



**City of Hillsboro
Water Management and Conservation Plan**

AUGUST 2017

Prepared by:



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Oregon

Kate Brown, Governor

Water Resources Department

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August 28, 2017

Kristel Griffith
City of Hillsboro
Hillsboro Civic Center
150 East Main Street, Third Floor
Hillsboro, OR 97123

Subject: Water Management and Conservation Plan

Dear Ms. Griffith:

Enclosed, please find the final order approving your Water Management and Conservation Plan (Plan) and authorizing the diversion of up to 30.94 cfs of water under Permit S-55045 (*out of total permitted 56.0 cfs for the City of Hillsboro*).

The attached final order specifies that the City of Hillsboro's plan shall remain in effect until **August 28, 2027**. Additionally, the City of Hillsboro is required to submit a progress report to the Department by **August 28, 2022**, detailing progress made toward the implementation of conservation benchmarks scheduled in the plan. Finally, the City of Hillsboro must submit an updated Water Management and Conservation Plan to the Department by **February 24, 2027**.

***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 Hillsboro 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 503-986-0919 or Kerri.H.Cope@oregon.gov if you have any questions.

Sincerely,

Kerri H. Cope
Water Management and Conservation Analyst
Water Right Services Division

Enclosure

cc: WMCP File
Application #S-55010 (Permit #S-55045)
Watermaster #18, Jake Constans (*via email*)
GSI Water Solutions, Inc., Attn: Suzanne de Szoeko, 1600 SW Western Blvd., Suite 240, Corvallis, OR 97331

**BEFORE THE WATER RESOURCES DEPARTMENT
OF THE
STATE OF OREGON**

In the Matter of the Proposed Water)	FINAL ORDER APPROVING A
Management and Conservation Plan for)	WATER MANAGEMENT AND
City of Hillsboro, Washington County)	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 Hillsboro submitted a Water Management and Conservation Plan (Plan) to the Water Resources Department (Department) on March 29, 2017. The required statutory fee for review of the plan was received by the Department on March 30, 2017. The plan was required by a condition set forth in the final order issued on July 31, 2015, approving an extension of time for Permit S-45565 (now S-55045 per transfer application T-12512).
2. The Department published notice of receipt of the plan on April 4, 2017, 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 June 12, 2017. In response, the City submitted a revised plan on July 28, 2017 then added a revision on August 7, 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 projections of future water needs in the plan demonstrate a need for 30.94 cfs of water available under Permit S-55045 to help meet overall projected 20 year demands. These projections are reasonable and consistent with the City's land use plan.
6. The system is fully metered and the rate structure includes a base rate and volumetric charge. Non-revenue water is estimated at 7.4 percent.

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.

7. The plan includes 5-year benchmarks for replacement of all old style meters with AMR meters by 2020 and utilization of the newly installed AMR meters as part of its currently implemented leak detection and repair program; inclusion of distribution system flushing estimates and metered bulk water consumption in its non-revenue water calculations; and the City will continue to budget for replacement of aging infrastructure and will inspect all three distribution reservoirs for cracks and leaks every five years.
8. The plan includes the continuation of the following required conservation measures:
 - a. Annual water audits;
 - b. System wide metering;
 - c. A meter testing and maintenance program;
 - d. A rate structure under which customers' bills are based, in part on the quantity of water metered at the service location, including a three-tiered rate structure for single-family residential customers and a higher cost per unit when base volume is exceeded for the commercial, public entities, and non-profit customer categories and;
 - e. A leak detection and repair program; and,
 - f. A robust public education program that includes bills inserts, city newsletters, water conservation information on the City's website, local community outreach events, and use of social media.
9. The plan identifies the main sources of the City's municipal water rights as being: the Tualatin River and its tributaries, which include a combination of natural flow and stored water released from Hagg Lake; Barney Reservoir in the Trask River watershed; and the Willamette River. The City also holds municipal water rights for Sain creek, Scoggins Creek, and the Middle Fork of the North Fork Trask River. The revised plan accurately and completely describes the listed fish species that occur in the Tualatin River, Willamette River, and Trask River in the vicinity of the City's points of diversion as well as the water quality parameters for which the City's water sources have been placed on the 303 (d) list by the Oregon Department of Environmental Quality. The City's non-municipal 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 S-55045 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 population growth, 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 the City's water demand projections, access to an increased diversion of water under Permit S-55045 is the most feasible and appropriate alternative to the supplier.
- c. The final plan identifies that, while the City is not currently required to take any mitigation actions under state or federal law the City is subject to conditions establishing flows in the Willamette River that are necessary to maintain the persistence of listed streamflow-dependent species, as set forth in the final order approving an extension of time for Permit S-55045.

Conclusion of Law

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

Now, therefore, it is ORDERED:

Duration of Plan Approval:

1. The City of Hillsboro's Water Management and Conservation Plan is approved and shall remain in effect until **August 28, 2027**, unless this approval is rescinded pursuant to OAR 690-086-0920.

Development Limitation:

2. The limitation of the diversion of water under Permit S-55045 established by the extension of time approved on July 31, 2015, is removed and, subject to other limitations or conditions of the permit, the City of Hillsboro is authorized to divert up to **30.94 cfs** (*out of the total permitted 56.0 cfs for the City of Hillsboro*) under Permit S-55045.

Plan Update Schedule:

3. The City of Hillsboro shall submit an updated plan meeting the requirements of OAR Chapter 690, Division 086 within **10 years** and no later than **February 24, 2027**.


Progress Report Schedule:

4. The City of Hillsboro shall submit a progress report containing the information required under OAR 690-086-0120(4) by **August 28, 2022**.

Other Requirements for Plan Submittal:

5. 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 Hillsboro 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 28 day of August, 2017.


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

Mailing date: AUG 31 2017

Notice Regarding Service Members: Active duty service members have a right to stay proceedings under the federal Service Members Civil Relief Act. 50 U.S.C. App. §§501-597b. You may contact the Oregon State Bar or the Oregon Military Department for more information. The toll-free telephone number for the Oregon State Bar is: 1 (800) 452-8260. The toll-free telephone number of the Oregon Military Department is: 1 (800) 452-7500. The Internet address for the United States Armed Forces Legal Assistance Legal Services Locator website is: <http://legalassistance.law.af.mil>

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- Exhibit ES-1. Summary of Water Conservation Five-Year Benchmarks
- Exhibit 2-1. City of Hillsboro Current Service Area Map and Water System Schematic.
- Exhibit 2-2. Entire Service Area Historical Annual Water Demand, Average Day Demand, Maximum Day Demand, Peaking Factor, and Maximum Month Demand, 2008-2015.
- Exhibit 2-3. Annual Demand (MG), 2008-2015.
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- Exhibit 2-5. Peaking Factors (MDD: ADD), 2008-2015.
- Exhibit 2-6. Monthly Demand (MG), 2008-2015.
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- Exhibit 2-12. Seasonal Water Consumption and Summer:Winter Peaking Factor by Customer Category, 2015.
- Exhibit 2-13. Per Capita Residential Consumption, 2007 and 2015.

- Exhibit 2-14. Seasonal Per Capita Residential Consumption, 2007 and 2015.
- Exhibit 2-15. Non-revenue Water, 2008-2015.
- Exhibit 2-16. Water Rights.
- Exhibit 2-17. Listed Fish Species in the Willamette River (within the reach of the City’s Point of Diversion at ~river mile 39), Tualatin River Watershed, and Trask River Watershed.
- Exhibit 2-18. Permit S-55045 Target Flows for Fish Persistence in the Willamette River, Measured at U.S. Geological Survey (USGS) Gage 14191000 at Salem.
- Exhibit 2-19. Willamette River Flows at Salem Gage (seven-day rolling average) compared to Permit S-55045 Target Flows, 2000-2015. Target flows were missed on 5.2% of the days.
- Exhibit 2-20. Summary of System Reservoirs.
- Exhibit 2-21. Summary of Existing Pump Stations.
- Exhibit 2-22. Summary of Pipeline Sizes.
- Exhibit 2-23. Summary of Pipeline Materials.
- Exhibit 3-1. Summary of Water Conservation Five-Year Benchmarks.
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- Exhibit 5-6. MDD Projections and Planned Water Supply Sources, 2026 and 2036.

Appendices

- Appendix A Letters to Local Governments and Comments
- Appendix B Interconnections
- Appendix C Intergovernmental Agreements
- Appendix D City of Hillsboro, Non-Municipal Water Rights
- Appendix E DEQ’s 303(d) Listings: Applicable Municipal and Non-Municipal Water Rights
- Appendix F City of Hillsboro Water Rates by Customer Category (as of October 1, 2016)
- Appendix G Request to Remove City of Hillsboro’s Demand from Permit S-35819

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Executive Summary

This Water Management and Conservation Plan (WMCP) presents how the City of Hillsboro (City) has managed its water rights, water system, and relationships with customers and neighboring water providers to enhance the reliability and sustainability of its water supply.

The City developed this WMCP to comply with an Oregon Water Resources Department (OWRD) water right permit extension approval and to request authorization to use Willamette River water under Permit S-55045.

To receive WMCP approval from OWRD, specific criteria outlined in administrative rules under OAR Chapter 690, Division 86 must be met. The following describes how each of the criteria for approval are met in this WMCP.

- WMCP includes the requirements under OAR 690-086-0125, which are:
 - Descriptions of the water supplier, water conservation measures and 5-year water conservation benchmarks, a water curtailment plan, and projected water supply needs.
 - A list of affected local governments to whom the City sent its draft WMCP, as well as any comments received by the affected local governments.
 - The City's proposed date for submitting an updated 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 to OWRD within 5 years of the final order.
 - A statement that the City is not requesting additional time to implement metering or a previous benchmark.
- Future water needs projections
 - The City's projected maximum day demand (MDD) for the City's In-town service area, the City's Upper System service area, and wholesale customers: City of Cornelius, City of Gaston, and LA Cooperative is 89.25 cubic feet per second (cfs) or 57.70 million gallons per day (mgd) in 2036. The City anticipates a need for 64.59 cfs of water supply through the Joint Water Commission (JWC) and 24.66 cfs of Willamette River water to meet this projected demand. In addition to being a supply source to meet future demand, the City acquired the water use permit on the Willamette River to secure a redundant water supply source. Thus, the City is seeking authorization to use up to 30.94 cfs (20 mgd) of Permit S-55045 to meet projected demands and redundant water supply needs. The City anticipates a need for 64.59 cfs of water supply through the JWC and the entirety of its 56 cfs (36 mgd) portion of Permit S-55045 of Willamette River water to meet projected demand by 2085.
 - The City's demand projections are reasonable and consistent with land use plans of the City and affected local governments, and demonstrate the need for water to be diverted during the next 20 years under its water right permits.
- Water Conservation measures
 - The City describes its water management and conservation program, which includes water conservation measures required under OAR 690-086-0150(4, 5, and 6), as well as 5-year benchmarks for implementation of conservation measures. **Exhibit ES-1** summarizes the City's water conservation 5-year benchmarks.

Exhibit ES-1. Summary of Water Conservation Five-Year Benchmarks

Five-Year Benchmark	Timeline
Annual water audits	Continue
Update non-revenue water calculations	By 2022
Replace old style meters with AMR meters	Continue. Replace all by 2020.
Install AMR in all new meters	Continue
Implement meter testing and maintenance program	Continue
Replace the raw water sonic meters at the SSFP	By 2022
Establish maintenance program for AMR meters	By 2022
Billing based on the volume of water consumed, with pricing structures encouraging conservation	Continue
Implement 2014 rate study recommendations	Continue
Conduct a new rate study	By 2022
Three-tiered water rate: single-family residential class	Continue
Switch to monthly billing	By end of 2018
Use leak surveys and AMR program to detect leaks	Continue
Budget for replacement of aging infrastructure	Continue
Inspect all three distribution reservoirs for cracks and leaks	Every five years, next in 2021
Implement public education program	Continue
Add conservation videos and possibly links to website	By 2022
Complete Teacher Resource brochure and link	By 2022
Complete Tualatin River watershed display	By Spring 2017
Budget annually for technical and financial incentives	Continue
Offer water audits, water saving devices, free conservation kits, and technical assistance and water saving materials to school and community gardens	Continue
Work with commercial, multi-family, non-profit, and industrial customers to reduce water use	Continue
Promote water-wise gardening techniques and develop new water-wise gardens/outdoor areas	Continue
Offer rebates for water-efficient fixtures and/or devices	Continue
Offer assistance with waterless urinal installations	Continue
Offer free water saving devices (e.g. faucet aerators, showerheads)	Continue
Encourage Clean Water Services and other industrial customers to reuse water	Continue
Review currently owned and newly acquired non-municipal water rights for potential non-potable water use opportunities	By 2022
Hold membership in several water conservation organizations	Continue
Attend trainings and conferences to enhance conservation programs	Continue

- Resources Issues under OAR 690-086-0140(5)(i)
 - The City shows the fish species with state or federal protections in the Willamette River within the reach of the City's point of diversion for Permit S-55045 (~river mile 39), the Tualatin River watershed, and Trask River watershed.
 - The City presents DEQ's 303(d) listings related to the City's Willamette River municipal water use permit (Permit S-55045), as well as all JWC and Barney Reservoir Joint Ownership Commission (BRJOC) related municipal water rights and the City of Hillsboro's non-municipal water rights.
 - The City also states that neither the City nor the JWC hold native groundwater rights for municipal water supply and that the City's non-municipal groundwater rights are not located within a critical groundwater area.
- Water Curtailment Plan
 - The City has a water curtailment plan that consists of four curtailment stages. For each stage, the City describes the potential triggers (i.e. initiating conditions) and its planned public information program actions that promote water conservation. This curtailment plan fulfills the requirements under OAR 690-086-0160.
- Need for water beyond the authorized rate of diversion
 - This WMCP describes the City's need to initiate diversion of water under Permit S-55045 during the next 20 years.
 - The City determined that water savings from conservation measures cannot eliminate the City's need for additional supply from the Willamette River to meet projected demands and to provide a redundant water supply source. Nevertheless, the City will continue to strive to maximize water conservation in its water service area and act as a role model for water conservation in the region.
 - The City evaluated a variety of water supply options and concluded that the Willamette River was the best option for meeting the City's projected water demands. Furthermore, the City wanted to have its own water supply, as well as a redundant water supply, to avoid risks associated with complete dependency on the JWC.
 - No mitigation actions are required under state or federal law.

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1. Municipal Water Supplier Plan Elements

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

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

Introduction

The City of Hillsboro (City) is a thriving community located in central Washington County, Oregon. The City's economy is driven by the high-tech industry, manufacturing, healthcare education, and small businesses. In addition to having employment opportunities, the City boasts a strong arts and culture scene and proximity to agriculture and recreation, all of which help make the City an attractive place to live.

The City considers one of the cornerstones of livability to be access to a high-quality, sustainable drinking water supply. As such, the City has a robust water management and conservation program.

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

- 1) guide development and implementation of water management and conservation programs that promote sustainable water use; and
- 2) analyze the City's future water needs and timelines for developing Willamette River water under the City's portion of water use permit S-55045 that the City acquired from the City of Salem.

The City is a member of the Joint Water Commission (JWC) and the Barney Reservoir Joint Ownership Commission (BRJOC). The Joint Water Commission (JWC) comprises of four member agencies: the Cities of Hillsboro, Forest Grove, and Beaverton and the Tualatin Valley Water District (TVWD). These same agencies and Clean Water Services are members of the Barney Reservoir Joint Ownership Commission. The City of Hillsboro serves as the managing agency for both organizations. The purpose of the BRJOC is to locally own and manage Barney Reservoir/Mills Dam storage and releases on behalf of its members. JWC's focus is municipal water treatment and potable water delivery through a transmission system to the members.

The JWC and BRJOC members are authorized to use water under surface water rights from the Tualatin River basin and "secondary" rights for the use of stored water from Barney Reservoir and Hagg Lake. The 2010 JWC Water Management and Conservation Plan (approved by Oregon Water Resources Department (OWRD) in a Final Order issued on September 14, 2010) documents the water rights associated with the JWC, BRJOC, and its member agencies, water supply sources, water transmission and distribution systems, conservation measures, and historical and future water demands.

To meet long-term water demands and to provide a seismically resilient supply for its community, the City decided in 2012 to acquire a water right for municipal supply from the Willamette River. The City based its decision to develop a mid-Willamette water supply on a thorough water supply alternatives analysis. The City recently acquired a portion of water use permit S-55045 from the City of Salem that will serve as that mid-Willamette water supply source. The City has partnered with TVWD through an intergovernmental agreement to develop the mid-Willamette River as a water supply source for both water providers (TVWD holds a separate water right for use of water from the Willamette River). This

partnership, called the Willamette Water Supply Program, includes cost share to permit, design, and construct the needed infrastructure. This City’s Willamette River water supply is the focus of this WMCP.

Plan Requirement

The Final Order dated July 31, 2015, approving an extension of time for water use permit S-55045, requires a WMCP by July 31, 2018, and before diverting any water under the permit.

This WMCP meets all 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

The 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 conservation and water supply planning efforts. The WMCP also includes appendices with supporting information.

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

Affected Local Governments

OAR 690-086-0125(5)

The following local governmental agencies are considered “affected local governments” under OWRD’s WMCP administrative rules:

- City of Hillsboro
- City of Beaverton
- City of Forest Grove
- Washington County
- Multnomah County
- Metro
- City of Gaston
- City of Cornelius

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

JWC, Tualatin Valley Water District, LA Water Cooperative, the Willamette River Water Coalition, the City of Salem, the City of Wilsonville, and the City of North Plains with a copy of the draft plan as a courtesy. The letters requesting comments and documentation of any comments received are in **Appendix A**.

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.

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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)

Currently, the City's municipal water supply is provided from two sources: the Tualatin River and its tributaries (including natural flow and released stored water from Hagg Lake), and stored water released into the upper portion of the Tualatin River from Barney Reservoir on the Trask River system.

This water is diverted at either the JWC's Spring Hill Pumping Plant (SHPP) or the City's Haines Falls Intake. The SHPP diverts water from the Tualatin River at River Mile (RM) 56.3 approximately one mile south of the City of Forest Grove. This water is treated at the JWC's water treatment plant (WTP). The City can receive up to 33.75 mgd (52.21 cfs) from the JWC, based on the City's ownership share of the 75 mgd (116 cfs) capacity of the JWC WTP. (The 2010 JWC WMCP contains more detailed information about the JWC's water sources.) The City can also divert water at its Haines Falls Intake located at RM 73.2 on the Tualatin River. This water is treated at the Cherry Grove WTP, which is a slow sand filter plant with a maximum capacity of 3 mgd (4.6 cfs).

The City is party to a JWC held Aquifer Storage and Recovery (ASR) Limited License, but no wells have reached full production status to date. The City has access to one-third the capacity of the JWC limited license, but currently does not have infrastructure built to access the Cooper Mountain area.

Finally, the City recently acquired a 56 cfs portion of water use permit S-55045 from the City of Salem. This permit authorizes the use of water from the Willamette River for municipal purposes.

The City has numerous non-municipal water rights for use of water from such sources as the Tualatin River, McKay Creek and tributaries, Glencoe Swale, Beaverton Creek, Bronson Creek, Rock Creek and tributaries, Dairy Creek, a tributary to Jackson Slough, Sain Creek, a pond, wastewater effluent, and wells. The uses under these water rights include irrigation, supplemental irrigation, multi-purpose storage, wetlands creation enhancement, wildlife, hydroelectric production, nursery operations, fish culture, aesthetics, storage of wastewater, and instream use. These water rights are not used to meet the City's potable water supply needs; they are not withdrawn for treatment and are not put into the transmission or distribution systems.

The water rights associated with these sources are described in the Water Rights subsection of Section 2.

Service Area Description and Population

OAR 690-086-0140(2)

The City's current retail water service area includes two geographically separated areas: (1) the In-Town retail service area, which includes approximately 75% of the City of Hillsboro's urban boundary, and (2) the Upper System, which serves an unincorporated area to the southwest of the City of Forest Grove. The City wholesales water to the City of Cornelius through interconnections near the In-Town area, and to the City of Gaston and LA Water Cooperative through interconnections in the Upper System. The City serves its In-Town service area from the JWC WTP, and its Upper System from both the JWC and Cherry Grove WTPs. The City of Hillsboro's remaining population, east of Cornelius Pass Road, is served by the Tualatin Valley Water District (TVWD). **Exhibit 2-1** shows the City's existing service area.

The 2015 service population in the City of Hillsboro's In-Town service area was approximately 84,224, plus 1,464 people in its Upper System (based on the Portland State University Population Research Center report "Regional Water Providers Consortium Population, Housing Unit, and Household Forecasts 2014 to 2045" (RWPC PRC Report)). The City of Hillsboro wholesales to 2,100 people within LA Water Cooperative (as reported to the Oregon Health Authority by the LA Water Cooperative). The City of Hillsboro also wholesales water to the Cities of Cornelius and Gaston with 2015 populations of 11,900, and 640, respectively (Portland State University PRC). Summing the City of Hillsboro service and wholesale customer populations yields a total service population of 100,328.

Exhibit 2-1. City of Hillsboro Current Service Area Map and Water System Schematic.

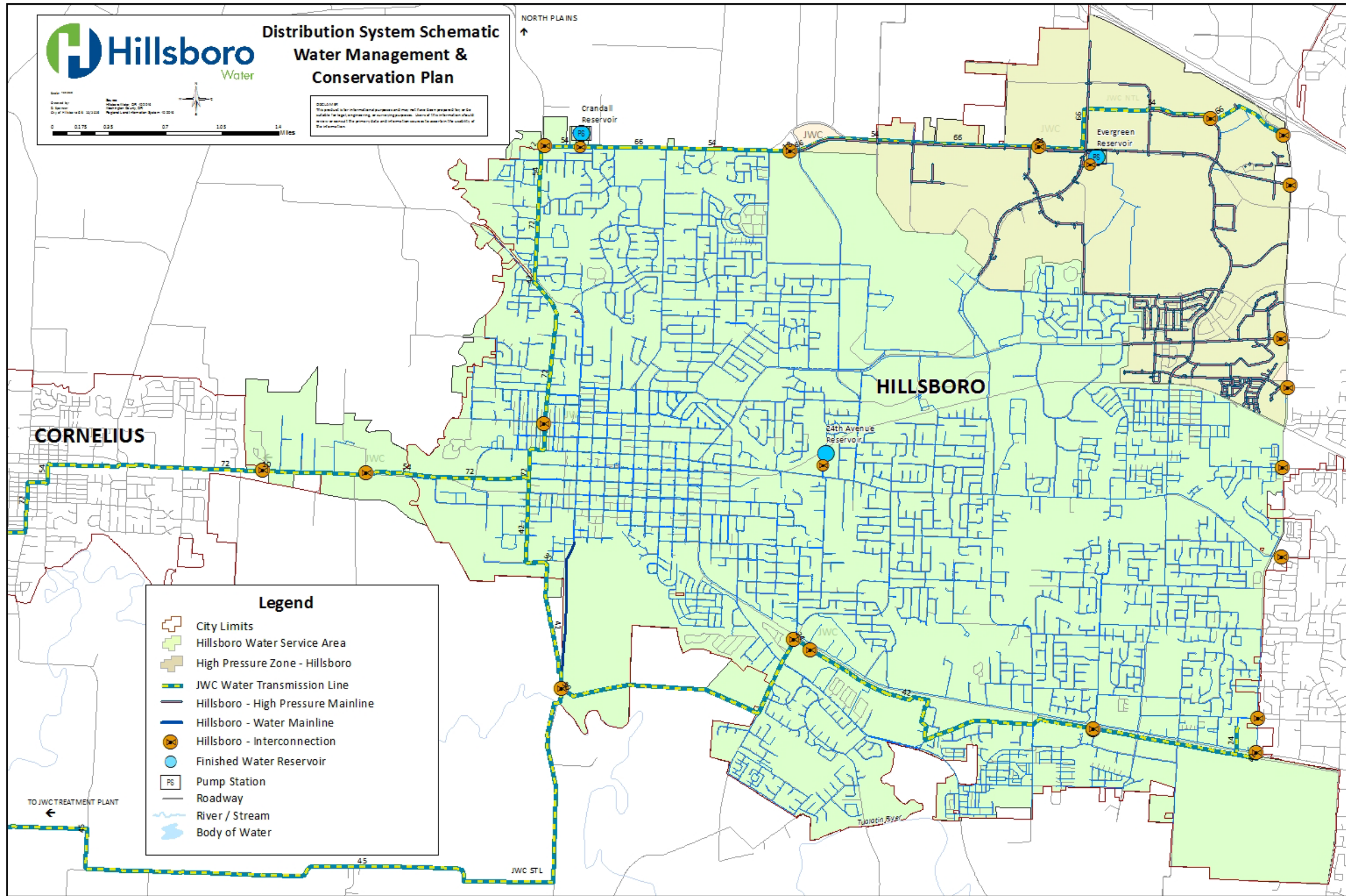
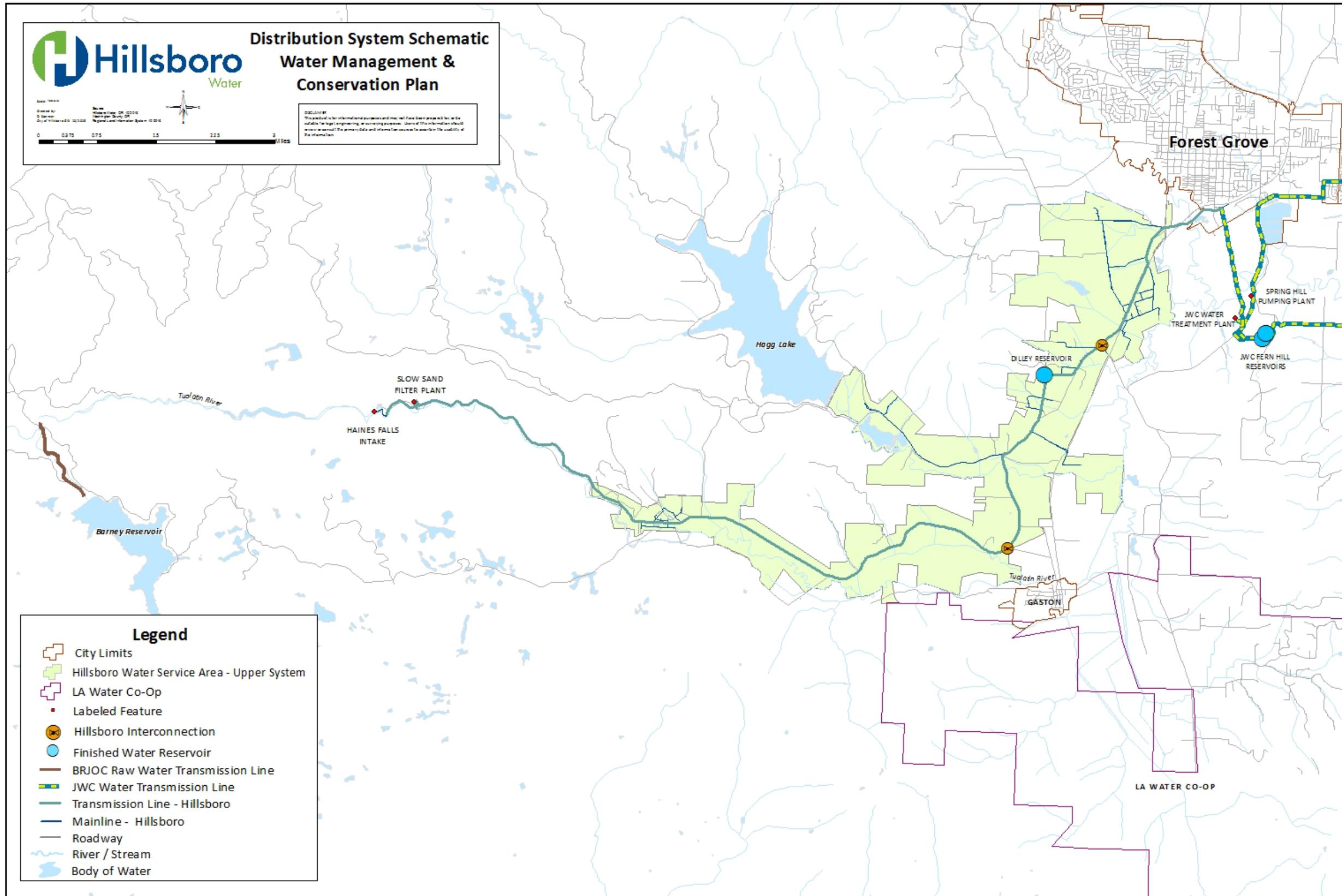


Exhibit 2-1. City of Hillsboro Current Service Area Map and Water System Schematic Continued.



Interconnections with Other Systems

OAR 690-086-0140(7)

Although the City operates two different surface supply treatment facilities, the systems are interconnected for emergency and back-up supply alternatives to the Upper System. For example, water from the JWC WTP can be served to the LA Water Cooperative and the City of Gaston for emergency purposes and during high turbidity events that may impact the Cherry Grove WTP.

Hillsboro Upper System

The City of Hillsboro's Upper System transmission line has one metered interconnection with the City of Gaston, one metered interconnection with the LA Water Cooperative, and one metered interconnection with the JWC supply system. A portion of the Upper System can be fed with adequate pressure by the JWC WTP, but the Upper System cannot currently serve the In-Town System based on the present state of infrastructure.

Hillsboro In-Town System

The City of Hillsboro's main distribution system has interconnections with the JWC supply system, and the TVWD Wolf Creek service area. The City of Hillsboro has 16 master meter locations connecting to JWC transmission lines. The City of Hillsboro serves the City of Cornelius water via a JWC transmission line and currently water can only be conveyed one-way to the City of Cornelius. Eight unmetered emergency interties with TVWD are located on the boundary between the two systems. TVWD's current water sources include the JWC, and wholesale water from the City of Portland, and ASR.

Appendix B contains a list of interconnections.

Intergovernmental Agreements

OAR 690-086-0140(1)

A summary of all of the City's current intergovernmental agreements is contained in **Appendix C**. These intergovernmental agreements include agreements for: wholesale water purchase; storage and diversion of water from Barney Reservoir and Hagg Lake; and interagency agreements related to ownership, water rights, usage, maintenance, and financing of the JWC and the BRJOC.

Records of Water Use

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

Terminology

System demand (i.e. production): the quantity of water delivered to a distribution system from a water treatment plant, wholesale supplier, or an ASR well.

- System demand includes metered consumption (e.g. single-family residential and commercial/industrial), unmetered public uses (e.g. firefighting and hydrant flushing), water lost to leakage, and reservoir overflow.

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

Generally, water suppliers express demand and consumption in units of million gallons per day (mgd). They may also 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).

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

- Average day demand (ADD) equals the total annual system demand divided by 365 (or 366) days.
- Maximum day demand (MDD) equals the highest system demand that occurs on any single day during a calendar year.
 - MDD is an important value for water system planning. The supply facilities (treatment plants, pipelines, reservoirs) and water rights must be capable of meeting the MDD. Moreover, water rights are typically established as a rate of diversion “at the source” and the projected rate of diversion should be planned for accordingly.
- Monthly demand refers to demand during a calendar month. This demand can be expressed as the total volume of water produced in a month, or as a daily demand value by dividing the total monthly volume by the number of days in the month.
- Maximum monthly demand (MMD) in MG equals the highest total monthly demand of the 12 months of a calendar year. MMD in mgd equals the average day demand of the one month with the highest total demand of the 12 months of a calendar year. This statistic is valuable when MDD values are not available.
- Peaking factors are the ratios of one demand value to another. The most common peaking factor is the ratio of the MDD to the ADD.
- Summer season refers to the months of the year with typically the greatest demand: June, July, August, and September.
- Winter season refers to the months of the year with typically the least demand: December, January, February, and March.

Historical Water Demands

Annual Demands

Exhibit 2-2 summarizes historical demands (annual, ADD, MDD, and MMD), and peaking factors for the City’s entire service area.

Exhibit 2-2. Entire Service Area Historical Annual Water Demand, Average Day Demand, Maximum Day Demand, Peaking Factor, and Maximum Month Demand, 2008-2015.

Year	Annual Demand (MG)	ADD (mgd)	MDD (mgd)	Date of MDD	Peaking Factor (MDD: ADD)	MMD (mgd)	MMD Month
2008	4939.54	13.50	28.02	8/15	2.08	653.6	July
2009	4998.67	13.69	24.95	7/30	1.82	677.3	July
2010	4977.53	13.64	24.99	8/15	1.83	646.3	August
2011	5474.67	15.00	28.64	8/21	1.91	731.9	August
2012	5892.04	16.10	28.37	8/19	1.76	744.1	August
2013	6051.56	16.58	28.54	8/15	1.72	788.0	July
2014	6388.96	17.50	32.57	8/5	1.86	759.3	July
2015	6909.50	18.93	33.75	7/3	1.78	846.2	July

As shown in Exhibit 2-3, the City’s annual demand increased steadily from 2010 to 2015 after remaining flat from 2008 to 2010 during the economic recession. The average annual rate of increase from 2008 through 2015 was 4.8%. Increases in the City’s annual demand over the last five years are largely attributable to the growth of the commercial and industrial sector of water use, which is described in greater detail in the analysis of consumption to follow.

Exhibit 2-3. Annual Demand (MG), 2008-2015.

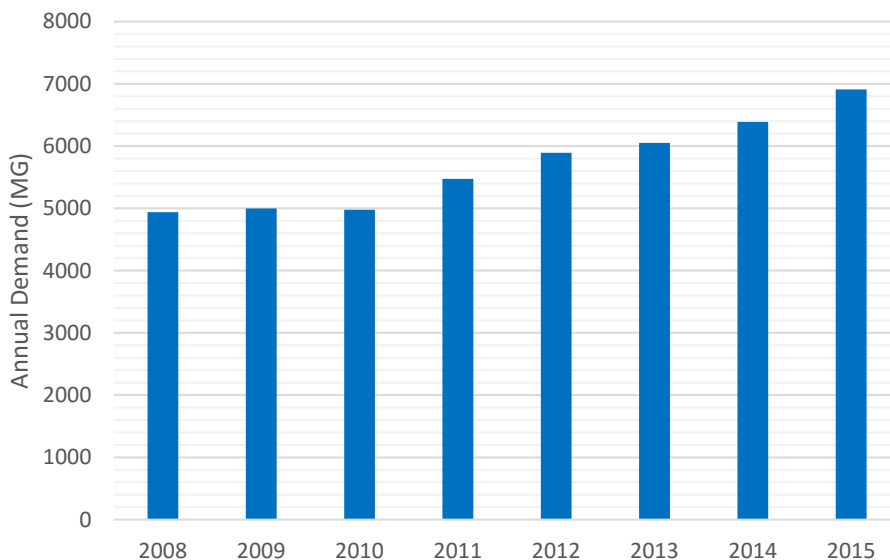
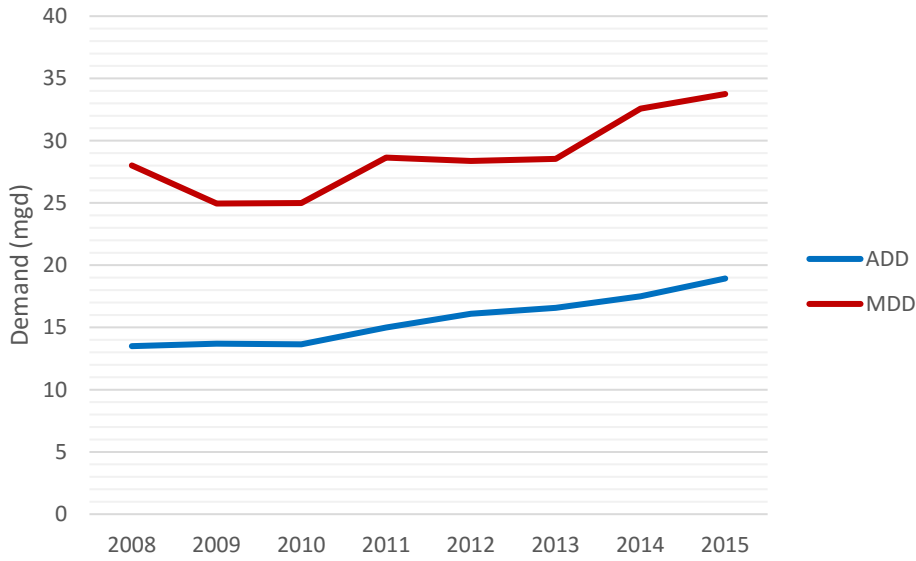


Exhibit 2-4 shows the City's ADD and MDD from 2008 to 2015. ADD ranged from 13.50 mgd in 2008 to 18.93 mgd in 2015, increasing steadily during that period. In contrast, MDD fluctuated over time, but has still followed an increasing trend. MDD ranged from 24.95 mgd in 2009 to 33.75 mgd in 2015. From 2008 to 2015, the MDD occurred twice in July and six times in August.

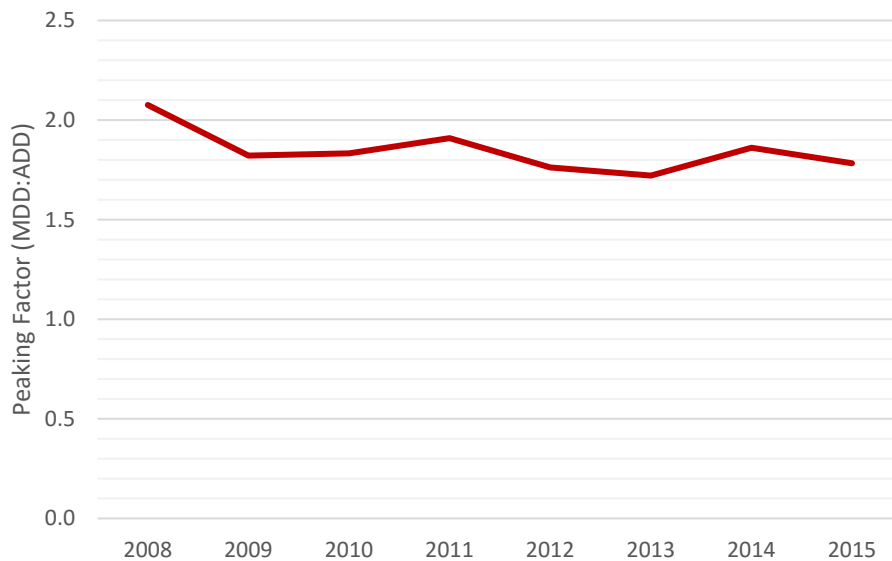
Exhibit 2-4. Average Day Demand (ADD) and Maximum Day Demand (MDD), 2008-2015.



Peaking Factors

Exhibit 2-5 shows the City's MDD:ADD peaking factor from 2008 to 2015. The peaking factor has generally declined during the study period, from a high of 2.08 in 2008 to a low of 1.72 in 2013. This declining trend contrasts with the MDD and ADD increasing trends. The decline in the peaking factor is likely attributable to the economic downturn incentivizing precision-driven irrigation practices to save money and increase watering efficiencies, a proportional increase in industrial customers (discussed further in the consumption description below) that typically have lower peaking factors, and the City's water conservation efforts targeting peak season water use, which are described in detail in Section 3. From 2008 to 2015, the peaking factor averaged 1.85.

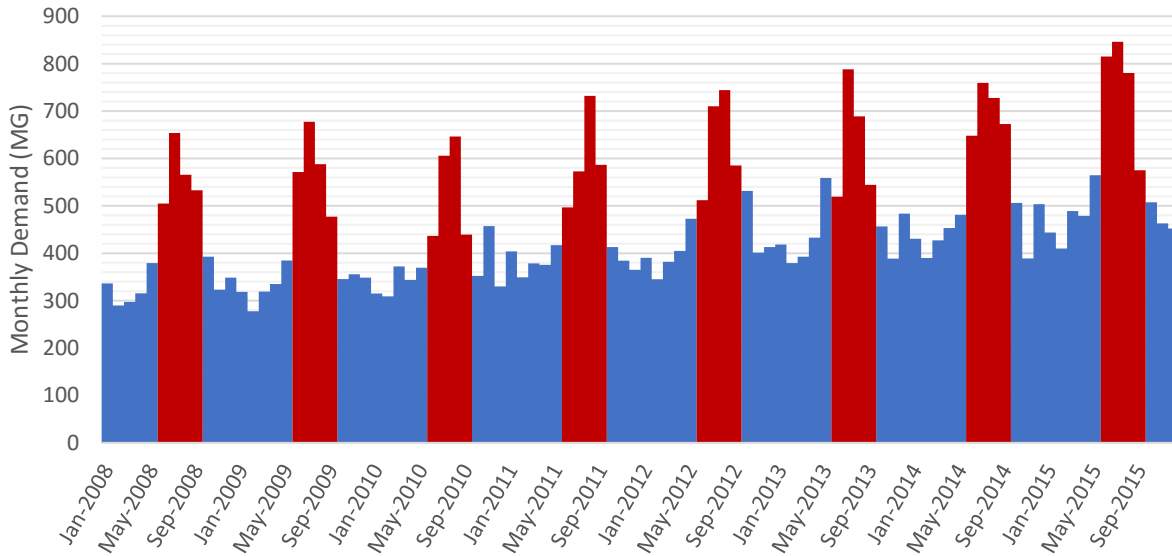
Exhibit 2-5. Peaking Factors (MDD: ADD), 2008-2015.



Monthly Demand

Exhibit 2-6 shows the City's monthly demand from 2008 through 2015. The peak demand months of June through September are shown in red. The greatest monthly demand for the entire service area was 846.2 MG in July 2015. Expressed as an average daily demand for the month, this equates to 27.30 mgd.

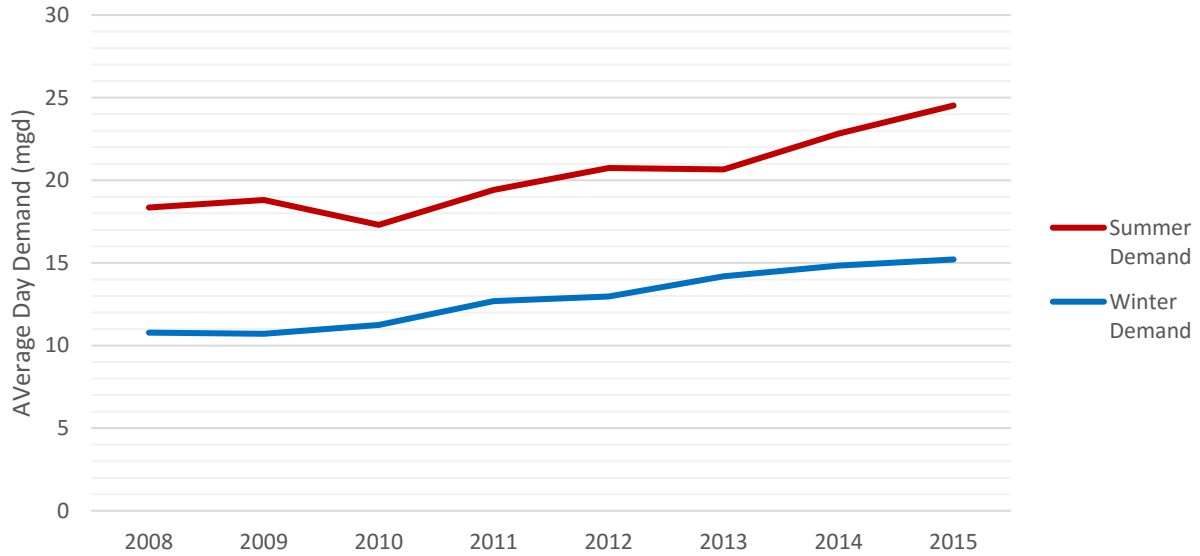
Exhibit 2-6. Monthly Demand (MG), 2008-2015.



Seasonal Demands

Exhibit 2-7 shows the City's seasonal water demand. Both the summer (June to September) ADD and the winter (December to March) ADD have shown an increasing trend over time. The summer ADD ranged from a low of 17.30 mgd in 2010 to a high of 24.53 mgd in 2015. The winter ADD ranged from 10.71 mgd in 2008 to 15.21 mgd in 2015.

Exhibit 2-7. Seasonal Water Demands (mgd) in Summer (June to September) and Winter (December to March), 2008-2015.



Customer Characteristics and Use Patterns

OAR 690-086-0140(6)

The City has eight customer categories: single-family residential, multi-family residential, commercial, industrial, public entity, non-profit, irrigation¹, and wholesale. This report presents combined values for the public entity and non-profit categories because these two have low usage and similar rate structures. The City's three wholesale customers are the City of Cornelius (3 customer accounts), the City of Gaston (1 customer account), and LA Water Cooperative (1 customer account).

As shown in **Exhibit 2-8**, the greatest number of service connections in 2015 were in the single-family residential category. This is consistent with other years as well.

Exhibit 2-8. Number of Connections by Customer Category, 2015.

Customer Category	Number of Accounts	Percent
Single Family Residential	22,479	92.6
Multi-family Residential	267	1.1
Commercial	869	3.6
Industrial	72	0.3
Public Entity	105	0.4
Non-profit	69	0.3
Irrigation	405	1.7
Wholesale	5	0.0
Total	24,271	100.0

Exhibit 2-9 presents annual metered consumption by customer category from 2007 through 2015. The year 2007 was the final year of the previous WMCP reporting period and the first full year that the City used its current billing categories. No years preceding 2007 were used due to difficulties comparing customer categories. **Exhibit 2-10** presents the percentage of metered water consumption by each of the City's customer categories in 2015.

The City's annual metered consumption increased from 5,207 MG in 2007 to 6,399 MG in 2015, with industrial water consumption responsible for virtually all increases in consumption. The industrial metered consumption increased from 1,750 MG in 2007 to 2,961 MG in 2015, and had an average annual growth rate of 4.5%. This growth resulted in the industrial category increasing its share of total metered consumption from 34% in 2007 to 46% in 2015.

Although single family residential metered consumption in 2015 (1,573 MG) was similar to 2007 (1,530 MG), consumption fluctuated in the intervening years, sometimes dramatically. For example, annual metered consumption was 1,676 MG in 2008 and 1,651 MG in 2009 and then dropped dramatically to 1,464 MG in 2010 due to the economic downturn. Single-family residential metered consumption has not returned to 2008 and 2009 levels, likely due to the slow economic recovery and the City's water

¹The "Irrigation" class is for meters specifically purchased for irrigating large areas. Other classes of meters can be used for irrigation as well (such as residential meters), but are not irrigation-exclusive. Irrigation meters have no associated sewer charges, and can be turned off in the winter without incurring base fees, but are charged a higher rate for water consumed since irrigation use occurs almost exclusively during peak season.

conservation initiatives. Except for the industrial customer category, every customer category had an average annual growth rate of 1.1% or less from 2007 through 2015. Thus, conservation initiatives and economic conditions had a large influence on water consumption in recent years. Weather patterns likely influenced some of the variability in consumption to a lesser extent, in ways that would increase consumption some years and decrease consumption in other years.

Exhibit 2-9. Annual Metered Consumption by Customer Category, 2007-2015.

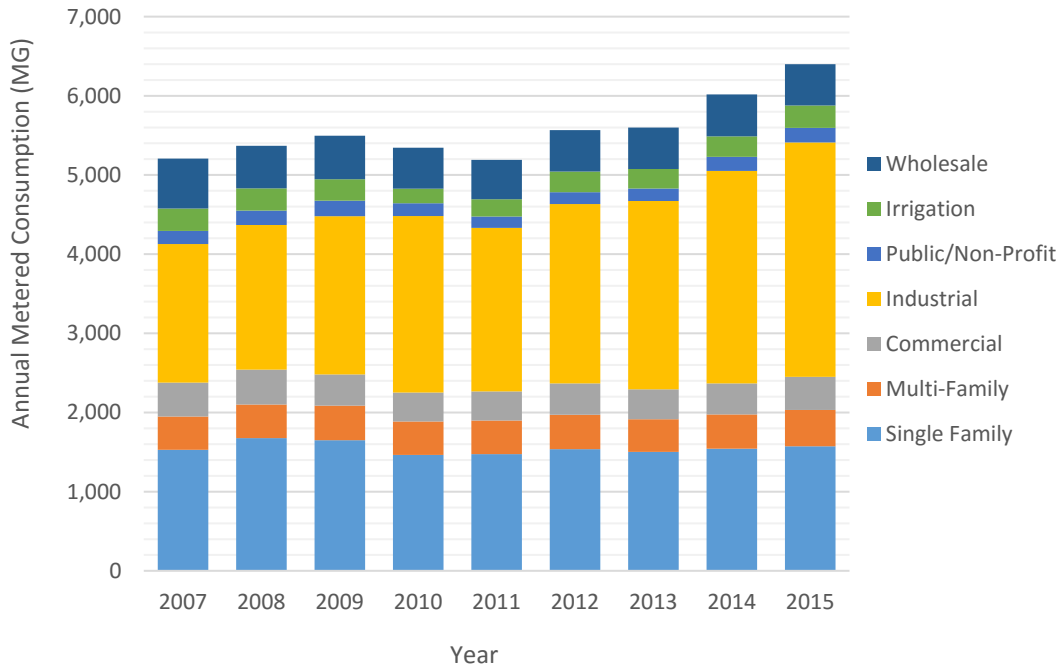


Exhibit 2-10. Percent Annual Metered Consumption by Customer Category, 2015.

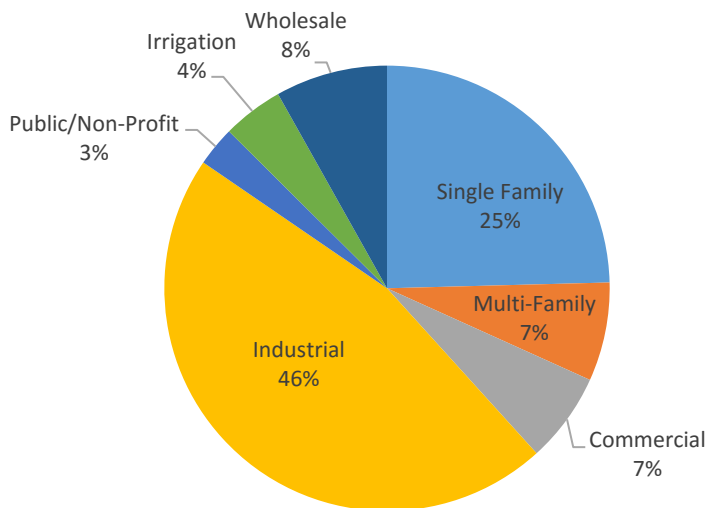
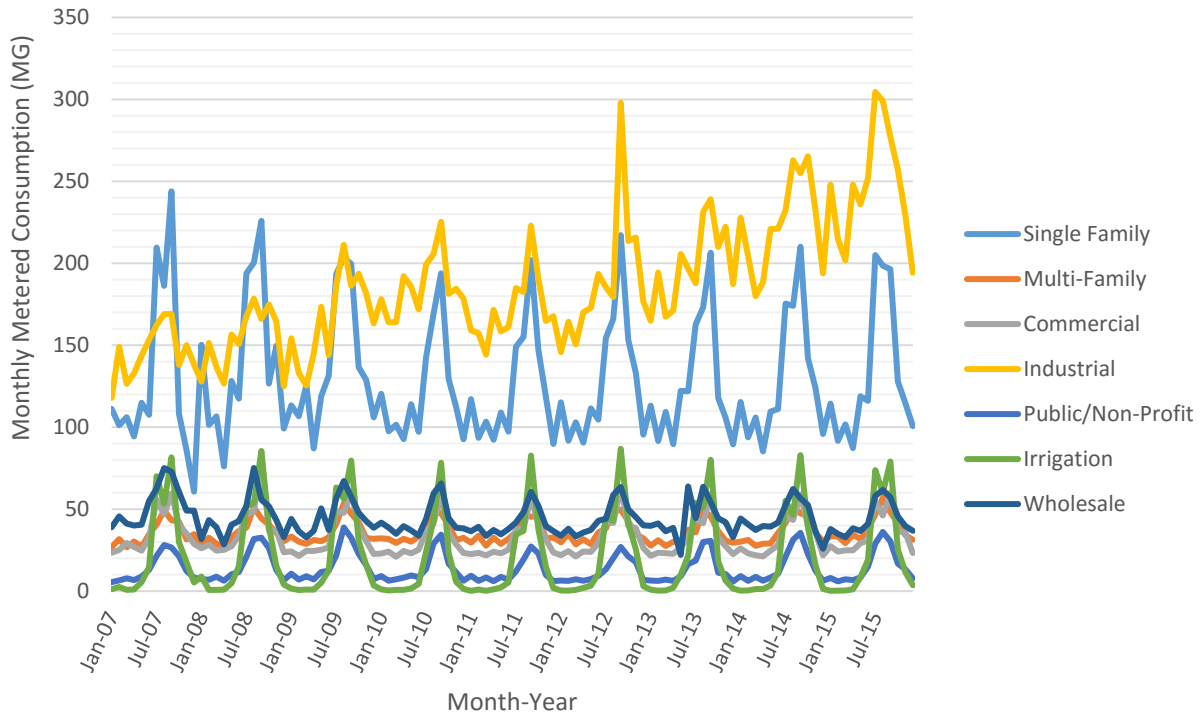


Exhibit 2-11 shows monthly metered consumption by customer category. The most notable trend is the steady increase in industrial water use throughout the study period.

Exhibit 2-11. Monthly Metered Consumption by Customer Category, 2008-2015.



Seasonal Water Use

Exhibit 2-12 compares the City’s summer (June to September), winter (December to March), and annual average water use for each customer category. Besides the irrigation category, public/nonprofit had the highest peaking factor of 3.8, which is due to irrigation of turf and landscaping in the summer. The single-family and commercial customer categories had similar peaking factors, 1.8 and 1.9, respectively, demonstrating that irrigation of lawns and landscapes in the summer nearly doubles monthly water use. The industrial customer class had a minor difference between summer and winter season use. Due to these peaking factors, the City is focusing its outdoor water conservation efforts on the public/non-profit, single-family, and commercial customer classes.

Exhibit 2-12. Seasonal Water Consumption and Summer:Winter Peaking Factor by Customer Category, 2015.

Customer Category	Average (MG/Month)			Peaking Factor (Summer:Winter)
	Summer	Winter	Annual	
Single Family	179.0	102.1	131.1	1.8
Multi-Family	47.4	31.8	38.2	1.5
Commercial	48.0	24.9	34.8	1.9
Industrial	283.1	214.7	246.8	1.3
Public/Non-Profit	27.6	7.2	15.4	3.8
Irrigation	57.9	1.1	23.5	52.0
Wholesale	54.5	35.6	43.4	1.5

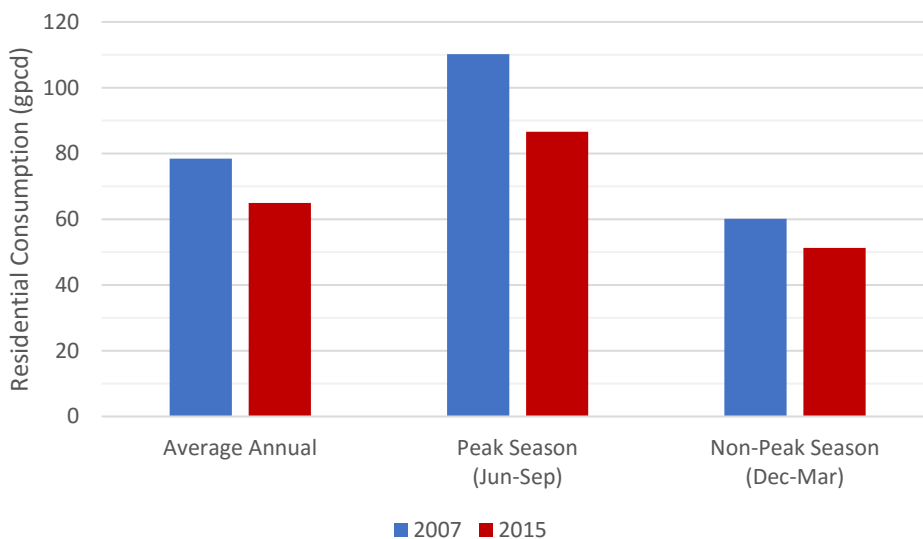
Per Capita Residential Consumption

Exhibit 2-13 and **Exhibit 2-14** compare the City’s residential (single-family and multi-family) per capita consumption in 2007, the latest year reported in the approved 2010 JWC WMCP, to the City’s residential per capita consumption in 2015. Consumption and population data from 2007 and 2015 were used to estimate annual and seasonal per capita residential consumption during these two years. The residential categories only include customers in the Hillsboro retail service areas (i.e. excludes wholesale deliveries to LA Water Cooperative, the City of Cornelius, and the City of Gaston). Therefore, only the In-town and Upper System Service populations are included in the service area population data shown in **Exhibit 2-13**. The residential consumer category per-capita consumption has declined by 18% since 2007, with greater reductions during the peak demand season. Furthermore, the Regional Water Providers Consortium (RWPC) 2016 Supply Plan analysis found that the City showed a greater rate of decline in residential per capita consumption than all other RWPC members from 2004 through 2013. The City attributes these reductions to modifications of the rate structure, smaller lot sizes, plumbing code changes, and the more than two decades of City conservation efforts geared toward residential customers, including public education efforts, technical and financial assistance programs, and rebates for water-efficient appliances. These programs are discussed in greater detail in Section 3.

Exhibit 2-13. Per Capita Residential Consumption, 2007 and 2015.

Year	Hillsboro Service Population (excluding wholesale)	Residential Consumption (MG)	Percent of Total Annual Consumption (%)	Residential Consumption (gpcd)		
				Annual Average	Peak Season (Jun-Sep) Average	Non-Peak Season (Dec-Mar) Average
2007	68,060	1,948.7	38%	78.45	110.19	60.10
2015	85,688	2,031.5	32%	64.95	86.61	51.26
Change	+21%	+4%		-21%	-27%	-17%

Exhibit 2-14. Seasonal Per Capita Residential Consumption, 2007 and 2015.



Water Losses

OAR 690-086-0140(9)

The City calculates non-revenue water (i.e. water loss) as the difference between total annual water demand and total annual metered consumption. To calculate non-revenue water, the City tracks water demand daily and metered water consumption monthly or bi-monthly. Non-revenue water represents the sum of unmetered uses (e.g. hydrant flushing and distribution system flushing), system leakage, overflows, and inaccuracies in measuring the production or customer meters. The City recently began estimating the volume of water used for distribution system flushing and tracking the volume of water used for construction purposes, but those data have not yet been integrated into the non-revenue water calculations. The City also meters water used at automatic flushing stations, at Fire Department training centers, and in bulk water sales, but those data have not been integrated into the non-revenue water calculations.

System leakage, as the name implies, is water lost due to deteriorating pipe, compromised pipe joints, service connections, valves, etc. With proper record keeping and metering of water, the percentage of water loss approaches the net volume lost to actual leakage.

In 2015, the City's non-revenue water was 7.4%, as shown in **Exhibit 2-15**. During preparation of the 2010 JWC WMCP, the City investigated potential causes for negative non-revenue water estimates from 2008 through 2010. The City determined that old sonic meters that could not be calibrated were likely responsible for the readings and replaced all sonic meters with magnetic meters in Fall 2010. From 2011 through 2015, the City's total non-revenue water averaged 6.3%.

Exhibit 2-15. Non-revenue Water, 2008-2015.

Year	Total Demand (MG)	Total Consumption (MG)	Non-revenue Water (MG)	Non-revenue Water (%)
2008	4,939.5	5,368.3	-428.8	-8.7%
2009	4,998.7	5,495.1	-496.4	-9.9%
2010	4,977.5	5,343.8	-366.3	-7.4%
2011	5,474.7	5,191.2	283.4	5.2%
2012	5,892.0	5,566.5	325.5	5.5%
2013	6,051.6	5,598.8	452.8	7.5%
2014	6,389.0	6,017.2	371.7	5.8%
2015	6,909.5	6,398.6	510.9	7.4%

Water Rights

OAR 690-086-0140(5)

The City's current water supply sources are the Tualatin River and its tributaries, which include a combination of natural flow and stored water released from Hagg Lake, and Barney Reservoir in the Trask River watershed. The City and its partners in the JWC and BRJOC, have several water rights granting access to these water supply sources. The member agencies have numerous intergovernmental agreements, as previously described (Appendix C), that clarify how and when these water rights are pooled together. Under these agreements, the City currently owns 33.75 mgd (52.21 cfs) of supply from the JWC WTP. Following a 10 mgd treatment capacity expansion of the JWC WTP, which is estimated to be completed in 2019, the City anticipates having access to an additional 8 mgd for total access of up to 41.75 mgd (64.59 cfs).

The JWC holds a limited license for an aquifer storage and recovery (ASR) program. The City has access up to one-third the capacity of the JWC limited license.

Finally, the City holds a 56 cfs portion of Permit S-55045, which authorizes the use of water from the Willamette River for municipal purposes. (The City of Salem holds the remaining portion of this right.)

The following descriptions and **Exhibit 2-16** summarize the JWC and BRJOC related water rights, JWC ASR limited license, and the City's Willamette River water right.

JWC Direct Diversion (Natural Flow) Water Rights

The JWC manages municipal water rights for the use of water from:

- the Tualatin River with authorized points of diversion at the Haines Falls Intake and at the SHPP;
- Sain Creek, which flows into Scoggins Creek at Hagg Lake, with points of diversion on Sain Creek and at the Scoggins Dam outlet, with re-diversion authorized at the JWC's SHPP;
- Scoggins Creek; and
- Gales Creek, with re-diversion authorized at the JWC's SHPP.

Storage Rights and Secondary Rights to Use Stored Water

In addition to using direct diversion or "natural flow" water rights, the JWC manages several water rights to store water and secondary water rights to use the stored water in order to meet the existing water demands within its system. These water rights are associated with Barney Reservoir and Scoggins Dam/Hagg Lake.

JWC ASR Program

The JWC (on behalf of the City of Hillsboro, City of Beaverton, and TVWD) holds ASR Limited License #019 (LL-019) to assess the feasibility of developing a regional ASR project in the Cooper Mountain vicinity. Each partner has access to one-third the capacity of the Limited License.

OWRD recently granted the JWC a five-year time renewal for ASR LL-019, from September 27, 2016 to September 27, 2021. ASR LL-019 was issued in the name of the JWC to authorize ASR pilot testing. It authorizes the storage of up to 2.1 billion gallons, which can be injected using up to 14 wells. Water can be injected at a maximum rate of 8,100 gpm (11.7 mgd). The JWC ASR limited license authorizes recovery of the stored water at a combined rate of up to 28,000 gpm (40.3 mgd). Recovery is limited to

2,000 gpm (2.9 mgd) at each of the 14 recovery wells, which are also the injection wells.

Thus far, development under ASR LL-019 has included installation of ASR wells and test wells. No ASR pilot testing activities have occurred to date.

Willamette River

The City holds a 56 cfs portion of Permit S-55045. This permit authorizes the use of water from the Willamette River year-round for municipal purposes. The current development timeline for this permit is October 1, 2086. A permit amendment (T-12512) is currently pending with OWRD that would change the authorized point of diversion for the City's 56 cfs portion of the permit to the Willamette River Intake near the City of Wilsonville.

Water Rights for Purposes Other Than Potable Water Supply

As shown in **Appendix D**, the City has numerous non-municipal water rights. The sources of these water rights include the Tualatin River, Barney Reservoir, McKay Creek and tributaries, Glencoe Swale, Beaverton Creek, Bronson Creek, Rock Creek and tributaries, Dairy Creek, a tributary to Jackson Slough, Sain Creek, a pond, wastewater effluent, and wells. The uses under these water rights include pollution abatement, irrigation, supplemental irrigation, multi-purpose storage, wetlands creation enhancement, wildlife, hydroelectric production, nursery operations, fish culture, aesthetics, storage of wastewater, and instream. Many of these water rights have been acquired through land acquisitions.

The City developed a system for identifying and tracking water rights acquired through land acquisitions following an initial inventory of water rights associated with lands owned by the City of Hillsboro in 2011. The inventory of water rights found 39 water rights clearly appurtenant to properties owned by the City of Hillsboro. A majority of the water rights are appurtenant to land managed by the Parks and Recreation Department, with the remainder associated with Public Works and Water Departments.

Since completion of the inventory, the City has been working diligently to manage these water rights. Below is a list of water rights management activities that the City has completed and ones planned for future dates.

Completed

- Received two instream leases covering five certificates.
- Certificated six permits.
- Cancelled three groundwater permits.
- Conducted one partial transfer with an adjacent landowner.

Forthcoming

- Completion of water right certification for Jackson Bottom Wetlands Preserve.
- Two groundwater permits to cancel.
- Review of remaining certificates available for instream lease or cancellation. Evaluation of costs/benefits of instream leasing for small amount of available flow will need to be performed.

Not Appurtenant

- Several water rights identified in the original inventory were deemed not applicable to City lands upon further review.

After completion of the City's water rights inventory on all City-owned properties, the City determined that development of a procedure to keep the inventory up-to-date was essential. Now, when City

Departments are purchasing or selling property, the Water Department is contacted to perform a search for appurtenant water rights and assist with the land exchange if needed. The City's Water Department provides education, guidance, administrative support, and contracting with water rights consultants to other City Departments.

Exhibit 2-16. Water Rights.

Source	Priority Date	Application	Permit	Certificate/ Transfer	Entity name on water right	Type of Beneficial Use	Authorized Rate (cfs)	Authorized Volume	Maximum Rate of Withdrawal To Date		Average Daily Diversion (mgd)		Average Monthly Diversion (MG)		Authorized Date of Completion
									Instantaneous (cfs)	Annual (MG)	2015	5-year (2011-2015)	2015	5-year (2011-2015)	
Tualatin and Trask River Basin Supplies															
Sain Creek	1/22/1912	S-2016	S-1136	81026	City of Hillsboro	Municipal	3	n/a	3		18.93	16.8	575.8	512.0	n/a
Sain Creek	5/1/1915	S-4250	S-2443	81027	City of Hillsboro	Municipal	2	n/a	2						n/a
Gales Creek	2/14/1947	S-222251	S-17549	T-11677	City of Forest Grove	Municipal	4.46	n/a	4.46						10/1/2035
Tualatin River	8/15/1930	S-13681	S-10408	67891	City of Hillsboro	Municipal	9	n/a	9						n/a
Tualatin River	2/6/1974	S-51643	S-46423	85913	City of Hillsboro	Municipal	43	n/a	43						n/a
Tualatin River	7/15/1980	S-60357	S-45455	85914	City of Beaverton	Municipal	25	n/a	25						n/a
Tualatin River	4/28/1976	S-54203	S-40615	85916	City of Forest Grove	Municipal	33	n/a	33						n/a
Scoggins Creek	6/9/1988	S-69637	S-54737		City of Hillsboro, City of Forest Grove, City of Beaverton, Tualatin Valley Water District, Joint Water Commission	Municipal	75	n/a	0						10/1/2071
Middle Fork of the North Fork Trask River (Barney Reservoir)	6/26/1958 & 12/10/1965	R-32420	R-4890	81024	City of Hillsboro	Municipal	n/a	12,600 AF & 7,400 AF	n/a	12,600 AF & 7,400 AF					n/a
Middle Fork of the North Fork Trask River and Barney Reservoir	6/26/1958	S-32421	S-32139	81020	City of Hillsboro	Municipal	38.7	n/a	38.7						n/a
Barney Reservoir	6/24/1971	S-48359	S-37837	81022	City of Forest Grove	Municipal	n/a	500 AF	n/a	500 AF					n/a
Middle Fork of the North Fork Trask River (in Barney Reservoir)	12/23/1971	R-49807	R-5773	81023	City of Hillsboro	Pollution Abatement	n/a	2,000 AF	n/a	2,000 AF					n/a
Barney Reservoir	7/8/1971	S-48420	S-35782	81021	City of Hillsboro	Pollution Abatement	30	n/a	30						n/a
Scoggins Creek	2/20/1963	R-38449	R-5777	81149	Bureau of Reclamation	Irrigation, Supplemental Irrigation, Municipal, Water Quality Control, and Fish and Recreation	n/a	60,000 AF (13,500 AF for Municipal Use by JWC Member Agencies)	n/a	60,000 AF					n/a
Scoggins Reservoir/Henry Hagg Lake	2/20/1963	S-38447	S-35792	87304	Bureau of Reclamation	Municipal	70.0	13,000	70.0		n/a				
Scoggins Reservoir/Henry Hagg Lake	2/20/1963	S-38447	S-35792	87303 T-11872	Bureau of Reclamation	Municipal	n/a	500 AF	n/a	500	n/a	n/a	n/a	10/1/2021	
Sain Creek, Tualatin River, Scoggins Creek and the Bull Run River, tributaries of Scoggins Creek, the Willamette River, the Tualatin River, and the Sandy River.			ASR LL-019		Joint Water Commission	Aquifer Storage and Recovery (ASR)	Recovery: up to 28,000 gpm (40.3 mgd) total (2000 gpm, 2.9 mgd) from each of 14 wells	2.1 billion gallons	0	0	0	0	0	0	9/27/2021

cfs = cubic feet per second; MG = million gallons; AF = acre-feet

Exhibit 2-16. Water Rights Continued.

Source	Priority Date	Application	Permit	Certificate/ Transfer	Entity name on water right	Type of Beneficial Use	Authorized Rate (cfs)	Authorized Volume	Maximum Rate of Withdrawal To Date		Average Daily Diversion (mgd)		Average Monthly Diversion (MG)		Authorized Date of Completion
									Instantaneous (cfs)	Annual (MG)	2015	5-year (2011-2015)	2015	5-year (2011-2015)	
Willamette River Supply															
Willamette River	12/6/1976	S-55010	S-55045 (Permit amendment T-12512)		City of Salem, City of Hillsboro	Municipal	200 (56 cfs of which is the City of Hillsboro's portion)	n/a	0	0	0	0	0	0	10/1/2086

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; and 3) any designation of the source as being in a critical groundwater area.

Water Quality

The Willamette River has been source of safe drinking water for communities (cities of Springfield, Corvallis, Adair Village, Wilsonville, and Sherwood) in the Willamette Valley for decades. For example, the Willamette River Water Treatment Plant in the City of Wilsonville has met or exceeded every safe drinking water quality standard since it began operation. Likewise the JWC WTP has provided safe drinking water from the Tualatin River and its tributaries since 1976. While water treatment plants produce water that meets drinking water quality standards, some pollutants remain in the rivers' untreated water. The Clean Water Act Section 303(d) requires the Oregon Department of Environmental Quality (DEQ) to identify waters (instream) that do not meet water quality standards for various water quality parameters and to determine where a Total Maximum Daily Load (TMDL) pollutant load limit needs to be developed as a means of improving water quality. When a TMDL has been established (i.e. approved), water quality parameters may be removed from the 303(d) list. Other measures established to improve water quality, data demonstrating water quality improvements, and revisions of water quality standards may also result in removal of water quality parameters from the 303(d) list.

City of Hillsboro Municipal Water Rights for Willamette River Supply

The City has a permit amendment application (T-12512) pending at OWRD to change the point of diversion downstream for its 56 cfs portion of Permit S-55045 to the Willamette River Intake located at approximately river mile 39. The reach of the Willamette River containing the City's point of diversion is included on the DEQ's 303 (d) list for chlorophyll-a (summer) (For more information see: www.deq.state.or.us/wq/assessment/2010Report.htm). DEQ delisted temperature and *E. coli* (Fall/Winter/Spring) in 2010 upon approval of a TMDL.

JWC and BRJOC Related Municipal Water Rights and City of Hillsboro Non-municipal Water Rights

Appendix E presents DEQ's 303(d) listings for all JWC and BRJOC related municipal water rights and the City of Hillsboro's non-municipal water rights. This is also described in the 2010 JWC WMCP. The municipal water rights authorize diversions on the Tualatin River and tributary creeks, and the Middle Fork of the North Fork Trask River. The City's non-municipal water rights authorize diversions on the Tualatin River, McKay Creek and tributaries, Glencoe Swale, Beaverton Creek, Bronson Creek, Rock Creek and tributaries, Dairy Creek, runoff--a tributary to Jackson Slough, Sain Creek (tributary of Scoggins Creek), a pond, effluent wastewater, and wells.

Listed Streamflow-dependent Species

Exhibit 2-17 shows the fish species with state or federal protections in Willamette River within the reach of the City’s point of diversion (~river mile 39), the Tualatin River watershed, and Trask River watershed.

Exhibit 2-17. Listed Fish Species in the Willamette River (within the reach of the City’s Point of Diversion at ~river mile 39), Tualatin River Watershed, and Trask River Watershed.

Listed Fish Species	Type of Listing		Evolutionarily Significant Unit (ESU) (i.e. Range of Federal/State Listing)	Affected Watershed(s)
	Federal	State		
Fall Chinook	Threatened	Sensitive-Critical	Lower Columbia River	Tualatin, Willamette
Spring Chinook	Threatened	Sensitive-Critical	Lower Columbia River, Upper Willamette River,	Tualatin, Willamette
Coastal Cutthroat		Sensitive-Vulnerable, below Willamette Falls	Lower Columbia River, including up to Willamette Falls; Coastal Cutthroat Trout Species Management Unit (SMU)	Tualatin, Willamette, Trask
Coho Salmon	Threatened	Endangered	Lower Columbia River, including up to Willamette Falls	Tualatin, Willamette
Coastal Spring Chinook		Sensitive-Critical	Coastal Spring Chinook SMU	Trask
Coastal Coho Salmon	Threatened	Sensitive-Vulnerable	Coastal Coho Salmon SMU/ Oregon Coast	Trask
Coastal Winter Steelhead		Sensitive-Vulnerable	Oregon Coast	Trask
Winter Steelhead	Threatened	Sensitive-Critical	Lower Columbia River, Upper Willamette River	Tualatin, Willamette
Chum Salmon	Threatened	Sensitive-Critical	Columbia River	Tualatin, Willamette
Western Brook Lamprey		Sensitive-Vulnerable	Columbia River System	Tualatin, Willamette, Trask
Pacific Lamprey	Petitioned for listing	Sensitive-Vulnerable	Columbia River System	Tualatin, Willamette, Trask
Pacific Eulachon	Threatened	Sensitive-Vulnerable	Southern DPS, Northern Oregon and Washington	Tualatin, Willamette, Trask

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/oregonfo/Species/Data/PacificLamprey/default.asp>

Critical Groundwater Area

Neither the City nor the JWC hold native groundwater rights for municipal water supply, so a critical groundwater area designation does not apply to their municipal water rights. The City's non-municipal groundwater rights are not located within a critical groundwater area.

Evaluation of Water Rights and Supply

OAR 690-086-0140(3)

Tualatin River Basin and Barney Reservoir Water Supply

As previously described, the City obtains its municipal water supply from the JWC, which manages water rights for the Tualatin River and its tributaries (both natural flow and stored water), and stored water released from Barney Reservoir in the Trask River watershed. The reliability of these water rights is evaluated in detail in the JWC's 2010 approved WMCP. On occasion all natural flow water rights have been regulated off due to low river flows and comparatively junior priority dates. The City must, therefore, rely on released stored water from Hagg Lake and Barney Reservoir under those circumstances. As previously described, the City is currently entitled to up to 33.75 mgd (52.2 cfs) of supply from the JWC WTP and anticipates having access to 41.75 mgd (64.59 cfs) following the JWC WTP capacity expansion, which is estimated to be completed in 2019.

ASR Program

The City, as well as TVWD and the City of Beaverton, have initiated an ASR project, which is authorized by ASR limited license #019 (held by the JWC). The limited license authorizes a maximum storage volume of 2.1 billion gallons and a maximum combined recovery rate of 40.3 mgd (62.3 mgd). To date, however, water has not been stored under this ASR limited license, and the City does not have infrastructure to distribute water from the test wells' locations, so ASR does not currently provide the City with a source of water supply.

Willamette River

As previously described, the City holds a 56 cfs portion of Permit S-55045 for use of water from the Willamette River. The Willamette River has ample water supply to meet the City's projected water use under Permit S-55045. OWRD's online water availability database indicates as much as 993 cfs of water is available for appropriation in the Willamette River at Salem in the month of August. The water availability analyses incorporate all existing consumptive use and non-consumptive use water rights, including instream water rights, when determining water availability. Based on streamflow available in the Willamette River and the priority date, Permit S-55045 is expected to be highly reliable.

However, the reliability of Permit S-55045 can be affected by permit extension conditions. As part of the municipal permit extension process, the Oregon Department of Fish and Wildlife (ODFW) recommended to OWRD that the extension of time for Permit S-55045 contain conditions intended to “maintain the persistence of listed fish.” These conditions include target flows on the Willamette River, as shown in **Exhibit 2-18**. If the target flows are not met, use of the undeveloped portion of Permit S-55045 would be reduced in proportion to the amount by which the target flow is missed (based on a seven-day rolling average of mean daily flows). The overall reduction in the amount that can legally be diverted will not exceed 20%.

Exhibit 2-18. Permit S-55045 Target Flows for Fish Persistence in the Willamette River, Measured at U.S. Geological Survey (USGS) Gage 14191000 at Salem.

Time Period	Target Flows (cfs)
July 1 – October 31	5,630
November 1 – March 31	6,000
April 1 – April 15	15,000
April 16 – April 30	17,000
May 1 – May 31	15,000
June 1 – 15	12,600
June 16 – 30	8,500

The U.S. Army Corps of Engineers (USACE) has managed its thirteen reservoirs within the Willamette River Basin to meet target flows since the early 2000s. While the USACE’s target flows are slightly different from the ones included in Permit S-55045, they both refer to flows measured at the Salem gage (USGS 14191000). Analysis of seven-day rolling average streamflow records from January 2000 through December 2015 shows that target flows for Permit S-55045 were met on 94.8% of the days. **Exhibit 2-19** shows the number of days and range of months that the seven-day rolling average flow did not meet the above-described target flows. The 302 days in which the target flows were not met were most likely to occur in April, May, and June, which do not correspond to the City’s time period of peak demands in July and August.

Exhibit 2-19. Willamette River Flows at Salem Gage (seven-day rolling average) compared to Permit S-55045 Target Flows, 2000-2015. Target flows were missed on 5.2% of the days.

Year	Number of Days Target Flows Missed	Months
2000	1	June
2001	80	April - August
2002	2	June
2003	13	May - June
2004	25	April - May
2005	2	April
2006	0	
2007	20	May - June
2008	0	
2009	0	
2010	0	
2011	0	
2012	0	
2013	13	May - June
2014	4	June
2015	142	April - September

In addition to the fish persistence conditions on Permit S-55045, the Willamette River has unconverted minimum perennial streamflows (MPSFs) with both natural flow and released stored water components. The natural flow component of the unconverted MPSF at Wilsonville is 1,500 cfs and the released stored water component is up to 4,700 cfs. The City does not expect the conversion of the MPSFs to impact the reliability of Permit S-55045. Nevertheless, the City will continue to track the conversion process and is an active participant in the Willamette River Basin Review (often called the “Reallocation Study”).

System Description

OAR 690-086-140(8)

The City has the Cherry Grove WTP on the Tualatin River, which serves the City’s Upper System, Gaston, and LA Water Cooperative. The WTP has a capacity of 3.0 mgd. The City has four finished water storage reservoirs with a total capacity of 31.9 MG and approximately 1,613,552 linear feet of distribution lines. **Exhibit 2-1** presents a schematic of the City’s water system in the City’s current water service area (See **Exhibit 5-1** for the City’s future water service area). **Exhibits 2-20** through **2-23** provide information about the City’s reservoirs, booster pumps, and pipelines.

The JWC uses the SHPP and adjacent JWC WTP on the Tualatin River to divert then treat natural flow and released stored water from the Tualatin River. The JWC WTP currently has a rated capacity of 75.0 mgd. Finished water from the JWC WTP is pumped via high pressure transmission lines the partners’ distribution systems, either directly or first to the Fern Hill Reservoirs, two 20 MG concrete reservoirs

located on a hill approximately one-third mile east of the WTP. The JWC water system is described in detail in the 2010 JWC WMCP.

Planning and development of the infrastructure required to deliver the Willamette River water supply is currently underway.

Exhibit 2-20. Summary of System Reservoirs.

Facility	System	Material	Capacity (MG)
24th Avenue	In-Town	Concrete	6.0
Evergreen	In-Town	Concrete	15.0
Dilley	Upper	Steel	0.9
Crandall	In-Town	Concrete	10.0

Exhibit 2-21. Summary of Existing Pump Stations.

Facility	System	Design Capacity (mgd)	Motor Drive
24th Avenue	In-Town	5	Two 125 HP Variable Speed
Evergreen	In-Town	10	Two 125 HP Constant Speed; Two 125 HP Variable Speed
Crandall	In-Town	15	Four 150 HP Variable Speed

Exhibit 2-22. Summary of Pipeline Sizes.

Pipe Diameter	Length in Linear Miles	Percent of Total Length (%)
1"	0.2	0.1
1.5"	0.01	0.0
2"	5.8	1.9
3"	0.1	0.0
4"	20.4	6.7
6"	61.5	20.1
8"	110.8	36.3
10"	36.1	11.8
12"	26.9	8.8
16"	10.2	3.3
18"	28.7	9.4
20"	0.5	0.2
24"	2.8	0.9
36"	1.5	0.5
Unknown	0.02	0.0
TOTAL	305.5	100.0

Exhibit 2-23. Summary of Pipeline Materials.

Pipeline Material	Length in Linear Miles	Percent of Total Length (%)
Ductile Iron	220.2	72.0
Cast Iron	58.0	19.0
OD Steel	14.7	4.8
Plastic	8.7	2.8
Galvanized	1.9	0.6
Copper	1.0	0.4
Steel Concrete Cylinder	1.0	0.4
TOTAL	305.5	100.0

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3. Water Conservation

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

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

Current Conservation Measures

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

Progress Report

This is the first WMCP developed solely by the City. The JWC’s WMCP, approved by OWRD in 2010, describes the conservation programs of each of the JWC member agencies, including the City of Hillsboro. In addition, the JWC’s 2015 WMCP Progress Report includes status updates on the City’s and other JWC member agencies’ water conservation benchmarks included in the 2010 approved JWC WMCP.

Background

The City has numerous water conservation measures that make up its robust water conservation program, including the following measures:

- The City’s water conservation education program elements include several websites promoting water conservation, water conservation presentations and activities for youth, distribution of devices and information that encourage community gardeners to conserve water, and outreach at local and regional events.
- The City has a three tiered rate structure for the single-family residential and a higher cost per unit when a base volume is exceeded for the commercial, public entities, non-profit, customer categories. The rates for all customer categories are based on analyses in a rate study completed in 2014 and are designed to bill each class fairly for its share of system demand. This rate structure causes customers to pay a higher unit cost for water use that exceeds what is considered essential for basic life/health needs, which encourages less water use.
- The City is currently installing an AMR (automated meter reading) system, which is on track to be finished by 2020, as planned. All new meters will be installed as AMR meters and existing meters are being replaced with AMR.
- The City approved and implemented a new bulk water program in Spring 2010 and further refined the bulk water program in 2016. The bulk water program requires contractors to use a hydrant meter and pay for the metered water usage.
- To encourage water use efficiency among gardeners, the City provides technical and financial assistance to community gardens and to school gardening programs. Assistance includes funding water-wise landscape architectural design, planting water-wise demonstration gardens and planting strips, providing compost, water-wise gardening educational information, rain gauges, aqua spikes, and planting brochures.

- The City recently added residential rebates for WaterSense-labeled Weather-Based Irrigation Controllers, which has been a very popular rebate program.
- Hillsboro Water Department participates on the City of Hillsboro's Sustainability Task Force that sets ambitious goals for conservation (decrease in gpcd) and non-revenue water loss (never to exceed 10%).
- The City ran a waterless urinal pilot project with Forest Hills Lutheran School (previously known as Westside Lutheran). Forest Hills Lutheran Church runs a small private school, and is not affiliated with Hillsboro School District. The waterless urinal pilot project was proposed by the Lutheran School, and the City thought it was a good partnership for the City's ICI (Industrial, Commercial, and Institutional) Conservation Program. The City paid for three urinals installed in 2009 and paid for 50 percent of two additional urinals in 2014. Waterless urinals have been successful at the school due to the dedication of maintenance staff and the relatively low volume of use. In addition, the City hired a consultant (SBW Consulting) to conduct urinal audits at several older Hillsboro School District schools. The urinals at the schools evaluated were built into the walls, and it would have been a considerable expense to tear out the urinals to replace them with newer models, waterless or otherwise. Instead, SWB Consulting recommended throttling the shutoff valves on the existing urinals, which essentially cut the water required for flushing urinals in half. At one school, estimated water savings through this measure was approximately 81,000 gallons, at no cost to the school. The City determined that this action was a much more cost-effective approach than promoting waterless urinals. Furthermore, the City provided some funding for toilet replacements at older schools in the Hillsboro School District.

Use and Reporting Program

OAR 690-086-0150(2)

The City manages the water use measurement and reporting program for the JWC managed water rights and for the City's facilities. The JWC's water withdrawals are measured at two raw water meters in the raw water pipelines between the intake facility at the SHPP and the JWC's WTP. (The JWC is currently replacing the raw and finished water meters to ensure the highest accuracy). The City's water withdrawals at the Cherry Grove WTP are measured downstream of the WTP near the soda ash station. The meters located between the Haines Falls intake and the Cherry Grove WTP are unreliable because of old age, oversizing, and unmet straight-line pipe requirements. The requested FY17-18 budget includes funds for their replacement. During preparation of the 2010 JWC WMCP, the City investigated potential causes for negative non-revenue water estimates from 2008 through 2010. The City determined that old sonic meters that could not be calibrated were likely responsible for the readings and replaced all sonic meters with magnetic meters measuring flow from the JWC to the City in Fall 2010.

The water withdrawal measurements are used for reporting that complies with the measurement standards in OAR Chapter 690, Division 85. The City's water use records can be found on the OWRD webpage: http://apps.wrd.state.or.us/apps/wr/wateruse_report/.

In addition to the measurement and reporting required by the water use reporting program, the City and the JWC submit weekly withdrawal reports to the District 18 Watermaster during the peak season to coordinate stored water releases and instream flows. Furthermore, the City reports stored water releases annually to OWRD.

Required Conservation Programs

OAR 690-086-0150(4)

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

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

Five-Year Benchmarks for Required Conservation Measures

During the next five years, the City plans to initiate, continue, or expand the following conservation measures that are required of all municipal water suppliers.

Annual Water Audit

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

The City conducts annual water audits. The City calculates non-revenue water as the difference between total water demand and total metered consumption. To calculate non-revenue water, the City tracks annual water demand and metered water consumption. Non-revenue water represents the sum of unmetered uses (e.g. hydrant flushing and distribution system flushing), system leakage, overflows, evaporation, and inaccurate measurements at the production or customer meters. The City recently began estimating the volume of water used for distribution system flushing and tracking the volume of water used for construction purposes, but those data have not yet been integrated into the non-revenue water calculations. Historically, the water used for construction purposes was managed through the City's bulk water program and water use was estimated by individual contractors. However, the City approved and implemented a new bulk water program in Spring 2010. Contractors are no longer allowed to estimate bulk water usage then pay based on that estimate. Contractors must use a hydrant meter and pay for the metered water usage. The City refined the bulk water program in 2016 to further reduce unauthorized water use.

The City's non-revenue water in 2015 was 7.4%. The City's accounting of non-revenue water has significantly improved since the 2010 JWC WMCP as a result of City actions such as: replacing all sonic master meters with magnetic master meters, installing Automated Meter Reading (AMR) meters, and implementing the bulk water program.

Five-Year Benchmarks: The City will continue to conduct annual water audits. In the next five years, the City will include distribution system flushing estimates and metered bulk water consumption in its non-revenue water calculations.

System-wide Metering

The City is completely metered. The City installs meters that are 2 inches or smaller and hires contractors to install larger meters on new connections. The City is currently converting to an AMR system. As of September 2016, the City installed 18,900 meters (77% of the total) and has about 5,700 meters (23% of the total) left to install. The City is on schedule to finish installing the AMR system by 2020, as planned. All new meters will be installed as AMR meters and existing meters are being replaced with AMR. The AMR Neptune meters are equipped with notification alarms that indicate a leak is present when a meter runs continuously, or may be present when a meter runs for 18 hours. The new AMR system also will alert customers and Water Department staff when meters fail to function properly.

Five-Year Benchmarks: The City will continue to replace old style meters with AMR meters on a schedule plan that will have all existing meters replaced by or before 2020. The City will also continue to install AMR in all new meter installations.

Meter Testing and Maintenance

The City manages the meter testing and maintenance program for the City's master meters. The City has a biennial testing and maintenance program for meters less than three inches in diameter. The City tests meters three inches or larger annually. Any meters that fail testing are promptly either rebuilt or replaced. In Fall 2010, the City replaced all sonic master meters with magnetic master meters where the City's distribution system connects to JWC transmission lines. In Spring 2014, the City installed the new magnetic meter to measure the SSFP's finished water. Replacement of these master meters has resulted in more accurate non-revenue water data. Replacement of the City's sonic meters measuring raw water at the SSFP is currently in the planning stage.

Five-Year Benchmarks: The City will continue to implement its meter testing and maintenance program. The City will replace the sonic meters measuring raw water at the SSFP. The City will work with Neptune to establish a reliable maintenance program for the AMR meters.

Water Rate Structure

The City charges its retail water customers a base rate based on meter size and a usage rate based on the volume of water consumed. The City has a three-tiered rate structure for the single-family residential customer category and a higher cost per unit when a base volume is exceeded for the commercial, public entities, non-profit, customer categories. The net impact of these rate structures is that customers pay a higher unit cost for water use above what is considered essential to life/basic needs, which encourages customers to conserve water to save money, and in the case of commercial, public entities, and non-profits, the goal is to encourage those customers to reduce their summer peaks. The rates are based on analyses in a rate study completed in 2014 and are designed to bill each customer category fairly for its share of system demand. The City's irrigation customer category rate is set high to promote conservation and to reduce water demand peaks during the summer season. In addition, the City increased rates across all retail customer categories by 6.5% in 2014, 6% in 2015, and 9% in 2016, and it plans to continue to similarly raise rates through 2019. **Appendix F** shows the water rates for the City's customer classes as of October 1, 2016.

Five-Year Benchmarks: The City will continue to bill customers based on the volume of water consumed, with pricing structures set to encourage conservation, especially during peak season. The City will continue to implement recommendations from the 2014 rate study. In the next five years, the City will conduct another rate study.

Leak Detection and Repair

The City has a comprehensive leak detection and repair program, which it recently enhanced. In 2016, the City bought \$40,000 worth of leak detection equipment, including 10 data loggers, a correlator set, and active listening devices. The City also bought a vehicle and has outfitted it with a canopy, the newly purchased equipment for the leak detection program, and other tools and equipment (e.g. wrenches, keys for opening and closing valves, and water quality equipment). In addition, the City is now dedicating two employees to the year-round leak detection program. These two employees use leak detection equipment to check areas for leaks, which is a daily responsibility. When they are informed of leaks needing investigation, the employees prioritize repairs based on urgency, then either complete their current task or immediately respond. They use such information as quarter sections and addresses to plan and track the leak detection survey work.

Identified leaks are evaluated for their potential water loss and fixed on a prioritized basis based on the risk of injury and property damage. Leaks deemed as having immediate risk to injury or property damage are considered an emergency and are responded to immediately. Less urgent leaks are addressed as soon as the more urgent leaks are repaired.

The City also uses its AMR program to flag both intermittent leaks and sustained leaks on the customer side of the meter. The City notifies the customer of the potential leak so the customer can take corrective action. The City also has a policy (adopted in a 1988 resolution) to adjust the leak portion of a customer's bill if the customer repairs the leak within 10 days of it being reported and provides proof of repair, and the customer hasn't received another leak adjustment over a prior 12-month period. The program is designed to encourage customers to identify and repair leaks in a timely manner.

The City targets approximately \$2 million per year in funded depreciation projects to replace high priority aging infrastructure as well. (The actual dollar value budget varies each year based on revenue and overall expenditure projections). The City uses pipe age, tracked in GIS, to decide which part of the system is in the greatest need of replacement when funded depreciation projects are chosen annually.

From 2011 through 2014, the City spent \$3,485,000 and replaced approximately 28,860 linear feet of pipeline. Since the City began implementing its enhanced leak detection and repair program in February 2016, the City has surveyed approximately 41 miles of pipeline for leaks and found and repaired approximately 14 leaks. The survey began in areas suspected to have a high possibility of leaks, including the older areas of the distribution system. In addition, the City inspected all three distribution reservoirs for cracks and leaks in 2016.

In 2015, the City's non-revenue water was 7.4%.

Five-Year Benchmarks: The City will continue to conduct leak surveys and to utilize its AMR program as part of its leak detection and repair program. The City will continue to budget for replacement of high priority aging infrastructure. The City will inspect all three distribution reservoirs for cracks and leaks every five years.

Public Education

The City's public education program utilizes a variety of approaches to encourage customers to conserve water. The City communicates regularly with its customers via brochures, bill inserts, City newsletters, websites, local outreach events, social media and other media outlets. The City also organizes local water conservation programs and water education outreach activities. The City's

public education program is managed by a one-time State of Oregon certified teacher, with a Master's Degree in teaching. Having someone with teaching experience run the program has allowed the City to tailor its program to maximize educational value. In 2010, the City added another conservation staff person to further implement conservation programs. The elements comprising the City's public education program are described in greater detail below.

Print and Media

The City's Water Department website (www.hillsborowater.org) contains water conservation information, descriptions of the City's water conservation programs, water-efficiency rebate information, a weekly watering tool to help Hillsboro residents know how much to water during summer months, and teacher resources for water conservation education. The website also contains a link to the Regional Water Providers Consortium (RWPC) conservation website (www.conserveh2o.org), which provides more detailed conservation tips and resources, web tools for assistance in water-wise planning, and water conservation and leak repair videos. The City provides a significant portion of the funding for RWPC Conservation Committee programs, served on the panel to select the web design firm for the RWPC website, and actively participates in web development for the site. In addition, the City has a water supply website (<http://hillsborowatersupply.org>) that includes water conservation content, and a sustainable gardening website (www.hillsborogardening.org) that suggests water-efficient plants and provides a watering guide. In 2016, the City hired a videographer who is assisting in the creation of "how-to" water conservation and other water education videos, including freeze protection and leak repair. The City also has participated in several news segments about water conservation on local news stations.

Youth Education

The City's youth education program consists of classroom lessons about water resources that integrate water conservation messages. The City tailors these school lessons to match proper developmental stages for students and to ensure that the lessons meet state benchmarks and curriculum guidelines. This specific lesson targeting results in an improved level of acceptance from teachers and deepens the City's ability to reach more students in more schools. The following are examples of classroom lessons.

K-2nd (Primary Benchmarks: Water Cycle, Weather):

Where's The Water Watson? The City and the RWPC worked with Mad Science to develop an entertaining, educational, and age-appropriate show highlighting the unique and magical attributes using water cycle as the learning model, while also weaving in important messages about water conservation suitable for lower primary students.

Incredible Journey – A *Project Wet* curriculum activity that uses beads for graphing a water drop's journey through the water cycle. (The *Project Wet* curriculum was developed by the Project WET Foundation, which develops water education resources for teachers to use in the classroom.)

3rd & 4th (Primary Benchmarks: Communities, Environment, Water Cycle):

Drop in the Bucket – Another *Project Wet* activity that visually demonstrates how little fresh water is actually available in the world for drinking.

Common Water – A *Project Wet* activity that was modified by staff to include a lesson on Hillsboro city history. Students learn how the water available in the Tualatin River Watershed is the same amount as what was available 200 years ago. They see how the water needs to be shared with people, plants, animals, fish, the river, etc.

Incredible, Edible Aquifer – An activity that teaches about point source pollution and what happens if an aquifer is depleted by too much use.

The Long Haul – An activity that teaches how water was retrieved before pipes made the process as easy as turning on the tap. Students discuss how much less water was used back then per person and why, and if they would find ways to use less if they still had to haul water today. The lesson ends with ideas about how to reduce water use in current society, why that is still important, and why we should never take drinking water for granted.

Mad Science “What do you know about H₂O?” – An assembly program that was developed by a joint venture between Mad Science, an organization that offers science programs, and the RWPC that teaches water science and conservation.

Upper Elementary (Primary Benchmarks: Basic Chemistry, States of Matter and Physical Properties):

Water Quality and Quantity – Teaches students the importance of high quality water and what that means for supply issues. Students are taught that high quality water is not available in endless quantities and as supplies are stretched source quality can deteriorate.

6th Grade and Above:

From Source to Tap - This in-depth lesson teaches students to care about their water and their watershed. It emphasizes how water demands grow but sources typically don't grow and how all life in a watershed is dependent on the supply. It also includes conversation about infrastructure, including why it is important that the City keep water loss to a minimum, and to find and repair leaks in its transmission and distribution lines. The lesson ends with focus on the students and their water usage. How much water do they use? What kind of demands does that put on the system? Why is it important to find and repair leaks at home? What is the student's "water footprint" on the environment and finally, what actions can they take to save water?

Since 2005, the City has hosted an annual calendar contest in which elementary school students enter water-themed drawings (primarily featuring water-wise tips) for a calendar. Themes have included “Catch on to Saving Water” and “Give Water Conservation a Hand.” Announcements for the yearly contest also share information about other school programs that the Water Department offers including stage shows for school assemblies and in-class presentations. Teachers often call for a presentation and then encourage their students to participate in the contest by illustrating the new water facts and conservation tips they have learned.

The Water Department has begun coordinating with other city departments to provide a “one-stop shopping” opportunity for teachers. A webpage and brochure are under development that will inform teachers of all educational programs available through the City. The goal of this collaborative effort is to increase promotional efficiency of City-offered programs, and should increase the number of teachers participating in water educational programs in their classrooms.

Community (All Ages) Outreach

The Hillsboro Water Department puts a high priority on educational programs focused on reducing peak season water use. The Water Department has partnered with the Parks Department to run a community garden program, which encourages community gardeners to use water-wise gardening practices and provides information on the “how-to” of water-wise gardening at the gardeners yearly kick-off meeting. The City also provides incentive equipment and supplies for water-wise gardening. Tools and supplies include: soaker hoses, compost, water-wise seeds, hose nozzles, and special nozzles called “Aqua Spikes.” An Aqua Spike can be screwed on to a soda bottle full of water and inserted into the ground. Water is gradually delivered directly to the root-zone of nearby plantings, with very little water lost to evaporation.

The City’s “Seven Steps for Water-Efficient Gardening” activity, which is commonly used at summer events, promotes water-wise plant choices and teaches proper planting techniques. Kids and adults choose water-wise seeds from a plethora of choices and then plant the seeds in a peat pot. While they follow the planting steps that are detailed in signage and also explained by staff, participants learn why it’s important to amend dirt with compost to increase nutrient load and water-holding capacity and why they should use mulch to reduce evaporation and suppress weeds. Finally, the City encourages participants to water regularly until the seeds are established, then reduce or eliminate watering altogether.

City staff also provides both child and adult-oriented learning opportunities to other community organizations. Those groups include Boy and Girl Scout troops, the AARP, community garden groups, and civic organizations. The presentations are tailored to the individual group, such as a “Seven Steps to Water-Wise Gardening” presentation for gardening groups and presentations/tours tailored to meet requirements for waterworks badges when working with Scout troops.

The City provides conservation information and water-saving devices at local events, such as the Latino Festival, Earth Day Celebration, Pix on the Plaza, Farmers’ Markets, and watershed education events. In 2013, the City designed a water-saving devices display board for events, which allows customers to only take the specific devices that they want to install rather than handing out kits.

The City also usually takes the lead in organizing and providing staffing for water conservation outreach at regional events, including the Washington County Fair, the Public Works Fair, and the International Air Show. Some events, such as a new City-organized event at the M & M Swap Meet in Hillsboro target low-income and minority citizens. Given that Washington County has a significant Latino population, the City also provides a large portion of educational information in both English and Spanish.

In addition, the City contributes \$1,000 and staff time to help coordinate the annual Clean Water Festival, a regional water educational learning opportunity for fourth and fifth graders that includes a variety of interactive conservation activities.

Five-Year Benchmarks: The City will continue its public education program. In the next five years, the City will add “how to” water conservation videos and may add links to other water conservation videos on the conserveh2o.org website. The Teacher Resource brochure and link will also be completed. In addition, the City received a grant to construct a Tualatin River watershed display that will be used in both classroom activities and at outreach events to promote source water protection and conservation efforts in the Tualatin Basin. The display will be completed in Spring 2017.

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 a five-year implementation schedule for a system-wide leak repair or line replacement program to reduce system leakage to no more than 15%.

The City proposes to initiate diversion of water from the Willamette River under *extended permit* S-55045. Aquatic resource issues have been identified for the Willamette River; however, in 2015, the City's non-revenue water was 7.4%. Although the City's non-revenue water, and thus system leakage, is well below 15%, the City continues to implement a comprehensive leak detection and repair program as summarized above.

Additional Conservation Measures

OAR 690-086-0150(6)

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

1. Leak Repair or Line Replacement Program

Under this rule requirement, the City is required to implement a system-wide leak repair program or line replacement program to reduce system leakage to 15%, and if feasible to 10%. The City's non-revenue water in 2015 was 7.4%, and, therefore, system leakage is well below 10%. Nevertheless, the City has a comprehensive leak detection and repair program.

Five-Year Benchmarks: The City will continue to conduct leak surveys and to utilize its AMR program as part of its leak detection and repair program. The City will continue to budget for replacement of high priority aging infrastructure. The City will inspect all three distribution reservoirs for cracks and leaks every five years.

2. Technical and Financial Assistance Programs

The City set aside \$10,000 in its conservation budget each year from 2010-2015 to offer technical and financial incentives to commercial, multi-family, non-profits and industrial customers throughout the City (ICI (Industrial, Commercial and Institutional) Program). In 2016, this budget increased from \$10,000 to \$20,000 to provide more conservation assistance to non-residential customers, especially in the area of outdoor irrigation. The City continues to offer water audits and water saving devices to industrial customers, online water audits to residential customers, technical assistance and water saving materials to demonstration and community gardens, and free indoor and outdoor water-saving devices to customers at events or upon request.

The City has provided technical and financial assistance to the Hillsboro School District and Intel, its largest institutional and industrial customers. In 2008, the Pacific Northwest Section of AWWA deemed the City's School Audit Program the best non-residential conservation program run by a middle-sized agency. For Intel, the City hired a consultant (SBW Consulting) to provide a list of implementation recommendations, along with a cost/benefit analysis for which recommendations

had the quickest payback. In addition to providing the audit and recommendation report, the City and consultant staff also installed low-flow showerheads, low-flow faucet aerators, water efficient toilets, and low-flow pre-rinse sprayheads on Intel's four campuses. This resulted in an immediate savings of 322,000 gallons per year.

In addition to a water audit and expertise in behavioral changes, the City also provided Calvary Lutheran Church \$1,500 in funding for toilet replacements. Hillsboro Water Department staff conducting the audit also discovered a significant leak. The retrofits and the leak repair reduced daily usage an average of 470 gallons per day, or 17,155 gallons per year – to less than half of the amount of water the church had been using before the audit.

The City has also partnered with Home Owner Associations (HOAs) and multi-family management companies to update irrigation controllers and other water-using technology. Recently-funded programs include WaterSense-labeled irrigation controllers and replacement of water-cooling equipment with air-cooling equipment.

International Paper made numerous independent improvements to reduce water use in 2014. The City assisted with funding for a WaterSense-labeled irrigation controller that waters based on evapotranspiration (ET) rates. In 2015, the City provided financial assistance to Avamere Rehabilitation Center for the replacement of water-chilled compressors for air-chilled compressors, which produces an estimated savings of 1.3 million gallons per year for the compressors and a 25% reduction in outdoor water use for the controller. In 2015/2016 fiscal year, the City also provided financial assistance (and some technical assistance as needed) to Avamere, Avana Orenco Station, Brookwood HOA, and The Parks at Laurel Oaks HOA for the replacement of regular irrigation controllers with WaterSmart irrigation controllers. These replacements are estimated to result in 25% outdoor water savings in future years for the complexes.

In 2011, the City partnered with the Energy Trust of Oregon on an indoor water and energy audit program for residential customers. In 2014, the audit program changed from including a site visit to operating completely online.

The City continues to partner with its Parks Department to provide technical assistance to landscapers and gardeners. After completion of a successful weather station venture, the Water Department and Parks Department worked together again in 2010, along with local high school students, on the City's very first demonstration garden project at Dairy Creek. The Water Department provided educational materials, water-conserving tools (such as rain gauges, soaker hoses, hose nozzles, water-wise seeds and aqua spikes) along with a load of compost for amending the soil to improve its water-holding capabilities. The garden had a very successful first year, and provided water-wise gardening examples for the entire community.

In 2015, the City installed water-wise planting strips surrounding its new parking lot for the Shute Park Aquatic and Recreational Center (SHARC). The new parking strips demonstrate a water-wise, non-grass alternative for parking strips to SHARC users and other members of the public.

The success of the City's first community garden project at Calvary Lutheran Church led the City to provide assistance to other community gardens and to school gardening programs. The City subsequently began providing compost, water-wise gardening educational information, rain gauges, aqua spikes, and planting brochures to David Hill and Sunrise Community Gardens. In 2011, the City partnered with City View Charter School and 4-H group on a water-wise educational garden, contributing compost and materials. In 2013, the City developed a partnership with Jackson Bottom

to establish a water-wise demonstration garden and has provided \$10,000 for the project, which should be completed in spring 2017.

Five-Year Benchmarks: The City promotes itself as a water efficiency resource for the community, and will continue to set aside budget each year to offer technical and financial incentives to both residential and non-residential customers (known as the ICI Program). The City will continue to offer water audits and water saving devices to all classes of customers, online water audits to residential customers with its Energy Trust partner, free indoor and outdoor conservation kits to its customers at events and to individual customers upon request, and technical assistance and water saving materials to school and community gardens. Staff will work closely with its ICI customers, as well as multi-family customers, to find innovative ways to reduce water use at those facilities through improved technology and maintenance. The City will also continue to seek opportunities to promote water-wise gardening techniques at community garden events and to develop new community and school water-wise gardens and outdoor areas, such as parking strips.

3. Supplier Financed Retrofit or Replacement of Inefficient Fixtures

The City has a washing machine rebate program, toilet rebate program, waterless urinal program, free water-saving devices distribution program, and WaterSense-labeled evapotranspiration controller program.

In 2010, the City used funding from OWRD's Water Conservation, Reuse and Storage Grant Program (established by Senate Bill 1069) to complete a *WaterSense Rebate Feasibility Study* to identify the most cost-effective rebate programs within the EPA's WaterSense certification and labeling program. The study's final report included descriptions and cost-benefit analyses of potential WaterSense conservation programs to pursue. In 2011, the Utilities Commission approved the recommendations to add WaterSense-labeled high-efficiency toilet rebates and to partner with the Energy Trust for affordable indoor audits.

The City implemented both study-recommended programs in 2011 and the programs are ongoing, however the Energy Trust program has since evolved away from staff-intensive in-home inspections and has introduced a less intrusive process providing a do-it-yourself guide online. The high-efficiency toilet rebate program has given out 3,106 rebates for replacements of non-high efficiency toilets at a cost to the City of \$87,675 to date. In 2013, the City expanded the rebate program to include mobile homes, condominiums, and town homes if the residence is owner-occupied, even if the residence is served by a common meter. The City also has also issued toilet rebates for various local businesses, as part of its ICI technical assistance program.

The City currently offers a \$50 washing machine rebate with approximately \$30,000 budgeted per year. The program initially began in 2002 with \$75 rebates, which lasted until the demand for washing machine rebates declined due to market saturation. To date, the City has given out 3,901 rebates at a cost to the City of \$242,700. Overall, the rebate program has been very popular and the City has continued to increase its conservation budget to match the rebate demands from the community.

As mentioned above, the City provided water-saving devices to the Hillsboro School District and Intel for the replacement of toilets, showerheads, faucet aerators and pre-rinse sprayheads. The City also provides water-saving devices at local events and uses a water-saving devices display board (designed by the City) for event, which allows customers to only take the specific devices that they want to install rather than handing out kits.

The City ran a waterless urinal pilot project with Forest Hills Lutheran School, as described above. Waterless urinals have been successful at the school due to the dedication of maintenance staff and the relatively low volume of use. The success of waterless urinals depends highly on those two factors. Consequently, the City is willing to partner with and provide waterless urinal funding to ICI applicants that have urinals with low volumes of use and that demonstrate dedication to waterless urinal maintenance.

As previously described, the City also hired SWB Consulting to conduct urinal audits at several older Hillsboro School District schools. Instead of doing costly urinal replacements, SWB Consulting recommended throttling the shutoff valves on the existing urinals to cut the water requirements for flushing urinals approximately in half, an action that essentially carries no cost. In addition, the City provided some funding for toilet replacements at older schools in the Hillsboro School District.

Finally, the City monitored TVWD's evapotranspiration (ET) controller pilot program, and based on TVWD's experience and the 2010 *WaterSense Rebate Feasibility Study*, the City decided to implement a similar ET program. In 2014, the City began offering residential customers rebates of up to \$200 for WaterSense-labeled weather-based irrigation controllers. The ET program has been very popular. So far, the City has provided 61 residential controller rebates at a cost to the City of \$9,833.

Five-Year Benchmarks: The City will continue to offer rebates to customers for replacement of high water use fixtures and/or devices with those that are engineered to be more water-efficient. The rebate program operates with some flexibility regarding what market transformations are needed to increase the availability of water efficient devices, along with consistency in Washington County with other water providers. The City will continue to offer assistance with waterless urinal installations, based on customer proposals since waterless urinals need a stronger commitment by a customer to result in water savings. The City will also continue to offer free water saving devices, such as low-flow faucet aerators and low-flow showerheads.

4. Rate Structure and Billing Practices that Encourage Conservation

The City continues to promote a three-tiered conservation-based rate structure for the single-family residential class. City staff will provide an account review and offer advice on ways to conserve water whenever a customer expresses interest. When the City suspects that a customer has a leak, the City notifies them about the high water usage, or continuous flow at the meter, and suggests that the customer check for a leak using instructions provided on the Department webpage. The City talks regularly with customers and provides tips for lowering water use to help them keep their water usage under the amount that bills at the third-tier rate.

Billing is primarily bi-monthly, except for customers in the Upper System, some large industrial customers, and where meter replacements with AMR are completed. The City is in the process of switching from bimonthly to monthly billing, and has begun to organize routes for AMR-reading efficiency. Some routes with complete AMR installations will begin monthly billing earlier than expected, after software is updated, and customers are notified of the change. The estimated completion year for an entire changeover to monthly billing has been accelerated to 2018, instead of the originally projected completion year of 2020, in order to provide more timely feedback on water usage and associated costs to customers. The more immediate feedback on water usage will provide customers an opportunity to reduce usage a month earlier than in the past, which can make a big difference in summer. A customer who would have received a bill in September for July/August

usage, now will see July usage in August and may decrease usage, or call for conservation assistance, especially if outdoor watering has landed the customer in the third billing tier.

Work is also being done to improve customer utility bills and make them a more effective communication tool. Currently, the bills include graphs that show 13 months of past usage, enabling customers to compare water use to the same month the previous year and to recent months. Notes promoting conservation, or providing water efficiency tips are often placed on the customer bills, or sometimes customer conservation programs are promoted more in-depth using bill stuffer format.

Customers calling Utility Billing to conduct business are put into a queue where they listen to pre-recorded messages as they wait for a customer service representative. There is always at least one message promoting conservation programs for the queued customers, and all messages are recorded in English and Spanish.

Five-Year Benchmarks: The City will continue to have a three-tiered water rate system for the single-family residential class to promote water use efficiency. The City will eventually switch customers to monthly billing, with the accelerated goal of completing this transition by the end of 2018.

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

Clean Water Services (CWS) manages the water reuse program in Washington County. Wastewater from customers in the City's municipal water system is reclaimed by CWS at the Rock Creek Wastewater Treatment Facility. The City has a registration for use of reclaimed water (RM-203) to irrigate Rood Bridge Park grounds. Full utilization of RM-203 has not yet occurred due to the lack of capital funding needed to upgrade the infrastructure to meet the plumbing code and operational requirements of the system. CWS is exploring new water reuse opportunities with the Oregon Department of Environmental Quality (DEQ).

The City's 2014 Water System Master Plan Appendix 1.1 includes Technical Memo 07 on "Water Reuse - Waste Stream Quantity and Quality Analysis," and Technical Memo 08 on "Water Reuse - Water Reuse Treatment Process Requirements" . These memos identified two sources of wastewater for reuse purposes: treated effluent from Clean Water Service's Rock Creek Advanced Wastewater Treatment Facility for domestic potable water supply, and the "process wastewater" stream from industries in the Hillsboro's Dawson Creek area. The City is exploring these water reuse opportunities and is encouraging customers, especially industrial water users, to investigate water reuse options. The City especially encourages the elimination of single-pass cooling, and provides technical assistance on improving cooling tower efficiencies on request. Intel announced a plan to expand its on-site water reuse treatment facility by 2019 and other industrial customers are exploring on-site water reuse, as well.

In addition, the City's recently devised system for cataloging and tracking non-municipal water rights, which may reveal non-potable water opportunities. As described in Section 2, when City Departments are purchasing or selling property, the Water Department is now contacted to perform a search for appurtenant water rights and assist with the land exchange if needed. The City's Water Department provides education, guidance, administrative support, and contracting with water rights consultants to other City Departments. The other City Departments then inform the Water Department of completed land acquisitions, at which point the Water Department begins tracking any appurtenant water rights. During this process, the Water Department will be evaluating the potential for non-potable water opportunities related to the new non-municipal water rights.

Five-Year Benchmarks: The City will continue to encourage Clean Water Services and other industrial customers to reuse water where practical. In the next five years, the City will review currently

owned and newly acquired non-municipal water rights for potential non-potable water use opportunities.

6. Other Conservation Measures

The City is a member of the Regional Water Providers Consortium and the Alliance for Water Efficiency, and City staff is active (Hillsboro Conservation Program Specialist is currently the Chair) on the Conservation Committee of the Pacific Northwest Section of the American Water Works Association (AWWA).

The Hillsboro Conservation Program Specialist regularly attends trainings to learn about new programs and technology that will improve the City's conservation program. Trainings include AWWA workshops/conferences and an annual WaterSmart Innovations conference.

Five-Year Benchmarks: The City will continue to be a member of the Regional Water Providers Consortium, the Alliance for Water Efficiency, and an active participant on the Conservation Committee of the Pacific Northwest Section of the AWWA. The Conservation Program Specialist will continue to attend trainings and conferences that provide education and insight to potentially grow and enhance existing City conservation programs.

Exhibit 3-1 presents a summary of the City's 5-year water conservation benchmarks.

Exhibit 3-1. Summary of Water Conservation Five-Year Benchmarks.

Conservation Measures	Five-Year Benchmarks
Annual Water Audit	The City will continue to conduct annual water audits.
	In the next five years, the City will include distribution system flushing estimates and metered bulk water consumption in its non-revenue water calculations.
System-wide Metering	The City will continue to replace old style meters with AMR meters on a schedule plan that will have all existing meters replaced by or before 2020.
	The City will also continue to install AMR in all new meter installations.
Meter Testing and Maintenance	The City will continue to implement its meter testing and maintenance program.
	The City will replace the sonic meters measuring raw water at the SSFP.
	The City will work with Neptune to establish a reliable maintenance program for the AMR meters.
Water Rate Structure and Billing Practices that Encourage Conservation	The City will continue to bill customers based on the volume of water consumed, with pricing structures set to encourage conservation, especially during peak season.
	The City will continue to implement recommendations from the 2014 rate study.
	In the next five years, the City will conduct another rate study.
	The City will continue to have a three-tiered water rate system for the single-family residential class to promote water use efficiency.
	The City will eventually switch customers to monthly billing, with the accelerated goal of completing this transition by the end of 2018.
Leak Detection and Repair or Line Replacement	The City will continue to conduct leak surveys and to utilize its AMR program as part of its leak detection and repair program.
	The City will continue to budget for replacement of high priority aging infrastructure.
	The City will inspect all three distribution reservoirs for cracks and leaks every five years.
Public Education	The City will continue its public education program.
	In the next five years, the City will add “how to” water conservation videos and may add links to other water conservation videos on the conserveh2o.org website.
	In the next five years, the Teacher Resource brochure and link will be completed.
	The City received a grant to construct a Tualatin River watershed display that will be used in both classroom activities and at outreach events to promote source water protection and conservation efforts in the Tualatin Basin. The display will be completed in Spring 2017.

Exhibit 3-1. Summary of Water Conservation Five-Year Benchmarks Continued.

Conservation Measures	Five-Year Benchmarks
<p>Technical and Financial Assistance Programs</p>	<p>The City promotes itself as a water efficiency resource for the community, and will continue to set aside budget each year to offer technical and financial incentives to both residential and non-residential customers. (Known as the ICI Program).</p>
	<p>The City will continue to offer water audits and water saving devices to all classes of customers, online water audits to residential customers with its Energy Trust partner, free indoor and outdoor conservation kits to its customers at events and to individual customers upon request, and technical assistance and water saving materials to school and community gardens.</p>
	<p>Staff will work closely with its ICI customers, as well as multi-family customers, to find innovative ways to reduce water use at those facilities through improved technology and maintenance.</p>
	<p>The City will also continue to seek opportunities to promote water-wise gardening techniques at community garden events and to develop new community and school water-wise gardens and outdoor areas, such as parking strips.</p>
<p>Supplier Financed Retrofit or Replacement of Inefficient Fixtures</p>	<p>The City will continue to offer rebates to customers for replacement of high water use fixtures and/or devices with those that are engineered to be more water-efficient. The rebate program operates with some flexibility regarding what market transformations are needed to increase the availability of water efficient devices, along with consistency in Washington County with other water providers.</p>
	<p>The City will continue to offer assistance with waterless urinal installations, based on customer proposals since waterless urinals need a stronger commitment by a customer to result in water savings.</p>
	<p>The City will continue to offer free water saving devices, such as low-flow faucet aerators and low-flow showerheads.</p>
<p>Water Reuse, Recycling, and Non-potable Opportunities</p>	<p>The City will continue to encourage Clean Water Services and other industrial customers to reuse water where practical.</p>
	<p>In the next five years, the City will review currently owned and newly acquired non-municipal water rights for potential on non-potable water use opportunities.</p>
<p>Other Conservation Measures</p>	<p>The City will continue to be a member of the Regional Water Providers Consortium, the Alliance for Water Efficiency, and an active participant on the Conservation Committee of the Pacific Northwest Section of the American Water Works Association.</p>
	<p>The Conservation Program Specialist will continue to attend trainings and conferences that provide education and insight to potentially grow and enhance existing City conservation programs.</p>

Willamette River Fish Flows: Public Education and Voluntary Conservation

The City holds a 56 cfs portion of *extended water use permit S-55045*, which is for municipal use of up to a total of 200 cfs from the Willamette River. The City of Salem continues to hold the remaining 144 cfs portion of Permit S-55045. OWRD issued the permit in 1981, and in July 2015, issued a final order approving an extension of time to 2086 to put the permit to full beneficial use.

The City is aware that some extensions for municipal water rights from the Willamette River require a special section in the water provider's WMCP on public messaging. Although the extension of time for Permit S-55045 does not include this requirement in the Final Order, the City is voluntarily including this special section as part of its stewardship activities with the Willamette Water Supply Program (WWSP).

This special section describes the City's implementation steps for initiating and disseminating public education messages related to Willamette River flows and water conservation. These public education messages will begin once the City begins to use water under Permit S-55045.

The City will annually post a public education message on its website from April 1 through May 31 and mail or email a public education message to customers as a bill insert in the Spring. The public education messages will include the following descriptions:

- Status of river flow in relation to target flows for fish persistence in the Willamette River, measured at Salem (USGS Gage Number 14191000).
- Connection between customer water use and Willamette River flows.
- Importance of Willamette River flows to fish and fish resources, and the listed fish present.
- How the Willamette River is part of the City's source of supply.
- Voluntary water conservation measures commonly accepted as effective, such as avoidance of outdoor watering, car washing, and washing outdoor surfaces.
- How water conservation is important year-round, and especially important when target flows in the Willamette River, measured at Salem, are not being met.

The City will generate an additional public education message if the 7-day rolling average of mean daily stream flow in the Willamette River at the Salem gage falls below the target flows shown in **Exhibit 2-18** by 10% or more for 15 consecutive days any time during the year (except for April 1 through May 31 when public messaging is already required). The additional public education message will be posted on the City's website and additionally communicated using means such as the City newsletter, bill insertion and/or local media alerts, depending on which method makes sense based on timing. The public education message will contain the bulleted information above. The City will suggest voluntary conservation measures appropriate for the season when the fish target flows are not met. The City will maintain the public education information on its website until the fish target flows at Salem are met. For each additional period of 15 consecutive days that the 7-day rolling average of mean daily stream flows in the Willamette River at the gage near Salem are below the fish target flows by 10% or more, the City will disseminate another public education message as described above.

The City expects that the actions described in this special section will reduce demand on Willamette River water year-round and when fish target flows are not being met. This expectation is based on water savings that the City has achieved in recent years as a result of its comprehensive water conservation program and the City's ongoing, ambitious water conservation efforts, which are described in this section. The City is able to educate customers about water conservation through multiple forms of communication, including: its websites, bill inserts, television (through membership in the RWPC), school lessons, community gardening programs, and booths at community events.

4. Municipal Water Curtailment Element

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

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

Introduction

The City currently obtains the majority of its water supply from the JWC so the City's curtailment planning is intrinsically linked to JWC curtailment. While the JWC curtailment plan creates processes for coordination and negotiation of water supplies for the JWC partners, the City's curtailment plan establishes measures to reduce its water demands when water supplies aren't enough to meet the needs of the City and its customers.

This curtailment plan will focus on supply constraints during the peak season and during an emergency event. Triggers have been identified (such as equipment malfunctions, infrastructure damage and supply-limiting events) for five different curtailment stages. Next, specific actions to reduce demands, voluntary and mandatory, are described for each curtailment stage.

Because the City operates two water systems with separate treatment plants and points of diversions, one of the supply systems may be impacted by curtailment conditions while the other system is not. The City may enact curtailment actions for the systems separately or in combination, depending on the nature of the event and the capacity of supplies. Wholesale customers are required to adhere to the City's curtailment actions as stipulated through their wholesale contracts.

History of System Curtailment Episodes

OAR-690-086-0160(1)

Assessment of Water Shortages & Limitations

Despite several incidents of JWC supply shortages in the past, the City has not had to implement mandatory curtailment to date. Those supply incidents are described in greater detail below, but all were handled by operational adjustments and negotiations for alternative supplies with JWC partners. The City and its partners excel at working together to meet the water supply needs of all partners, if alternatives besides curtailment are available. Curtailment is considered a last resort to achieve decreased demand, but the City has a plan to employ curtailment if necessary. JWC incidents that resulted in supply issues, which could have resulted in the need for the City to implement curtailment protocols, are detailed below:

1990s Incidents

During the 1990s, the JWC Water Treatment Plant (WTP) experienced incidents that impacted supply/capacity, including: loss of power due to a car hitting a power pole near the WTP, loss of power due to a windstorm, severe raw water quality impacts due to a flood, and disruption of deliveries to partners due to a transmission line leak on the WTP site. The incidents all reduced the ability of the JWC

to supply water. At that time, there was only one reservoir on Fern Hill with 20 MG available storage, less stored water for emergency backup supply than is available today.

These power supply disruptions led to new JWC response agreements with PGE, and construction of a second finished water pumping station with a supporting power transformer station. In March 2016, a backup power generator was brought online at the WTP. The generator is capable of running the WTP at about half of current peak capacity, but that capacity would be able to fully serve the partners for a large portion of the year, based on 2016 demands.

Summary of 2001 Drought (presented in detail in the JWC's 2010 WMCP)

The JWC experienced its first source water shortage in the summer of 2001. JWC is generally regulated off its natural flow water rights on the Tualatin River beginning in late May to early June until mid-October (described in more detail in the 2010 WMCP: Section 2, Water Rights). JWC relies primarily on stored water releases from Hagg Lake and Barney Reservoir during this period.

For the first time since construction of Scoggins Dam was completed in 1977, Hagg Lake did not fill in 2001, reaching only 54 percent of its storage capacity. Several JWC member agencies (the Cities of Hillsboro, Beaverton, and Forest Grove) hold contracts with the Bureau of Reclamation (BOR) for the use of stored water in Hagg Lake that also specify curtailment measures. All of the BOR contracts state that 2,500 acre-feet of water will be reserved for natural or minimum flow during water shortage events. All BOR contracts also specify that the quantity of water to be furnished for irrigation (Tualatin Valley Irrigation District) and water quality control (Clean Water Services) shall be reduced first as necessary but not by greater than 15%. Beyond that point, reductions shall be shared among all of the entities receiving a water supply from the project in the proportion that the entity's water entitlement under the BOR contract bears to the total quantity of the project water under contract.

Based on these contract conditions, the JWC partner cities of Hillsboro, Beaverton, and Forest Grove received only about 76% of their normal water allocations from Hagg Lake in 2001. Clean Water Services (CWS) and Tualatin Valley Irrigation District received only 27% and 47%, respectively, of their normal water allocations. Discharge changes at Scoggins Dam were made twice a day, seven days a week to closely match the timing of water orders, avoid waste, and maintain natural flow in the Tualatin River.

In the same year, Barney Reservoir only reached 55% of its storage capacity. The Joint Water Ownership Agreement for the Barney Reservoir Project specifies that amount of stored raw water available to each agency is determined as a percentage (based on ownership) of the total stored raw water available to the Parties. As part of the 1994 Barney Reservoir Environmental Impact Statement (EIS), 15% of stored raw water is allocated to the Oregon Department of Fish and Wildlife (ODFW) for flow to the Trask River that benefits fish and wildlife. The Barney Reservoir Joint Ownership Commission (Hillsboro, Forest Grove, Beaverton, TVWD, and CWS) decided to hold 4,000 acre-feet of Barney Reservoir water in reserve in case dry conditions continued into 2002.

Staff met with Oregon Department of Fish and Wildlife (ODFW) to set the allotment for 2001. ODFW allowed the releases from Barney Reservoir for downstream flow to be shut down for a portion of the impoundment period after it was determined that the reservoir wouldn't fill. ODFW's allotment in 2001 was about 1,500 acre-feet instead of their usual 3,000 acre-feet allotment from a full reservoir. They took that water over a 120-day period.

After accounting for dead pool storage and releases for fish flows to the Trask River (15% of the available storage), the Barney Reservoir member agencies were allotted only 54% of normal full pool allocations.

The JWC and BRJOC partners used a combination of leasing, alternative source options and agreements, and voluntary curtailment to meet summer 2001 demands on the JWC water system. Portland Water Bureau (PWB) had full supplies in both Bull Run and the Columbia River Wellfield. They offered assistance with coordination of regional supply, and provided an alternate source for Tualatin Valley Water District and the City of Beaverton. TVWD allowed Clean Water Services (CWS) to use some of its allocated water in the Barney Reservoir to meet streamflow demands, and CWS paid TVWD the difference between the cost of JWC water and the more expensive PWB water in exchange. It also helped that the summer weather of 2001 was cooler and wetter than usual. No mandatory curtailment was necessary.

2015 Extreme Weather Incidents

In 2015, two weather events, a summer drought and a winter flood, caused supply concerns for the JWC. Neither event resulted in mandatory curtailment, but each required actions by the partners to ensure that all water demands of the JWC partners could be met.

Summer Supply Issue:

An abnormal onset of early summer weather, with a record number of days exceeding 90 degrees, caused customer demands to skyrocket. In anticipation of possible shortages for the City and TVWD, the JWC approved leases of stored water and treatment plant capacity at its July 2015 meeting. The summer continued hot and dry, and demands on the WTP were often near its maximum capacity, but all agencies were able to supply their customers without needing curtailment measures.

Winter Supply Issue:

Western Oregon received a record amount of rain from December 7 to 11, 2015. The heavy rain flooded the Tualatin River, and in some places, the flooding was worse than the flood of 1996. This flooding raised water turbidity and changed the chemistry of the raw water entering the WTP, creating significant challenges for treating the water to safe drinking water standards. The more intense treatment required a slower WTP process; production declined to under 20 mgd.

During this time, demands on the WTP were over 20 mgd. Based on the decreased WTP production capacity, the demands of some partners exceeded their ownership percentage of the available capacity. Throughout the week, as the WTP continued to experience treatment challenges, and Fern Hill Reservoirs and the City's in-town storage continued to deplete, it became unclear if the City would continue to meet demands without some measure of mandatory curtailment since the City of Hillsboro does not currently have any alternate supply sources. City of Beaverton voluntarily turned on one of its ASR wells the first day of the event to reduce demands on the WTP and provide more water to the partners, especially the City of Hillsboro. As the event continued, it appeared that the City of Hillsboro might need to curtail its own customers' water usage. On the third day, TVWD shifted demand onto its PWB supplies and the City of Beaverton agreed to turn on a second ASR well, to further lessen their JWC system demand. (The City of Beaverton used ASR wells developed under LL #002, not the JWC's ASR LL #019.)

TVWD and the City of Beaverton were meeting their customer demands with these alternate sources, and the City of Forest Grove was still able to meet its customer demands with its share of the reduced JWC WTP capacity that was available. As raw water quality improved, the WTP increased production

levels, and by the fourth day of the event, the WTP was again producing enough water to begin refilling the storage reservoirs. The City of Hillsboro did not need to curtail. The event was over by the beginning of the following week, with normal WTP production capacity restored and all partners returning to their normal demand levels at the WTP.

Curtailment Event Triggers and Stages

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

The City is well-positioned to meet its non-peak season customer demands for the following reasons:

- The JWC’s Fern Hill Reservoir 1, with 20 million gallons of storage available, was seismically upgraded in 2006.
- An additional 20 million gallons of storage (for a total of 40 million gallons of storage) was provided with the construction of a second JWC Fern Hill Reservoir in 2006. The construction included seismic hardening and wrapping with rebar.
- The City has increased in-town storage with the addition of Crandall Reservoir.
- The City has seismically reinforced the 24th Street Reservoir, and is in the process of upgrading and reinforcing Dilley Reservoir.
- The City has added chlorination feeders to its reservoirs to increase storage time.
- The WTP has added an automatic powdered activated carbon (PAC) feeder and a back-up power generator onsite.
- The City consistently follows best management practices and stores three days of average day demand (ADD) in finished water storage in the JWC and local distribution system.

Curtailment Stages

During the peak summer demand period from June through September when the system is operating at or near its maximum capacity, interruption of supply due to natural disaster, mechanical failure, terrorist act or loss of source could present significant challenges to the City. Therefore, the following triggers and related curtailment stages in this curtailment plan are based primarily on events occurring during this time period. In addition, less critical impacts to the water supply such as forecasted drought, and minor mechanical or electrical failures are addressed in Stages 1 and 2.

It is important to note that the City of Hillsboro may be able to make alternative arrangements to meet customer demands, and that the “Initiating Conditions” described below don’t always require the need to implement curtailment stages. If the City is able to make alternative arrangements, or utilize other parts of its system to meet the demands required of its customers, no curtailment stage will be activated.

This curtailment plan for the City is designed to be initiated and implemented in progressive stages. The City’s curtailment plan has four distinct stages, as shown in **Exhibit 4-1**, each of which is triggered by one or more of the listed events:

Exhibit 4-1. Curtailment Plan Stages 1 through 4.

Curtailment Stages	Potential Initiating Conditions
<p>Stage 1 Temporary Water Shortage Alert (Short-Term Voluntary)</p>	<p>Short-term¹ interruption of electrical service affecting water treatment and distribution; Minor mechanical or electrical malfunction in pumping facilities or treatment plant; Minor damage to raw or treated water transmission mains (e.g., leaking joint requiring repair); or Forecasts of below-normal² levels of stored water in Barney Reservoir and Scoggins Dam (Hagg Lake) that may fall below the historical 25th percentile in the peak season.</p>
<p>Stage 2 Long-Term Water Shortage Alert (Long-Term Voluntary)</p>	<p>Forecasts of below-normal² levels of stored water in Barney Reservoir and Scoggins Dam (Hagg Lake) that may fall below the historical 10th percentile in the peak season. Forecasts of drought conditions for the peak season.</p>
<p>Stage 3 Severe Water Shortage (Long-Term Mandatory)</p>	<p>One or both of JWC’s summer supplemental sources (Barney Reservoir and Scoggins Dam (Hagg Lake)) are below 50% of full capacity, resulting in a significant reduction of City’s water supply capacity;³ Any event causing the Cherry Grove WTP to be out of service for an extended period beyond the storage at the plant (7 to 15 days); or Multiple failures in the pumping facilities, treatment plant or transmission mains that require a lengthy repair time.</p>
<p>Stage 4 Critical Water Shortage (Critical Mandatory Restrictions)</p>	<p>Extensive damage to transmission, pumping or treatment processes caused by natural disaster; One or both of JWC’s summer supplemental sources (Barney Reservoir and Scoggins Dam (Hagg Lake)) do not fill, resulting in a severe reduction of the City’s water supply capacity; Interruption of electrical service to the WTP for an unknown or extended period of time. Transmission line break resulting in supply disruption. Unplanned water quality, or other treatment issue, that slows JWC WTP production below partner demands in which the timeline for recovery from the condition is uncertain and the risk of total reservoir depletions, at projected rates of production and demand, is high. Short-term increase in Hillsboro’s demand beyond the City’s percentage of JWC WTP production capabilities, due to an unforeseen circumstances such as extreme hot weather conditions, fire, or loss of a secondary supply. (This condition would be for short-term shortages, and not long-term shortages, such as one caused by drought.)</p>

¹ “Short-term” interruption means an interruption with a predicted end. For example, a power outage predicted to last one week would be probable cause for Stage 1 curtailment. The decision to initiate curtailment would depend on the time of year, likelihood that power will be restored in the predicted timeframe, and the likelihood that the City can maintain backup power for the duration of the outage. In this case, the City could avoid curtailment by using the back-up generators at the water treatment plant, backup fuel supplies, and the City’s in-town storage.

² “Below normal” levels means that water levels fall slightly outside the normal drawdown curve. However, the City could avoid curtailment if alternate supplies are made available that put source supplies back into normal ranges. For example, the reservoirs were between the 25th and 10th percentile in the 2015-2016 release season, but curtailment was not necessary. In addition, if alternate supplies are expensive, the City may choose to promote voluntary curtailment in order to reduce dependency on alternative supplies and to reduce costs.

³ “Significant Reduction” means that the City’s water supply capacity cannot be made up through alternative means, so mandatory curtailment is necessary to reduce demand levels to ensure that water supplies don’t run out. However, the City could avoid mandatory curtailment if alternate supplies are made available that put source supplies back into normal ranges. For example, the City’s stored water supplies dipped below 50% of full capacity in the 2000-2001 release season, but mandatory curtailment wasn’t needed due to availability of other supplies in the region.

Authority

The City's Water Department Director, under the authority of the City of Hillsboro Utilities Commission will be responsible for the actions and implementation of Stages 1 and 2, with frequent updates to the City Manager and City Council. Before implementing Stages 3 or 4, the Water Department Director, under the authority of the Utilities Commission, will notify and make a recommendation to the City Manager, regarding the proposed curtailment action. Actions under Stages 3 and 4 of this plan may be initiated only after a declaration of emergency is issued by the Mayor, City Council, or appropriate successor as outlined in the City's Emergency Response Plan. If an emergency declaration made by the Mayor or City Council does not impact water supply or demands, Stages 3 and 4 may not be implemented, under the authority of the Hillsboro Utilities Commission.

Plan provisions will remain in effect until the emergency declaration is lifted by the City Manager or appropriate successor, or until the Utilities Commission is able to demonstrate that the Water Department can meet water demands.

Curtailment measures may be applied to the entire system, or only to water use sectors, and/or in certain geographic areas, which are directly impacted as determined by City staff under the direction of the Water Department Director, or a designee such as an Acting Director or the Assistant City Manager. Different restriction levels may be placed upon the Upper System depending on the nature, severity, and location of the initiating conditions.

The Water Department Director and Water Department staff, under the authority of the Utilities Commission, are responsible for execution of the plan provisions once an emergency has been declared.

The Water Department Director and staff will keep the JWC, its partners, and its wholesale customers informed about water demands and curtailment plans during the course of any water emergency.

Curtailment Plan Implementation and Enforcement

OAR-690-086-0160(4)

In implementing this curtailment plan, Department staff will work closely with the JWC and other member agencies to assure consistent approaches to dealing with water shortages by coordinating stage designations, public notices, press releases, and other outreach activities. Department staff will also coordinate with its wholesale customers on curtailment efforts.

Stage 1: Temporary Water Shortage Alert

After notifying the City Manager and the Utilities Commission, Water Department staff, under the direction of the Water Department Director, will activate a Temporary Water Shortage Alert to inform customers of the need for voluntary, temporary reductions in consumption. This will occur when the Stage 1 triggers described in **Exhibit 4-1** are met, and the City is unable to meet demands through alternative methods.

Stage 1 Temporary Water Shortage Alert requests for short-term voluntary reductions will be made if the Utilities Commission determines that finished water storage at the JWC or in the distribution system may not meet projected demands due to the events described in **Exhibit 4-1** Stage 1.

Stage 1 public information program elements will include one or more of the following actions:

1. Issue a general request for voluntary reductions in water use by all water users. The request will include a summary of the current water situation, the reasons for the requested reductions, and a warning that mandatory cutbacks will be required if voluntary measures do not sufficiently reduce water usage.
2. Contact local media outlets, in coordination with the JWC, to inform customers about temporary interruptions to normal service delivery.
3. Post a public service announcement on City's webpage and social media (SM) outlets. Include prepared information regarding conservation tips.
4. Encourage, through public service announcements, SM, and other communication venues, voluntary reductions on outdoor irrigation and limit irrigation times to between the hours of 8:00 p.m. and 5:00 a.m., if appropriate for season.
5. Encourage customers to refrain from washing cars except at commercial establishments that recycle or reuse water in their cleaning process. Consider offering free or discounted single-wash coupons to encourage compliance. Depending on severity of situation, car wash fundraisers may also be excluded from voluntary restriction, as decided by Water Department Director with advisement from staff.
6. Contact wholesale customers notifying them of the existence of, or potential for, water shortages and ask them to issue similar messages to their customers.
7. Provide notification, assistance, and conservation curtailment materials to wholesale customers, if requested. Share materials with JWC partners on request as well, so they are aware of messaging, even if they are not participating in curtailment actions.

Stage 2: Long-Term Water Shortage Alert

A Stage 2 Long-Term Water Shortage Alert will be issued for potential long-term voluntary reduction preparations if it is projected by the JWC and Barney Reservoir Joint Ownership Commission that peak season storage supplies may not reach projected peak season demand, and the City is not able to secure additional supply through alternate means. The actions under this stage will include the previous actions listed above in Stage 1, but will also include the following actions requesting customers to voluntarily restrict their non-essential uses.

Stage 2 public information program elements will include one or more of the following actions:

1. Utilities Commission will implement Stage 1 program elements as appropriate.
2. Begin preparations for an aggressive conservation campaign to begin in April or May, before the peak season
3. Provide notice and press releases to local media outlets to inform customers about potential water shortages for peak season demands.
4. Develop and provide conservation advertisements through various communication venues.
5. Encourage customers to water sparingly through communications, events and promotions.
6. Provide weekly updates using the City website and other communication venues of water availability in Barney and Scoggins Dam (Hagg Lake).

7. Tailor all conservation messaging at outreach events to the drought conditions and attend additional events such as neighborhood or homeowner's associations, farmer's markets, etc.
8. Consider purchasing additional radio or television advertisements with other affected partners such as the JWC or RWPC.
9. Advise the Industrial Users Group, Top 25 Customer Group, and wholesale customers of the water supply situation.

Staff will closely monitor the citizen response to Stage 2 throughout the peak season and will implement Stage 3 if response is not adequate to sustain storage supplies through the entire peak season. *(These measures proved sufficient during the 2001 curtailment campaign.)*

If the situation worsens, or warrants stricter measures, the following restrictions could also be implemented under Stage 2:

- Restricting outdoor irrigation to only 3-days days per every 7-day period (including use of specific schedules imposed by the City Manager) and only between the hours of 8:00 p.m. and 5:00 a.m. This restriction and prohibition applies to all outdoor irrigation unless:
 - Grass, turf or landscaping is less than 1-year old;
 - Grass or turf is part of a commercial sod farm;
 - Grass or turf areas are within a high use athletic field used for organized play;
 - Grass or turf areas are used for golf tees or greens; or
 - Grass or turf areas are part of a park or recreation area deemed by the City Council or Utilities Commission to be of particular significance and value to the community.
 - Notwithstanding the exceptions to the outdoor irrigation restrictions and prohibitions noted above, all outdoor watering schedules shall be limited to only that necessary to maintain plant health and shall not allow unnecessarily irrigation.
 - Mandatory restrictions on nonessential water uses, including:
 - No washing of paved surfaces;
 - No fountains except those using re-circulated water;
8. No washing of vehicles other than in establishments that recycle water. (Depending on severity of situation, car wash fundraisers may also be excluded from voluntary restriction, as decided by Water Department Director with advisement from staff); and
 - No washing of roofs, decks or home siding unless such uses are solely to abate a potential fire hazard.
 - Department staff will continue to work closely with Utility Billing to identify and notify customers of unfixed leaks. Additional financial incentives may be made available to customers that fix their leaks within a short timeframe. Additional restrictions will be considered for notified customers with unfixed leaks.

- In addition, City staff will work with large, local industrial and commercial water users to minimize their non-essential water use.

Stage 3: Severe Water Shortage

Conditions causing Stage 3 curtailment measures are severe enough in terms of extent and duration that significant reductions in water use must be achieved as quickly as possible in order to ensure public health, safety, and welfare, even after the City has attempted to secure additional supply through alternate means. Stage 3 builds on measures enacted through the previous stages. In a Stage 3 curtailment, all outside watering is prohibited and any exceptions noted above for outdoor water uses are rescinded unless such uses are solely to abate public health or fire hazards (an allowance may be made by the City Manager to water sparingly in order to keep public-funded parks and outdoor areas alive). Stage 3 measures attempt to achieve reductions in residential and commercial demands of up to 20% of peak season demand. In the case of temporary water loss due to major damage to critical supply system facilities or major damage to local electrical utility systems, it may be necessary to go directly to Stage 4.

Under Stage 3 it will be expressly prohibited to:

1. Water, sprinkle or irrigate lawns, grass, landscaping or turf unless such uses are solely to abate public health or fire hazards, as directed by the City Manager with advisement from agencies such as Washington County Public Health or Hillsboro Fire Department, or as directed by the City Manager to sustain publicly-funded outdoor areas.
2. Wash, wet down, or sweep sidewalks walkways, driveways, parking lots, open ground or other hard-surfaced areas with water.
3. Wash vehicles, unless the City Manager or other authority, such as the Washington County Health Department, finds that the public health, safety, and welfare is contingent upon frequent vehicle cleaning such as cleaning of solid waste transfer vehicles, vehicles that transfer food and other perishables, or as otherwise required by law. An exception is that washing vehicles will be allowed at vehicle washing establishments that recycle water.
4. Flush water mains, except for water quality concerns or emergency purposes.
5. Staff, under the authority of the Utilities Commission, may also consider reducing pressure at PRV stations for prolonged severe water shortage event.

The Water Department Director will consider exemptions on a case-by-case basis for businesses that rely on irrigation for their essential operations, such as nurseries, and businesses that are willing to implement requested conservations measures. Exemptions can also be appealed by the customer to the Utilities Commission.

Additional restrictions and exemptions may be passed, as necessary, if the above measures do not adequately reduce demands.

If the Stage 3 alert is triggered by an extended disruption at the City's Cherry Grove WTP or a specific geographical area with the distribution system, the City may provide bottled water or deploy the JWC Emergency Water Distribution System to the limited number of customers who affected by loss of water service.

Stage 4: Critical Water Shortage

Stage 4 responds to events causing an immediate and sustained loss of the source of supply or major damage to critical treatment, transmission and pumping systems, even after the City has attempted to secure additional supply through alternate means. Examples may include failure of a main transmission line, failure of an intake or water treatment plant, a contamination event in Barney Reservoir, Hagg Lake, or the upper Tualatin River or its tributaries, natural disaster such as an earthquake, or a malevolent attack on the system that introduces a contaminant at some point in the system.

Under the Critical Water Shortage stage, all water use may be prohibited, except that which is necessary for human consumption, fire suppression, and sanitation needs. If the emergency causes or is expected to cause a shortage of water for an extended period of time, implementing the curtailment measures of Stage 3 may be more appropriate than Stage 4 for business continuity purposes and recovery operations.

If the event causes immediate sustained loss of supply, major damage, or renders water in the system unsafe to drink (as described above), the Hillsboro Emergency Operations Center (EOC) will be activated within the Incident Command System. The Incident Commander will assume command and control of the City's response to the event. As the cause and severity of the event dictates, the Incident Commander will direct the following actions to occur:

1. Implement the appropriate response protocols of the City's Emergency Response Plan for the Hillsboro Water System.
2. Contact Washington County Emergency Management, Washington County Public Health, and the Oregon Drinking Water Program: Department of Human Services, and any other identified support agencies, to request assistance in response actions.
3. Issue media release and notify the local news media to solicit their assistance in notifying customers.
4. Contact county, state and federal law enforcement officials as appropriate.
5. Contact the County Public Health Officer and local hospitals as appropriate for the nature of the event.
6. Contact JWC staff and request deployment of the Emergency Water Distribution System.
7. Consider contacting another Oregon Water/Wastewater Agency Response Network (ORWARN) agency requesting additional equipment and staff for emergency response operations.

The City will continue to investigate and develop specific back-up plans for a Stage 4 emergency. These plans may include negotiating a water purchase agreement with another water agency, designating emergency water distribution locations, and working to secure redundancy supply through the development of the mid-Willamette River as a second source and Aquifer Storage and Recovery (ASR) technology.

Drought Declaration

If the Governor declares a drought in Washington County, the City will inform customers of the drought declaration and the status of the City's water supply via the City website. In addition, the City will ask customers to voluntarily decrease water use. The City will outline measures that customers can take to reduce water use and it will remind customers of City's availability as a water conservation resource for information and water-saving devices.

Note: The JWC adopted an updated Curtailment Plan on January 13, 2017. The City's Curtailment Plan works in conjunction with the JWC plan. Both the JWC Curtailment Plan and the City of Hillsboro Curtailment Plan may be updated again for the 2020 JWC Water Management and Conservation Plan (WMCP).

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5. Water Supply

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

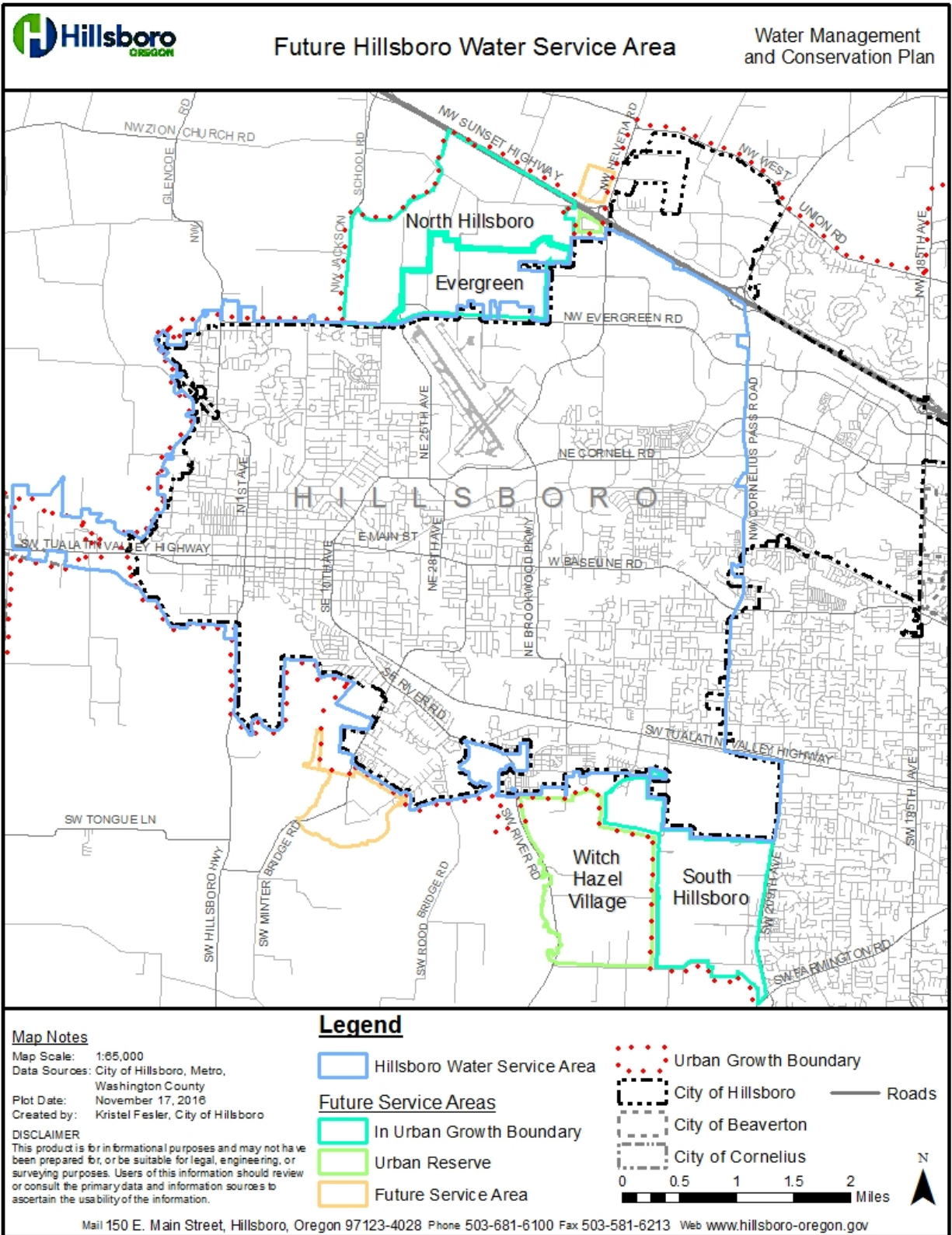
This rule requires descriptions of the City's current and future water delivery areas and population projections, demand projections for 10 and 20 years, and the schedule for when the City expects to fully exercise its water rights. The rule also requires comparison of the City's projected water needs 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)

As described in Section 2, the City's current retail water service area includes two geographically separated areas: (1) the In-Town retail service area, which includes approximately 75% of the City of Hillsboro's political boundary, and (2) the Upper System, which serves an unincorporated area to the southwest of the City of Forest Grove. The City's future water service area during this WMCP 20-year planning period consists of the City's current water service area, as shown in **Exhibit 2-1**, plus the In-Town areas identified in **Exhibit 5-1**. The three main future service areas are South Hillsboro/Witch Hazel Village, North Hillsboro, and Evergreen. The boundary between the City of Hillsboro and TVWD water service areas is Helvetia Road for areas north of Sunset Highway (Highway 26) and Cornelius Pass Road for areas south of Sunset Highway to Tualatin Valley Highway (Hwy 8). The boundary is SW 209th Avenue for areas south of Tualatin Valley Highway to Farmington Road.

Exhibit 5-1. Future Water Service Area.



Population Projections

OAR 690-086-0170(1)

The City’s entire service area population is projected to be 117,073 in 2026 and 130,500 in 2036. As shown in **Exhibit 5-2**, the City’s projected service area population consists of the populations projected within the City’s In-Town service area, the City’s Upper System service area, and the wholesale customer service area of the LA Water Cooperative, and the Cities of Gaston and Cornelius. The population projection within the City’s In-Town service area and the City’s Upper System are based on the 2014 RWPC PRC Report. The population projection of LA Cooperative applied its annual growth rate from 2010 through 2016 of 0.5% to the 2015 estimated population. The City of Gaston population projection is based on its average annual growth rate from 2010 through 2015 of approximately 0.1% (according to the PSU PRC) applied to the 2015 estimated population. The City of Cornelius population projection is based on an average annual growth rate of 1.68% derived from its PSU PRC 2015 population (11,900) and Metro’s Regional 2035 Forecast Distribution (2012) population projection for the City of Cornelius in 2035.

Exhibit 5-2. Population Projections.

Location	Current	Projected	
	2015	2026	2036
City of Hillsboro (In-Town)	84,224	98,281	107,471
Hillsboro Upper System	1,464	1,611	1,637
LA Water Co-Op	2,100	2,208	2,321
Gaston	640	651	663
Cornelius	11,900	14,322	18,409
Total	100,328	117,073	130,500

Demand Forecast

OAR 690-086-0170(3)

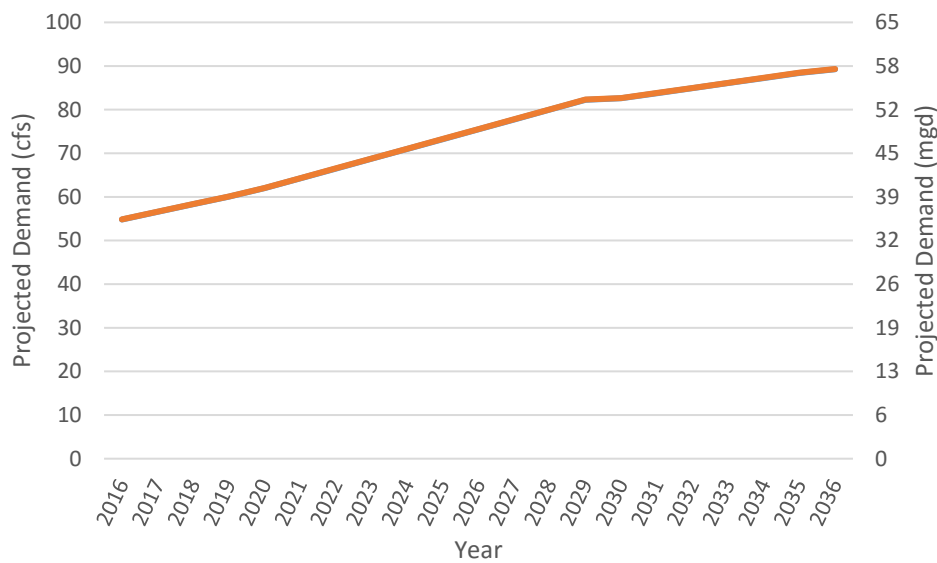
The City’s projected MDD for the City’s In-town service area, the City’s Upper System service area, and wholesale customers: City of Cornelius, City of Gaston, and LA Cooperative is 48.80 mgd in 2036 and 57.70 mgd in 2036, as shown in Exhibits 5-3 and 5-4. The City’s In-Town demand projections were based on projected land use development (based on zoning designations) and unit demands for each customer class (utilizing consumption data) in gallons per acre per day. Population projections were not used for the City’s In-Town demand projections. An integrated land-use demand projection was used because of the significant amount of industrial water usage in the City’s In-Town service area and the amount of undeveloped industrial land. The demand projections for the City’s Upper System and three wholesale customers were based on projected population growth rates. The demand projections utilized 2010 data as a baseline. A peaking factor of 1.5 for the City of Cornelius and a peaking factor of 2.0 for the Upper System were applied to average day demands (based on recent historical metered consumption). These demand projections were created before the old sonic meters were replaced, thus the City adjusted unit demands upward by 10% in the In-Town calculations and 20% in the Upper System and wholesale customer calculations to account for system water loss. The demand projection methodology was originally described in the City’s approved 2013 Water System Master Plan, and subsequently updated

as described in the 2012 City report titled Hillsboro Water Demand Forecasting Update. The updated demand projection was then used for the JWC’s 2015 Capital Improvement Plan.

Exhibit 5-3. MDD Projections, 2026 and 2036.

Year	Total MDD (mgd)	Total MDD (cfs)
2026	48.80	75.49
2036	57.70	89.25

Exhibit 5-4. MDD Projections, 2016-2036.



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

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

As previously described in Section 2, the majority of the City’s current water supply is provided through the JWC. Under the current JWC agreement, the City has access to up to 52.21 cfs (33.75 mgd) of supply from the JWC WTP. Following the 15.47 cfs (10 mgd) treatment capacity expansion of the JWC WTP, which is estimated to be completed in 2019, the City anticipates having access to an additional 12.38 cfs (8 mgd) for total access of up to 64.59 cfs (41.75 mgd). The Cherry Grove WTP has an operational capacity of approximately 4.6 cfs (3 mgd). In addition, the City recently acquired 56 cfs (36.18 mgd) of Willamette River water under *extended water use permit* S-55045 from the City of Salem².

² See the letter withdrawing the City’s demands from *extended permit* S-35819 in Appendix G.

The City anticipates that the year 2026 will mark a pivotal change in the City's water supply management. In that year, the Willamette Water Supply Program (WWSP) WTP is expected to become operational and the City plans to begin diverting Willamette River water under *extended permit S-55045*, with the potential to divert up to 30.94 cfs (20 mgd) based on its ownership of the total WWSP WTP capacity. By 2026, the City intends to use water diverted from the JWC WTP to satisfy up to 64.59 cfs (41.75 mgd) of its projected water demands, which is the maximum amount of JWC water that the City will be entitled to based on the investment the City plans to make in the JWC WTP. The City plans to meet water demand beyond 64.59 cfs by using Willamette River water under *extended permit S-55045*. If water demand is in excess of 64.59 cfs before the WWSP WTP is operational, the City will likely meet demand by entering into a short-term lease of additional JWC WTP capacity.

For planning purposes, the City excluded water supply from the Cherry Grove WTP as a water supply source to ensure sufficient water supply to the Upper System in the event that the Cherry Grove WTP fails. The Cherry Grove WTP frequently experiences service interruptions due to high turbidity events. The City also excluded JWC ASR as a water supply source for the purposes of this analysis given that ASR is not currently a supply source and is not expected to become a significant supply source within the planning period.

Exhibit 5-5 presents how the City's projected water demands will be met by the JWC and Willamette River water supply sources during the 20-year WMCP planning period. **Exhibit 5-6** shows that the City anticipates a need for 64.59 cfs of JWC water and 10.90 cfs of Willamette River water in 2026 to meet the projected demand of 75.49 cfs. In 2036, the need remains the same for JWC WTP, 64.59 cfs, and increases to 24.66 cfs of Willamette River water to meet the projected demand of 89.25 cfs.

In addition to being a supply source to meet future demand, the City acquired the water right on the Willamette River to secure a redundant water supply source. A redundant source is crucial given that some or all of the live flow water rights have been regulated off by OWRD in low-flow years on the Tualatin River, leaving only stored water available. The reliability of live flow water rights could be negatively affected by climate change and prolonged drought in the future.

For several years, the JWC has been planning for significant seismic improvements to the WTP. Some of those improvements will be completed by 2019 as part of the expansion to 85 mgd capacity. However, planning for the more significant improvements will begin after the WWSP becomes operational in 2026. Completion of these seismic improvements will require a temporary decrease in the capacity of the JWC WTP during construction. At that time, the WWSP will be an important redundant supply source.

Seismic upgrades of this magnitude are occurring to meet the Oregon Resilience Plan goals. House Resolution 3 directs the Oregon Seismic Safety Advisory Committee (OSSPAC) to lead a state-wide effort to plan for the impacts of a Cascadia earthquake and tsunami. OSSPAC developed the Oregon Resilience Plan (ORP) in response. The central finding of the ORP was that very large earthquakes will occur in Oregon's future, and the state's infrastructure will remain poorly prepared to meet the threat unless action is taken now to start building necessary resilience. The ORP includes goals for specific functions of water systems in the event of an earthquake. For WTPs and water supply systems, the ORP recommends that 20% to 30% of the potable supply be available within 24 hours following the event, and near full restoration of the supply within one to two weeks. One of the primary objectives of the JWC WTP seismic upgrades is to meet that goal.

Thus, the City is seeking access to 30.94 cfs (20 mgd) of the undeveloped portion of *extended permit S-55045*, which is the capacity of the WWSP WTP that the City intends to own during this 20-year planning period (6.28 cfs of redundant water supply beyond the projected need for 24.66 cfs of Willamette River water to meet the City’s projected total demand in 2036). Currently, the City does not have access to the undeveloped portion of *extended permit S-55045*. Therefore, the City is requesting access to 30.94 cfs (20 mgd) of “green light water” under *extended permit S-55045* to meet its projected municipal water demands in 2036 and to provide a small amount of water supply redundancy.

The City intends to put the entirety of its 56 cfs (36 mgd) portion of *extended permit S-55045* to beneficial use by approximately 2060 when the City anticipates another major expansion of the WWSP WTP, at which point the City will be entitled to a 56 cfs portion of the total WWSP WTP capacity. The City plans to use 64.59 cfs of JWC water and 40.59 cfs of *extended permit S-55045* to meet the projected demand of 105.18 cfs by approximately 2060, and to use the remaining 15.41 cfs of its 56 cfs portion of *extended permit S-55045* for a small amount of water supply redundancy. The City projects that by approximately 2085 it will need the entirety of its 56 cfs portion of *extended permit S-55045*, along with the 64.59 cfs of JWC water, to meet the projected demand of 120.65 cfs (77.99 mgd).

Exhibit 5-5. MDD Projections and Planned Water Supply Sources, 2016-2036.

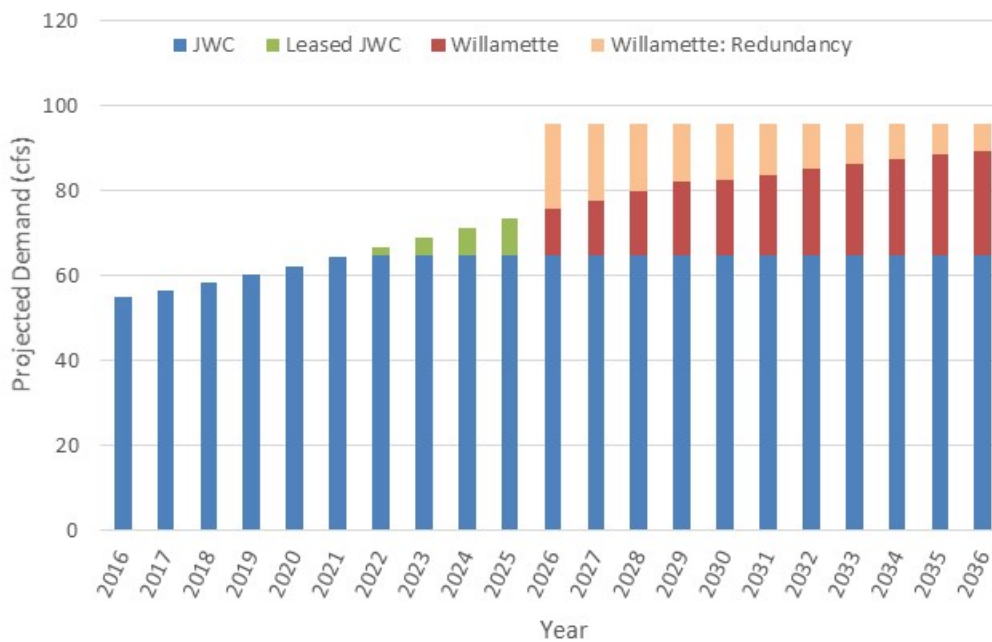


Exhibit 5-6. MDD Projections and Planned Water Supply Sources, 2026 and 2036.

Year	Demand by Water Source (mgd)			Demand by Water Source (cfs)		
	JWC	Willamette	Total	JWC	Willamette	Total
2026	41.75	7.05	48.80	64.59	10.90	75.49
2036	41.75	15.95	57.70	64.59	24.66	89.25

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. As described above, the City plans to initiate diversion of water under Permit S-55045 to meet its future water demands.

The City recently conducted a thorough evaluation of water supply options to meet its future water demands, which is included in Volume 2 of the City's approved 2013 Water System Master Plan. The City considered the following supply options: the Portland Water Bureau, the Willamette River, the Tualatin Basin Water Supply Project (which involved raising the dam at Hagg Lake), JWC ASR, treated effluent, and a groundwater source. The City's evaluation criteria for each option included: the cost, source reliability, source redundancy, ownership, operational complexity, implementation risk, source water quality, treated water quality, environmental impacts, and responsiveness to demand growth.

Based on this evaluation and extensive outreach, the City determined that the Willamette River was the best water supply source option. The Willamette River water supply source offers such benefits as year-round reliability, source redundancy, ownership and control of supply, excellent finished water quality, cost-effectiveness, and reduced environmental impacts compared to other options. According to OWRD's water availability analysis, water is available in the reaches of the Willamette River below the McKenzie River confluence at 80% exceedance every month of the year. The ability to partner with TVWD and other water providers to create the WWSP made the Willamette River water supply option more feasible and preferable, as well.

(a) Conservation Measures

As detailed in Section 3, the City has an aggressive and comprehensive water conservation program that strives to maximize the cost-effectiveness of water conservation measures, as shown by the study carried out to determine the most cost-effective WaterSense conservation programs. While the City's conservation efforts are achieving and will continue to achieve water savings, conservation measures alone cannot eliminate the City's need for additional water supply to meet the City's future demands within its entire service area. Even if the City achieved water conservation savings of 5% annually, which is unlikely given the aggressive programs already in place and very low per capita water use, the City would still need as much as 20 cfs in 2036 from the Willamette River. Therefore, water savings from conservation measures cannot not eliminate the City's need for additional supply from the Willamette River. Nevertheless, the City believes that successful water management requires a robust water conservation program and it will continue to strive to maximize water conservation in its water service area, as well as act as a role model for water conservation in the region. For example, even though Permit S-55045 does not require a Special Section nor the additional water conservation actions, the City has voluntarily included that section and intends to implement those actions when it begins diverting water under Permit S-55045.

In addition, while water conservation may delay the need for additional water supply in the future, it does not diminish the City's need for a redundant water supply under Permit S-55045. As described in Section 2, in past low-flow years OWRD regulated off a portion or all of the JWC related live flow water rights, which made the City of Hillsboro (and other JWC members) rely exclusively on its storage water rights. The result is that the City's water supply is vulnerable to long-term drought. To avoid a shortfall in the City's water supply stemming from weather or other events reducing water availability from the JWC, the City considers securing a redundant supply to be imperative.

(b) Interconnections

Additional interconnections with other water suppliers will not provide the City with an additional reliable supply source, so the City acquired a 56 cfs portion of Permit S-55045. The City currently obtains its water supply from interconnections with the JWC supply system. The City supplies water to, but does not receive water from, neighboring areas (the City of Gaston, City of Cornelius, and the LA Cooperative) because these areas do not have their own municipal water rights to provide a source of supply. The adjacent City of Beaverton and TVWD service area also use JWC water supply. Limitations on the JWC water supply affecting the City cannot be resolved by connecting to other JWC members. As previously described, the City evaluated a variety of water supply options and concluded that the Willamette River was the best option for meeting the City's projected water demands.

Furthermore, the City wanted to have its own water supply, as well as a redundant water supply, to avoid risks associated with complete dependency on the JWC.

(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.

Water conservation measures alone, regardless of the cost, cannot meet the City's projected water demands, as described above. Furthermore, water conservation measures cannot eliminate the City's need for a redundant water supply source. Development of a Willamette River supply combined with the City's cost-effective conservation measures will enable the City to meet its projected demands beginning in 2026. Any Willamette River supply beyond the rate used to meet projected demands will provide the City with needed water supply redundancy.

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 up to 30.94 cfs (6.28 cfs of redundant water supply beyond the projected need for 24.66 cfs of Willamette River water to meet the City's projected total demand in 2036) under the Permit S-55045 to help meet its projected water demands beginning in 2026. Assuming that the water right is used at 20 mgd (30.94 cfs), 24 hours per day for 31 days during the peak demand month (likely July or August), the maximum monthly volume for the water right would be approximately 620 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 currently is not required to take any mitigation actions under state or federal law. However, the final order approving an extension of time for Permit S-55045 included “fish persistence” conditions, which are described above in Section 2. The City is aware of the conditions.

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

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Appendix A

Letters to Local Governments and Comments



February 24, 2017

Colin Cooper
City of Hillsboro Planning Department
Civic Center, 4th Floor
150 E Main Street
Hillsboro, OR 97123

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

Dear Mr. Cooper:

The City of Hillsboro 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 shall 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 USB flash drive containing the City of Hillsboro'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 Comprehensive Land Use Plan, a letter response to that effect would be appreciated. You may send your comments to me by email at asussman@gsiws.com.

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

Sincerely,
GSI Water Solutions Inc.

A handwritten signature in blue ink, appearing to read "Adam Sussman", is written over a light blue horizontal line.

Adam Sussman
Principal Water Resources Consultant

Enclosure



Water Solutions, Inc.

February 24, 2017

Anna Slatinsky
City of Beaverton Planning Division
Beaverton City Hall
4755 SW Griffith Dr.
P.O. Box 4755
Beaverton, OR 97076

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

Dear Ms. Slatinsky:

The City of Hillsboro 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 shall 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 USB flash drive containing the City of Hillsboro's draft WMCP for your review.

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

Sincerely,
GSI Water Solutions Inc.

A handwritten signature in blue ink, appearing to read "Adam Sussman", is written over the typed name.

Adam Sussman
Principal Water Resources Consultant

Enclosure



February 24, 2017

Jon Holan
City of Forest Grove Community Development: Planning
City Hall
1924 Council Street
P.O. Box 326
Forest Grove, OR 97116-0326
Subject: Water Management and Conservation Plan for the City of Hillsboro

Dear Mr. Holan:

The City of Hillsboro 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 shall 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 USB flash drive containing the City of Hillsboro's draft WMCP for your review.

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Sincerely,
GSI Water Solutions Inc.

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Adam Sussman
Principal Water Resources Consultant

Enclosure



February 24, 2017

Andy Back
Washington County Public Services Building
Land Use & Transportation Division
Planning and Development Services, Long Range Planning
155 N 1st Avenue, Suite 350
Hillsboro, Oregon 97124-3072

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

Dear Mr. Back:

The City of Hillsboro 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 shall 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 USB flash drive containing the City of Hillsboro's draft WMCP for your review.

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Sincerely,
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Adam Sussman
Principal Water Resources Consultant

Enclosure



February 24, 2017

Multnomah County Planning Department
1600 SE 190th Avenue
Portland, OR 97233

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

Dear Sir or Madam:

The City of Hillsboro 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 shall 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 USB flash drive containing the City of Hillsboro's draft WMCP for your review.

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Adam Sussman
Principal Water Resources Consultant

Enclosure



February 24, 2017

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 Hillsboro

Dear Ms. Gertler:

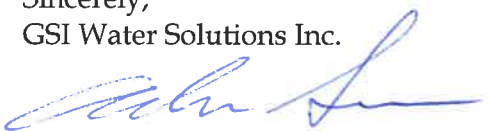
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If you have any questions, please feel free to contact me at 541-257-9001. Thank you for your interest.

Sincerely,
GSI Water Solutions Inc.



Adam Sussman
Principal Water Resources Consultant

Enclosure



February 24, 2017

City of Gaston
116 Front St
PO Box 129
Gaston, Oregon 97119

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

Dear Sir or Madam:

The City of Hillsboro 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.

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Sincerely,
GSI Water Solutions Inc.

A handwritten signature in blue ink, appearing to read "Adam Sussman", is written over the typed name.

Adam Sussman
Principal Water Resources Consultant

Enclosure



February 24, 2017

Ryan A. Wells, AICP
Community Development Department
City of Cornelius
1355 N. Barlow Street,
Cornelius, OR 97113

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

Dear Mr. Wells:

The City of Hillsboro 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 shall 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 USB flash drive containing the City of Hillsboro's draft WMCP for your review.

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Sincerely,
GSI Water Solutions Inc.

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Adam Sussman
Principal Water Resources Consultant

Enclosure



February 24, 2017

LA Water Cooperative
23055 NE Albertson Road
Gaston, Oregon

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

Dear Sir or Madam:

The City of Hillsboro 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 shall 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 Hillsboro is providing you with a copy of the Draft WMCP on a USB flash drive. If you have any questions, please feel free to contact me at 541-257-9001 or asussman@gsiws.com.

Sincerely,
GSI Water Solutions Inc.

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Adam Sussman
Principal Water Resources Consultant

Enclosure



February 24, 2017

Mark Knudson, Chief Executive Officer
Tualatin Valley Water District
1850 SW 170th Avenue
Beaverton, OR 97003

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

Dear Mr. Knudson:

The City of Hillsboro 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 shall 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.

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Sincerely,
GSI Water Solutions Inc.

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Adam Sussman
Principal Water Resources Consultant

Enclosure



Water Solutions, Inc.

February 24, 2017

Chris Neamtzu
City of Wilsonville Planning Division
29799 SW Town Center
Loop E
Wilsonville, OR 97070

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

Dear Mr. Neamtzu:

The City of Hillsboro 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 shall 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.

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Sincerely,
GSI Water Solutions Inc.

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Adam Sussman
Principal Water Resources Consultant

Enclosure



Water Solutions, Inc.

February 24, 2017

Kelly Ross
Willamette River Water Coalition
6745 SW Hampton, Suite 101
Portland, OR 97223

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

Dear Mr. Ross:

The City of Hillsboro 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 shall 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.

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Adam Sussman
Principal Water Resources Consultant

Enclosure



Water Solutions, Inc.

February 24, 2017

Eunice Kim
City of Salem Planning Division
City Hall
555 Liberty Street SE, room 305
Salem, OR 97301

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

Dear Ms. Kim:

The City of Hillsboro 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 shall 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 Hillsboro is providing you with a copy of the Draft WMCP on a USB flash drive. If you have any questions, please feel free to contact me at 541-257-9001 or asussman@gsiws.com.

Sincerely,
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Adam Sussman
Principal Water Resources Consultant

Enclosure



Water Solutions, Inc.

February 24, 2017

Blake Boyles, City Manager
City of North Plains
31360 NW Commercial Street
North Plains, OR 97133

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

Dear Mr. Boyles:

The City of Hillsboro 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 shall 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 Hillsboro is providing you with a copy of the Draft WMCP on a USB flash drive. If you have any questions, please feel free to contact me at 541-257-9001 or asussman@gsiws.com.

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GSI Water Solutions Inc.

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Adam Sussman
Principal Water Resources Consultant

Enclosure



Water Solutions, Inc.

February 24, 2017

Niki Iverson
Joint Water Commission
Hillsboro Civic Center
150 E Main St., 3rd Floor
Hillsboro, OR 97123

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

Dear Ms. Iverson:

The City of Hillsboro 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 shall 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.

Given the relationship between the Joint Water Commission and the City of Hillsboro, we are providing you with a courtesy copy of the Draft WMCP on a USB flash drive. If you have any questions, please feel free to contact me at 541-257-9001 or asussman@gsiws.com.

Sincerely,
GSI Water Solutions Inc.

A handwritten signature in blue ink, appearing to read "Adam Sussman", is written over the typed name.

Adam Sussman
Principal Water Resources Consultant

Enclosure

Suzanne de Szoeki

From: Adam Sussman
Sent: Monday, March 27, 2017 3:16 PM
To: Suzanne de Szoeki
Subject: Fwd: WMCP Review

FYI, communications with COH planner.

Adam Sussman
GSI Water Solutions

Begin forwarded message:

From: Kristel Fesler <Kristel.Fesler@hillsboro-oregon.gov>
Date: March 27, 2017 at 3:10:56 PM PDT
To: Laura Weigel <Laura.Weigel@hillsboro-oregon.gov>
Cc: Niki Iverson <Niki.Iverson@hillsboro-oregon.gov>, Tacy Steele <Tacy.Steele@hillsboro-oregon.gov>, Adam Sussman <asussman@gsiws.com>
Subject: RE: WMCP Review

Laura,

Apologizes for the confusion between this Water Management and Conservation Plan (WMCP) and the documents relating to the Willamette Water Supply permitting. The WMCP is needed for the City to withdraw water from Willamette River. The others are to permit the building of infrastructure to deliver that water.

To recap our discussion on the WMCP.

- The included map of future service areas (Exhibit 5-1) is consistent with the City's long-range planning efforts.
- In the text, we may want to include a description of future service boundaries. Namely, for areas north of Hwy 26, Helvetia Rd is the boundary between COH and TVWD water service areas.

Please let me know if you have any additional questions or comments to the WMPC.

Thanks,
-Kristel

Kristel Fesler | *Water Resources Program Coordinator*
City of Hillsboro, Oregon | Water Department
phone 503-615-6735 | cell 503-928-1445
email Kristel.Fesler@hillsboro-oregon.gov | web www.hillsborowater.org
Follow us on Twitter [@hillsborowater](https://twitter.com/hillsborowater) and [Facebook](https://www.facebook.com/hillsborowater)

From: Niki Iverson
Sent: Tuesday, March 21, 2017 5:06 PM
To: Tacy Steele <Tacy.Steele@hillsboro-oregon.gov>; Kristel Fesler <Kristel.Fesler@hillsboro-

From: [Adam Sussman](#)
To: [Suzanne de Szoeki](#)
Subject: FW: City comments on Hillsboro Water Management and Conservation Plan
Date: Wednesday, March 15, 2017 12:26:34 PM

From: Ryan Wells [mailto:RWells@ci.cornelius.or.us]
Sent: Wednesday, March 15, 2017 12:16 PM
To: Adam Sussman <asussman@gsiws.com>
Subject: City comments on Hillsboro Water Management and Conservation Plan

Dear Adam,

Following our review of the Water Management and Conservation Plan for the City of Hillsboro, the plan appears to be consistent with our adopted Comprehensive Plan. Thank you for the opportunity to comment.

Ryan A. Wells, AICP
Community Development Director
City of Cornelius
1300 S. Kodiak Circle
Mailing: 1355 N. Barlow Street
Cornelius, Oregon 97113
phone 503-992-5370 | cell 707-496-2177
email rwells@ci.cornelius.or.us
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From: [Suzanne de Szoeke](mailto:Suzanne.de.Szoeke@gsiws.com)
To: "Mende@ci.wilsonville.or.us"
Cc: [Adam Sussman](mailto:Adam.Sussman@gsiws.com)
Subject: RE: Comments on Hillsboro WMCP
Date: Tuesday, March 28, 2017 10:25:58 PM
Attachments: [image001.png](#)

Eric,

Thank you for your comments.

We fixed the header and added the Kinsman Road agreement. The lease agreement has not been finalized yet, so will not be included.

Thanks,

Suzanne

Suzanne de Szoeke

Water Resources Consultant | GSI Water Solutions, Inc.

direct: 541-257-9006 | cell: 541-224-4588

1600 SW Western Boulevard, Suite 240 | Corvallis, OR 97333

www.gsiws.com | sdeszoeke@gsiws.com

Normal Work Days: Mondays, Wednesdays, and Fridays

From: Mende, Eric [<mailto:Mende@ci.wilsonville.or.us>]

Sent: Monday, March 20, 2017 8:19 AM

To: Adam Sussman <asussman@gsiws.com>

Subject: Hillsboro WMCP

The Header of Appendix C says Appendix B.

Two Agreements that I am aware of are not listed on Appendix B:

- 1) Agreement for construction of pipeline segment under Kinsman Road (Wilsonville), and
- 2) Lease Agreement between WWSP and Wilsonville concerning pipeline through Wilsonville.

No other comments.

Eric

Eric W. Mende PE

Capital Projects Engineering Manager

City of Wilsonville

503.570.1538 direct

503.682.4960 (front desk)

mende@ci.wilsonville.or.us

www.ci.wilsonville.or.us

<image001.png>

Disclosure Notice: This email may be subject to Oregon Public Records laws.



April 4, 2017

Adam Sussman, Principal Water Resources Consultant

GSI Water Solutions Inc.
1600 SW Western Blvd., Suite 240
Corvallis, OR 97333

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

Dear Mr. Sussman,

Thank you for the opportunity to review the Water Management and Conservation Plan (Plan) prepared for the city of Hillsboro. Washington County staff has reviewed the draft document and it appears to be consistent with the County's Comprehensive Framework Plan and the County's 2003 Hillsboro Urban Service Agreement (HUSA). Staff provided a copy of the HUSA via email and requests that it be included in Appendix C of the Plan.

The Plan considered the future water demand based on the anticipated land use designations for several areas outside of the current Hillsboro service area that are of interest and concern to Washington County. The Plan successfully demonstrates with system upgrades, conservation measures and acquisition of the water rights to the Willamette River that Hillsboro will be able to meet the identified water needs of these future service areas for the 20 and 30 year planning horizon.

Sincerely,

Andy Back, Manager
Planning and Development Services

Department of Land Use & Transportation
Planning and Development Services

155 N. First Ave., Suite 350, MS14, Hillsboro, OR 97124-3072
phone: 503-846-3519 • fax: 503-846-4412
www.co.washington.or.us/lut • lutdev@co.washington.or.us

Appendix B

Interconnections

JWC to Hillsboro

NTL-Valley View
NTL-Dairy Creek
NTL-Connell & Jackson
NTL-Glencoe & Evergreen
NTL-25th & Evergreen
NTL-Dawson Crk & Evergreen
NTL-229th & Bennett
NTL-Evergreen Reservoir
NTL-Crandall Reservoir
STL-1st AVE
STL-Minter Bridge
STL-239th (Imlay)
STL-Roseway
STL-Jackson Bottom
STL-Clean Water Services
STL-KD Auto

JWC to Hillsboro's Cherry Grove system

Dilley PRV

Hillsboro to Gaston

Patton Valley Rd/Bates Rd

Hillsboro to LA Water Co-Op

Old Hwy 47/Springhill Rd

Hillsboro and TVWD

Cornelius Pass Rd/Evergreen Rd
Cornelius Pass Rd/Cherry Lane
Cornelius Pass Rd/Quatama Rd
Cornelius Pass Rd/Baseline Rd
Cornelius Pass Rd/Walbridge St
Cornelius Pass Rd/SW Johnson St
Cornelius Pass Rd/TV Hwy
Kinnaman Rd

NTL = North Transmission Line

STL = South Transmission Line

Appendix C

Intergovernmental Agreements

APPENDIX C

Summary of Intergovernmental Agreements

Title	Date	Parties	Scope
Repayment contract between the United States of America and the City of Hillsboro, Contract No. 14-06-100-7180	11-Nov-71	Hillsboro, BOR	Hillsboro enters into contract with BOR for construction and repayment of costs of the Tualatin Federal Reclamation Project. Provides Hillsboro with 4,500 ac-ft per year of municipal and industrial water supply from the project.
Supplemental contract between the United States of America and the City of Hillsboro, Contract No. 14-06-100-8069	8-Mar-74	Hillsboro, BOR	Adds construction of the Spring Hill Pumping Plant to the Tualatin Federal Reclamation Project.
Joint Water Commission Water Service Agreement	February 1, 1976	Hillsboro, Forest Grove	Establish a joint operation for the pumping, treatment and transmission of Municipal and Industrial Water, Creating a Joint Water Commission.
Joint Water Commission Water Service Agreement	April 17, 1979	Hillsboro, Forest Grove, Beaverton	"Establish joint operations for the supply, pumping, treatment and transmission of municipal and industrial waters." Adds Beaverton as member of Joint Water Commission
Assignment of repayment contract No. 14-06-100-7182	21-Aug-80	Tigard Water District, Hillsboro, BOR	Transfers Contract No. 14-06-100-7182 (2,500 ac-ft) from Tigard Water District to Hillsboro. Contract is then assigned to the City of Beaverton.
Spring Hill Pump Plant Bypass Construction Agreement	28-Feb-84	Hillsboro, Forest Grove, Beaverton Joint Utilities Commission, TVID, BOR	Springhill Pump Station Construction, JWC providing an advance of funds (\$91,000) to construct the bypass to reduce sediment accumulation.
Repayment contract between the United States of America and the City of Hillsboro, Contract No. 2-07-10-W0867	26-Dec-91	Hillsboro, BOR	Provides Hillsboro with 500 ac-ft per year of M&I water from the Tualatin Federal Reclamation Project.
Interim Water Conservation Plan Resolution No. 3230	July 16, 1993	Hillsboro, Forest Grove, Beaverton, TVWD	"Committing to an Interim Water Conservation Plan." Conserving to comply with Barney Reservoir Expansion Project
By-Laws of the Columbia-Willamette Water Conservation Coalition	between 1993 and 1997	Municipal water providers of the Portland Metropolitan area	Establish the Conservation Coalition (later becomes the Regional Water Providers Consortium), establish goals, objectives, outline powers, duties and committees.
Joint Water Commission Water Service Agreement Amendment	June 30, 1994	Hillsboro, Forest Grove, Beaverton, TVWD	Adds TVWD as member of Joint Water Commission
Joint Ownership Agreement- Barney Project (Rev 6-08-94) (AKA the "Original Barney Agreement")	July 19, 1994	Hillsboro, Forest Grove, Beaverton, TVWD, United Sewerage Agency	"Establishes the Barney Reservoir Joint Ownership Committee (BRJOC)." Includes Warranty Deed for land ownership in Yamhill (June 19, 1968) and Washington Counties (April 29, 1968).
Hillsboro-Beaverton-TVWD Joint Water Transmission Agreement	September 21, 1994	Hillsboro, Forest Grove, Beaverton, TVWD	Amends Joint Water Service Agreement of April 17, 1979, by adding TVWD as part owner of the joint transmission line system.
Northside Water Transmission Agreement	April 11, 1997	Hillsboro, Forest Grove, Beaverton, TVWD	Construction of Phase I of Northside Transmission Line
Proposed Bylaw Revision	July 17, 1997	Columbia-Willamette Water Conservation Coalition	Adds new section of Finance Manager, establishes standing coalition committees
Northside Water Transmission Agreement-Phase II	14-Jan-00	TVWD, Hillsboro, JWC	Construction of Phase II of Northside Transmission Line
Transmission Line Intergovernmental Agreement	14-Jan-00	JWC, Hillsboro, TVWD, Cornelius	To coordinate the design and construction of replacement 72-inch water line that runs from the slow sand filter plant to Forest Grove and Cornelius and from which Cornelius has obtained domestic water service pursuant to a contract between Hillsboro and Cornelius.

APPENDIX C

Summary of Intergovernmental Agreements

Title	Date	Parties	Scope
Joint Funding Agreement IWRM Water Supply Feasibility Study	14-May-01	United Sewerage Agency, TVWD, Hillsboro, Beaverton, Forest Grove, Tigard, Sherwood, Tualatin, North Plains, Cornelius, Banks	Enters parties into an agreement under which they shall jointly fund a feasibility study of two alternatives and a 'no action' alternative to increasing the water supply for users within the Tualatin Basin. The two alternatives are Scoggins Dam Raise and Willamette River Exchange Pipeline. (IWRM = Integrated Water Resource Management)
Tualatin Basin Water Supply Agreement Memorandum of Understanding	18-May-01	JWC, Tigard	Memorandum of Understanding outlining cooperation in planning for the development or expansion of water sources in the Tualatin River Basin and water supply facilities.
Authorizing Ordinances	Mar-03	Hillsboro, Forest Grove, Beaverton, TVWD	Each city authorizing an intergovernmental agreement titled "Joint Ownership Agreement Barney Project" which continues the Barney Reservoir Joint Ownership Commission.
Ordinance No. 5239	4-Mar-03	Hillsboro	City of Hillsboro authorizing an Intergovernmental Agreement Titled "Joint Water Commission - Hillsboro, Forest Grove, Beaverton and Tualatin Valley Water District Water Service Agreement".
Joint Ownership Agreement- Barney Project	27-Oct-03	Hillsboro, Forest Grove, Beaverton, TVWD, CWS	Terminates and Replaces the "Original Barney Agreement" (Rev 6-08-94).
Joint Water Commission Water Service Agreement (JWC IGA)	27-Oct-03	JWC	Terminates and Replaces the Water Service Agreement, the Amended Water Service Agreement, the Transmission Agreement, the Amended Transmission Agreement, the Northside Water Transmission Agreement and the Northside Water Transmission Agreement Phase II.
Ordinance No. 5348	3-Feb-04	Hillsboro	Authorizing a first amendment to the water service agreement and joinder agreement relating to the Joint Water Commission.
City of Cornelius Water Supply Agreement	1-Jan-14	Hillsboro, Cornelius	City of Hillsboro wholesale water supply agreement with City of Cornelius, automatically renews for four successive five-year renewal periods.
City of Gaston Water Supply Agreement	1-Jan-14	Hillsboro, Gaston	City of Hillsboro wholesale water supply agreement with City of Gaston, automatically renews for four successive five-year renewal periods.
LA Water Cooperative Water Supply Agreement	1-Jan-14	Hillsboro, LA Water Cooperative	City of Hillsboro wholesale water supply agreement with LA Water Cooperative, automatically renews for four successive five-year renewal periods.
LA Water Cooperative Water Supply Agreement	17-Nov-05	Hillsboro, LA Water Cooperative	City of Hillsboro wholesale water supply agreement with LA Water Cooperative, expires in December 31, 2014.
Urban Services Agreement	2-Apr-03	Hillsboro, TVWD	Defines the service boundary between Hillsboro and TVWD
Agreement for Interim Water Supply in South Hillsboro	7-Aug-12	Hillsboro, TVWD	Outlines how water service will be provided to properties in South Hillsboro as it develops.
Purchase and Sale Agreement: Water Use under Permit S-45565	9-May-16	Hillsboro, Salem	Agreement for the City of Hillsboro to purchase a 56 cfs portion of Permit S-45565 from the City of Salem.
Memorandum of Understanding	8-Jul-11	JWC, Hillsboro, Beaverton, TVWD	Regarding an exploratory ASR well on property owned by Beaverton near its Cooper Mountain Reservoir. Lead to the JWC ASR agreement in 2013.
JWC ASR Agreement	Jul-13	JWC, Hillsboro, Beaverton, TVWD	Allows signatories to individually or jointly develop ASR capacity under the JWC ASR limited license #19. Provides for the allocation and management of ASR water and costs among them.
Willamette Water Supply Program Public Affairs/Outreach Agreement	20-Aug-13	Hillsboro, TVWD	Agreement for hiring Public Affairs and Outreach Consultants for WWSP work
Waterline Improvements on Old Hwy 47 at the Bridge over Scoggins Creek	18-Oct-11	Hillsboro, Washington County	Agreement for waterline/bridge improvements
Waterline Improvements on Evergreen Road	16-Aug-12	Washington County, Hillsboro, JWC	Road and waterline improvement partnership
Memorandum of Understanding	2-Aug-16	Hillsboro and Hillsboro School District; Hillsboro and Gaston School District	Agreements to help school districts with lead testing

APPENDIX C

Summary of Intergovernmental Agreements

Title	Date	Parties	Scope
Opportunity Project Memorandum of Understanding	18-Oct-16	Hillsboro, Washington County, TVWD	Funding and construction of transportation and water infrastructure improvements
Willamette Water Supply Program Intergovernmental Agreement	Jun-15	Hillsboro, TVWD	Agreement for design and construction of WWSP
Willamette Water Supply Program Intergovernmental Agreement	20-Aug-13	Hillsboro, TVWD	Pre-design, design Public affairs and public outreach of WWSP
Avenue Extension Project Final Design Intergovernmental Agreement	14-Oct-14	Hillsboro, Washington County, TVWD	Memorializes intentions of Partners regarding final design and construction of the Road Project and the Pipeline Project on 124th Avenue.
124th Memorandum of Understanding	14-Oct-14	Hillsboro, Washington County	Design and Construction of 124 th Avenue and WWSS water pipeline
124th Intergovernmental Construction Agreement	16-Jun-15	Hillsboro, Washington County, TVWD	Water system improvements on the SW 124 th Avenue Extension Project
Kinsman Road Memorandum of Understanding	21-Jul-15	Hillsboro, Wilsonville, TVWD	Agreement for design/placement of a water transmission pipeline under Kinsman Road during road construction
Kinsman Road Intergovernmental Agreement	22-Apr-16	Hillsboro, Wilsonville, TVWD, Oregon Department of Transportation	Agreement for construction of a water transmission pipeline under Kinsman Road (between SW Boeckman and SW Barber Streets in Wilsonville) during road construction
Bridge Memorandum of Understanding	17-Dec-14	Hillsboro, TVWD, Wilsonville, Beaverton, Sherwood, Tigard, Tualatin	MOU reaffirmed commitment to participate in discussions with the goal of developing mutually acceptable agreements or MOUs related to ownership, finance, design and construction of water system facilities. Each party will evaluate the benefits of becoming a party to future agreements.
Intergovernmental Agreement of Regional Water Providers Consortium	Amended in 2004-2005	Hillsboro, 26 Other RWPC members	To provide a collaborative clearinghouse for water supply planning and development that fosters regional coordination. To provide a forum for the study and discussion of water supply and resource related issues of mutual interest. To conduct regional conservation programs, and facilitate emergency preparedness for water suppliers in the region.
Water System Data Use and Confidentiality Agreement	2012	Members of the RWPC	Enable parties to share confidential information (water system information, vulnerabilities, records and mapping information) to support emergency response and supply planning.
Tualatin-Sherwood Road and Roy Rogers Road Water Infrastructure Improvements Memorandum of Understanding	18-Oct-16	Hillsboro, Washington County, TVWD	Funding and Construction of Transportation Improvements in Conjunction with Water Infrastructure Improvements on Tualatin-Sherwood Road and Roy Rogers Road.

Appendix D

City of Hillsboro

Non-Municipal Water Rights

Source	Priority Date	Application	Permit	Certificate	Claim, Transfer, Instream Lease	Entity Name on Water Right	Type of Beneficial Use	Authorized Rate (cfs)	Authorized Volume (ac-ft)	Maximum Rate of Withdrawal to Date		Average Daily Diversion (mgd)		Average Monthly Diversion (MG)		Authorized Date of Completion	Expiration of Instream Lease
										Instantaneous (cfs)	Annual (MG)	2015	5-year	2015	5-Year		
McKay Creek	8/16/1957	S-31801	S-25056	26358		Edward H Sahlfeld	Irrigation of 9.4 Acres	0.12		0.12	ND	ND	ND	ND	ND		
McKay Creek	4/29/1960	S-33916	S-26747	34822	Il-1325	La Vern William Buelet	Irrigation of 13.6 Acres	0.17		0.17	ND	ND	ND	ND	ND		10/1/2017
A Spring (tributary to McKay Creek)	7/11/1950	S-24975	S-19699	23481		Claire A and Marjorie E Richardson	Irrigation of 2.0 Acres	0.025		0.025	ND	ND	ND	ND	ND		
A Well	3/3/2003	G-15937	G-15550 CANCELED			Carol Curl	Irrigation	0.02		NA	NA	NA	NA	NA	NA		
A Well	1/28/1997	G-14450	G-13463			Benchmark Land Co.; Jones Farm Single Family LLC	Irrigation of 85.7 Acres	1.07		ND	ND	ND	ND	ND	ND	10/1/2020	
Glencoe Swale	10/31/1994	R-74833	R-11641	84669		Intel Corp.	Wildlife		0.9		0.29	ND	ND	ND	ND		
Beaverton Creek	4/26/1965	R-40798	R-4568	35688		Gladys Smith	Fish Culture		2.8		0.91	ND	ND	ND	ND		
Beaverton Creek and a Reservoir Constructed Under Application No R-40798	4/26/1965	S-40799	S-30398	35689		Gladys Smith	Irrigation of 0.7 Acres and Fish Culture	0.06 (being 0.05 from Creek and Reservoir for Fish Culture and 0.01 from Creek for Irrigation)		0.06	ND	ND	ND	ND	ND		
Bronson Creek	4/20/1939	S-17913	S-13599	15402		E.J. Meihoff	Irrigation of 4.6 Acres	0.06		0.06	ND	ND	ND	ND	ND		
Bronson Creek	2/1/1945	S-20665	S-16166	16748		Erwin Springer	Irrigation of 2.5 Acres	0.031		0.031	ND	ND	ND	ND	ND		
Bronson Creek	11/30/1949	S-24303	S-19058	22749		Erwin Springer	Irrigation of 3.5 Acres	0.04		0.04	ND	ND	ND	ND	ND		
Rock Creek	4/7/1952 5/22/1952	S-27055	S-21221	23068	Il-1438	Derrell E Brown	Irrigation of 36.8 Acres	0.46		0.46	ND	ND	ND	ND	ND		9/30/2019
Bronson Creek	4/18/1940	S-18670	S-14301	14497		F.J. Meihoff	Irrigation of 5 acres	0.0625		0.0625	ND	ND	ND	ND	ND		
Beaverton Creek	1/22/1953	S-28021	S-22050	23621		Earl L Horning	Irrigation of 9.2 Acres	0.12		0.12	ND	ND	ND	ND	ND		
Dairy Creek	8/2/1966	S-42578	S-31814	35409		Laura Currin By Ruth Spaniol, Guardian	Irrigation of 264.3 Acres	1.04		1.04	ND	ND	ND	ND	ND		
Unnamed Stream, Tributary of Rock Creek	4/20/1967	R-43509	R-4876	40486		William Wallace	Storage		0.41		0.13	ND	ND	ND	ND		
Unnamed Stream, Tributary of Rock Creek	8/23/1967	R-43998	R-5072	40834		A.V. and Ida B Peterson	Storage		2.5		0.82	ND	ND	ND	ND		
Unnamed Spring Branch of Rock Creek	9/28/1932	S-14749	S-10743	12088	Il-1325	Edith S and Robert Couch	Irrigation of 16.5 Acres	0.22		0.22	ND	ND	ND	ND	ND		10/1/2017
Little Rock Creek	8/23/1966	S-42690	S-31900	38900		Joe Stroeder	Irrigation of 4 Acres	0.05		0.05	ND	ND	ND	ND	ND		

ND = No Data Available
NA = Not Applicable
cfs = cubic feet per second
MG = million gallons
ac-ft = acre-feet

Source	Priority Date	Application	Permit/ Instream Lease	Certificate	Claim, Transfer, Instream Lease	Entity Name on Water Right	Type of Beneficial Use	Authorized Rate (cfs)	Authorized Volume (ac-ft)	Maximum Rate of Withdrawal to Date		Average Daily Diversion (mgd)		Average Monthly Diversion (MG)		Authorized Date of Completion	Expiration of Instream Lease
										Instantaneous (cfs)	Annual (MG)	2015	5-year	2015	5-Year		
Unnamed Stream, a Tributary of Rock Creek, in Wetland Enhancement Reservoir appropriated under Permit S-50702	5/15/1989	R-69904	R-11133	65057		Keith and Ann Jansen	Wildlife		0.61		0.2	ND	ND	ND	ND		
Unnamed Stream and Wetland Enhancement Reservoir constructed under Permit R-11133, a Tributary of Rock Creek	5/15/1989	S-69905	S-50702	65058		Keith and Ann Jansen	Wildlife	0.012		0.012		ND	ND	ND	ND		
Rock Creek, a tributary of Tualatin River	6/10/1958	S-32385	S-25574	28514		Syver O. Ruud	Irrigation	0.02		0.02		ND	ND	ND	ND		
Wells 2 through 10 in the Tualatin River Basin	6/17/1991	G-12577	G-13059 CANCELLED			Oregon Roses Inc	Supplemental Agricultural Use and Irrigation of 30.2 acres	0.226		NA		NA	NA	NA	NA		
An Unnamed Drainage Channel and Teufel Reservoir constructed under Permit R-5805, Tributaries of Tualatin River	6/17/1991	S-71702	S-51627 CANCELLED			Oregon Roses Inc	Agriculture and Irrigation on 30.2 Acres	0.223	6.4 AF	NA		NA	NA	NA	NA		
Wastewater from Hillsboro West Wastewater Treatment Plant and Effluent Holding Pond, Constructed Under Permit R-8396	2/23/1982	S-63318	S-46641	83206		United Sewerage Agency of Washington County	Irrigation of 150 Acres	1.88 (of Wastewater from the Hillsboro West WTP)	120.0 (Water from the Effluent Holding Pond)	1.88 (of Wastewater from the Hillsboro West WTP)		ND	ND	ND	ND		
Runoff, Tributary to Jackson Slough	6/16/2011	R-87729	R-14953			City of Hillsboro	Storage for Wetland Enhancement		72.1 AF		ND	ND	ND	ND	ND	5/14/2017	
No. 1 Well	3/7/1961	G-1945	G-1788	33209		Glenn A. Walters	Irrigation of 8.2 Acres	0.07		0.07		ND	ND	ND	ND		
Walters Well	9/18/1973	G-6299	G-5922	47772		Amfac Nurseries Inc.	Irrigation of 6.3 Acres	0.08		0.08		ND	ND	ND	ND		
Wells in the Tualatin River Basin	12/13/1990	G-12343	G-12247	87500		Oregon Garden Products	Nursery Operations on 19.4 Acres	0.71 cfs, being 0.28 cfs from Well NE1, 0.005 cfs from Well NE2, 0.10 cfs from NE4, 0.045 cfs from Well NE7, 0.03 cfs from Well NW3, 0.22 cfs from Well NW4, and 0.03 cfs from Well NW5		0.71 cfs, being 0.28 cfs from Well NE1, 0.005 cfs from Well NE2, 0.10 cfs from NE4, 0.045 cfs from Well NE7, 0.03 cfs from Well NW3, 0.22 cfs from Well NW4, and 0.03 cfs from Well NW5		ND	ND	ND	ND		

ND = No Data Available
NA = Not Applicable
cfs = cubic feet per second
MG = million gallons
ac-ft = acre-feet

Source	Priority Date	Application	Permit	Certificate	Claim, Transfer, Instream Lease	Entity Name on Water Right	Type of Beneficial Use	Authorized Rate (cfs)	Authorized Volume (ac-ft)	Maximum Rate of Withdrawal to Date		Average Daily Diversion (mgd)		Average Monthly Diversion (MG)		Authorized Date of Completion	Expiration of Instream Lease
										Instantaneous (cfs)	Annual (MG)	2015	5-year	2015	5-Year		
Waste Water from Hillsboro West Wastewater Treatment Plant, and Effluent Holding Pond	2/23/1982	R-63317	R-8396	83205		United Sewerage Agency of Washington County	Storage of Wastewater to be appropriated under Permit 466414 Irrigation		120		39.1	ND	ND	ND	ND		
Tualatin River, Tributary of Willamette River	4/20/1967	R-43511	R-5022	43325		Delane Fry	Storage for Supplemental Irrigation		97.9		31.9	ND	ND	ND	ND		
A Well	8/24/1970	G-5294	G-5127	43693		Glenn A Walters	Supplemental Irrigation of 8.2 Acres	0.1		0.1		ND	ND	ND	ND		
Rock Creek	1/4/1951	S-25550	S-20063	22925	II-1325	C E Hawkinson	Irrigation of 19.2 Acres	0.24		0.24		ND	ND	ND	ND		10/1/2017
An Unnamed Stream, Tributary of Rock Creek	11/25/1994	R-75046	R-11692	87499		City of Hillsboro, Water Department	Wetlands Creation and Enhancement		1.71		0.56	ND	ND	ND	ND		
Treated Effluent from Rock Creek Advanced Wastewater Treatment Facility, Discharged to Tualatin River	10/18/2006	S-86704	S-54476			Clean Water Services	Instream	10.4		ND		ND	ND	ND	ND	10/1/2025	
Lower Pond, Constructed Under Permit R-14774	1/20/2009	S-87381	S-54667	89671		City of Hillsboro, Parks And Recreation Department	Aesthetics		6.3		2.1	ND	ND	ND	ND		
Lower Pond, tributary to Tualatin River	1/20/2009	R-87379	R-14773	88492		City of Hillsboro, Parks And Recreation Department	Multi-Purpose Storage		0.3		0.1	ND	ND	ND	ND		
Runoff, Tributary to Tualatin River	1/20/2009	R-87380	R-14774	89670		City of Hillsboro, Parks And Recreation Department	Multiple-Purpose Storage		6.0		2.0	ND	ND	ND	ND		
Dairy Creek	10/9/1939	S-18415	S-14050	49086	II-1325	Eva Bailey Lynch	Irrigation of 34.5 Acres	0.43		0.43		ND	ND	ND	ND		10/1/2017
Sain Creek, a tributary to Scoggins Creek and the waters of the Tualatin River, a tributary to the Willamette River	4/25/2012			87842	PC-896	City of Hillsboro	Hydroelectric Production of 137 theoretical horsepower	3.8		3.8		ND	ND	ND	ND		

ND = No Data Available
 NA = Not Applicable
 cfs = cubic feet per second
 MG = million gallons
 ac-ft = acre-feet

Appendix E

**DEQ's 303(d) listings: Applicable
municipal and non-municipal water rights**

Basin Name	Watershed (USGS 4th Field Name)	Water Body (Stream/Lake)	River Miles	Parameter	Season	Status	Assessment Year
Willamette	Tualatin	Beaverton Creek	0 to 9.8	Dissolved Oxygen	January 1 - May 15	Cat 5: Water quality limited, 303(d) list, TMDL needed	2010
Willamette	Tualatin	Beaverton Creek	0 to 2.1	Dissolved Oxygen	May 1 - October 31	TMDL approved	2002
Willamette	Tualatin	Beaverton Creek	0 to 2.1	Fecal Coliform	Summer	TMDL approved	2002
Willamette	Tualatin	Beaverton Creek	0 to 2.1	Fecal Coliform	Year Around	TMDL approved	2002
Willamette	Tualatin	Beaverton Creek	0 to 2.1	Phosphorus	June 1 - September 30	TMDL approved	1998
Willamette	Tualatin	Beaverton Creek	0 to 9.8	Arsenic	Year Around	Cat 5: Water quality limited, 303(d) list, TMDL needed	2010
Willamette	Tualatin	Beaverton Creek	0 to 9.8	Biological Criteria	Year Around	Water quality limited not needing a TMDL	2002
Willamette	Tualatin	Beaverton Creek	0 to 9.8	Dissolved Oxygen	May 1 - October 31	TMDL approved	2002
Willamette	Tualatin	Beaverton Creek	0 to 9.8	E. Coli	FallWinterSpring	Cat 4A: Water quality limited, TMDL approved	2004
Willamette	Tualatin	Beaverton Creek	0 to 9.8	E. Coli	Summer	Cat 4A: Water quality limited, TMDL approved	2004
Willamette	Tualatin	Beaverton Creek	0 to 9.8	Habitat Modification	Undefined	Water quality limited not needing a TMDL	2002
Willamette	Tualatin	Beaverton Creek	0 to 9.8	Iron	Year Around	Cat 5: Water quality limited, 303(d) list, TMDL needed	2004
Willamette	Tualatin	Beaverton Creek	0 to 9.8	Manganese	Year Around	Cat 5: Water quality limited, 303(d) list, TMDL needed	2004
Willamette	Tualatin	Beaverton Creek	0 to 9.8	Phosphorus	June 1 - September 30	TMDL approved	1998
Willamette	Tualatin	Beaverton Creek	0 to 9.8	Temperature	Summer	TMDL approved	2002
Willamette	Tualatin	Bronson Creek	0 to 6.5	Biological Criteria	Year Around	Water quality limited not needing a TMDL	2002
Willamette	Tualatin	Bronson Creek	0 to 6.5	Chlorophyll a	Summer	TMDL approved	2002
Willamette	Tualatin	Bronson Creek	0 to 5	Dissolved Oxygen	January 1 - May 15	Cat 5: Water quality limited, 303(d) list, TMDL needed	2010
Willamette	Tualatin	Bronson Creek	0 to 6.5	Dissolved Oxygen	May 1 - October 31	TMDL approved	2002
Willamette	Tualatin	Bronson Creek	5 to 6.5	Dissolved Oxygen	January 1 - May 15	Cat 5: Water quality limited, 303(d) list, TMDL needed	2010
Willamette	Tualatin	Bronson Creek	0 to 6.5	E. Coli	FallWinterSpring	TMDL approved	2002
Willamette	Tualatin	Bronson Creek	0 to 6.5	E. Coli	Summer	TMDL approved	2002
Willamette	Tualatin	Bronson Creek	0 to 6.5	Habitat Modification	Undefined	Water quality limited not needing a TMDL	2002
Willamette	Tualatin	Bronson Creek	0 to 6.5	Phosphorus	June 1 - September 30	TMDL approved	1998
Willamette	Tualatin	Bronson Creek	0 to 6.5	Temperature	Summer	TMDL approved	2002
Willamette	Tualatin	Dairy Creek	0 to 10.1	Ammonia	June 1 - September 30	TMDL approved	1998
Willamette	Tualatin	Dairy Creek	0 to 10.1	Dissolved Oxygen	January 1 - May 15	Cat 5: Water quality limited, 303(d) list, TMDL needed	2010
Willamette	Tualatin	Dairy Creek	0 to 10.1	E. Coli	FallWinterSpring	TMDL approved	2002
Willamette	Tualatin	Dairy Creek	0 to 10.1	E. Coli	Summer	TMDL approved	2002
Willamette	Tualatin	Dairy Creek	0 to 10.1	Flow Modification	Undefined	Water quality limited not needing a TMDL	2002
Willamette	Tualatin	Dairy Creek	0 to 10.1	Phosphorus	June 1 - September 30	TMDL approved	1998
Willamette	Tualatin	Dairy Creek	0 to 10.1	Temperature	Summer	TMDL approved	2002
Willamette	Tualatin	McKay Creek	0 to 15.8	Ammonia	June 1 - September 30	TMDL approved	1998
Willamette	Tualatin	McKay Creek	0 to 15.7	Dissolved Oxygen	January 1 - May 15	Cat 5: Water quality limited, 303(d) list, TMDL needed	2010
Willamette	Tualatin	McKay Creek	0 to 15.8	E. Coli	FallWinterSpring	TMDL approved	2002
Willamette	Tualatin	McKay Creek	0 to 15.8	E. Coli	Summer	TMDL approved	2002
Willamette	Tualatin	McKay Creek	0 to 15.8	Phosphorus	June 1 - September 30	TMDL approved	1998
Willamette	Tualatin	McKay Creek	15.8 to 22.7	Phosphorus	June 1 - September 30	TMDL approved	1998
Willamette	Tualatin	McKay Creek	0 to 15.8	Temperature	Summer	TMDL approved	2002
Willamette	Tualatin	Rock Creek	0 to 5.7	Biological Criteria	Year Around	Water quality limited not needing a TMDL	2002
Willamette	Tualatin	Rock Creek	0 to 18.2	Ammonia	June 1 - September 30	TMDL approved	1998
Willamette	Tualatin	Rock Creek	0 to 18.2	Biological Criteria	Year Around	Water quality limited not needing a TMDL	2002
Willamette	Tualatin	Rock Creek	0 to 18.2	Chlorophyll a	Summer	TMDL approved	2002
Willamette	Tualatin	Rock Creek	0 to 12.6	Dissolved Oxygen	January 1 - May 15	Cat 5: Water quality limited, 303(d) list, TMDL needed	2010
Willamette	Tualatin	Rock Creek	0 to 18.2	Dissolved Oxygen	May 1 - October 31	TMDL approved	2002
Willamette	Tualatin	Rock Creek	0 to 18.2	E. Coli	FallWinterSpring	TMDL approved	2002
Willamette	Tualatin	Rock Creek	0 to 18.2	E. Coli	Summer	TMDL approved	2002
Willamette	Tualatin	Rock Creek	0 to 18.2	Habitat Modification	Undefined	Water quality limited not needing a TMDL	2002
Willamette	Tualatin	Rock Creek	0 to 18.2	Phosphorus	June 1 - September 30	TMDL approved	1998
Willamette	Tualatin	Rock Creek	0 to 18.2	Temperature	Summer	TMDL approved	2002
Willamette	Tualatin	Scoggins Creek	0 to 5.1	Ammonia	June 1 - September 30	TMDL approved	1998
Willamette	Tualatin	Scoggins Creek	0 to 14	Biological Criteria	Year Around	Cat 5: Water quality limited, 303(d) list, TMDL needed	2010
Willamette	Tualatin	Scoggins Creek	0 to 5.1	Dissolved Oxygen	FallWinterSpring	TMDL approved	2002
Willamette	Tualatin	Scoggins Creek	0 to 5.1	Phosphorus	June 1 - September 30	TMDL approved	1998
Willamette	Tualatin	Tualatin River	0 to 80.7	Biological Criteria	Year Around	Cat 5: Water quality limited, 303(d) list, TMDL needed	2010
Willamette	Tualatin	Tualatin River	0 to 44.7	Chlorophyll a	FallWinterSpring	Cat 4A: Water quality limited, TMDL approved	2004
Willamette	Tualatin	Tualatin River	0 to 44.7	Chlorophyll a	Summer	Cat 4A: Water quality limited, TMDL approved	2004
Willamette	Tualatin	Tualatin River	44.7 to 69.9	Chlorophyll a	Summer	TMDL approved	1998
Willamette	Tualatin	Tualatin River	0 to 62.6	Dissolved Oxygen	January 1 - May 15	Cat 5: Water quality limited, 303(d) list, TMDL needed	2010
Willamette	Tualatin	Tualatin River	0 to 44.7	Flow Modification	Undefined	Water quality limited not needing a TMDL	2002
Willamette	Tualatin	Tualatin River	44.7 to 69.9	Habitat Modification	Undefined	Water quality limited not needing a TMDL	2002
Willamette	Tualatin	Tualatin River	69.9 to 80.6736	Habitat Modification	Undefined	Water quality limited not needing a TMDL	2002
Willamette	Tualatin	Tualatin River	0 to 80.6736	Iron	Year Around	Cat 5: Water quality limited, 303(d) list, TMDL needed	2004
Willamette	Tualatin	Tualatin River	0 to 80.6736	Manganese	Year Around	Cat 5: Water quality limited, 303(d) list, TMDL needed	2004
Willamette	Tualatin	Tualatin River	0 to 44.7	Phosphorus	June 1 - September 30	TMDL approved	1998
Willamette	Tualatin	Tualatin River	44.7 to 69.9	Phosphorus	June 1 - September 30	TMDL approved	1998
Willamette	Tualatin	Tualatin River	0 to 44.7	Temperature	Summer	TMDL approved	2002
Northern Oregon Coastal	Wilson-Trask-Nestucca	North Fork Trask River	0 to 11.4	Flow Modification	Undefined	Water quality limited not needing a TMDL	2002
Northern Oregon Coastal	Wilson-Trask-Nestucca	North Fork Trask River	0 to 4.4	Temperature	Summer	TMDL approved	2002
Northern Oregon Coastal	Wilson-Trask-Nestucca	Trask River	4.1 to 10.2	Dissolved Oxygen	September 15 - May 31	303(d)	2002
Northern Oregon Coastal	Wilson-Trask-Nestucca	Trask River	0 to 10.2	Fecal Coliform	Year Around	Cat 4A: Water quality limited, TMDL approved	2004
Northern Oregon Coastal	Wilson-Trask-Nestucca	Trask River	10.1 to 18.5	Flow Modification	Undefined	Water quality limited not needing a TMDL	2002
Northern Oregon Coastal	Wilson-Trask-Nestucca	Trask River	0 to 10.2	Habitat Modification	Undefined	Water quality limited not needing a TMDL	2002
Northern Oregon Coastal	Wilson-Trask-Nestucca	Trask River	0 to 18.6	Temperature	Summer	TMDL approved	2002

Appendix F

**City of Hillsboro Water Rates by
Customer Category (as of October 1, 2016)**

City of Hillsboro Utilities Commission

Water Rate Schedule Resolution #226-W

Effective date October 1, 2016

CUSTOMER CLASS - Single Family Residential Class Code 1

Meter Size	Monthly Base		Bi-monthly Base		Inside City Volume Charge			
	Inside	Outside	Inside	Outside	Billing Frequency	Block One	Block Two	Block Three
5/8"x3/4"	\$ 14.94	\$ 22.41	\$ 29.88	\$ 44.82	monthly usage	0 - 8 ccf	9 - 18 ccf	19+ ccf
1"	23.76	35.64	47.52	71.28	bi-monthly usage	0 - 16 ccf	17 - 36 ccf	37+ ccf
1-1/4"	37.78	56.67	75.56	113.34	volume or \$/ccf	\$1.82	\$2.84	\$3.85
1-1/2"	37.78	56.67	75.56	113.34	<i>max ccf per block</i>	(8/16)	(10/20)	
2"	56.03	84.05	112.06	168.10	Outside City Volume Charge			
					Billing Frequency	Block One	Block Two	Block Three
					monthly usage	0 - 8 ccf	9 - 18 ccf	19+ ccf
					bi-monthly usage	0 - 16 ccf	17 - 36 ccf	37+ ccf
					volume or \$/ccf	\$2.73	\$4.26	\$5.78
					<i>max ccf per block</i>	(8/16)	(10/20)	

Example calculation of bi-monthly bill for 18 ccf: \$29.88 (base charge) + (16 ccf x \$1.82)+ (2 ccf x \$2.84) = \$64.68 total water bill

1 ccf = 100 cubic feet or 748 gallons of water

CUSTOMER CLASS - Multi-Family Residential Class Code 2

Meter Size	Monthly Base		Bi-monthly Base		Inside City Volume Charge			
	Inside	Outside	Inside	Outside				
5/8"x3/4"	\$ 21.07	\$ 31.61	\$ 42.14	\$ 63.22	All usage \$/ccf \$2.09			
1"	39.07	58.61	78.14	117.22				
1-1/4"	68.46	102.69	136.92	205.38				
1-1/2"	68.46	102.69	136.92	205.38				
2"	105.08	157.62	210.16	315.24				
3"	214.57	321.86	429.14	643.72	Outside City Volume Charge			
4"	323.82	485.73	647.64	971.46	All usage \$/ccf \$3.14			
6"	624.06	936.09	1,248.12	1,872.18				
8"	983.51	1,475.27	1,967.02	2,950.54				
10"	1,508.28	2,262.42	3,016.56	4,524.84				

CUSTOMER CLASS - Commercial Class Code 3

Meter Size	Monthly Base		Bi-monthly Base		Inside City Volume Charge			
	Inside	Outside	Inside	Outside				
5/8"x3/4"	\$ 24.33	\$ 36.50	\$ 48.66	\$ 73.00	Base (\$/ccf) Usage over Base (\$/ccf) (winter average) \$3.11 \$2.21			
1"	46.84	70.26	93.68	140.52				
1 1/4"	83.74	125.61	167.48	251.22				
1 1/2"	83.74	125.61	167.48	251.22				
2"	129.45	194.18	258.90	388.36				
3"	263.78	395.67	527.56	791.34	Outside City Volume Charge			
4"	400.42	600.63	800.84	1,201.26	Base (\$/ccf) Usage over Base (\$/ccf) (winter average) \$4.67 \$3.32			
6"	776.76	1,165.14	1,553.52	2,330.28				
8"	1,227.46	1,841.19	2,454.92	3,682.38				
10"	1,779.54	2,669.31	3,559.08	5,338.62				

CUSTOMER CLASS - Industrial **Class Code 4**

Meter Size	Monthly Base		Bi-monthly Base		Inside City Volume Charge	
	Inside	Outside	Inside	Outside		
5/8"x3/4"	\$ 39.37	\$ 59.06	\$ 78.74	\$ 118.12	<i>All usage \$/ccf</i> \$2.27	
1"	84.81	127.22	169.62	254.44		
1-1/4"	159.89	239.84	319.78	479.68		
1-1/2"	159.89	239.84	319.78	479.68		
2"	251.44	377.16	502.88	754.32		
					Outside City Volume Charge	
3"	507.28	760.92	1,014.56	1,521.84	<i>All usage \$/ccf</i> \$3.41	
4"	781.19	1,171.79	1,562.38	2,343.58		
6"	1,538.80	2,308.20	3,077.60	4,616.40		
8"	2,447.06	3,670.59	4,894.12	7,341.18		
10"	2,642.59	3,963.89	5,285.18	7,927.78		

CUSTOMER CLASS - Irrigation **Class Code 5**

Meter Size	Monthly Base		Bi-monthly Base		Inside City Volume Charge	
	Inside	Outside	Inside	Outside		
5/8"x3/4"	\$ 26.58	\$ 39.87	\$ 53.16	\$ 79.74	<i>All usage \$/ccf</i> \$3.81	
1"	51.49	77.24	102.98	154.48		
1-1/4"	92.20	138.30	184.40	276.60		
1-1/2"	92.20	138.30	184.40	276.60		
2"	142.68	214.02	285.36	428.04		
					Outside City Volume Charge	
3"	290.41	435.62	580.82	871.24	<i>All usage \$/ccf</i> \$5.72	
4"	441.16	661.74	882.32	1,323.48		
6"	856.49	1,284.74	1,712.98	2,569.48		
8"	1,353.78	2,030.67	2,707.56	4,061.34		

CUSTOMER CLASS - Public Entities **Class Code 6**

Meter Size	Monthly Base		Bi-monthly Base		Inside City Volume Charge	
	Inside	Outside	Inside	Outside		
5/8"x3/4"	\$ 24.72	\$ 37.08	\$ 49.44	\$ 74.16	Base (\$/ccf)	Usage over Base (\$/ccf)
1"	47.60	71.40	95.20	142.80	(winter average)	\$3.22
1-1/4"	85.09	127.64	170.18	255.28	\$2.29	
1-1/2"	85.09	127.64	170.18	255.28	Outside City Volume Charge	
2"	131.54	197.31	263.08	394.62		
3"	268.04	402.06	536.08	804.12		
4"	406.89	610.34	813.78	1,220.68		
6"	789.32	1,183.98	1,578.64	2,367.96		
8"	1,247.30	1,870.95	2,494.60	3,741.90	Base (\$/ccf)	Usage over Base (\$/ccf)
					(winter average)	\$4.83
					\$3.44	

CUSTOMER CLASS - Nonprofit **Class Code 8**

Meter Size	Monthly Base		Bi-monthly Base		Inside City Volume Charge	
	Inside	Outside	Inside	Outside		
5/8"x3/4"	\$ 24.33	\$ 36.50	\$ 48.66	\$ 73.00	Base (\$/ccf)	Usage over Base (\$/ccf)
1"	46.84	70.26	93.68	140.52	(winter average)	\$3.11
1-1/4"	83.74	125.61	167.48	251.22	\$2.21	
1-1/2"	83.74	125.61	167.48	251.22	Outside City Volume Charge	
2"	129.45	194.18	258.90	388.36		
3"	263.78	395.67	527.56	791.34		
4"	400.42	600.63	800.84	1,201.26		
6"	776.76	1,165.14	1,553.52	2,330.28		
8"	1,227.46	1,841.19	2,454.92	3,682.38	Base (\$/ccf)	Usage over Base (\$/ccf)
10"	1,779.54	2,669.31	3,559.08	5,338.62	(winter average)	\$4.67
					\$3.32	

PRIVATE FIRE PROTECTION \$ 4.10 *per month, per inch of pipe diameter* **FIRE**

City of Hillsboro Wholesale **Class Code 7**

\$ 1.39	Gaston & LA Water
\$ 1.37	Cornelius

Appendix G

**Request to Remove City of Hillsboro's
Demand from Permit S-35819**



March 29, 2017

Dwight French
Oregon Water Resources Department
725 Summer Street NE, Suite A
Salem, OR 97301

Re: Request to remove City of Hillsboro's demand from Permit S-35819

Dear Mr. French;

On February 15, 2012, the City of Adair Village (Adair Village) filed a revised permit extension application for its Permit S-35819 with the Oregon Water Resources Department (OWRD). (Permit S-35819 authorizes the use of up to 82 cfs from the Willamette River for municipal purposes.) The application requested that the agency extend the permit's development deadline to October 1, 2050, and indicated that Adair Village had entered into an intergovernmental agreement with the City of Hillsboro (City) that gave the City an exclusive option to enter into an agreement to develop up to 56 cfs under Permit S-35819. The application also described that the City's demand for water under the permit was estimated to be 57.68 cfs in 2050.

After resolving a protest to the extension, OWRD issued a final order on February 24, 2014 that approved the requested extension of time. The City and Adair Village subsequently entered into negotiations for the sale of a 56 cfs portion of the permit. These negotiations were ultimately unsuccessful and the City had to seek an alternative water supply source. (As you are aware, the City has purchased a 56 cfs portion of Permit S-45565 from the City of Salem.)

For the reasons described, the City no longer intends to developed water under Adair Village's permit. To ensure that OWRD's records contain a clear record of the City's water supply and intended plans for meeting its future water supply needs, the City is formally withdrawing its water demands from Permit S-35819. The City requests that a copy of this letter be placed in OWRD's official water right file for Permit S-35819 to document this change.

Please contact me if you have any questions. My telephone number is (503) 615-6585.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Kevin Hanway', is written over a faint, larger version of the same signature.

Kevin Hanway
Director, Water Department
City of Hillsboro