Water Demands

Annual and Daily Demands

Exhibit 2-2 summarizes the City's water demands from 2009 through 2014, excluding 2012.

Exhibit 2-2. Annual Demand, Average Day Demand, Maximum Day Demands, Monthly Demands, and Peaking Factors, 2009-2014.

Year[1]	Annual Demand (MG)	ADD (mgd)	MDD (mgd)	Peaking Factor (MDD:ADD)	MMD (MG)	MMD (mgd)
2009	251.5	0.69	1.72	2.5	36.1	1.17
2010	226.7	0.62	1.57	2.5	33.0	1.07
2011	179.1	0.49	1.34	2.7	21.0	0.68
2013	222.6	0.61	1.24[2]	2.0	30.4	0.98
2014	227.2	0.62	1.19	1.9	29.9	0.96
Average	221.4	0.61	1.41	2.3	30.1	0.97
Highest	251.5	0.69	1.72	2.7	36.1	1.17

[1]2012 data are not included because of the loss of June, July, and August data.
[2]An outlier on March 20, 2013, was excluded.

The City's annual demand decreased from 2009 through 2011 then increased in 2013 and 2014 to a level similar to 2010, as shown in **Exhibits 2-2** and **2-3**. The low annual demand in 2011, primarily the result of abnormally low summer demands that will be discussed later, is likely the result of an accounting issue. Annual demand in 2012 was not available because of the loss of data from June through August 2012. Excluding 2011, ADD remained fairly steady. In contrast, MDD decreased steadily during the same time period. The City attributes the decrease in MDD to its implementation of water conservation programs and to the economic downturn in 2009 causing customers to reduce water use to save money, a change in behavior that customers seem to be maintaining despite recent improvements in the economy. **Exhibit 2-4** shows ADD and MDD from 2009 through 2014.

Exhibit 2-3. Annual Demand (MG), 2009-2014.

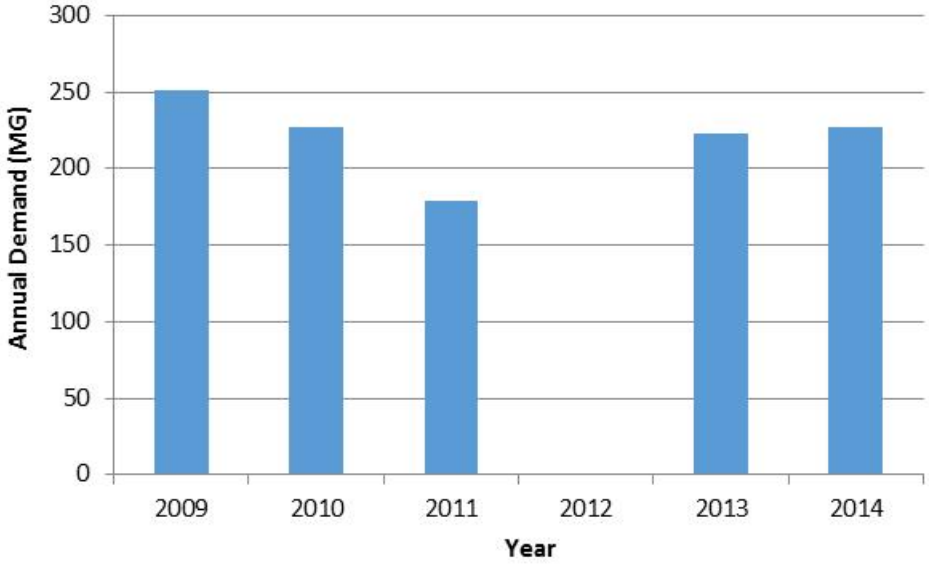
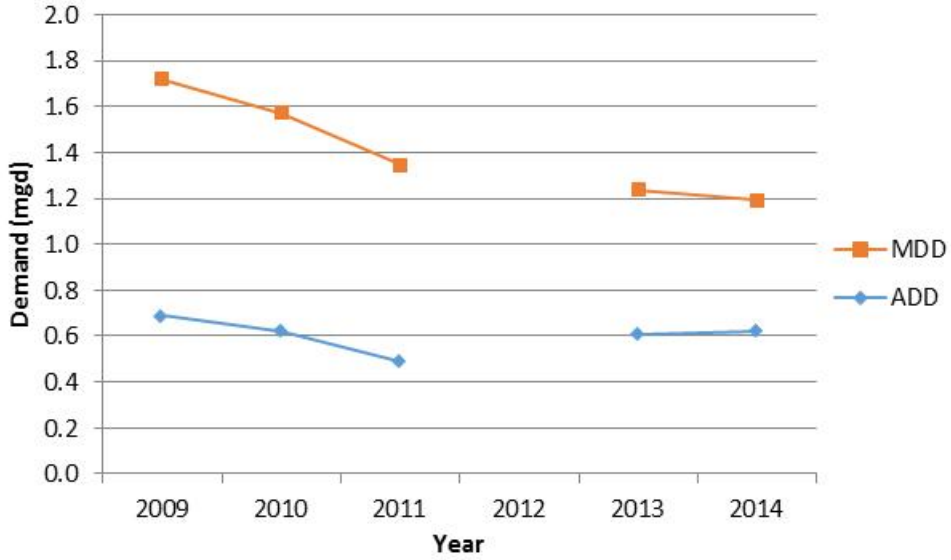


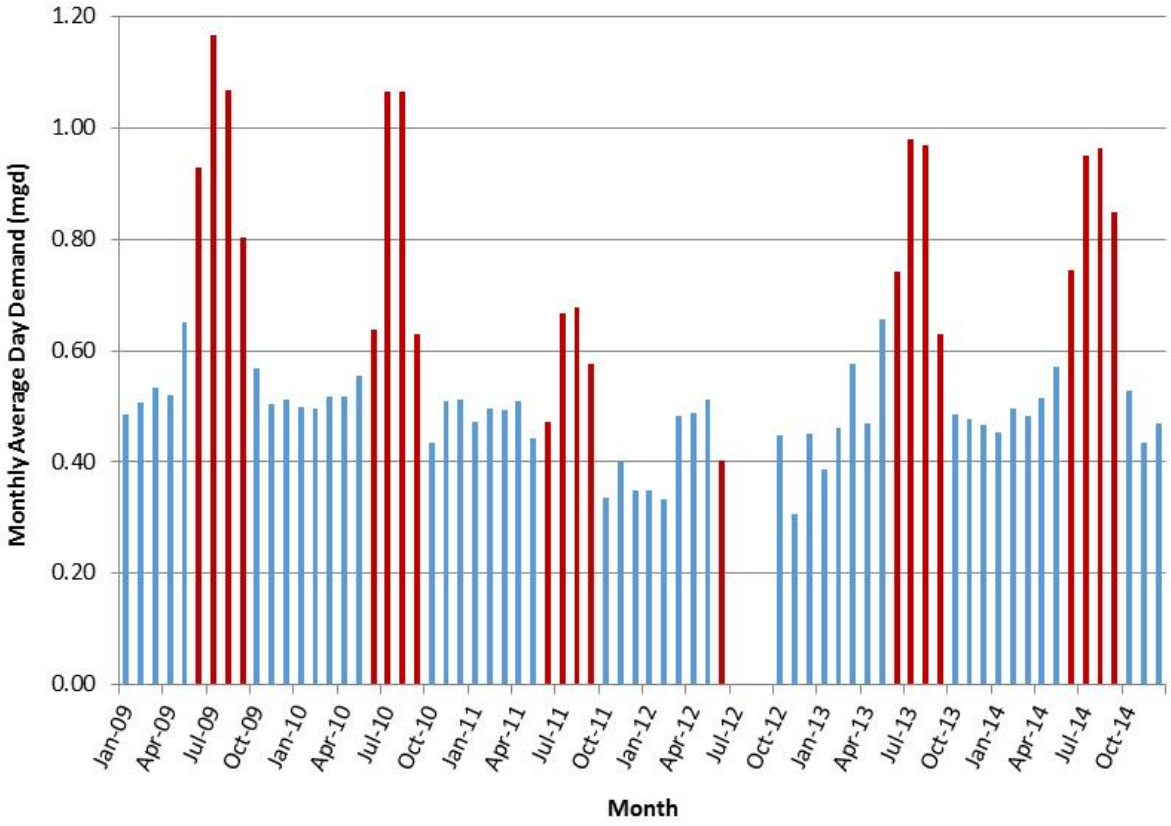
Exhibit 2-4. Average Day Demand and Maximum Day Demand (mgd), 2009-2014.



Monthly Demand

As shown in **Exhibit 2-5**, the City's demand increases substantially during the peak season months, usually June through September. This pattern, which is typical of water providers in Oregon, is primarily the result of irrigation during the summer months. Peak season demands in 2011 were uncharacteristically low, which is likely attributable to accounting issues. The City's loss of June through September demand data resulting from software issues is evident in the exhibit, as well.

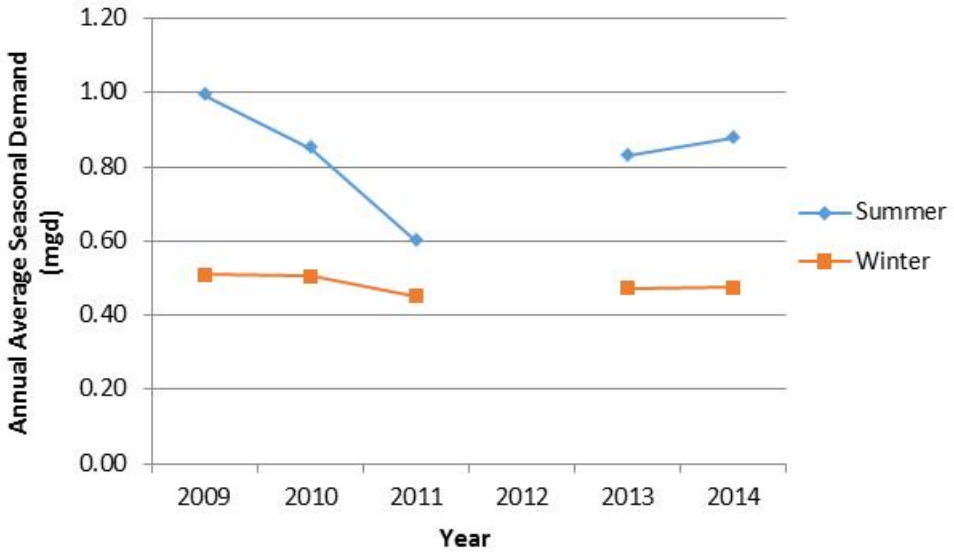
Exhibit 2-5. Monthly Average Day Demand (mgd), 2009-2014. Red indicates peak season months (June through September) while blue indicates non-peak season months.



Seasonal Demand

Exhibit 2-6 presents the City's ADD in summer (June through September) and winter (December through March) from 2009 through 2014, excluding 2012. During this period, winter ADD ranged from 0.45 to 0.51 mgd and summer ADD ranged from 0.83 and 0.99 mgd, with the exception of 2011 when summer ADD was markedly lower (0.60 mgd) than other years. The average of the City's ADD in summer was 1.7 times greater than the average of the City's ADD in winter. This difference falls within the range of other nearby cities (City of Sandy's 2016 WMCP, 1.6; City of Troutdale's 2016 WMCP, 1.9), and reflects additional demand for water for irrigation.

Exhibit 2-6. Historical Seasonal Average Day Demand (mgd), 2009-2014. Summer = June through September. Winter = December through March.



Authorized Consumption

Authorized consumption is equal to the metered and certain unmetered water uses within the system.

Customer Characteristics and Use Patterns

OAR 690-086-0140(6)

Customer Description

The City has two customer categories: residential and commercial. The residential customer category consists of single family and multi-family residences. The commercial category includes water use at City facilities, but those uses currently are not billed. The City bills approximately eight commercial accounts served water by RWPUD because these customers are outside of RWPUD's service area and those accounts are tied to the City's sewer system. Consumption by the eight accounts served by RWPUD has been excluded from consumption analyses in this WMCP.

Exhibit 2-7 presents the number of accounts by customer category as of December 31, 2014. Of the 1,457 residential accounts, 1,371 were single-family accounts and 86 were multi-family accounts, which served 1,683 multi-family dwelling units.

Exhibit 2-7. Number of Accounts by Customer Category, as of December 31, 2014.

Customer Category	Number of Accounts
Residential	1,457
Commercial	151
Total	1,608

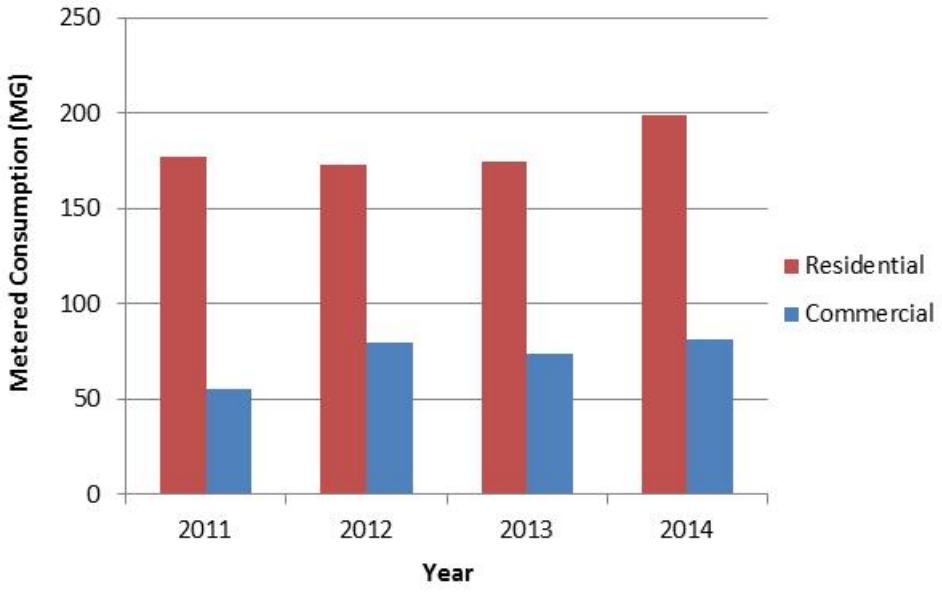
Although the City can estimate the number of residential accounts that are single-family residences versus multi-family residences, the City's billing software currently is not set up to differentiate between consumption by the two categories of residential accounts. In addition, the City does not have consumption data before 2011 as a result of new billing software installed in 2010. Consequently, this WMCP analyzes only consumption by two customer categories, residential and commercial, from 2011 through 2014.

Annual Consumption

Annual total metered consumption was 232.4 MG in 2011, 248.4 MG in 2013, and 280.4 MG in 2014 (Calendar Years). The City's approved 2005 WMCP annual total metered consumption was generally higher than in recent years, ranging between 243 MG and 317 MG from Water Years 1999-2000 through 2003-2004. The comparative reduction in consumption in recent years is likely related to the recent economic downturn and the City's water management and conservation efforts, which are described in Section 3.

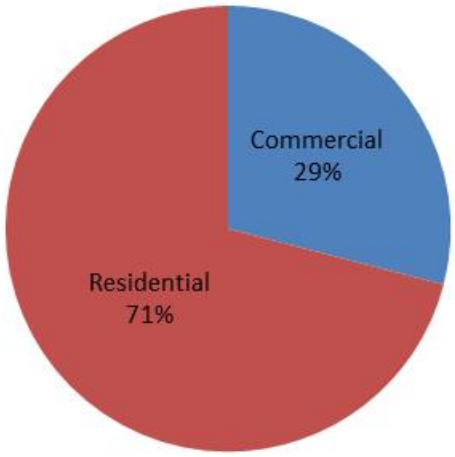
Exhibit 2-8 shows the City's annual water use by customer category from 2011 through 2014. During this period, the City's residential consumption ranged between 173.3 and 199.0 MG, while commercial consumption ranged between 55.2 and 81.4 MG. No clear consumption trends are evident for either customer category. The lower commercial consumption in 2011 is likely attributable to accounting issues stemming from the City's conversion to a new software system in December 2010. The City resolved these issues by 2012. The increase in residential consumption in 2014 is the result of meter reading errors for April and May 2014, as further described in the monthly consumption discussion below.

Exhibit 2-8. Annual Water Use by Customer Category, 2011-2014



In 2014, residential customers represented 71 percent of total consumption and commercial customers represented 29 percent, as shown in **Exhibit 2-9**. This suggests that water conservation programs geared toward reducing residential consumption could be more cost-effective.

Exhibit 2-9. Percent Annual Water Use by Customer Category, 2014.



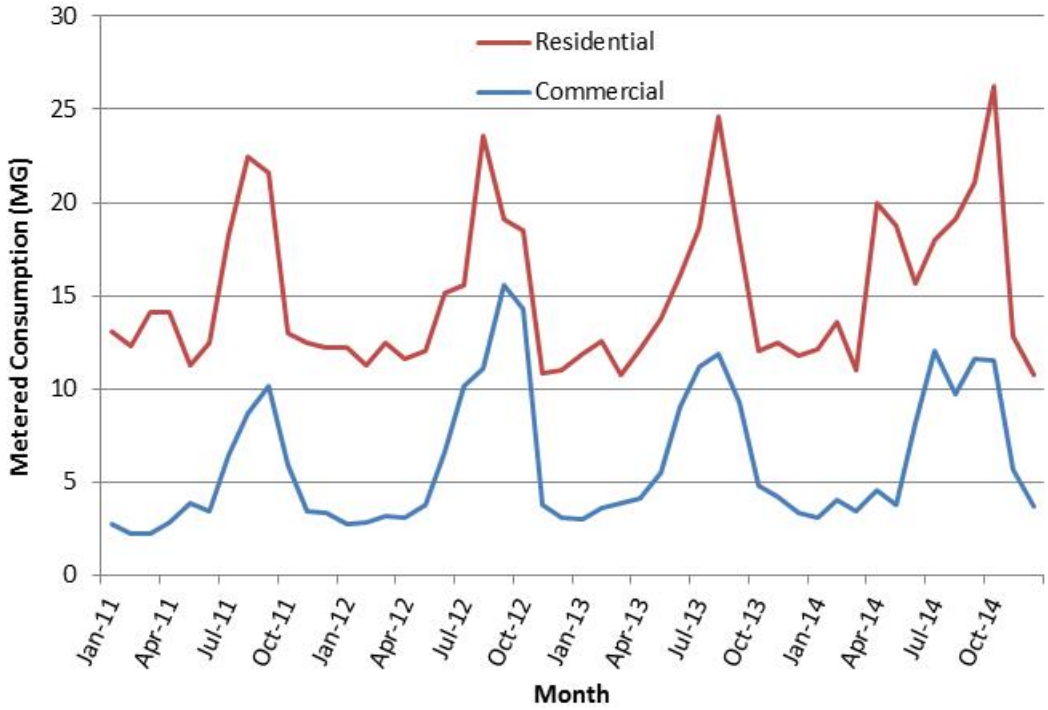
Monthly Consumption

Exhibit 2-10 shows monthly metered consumption by residential and commercial customer categories from 2011 through 2014. Residential and commercial consumption peaked during the summer months. Many residential customers irrigate lawns and gardens in the summer. Water conservation programs targeting outdoor water use by both types of customers could reduce peak day demands and produce water savings.

The unusually high consumption in April and May 2014 was the result of meter reading errors in a single City account that is not actually billed. Several City accounts are classified as residential, but the City is now considering reclassifying those accounts as commercial to more accurately classify these accounts.

The City did not report monthly metered consumption by customer category in the 2005 WMCP, so a comparison of monthly consumption by customer category between the two WMCPs is not included here.

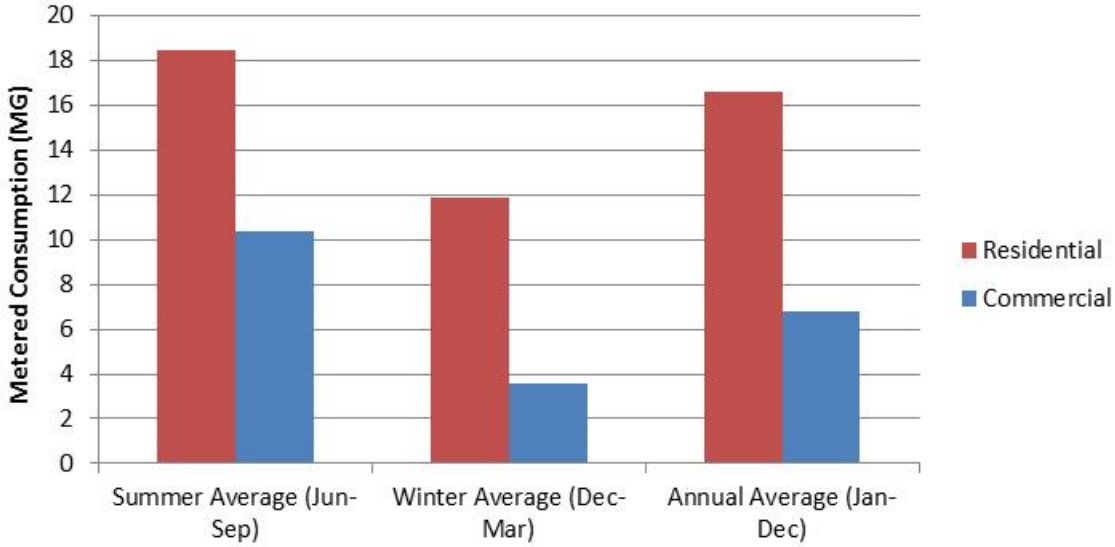
Exhibit 2-10. Monthly Metered Consumption by Customer Category, 2011-2014.



Seasonal Consumption

Average monthly consumption by season and customer category in 2014 is presented in **Exhibit 2-11**. Residential demand was 1.6 times greater in summer than winter and commercial demand was 2.9 times greater in summer, which demonstrates that the City may want to focus on water conservation programs targeting outdoor use by both customer categories. Further, investigating factors contributing to the greater jump in demand by commercial customers could result in a more cost-effective approach for producing water savings among these customers.

Exhibit 2-11. Seasonal Water Consumption by Customer Category, 2014.



For the purposes of comparing seasonal consumption in the previous WMCP (2005) with seasonal consumption in 2014, the City also calculated winter ADD based on the months of November, December, and January, and calculated summer ADD based on the months of June, July, and August. In this case, winter ADD increased from 0.51 mgd in 2005 to 0.52 mgd in 2014, and summer ADD increased from 1.09 mgd in 2005 to 1.25 mgd in 2014.

Unaccounted-for Water

OAR 690-086-0140(9)

For the purposes of this WMCP, unaccounted-for water is the difference between demand and metered water consumption. Thus, unaccounted-for water represents system leakage, and unmetered authorized and unauthorized water usage.

System leakage is water lost because of deteriorating water system infrastructure, such as reservoirs, pipes, service connections, and valves. Over the past 5 years, a contractor hired by the City conducted leak detection work in the oldest section of the City where leaks were most likely and identified no leaks. Based on the results of the leak detection surveys, the relatively young age of the pipes, and the minimal number of leaks encountered by City staff, the City believes its system leakage is well under the 10 percent goal set by OWRD.

Unmetered uses typically result from incomplete or inaccurate metering of consumer demand, and include the following typical categories: unmetered water for operations and maintenance uses (street cleaning), unmetered water for firefighting, and data collection and accounting errors. The City has no unmetered authorized uses, and is unaware of any unmetered or unauthorized connections.

As shown in **Exhibit 2-12,** the City had negative unaccounted-for water, meaning that metered consumption was greater than demand in 2011, 2013, and 2014. System leakage is not a plausible cause of the negative unaccounted-for water given the lack of leaks detected in recent surveys, the young age of the most of the pipes, field observations, and the fact that leakage would have had the opposite effect on the City's unaccounted-for water. Given that the City has no unmetered authorized uses and the unlikelihood of unmetered or unauthorized connections, the City has concluded that its negative unaccounted-for water is primarily the result of accounting errors.

The City believes that the negative unaccounted-for water stems from its new billing software (installed in 2010) having accounting errors that inflated metered consumption for some accounts. The City conducted an in-depth investigation of its billing software in November 2016, after OWRD's initial review of the WMCP and identified numerous accounts with errors. The City identified accounting errors by removing the following from its total consumption: 1) any consumption reported on accounts with independent sources of water and a sewer service that is billed based on the independent water consumption (In these instances, a consumption figure still shows on reports, as a water meter is utilized to indicate how much water the customer is using in order to charge accurately for sewer service), 2) any large account adjustments due to identified billing errors, and 3) any consumption that appears on consumption reports but is actually provided by the RWPUD. (The City bills for water consumption at its rates, but then turns over to RWPUD the revenue on select accounts at RWPUD's rates.)

Following this discovery of billing errors, the City adjusted the consumption for the errors and issued monetary credits to affected customers. In almost all cases, the City was able to manually obtain a read, even if the prior billing had been erroneous or the City used an estimate to bill. This enabled the City to largely correct the consumption and billing. For the few accounts that the City was unable to maintain a manual reading, the City billed customers based on consumption during the same month the previous year, or if that looked abnormal, an average consumption during the same month over the previous two years. This replacement of erroneous metered consumption values with corrected and estimated consumption values at the time of billing was not recorded separately and then provided to staff conducting water audits, which inflated the consumption values used in this WMCP.

After making the above described adjustments to consumption values in 2014 and 2015, metered consumption was greater than demand by only approximately 12.1 MG and 5.6 MG, respectively, which is a significant error reduction. **Exhibit 2-13** shows the revised unaccounted-for water values. The City analyzed the year 2015 rather than years preceding 2014 to be able to understand the most current state of its unaccounted-for water. The City suspects that a large portion of the remaining error (approximately 12.1 MG in 2014 and 5.6 MG in 2015) could stem from the timing of SCADA data

reporting for a given month not aligning exactly with metered consumption reporting. In addition, the City thinks that a small portion of the remaining error could be attributed to the City using slight overestimates of metered consumption when replacing erroneous readings. As the City investigated its metered consumption, it also checked all valves for leaks and verified that all of the magnetic meters were properly calibrated to eliminate the possibility that leaky valves or inaccurate master meter readings (demand side) errors were contributing to the negative unaccounted-for water.

Exhibit 2-12. Unaccounted-for Water, 2011-2014[1].

Year	Annual Demand (MG)	Metered Consumption (MG)	Unaccounted-for Water (MG)
2011	179.1	232.4	-53.3
2013	222.6	248.4	-25.8
2014	227.2	280.4	-53.1

[1]2012 data are not included because of the loss of June, July, and August data.

Exhibit 2-13. Revised Unaccounted-for Water, 2014-2015.

Year	Annual Demand (MG)	Metered Consumption (MG)	Unaccounted-for Water (MG)
2014	227.2	239.3	-12.1
2015	243.7	249.3	-5.6

If accounting and metering issues are eliminated, the percentage of unaccounted-for water should approach the net volume lost to actual leakage.

Water Rights

OAR 690-086-0140(5)

The City holds six municipal groundwater rights. **Exhibit 2-14** provides detailed information regarding the City's municipal water rights that supply potable water through its publicly owned municipal distribution system.

The City's groundwater rights include four water right certificates, one permit, and one groundwater registration.

The City's groundwater registration claims the appropriation of groundwater via the "Pump Well" (Well 1), which develops water from one of two shallow aquifers: the unconsolidated sedimentary aquifer or the Troutdale Gravel Aquifer (TGA). Groundwater registration GR-363 claims the use of 100 gpm (0.22 cfs) for municipal use. The City currently does not use this water right as a source of supply.

The remaining water rights authorize the appropriation of groundwater from the TSA, and the deeper SGA. The City holds one water right that authorizes the appropriation of groundwater from the TSA. Certificate 74803 authorizes appropriation at a rate of

up to 0.67 cfs from the "Fairview Well" (Well 7). The City currently uses this water right as a back-up source of supply. Well 7 has low production capacity and poor water quality, and currently is not connected to the water distribution system.

The City's remaining three water right certificates (87103, 87104, and 88274) authorize total appropriation of up to 5.87 cfs from the SGA via Wells 5, 8, and 9. These water rights provide the City with its primary source of water supply. Permit G-7029 also authorizes appropriation of groundwater from the SGA at a rate of up to 2.2 cfs via the City's Well 6.[2] On August 29, 2014, OWRD issued a final order approving an extension of time for Permit G-7029, which extended the time to complete construction and apply water to full beneficial use to October 1, 2040. The final order limited use under this permit to 0.76 cfs until a final order approving the City's WMCP removed this limitation. The City currently uses this water right as a back-up source of supply.

Information about the non-municipal water rights held in the City's name is provided in **Exhibit 2-15**. These non-municipal use water rights are related to the storage of non-potable water from Fairview Creek in Fairview Reservoir for aesthetics, recreation, and wildlife habitat. The City does not deliver water through its municipal distribution system for municipal customer supply under either of these water rights.

[2] As part of the review of the permit extension application for Permit G-7029, the OWRD Groundwater Section indicated that Well 6 appropriates water from the TSA. GSI has subsequently provided OWRD with information to show that the well produces water from the SGA.

Exhibit 2-14. City of Fairview Municipal Water Rights.

Source	Application	Permit	Certificate or Registration	Type of Beneficial Use	Priority Date	Authorized Rate (cfs)	Authorized Annual Volume (acre-feet)	Authorized Date for Completion	Maximum Rate of Withdrawal to Date		2014 Average Withdrawal		Five-Year (2010-2014) Average Withdrawal		Comments
									Instantaneous (cfs)	Annually (MG)	Monthly (MG)	Daily (mgd)	Monthly (MG)	Daily (mgd)	
Well 6	G-7563	G-7029	--	Municipal	10/27/1976	2.2	--	10/1/2040	0.76	62.8	0	0	0	0	Well 6 has water quality issues. The City currently uses Well 6 primarily for non-potable water purposes. Use of water is currently limited to 0.76 cfs by the final order approving an extension of time. Access to additional water must be granted by a final order approving a WMCP
"Fairview Well" (Well 7)	G-2650	G-2460	74803	Municipal	7/5/1963	0.67	--	N/A	0.67	31.2	0	0	0	0	Well 7 is currently used as a back-up water supply source. It currently lacks telemetry and water treatment.
Well 9	G-529	G-443	87103	Municipal	12/19/1956	0.11	--	N/A	1.0	86.7[1]	7.0	0.23	6.8[1]	0.22[1]	Well 9 is typically operated at a rate of 1.78 cfs to reduce bio-fouling.
					2/7/1957	0.89	--								
Wells 5 and 9	G-5857	G-5594	87104	Municipal	8/1/1972	Total 2.2: Well 5 -1.62 Well 9 – 2.2	--	N/A	2.2						Well 5 is currently used as a back-up water supply source to Well 9. Wells 5 and 9 are cannot be operated simultaneously.
Well 8	G-14121	G-15029	88274	Municipal	6/30/1995	2.67	--	N/A	2.67	156.0	12.1	0.40	11.5	0.38	
Pump Well (Well 1)	N/A	N/A	GR-363	Municipal	"May 1939"	0.22 (100 gpm)	--	N/A	0.22	Unknown	0	0	0	0	Not currently used as a water supply source.

[1]Based on data from 2011 through 2014. Well 9 did not come online until January 2011.

Exhibit 2-15. Non-Municipal Water Rights Held by the City of Fairview.

Source	Application	Permit	Certificate	Type of Beneficial Use	Priority Date	Authorized Rate (cfs)	Authorized Annual Volume (acre-feet)	Authorized Date for Completion
Fairview Creek	S-71436	S-53272	90061	Maintain a reservoir for wildlife habitat, recreation and aesthetics	3/26/1991	1.24	--	N/A
						0.5	--	
					4/12/1991	0.74	--	
Fairview Creek	R-71435	R-12301	90062	Storage in Fairview Reservoir for wildlife habitat, recreation and aesthetics	3/26/1991	--	291	N/A

This page intentionally left blank.

Aquatic Resource Concerns

OAR 690-086-140(5) requires municipal water suppliers to identify the following for each of its water sources:

1. Any listing of the source as water quality limited (and the water quality parameters for which the source was listed)
2. Any streamflow-dependent species listed by a state or federal agency as sensitive threatened or endangered that are present in the source
3. Any designation of the source as being in a critical groundwater area

The City's municipal water source is groundwater, and as such, the source has no 303(d) water quality limitations identified by the Oregon Department of Environmental Quality (DEQ) and no listed species identified by state or federal agencies. The City's groundwater source is not in a designated critical groundwater area.

The City's non-municipal water source is Fairview Creek, a tributary of the Columbia River Slough. Both Fairview Creek and the Columbia River Slough are listed as 303(d) water quality limited by DEQ. Fairview Creek is listed as 303(d) water quality limited for phosphorus (year-around), temperature (spring and summer), and *E. coli* (summer). Columbia River Slough are listed as 303(d) water quality limited by DEQ. Fairview Creek is listed as 303(d) water quality limited for: chlorophyll-a (spring, summer, and fall), DDT metabolite, dissolved oxygen (year around), dioxin, fecal coliform (fall, winter, and spring), flow modification, iron (year around), lead (year around), manganese (year around), phosphorus (spring, summer, and fall), phosphorus (spring, summer, and fall), and temperature (spring, summer, and fall). **Exhibit 2-16** shows the listed fish species in the lower Columbia River, including the mainstem Columbia River and the Fairview Creek drainages.

Exhibit 2-16. Listed Fish Species in the Lower Columbia River, Mainstem Columbia River, and Fairview Creek Drainages[1].

Species	Common Name	Evolutionarily Significant Unit (ESU) (if applicable)	Federal Listing	State Listing
Oncorhynchus tshawytscha	Chinook	Lower Columbia River ESU	Threatened	Sensitive "Critical" (Fall Run)
Oncorhynchus mykiss	Steelhead	Lower Columbia River ESU	Threatened	Sensitive "Critical" (Winter Run)
Oncorhynchus keta	Chum	Columbia River – Oregon ESU	Threatened	Sensitive "Critical"
Oncorhynchus clarkii	Coastal Cutthroat Trout	Southwestern Washington/Columbia River ESU		Sensitive "Vulnerable"
Oncorhynchus kisutch	Coho	Lower Columbia River ESU	Threatened	Endangered
Lampetra richardsoni	Western Brook Lamprey	--		Sensitive "Vulnerable"
Lampetra tridentate	Pacific Lamprey	--		Sensitive "Vulnerable"
Thaleichthys pacificus	Pacific Eulachon	Southern DPS, Northern Oregon and Washington	Threatened	

[1] The fish species listed in this exhibit are from all of the sources combined, such that not all of the species listed are found in each source.

Sources:
Federal ESA listed species (T&E), from NOAA Fisheries Office of Protected Resources: http://www.nmfs.noaa.gov/pr/species/esa/fish.htm
Federal Sensitive species, from the Interagency Special Status/Sensitive Species Program for Oregon and Washington State: http://www.fs.fed.us/r6/sfpnw/issssp/agency-policy/
Oregon State ESA listed species, from the Oregon Department of Fish & Wildlife: http://www.dfw.state.or.us/wildlife/diversity/species/threatened_endangered_candidate_list.asp
Oregon State Sensitive Species, from the Oregon Department of Fish & Wildlife: http://www.dfw.state.or.us/wildlife/diversity/species/sensitive_species.asp
Federal Species of Concern, from the U.S. Fish & Wildlife Service, Oregon Fish & Wildlife Office: http://www.fws.gov/oregonfwo/Species/Data/PacificLamprey/default.asp

Evaluation of Water Rights/Supply

OAR 690-086-0140(3)

As described above, the City currently appropriates groundwater primarily from the SGA to meet its municipal demands, and lesser quantities from the TSA for emergency back-up supply purposes. The SGA is a deep, relatively productive, regional aquifer in the Portland basin. An evaluation of this aquifer, based on reported static water levels, indicates that groundwater levels in the SGA are relatively stable. Further, although some well-to-well interference can occur when other water providers pump their SGA production wells at high rates, such interference at the City's wells has not impacted the City's ability to appropriate groundwater at the rates allowed under the City's water rights. In addition, there is not a history of regulation of groundwater rights in this aquifer.

The TSA is a shallower aquifer in this area. Because of lower productivity and poorer water quality, the TSA is not used as a primary source of supply for the City. The TSA has not experienced static water level declines or well-to-well interference. There is not a history of regulation of water rights from this aquifer.

Both aquifers, therefore, can provide a reliable source of supply, although the City will continue to use the TSA aquifer (under Certificate 74803) as a backup water supply source for the SGA aquifer.

Given the reliability of the TSA and SGA, the City's water right certificates authorizing the use of groundwater from these aquifers are expected to provide a reliable source of water supply. However, the water rights and infrastructure related to use of these aquifers do have some limitations.

The City's Permit G-7029 authorizes appropriation of up to 2.2 cfs of groundwater from the SGA. As previously described, this aquifer is reliable, but Well 6 has water quality problems. In addition, the City's use of water under this permit currently is limited to 0.76 cfs because of a condition of the final order granting an extension of time for this permit. To obtain access to additional supply under this permit, OWRD must grant access to the water in a final order approving the City's WMCP.

The City's Certificate 87104 authorizes the use of up to 2.2 cfs of groundwater from the SGA using Wells 5 and 9. However, Certificate 87104 limits appropriation from Well 5 to up to 1.62 cfs. Because of interference between Wells 5 and 9, which are located close together, the City can only operate one of these wells at a time.

Certificate 87103 also authorizes the appropriation of groundwater from Well 9 at a rate of up to 1.0 cfs. Well 9 has the capacity to produce water at the combined maximum authorized rate of 3.2 cfs for Certificates 87103 and 87104, but to reduce the rate of bio-fouling at the well, the City typically operates the well at a rate of approximately 1.78 cfs.

Finally, the City also holds a groundwater registration (GR-363) claiming the use of 100 gpm (0.22 cfs) of groundwater from Well 1, which appropriates water from either the Unconsolidated Sedimentary Aquifer and/or the TGA. The City currently does not use this source, part because of concerns about water quality from a shallow, unconfined aquifer.

Further, the City will not have certainty about this supply until the claimed right is adjudicated. Because there is a possibility that the registration could be confirmed at a lower rate, there is some risk associated with relying on the groundwater registration.

System Description

OAR 690-086-140(8)

The City operates a public drinking water system (Public Water System Identification Number 4100296) and a schematic of that system is presented in **Exhibit 2-1**. The City's water source is groundwater from the SGA and TSA of the Lower Troutdale Formation. The City actively operates five wells. **Exhibit 2-17** describes the location, aquifer, depth, and year completed of the City's wells.

Exhibit 2-17. Municipal Well Characteristics.

Well (Well Log #)	Location	Lower Troutdale Formation Aquifer	Depth	Year Completed
Well 5 (MULT 1368)	48 First Street	Sand and Gravel	360	1973
Well 6 (MULT 1357)	225 Crestwood Street	Sand and Gravel	322	1977
Well 7 (MULT 53960)	21601 NE Halsey Street	Troutdale Sandstone	380	1997
Well 8 (MULT 66769)	4111 NE Blue Lake Road	Sand and Gravel	421	2002
Well 9 (MULT 102164)	48 First Street	Sand and Gravel	574	2010

Water from the wells in the SGA is treated at the wellhead with sodium hypochlorite. Water from Well 6 historically has had PCE and EDB concentrations that exceeded the EPA primary drinking water MCL. Given that there is no treatment currently in place to remove PCE and EDB, Well 6 cannot be used when contaminant concentrations exceed the MCL, and the City does not currently operate Well 6 for this reason. Well 7, the only well in the TSA, has high iron and manganese levels, such that it requires treatment. However, Well 7 currently has no treatment in place. All wells are metered.

The City's wells pump water into the distribution system, which consists of two pressure zones, and fill the City's three reservoirs. The City's total reservoir capacity is currently 6.2 MG. All of the City's reservoirs are welded steel and are located on the south side of the City. Reservoirs 1 and 3 are in the lower service level and Reservoir 2 in the upper service level. The City relies on a single booster station to pump water from the lower to the upper service level. A standby generator located within the pump station has the capacity to power all pumps and equipment at full load for 24 hours.

Exhibit 2-18 and **Exhibit 2-19** provide more details about the City's reservoirs and pump stations, respectively. **Exhibit 2-20** shows a breakdown of the City's pipelines by pipe diameter.

Exhibit 2-18. Summary of System Reservoirs.

Reservoir	Location	Volume (MG)	Completion Date
Reservoir 1	21601 NE Halsey St.	1.0	1977
Reservoir 2	23050 NE Glisan St.	2.0	1997
Reservoir 3	21601 NE Halsey St.	3.2	2005
Total		6.2	

Exhibit 2-19. Summary of System Pump Station.

Name	Location	# Pumps	Horsepower (hp)	Flow (gpm)
Booster Station 1	Reservoirs 1 and 3	2	20 hp (each)	500 (each)

Exhibit 2-20. Summary of System Pipelines.

Pipe Diameter (inches)	Total Length (feet)	Percent of Total Pipeline (%)
1	205	0.2
2	725	0.6
4	2,525	2.1
6	23,665	19.4
8	30,360	24.8
10	27,245	22.3
12	34,180	28.0
16	3,365	2.8
20	15	0.0
Total	122,285	100.0

This page intentionally left blank.

SECTION 3

Water Management and 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.

Current Conservation Measures

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

Progress Report

This is the City's second WMCP. OWRD approved the first WMCP in November 2006. **Exhibit 3-1** summarizes the actions described in the WMCP approved in 2006 plan and the City's progress toward implementing the actions.

Current Conservation Measures

Since approval of its WMCP approved in 2006, the City has continued to implement water management and conservation measures as staff and funding allowed. The following is a summary of some of the measures the City is implementing to promote water management and conservation:

- The City conducts annual water audits
- The City installs new automatic meter reading technology (AMR) meters, which provide an alert if water flows through the meter continuously for 24 hours. This allows the City to alert customers about leaks on the customer's side of the water meter.
- The City has periodically tested 5/8-inch and ¾-inch meters that were 15 years or older, and tests the 2-inch and larger meters every 2 years.
- The City bills its customers based in part on the quantity of water metered at the service connection.
- The City bills its customers on a monthly basis and includes historical water use information on the bill.
- The City has presented conservation programs to schools and has a groundwater model that it uses to demonstrate the interconnection between surface water and groundwater.
- The City has distributed water conservation information at the Summer on the Green Festival, and provides water conservation information on its Web site.
- The City provided indoor and outdoor conservation kits to its customers.

The City did not implement several measures as a result of budget and staffing constraints, such as offering free irrigation audits, providing workshops for property manager and tenants, analyzing the potential for non-potable water supply for park irrigation, and developing savings estimates for the City's conservation projects.

Exhibit 3-1. Progress Report on Conservation Measures.

Conservation Measure	Benchmarks (Conservation Projects) in approved 2006 Plan	Current Status
Required Conservation Measures		
Annual Water Audit	Prepare an annual water audit	Since 2011, the City has prepared an annual water audit (except in 2012) comparing the quantity of water pumped into its system with the metered water use by its customers.
System Metering	No benchmark	The City's system is fully metered.
Meter testing and Maintenance	Document age and condition of all customer meters	The City tested periodically 5/8-inch and ¾-inch meters that were at least 15 years old. The City tests 2-inch and larger meters every 2 years.
Rate Structure	Have a contractor conduct a feasibility analysis of inverted block rates and seasonal block rates Analyze consumption-based sewer rates as a potential incentive to conserve water	The City has discussed these block rates, but has not had funding to conduct a feasibility study. The City does not have staff time or budget available to analyze these rates.
Leak detection program	Hire a contractor to conduct leak detection work.	The City has hired a contractor and has focused on the oldest portion of town in its effort to identify leaks. No leaks were identified.
Public education	Rejoin the Regional Water Providers Consortium (RWPC) Put conservation information on its Web site Distribute water conservation material at the Summer on the Green Festival Include water conservation articles in the City's newsletter Translate conservation brochures into Spanish	The City was a member of RWPC from 1996-2012. The City has posted water conservation information of its Web site. The City provides conservation information annually at the Summer on the Green Festival. The City includes articles on conservation in its quarterly newsletter. Limited staff time has prevented the City from completing this benchmark to date.
Additional Conservation Measures		
Leak detection and pipeline repair and replacement	See leak detection benchmark above	See above
Technical and financial assistance	Conduct four workshops for property managers and tenants Irrigation audits Staff training regarding commercial, industrial and institutional conservation	The City has not conducted these workshops because of budget and staffing constraints. The City did not offer irrigation water audits because of staffing constraints. City staff members attended conferences, such as AWWA conferences, that included conservation education.
Supplier financed retrofit/replacement of inefficient fixtures	Provide indoor and outdoor water conservation kits to City residents Analyze potential to retrofit Community Park irrigation system with an evapotranspiration (ET) system	The City distributed its entire supply of indoor and outdoor conservation kits. The City considered installation of an ET system at the park, but decided not to include the system.
Water rate and billing structure	No benchmark provided	The City bills its customers on a monthly basis and provides information about historical water use in each bill
Reuse, recycling, and non-potable water supply	Analyze potential for non-potable water use in City parks	The City has not completed this analysis because of budget and staffing constraints.
Other conservation measures	Develop water savings estimates for the City's conservation projects using ConEAST software	Because of budget and staffing constraints, the City did not develop these cost savings estimates.

This page intentionally left blank.

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 using totalizing flow meters located in each well house. Instantaneous rate and volume data from the meters are transferred to the City's SCADA system via telemetry. Production data are summarized on a monthly basis.

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/

Required Conservation Programs

OAR 690-086-0150(4)

OAR 690-086-0150(4) requires that all water suppliers establish 5-year benchmarks for implementing the following water management and conservation measures:

1. Annual water audit
2. System-wide metering
3. Meter testing and maintenance
4. Unit-based billing
5. Leak detection and repair (if system leakage exceeds 10 percent)
6. Public education

Five-Year Benchmarks for Required Conservation Measures

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:

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, metered or estimated. The water audit also includes analysis of the water supplier's own water use.

   The City has conducted annual water audits since 2011, excluding 2012 when the City experienced a loss of data from June through August 2012. The results of the water audits during this period have, however, indicated that the amount of billed water consumption exceeded the amount of water produced. As described in Section 2, this resulted in negative unaccounted-for water each. System leakage is not a plausible cause of the negative unaccounted-for water given the lack of leaks detected in recent pipeline surveys and valve checks, the young age of the pipes, field observations, and the fact that leakage would have had the opposite effect on the City's unaccounted-for water. Given the City has no unmetered authorized uses and is unaware of any unmetered or unauthorized connections, the City has

concluded that its unaccounted-for water is primarily the result of accounting errors. Specifically, the City believes that the negative unaccounted-for water stems from its new billing software having accounting errors that inflated metered consumption in some customer accounts and from the timing of SCADA data reporting for a given month not aligning exactly with metered consumption reporting. As described in Section 2, the City conducted an in-depth investigation of its billing software in November 2016, after initial review of the WMCP by OWRD, and identified numerous accounts with accounting errors.

The City plans to conduct a monthly water audit going forward to determine whether the City's heightened scrutiny of its billing software and improved recording of metered consumption resolves the negative unaccounted-for water issue. Furthermore, the City plans to synchronize SCADA system demand data collection with meter reading/billing dates. The City also plans to hold training sessions administered by the City's AMR supplier to ensure accurate and consistent data collection and reporting. If the negative unaccounted-for water persists, then the City will analyze its process of calculating daily demand, which considers well production, and the filling and draining of Reservoir 2 (Glisan).

Additionally, the City is considering how to best classify several City accounts to improve water auditing.

Five-Year Benchmarks:

- In the next year, the City will synchronize SCADA system demand data collection with meter readings/billing dates. The City will also investigate the translation of data between AMR meters and Incode, as well as other aspects of the AMR system to rule out data issues related to the AMR system. Specifically, the City will hold training sessions administered by the City's AMR supplier to ensure accurate and consistent data collection and reporting.
- In the next year, the City will begin to conduct monthly water audits to determine whether the City's heightened scrutiny of its billing software and improved recording of metered consumption resolve the negative unaccounted-for water issue.
- The City will annually report to OWRD on the progress in resolving the negative unaccounted-for water until the issue is resolved.
- If the negative unaccounted-for water persists after two years, then the City will analyze its process of calculating daily demand, which considers well production, and the filling and draining of Reservoir 2 (Glisan).
- In the next year, the City will investigate how to best classify several City accounts to improve water auditing.
- In the next year, the City will consider transferring the responsibility of taking meter readings for RWPUD customers in City limits to the RWPUD, which will simplify the City's water audit.

2. System-wide Metering.

The City's water system is fully metered. City facilities, such as City Hall and public parks are fully metered, but are not charged for water service.

Five-Year Benchmarks:

- The City will continue to require all new connections to the water system to be metered.

3. Meter Testing and Maintenance.

The majority of the customer meters within the City's water supply system have been installed since 1995, when a significant amount of new construction occurred within the City. Nonetheless, the City has developed a method for documenting the age and condition of customer meters. The City has a systematic program for conducting meter testing. For 5/8-inch and ¾-inch meters, the City has periodically tested meters that are 15 years or older, and repaired or replaced meters as needed. Generally, the meters were found to be accurate. For 2-inch and larger meters, the City tests the meters every other year. The City calibrates its production meters annually.

In addition, during the last 3 years, the City has installed AMR and digital meters.

Five-Year Benchmarks:

- During the next 2 years, the City will develop a replacement program for meters within its system that are 20 to 25 years old.
- The City will continue testing 2-inch and larger meters every other year.

4. Water Rate Structure.

The City bills its customers based in part on the quantity of water used. The City's water rate structure includes a base charge based on meter size, plus a charge for each unit of water used. (Customers outside the City are charged a higher base charge.) **Exhibit 3-2** describes these rates. The City has discussed the feasibility of enacting inverted block rates and seasonal block rates, but limited staff time has precluded an in-depth study of these rate structures to date.

Exhibit 3-2. Monthly Service and Consumption Charges, as of January 1, 2016.

Meter Size (inches)	Base Charge		Water Use Charge (per 100 cubic feet)
	Inside the City	Outside the City	
3/4	$18.30	$27.45	$2.12
1.0	$26.66	$39.99	
1.5	$50.50	$75.75	
2.0	$83.82	$125.73	
3.0	$179.47	$269.21	
4.0	$313.18	$469.77	
6.0	$695.09	$1,042.64	
8.0	$1,000.95	$1,501.43	

Five-Year Benchmarks:

- The City will continue to charge its customers based in part on the quantity of water being used.

5. Leak Detection Program.

OWRD requires municipal water providers to have a regularly scheduled and systematic program to detect leaks when system leakage is above 10 percent. The results of the City's water audits show the amount of billed water consumption exceeded the amount of water produced (i.e. negative unaccounted-for water), which the City believes is the result of accounting errors, not system leakage. Although the City is unable to provide a value for a system leakage at this time, the City believes its system leakage is well under the 10 percent goal set by OWRD based on the results of the leak detection surveys, the relatively young age of the pipes, and field observations by City staff.

The City has hired contractors to conduct leak detection work on the City's distribution system. During the past 5 years, the City's contractor has conducted leak detection work in the oldest section of the City where leaks were most likely. No leaks were identified. The remainder of the City's pipelines are relatively new, and as such, leaks are unlikely.

City staff conducts visual inspections while in the field to monitor for leaks on an ongoing basis. When a leak is discovered by City staff or reported to the City by its customers, City staff members repair the leak immediately.

To encourage customers to promptly conduct repairs on their side of the meter, the City provides a credit to their water bill. When customers demonstrate that a leak has been promptly repaired, the City can bill the customer based on their monthly usage from the previous year, rather than for the increased amount of water metered caused by the leak.

Five-Year Benchmarks:

- The City will continue to promptly repair leaks when they are detected and to provide a credit to customers who promptly repair leaks on their side of the meter.
- Within 2 years, the City will develop and submit to OWRD a leak detection program to be implemented if not successful in addressing the negative unaccounted-for water issue within 5 years and/or if unaccounted-for water is determined to be greater than 10 percent.

6. Public Education.

The City has a public education program that includes a number of elements. The City created a water conservation web page on the City's Web site. The conservation information on the web page is rotated so that it is relevant to the current season. The web page also provides information about the Regional Water Providers Consortium (RWPC) and a link to its Conserveh2o water conservation Web site. Finally, information is provided about the availability of conservation kits.

The City also provides water conservation information via community events and its newsletter. Conservation brochures and conservation kits have been distributed annually at the Summer on the Green Festival. Conservation articles are included in the City's quarterly newsletter, which is mailed to residences and businesses in the City and is available at the library and at City Hall.

The City has partnered with the Audubon Society to promote the Audubon Society's Backyard Habitat Certification Program, which provides assistance and incentives to residents to restore native wildlife habitat in their yards. The program focuses on removal of aggressive weeds, landscaping using native plants, storm water management, and wildlife stewardship. Landscaping with native plants adapted to the local climate reduces the need to irrigate.

The City became a member of the RWPC in 1996 and ended its membership in 2012 when the RWPC diversified focus to also encompass resiliency and regional coordination.

Five-Year Benchmarks:

- The City will continue to include conservation information on its Web site, and in the City newsletter.
- The City will continue to promote the Backyard Habitat Certification Program as a means to reduce irrigation in the peak season.
- During the next 5 years, the City will have a booth at a minimum of one community event annually, such as the Summer on the Green Festival, and will distribute 200 conservation brochures.
- During the next 5 years, the City will work with high school Spanish students to have its conservation brochures translated into Spanish, which will make this conservation information more easily available to a portion of the City's customers.
- During the next five years, the City will contact elementary schools to determine ways that the City can support water conservation education.

Expanded Use under Extended Permits

OAR 690-086-0150(5)

Under OAR 690-086-0150(5), any municipal water supplier that proposes to expand or initiate the diversion of water under an extended permit for which resource issues have been identified shall include a description of activities and 5-year implementation schedule for a system-wide leak repair or line replacement program to reduce system leakage to no more than 15 percent. The City is proposing to expand the appropriation of water under *extended permit* G-7029; however, no resource issues have been identified for this water right.

Additional Conservation Measures

OAR 690-086-0150(6)

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

The City serves a population greater than 1,000 and proposes to initiate diversion of water under *extended permit* G-7029. As a result, the City is required to provide activities and 5-year benchmarks related to the following additional measures:

1. Leak repair or line replacement program
2. Technical and financial assistance programs
3. Supplier financed retrofit or replacement of inefficient fixtures
4. Rate structure and billing practices that encourage conservation
5. Water reuse, recycling, and non-potable opportunities
6. Other conservation measures

A summary of the City's 5-year benchmarks for additional conservation measures is provided below.

1. Leak Repair or Line Replacement Program

Under this requirement, in addition to detecting leaks, the City must implement a system-wide leak repair program or line replacement program to reduce system leakage to 15 percent, and if feasible to 10 percent. Currently, the City cannot determine its unaccounted-for water, or the subset of system leakage, because its water audits indicated that the amount of billed water consumption exceeded the amount of water produced. As described above, the City believes the errors are a result of problems with its billing system and that system leakage is well below the 10 percent goal set by OWRD.

Nonetheless, as described above, the City has a program to promptly repair leaks when they are identified. The City also provides a bill credit to customers that repair leaks that are identified on their side of the meter.

Five-Year Benchmarks:

- Within 2 years, the City will develop and submit to OWRD a leak detection program to be implemented if not successful in addressing the negative unaccounted-for water issue within 5 years and/or if unaccounted-for water is determined to be greater than 10 percent.

2. Technical and Financial Assistance Programs

The City has provided indoor and outdoor conservation kits to its customers. These kits included a number of items intended to provide customers with technical assistance, including 5-minute shower timers, leak detection dye tablets, watering gauges, hose timers, perennial seed packets, and information about outdoor water conservation.

Five-Year Benchmarks:

- During the next 5 years, the City will distribute 200 indoor and outdoor conservation kits annually (100 each) to its customers. The kits will include conservation items that provide its customers with technical assistance, such as leak detection dye tablets, watering gauges, hose timers, and information about outdoor conservation.
- During the next 5 years, the City will evaluate the feasibility of purchasing software that would allow customers to log onto a Web site to view their daily water consumption. Access to this information would allow customers to more easily identify whether they have a leak.

3. Supplier-Financed Retrofit or Replacement of Inefficient Fixtures

The indoor and outdoor conservation kits that the City has distributed included a number of items that replace inefficient fixtures. These items include water efficient shower heads, kitchen and bathroom faucet aerators, and hose nozzles.

The City also analyzed the potential to install an evapotranspiration (ET) system in Community Park. Ultimately, the City decided not to install the ET system. After consideration, the City concluded that the better option would be to investigate use of a rain gauge that would deactivate the park's irrigation system.

Five-Year Benchmarks:

- During the next 5 years, the City will distribute 200 indoor and outdoor conservation kits annually (100 each) to its customers. The kits will include conservation items that allow its customers to replace inefficient fixtures, such as water-efficient shower heads, kitchen and bathroom faucet aerators, and hose nozzles. The target population for these items will continue to be residents living in the older portion of the City because newer homes already have efficient fixtures. The kits will be available at City Hall and will be provided at the Summer on the Green Festival.

4. Rate Structure and Billing Practices that Encourage Conservation

The City's rate includes a charge based on water usage. As a result, the City's rate structure encourages conservation. The City also bills its customers on a monthly basis, which provides customers with relatively quick feedback on water usage. Customers' bills also show historical water use to help customers understand how much water they are using from month-to-month.

Five-Year Benchmarks:

- The City will continue to charge based in part on the amount of water used, and will bill customers on a monthly basis and based in part on the quantity of water metered at the service connection.
- The City will continue to provide information about the customer's historical water use.
- In the next 5 years, the City will conduct a more thorough evaluation of the feasibility of using inverted block rates and seasonal block rates.

5. Water Reuse, Recycling, and Non-potable Opportunities

Currently, the City does not have a water reuse, recycling, or non-potable program.

Five-Year Benchmarks:

- During the next 5 years, the City will investigate the ability to store stormwater from Fairview Creek to use for park irrigation purposes.

6. Other Conservation Measures

In addition to the conservation measures described above, the City will seek other opportunities to improve water use efficiency.

Five-Year Benchmarks:

- During the next 5 years, the City will investigate the opportunity to hire an intern to promote xeriscaping.

SECTION 4

Municipal Water Curtailment Plan

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

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

Introduction

Water curtailment plans are intended to reduce the impacts of water supply shortages and to ensure water supply for public health and safety during short-term water supply shortages. Water curtailment plans outline proactive measures that water suppliers may take to reduce demand during water supply shortages of varying intensity.

History of System Curtailment Episodes

OAR-690-086-0160(1)

The City has not experienced a supply deficiency during the past 10 years that required it to implement curtailment. The City's water supply and distribution system has been sufficient to meet water demands. A drought situation is not expected to affect the City's water supply because the City has deep groundwater wells, but a severe, multi-year drought could require the City to implement some stage of curtailment. In the event of a source water shortage cause by such events as contamination, natural disaster, or deliberate sabotage, the City has an Emergency Response Plan that describes procedures that the City will follow to respond to specific emergency events.

Curtailment Event Triggers and Stages

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

The City has a four-stage curtailment plan that it will implement if a water supply shortage requires water curtailment. Causes of a water supply shortage could include: failure of a component of the water system, natural disasters (fires, flooding, landslides, and earthquakes), prolonged droughts, source water contamination, and malevolent acts. The four stages of curtailment are intended to be implemented in progressive steps. The curtailment stages include both voluntary and mandatory rationing, and the type of rationing will depend on the cause, severity, and anticipated duration of the water shortage.

The City's four curtailment stages and their potential initiating conditions (i.e., triggers) are presented in **Exhibit 4-1**. The City's initiating conditions focus on the percentage of available water supply capacity, but also include other supply shortage initiating conditions.

Exhibit 4-1. Curtailment Stages 1 through 4.

Curtailment Stages	Potential Initiating Conditions
Stage 1: Water Shortage Advisory	• Water consumption reaches 85 percent of available capacity for 3 consecutive days. • Minor damage to a part of the water system. • Minor mechanical problems in part of the water system.
Stage 2: Moderate Water Shortage Alert	• Water consumption reaches 90 percent of available capacity for 3 consecutive days. • Failure of a minor part of the water system. • A criminal act that causes minor damage to the water system.
Stage 3: Severe Water Shortage Alert	• Water consumption reaches 95 percent of available capacity for 3 consecutive days. • A loss or complete malfunction of the groundwater source that causes a water shortage. • Failure of a major part of the water system. • A criminal act that damages a critical water system facility. • Isolated contamination of the water supply. • Severe, prolonged drought that significantly affects well yield.
Stage 4: Water Shortage Emergency	• Water consumption reaches 100 percent of available capacity for one day. • Major water system damage or contamination due to a natural disaster (i.e., geologic event, flood, storm), fire, or criminal act. • Failure of an essential part of the water system. • Significant contamination of wells or the water supply in the water system.

Authority and Enforcement

The Public Works Director has the authority to activate and to end water curtailment stages. The Public Works Director also has the authority to provide exceptions to implemented water curtailment measures, if the exception is found to be in the public interest and required to protect public health, safety, and welfare. An exception must be in writing and must describe the circumstances under which the exception is being given.

Mandatory curtailment measures will be enforced using one or more of the following depending on the number of citations and type of violation: issuance of a letter of warning, issuance of municipal court citations and fines, installation of a flow restrictor on the City side of the customer's water meter, and termination of water service. The Public Works Director has authority to take other such actions as deemed appropriate.

Curtailment Plan Implementation

OAR-690-086-0160(4)

Stage 1: Water Shortage Advisory

Stage 1 is activated when the City expects consumption of 85 percent of supply capacity to continue for 3 consecutive days, or when the water system experiences minor damage or

mechanical problems. The City expects consumption to exceed 85 percent or more of supply capacity only when unanticipated loss of supply occurs. Under Stage 1, the City will ask customers to voluntarily decrease indoor and outdoor water use.

The City will notify customers of Stage 1 activation through one or more of the following methods: the City's Web site, a direct mailing with water bills, a special mailing, door hangers, television, and radio stations. The notification will include indoor and outdoor water conservation recommendations.

In addition, the City will ask the City's staff to voluntarily reduce water use for street sweeping, hydrant flushing, pipeline flushing, and irrigation of large turf areas.

Stage 2: Moderate Water Shortage Alert

Stage 2 is activated when the City expects consumption of 90 percent of supply capacity to continue for 3 consecutive days, or experiences a failure of a minor water system component or water system damage from a malevolent act. Under Stage 2, the City will ask customers to take one or more of the following voluntary actions to curtail water use:

- Limit watering of annual or non-woody plants, lawns, parks, golf course fairways, play fields, and other recreational areas to at most every other day.
- Postpone expanding nursery facilities, placing new irrigated agricultural land in production, or planting of landscaping except when required by the site design review process.
- Reduce use of water for dirt controller compaction.
- Reduce use of water for washing sidewalks, walkways, driveways, parking lots, tennis courts, or other hard-surfaced areas.
- Postpone non-commercial washing of motor and other vehicles if health and safety are not concerns.
- Serve water in restaurants, clubs, or eating places only upon customers' request.
- Limit flushing of gutters or allowing water to run or accumulate in any gutter or street.
- Limit washing down of buildings or structures for purposes other than immediate fire protection.
- Limit filling of fountains, reflecting pools, and artificial waterfalls.
- Reduce filling of scenic and recreational ponds and lakes, except for filling necessary to support fish and wildlife.

The City's announcement of Stage 2 will be widely distributed to water users following such approaches as those described for Stage 1. In addition to the information provided in Stage 1, Stage 2 announcements will emphasize the specific types of water use reductions requested.

The City also will ask the City staff to limit use of fire hydrants to essential firefighting purposes and postpone flushing of sewers and hydrants, except as needed to ensure public health and safety.

Stage 3: Severe Water Shortage Alert

Stage 3 is activated when the City expects consumption of 95 percent of supply capacity to continue for 3 consecutive days, or experiences a loss or complete malfunction of the groundwater source causing a water shortage; failure of a major part of the water system; a criminal act that damages a critical water system facility; isolated contamination of the water supply; or severe, prolonged drought that significantly affects well yield. Under Stage 3, the City will ask customers to take one or more of the following mandatory actions to curtail water use:

- Cease outdoor irrigation, with the exception of minimal watering for vegetable gardens, tree and woody plant survival, production of food and fiber or maintenance of livestock, establishing or maintaining revegetation or landscape plantings required pursuant to law or regulation, commercial nursery stock maintenance, plants of significance in public gardens.
- Reduce all non-essential water use in dwellings, commercial and religious establishments, and schools.
- Not expand nursery facilities, placing new irrigated agricultural land in production, or planting of landscaping except when required by the site design review process.
- Cease use of water for dirt controller compaction.
- Cease use of water for washing sidewalks, walkways, driveways, parking lots, tennis courts, or other hard surfaced areas.
- Cease non-commercial and commercial washing of motor and other vehicles, except when needed to maintain health and safety.
- Serve water in restaurants, clubs, or eating places only upon customers' request.
- Cease flushing of gutters or allowing water to run or accumulate in any gutter or street.
- Cease washing down of buildings or structures for purposes other than immediate fire protection.
- Cease filling of fountains, reflecting pools, artificial waterfalls, and swimming pools.
- Cease filling of scenic and recreational ponds and lakes, except when necessary to support fish and wildlife.

The City's announcement of Stage 3 will be widely distributed to water users following such approaches as those described for in Stage 2. In addition to the information provided in Stage 2, Stage 3 announcements will emphasize that non-essential outdoor water use is prohibited.

The City also will notify RWPUD and the Cities of Wood Village and Troutdale about opening the intertie to supplement City water supply if the water supply emergency cannot be resolved.

Stage 4: Water Shortage Emergency

Stage 4 is activated when the City expects consumption of 100 percent of supply capacity to continue for 1 day, or experiences major water system damage or contamination because of a natural disaster, fire, or criminal act; failure of an essential part of the water system; or significant contamination of wells or the water supply in the water system. In addition to curtailment actions under Stage 3, the City will ask customers to take the following mandatory actions to curtail water use under Stage 4:

- Limit water use to only those uses necessary to protect public health and safety.
- Cease outdoor irrigation.

The City's announcement of Stage 4 will be widely distributed to water users following such approaches as those described for Stage 3. In addition to the information provided in Stage 3, the City may use automated "robo-calls" to inform customers of Stage 4 activation.

The City will ask the City staff to restrict water use to those uses necessary to maintain public health and safety, to allow firefighting, and to enable water hauling for domestic use when other water sources are not available.

This page intentionally left blank.

SECTION 5

Water Supply

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

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

Delineation of Service Areas

OAR 690-086-0170(1)

The City's future growth area is constrained by the adjacent Cities of Gresham, Wood Village, and Troutdale and by development restrictions in place for conservation land and/or designated parks located within city limits (i.e., the City's corporate boundary). Consequently, the City's future water service area for at least the next 20 years will not differ from its current water service area. **Exhibit 2-1** shows the City's current (and future) water service area.

Population Projections

OAR 690-086-0170(1)

The City projects that the population of its future water service area will reach 8,856 in 2025 and 9,875 in 2035, as shown in **Exhibit 5-1**. These population projections were developed by applying the average annual population growth rate of 1.3 percent, which was the City's average annual growth rate from 2000 through 2014, to the City's 2014 baseline population of 7,735. The population was grown until the projected population reached the buildout population of 10,487, which was projected to occur in 2041 (in 27 years). The buildout population was estimated by multiplying the 4,178 estimated residential equivalent dwelling units (EDU) at buildout by the City's 2010 U.S. Census average household size of 2.51. (The 4,178 EDU consists of 3,054 residential EDUs as of 2014 plus 1,124 EDUs estimated to still be available within City limits based on developable lands zoned as residential.)

Exhibit 5-1. Population Projections.

Year	Population
2025	8,856
2035	9,875
2041 (Buildout)	10,487

Demand Forecast

OAR 690-086-0170(3)

The City developed its 10- and 20-year MDD projections by separately analyzing projected residential MDD and commercial MDD, then summing the two MDDs.

The City projected residential MDD by:

1. Subtracting the 2014 baseline residential EDU (3,054) from the residential EDU at buildout in 2041 (4,178) to estimate the number of EDUs to be developed. The year 2014 was used because it represents the most recent residential data.
2. Dividing the number of EDUs to be developed by 27 years to determine the average annual growth of EDUs per year, which is approximately 42 EDU/year (4,178-3,054)/27= 42).
3. Applying the average annual growth of approximately 42 EDU/year to the 2014 baseline residential EDU and then growing the number of residential EDUs through buildout in 2041.
4. Calculating the 2014 MDD per EDU.
    a. Dividing the 2014 residential metered consumption of 199 MG by the number of residential EDUs in 2014 of 3,054 , converting to gallons, and then dividing by 365 days to calculate the 2014 ADD per EDU (178.5 gpd/EDU).
    b. Multiplying the 2014 ADD per EDU by the average MDD:ADD peaking factor from 2009 through 2014 of 2.3, resulting in the 2014 MDD per EDU of 410.6 gpd/EDU (178.5*2.3=410.6). The average MDD:ADD peaking factor from 2009 through 2014 of 2.3 was used because peaking factors varied widely during those years (1.9 to 2.7) and the average was considered a conservative value.
5. Multiplying the 2014 MDD per EDU (410.6 gpd/EDU) by the projected number of residential EDUs in 2025 and 2035 to get the projected residential MDD in 2025 and 2035.

The City projected commercial MDD by:

1. Estimating commercial MDD in 2011:
    a. The City's most recent analysis of the number of developed acres for commercial use within City limits occurred in 2011, which calculated 165.43 acres had been developed.
    b. The City then calculated the daily rate of commercial water consumption per acre in 2011 (approximately 0.0009 mgd/acre) by dividing the total commercial consumption in 2011 of 55.2 MG by the number of acres that had been developed as of 2011 (165.43 acres), and then dividing by 365 days [(55.2/165.43)/365 = approximately 0.0009]. Commercial consumption data from 2011 were used because the most recent land use inventory occurred in 2011.

c. Next, the City determined that the ADD for all of the developed acres in 2011 was approximately 0.15 mgd by multiplying the number of acres developed as of 2011 (165.43 acres) by the daily rate of commercial water consumption per acre in 2011 (0.0009 mgd/acre) (165.43 * 0.0009 = approximately 0.15).

d. The City multiplied the average MDD:ADD peaking factor from 2009 through 2014 of 2.3 by the commercial ADD in 2011 (approximately 0.15 mgd), resulting in a commercial MDD in 2011 of approximately 0.348 mgd in 2011 (0.15 * 2.3 = approximately 0.348).

2. Estimating an annual growth rate in commercial MDD:

   a. The City calculated the annual growth rate in commercial MDD of 0.017 mgd per year by:

      i. Estimating the total number of acres developed for commercial use at buildout to be 574.79 acres by adding the number of acres developed for commercial use as of 2011 (165.43 acres) and the number of acres vacant and re-developable for commercial use as of 2011 (409.36 acres)(165.43 + 409.36 = 574.79).

      ii. Multiplying the daily rate of commercial water consumption per acre in 2011 (approximately 0.0009 mgd/acre) by the total number of commercial acres at buildout (574.79 acres) to get the buildout commercial ADD of approximately 0.53 mgd (0.0009 * 574.79 = approximately 0.53). (Note: The number of vacant commercial acres that cannot be developed because of natural resource (e.g., stream and wetland) protections has not been calculated and subtracted from the total number of vacant commercial acres.)

      iii. Then subtracting the 2011 commercial ADD (approximately 0.15 mgd) from the buildout commercial ADD (approximately 0.53 mgd) and dividing that value by 50, the number of years that the City estimates it will take to reach commercial buildout, resulting in an annual growth rate in commercial ADD of approximately 0.01 mgd per year [(0.53 – 0.15)/50 = approximately 0.01].

      iv. Next, the City multiplied the average MDD:ADD peaking factor from 2009 through 2014 of 2.3 by the annual growth rate in commercial ADD of approximately 0.01 mgd per year, resulting in an annual growth rate in commercial ADD of approximately 0.017 mgd per year.

3. Applying an annual growth rate in commercial MDD of approximately 0.017 mgd/year to the 2011 commercial MDD through buildout in 2041 to get the projected commercial MDD in 2025 and 2035.

In addition, the City developed MDD projections that account for the City's need for process water and the potential effects of climate change on demand. To account for its demand for process water in the demand projections, the City multiplied its projected MDD by 5 percent then added that process water demand value and the projected MDD to obtain the total

MDD. The City's estimate that process water represented an additional 5 percent of total water consumption was based on the past records of process water use.

To consider climate change, the City added a 4 percent demand increase on top of the demand projection including process water. The 4 percent increase is based on the 2002 report developed for the Portland Water Bureau "The impacts of climate change on Portland's water supply: An investigation of potential hydrologic and management impacts on the Bull Run System," which projected that climate change could increase current water demand projections by 4 percent.

After completing its initial demand projections using the above-described process, the City concluded that the resulting projections could be somewhat inflated. As described in Section 2, the City determined that its unaccounted-for water was negative (i.e. metered consumption was greater than demand) due to metered consumption accounting errors stemming from its billing software[3]. Since the City's demand projections are based on its historic metered consumption, the demand projections could be elevated by approximately 20 percent because consumption exceeded production by 20 percent (unaccounted-for water was approximately -20 percent) in 2014. Thus, the City reduced its projected MDD by 20 percent to adjust for the accounting errors.

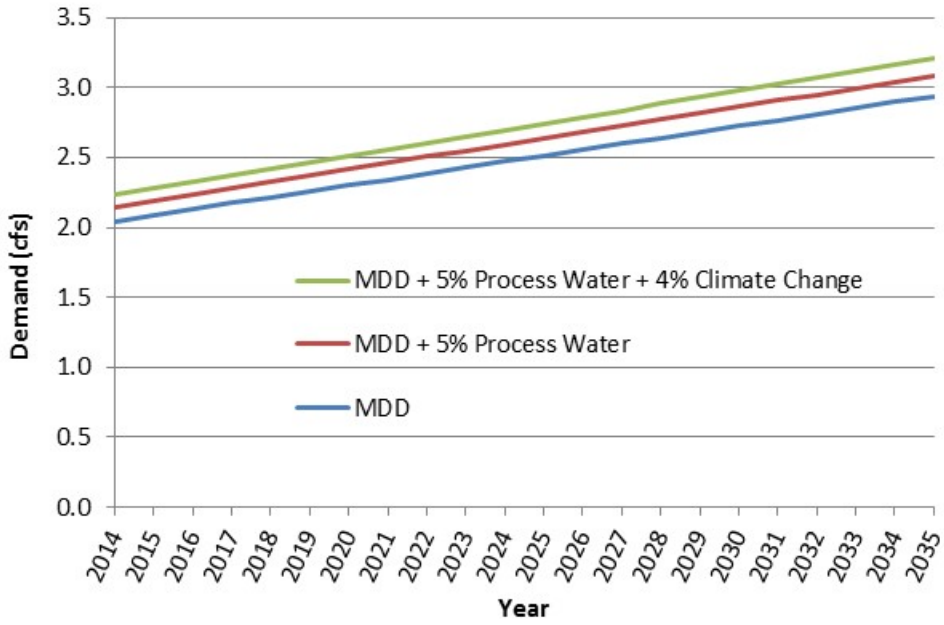
Exhibit 5-2 presents the City's MDD projections through buildout, with and without additional demand associated with process water and climate change. The City's projected MDD with process water is 2.64 cfs (1.71 mgd) in 2025 and 3.08 cfs (1.99 mgd) in 2035. The City's projected MDD with process water and climate change impacts is 2.74 cfs (1.77 mgd) in 2025 and 3.21 cfs (2.07 mgd) in 2035. These projections also are shown in the graph provided in **Exhibit 5-3.**

[3] Following this discovery, the City adjusted the consumption for the errors and issued monetary credits to affected customers.

Exhibit 5-2. Projected Maximum Day Demands.

Year	Residential EDU (units)	Residential MDD (mgd)	Commercial MDD (mgd)	Total MDD (mgd)	Total MDD (cfs)	Total MDD + 5% Process Water (mgd)	Total MDD + 5% Process Water (cfs)	Total MDD + 5% Process Water + 4% Climate Change (mgd)	Total MDD + 5% Process Water + 4% Climate Change (cfs)
2025	3,512	1.44	0.59	1.62	2.51	1.71	2.64	1.77	2.74
2035	3,928	1.61	0.76	1.90	2.94	1.99	3.08	2.07	3.21

Exhibit 5-3. Projected Maximum Day Demands.



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

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

As described in Section 2, the City primarily appropriates its source of water supply under water right certificates 87103, 87104, and 88274. These three certificates authorize total appropriation of up to 5.87 cfs from Wells 5, 8, and 9. Although, the water supply available under certificates 87103, 87104, and 88274 exceeds the City's adjusted projected MDD with 5 percent process water and climate change impacts in 2035 (3.21 cfs), the City needs access to additional water under Permit G-7029 to provide it with sufficient system redundancy, greater capacity, operational flexibility, and resiliency for the its water supply system.

The loss of one of the City's primary wells (Well 5, 8, or 9) would compromise the City's ability to meet system demand; the City has had situations in the past where demand has exceeded capacity when one or more wells have been down for repair. Moreover, under the following conditions, the City's supply would currently be limited to only 1.78 cfs. If Well 8 goes down during the peak season, the City would immediately use only Well 9, because Well 5 cannot be used at the same time as Well 9 and Well 9 is the more productive well. (Additionally, Well 6 has contamination issues that preclude immediate use and Well 7 is currently not connected to the water distribution system due to its low production capacity and poor water quality. Increasing the capacity of Well 7 is not cost-effective for the City.) Recent data and analysis shows that the operational capacity of Well 9 is approximately 800 gpm (1.78 cfs). Well 9 initially had a higher capacity (1,100 gpm), but the ability to sustain that capacity has diminished as a result of biofouling. The City has been monitoring and assessing Well 9 for approximately three years, and the most recent assessment occurred at the end of 2016. The City found that increasing the pumping rate resulted in increased biofouling, and after several iterations of testing determined that the optimal pumping rate to minimize the rate of clogging and degrading of the well from biofouling is 800 gpm. The City has experienced times when it had to rely exclusively on Well 9, and the well is only sufficient to meet the City's current MDD for a short time period.

For this reason, the City is considering development of a new well (Well 10), which would be one of the City's most reliable and best producing wells. The City would locate Well 10 in the upper elevation zone in the system where the aquifer is able to support a well with enough capacity to meet projected demands from this single well, if needed, and the City is able to directly convey water from the well to the distribution system, thereby eliminating the need to rehabilitate the current reservoir in that zone or build a replacement reservoir. (The current reservoir is essentially obsolete given it does not meet modern seismic standards and other construction standards.) The City is considering developing Well 10 in 2017 and adding it as a supply source to *extended permit* G-7029 through a permit amendment. The City also would submit an additional permit amendment to add Well 10 to another existing permit to cover the full capacity of Well 10, thereby increasing operational flexibility.

As stated above in the Demand Forecast, the City's projected MDD with process water and climate change impacts is estimated to be 3.21 cfs (2.07 mgd) in 2035. After adding Well 10 as an authorized point of appropriation for *extended permit* G-7029 through a permit

amendment, the City would have a supply of 2.54 cfs when Well 8 is down (1.78 cfs from Well 9 + 0.76 cfs from Well 10 under *extended permit* G-7029 (currently associated with Well 6) = 2.54 cfs). In 2035, the City would experience a water supply deficit of 0.67 cfs during such an event (3.21 cfs – 2.54 = 0.67 cfs). Based on this scenario, the City would need 0.67 cfs (0.49 mgd) of undeveloped capacity under *extended permit* G-7029 within the next 20 years to provide the needed redundancy and water supply capacity for the City's water supply system. Therefore, the City is requesting access to up to 0.67 cfs of "green light water" under *extended permit* G-7029 to provide needed water supply capacity, redundancy, operational flexibility, and resiliency. The City intends to fully develop the remaining capacity under *extended permit* G-7029 by using the expected additional capacity of Well 10 by 2062 under current projections, or possibly sooner if economic or environmental conditions change.

Alternative Sources

OAR 690-086-0170(5)

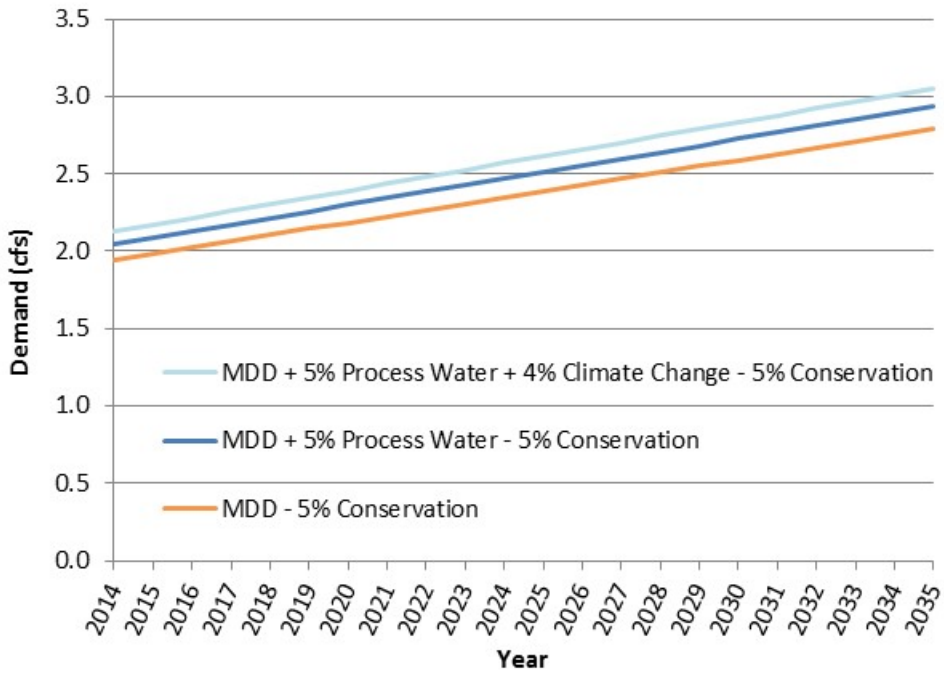
OAR 690-086-0170(5) requires an analysis of alternative sources of water if any expansion or initial diversion of water allocated under existing permits is necessary to meet future water demand. The City intends to begin diverting water under the undeveloped portion of Permit G-7029 to provide water supply redundancy and to improve water supply reliability, as described above.

(a) Conservation Measures

As described in Section 3, the City has numerous water conservation measures to encourage its customers to conserve water, and these measures have contributed to the decreasing trend in MDD during the past 5 years. The City plans to continue implementing its diverse array of water conservation measures.

For demonstration purposes for this WMCP, the City estimated how conservation savings of up to 5 percent could affect the future demand scenarios. **Exhibit 5-4** presents demand projections when 5 percent conservation is achieved annually.

Exhibit 5-4. Projected Maximum Day Demands with 5 Percent Conservation.



As previously described, the City needs the 0.67 cfs of "green light water" under *extended permit* G-7029 to provide water supply redundancy, operational flexibility, resiliency, and water supply capacity. Although water conservation may delay the need for additional future water supply, it cannot address the City's immediate need to use groundwater under Permit G-7029 as a redundant supply in the event that one or more of the City's current primary water supply wells becomes unavailable.

(b) Interconnections

The City provides water to, but does not receive water from, RWPUD with water through its interconnection, so this interconnection is not a water supply option. The City's interconnections with RWPUD, the City of Troutdale, and/or the City of Wood Village could provide the City with a short-term water supply, such as in emergency or on a peak demand day. RWPUD relies on groundwater and water from the Portland Water Bureau (PWB), which can be subject to curtailment. Like the City of Fairview, the Cities of Troutdale and Wood Village rely exclusively on groundwater. Consequently, the City is unlikely to be able to rely on its interconnections with these water suppliers in the case of source water contamination or long-term drought, which would affect these other water providers' groundwater supplies similarly. No other water providers with different water supply sources neighbor the City. As a result, the City cannot rely on additional interconnections with other water suppliers to increase its system redundancy or to meet its future water demands.

(c) Cost effectiveness

OAR 690-086-170(c) requires an assessment of whether the projected water needs can be satisfied through other conservation measures that would provide water at a cost that is equal or less than the cost of other identified sources.

As previously described, the City needs the 0.67 cfs of "green light water" under *extended permit* G-7029 to provide water supply redundancy, thereby improving water supply reliability. Water conservation, regardless of the cost, cannot meet the City's need to increase its system redundancy in the event that City's current primary water supply wells become unavailable.

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. Within the next 20 years, the City is planning to need 1.43 cfs (0.76 + 0.67 = 1.43) under Permit G-7029 to help meet its projected water demands. Assuming that the water right is used at 1.43 cfs (0.92 mgd), 24 hours per day for 31 days during the maximum month (likely July or August), the maximum monthly volume for the water right would be approximately 28.5 MG.

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. The City is not required to take any mitigation actions under state or federal law.

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. The City 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.

May 18, 2016

Erika Palmer, Senior Planner
Department of Planning Services
1300 NE Village Street
Fairview, Oregon 97024

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

Dear Ms. Palmer:

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

Under these rules, the water supplier must make its draft WMCP available for review by affected local governments and seek comments relating to consistency with the local governments' comprehensive land use plans. Enclosed is a CD containing the City of Fairview's draft WMCP for your review.

Please provide comments to me within 30 days from the date of this letter. If the plan appears consistent with your agency's Comprehensive Land Use Plan, a letter response to that effect would be appreciated. You may send your comment to me at the address on this letterhead or e-mail them to me directly at: kgrigsby@gsiws.com.

If you have any questions, please feel free to contact me at 541-257-9004. Thank you for your interest.

Sincerely,
GSI Water Solutions Inc.

Kimberly Grigsby
Senior Water Resources Consultant

Enclosure

1600 SW Western Blvd., Suite 240 Corvallis, OR 97333 P: 541.753.0745 F: 541.754.4211 info@gsiws.com www.gsiws.com

GSI
Water Solutions, Inc.

May 18, 2016

Department of Community Services (DCS), Land Use Planning
Multnomah County
1600 SE 190th Ave.
Portland, OR 97233

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

Dear Sir or Madam:

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

Under these rules, the water supplier must make its draft WMCP available for review by affected local governments and seek comments relating to consistency with the local governments' comprehensive land use plans. Enclosed is a CD containing the City of Fairview's draft WMCP for your review.

Please provide comments to me within 30 days from the date of this letter. If the plan appears consistent with your agency's Comprehensive Land Use Plan, a letter response to that effect would be appreciated. You may send your comment to me at the address on this letterhead or e-mail them to me directly at: kgrigsby@gsiws.com.

If you have any questions, please feel free to contact me at 541-257-9004. Thank you for your interest.

Sincerely,
GSI Water Solutions Inc.

Kimberly Grigsby

Kimberly Grigsby
Senior Water Resources Consultant

Enclosure

GSI
Water Solutions, Inc.

May 18, 2016

Elissa Gertler, Director
Metro, Planning and Development
Metro Regional Center
600 NE Grand Ave
Portland, OR 97232-2736

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

Dear Ms. Gertler:

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

Under these rules, the water supplier must make its draft WMCP available for review by affected local governments and seek comments relating to consistency with the local governments' comprehensive land use plans. Enclosed is a CD containing the City of Fairview's draft WMCP for your review.

Please provide comments to me within 30 days from the date of this letter. If the plan appears consistent with your agency's Comprehensive Land Use Plan, a letter response to that effect would be appreciated. You may send your comment to me at the address on this letterhead or e-mail them to me directly at: kgrigsby@gsiws.com.

If you have any questions, please feel free to contact me at 541-257-9004. Thank you for your interest.

Sincerely,
GSI Water Solutions Inc.

Kimberly Grigsby

Kimberly Grigsby
Senior Water Resources Consultant

Enclosure

1600 SW Western Blvd., Suite 240 Corvallis, OR 97333 P: 541.753.0745 F: 541.754.4211 info@gsiws.com www.gsiws.com

GSI
Water Solutions, Inc.

May 18, 2016

Mike Rosenberger, General Manager
Rockwood Water People's Utility District
19601 NE Halsey Street
Portland, OR 97230

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

Dear Mr. Rosenberger:

The City of Fairview has developed a Draft Water Management and Conservation Plan (WMCP) to fulfill the requirements of Oregon Administrative Rule Chapter 690, Division 86 of the Oregon Water Resources Department. Under these rules, the water supplier must make its Draft WMCP available for review by affected local governments and seek comments relating to consistency with the local governments' comprehensive land use plans.

As a courtesy, the City of Fairview is providing you a copy of the Draft WMCP. If you have any questions, please feel free to contact me at 541-257-9004.

Sincerely,
GSI Water Solutions Inc.

Kimberly Grigsby

Kimberly Grigsby
Senior Water Resources Consultant

Enclosure

1600 SW Western Blvd., Suite 240 Corvallis, OR 97333 P: 541.753.0745 F: 541.754.4211 info@gsiws.com www.gsiws.com

GSI
Water Solutions, Inc.

May 18, 2016

Chris Damgen, Senior Planner
Department of Planning and Community Development
City of Troutdale
2200 SW 18th Way
Troutdale, OR 97060

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

Dear Mr. Damgen:

The City of Fairview has developed a Draft Water Management and Conservation Plan (WMCP) to fulfill the requirements of Oregon Administrative Rule Chapter 690, Division 86 of the Oregon Water Resources Department. Under these rules, the water supplier must make its Draft WMCP available for review by affected local governments and seek comments relating to consistency with the local governments' comprehensive land use plans.

As a courtesy, the City of Fairview is providing you a copy of the Draft WMCP. If you have any questions, please feel free to contact me at 541-257-9004.

Sincerely,
GSI Water Solutions Inc.

Kimberly Grigsby
Senior Water Resources Consultant

Enclosure

1600 SW Western Blvd., Suite 240 Corvallis, OR 97333 P: 541.753.0745 F: 541.754.4211 info@gsiws.com www.gsiws.com

GSI
Water Solutions, Inc.

May 18, 2016

Department of Planning and Zoning
City of Wood Village
City Hall
2055 NE 238th Drive
Wood Village, OR 97060-1095

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

Dear Sir or Madam:

The City of Fairview has developed a Draft Water Management and Conservation Plan (WMCP) to fulfill the requirements of Oregon Administrative Rule Chapter 690, Division 86 of the Oregon Water Resources Department. Under these rules, the water supplier must make its Draft WMCP available for review by affected local governments and seek comments relating to consistency with the local governments' comprehensive land use plans.

As a courtesy, the City of Fairview is providing you a copy of the Draft WMCP. If you have any questions, please feel free to contact me at 541-257-9004.

Sincerely,
GSI Water Solutions Inc.

Kimberly Grigsby

Kimberly Grigsby
Senior Water Resources Consultant

Enclosure

1600 SW Western Blvd., Suite 240 Corvallis, OR 97333 P: 541.753.0745 F: 541.754.4211 info@gsiws.com www.gsiws.com

GSI
Water Solutions, Inc.

May 18, 2016

Interlachen Water People's Utility District
PO Box 1776
Interlachen, OR 97024

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

Dear Sir or Madam:

The City of Fairview has developed a Draft Water Management and Conservation Plan (WMCP) to fulfill the requirements of Oregon Administrative Rule Chapter 690, Division 86 of the Oregon Water Resources Department. Under these rules, the water supplier must make its Draft WMCP available for review by affected local governments and seek comments relating to consistency with the local governments' comprehensive land use plans.

As a courtesy, the City of Fairview is providing you a copy of the Draft WMCP. If you have any questions, please feel free to contact me at 541-257-9004.

Sincerely,
GSI Water Solutions Inc.

Kimberly Grigsby
Senior Water Resources Consultant

Enclosure

1600 SW Western Blvd., Suite 240 Corvallis, OR 97333 P: 541.753.0745 F: 541.754.4211 info@gsiws.com www.gsiws.com

From:	mike rosenberger
To:	Kim Grigsby
Cc:	"mike rosenberger"
Subject:	Draft of Fairview WMCP
Date:	Monday, May 23, 2016 2:54:10 PM
Attachments:	image001.jpg

Kim, thanks for the draft to review.

Rockwood has no comments.

Michael Rosenberger
General Manager
Rockwood Water People's Utility District
19601 NE Halsey Street
Portland, Oregon 97230-7430
503-665-4179

From:	Michael CERBONE
To:	Kim Grigsby
Subject:	City of Fairview WMCP
Date:	Wednesday, June 1, 2016 2:21:18 PM

Kimberly,

I have reviewed the City of Fairview WMCP. The document appears to be consistent with Multnomah County's Comprehensive Plan.

Under OAR 690-086-0150(5) can the City increase their water appropriations if it is unable to confirm what their leakage rate is? The County has no objection to an increase in appropriations, I am curious as I have never seen a system that has a negative water loss rate.

Respectfully,

Michael Cerbone, AICP
Planning Director
Multnomah County
503.988.0218

https://multco.us/landuse