
Draft for OWRD Review

Water Management and Conservation Plan

City of The Dalles



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Appendices

Appendix A – Letters to Affected Governments

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1. Municipal Water Supplier Plan Elements

This section satisfies OWRD's requirement to provide a list of affected local governments to whom the plan was made available and a proposed date for submittal of an updated plan.

1.1 Introduction

The City of The Dalles (City or The Dalles) is located along the Columbia River, east of Mount Hood in Wasco County and within the Columbia River Gorge National Scenic area. The City has a rich history in the region, operating as a trading hub for the Mid-Columbia Region for over a century. The City was incorporated as Dalles City by act of the Oregon Territorial Legislature on June 26, 1857, and is the third oldest incorporated city in Oregon and is second in population to Portland for cities along the river. The City also offers easy access to numerous recreational opportunities.

The climate of the region is characterized by hot and dry summers and cold, mildly wet winters. Average daily high summer temperatures occur June through September and range from 80 to 90 degrees Fahrenheit. Average temperatures in December through February are in the high 20 degrees Fahrenheit. The region sees most of its annual precipitation occurring in November through March and averages 14.5 inches of precipitation per year with minimal precipitation during the winter.

The City relies primarily on surface water supplies to meet system demand needs. The City relies on several creeks within South Fork Mill Creek watershed that flow into South Fork Mill Creek. In addition, South Fork Mill Creek flow is augmented by water diverted from Dog River, a tributary of Hood River. An impoundment on the South Fork Mill Creek creates the Crow Creek Reservoir. An intake downstream of the reservoir diverts stored water and live flow to the City's water treatment plant (WTP). The City has three groundwater wells that supplement surface water supply during the summer months and provide emergency supplies and three additional wells that provide emergency supplies and may be used to supplement surface water supplies during peak season as needed.

In the 2010s, the City began dedicating substantial time and resources towards water management and conservation measures, an effort that has helped reduce per capita single family residential water consumption. As a result, the City has been able to extend the duration at which its current available water supplies are able to meet future demand.

The purpose of this Water Management and Conservation Plan (WMCP or Plan) is to: (1) guide development, financing, and implementation of water management and conservation policies, programs, and practices that ensure long-term sustainable water use by the City and its customers and (2) assess the City's water supply and document a plan to meet the City's future water needs. This WMCP addresses a 20-year planning period from 2024 to 2044.

1.2 Plan Requirement

This is the City's second WMCP and updates the City's 2014 WMCP. The City's 2014 WMCP was developed in response to final orders approving extensions for Permits S-53930 and S-49653 issued by Oregon Water Resources Department (OWRD) on October 28, 2011, and October 16, 2012, respectively. These final orders included conditions requiring the City to submit a WMCP within three years.

This WMCP was developed to satisfy a condition to submit a WMCP to OWRD per OWRD's final order approving the 2014 WMCP issued on November 14, 2014. This WMCP meets all of OWRD's water management and conservation plan requirements that apply to municipal water providers adopted by the Water Resources Commission effective December 21, 2018, regarding WMCPs.

1.3 Plan Organization

The WMCP is organized into the following sections, each addressing specific sections of OWRD's requirements. 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 will direct its water conservation and water supply planning efforts. The WMCP also includes appendices with supporting information.

Section

Section 1 – Water Supplier Plan

Section 2 – Water Supplier Description

Section 3 – Water Conservation Element

Section 4 – Water Curtailment Element

Section 5 – Water Supply Element

1.4 Affected Local Governments

The following local governments may be affected by this WMCP:

- Wasco County

Thirty days before submitting this WMCP to OWRD, the City made the draft WMCP available for review by Wasco County (County) along with a request for comments relating to consistency with the County's comprehensive land use plan. No formal comments were provided by the County regarding consistency with the County's land use plan, however informal communication occurred between the City and County regarding sources of supply. In addition, the City provided Chenoweth Water People's Utility District (Chenoweth PUD) and The Dalles Irrigation District with the draft plan as a courtesy. Letters from the City to these entities are found in Appendix A.

1.5 Plan Update Schedule

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

1.6 Time Extension

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

1.7 Water System Master Plan Coordination

Concurrent with development of this WMCP, the City was updating its Water System Master Plan (WSMP). Information common to both documents is consistent between documents. In some cases, the same base data was used, but modifications were made in order to fulfill the unique purposes of this WMCP.

1.8 Terminology

Demand refers to the quantity of treated water delivered to the water distribution system as measured at the meters immediately downstream of the City's WTP installed on the Mill Creek and Highline transmission lines. Demand also refers to water produced from the Lone Pine, Jordan, and Marks Wells located within the City. Water system demands occur as a result of metered consumption, unmetered uses, and water lost to leakage and evaporation, among other factors.

Consumption refers to the portion of water use that is metered and authorized, unmetered volumes of water estimated by the City.

Generally, demand and consumption in municipal systems are expressed 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).

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

- Average day demand (ADD) equals the total annual system input (demand) divided by 365 days.
- Maximum day demand (MDD) equals the highest system demand that occurs on any single day during a calendar year.
- Maximum monthly demand (MMD) in MG equals the highest total monthly demand of the 12 months of a calendar year. MMD in mgd equals the average day demand of the one month with the highest total demand of the 12 months of a calendar year.
- Peaking factors are the ratio of MDD to ADD.

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2. Water Supplier Description

This section satisfies OWRD's requirements to describe the City's water sources, water delivery area and population, water rights, and adequacy and reliability of the existing water supply. This section meets OWRD's requirements to describe the City's customers and their water use, the water system, interconnections and agreements with other water suppliers, and quantification of system leakage.

2.1 Water Sources

The City's primary source of water is surface water from the South Fork Mill Creek and Dog River watersheds. South Fork Mill Creek originates on the east slope of Surveyor's Ridge, in Mill Creek Buttes, about 25 miles southwest of the City. In addition, South Fork Mill Creek flow is augmented by water diverted from Dog River, a tributary of Hood River also to the southwest of the City. Surface water from Dog River, Crow Creek, and South Fork Mill Creek flows into Crow Creek Reservoir, an impoundment created by Crow Creek Dam. Stored water is released at Crow Creek Dam into South Fork Mill Creek and live flow and released stored water are captured 8 miles downstream at the South Fork Mill Creek Intake. This water then flows by gravity a short distance to Wicks WTP from which it is treated and conveyed approximately 7 miles to the City's service area via two transmission lines.

The City has three groundwater wells (Lone Pine, Jordan, Marks Wells) that supplement surface water supply during the summer months and one additional well, Wicks well, that is used only to provide emergency supplies due to low water quality. The Dalles has two additional wells under construction, Riverside wells 1 and 2, that can be used to meet demand using native groundwater or for use in the City's ASR system. The wells draw water from The Dalles Pool aquifer and are located within City limits and The Dalles Critical Groundwater Area.

In 2022, approximately 81 percent of municipal water supply came from the City's surface water sources and 19 percent came from groundwater.

2.2 Interconnections with Other Systems

The City has an emergency intertie with Chenoweth PUD located in the western portion of the City's service area (approximately 10th and Perkins). This intertie has a maximum capacity of 1,400 gpm. Chenoweth PUD has its own water supply, and this bi-directional intertie enables both Chenoweth PUD and The Dalles to receive water from the other during water supply shortages.

2.3 Intergovernmental Agreements

The City has one formal intergovernmental agreement related to water supply. The City and Wasco County entered into an intergovernmental agreement on June 19, 1989, concerning the purchase of land, wells, and water rights for the Discovery Center. The parties developed a second intergovernmental agreement regarding ownership and management of the water

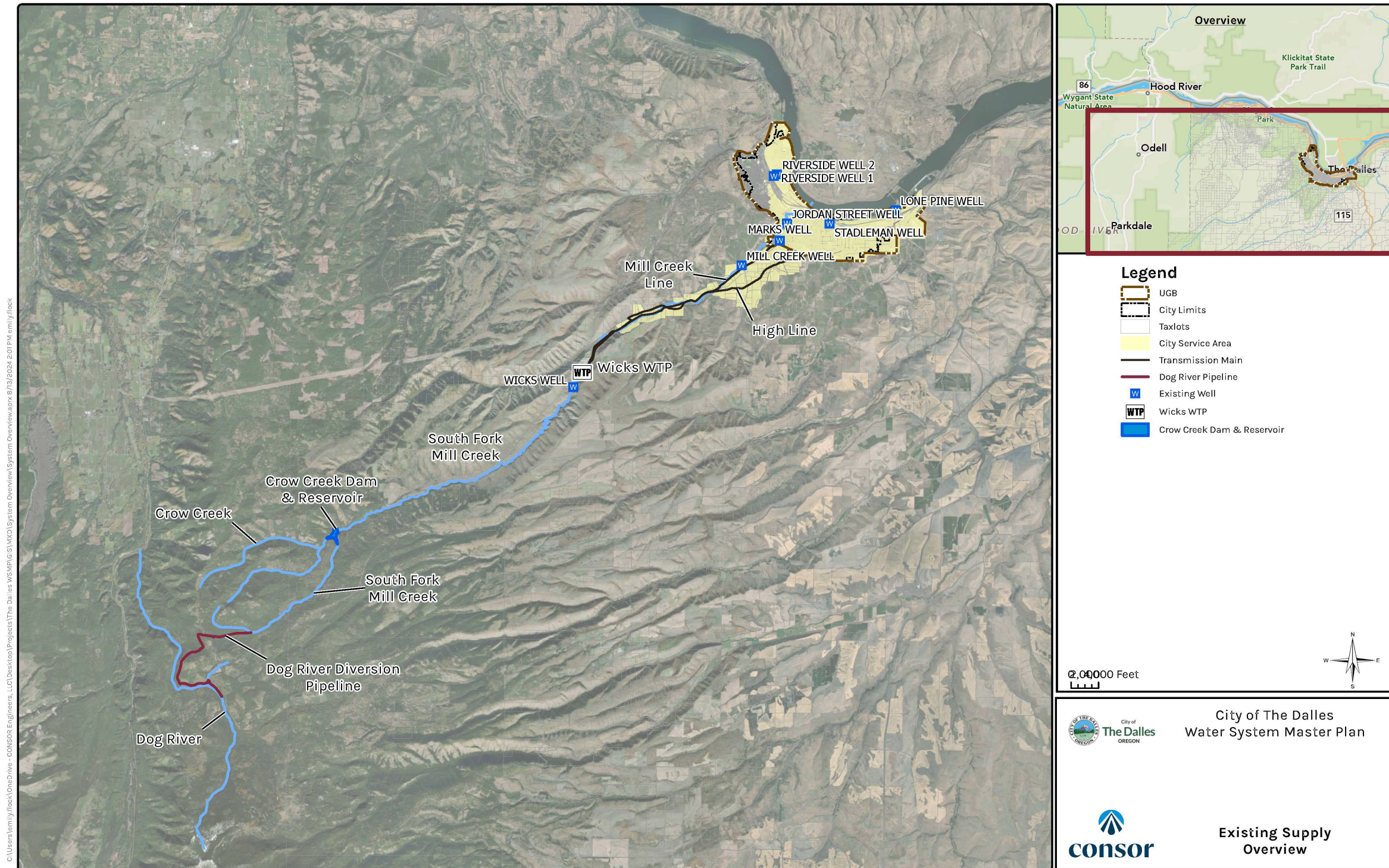
system on September 27, 1995, and subsequently amended the agreement on November 13, 1996. Under the terms of this agreement, the County constructed a water and sanitary sewer system for the Service Area, and the City operates and maintains the system. Water service is metered, and the County pays the City to provide operation and maintenance services according to the agreement. Ownership of the infrastructure will be transferred from the County to the City upon satisfaction of the bonded indebtedness from construction of the Discovery Center. The agreement describes the potential for future service connections within the Service Area, including The Dalles Country Club, as well as a potential future interconnection with the municipal water system of the City of The Dalles. The Service Area is currently outside the City's current Urban Growth Boundary.

2.4 Service Area Description and Population

Exhibits 2-1 through 2-3 provide schematics of the City water system. Exhibit 2-1 provides an overview of the system with sources of supply, Exhibit 2-2 shows the City's service area, and Exhibit 2-3 presents a system schematic, complete with key components of the City's distribution system. The service area shown in Exhibit 2-2 includes a significant portion of the City and an area along the transmission line corridor leading to the WTP that includes some residential customers. Chenoweth PUD serves some City residents.

To estimate the population within this service area, the City relied on a population estimate produced by Portland State University's Population Research Center (PSU). PSU's estimated population within City limits in 2023 was 16,417. Of this population, the City estimates that approximately 3,000 people are served by Chenoweth PUD located within the City limits. The City serves approximately 292 residents outside City limits through 117 residential service connections. Taking into account these adjustments, the City's estimated water service population in 2023 was 13,709.

Exhibit 2-1. Map of Sources of Supply

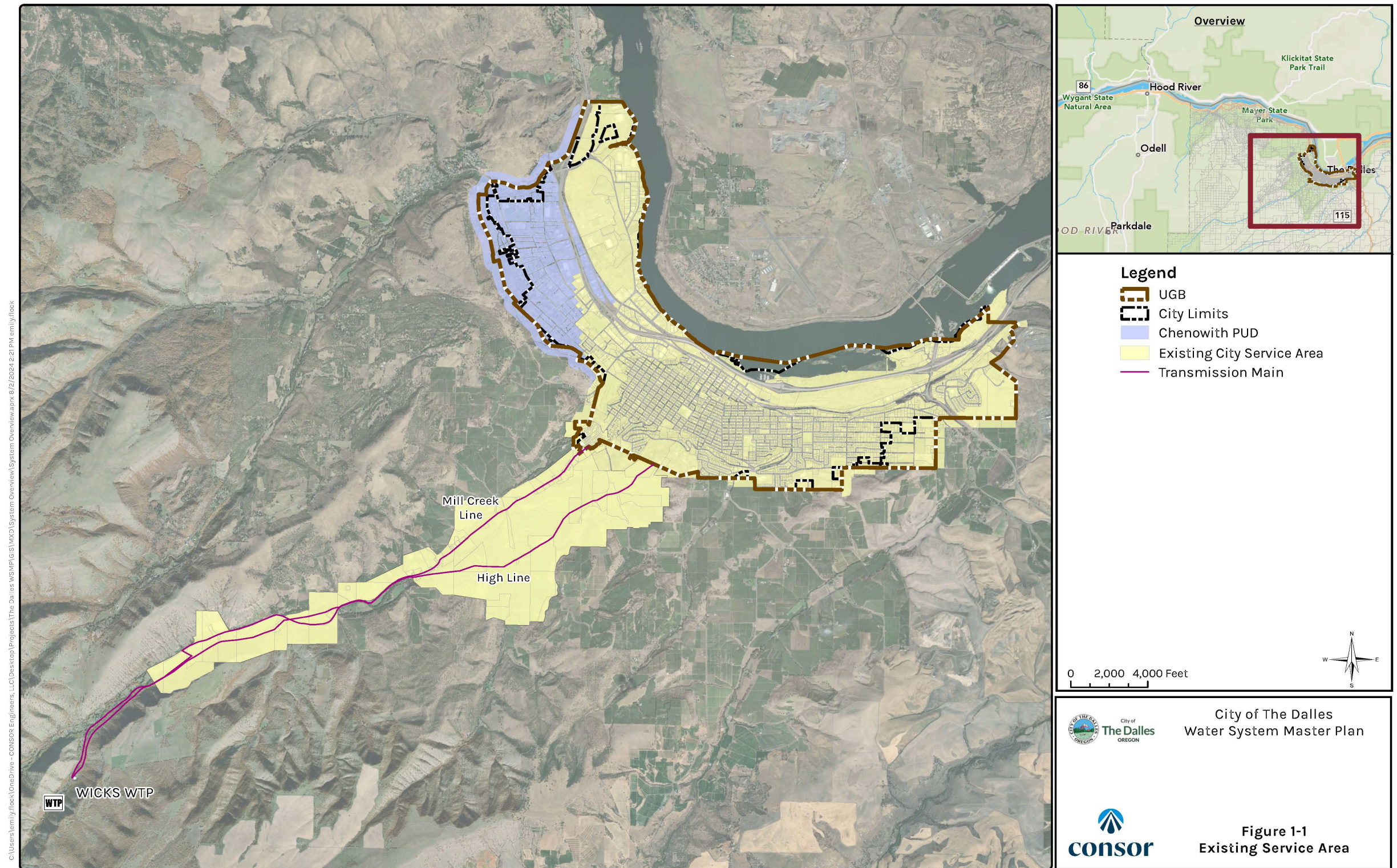


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Data Sources: City of The Dalles, 2023; World Imagery: Earthstar Geographics
 Community: Oregon State Parks, State of Oregon GEO, WA State Parks GIS, Esri, TomTom, Garmin, SafeGraph, FAO, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USFWS
 Coordinate System:
 Disclaimer: Consor and CLIENT make no representations, express or implied, as to the accuracy, completeness and timeliness of the information displayed. This map is not suitable for legal, engineering, or surveying purposes. Notification of any errors is appreciated.

W1961170R August 2024

Exhibit 2-2. Water System Service Area



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Data Sources: City of The Dalles, 2023; Community: Oregon State Parks, State of Oregon GEO, WA State Parks GIS, Esri, TomTom, Garmin, SafeGraph, FAO, MET/NASA, USGS, Bureau of Land Management, EPA, NPS, USFWS
World Imagery: Maxar
Coordinate System:
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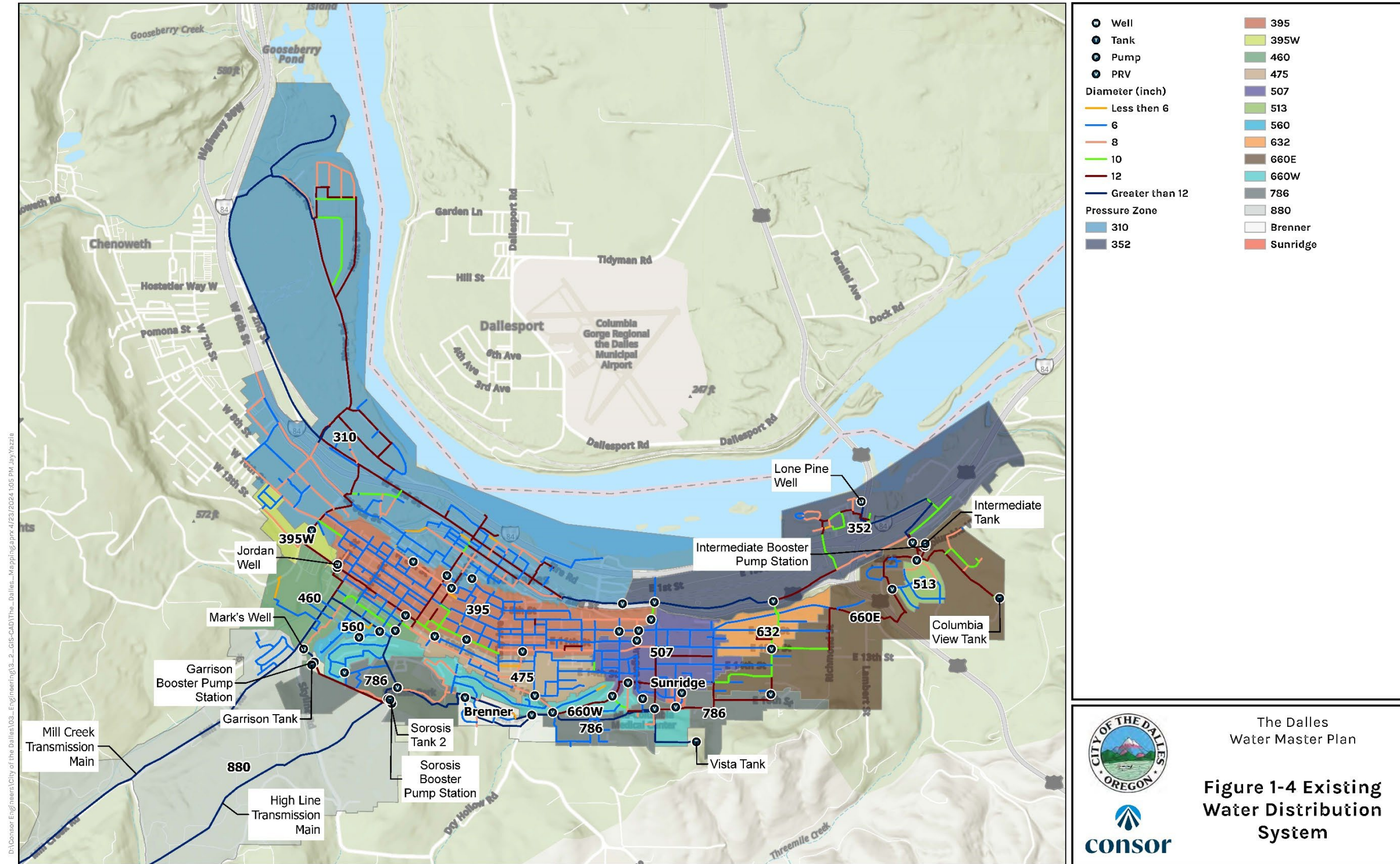
City of The Dalles
 Water System Master Plan

consor

Figure 1-1
 Existing Service Area

W1961170R August 2024

Exhibit 2-3. Service Area Schematic



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Data Sources: NTUA 2020; ESR; World Topographic Map; Oregon State Parks, State of Oregon GEO, WA State Parks GIS, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, US Census Bureau, USDA, USFWS
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The Dalles
 Water Master Plan

**Figure 1-4 Existing
 Water Distribution
 System**

Project No. W1961170R.00 April 2024

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2.5 Historical Water Demands

The following water demand data is based on the sum of volume of treated surface water as measured at the WTP following treatment and supplies from groundwater as measured at the City’s wells. Exhibit 2-4 summarizes the City’s water demands from 2017 through 2022.

Exhibit 2-4. Historical Water Demand, 2017 – 2022

Year	Demand (MG)	ADD (MGD)	MDD (MGD)	MDD: ADD Peaking Factor
2017	1,150.0	3.2	7.0	2.2
2018	1,260.0	3.5	7.4	2.1
2019	1,210.0	3.3	(1)	(1)
2020	1,300.0	3.6	8.4	2.4
2021	1,460.0	4.0	9.0	2.3
2022	1,300.0	3.6	8.4	2.4
Max	1,450.0	3.6	9.0	2.4

(1) MDD from the months in which MDD would most likely occur were not available.

Demand values in Exhibit 2-4 were adjusted to account for missing data for July and August of 2019, March and April of 2020, and August and September of 2021. As described in the City’s WSMP, this adjustment was accomplished by using available data for the month in which the data was missing to obtain monthly usage.

2.5.1 Annual and Daily Demands

As shown in Exhibit 2-5 and Exhibit 2-6, annual demand, ADD, and MDD showed increasing trends from 2017 through 2022. The City attributes increasing values over this period to a change in population over time and increased demands from the City’s Commercial/Industrial customer class. Consumption by the City’s customer classes is discussed in Section 2.6.

Exhibit 2-5. Historical Annual Demand, 2017-2022

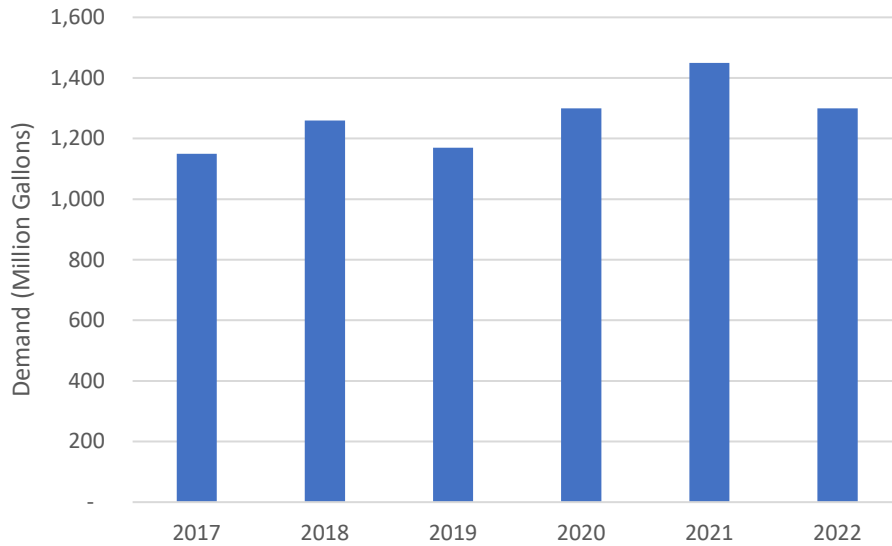
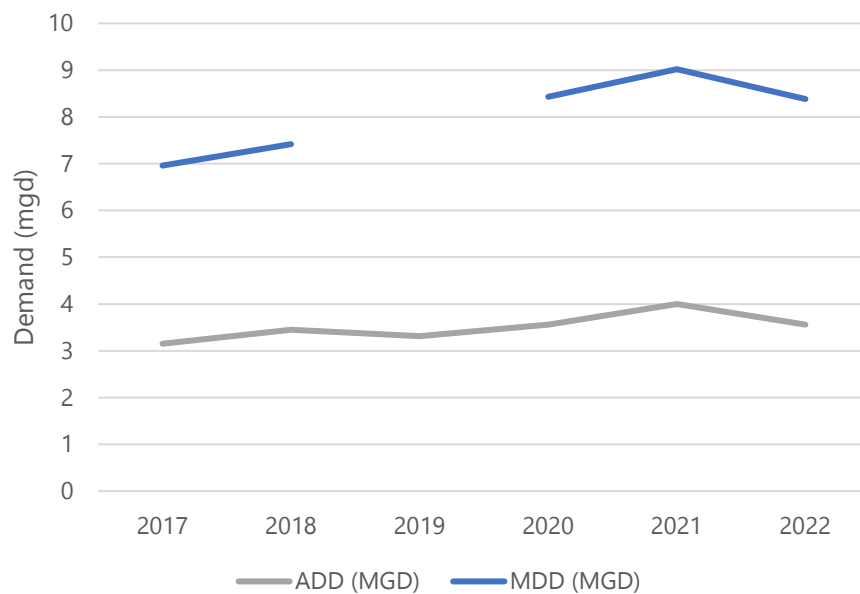


Exhibit 2-6. ADD and MDD, 2017-2022¹



(1) MDD for 2019 was unavailable.

MDD is an important value for water system planning. Water rights and supply facilities (e.g., treatment plants, pipelines, and reservoirs) must be capable of meeting the City’s MDD. If the MDD exceeds the combined supply capacity on any given day, finished water storage levels will be reduced, and if the MDD exceeds combined supply capacity on several consecutive days, a water shortage may occur.

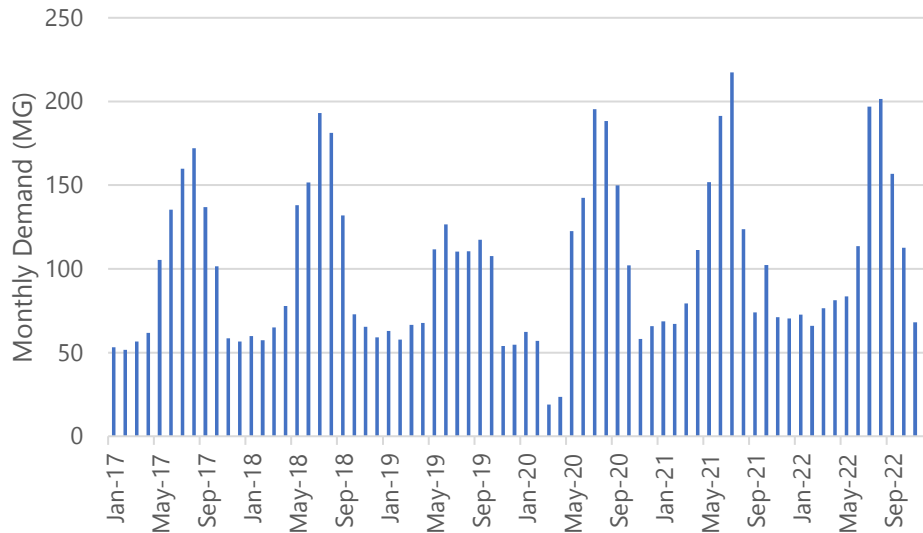
Weather patterns and the economy strongly influence MDD. Weather patterns that can cause fluctuations in MDD from year to year include maximum temperatures, the number of consecutive days with high temperatures, when high temperatures occur in the summer, overall rainfall levels during the summer, and consecutive days without rainfall. Unusually hot and/or dry weather results in more outdoor irrigation, which increases the MDD. The economy can affect MDD by influencing customer spending on irrigation, the number of new homes with landscapes needing intense irrigation for plant establishment, the opening or closing of facilities that use water in their operations, or the seasonal nature of some economic activity.

The City’s MDD to ADD peaking factor ranged from 2.1 to 2.4 as compared to the range provided in the City’s 2014 WMCP of 2.3 to 3.3. The City attributes a decrease in this peaking factor primarily to the expansion of its conservation program in the 2010s and the increase in the use of water by the Commercial/Industrial class over time, which tends to have more even volumes of seasonal usage, among other factors. This peaking factor is an important component used in demand forecasting.

2.5.2 Monthly Demand

Exhibit 2-7 shows monthly demand from 2017 through 2022. The highest monthly demand during this period occurred in July of 2021 at 217 MG and the months with the greatest demand were consistently June through August. This seasonal nature of demand is primarily attributable to outdoor uses of water, such as irrigation, and commercial and industrial cooling water uses during the summer months. Monthly demand was lowest during the winter season, typically December through February. These seasonal differences are further described below.

Exhibit 2-7. Monthly Demand (MG), 2017-2022



As previously noted, data for some months were not available, which describes inconsistencies in the seasonal pattern of demand shown in Exhibit 2-5.

2.6 Customer Characteristics and Use Patterns

The following analyses of the City’s customer water use are based on metered water use records from 2006 through 2022. Data for 2019 through 2022 were obtained from the City’s draft WSMP and data previous to 2019 was collected from City’s 2018 WMCP progress report and 2014 WMCP.

2.6.1 Customer Description

The City’s customers are categorized into three major customer classes: residential, commercial/industrial, and government. The Residential class includes all properties with four or less dwelling units. Multifamily units larger in size are categorized within the Commercial/Industrial class along with restaurants and other businesses within the services industry. Also within this class are some meters affiliated with data centers. The Government class includes facilities owned by the City, County, Port of The Dalles, and the Columbia Gorge Community College. Exhibit 2-8 shows the number of accounts by customer category in December 2022. The Residential class represents the largest block of users on the system.

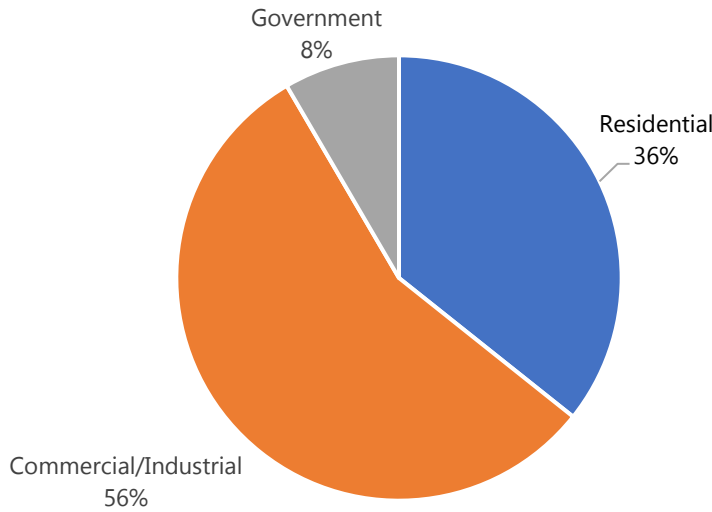
Exhibit 2-8. Number of Accounts by Customer Class, December 2022

Customer Class	Number of Accounts
Commercial/Industrial	595
Residential	4,287
Government	84
Total	4,966

2.6.2 Annual Consumption

Exhibit 2-9 illustrates the percentage consumed by each customer class in 2022. The City’s Residential class used 36 percent of all water consumed, but because The Dalles is a hub of regional economic activity, boasting a large industrial base and thriving commercial sector, the Commercial/Industrial accounted for 56 percent of total consumption, in part due to the considerable acreage and number of active industrial properties. The presence of the available water sources that are capable of supporting industry are attractants to many types of industrial customers.

Exhibit 2- 9. Percentage of Consumption by Customer Class of Total Consumption, 2022



The total annual consumption for the combined classes shows an increasing trend since 2006, as presented in Exhibit 2-10. This increase in consumption is attributable to increases in usage by the industrial and commercial classes primarily. Consumption volumes for 2016 to 2018 were based on fiscal years and volumes for 2013 to 2015 were not available.

Exhibit 2-10. Annual Water Consumption, 2006-2012 and 2019-2022

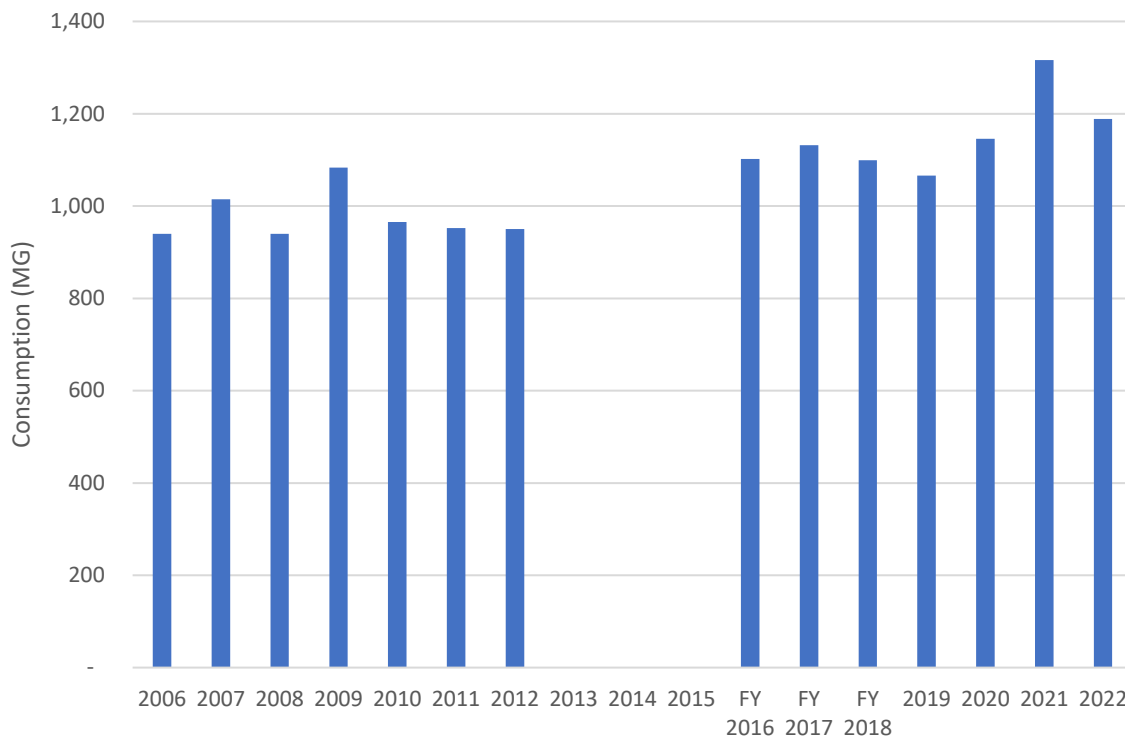
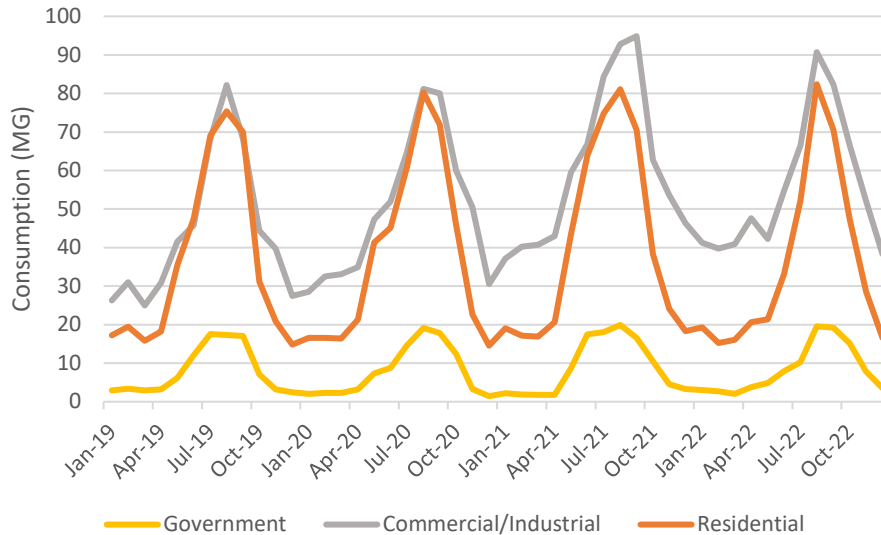


Exhibit 2-11 describes annual metered water use by customer classes. Residential water use exceeded the consumption volume of other classes in 2019 and 2020 and in 2021 and 2022, the commercial sector was the largest customer class.

Exhibit 2-11. Annual Water Use by Customer Class, 2019-2022

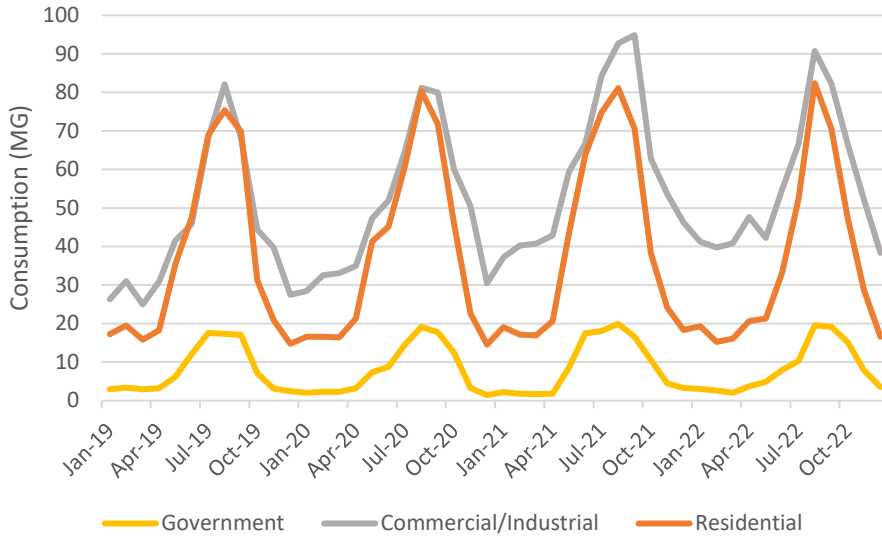


Direct comparisons of recent consumption volumes by customer class to volumes found in the City’s 2014 WMCP and the City’s 2019 WMCP Progress Report are not possible due to the differing classes used to aggregate customer consumption. However, the City reviewed the annual consumption volumes of the Residential class over time since the definition of this customer type has not significantly changed since 2006. This comparison showed that the volume of water consumed by the Residential class has shown a decreasing trend over time. The average annual consumption volumes for the Residential class for the period 2006 to 2012 was 486 MG and from 2019 to 2022 was 450 MG, a decrease of 7.5 percent. This decrease in residential consumption is in contrast to the population increase in the City from 2006 to 2022 of 3,792 people, or 30 percent. The diverging results of the changes in use compared to population indicate a decrease in the residential per capita use over time. This decrease has been observed among residential classes at utilities across the state resulting from the tightening federal fixture and appliance water use standards over time, of which The Dalles is a beneficiary, and ongoing conservation programming implemented by The Dalles since the mid-2000s.

2.6.3 Monthly Consumption

Exhibit 2-12 shows monthly metered consumption by customer category from January 2019 through December 2022. Monthly metered consumption peaked in the summer months for all customer categories. The Commercial/Industrial class had the greatest consumption in the summer months, slightly greater than the summer consumption volumes of the Residential class, though showed far greater use in the winter.

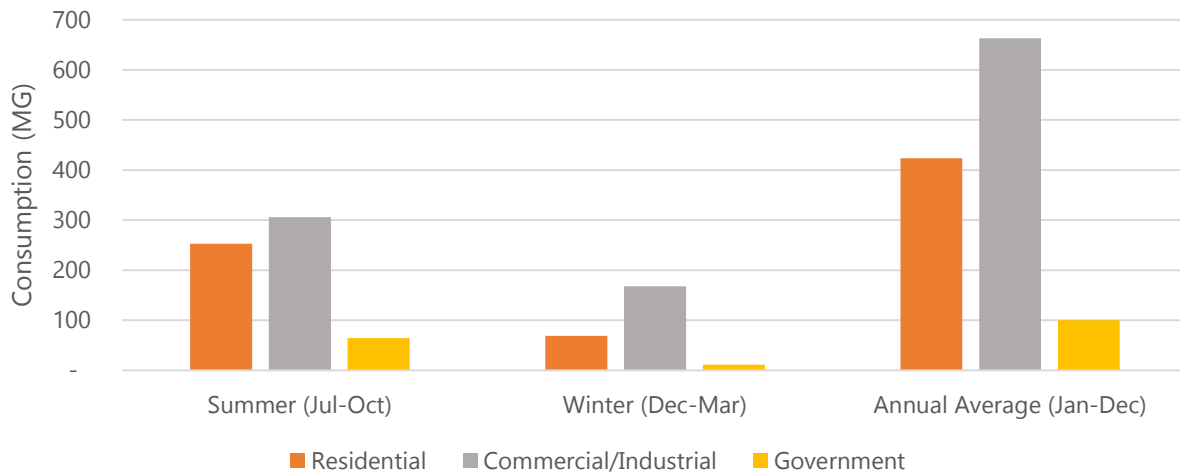
Exhibit 2-12. Monthly Metered Consumption by Customer Class, 2019-2022



2.6.4 Seasonal Consumption

Average monthly consumption by season and customer category in 2022 is shown in Exhibit 2-13. The City’s total summer consumption was approximately 2.5 times greater than its total winter consumption, which was similar to the value of 2.9 times greater for 2011 as reported in the City’s 2014 WMCP. Consumption during summer months exceeded winter consumption by 3.7 times for Residential class and by 2.8 times for Commercial/Industrial class. This reinforces the trend demonstrated by the monthly consumption data that Residential consumption has greater seasonal variation than Commercial/Industrial water consumption.

Exhibit 2-13. Seasonal Water Consumption by Customer Category, 2022



2.6.5 Single Family Residential Per Capita Consumption

Single Family Residential per capita demand, expressed in gallons per capita per day (gpcd), is the City's total demand from single family residential customers divided by the estimated water delivery area population. This value is intended to provide an estimate of the amount of water actually used by typical individuals. In 2012, Single Family Residential water use totaled 449.6 MG when the City's service area population was 11,964, resulting in a Single Family Residential per capita demand of 103.0 gpcd. In 2022, the per capita value had decreased to 72 gpcd.

2.7 Water Loss

Water loss is defined as the difference between demand and the sum of metered water consumption plus unmetered authorized water usage. Demand volumes are a combination of the water treated at the WTP, and water appropriated at the City's wells. Water consumption volumes are those measured at the service meters of City customers. Unmetered, authorized volumes include water used during the City's flushing operations. Hydrant flushing is tracked based on the duration of each hydrant flush times the rate through the use of a software database program.

The City fee schedule includes a system for tracking and invoicing contractor water usage for construction purposes. Water taken from fire hydrants is metered and water taken from the Public Works Department fill station is tracked by volume estimate per load. Records are totaled to obtain the volume of contractor water use and this data is incorporated into the annual consumption totals.

With accurate record keeping and metering of all water consumed, the percentage of water loss should approach the net volume lost to leakage. System leakage, as the name implies, is water lost due to deteriorating pipes, compromised pipe joints, service connections, valves, etc. The Dalles water loss represents real losses, such as system leakage, and apparent water losses, for example meter errors, and also includes uses that are authorized, but not tracked, such as uses by the Fire Department for fire suppression trainings and events The City is not aware of unauthorized water use (i.e. theft).

Exhibit 2-14 shows historical water losses. Demand and consumption volumes for FY 2017/18 were obtained from the City's 2019 WMCP Progress Report. Loss averaged 9.6 percent over the five-year period and was 8.5 percent in 2022.

Exhibit 2-14. Historical Water Losses

	Demand	Consumption		Water Loss	Percent Loss
		Metered	Unmetered, Authorized		
FY 2017-18	1,219	1,132	16.3	70.7	5.8%
2019	1,210	1,061	3.8	145.0	12.0%
2020	1,300	1,143	2.5	154.4	11.9%
2021	1,460	1,317	1.4	141.8	9.7%
2022	1,300	1,187	2.6 ¹	110.8	8.5%
Average					9.6%

¹ Unmetered, authorized volume for 2022 was not available for this analysis. The value is an average of the previous three calendar years.

2.8 Water Rights

2.8.1 Water Rights Descriptions

The City of the Dalles holds three surface water certificates, two surface water permits, one storage certificate, one storage permit, seven groundwater certificates, four groundwater rights in transfer status, two groundwater registrations, and one Aquifer Storage and Recovery (ASR) limited license. Details of these rights, such as source of supply and authorized rates of diversions, are presented in Exhibit 2-15. Exhibit 2-16 presents average monthly and daily water diversions by source of supply (point of diversion/point of appropriation) for the years 2018 through 2022 (5 years). Exhibit 2-16 includes the Water Use Report ID to match OWRD’s water use reporting system.

Surface Water Rights The City holds five surface water rights for municipal use. Three of these rights are certificated. Certificate 5691, which is the City’s most senior water right (priority date of 1862) and authorizes the use of up to 2 cfs from South Fork Mill Creek. Certificate 14954 is the City’s second oldest water right (priority date of 1870) and authorizes the use of all the water in Dog River at the point of diversion near the headwater of the Dog River.

Certificate 60410 authorizes use of 955 AF from Crow Creek Reservoir and is a secondary right to Certificate 44917, which authorizes the storage of up to 955 AF of water from South Fork Mill Creek and Dog Creek in Crow Creek Reservoir. As discussed in Section 2.1, these surface water sources provide the majority of the City’s municipal water supply.

The City holds Permit R-13105, which is for the enlargement of Crow Creek Reservoir by up to an additional 2100 AF. OWRD issued a final order approving an extension of time for Permit R-13105 on December 8, 2023; this order describes the deadline for beginning construction to enlarge the reservoir, completing construction, and filling the reservoir for Permit R-13105 by November 20, 2031. A project to potentially enlarge the reservoir is in the pre-planning stage and the need for the project is confirmed in the City’s 2024 WSMP update. The City has begun to evaluate Permit S-53930, which allows use of the additional 2100 AF from Crow Creek Reservoir for municipal purposes. Permit S-53930 has a development limitation requiring

approval of a WMCP before diverting any water, as established by an OWRD Extension Final Order issued on October 28, 2011, and the 2014 WMCP Final Order. Permit S-53930 has a completion date of October 1, 2041, established by the extension of time final order.

The City has authorization to appropriate up to 40 cfs from the Columbia River under Permit S-49653 for municipal use. The City is not currently authorized to divert any water under this permit. The permit is subject to fish persistence conditions established in an Extension Final Order dated October 16, 2012. The completion deadline for Permit S-49653 is October 1, 2073.

Groundwater Rights The City holds eleven groundwater rights for municipal use that authorize a total of 26.834 cfs (17.3 mgd). Of the 26.834 cfs, the Lone Pine, Marks, Jordan Street Wells and ASR Well 1 are authorized to appropriate up to 18.454 cfs. GR 4258 as modified by GR Modifications T-10865 and T-12893 authorize appropriation of up to 5.124 cfs from all four wells. Certificate 15543 and Certificate 86380 authorize the use of up to 2.68 cfs and 0.69 cfs, respectively, from the Marks Well. Certificate 48991 authorizes use of up to 5.5 cfs from the Jordan Street Well. Certificate 60026 authorizes use of up to 4.46 cfs from the Lone Pine Well.

Certificates 85886 and 44915 authorize the use of up to 0.81 cfs from the Mill Creek Well and up to 1.56 cfs from the Wicks Well, respectively. The Mill Creek Well currently is not actively used. GR-4257 is a domestic/manufacturing water right for use of up to 0.368 cfs from the Stadelman well, however, this well currently is not actively used.

OWRD approved Transfer T-13904 in 2024, which authorizes appropriation from Riverside Wells 1 and 2 at a total rate of up to 6.01 cfs for municipal use within the City's service area. Design LLC filed the transfer application and assigned it to the City. The authorized wells identified in T-13904, Riverside Wells 1 and 2, are also identified in limited license LL-025 as points of diversions. Use of native groundwater from either well may be available to the City following complete diversions of stored water under the City's ASR program, as noted in Limited License LL-025.

Limited License LL-025 Since 2018, the Dalles has held Limited License LL-025 for aquifer storage and recovery (ASR). This license authorizes diversion of up to 16.7 cfs from Dog River, South Fork Mill Creek, and Crow Creek Reservoir for storage of up to 1,200 MG. Limited License LL-025 authorizes recovery from four ASR well sites at a maximum recovery rate of 2,500 gpm per well. The City plans to begin using Riverside Well 1 for its ASR program under LL-025 in 2025.

Non-municipal Rights The City holds a groundwater right that is not part of the municipal water supply. Certificate 87278 is a commercial water right for up to 0.3384 cfs from three wells for use in a heating and cooling system at The Dalles Middle School. These wells are not connected to the City water system.

In addition, the City operates a well system that supplies water to Wasco County's Columbia Gorge Discovery Center tourist facility which is located outside City limits. The City provides this service to the County. This system includes a well (Kuck Well) that is not connected to the City's water system, and well appropriations are authorized under Permit G-13421 held by the County.

The City will inherit ownership of the water supply facilities once the County's period of bonded indebtedness expires. Because this permit is not held currently by the City, this right is not shown in Exhibit 2-14 and will not be discussed further in this WMCP.

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Exhibit 2-15. Water Rights Table

Application	Permit	Claim, Decree, or Transfer	Certificate	Priority Date	Type of Beneficial Use	Authorized Rate (cfs)	Source	Authorized Volume (AF)	Authorized Date for Completion	Maximum Withdrawal to Date	
										Rate (cfs)	Annual (MG unless otherwise noted)
Groundwater: Municipal System Connection											
-	-	GR 4258, Modification T-12893	-	10/11/1923	Municipal, Domestic, Irrigation, Manufacturing, and Industrial	5.12 (2300 gpm)	Marks Well Jordan Well Lone Pine Well ASR Well 1	-	-	5.124 cfs	415.50
U-135	U-127	-	15543	11/1/1940	Municipal	2.68	A well - Marks Well	-	-	2.68 cfs	
U-181	U-189	T-7258	20790 44783 86380	10/4/1945	Municipal	0.69	A well - Marks Well	-	-	0.69 cfs	
G-23	G-7806	-	48991	10/16/1953	Municipal	5.5	A well - Jordan Street Well	-	-	5.5	
G-1415	G-7807	-	60026	3/13/1959	Municipal	4.46	A well - Lone Pine Well	-	-	4.46	
G-2076	G-2132	-	44915	7/2/1962	Municipal	1.56	Wicks Well	-	-	1.56	47.82
U-181	U-189	T-7258	20790 44783 85886	10/4/1945	Municipal	0.81	Mill Creek Well	-	-	0.81	Water use data not available for this water right ¹
-	-	GR 4257	-	1910	Domestic / manufacturing	0.368 (165 gpm)	Stadelman Well	-	-	0.368	Water use data not available for this water right ²
G-471	G-338	T-13904	46835	9/7/1956	Municipal	2.9	Riverside Wells 1 & 2	-	10/1/2044	2.9	12.76 ³
G-734	G-645		46836	8/19/1957	Municipal	1.11	Riverside Wells 1 & 2	-		1.11	
G-737	G-648		46839	8/19/1957	Municipal	1.6	Riverside Wells 1 & 2	-		1.6	
G-735	G-646		82480	8/19/1957	Municipal	0.4	Riverside Wells 1 & 2	-		0.4	
ASR											

Application	Permit	Claim, Decree, or Transfer	Certificate	Priority Date	Type of Beneficial Use	Authorized Rate (cfs)	Source	Authorized Volume (AF)	Authorized Date for Completion	Maximum Withdrawal to Date	
										Rate (cfs)	Annual (MG unless otherwise noted)
ASR LL-25	LL-25	-	-	None - diversion of water for ASR testing retains the priority date of source water rights (14954, 5691, 60410)	ASR testing	16.7 cfs diverted from surface water sources; max injection rate of 1,875 gpm per well (up to four wells); max recovery rate of 2,500 gpm per well	Dog River, a tributary of Hood River (under Cert 14954); South Fork Mill Creek (under Cert 5691); and Crow Creek Reservoir (under Cert 60410)	Up to 1,200 MG stored in aquifer	Limited License expires 3/21/2028	0	0

Exhibit 2-15 (continued). Water Rights Table

Application	Permit	Claim, Decree, or Transfer	Certificate	Priority Date	Type of Beneficial Use	Authorized Rate (cfs)	Source	Authorized Volume (AF)	Authorized Date for Completion	Maximum Withdrawal to Date	
										Rate (cfs)	Annual (MG unless otherwise noted)
Groundwater: No Municipal System Connection											
G-15518	G-15149	-	87278	6/4/2001	Commercial	0.338 cfs, limited to: Well 1-- 0.077 cfs, Well 5-- 0.2 cfs, and Well 9-- 0.111 cfs	3 Wells - Wells 1, 5, and 9	-	-	0.338	57.50
Surface Water											
-	-	Mill Creek Decree	5691	1862	Municipal	2.0	South Fork Mill Creek, a tributary of Mill Creek	-	-	2.0	1,586.74
-	-	Hood River Decree	14954	8/1/1870	Municipal use for irrigation, domestic, power and stock	"All the water in stream at point of diversion"	Dog River, a tributary of Hood River	-	-	All the water in stream at point of diversion	1,726.68
S-43668	S-32479	-	60410	5/29/1967	Municipal	-	Crow Creek Reservoir, a tributary of Mill Creek	955	-	N/A	955 AF
S-84050	S-53930	-	-	1/21/1999	Municipal	-	Crow Creek Reservoir, a tributary of South Fork Mill Creek	2100	10/1/2041	0	0.00
S-55346	S-49653	-	-	1/13/1986	Municipal	40	Columbia River, a tributary of the Pacific Ocean	-	10/1/2073	0	0.00
Storage											
R-43667	R-4988	-	44917	5/29/1967	Storage for Municipal Use	-	South Fork Mill Creek, Dog River	955	-	N/A	955 AF
R-84049	R-13105	-	-	1/21/1999	Storage for Municipal Use	-	South Fork Mill Creek, Dog River	2100	11/20/2031	0	0

¹Water use has not been reported on OWRD's Water Use Reporting site from the current point of appropriation or the point of appropriation authorized on the water right prior to Transfer T-7258.

²Water has not been used under this water right since before water use reporting began.

³The maximum use reported for these water rights is from prior to Transfer T-13904, from Wells WASC 3256, WASC 3249, and WASC 3255, no longer authorized on these water rights.

Exhibit 2-16. Five Year Monthly and Daily Diversions by Source

Water Use Report ID	POD Name	2022 Average Withdrawal ¹			Five-Year (2018-2022) Average Withdrawal ¹		
		Annual (MG)	Monthly (MG)	Daily (mgd)	Annual (MG)	Monthly (MG)	Daily (mgd)
Groundwater							
12249	Lone Pine Well	82.50	6.88	0.23	56.48	4.71	0.15
12252	Jordan St. Well (WASC 2428)	28.20	2.35	0.08	126.66	10.56	0.35
12256	Marks Well (WASC 2431)	131.50	10.96	0.36	107.16	8.93	0.29
12248	Wicks Well	34.80	2.90	0.10	21.50	1.79	0.06
32602	Mill Creek Well (WASC 2431)	0.00	0.00	0.00	0.00	0.00	0.00
18571	Stadelman Well (WASC 2422)	0.00	0.00	0.00	0.00	0.00	0.00
N/A	Riverside Well 1	0.00	0.00	0.00	0.00	0.00	0.00
N/A	Riverside Well 2	0.00	0.00	0.00	0.00	0.00	0.00
Surface Water							
12247 ²	South Fork Mill Creek	246.50	20.54	0.68	273.98	22.83	0.75
12254 ³	Dog River	901.20	75.10	2.47	815.74	67.98	2.23
12250	Columbia River	0.00	0.00	0.00	0.00	0.00	0.00
30261 ⁴	Crow Creek Reservoir	198.20	16.52	0.54	189.50	15.79	0.52
Storage							
12246 ⁵	Crow Creek Dam	152.50	12.71	0.42	137.72	11.48	0.38

¹Annual volumes obtained from water use reporting data in OWRD's Water Rights Inventory System.

²Measurements are taken at the South Fork Mill Creek diversion and adjusted to account for water being rediverted for storage and Dog River Flow.

³Volumes include all use at Dog River from measurements taken at the point of diversion.

⁴Volumes include flow released from the Crow Creek Reservoir calculated as the difference in reservoir levels from month to month, converted to volumes.

2.8.2 Aquatic Resource Concerns

The City’s authorized surface water sources are Dog River, South Fork Mill Creek, Crow Creek Reservoir, and the Columbia River. The Columbia River, Dog River, and South Fork Mill Creek are listed as water quality limited streams according to the Oregon Department of Environmental Quality (DEQ). The City’s authorized point of diversion on the Columbia River is located just upstream of The Dalles Dam (RM 191.5). The assessment unit number for this reach of the Columbia River is OR_LK_1707010504_88_100137. At this location, the river is water quality limited for the following parameters: pH, temperature, dioxin, methylmercury, Polychlorinated Biphenyls, and total dissolved gas. Dog River (assessment unit OR_WS_170701050503_02_101998) is listed as impaired for iron (total) and South Fork Mill Creek (assessment unit OR_WS_170701050403_02_101992) is listed as impaired for temperature (spawning).

The list of water quality limiting parameters for these water bodies can be found in DEQ’s Water Quality Assessment – Oregon’s 2022 Integrated Report Assessment Database at https://rstudioconnect.deq.state.or.us/2022_IR_Database/.

Exhibit 2-17 shows the listed fish species in the middle Columbia River, including the mainstem Columbia River, Dog River, South Fork Mill Creek, and Crow Creek Dam drainages (Hydrologic Unit Code 17070105 subbasin).

Exhibit 2-17. Listed Fish Species That May Occur in City’s Sources of Supply¹

Species	Common Name	Federal Listing	State Listing
<i>Oncorhynchus tshawytscha</i>	Chinook	Endangered (Spring)	Sensitive (Fall and Spring)
<i>Oncorhynchus mykiss</i>	Steelhead	Threatened (Middle Col. R. and Upper Col. R.)	Sensitive-Critical (Summer)
<i>Oncorhynchus nerka</i>	Sockeye	Endangered	--
<i>Oncorhynchus keta</i>	Chum	Threatened	--
<i>Salvelinus confluentus</i>	Bull Trout	Threatened	Sensitive “Critical”
<i>Oncorhynchus clarkia lewisi</i>	Westslope Cutthroat Trout	--	Sensitive- Vulnerable
<i>Oncorhynchus clarkii clarkii</i>	Coastal Cutthroat Trout	--	Sensitive
<i>Lampetra ayresii</i>	Western River Lamprey	--	Sensitive
<i>Lampetra richardsoni</i>	Western Brook Lamprey	--	Sensitive
<i>Lampetra tridentate</i>	Pacific Lamprey	--	Sensitive
<i>Thaleichthys pacificus</i>	Pacific Eulachon	Threatened	--
<i>Acipenser medirostris</i>	Green Sturgeon	Threatened	--

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

Sources:

- OR Sensitive Species List:
https://www.dfw.state.or.us/wildlife/diversity/species/docs/Sensitive_Species_List.pdf
- Threatened, Endangered, and Candidate Fish and Wildlife Species in Oregon:
https://www.dfw.state.or.us/wildlife/diversity/species/docs/Threatened_and_Endangered_Species.pdf
- Status of ESA Listings and Critical Habitat Designations for West Coast Salmon and Steelhead
<https://www.fisheries.noaa.gov/resource/document/status-esa-listings-and-critical-habitat-designations-west-coast-salmon-and>
- Endangered Species Act, Threatened and Endangered Species Directory:
https://www.fisheries.noaa.gov/species-directory/threatened-endangered?species_title=&field_species_categories_vocab_target_id=1000000031&field_species_status_value=All&field_region_vocab_target_id=1000001126

2.9 Evaluation of Water Rights/Supply

2.9.1 Surface Water

The City's primary water supply is currently provided by surface water from The Dalles Municipal Watershed, which encompasses a 22,000-acre drainage containing the watersheds of Dog River and South Fork Mill Creek. Water from Dog River is diverted and conveyed to South Fork Mill Creek via a 3.5-mile pipeline. At the confluence of South Fork Mill Creek and Crow Creek, Crow Creek Dam impounds water from Dog River and South Fork Mill Creek in Crow Creek Reservoir. The City's live flow from Dog River and South Fork Mill Creek and stored water in Crow Creek Reservoir are released from the Crow Creek Dam into South Fork Mill Creek. This water is then diverted eight miles downstream at the City's South Fork Mill Creek intake, at which point the water flows by gravity a short distance to the Wicks WTP. This stored water and available live flow are used throughout the year to meet municipal demands. Though the City's WTP is capable of treating up to 8.2 cfs, reliable late summer flows from these surface water sources, including available live flows and stored water releases, are currently 5.4 cfs (3.5 mgd). This is based upon a rate that can be sustained all summer long and without over-drafting the water in Crow Creek Reservoir before refilling begins and is also based on the sustainable rate of treatment at the City's WTP. Reservoir drawdown usually begins in early July, and it is often November before the City starts refilling the reservoir.

As part of the City's Water System Master Plan Development, Jacobs Engineering Group (Jacobs) modeled natural flows in the City's municipal watershed under current and future conditions, with consideration of the impacts of climate change on the timing and amount of flow available under the City's water rights. Water availability during a 10 percent exceedance flow scenario is shown in comparison to the City's projected demands in Exhibit 2-18. The table shows both Jacobs' flow projection (in mgd) and supply available (in acre-feet [AF]). The latter also accounts for a required 0.5 cfs bypass flow during August through October the City agreed to as part of a recent Dog River pipeline replacement project. Flows are shown to be lowest in the summer months, leading to the lowest available supply during that period. During these periods, the City relies on groundwater as a supplemental source.

Exhibit 2-18. Dog River and South Fork Mill Creek Reliable Flow Estimates

Month	Jacobs' Water Supply Evaluation – Natural Flow (mgd)		Water Supply Available (AF)	
	Dog River	South Fork Mill Creek	Dog River ¹	South Fork Mill Creek
January	9.15	21.32	871	123
February	9.63	22.43	828	111
March	10.07	23.45	958	123
April	8.34	19.41	767	119
May	8.68	20.21	826	123
June	2.22	5.18	205	119
July	0.17	0.40	16	38
August	0.64	1.48	30	123
September	1.62	3.78	120	119
October	2.16	5.02	205	123
November	3.25	7.56	299	119
December	7.25	16.90	690	123

¹ As part of a recent expansion of the Dog River Pipeline, the City agreed to provide a bypass flow of 0.5 cfs during August through October. This bypass flow is reflected in the estimate of water supply available but not in the monthly natural flow estimates.

The City holds the most senior water right on Dog River (Certificate 14954) and on South Fork Mill Creek (Certificate 5691). The City's Dog River and South Fork Mill Creek water rights have not been subject to regulation. However, as described above, natural streamflow limits the supply available from the Dog River and South Fork Mill Creek. The City's storage water rights (Certificate 44917 and Permit R-13105) are junior to several water rights, but the reliability of the stored water and use of that stored water is not expected to be diminished given that storage occurs in winter months when flows are typically ample and senior water rights are primarily for irrigation for use during the irrigation season.

Permit S-49653 authorizes the use of the Columbia River. The City has not developed this source of supply; however the permit could serve as an important source of supply for the City in the future. Future use of this permit is affected by conditions placed by OWRD on the use of this permit and federal regulations prohibiting new net withdrawals. The permit is conditioned to require a reduction in the authorized rate of use when target flows are not met on a 7-day rolling average at McNary Dam, OR. These target flows are 260,000 cubic feet (cf) from April 10 to June 30 and 200,000 cf from July 1 to August 31. (There are no target flow restrictions identified in the permit from September 1 to April 9.) During these periods of potentially restricted use, the City's diversions must be reduced in proportion to the amount by which river flows are missed. If these flows are not met, the City's authorized diversion rates are reduced in proportion to the amount that flows were missed. The permit extension describes that the overall reduction will not exceed 20 percent of the right. Exhibit 2-16 shows the frequency that these flow targets were met from 1950 to 1981 while Gage 14109200 was in use. It is likely that

the City will not always have full access to the entire 40 cfs under Permit S-49653 during this period, limiting the reliability of this source of supply.

Exhibit 2-19. Columbia River Flow Targets

Time Period	Flow Target (cfs)	Frequency Flow Target Met at USGS Gage 14019200, 1950 - 1981
April 10 – June 30	260,000	45.2%
July 1 – August 31	200,000	59.6%

Expansion of Crow Creek storage can also provide an important source of supply to help meet future growth. Permit S-53930, a secondary right, authorizes use of up to 2,100 AF of water stored in the Crow Creek Reservoir under R-13105. Completion of R-13105 (by enlarging the reservoir and storing an additional 2,100 AF) following construction of an enlargement of the Crow Creek Reservoir will enable the City to use Permit S-53930. The City has not initiated development of Permit S-53930.

Permit S-49653 (authorizing use of water from the Columbia River) and Permit S-53930 (authorizing use of stored water in an enlarged Crow Creek Reservoir) are viable alternatives to help the City meet future demands. The City will conduct a detailed analysis of these future supply options to determine which source would best meet the City’s future needs.

2.9.2 Groundwater

The City’s current surface water supplies are supplemented by groundwater sources for use during the summer months when demand peaks and for backup supply. Of the 20.824 cfs (13.5 mgd) that the City holds in groundwater rights for municipal use, 18.454 cfs (11.9 mgd) may be appropriated using four wells: Lone Pine Well, Marks Well, Jordan Street Well, and the ASR Well 1 (known as Riverside Well 1) evidenced by: GR 4258 as modified by T-10865 and T-12893 (Lone Pine Well, Marks Well, Jordan Street Well, and the ASR Well 1) and Certificates 15543 (Marks Well), 86380 (Marks Well), 48991 (Jordan Street Well), and 60026 (Lone Pine Well). The Lone Pine, Marks, and Jordan Street Wells serve as the City’s primary municipal groundwater sources. The pumping capacities of the three non-ASR wells is 11.9 cfs (7.7 mgd) when running 24 hours per day.¹ Thus, of the 18.454 cfs in water rights authorizing use from these three wells, the current maximum sustainable rate is 11.9 cfs. Since the Marks and Jordan Street Wells have less desirable water quality due to elevated iron, manganese, and turbidity levels, water produced from these wells is blended with treated surface water supplies. The Marks Well is the last of the three wells that the City uses when groundwater is needed as a result of having the poorest water quality. ASR Well 1 is newly constructed and called Riverside Well 1.

The Dalles has four other well locations. Appropriation at Riverside Well 1 and 2 is authorized under Transfer T-13904 for municipal use. The Riverside Wells are newly constructed, with a design capacity of 1,800 gallons per minute (gpm) each but are not yet in use. The Wicks Well

¹ The pumping capacities of the wells are: Jordan, 3.9 cfs; Marks, 3.34 cfs; and Lone Pine, 4.67 cfs.

has very poor water quality (Certificate 44915), such that the authorized rate of 1.56 cfs (1 mgd) can only be used in emergencies to supplement surface water supplies after full treatment through the WTP. The Mill Creek Well (Certificate 85886) and the Stadelman Well (GR-4257) are currently not in use, also as a result of poor water quality. The three wells providing water to The Dalles Middle School (Certificate 87278) are not connected to the City's municipal water supply system.

All existing wells except the Wicks Well are completed in the Dalles Pool aquifer. OWRD declared the Dalles Pool aquifer a Critical Groundwater Area in 1959. This designation closed the aquifer to new appropriations and allows OWRD to implement various restrictions on water use to help prevent water level declines.

Water levels in the aquifer have fluctuated in response to drought and total groundwater pumping. A 1999 hydrogeologic assessment prepared by Golder Associates identified a sustainable annual yield—the level of groundwater pumping at which water levels are stable—of 5,000 to 5,500 acre-feet.

Through the early 2000s, the largest users of groundwater from the Dalles Pool Aquifer were aluminum smelters. As these industries shifted to less water intensive uses or discontinued operations, water levels increased by nearly 50 feet. Small declines over the past few years are driven by drought, as total groundwater pumping from the Dalles Pool Aquifer has declined to approximately 1,500 to 2,000 acre-feet per year. Maintaining higher groundwater levels in the Dalles Pool Aquifer improves the resiliency of the supply against drought, benefiting all users of the aquifer. Thus, the City limits use of its water supply wells to minimize impacts to the aquifer.

To determine total reliable municipal groundwater supply, water industry guidelines instruct water utilities to anticipate the loss of the single largest source. The City's largest well is the Jordan Street Well capable of producing 3.9 cfs. The resulting rate is called "firm capacity". Subtracting 3.9 cfs from the 11.9 cfs of the City's primary municipal groundwater sources results in a firm capacity of 8 cfs (5.2 mgd).

Combining the City's current reliable supplies of surface water (5.4 cfs) and groundwater (8 cfs), the City's total current reliable water supply typically available during peak summer demand is 13.4 cfs (8.7 mgd). The City's historical MDD exceeded 9 mgd in 2021 and exceeded 8 mgd in 2020 and 2022. Due to the stability of its water system infrastructure, its storage rights and the use of those rights, operational measures associated with its distribution system (e.g., use of inline storage reservoirs), and maximizing the use of the WTP, the City has been able to meet periods of high system demands.

The Dalles Limited License LL-025 is intended to provide a temporary source of supply until a new source, or sources of supply are available, such as the Columbia River (S-49653) or diversions from the Crow Creek Reservoir under the City's secondary right (Permit S-53930). Limited licenses are issued by OWRD and are valid for five years. The Dalles limited license is valid until March 2028. Limited licenses, including LL-025, do not provide secure sources of supplies as compared to the assurances of security conferred upon a permanent water right. For

example, limited licenses retain junior status relative to water rights and can be revoked, suspended, or modified for multiple reasons.

2.10 System Description

The City operates a public drinking water system (Public Water System Identification Number 4100869). Exhibit 2-1 is a schematic of the City's water distribution system.

The City's surface water sources are described above. The City's Wicks Water Treatment Plant (WTP) was constructed in 1949 and is located about seven miles south of The Dalles. Operationally, the City can realistically treat approximately 3.5 mgd and still have reasonable WTP filter run times, though it can be run a greater rate for short durations. Two finished water transmission pipelines, the High Line and the Mill Creek Line, use gravity flow to convey water approximately 7 miles from the WTP to the City limits. The High Line conveys water to Sorosis Reservoir and the Mill Creek Line conveys water to Garrison Reservoir. Together, these lines have a combined capacity of approximately 7.5 mgd. Each line serves a limited number of customers along its length, in addition to supplying the City's distribution system.

The City's primary municipal groundwater wells are the Jordan Street Well, Marks Well, and Lone Pine Well. The Jordan Street and Marks wells pump directly into the distribution system and the Lone Pine Well has a dedicated pump line to the Intermediate Reservoir. The City recently completed construction of Riverside Wells 1 and 2; each well has a capacity of 1,800 gallons per minute.

The City's distribution system has seven reservoirs with a total storage capacity of 16 MG, approximately 91 miles of distribution system pipeline, 16 service zones, and four booster pump stations.

3. Water Conservation Element

This section addresses OWRD's water conservation element requirements by describing the City's progress meeting historical conservation measures benchmarks and providing future conservation measures and associated benchmarks and additional conservation measures to be implemented by the City.

3.1 Progress Report

This is the City's second WMCP. The City submitted a five-year progress report to OWRD in 2020 describing the City's progress on meeting the conservation benchmarks presented in its 2014 WMCP. Exhibit 3-1 provides an update on the City's progress toward meeting these 2014 benchmarks.

3.2 Use and Reporting Program

The City's water measurement and reporting program complies with OWRD measurement standards. The City's water use records can be found at http://apps.wrd.state.or.us/apps/wr/wateruse_report/.

The City has magnetic meters at Vista Reservoir and its pump station, the Mill Creek and High Line transmission line intakes at the Wicks WTP, Jordan Street Well, Marks Well, Lone Pine Well, and Riverside Wells 1 and 2. The remaining City wells have in-line prop meters. Data are recorded daily at these locations and are compiled for reporting to OWRD on an annual basis.

3.3 Required Conservation Programs

OWRD requires that all water suppliers establish five-year benchmarks for implementing the following water management and conservation measures:

1. Annual water audit
2. System-wide metering
3. Meter testing and maintenance
4. Unit-based billing
5. Water loss analysis
6. Public education

Exhibit 3-1. Progress Meeting 2014 Conservation Benchmarks

Conservation Measure	2014 Conservation Benchmark	2024 Benchmark Status
Annual Water Audit	The City will continue to annually compare metered water production to metered consumption and estimated unmetered authorized uses to calculate unaccounted-for water.	Continued to compare metered water production to metered consumption and estimated unmetered authorized uses to calculate water losses.
	The City will continue to improve its billing system to provide more detailed consumption records.	Implemented a new billing system in FY 2016/17 which allowed for consumption reports detailing water use by customer class.
	The City will maintain practices to reduce the occurrence of missed meter reads, which results in higher use attributed to the next month's consumption.	The new billing system generates monthly exception reports for missed meter reads. These reports are used to consistently capture all meter reads in the current billing period thus reducing the occurrence of missed meter reads.
System Metering	The City will continue to require metering on all new connections in accordance with City of The Dalles Municipal Code 3.04.110 Meters (Formerly Ordinance 17-1358).	The water system is fully metered, and metering is required on all new connections.
Meter Testing and Maintenance	The City will continue annually testing large meters.	Continued to all test large meter at a rate of approximately 15 to 20 percent per year.
	The City will continue residential meter repair and replacement as needed and will replace meters smaller than 3 inches on a schedule.	Continued replacing and repairing residential meters as needed and replaces meters smaller than 3 inches on the schedule described below.
	The City will set a target to replace 10 percent of the residential meters on an annual basis.	Annual residential meter replacement target revised in 2020 from 10% to 8% to better align with available staffing and funding.
	The City will continue replacing all meters included on the monthly meter malfunction report, generated from meter reading software.	Continued replacing all meters included on the monthly meter malfunction report in lieu of repair.
	The City will implement a program to test its well meters and its magnetic meters.	Though testing of these meters would require removing and shipping them to a certified testing facility, these magnetic meters are inspected annually by the City's meter vendor to confirm proper operation.

Conservation Measure	2014 Conservation Benchmark	2024 Benchmark Status
Rate Structure and Billing Practices	In the next five years, the City will continue to bill customers based, in part, on the quantity of water metered at the service connection.	Continued to bill customers based, in part, on the quantity of water metered at the service connection.
Leak Detection and Repair	Over the next 5 years, the City will conduct leak detection on approximately 26 miles of pipeline, and based on the results of that effort, the City may revisit its annual leak detection efforts.	Purchased and trained City crews in 2017 to use leak detection equipment. Leak surveys of the distribution piping are conducted as time allows. Leak surveys are conducted annually on the two transmission lines. More than 70 miles of pipeline have been surveyed in the last 5 years.
	In the next 5 years, the City will continue to seek funding for major leak repairs to fix the leaks as soon as possible.	Continue to provide funding for major leak repairs to fix the leaks as soon as possible.
	The City will continue to address minor leaks on a priority basis from the annual maintenance budget or from a capital improvement budget established for future years.	Continues to address minor leaks on a priority basis from annual maintenance budget or capital improvement budget.
Public Education	The City will continue to maintain and update its print materials and Web site content about water conservation.	The Public Works Department Communication Plan includes relevant water conservation messaging for various platforms, including newsletter articles, the City website, press releases and Facebook posts, all of which are periodically updated.
	The City will continue to provide water conservation information and items at community events.	Annual water quality report (consumer confidence report) distributed to every water customer has included an article about water conservation.
	In the next 5 years, the City will seek additional partnerships to promote water conservation.	Continue to work with NW Natural to hold the NW Natural Get Ready emergency preparedness event. Distributes information about leak detection and repair, meter access, tips on water budgeting and water conservation at this event.

Conservation Measure	2014 Conservation Benchmark	2024 Benchmark Status
Technical and Financial Assistance Programs	The City will continue to offer rate adjustments for timely leak repair.	Continues to offer rate adjustments for timely leak repair, per The Dalles Municipal Code 3.04.090 Billing, Item K.
	Leak gauges, and lawn watering gauges at the annual Cherry Festival and at the Public Works Department office upon request.	Offered leak gauges and lawn gauges at the Cherry Festival and upon request. Stopped distributing toilet leak detection tablets due to concerns about children mistaking them for candy. Instead, updated water conservation flyer suggests using food coloring.
	Commercial/Industrial customers to discuss water conservation opportunities.	Discussed water conservation opportunities with commercial and industrial customers. Additionally, a question about water conservation measures is included in the industrial discharge permit application, permit fact sheet, and the site inspection form to ensure customers consider opportunities for conservation when applying and City assess opportunities during City review. Upon request, provides technical consultation about industrial scale water reuse and commercial scale water efficient products and processes.
Supplier Financed Retrofit or Replacement of Inefficient Fixtures	The City will continue to offer 1.5 gpm faucet aerators and toilet flappers to customers at the annual Cherry Festival.	The Cherry Festival was temporarily suspended due to COVID, and no suitable substitute events were identified.
Water Reuse, Recycling, and Non-potable Opportunities	The City will continue to explore opportunities for water reuse and recycling. In the next 5 years, the City will contact industrial users to discuss the potential for water reuse in their operations.	Upon request, provided technical consultation about industrial scale water reuse and commercial scale water efficient products and processes to industrial customers.

Conservation Measure	2014 Conservation Benchmark	2024 Benchmark Status
Other Conservation Measures	In the next 5 years, the City will review City ordinances and its building permit review process to find opportunities to encourage water conservation.	<p>Opportunities to incorporate water conservation measures in the City’s municipal code were not available, however, City staff keep a running list of revisions that would promote conservation when the opportunity arises.</p> <p>Since 2014, ceded building permit authority to Wasco County, reducing the City’s ability to use this process to drive conservation. However, recently re-affirmed conservation-related considerations (e.g., water re-use and recycling) found in its wastewater permit review procedural manual and updated this manual to inform permittees of state reuse and recycling rules.</p>

During the next five years, The Dalles plans to initiate, continue, or expand measures that promote more efficient uses of water. These measures and associated benchmarks that The Dalles intends to implement are presented below.

3.3.1 Annual Water Audit

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

The City conducts water system audits for its distribution system annually. For these audits, the City subtracts water production from consumption. Consumption volumes are comprised of uses at metered connections and estimates of unmetered authorized uses associated with distribution system line flushing. The City's water loss was 8.5 percent in 2022 and averaged 9.6 percent over the previous five years.

The City's utility billing system has a fail-safe measure to help ensure accurate consumption volumes are captured by the City. Specifically, the City's billing system generates monthly exception reports for missed meter reads. City staff use the reports to identify missed meters and follow up to resolve the error, helping to ensure customer consumption is documented and used during the annual audit.

The City's water audit includes authorized, unmetered volumes of water used during distribution system flushing activities that are intended to maintain the City's water quality standards. In future audits, the City intends to add authorized, unmetered uses associated with reservoir draining; fill station use; and water used for pressure testing, chlorinating, and flushing new water main lines. In addition, the City will begin to include estimates of water volumes used at hydrants to fill the public swimming pool. Incorporating volumes for these uses will reduce the City's water loss estimates.

In addition to conducting annual water audits for the City's distribution system, the City endeavors to perform audits for the transmission system which includes 14 miles of pipeline (two seven-miles lines). The audit will compare volumes diverted at the South Fork Mill Creek—as read by the master meters located the Mill Creek and High transmission pipelines—and the volumes entering the Garrison and Sorosis Reservoirs (the City's distribution system). The audit also will incorporate consumption of approximately 200 customers who are served directly from the transmission main, enabling the consumption from these customers to be excluded from water loss volumes.² The City will conduct an audit of the transmission system in 2025. If the results show water loss of 10 percent or more, the City will implement measures to reduce leakage and perform follow-up audits periodically in order to check the efficacy of those measures. One of these measures may include the replacement of the Mill Creek and High transmission lines as noted in the City's 2024 WSMP. These steps will help the City reduce the

² Consumption by these customers is included in the City's annual water audits.

City's own uses of water. In addition, the City determined that it would replace aging, inefficient water-using fixtures and appliances during City facility remodels or building construction projects with high efficiency fixtures and appliances.

Five-Year Benchmarks

- Continue to perform annual water audits.
- Continue to reduce the occurrence of missed meter reads.
- Incorporate additional uses of water into the annual water audit: use during reservoir draining, use of hydrants for new water main line flushing, use at the filling station, and the filling of the public swimming pool.
- Conduct a water audit of the transmissions system and implement water loss reduction measures if leakage exceeds 10 percent.
- Replace water inefficient fixtures and appliances with more efficient options during City facility remodels or building construction projects.

3.3.2 System-wide Metering

The City's water system is fully metered and all new service connections are metered in keeping with the City's Municipal Code 3.04.110 that requires City water services to be metered.

Five-Year Benchmark

- The City will continue to require meters on all service connections.

3.3.3 Meter Testing and Maintenance

The City's Water Distribution Division installed automated meter reading (AMR) technology on all of its service connection (customer) meters, which involved attaching an encoder receiver transmitter (ERT) to the water meter. This project was completed in 2015. During this project, the City replaced any nonfunctioning meters. This technology improves the accuracy rate of meter reads and, in turn, the accuracy of the City's water audit. The meter replacements that occurred during the AMR installation project improved the ability of the City to capture customer consumption at the locations found to have failed meters.

The City's meter testing and repair program focuses on maintaining the accuracy of customer meters and the City's master meters. The City repairs or replaces any meter found to be malfunctioning or operating outside of its accuracy rating. The City annually tests 10 to 12 of its large and/or high-volume customer meters in the system, which represents about one-fifth of the City's large meters. Large meters are defined as 3-inch or greater in size. Consequently, every large customer meter is tested approximately every five years. Small meters (less than 3-inches in size) are replaced on a schedule based on age and are not tested. These meter maintenance measures help ensure that the City's meters are accurately registering water use at service connections.

The City uses magnetic flow meters for its master meters. These are located at Vista Reservoir (installed in 2011), Wicks WTP (2007), Marks and Jordan Street wells (2013), Lone Pine well (2014), and Riverside Wells 1 and 2 (2024). These meters are inspected annually by the vendor of the meters to verify the electronics continue to meet factory specifications. Master meters are also installed at both ends of each of the two transmission mains, from the WTP (installed in 2008) to the City's distribution system (installed in 2013 and 2020). Magnetic meters cannot be easily tested without removal since they do not have moving parts. The City has a 20-year master meter replacement cycle for its master meters.

In addition to the City's proactive measures, a monthly meter malfunction report is generated from the meter reading software and the City replaces all meters (along with the ERTs) on this list. In addition, meters known to have malfunctioned that are not identified in this report are also replaced. During the reporting period 2014 to 2022, the average annual meter replacement rate for meters identified by the meter reading software was seven percent.

Five-Year Benchmarks:

- Continue testing and repairing or replacing large meters at a rate of approximately eight percent per year.
- Continue replacing small meters at approximately seven percent per year and identifying and replacing small meters that have failed.
- Continue to test the electronics of master meters annually.
- Replace master meters on a 20-year replacement cycle following installation.

3.3.4 Water Rate Structure

The City has a Residential class monthly basic service charge based on meter size and a consumption charge per 10,000 gallons over 10,000 gallons per month at \$1.61 per 1,000 gallons. The City also has a charge based on meter size for the Commercial/Industrial class with a volumetric rate of \$3.61 per 5,000 gallons.

Residential and commercial customers outside City limits are charged 1.5 times the applicable rates shown in Exhibit 3-1 for bonded water system improvements, in lieu of debt service property taxes collected inside the City. The City also charges contractors for hydrant water usage at commercial volume rate per 1,000 gallons.

Five-Year Benchmark

- In the next five years, continue to bill customers based, in part, on the quantity of water metered at the service connection.

3.3.5 Water Loss Analysis

The City's water audit identified a water loss in 2022 of 8.5 percent. The City has achieved its water loss target of 10 percent or less as a result of several operational and maintenance measures. The City's service connection meter maintenance and repair program is an important

component of the City's water loss reduction program. Inaccurate service meters increase water loss, thus the City's program to identify and replace, repair, or recalibrate service connection meters as described in the previous section helps ensure water use is accurately measured at customer connections. The City recognizes the importance of maintaining master meter accuracy as well and has a program to meet accuracy standards for these meters. These meter accuracy measures implemented by the City help ensure the integrity of the City's audits and contribute to low losses.

Another program integral to maintaining low water losses is the City's leak detection and repair program. The annual operations budget for the Water Distribution Division includes an allocation for leak detection surveys. Typically, one to two miles of distribution main are targeted annually to identify suspected leaks using the City's leak detection equipment. City staff conduct these surveys. The City intends to establish a schedule to survey approximately 10 percent of distribution system pipelines annually using its leak detection equipment. The equipment has also been used to survey segments of the two transmission lines in addition to visual inspections that are conducted periodically; these lines are seven miles each in length. Depending on the results of the City's water audit conducted for its transmission system, as noted above, the City may also begin surveying these lines as well. Distribution system leaks also are detected by visual inspection by City staff or by customers who contact the City with concerns.

When discovered, larger leaks are repaired immediately, and minor leaks are repaired based on priority though City staff repair minor leaks discovered at customers' connections promptly. Older lines are typically identified for replacement and the City prioritizes lines constructed of galvanized iron, a leak-prone material. As an example of one of the City's line replacement projects, the City replaced 530 feet of galvanized mainline pipe on West 16th Street and Pentland Street in fiscal year (FY) 2022/23.

The City is able to make repairs quickly due to consistent funding made available through the annual maintenance or capital improvements budgets.

To improve its leak detection capabilities, the City will explore alternate means of leak detection systems, such as the evaluation of the use of leak correlator meters. These leak-sensing meters can be installed throughout the distribution system at strategic locations and allow for leak locations to be "correlated" between two meters. These types of meters deployed in a water system will more accurately pinpoint leaks compared to the City's existing leak detection equipment and are always "on", thus capable of identifying and reporting leaks in real-time. If the City deems this system is compatible with the existing system and affordable, the new meter-correlators will be incorporated into the meter replacement program.

Five-Year Benchmarks

- Continue to perform targeted leak detection surveys in the distribution system.
- Establish and implement a schedule to survey approximately 10 percent of the distribution system annually.

- Continue to repair major leaks immediately and track, document, and repair minor leaks based on a prioritized leak list.
- Explore purchasing a type of meter that also serves as a correlator to assist with detecting leaks in the water distribution system.

3.3.6 Public Education

The City has relied on a variety of approaches to educate the public about water conservation. Outreach efforts have included attendance at community events, such as the annual Cherry Festival, where the City staffed a booth. Information distributed at community events included information and free items that promote efficient indoor and outdoor water use, including:

- For leaking toilets: Dye tablets and toilet flappers
- For efficient outdoor watering: Hose nozzles with a watering brochure, Master Gardeners information, and rain gauges to measure water applied
- For water-efficient landscaping: Master Gardeners information, AWWA brochures, and a drawing for free drought-tolerant plants
- For reduced flow: 1.5 gpm faucet aerators
- For shorter showers: Shower timers
- For leaky faucets: Leak gauge with conversion to annual gallons wasted
- For children, grades K-3 and 4-6: Booklets on water conservation in English and Spanish
- For children: Stickers and pencils with water conservation messages

The Cherry Festival was postponed in 2020, and the City intends to resume its participation in the event in 2025. In addition, in 2019, the City participated with NW Natural in bringing NW Natural's "Get Ready" emergency preparedness event to The Dalles. Dual purpose messaging (emergency preparedness and water conservation) was presented at this event. For example, the City promoted the prevention of frozen pipes at the event that can help prevent leaks and reduce leaks which can cause flooding in homes during severe winter weather. In addition, messaging also included the topic of maintaining meter access because water must be shut off to repair leaks within a building. The City will continue to partner with NW Natural and participate in this event when it is offered.

The City's Public Works Department administers its conservation program. Department staff developed a Communications Plan that defines the City's approach to marketing, outreach, and communication practices related to water conservation, among other topics. The plan identifies the use of various media to inform customers about water conservation on an annual cycle, such as use of the City's newsletter, website, brochures, press releases, and social media posts. Topics and methods of distribution include:

- Leak Detection & Repair, Be a Leak Seeker: published in the City's newsletter, website, at events, and as a brochure is distributed by staff when a potential leak is discovered on the customers' sides of meters.

- Prevent Frozen Pipes (leak prevention): published in the newsletter, on the website, in brochures, in bill insert, and issued in press releases
- WaterSense Find It, Flag It, Fix It: published in the newsletter and on the website
- WaterSense Sprinkler Spruce Up: published in the newsletter
- Water Conservation/Know Your Water Budget: published in the newsletter, on the website, in brochures, and Water Quality Report
- Meter Access: published in the newsletter, in brochures for distribution at events and to customers, and as a bill insert.

The City contracts for Spanish translation of all water conservation flyers and brochures to reach a wider audience. The water conservation print materials described above are available to the public at the Public Works Department office and City Hall Finance Department where utility bills are paid. In addition, the City delivers an annual Water Quality Report (Consumer Confidence Report) to every water customer that has included an article about water conservation.

Five-Year Benchmarks

- Continue to provide water conservation information at community events, such as the Northwest Natural Get Ready event and Cherry Festival.
- Continue implementing Communications Plan.
- Continue making outreach materials available in Spanish.
- Continue to maintain and update as necessary and distribute its water conservation materials using a variety of media and making this information widely available.

3.4 Additional Conservation Measures

OWRD 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, of several additional conservation measures. The City's population is greater than 7,500 and proposes to initiate the diversion of water under an extended permit with identified resources issues, therefore, this requirement applies.

3.4.1 Technical and Financial Assistance Programs

The City's conservation program offers a variety of technical and financial assistance measures. Technical assistance measures that promote water conservation include the following existing services:

- The City's website provides a variety of indoor and outdoor water saving techniques. Examples include an irrigation calculator, recommended watering rates, and outdoor

irrigation system checklist designed to help customers identify and fix inefficiencies in the system. The website also focuses on indoor water efficiency, identifying methods to identify and repair leaks.

- A “Find it, Flag It, Fix It” flyer and another flyer describing how to identify and repair leaks is available to customers in print and on the City’s website.
- The annual Water Quality Report frequently includes irrigation tips because the report is distributed near the beginning of the irrigation season.

The City provides interested customers with leak gauges to identify leaks and to increase customer awareness about water losses. The City provides shower timers upon customer request to inform customers of shower lengths and encourage conservation.

Financial assistance comes in the form of adjustments to water bills for repaired leaks. A City ordinance (General Ordinance No 91-1133, Section 9 (j)) allows a rate adjustment for customers who repair leaks promptly. Under the ordinance, customers that have cause to believe a leak may exist between the meter and the customers’ premises, these customers may notify the Public Works Department. Customers that repair these leaks within ten days after notification to the Public Works Department, or within a time schedule approved by the Public Works Department, can have their customer bill adjusted by up to one-half of the total estimated excess consumption over the previous thirty days.

Five-Year Benchmarks

- Continue to use print materials and online digital content on the City’s web site to provide technical assistance to customers.
- Continue to offer invoice adjustments for timely leak repair.

3.4.2 Supplier Financed Retrofit or Replacement of Inefficient Fixtures

The City offers its customers items that promote efficient water use indoors and outdoors. These items include 1.5 gpm faucet aerators, toilet flappers, and outdoor hose nozzles (that come with a brochure about efficient watering). These items are available at the Public Works Department and the Finance Department and are also distributed at community events.

Five-Year Benchmark

- Continue to offer fixture replacements to customers free of charge and make these readily available.

3.4.3 Rate Structure and Billing Practices that Encourage Conservation

Since 1996, City water rates have included both a base charge and a volumetric charge. The volumetric charges encourage efficient use of water.

The City bills customers monthly to provide relatively quick feedback on water usage to customers. Customers’ bills include usage for the month billed and for the same month in the

previous year, allowing customers to detect changes in use over time. The City also has printed conservation messages on bills on the topics of frozen pipe prevention and meter access related to emergency water shut off.

Five-Year Benchmarks

- Continue to bill customers based, in part, on the quantity of water metered at the service connection and maintain monthly billing schedule.
- Continue to periodically add water conservation messages onto its bills.

3.4.4 Water Reuse, Recycling, and Non-potable Opportunities

The City re-uses treated effluent at its wastewater treatment plant (WWTP) for clarifier sprayers, gravity belt wash down, and digester gas defoaming. The City also seeks opportunities for reuse or recycling of wastewater at some industrial customers' sites. During the City's reviews of wastewater discharge permit applications, the City has worked with at least one applicant to determine if reuse or recycling of wastewater or pre-treated wastewater is feasible. Common opportunities include the use of wastewater for cooling purposes or non-potable irrigation applications. The City will continue to explore these opportunities with permittees.

Five-Year Benchmarks

- Continue to re-use treated effluent during wastewater treatment plant operations.
- Continue to explore additional opportunities for wastewater reuse and recycling as part of the wastewater discharge permitting process.

3.4.5 Other Conservation Measures

In addition to the conservation measures previously discussed, The Dalles also promotes other means of conservation, including the following.

- City ordinance (General Ordinance No. 91-1133, Section 6) allows the City to terminate water service when a customer has been convicted for a violation of water restrictions. This helps maintain the integrity of The Dalles annual water audit.
- City staff participates actively in the American Water Works Association (AWWA), including the Pacific NW Section of AWWA. City staff participate in the Water Conservation Committee of the local section of AWWA and served recently as chair of the committee. Membership and participation in the association allow City staff to stay abreast of the latest conservation topics.

Five-Year Benchmarks

- Retain the ability to remove customers from the water system when customers violate water restrictions.
- Continue membership and participation in water industry organizations with a focus on water conservation.

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4. Municipal Water Curtailment Element

This section satisfies OWRD's requirements to describe past supply deficiencies and current capacity limitations, include stages of alert and associated triggers, and provides curtailment actions for each stage.

4.1 Introduction

This water curtailment plan describes proactive measures that The Dalles can take to reduce demand and describes potential alternative supplies during short-term water supply shortages. The goal of this water curtailment plan is to minimize the impacts of these shortages and to ensure that the City can maintain at a minimum an adequate water supply for public health and safety during a shortage.

4.2 History of Supply Deficiencies

From the 1980s through 1996, the City regularly implemented its water curtailment plan several times each year during high water use periods (typically May - September). Prior to 1996, the City charged residential customers a flat rate for water and did not meter customers' water use. Since achieving a fully metered residential customer base and implementing a rate structure based, in part, on the amount of water used for residential customers in late 1996, the City has not needed to curtail water use except on two occasions. Flooding in 1996 resulted in the temporary loss of the City's WTP. The flood occurred in February, a low water use time of year. The WTP was off-line for three days due to flood debris that buried the intake, and it continued to remain off-line for a total of about one month due to damage that occurred to numerous sections of the water transmission lines from the WTP to the City. The City was able to provide sufficient supply from its groundwater sources, but customers outside the City that were served from the surface water supply transmission lines were without water service for the month. In 2002, a threat from wildfire necessitated that the City's WTP be taken off-line for four days. These two events caused the City to request voluntary water curtailment by its customers. The City has not experienced another shortage since 2002.

4.3 Capabilities to Address Shortages

The Dog River and South Fork Mill Creek watersheds have the potential to be impacted by fire and volcanic activity. In the summer of 2013, a fire in the municipal watershed threatened the City's WTP and denuded some areas of vegetation around the streams that contribute to the City's supply. This increased the threat of the WTP becoming overwhelmed by water clogged with ash and sediments during heavy rain events. Though such an event did not occur, a fire in 1967 that burned in the municipal watershed was followed by heavy rains, resulting in enough ash and sediment that the City had to shut the WTP down for an extended period of time. The effects of the 1967 fire on water quality were still evident 20 years later. In addition, the City's watersheds are immediately adjacent to and downwind from Mt. Hood and may potentially be impacted by volcanic activity.

In the event that the City's surface water sources are unavailable, the City could rely on groundwater. Groundwater can provide up to 11.9 cfs (7.7 mgd) which exceeds the City's 2022 ADD of 3.55 mgd, however this is less than the City's 2022 MDD of 13.0 cfs (8.39 mgd). If the City's groundwater system was unavailable from contamination in the aquifer for example, the City would rely on surface water to meet system demands, as available. The City's WTP capacity is limited to a maximum of 8.2 cfs (5.3 mgd), which is greater than the City's 2022 ADD, but lower than the 2022 MDD. In sum, events that would eliminate the use of either surface or groundwater systems or both would likely require the City to initiate curtailment during peak season.

If the City's surface or groundwater sources are limited or unavailable, the City could rely temporarily on storage from the City's distribution system reservoirs. These reservoirs could meet ADD for more than four days and MDD for less than two days, assuming these reservoirs are full at the onset of use. The City may also rely on water supply trucks to bring in water, provide bottled water to customers during severe shortage situations, or open the interconnection with Chenoweth PUD to access this source of emergency supply.

4.4 Evaluation of Capacity Limitations

Under normal conditions, the combination of the City's surface and groundwater systems can meet system demands any time of the year. Thus, the City does not have any current capacity limitations that impinge on its ability to meet demand.

4.5 Curtailment Event Triggers and Stages

The City has adopted a four-stage curtailment plan that will be implemented during certain water supply shortages. These shortages could result from several feasible scenarios identified by the City, including flooding (from the Columbia River or Mill Creek), mechanical or electrical equipment failure in the system, fires in the watershed that directly or indirectly affect surface water quality, landslides or earthquakes that affect diversion or transmission infrastructure, and source water contamination. These stages may be implemented successively (from Stage 1 to Stage 2), or the City may bypass stages (from Stage 1 to Stage 3).

Each stage is initiated or triggered when defined conditions are met. These "initiating conditions" serve as guidelines and may be changed to reflect the water shortage event at hand. In addition to these initiating conditions, The Dalles will also consider the knowledge and judgment of staff members familiar with the water system as criteria to determine when the curtailment plan should be implemented, and which stage of curtailment should be implemented. Staff members may consider the extent of system damage or contamination, duration of repair, costs, fire hazards, and weather forecasts, among other factors to determine The Dalles' response to a water supply shortage.

Exhibit 4-1 presents the four curtailment stages and initiating conditions. The City's initiating conditions are defined by the relationship between system demand and water system capacity. Generally, when system demand approaches, is equivalent to, or exceeds the capacity of the City's water system, one of the stages of this curtailment plan may be implemented. Water

system capacity is defined as the combination of supply available from the City’s surface and groundwater systems and the operational capacities of the distribution and transmission systems and the WTP.

Exhibit 4-1. Curtailment Stages 1 through 4

Curtailment Stages	Initiating Conditions
Stage 1: Water Shortage Advisory	System demand anticipated to approach or approaches capacity of water system for 3 days or more.
Stage 2: Moderate Water Shortage Alert	System demand anticipated to reach or has reached capacity of water system for 3 days or more.
Stage 3: Severe Water Shortage Alert	System demand anticipated to exceed or exceeds capacity of water system for 2 days or more and distribution system reservoir volumes anticipated to decline or are declining but are anticipated to meet volumes reserved for fire flow and basic health and safety needs. ¹
Stage 4: Water Shortage Emergency	System demand anticipated to exceed or exceeds capacity of water system and distribution system reservoir volumes anticipated to decline or have declined below volumes reserved for fire flow and basic health and safety needs. ¹

¹The City’s 2024 Water System Master Plan identified minimum recommended volumes to maintain in each of the City’s distribution system reservoirs to meet emergency (standby) and fire suppression needs. This combined volume for these is currently 8.5 MG. See WSMP for more information.

4.6 Authority and Enforcement

The Dalles municipal code Title 3 Chapter 3.04 states that the City Manager has the authority to declare a water emergency. Upon that declaration, the City Manager has authority to impose water use restrictions deemed necessary to protect the health, safety, and welfare of citizens and will notify the public of the water use restrictions. The City Council has the authority to confirm, change, or terminate the restrictions imposed by the City Manager.

4.7 Communication

The City will notify customers of the activation of each stage through local newspapers or print media, local radio, television, its Web site, mailings, or other means. The City’s communications with customers will describe the activities that may be curtailed (under Stage 1) or are required to be curtailed (all other stages) and will provide water conservation measures that will help its customers reduce use.

4.8 Curtailment Plan Implementation

Each of the four stages of alert includes specific curtailment measures applicable to the City and the City’s customers that are designed to offset demand. These measures are described below for each stage of alert. These measures may be modified or removed, and additional measures may be added by the City to address the specific supply shortage at hand.

Curtailment measures are not intended to negatively affect the health and safety of the City's customers. The City may modify or remove measures that unintentionally result in these types of impacts or may provide waivers to individual customers or groups of customers for specific uses.

4.8.1 Stage 1: Water Shortage Advisory

Under Stage 1, the City may take the following actions to curtail water use:

- Ask customers to voluntarily decrease water use (indoor and outdoor) using, for example, water conservation tips recommended by the City.
- Request that City staff and customers caring for large turf areas, such as schools, parks, and cemeteries, voluntarily reduce water use.
- Require that customers using City water for irrigation purposes use a water delivery attachment on the end of the hose, such as a sprinkler, soaker, or other sprinkling device. Open hose irrigation is not allowed.
- Limit City water use for street sweeping and for hydrant and water line flushing.

4.8.2 Stage 2: Moderate Water Shortage Alert

In Stage 2, the curtailment actions under Stage 1 become mandatory and the following additional measures will be implemented:

- Irrigation of landscapes and gardens will be restricted from 8 pm to 8 am.
- City to encourage vehicle washing during regulated irrigation hours only. All vehicle washing not performed at a washing station where wash water is recirculated, such as a commercial car wash, must be done using a hand-operated spray nozzle device equipped with a spring-loaded trigger assembly or other mechanism in working order, which can be used to stop the flow of water.
- Restrict sprinkler irrigation of parking strips to the above established irrigation hours; water runoff into the streets should be kept to a practical minimum.
- Prohibit the use of water for cleaning or washing down sidewalks, driveways, parking lot areas, or other similar exterior cleaning uses at all times.
- Limit hydrant and water main flushing to emergencies only.
- Cease washing City vehicles except at facilities equipped with water re-circulation equipment or if necessary for public health or safety (e.g., garbage trucks or food transport) or as required by law.
- Ask commercial and industrial customers to voluntarily reduce non-essential water use.
- City to cease recharging the aquifer under the City's ASR program.

4.8.3 Stage 3: Severe Water Shortage Alert

In addition to curtailment actions under Stage 2, the City may take the following actions to curtail water use under Stage 3:

- Prohibit use of City water to clean, fill, or maintain levels in decorative streams, ponds, or fountains unless they have recirculating water systems.
- Prohibit use of City water to fill or top off swimming pools and hot tubs.
- Prohibit the installation of new turf and landscape.
- Impose a temporary moratorium on new water delivery connections and temporary water delivery (i.e., construction operations).
- Ask large water volume commercial and industrial customers to ~~implement curtailment plans developed by these customers to~~ eliminate non-business-essential use.
- Prohibit the use of City water to wash vehicles.

4.8.4 Stage 4: Water Shortage Emergency

In addition to curtailment actions under Stage 3, the City may take the following actions to curtail water use under Stage 4:

- Prohibit outdoor water use.
- Request that residential customers limit water use to those uses necessary for basic sanitation, drinking, and eating.
- In a Stage 4 emergency water shortage, the City may implement a water allocation regimen based on customer type, for example:
 - Single-family-- Hybrid of Per-capita and Percentage Reduction
 - Multi-family-- Hybrid of Per-capita and Percentage Reduction
 - Commercial-- Percentage Reduction
 - Industrial-- Percentage Reduction
 - Govt/Institutional-- Percentage Reduction
 - New Customers-- Per-capita (no allocation for new landscaping during Stage 4).

The percentage reductions for each customer class will be based on the customers' previous year's water bills as available or based on historical consumption of groups of customers.

4.9 Water Allocations

The City has prioritized the use of available potable water during shortages. Water allocations are established for all customers according to the following ranking system. Ranking of 1 is most critical and ranking of 5 least critical:

1. Minimum health and safety allocations for indoor residential needs (includes single-family, multi-family, hospital and convalescent facilities, retirement and mobile home communities, student housing, firefighting, and public safety).
2. Institutional/government operations (where water is used for manufacturing and for minimum health and safety allocations for employees and visitors), commercial, industrial to maintain jobs and economic base of the community (not including landscape uses).
3. Newly installed landscaping or shrubbery.
4. Existing landscaping.
5. New customers, i.e., proposed projects without building permits when the shortage is declared.

4.10 Drought Declaration

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

5. Water Supply Element

This Water Supply Element satisfies the requirement to describe 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. This section also presents the City's projected water needs and the available sources of supply, provides an analysis of alternative sources of water, and describes required mitigation actions.

5.1 Delineation of Service Areas

The City's Urban Growth Boundary (UGB), as shown in Exhibit 2-1, describes the boundary of the City's future water service area during the 20-year planning period of this WMCP. Within the planning period, the City anticipates growth will occur within the service area as infill and development of underdeveloped properties. The service area also may expand by 2044 to the areas identified in Exhibit 2-1 as outside the service area, but within the City's Urban Growth Boundary, generally to the south of the existing city limits.

5.2 Population Projections

As part of the WSMP update, the City conducted a population projection in 2023 that was based on the latest population forecast conducted by PSU (2020) for the City's UGB, less the estimated population residing in the Chenoweth PUD service area. The Chenoweth PUD service area population was assumed to remain constant over the 20-year planning period while the population within the City's service area was increased using an average annual growth rate (AAGR) of 0.6 percent per PSU's forecast. Future populations of the City's service area are presented in Exhibit 5-1.

Exhibit 5-1. Projected Water Service Area Population

Year	Population
2024	13,516
2034	14,534
2044	15,615

The City's service area population is anticipated to increase by 2,099 persons from 2024 to 2044.

5.3 Demand Forecast

The City conducted a demand forecast as part of the update to the WSMP and the results are presented in Exhibit 5-2. Future water demand was estimated for residential and non-residential consumption, then aggregated with an estimate of water loss of 10 percent to obtain the results shown in Exhibit 5-2. The City used a per capita consumption approach to estimate future residential consumption by multiplying the maximum annual per capita consumption of the residential class observed from 2019 to 2022 of 107 gallons per capita per day (gpcd) by the estimated service area populations in 2034 and 2044. (The maximum annual per capita consumption was selected as a conservative approach to forecasting demand.) Generally, non-residential demand was forecasted by increasing existing demand proportional to population growth and in cases of the current and future largest users, demand was held flat or increased based on the future estimates provided by the users. The projected ADDs for residential and most non-residential demands were multiplied by a peaking factor of 2.4, the maximum observed since 2017 (2020 and 2022). Peaking factors for the largest users were lower than 2.4 and based on the historical data or future estimates as provided by the users.

Exhibit 5-2. Projected Demands by Annual Rate, 2024, 2034, 2044

Year	ADD (mgd) ¹			MDD ¹ (mgd)	MDD ¹ (cfs)
	Residential	Non-Residential	Total		
2024	1.6	2.6	4.2	9.3	14.4
2034	1.7	4.2	5.9	14.9	23.1
2044	1.7	5.7	7.4	15.6	24.1

¹ Demand includes a water loss factor of 10 percent.

In addition to the City's annual and maximum day demands, the WSMP also projected monthly demands for 2034 and 2044. These projected demands are shown in Exhibit 5-3. Because the City's sources of supply are subject to seasonal and annual limitations on water availability, it is important to consider not only the City's annual and maximum instantaneous demands (i.e. use measured in cfs), but also the timing of those demands in relation to water availability requires consideration of monthly volumes. For example, peak season demands are greatest when the City's surface water sources of supply have the lowest flows. This is discussed in greater detail in Section 5.4.

Exhibit 5-3. Projected ADD by Month and Rate, 2034 and 2044

	2034 (mgd)	2044 (mgd)
January	4.08	4.24
February	4.41	4.59
March	4.71	4.90
April	6.83	7.11
May	9.01	9.38
June	11.74	12.22
July	12.90	13.43
August	11.18	11.64
September	9.19	9.57
October	6.39	6.65
November	4.36	4.54
December	4.18	4.35

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

Future demands are anticipated to increase within the 20-year planning period of this WMCP, with projected maximum day demand reaching 24.1 cfs (15.6 mgd) by 2044 (see Section 5.3). As discussed in Section 2, the City’s estimate of the total rate of reliable water supply (surface and groundwater) during the peak season is currently 13.4 cfs (8.7 mgd) in consideration of operational constraints and assuming the City’s WTP is operating at its typical summer low flow capacity (5.4 cfs). In 2025, the Riverside Well 1 will become operational and Riverside Well 2 will be operational within the 20-year planning horizon. These wells are anticipated to provide up to 6.01 cfs for an anticipated 2044 peak season system capacity of 19.41 cfs. Exhibit 5-4 describes the City’s groundwater and surface water systems’ future capacities.

Exhibit 5-4. Anticipated 2044 Peak Season System Capacity

System Capacity	Maximum Capacities (cfs)
Groundwater Capacity	
Firm Capacity (Marks and Lone Pine Wells only)	8.0
<i>Add Riverside Wells 1 & 2 (future)</i>	6.01
<i>Groundwater Capacity Subtotal</i>	<i>14.01</i>
Surface Water Capacity (reliable summer supply)	
Wicks WTP	5.4
<i>Surface Water Capacity Subtotal</i>	<i>5.4</i>
Grand Total	19.41

The 2044 MDD of 24.1 cfs (15.6 mgd) exceeds the City’s reliable water supply of 19.41 cfs, resulting in a potential deficit in the City’s ability to meet the maximum day demand of 4.69 cfs by 2044.

As described in Chapter 2, as part of the City’s Water System Master Plan Development, Jacobs modeled natural flows in the City’s municipal watershed and considered potential impacts of climate change on the timing and amount of flow available under the City’s water rights. Water availability during a 10 percent exceedance flow scenario is shown in comparison to the City’s projected demands in Exhibit 5-5. For the purpose of comparing supply and demand to units specified in the City’s water rights, Exhibit 5-5 shows total monthly supply and demand in terms of acre-feet.

Exhibit 5-5. Anticipated 2044 Peak Season System Capacity

Month	Total Demand (AF)		Water Supply Available (AF)			Additional Water Supply Needed (AF)	
	2034	2044	Dog River ¹	South Fork Mill Creek	Total	2034	2044
						2034	2044
January	388	404	871	123	994	0	0
February	379	394	828	111	939	0	0
March	448	466	958	123	1,081	0	0
April	628	654	767	119	886	0	0
May	857	893	826	123	949	0	0
June	1,081	1,125	205	119	324	757	801
July	1,227	1,278	16	38	54	1,173	1,224
August	1,063	1,107	30	123	183	911	954
September	846	881	120	119	209	607	642
October	608	633	205	123	328	280	305
November	401	418	299	119	418	0	0
December	398	414	871	123	813	0	0
Total Supply Deficit without Crow Creek Storage (AF)						3,728	3,926
Crow Creek Certificated Storage (AF) ⁴						800	800
Total Supply Deficit Less Crow Creek Certificated Storage (AF)						2,928	3,126

¹ As part of a recent expansion of the Dog River Pipeline, the City agreed to provide a bypass flow of 0.5 cfs during August through October. This bypass flow is reflected in the Dog River Supply.

² Calculated as follows: total demand minus total natural flow supply available.

³ Additional water supply needed includes the total volume of water that must be supplied from sources other than natural flow, including the City’s existing wells. Because 800 AF of existing Crow Creek storage is considered reliable, this is shown in the figure.

⁴ The City’s certificated storage right, (Certificate 44917) authorizes storage of up to 955 acre-feet, and the current maximum active storage is 800 acre-feet.

To meet this deficit, the City developed a multi-pronged approach. Over the short-term, the City plans to commence testing under its ASR limited license and obtain limited licenses for artificial groundwater recharge (AR) testing and recovery to supplement the sources of supply for the City’s ASR limited license. (See Section 5.8 for more information about the City’s plans for AR.) Over the long-term, the City will evaluate development of additional Crow Creek Reservoir storage or use of water from the Columbia River.

The City holds surface water Permit S-49653 for use of up to 40 cfs from the Columbia River and Permit S-53930 for use of up to 2,100 AF of stored water in an expanded Crow Creek Reservoir (stored under

Permit R-13105). Since both permits individually authorize water in quantities that exceed the projected 20-year deficit in supply, the City will seek to develop one of these rights within the planning period of this WMCP. The City has not begun to develop either source of supply and the City recognizes that development of either source will require significant investment in planning, permitting, and construction of the works necessary to access these sources. To develop Permit S-49653, the City must construct an intake, transmission lines, and a water treatment plant, among other water system improvements. To develop Permit S-53930, the City would need to raise the height of the Crow Creek Reservoir dam to impound a sufficient volume of water to meet the City's future needs.

The City will perform a comprehensive study to evaluate both options prior to selecting the option that will best meet the City's long-term needs; however this study has not been conducted, and the City is not prepared to select one of these supply options at this time. The City anticipates selecting and beginning to develop one of these sources within the next ten years. Prior to expending the resources necessary to evaluate and then develop either permit, the City seeks certainty from OWRD that the agency would favorably consider authorizing access to either of these sources of supply.

Based on the analysis of future demand described in the previous section, the City has identified the future quantity of water needed from *extended* Permits S-49653 and S-53930. The City seeks access to Permit S-49653 at a rate equivalent to the projected MDD in 2044 of 24.1 cfs of the 40 cfs authorized under the permit. Use of 24.1 cfs will allow the City to meet the 2044 projected MDD. Even if some of the City's operational constraints were alleviated through modification to existing infrastructure or construction of new infrastructure, these system changes would not alleviate the need to rely on the Columbia River as a redundant source of supply in the event that the City's current surface and groundwater sources of supplies are unavailable. Providing system redundancy for the City's groundwater system is important due to the location of the City's primary wells in a Critical Groundwater Area. Redundancy of the City's active surface water supplies is necessary due to the potential for drought, fires, or volcanic activity to take the City's surface water supplies offline.

As shown in Exhibit 5-5, if the City were to meet its future water needs through expansion of Crow Creek Reservoir, access to the full volume of water (2,100 AF) under Extended permit S-53930 (use of stored water from expanded Crow Creek Reservoir) would be needed to meet demands without further increases in groundwater pumping beyond the typical volume of the City's water use over the past five years.

In the short-term, the City plans to use its ASR system under LL-025 to help meet demand while the City pursues its long-term plan to develop either Permit S-49653 or Permit S-53930. LL-025 allows diversions of up to 5.57 cfs (2,500 gpm) per well. ASR Riverside Well 1 is expected to be operational with storage and recovery of water under LL-025 beginning in 2025. The rate of recovery from this well is expected to be 4 cfs (1,800 gpm), a rate that exceeds the rate necessary to meet MDD for the next several years, in combination with the City's current reliable sources of supply. While use of ASR will increase the rate available to the City to help meet peak season demand, the City may reach a point when water diverted for aquifer recharge limits the rate of water available for non-peak season use. Moreover, LL-025 is not a secure source of supply as compared to the security of a water right. Thus, the City considers its ASR program a short-term solution to meet demand.

In summary, the City anticipates meeting a portion of its projected demand over the next 20 years using its existing certificated surface water rights and storage to the fullest extent possible, while continuing to use groundwater to supplement surface water supplies during the summer months. The remainder of demand and redundancy needs will be met by gaining access to 24.1 cfs of water using Permit S-49653. Alternatively, the City could meet future demand by gaining access to 2,100 AF using Permit S-53930, which will also provide for system redundancy for the City's groundwater supplies. The City will select one of these sources of supply after further analysis of both options. Thus, the City requests access to 24.1 cfs by extended Permit S-49653 and the 2,100 AF authorized volume by extended Permit S-53930, however intends only to use either Permit S-49653 or Permit S-53930.

As described in the City's approved permit extensions, the City currently projects completing development of Permit S49653 by 2073 and S-53930 by 2041.

5.5 Alternative Sources

OWRD requires an analysis of alternative sources of water to see if any initial diversion of water allocated under existing permits is necessary to meet future water demand. The City intends initial diversion of water allocated under one of its existing Permits S-49653 or S-53930 during the planning period of this WMCP; therefore, this rule applies. Additionally, OWRD requires that if acquisition of new water rights will be necessary within the next 20 years to meet future needs, the City must also perform a similar analysis of alternative sources. Since the City intends to seek authorization for an artificial groundwater recharge (AR) limited license and permit, this section of the rule may also apply.

5.5.1 Conservation Measures

The City intends to continue implementing its water management and conservation program and to add additional water conservation measures as appropriate over the 20-year planning horizon of this WMCP. This could delay the need for additional supply. However, even with an assumed conservation savings of 5 percent (equivalent to 1.2 cfs in 2044) in addition to the savings the City likely realized as a result of implementation of its existing conservation program, the City will still need to pursue initial diversion of water under one of its existing permits to meet projected demands.

The primary goal of the City's ASR and AR systems is to increase the resiliency of the City's supply. While water conservation measures can help to reduce demand, water conservation would not provide the City with the same operational benefits of maintaining static water levels in the Dalles Pool aquifer.

5.5.2 Interconnections

The City has an interconnection with Chenoweth PUD that serves as an important source of emergency water supply for the City. However, Chenoweth PUD is unlikely to be able to provide supplemental supplies to The Dalles beyond those necessary for emergencies. Chenoweth PUD relies entirely on groundwater to meet its system demands from aquifer(s) within The Dalles Critical Groundwater Area. Given the large quantity of water needed by the City to meet future demand and the susceptibility of the aquifer(s) to drawdown, the City's use of these rights may exceed the sustainable annual yield of the aquifer(s). The City has not explored opportunities to obtain water from providers other than Chenoweth PUD via interconnections because the distances between the City and other large municipal water providers would make the expense of constructing necessary infrastructure cost-prohibitive.

5.5.3 Cost Effectiveness

OWRD 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 to or less than the cost of other identified sources.

As stated above, the City is committed to continuing to implement water conservation measures. Additional measures may produce a more cost-effective source of supply than the proposed use of Permits S-49653 or S-53930, but water conservation alone cannot preclude the City's need to expand diversion of water under either of these permits in order to meet projected demands. Consequently, implementing other water conservation measures will not reduce demand enough to prevent use of Permits S-49653 or S-53930.

With respect to a new water right for aquifer recharge: as the City is already constructing all the necessary infrastructure to improve its water supply resiliency through ASR, the requested AR limited license and permit and associated compliance testing would add little additional cost to the project.

5.6 Quantification of Projected Maximum Rate and Monthly Volume

OWRD requires a quantification of the maximum rate of withdrawal and maximum monthly use if expansion or initial diversion of water allocated under an existing permit is necessary to meet demands during the planning period of this WMCP. The City intends to begin diverting water allocated under Permits S-49653 or S-53930 during this time frame, therefore, this rule applies.

Assuming Permit S-49653 is used at the maximum rate of appropriation of 24.1 cfs at 24 hours per day over a 30-day period, the monthly volume of water would equal approximately 467 MG.

Assuming Permit S-53930 is used at the maximum allowable volume of diversion of 2,100 AF over a 12-month period, the average use would equal approximately 175 AF during a one-month period.

5.7 Mitigation Actions under State and Federal Law

For expanded or initial diversion of water under an existing permit, OWRD requires that 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 taking mitigation actions in response to legal requirements associated with its permits. However, the City is aware that it is subject to conditions establishing flows in the Columbia River identified by the Oregon Department of Fish and Wildlife that are necessary to maintain the persistence of listed stream-flow dependent species per OWRD's final order extending the completion date of Permit S-49653 held by The Dalles. The Dalles is also aware of federal restrictions on new diversions on the Columbia River that require mitigation for additional withdrawals of water.

5.8 New Water Rights

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. As shown in the above analysis, the City's water rights are sufficient to meet projected demands during the next 20 years, however, the City intends to obtain an AR limited license for recharge to supplement the City's ASR system.

The purpose of obtaining a limited license (and subsequently a permit) for AR is to enable consistent operation of the City's ASR system during the winter months. The City's ASR limited license allows for injection of water diverted under existing natural flow surface water rights for the Dog River and South Fork Mill Creek. The City's Dog River diversion is located at an elevation of approximately 4,300 feet. When temperatures are below freezing, flow available at the City's diversion may be as low 1 to 2 cfs, as the watershed above this elevation remains under snowpack.

The City's diversion on South Fork Mill Creek is located at an elevation below 1,000 feet. At and above this elevation, freezing temperatures are less common. As a result, South Fork Mill Creek flow tends to remain higher throughout the winter. But the City's water right for South Fork Mill Creek is limited to 2 cfs. The combined supply from the Dog River and South Fork Mill Creek would therefore be insufficient to meet the authorized rates of injection for two ASR injection wells under the City's ASR LL.

In order to ensure that water is available at a consistent rate for storage in the aquifer during the winter months, the City would seek a new authorization for aquifer recharge. While aquifer recharge is typically associated with basin infiltration, the City already plans to meet the higher standards for injection under its AR limited license.

Aquifer Recharge projects are typically authorized initially under a limited license, with data collection during testing of aquifer recharge necessary for obtaining a permit for aquifer recharge. However, because the City has already completed an ASR feasibility study and will begin testing ASR in fall 2024, the City may have sufficient data to apply for an AR permit by 2025. The City will communicate with OWRD staff regarding the best application pathway.

Based on OWRD's water availability database, water available for diversion from South Fork Mill Creek at the 50 percent exceedance flow would at least double the rate available under the City's existing natural flow surface water rights during winter.

Thus, the City intends to pursue an AR project as early as 2025 by obtaining an AR limited license for the storage of water sourced from the South Fork Mill Creek. Successful implementation of this project under this limited license may result in the City acquiring an AR permit for permanent authorization for the project starting in 2025.

Appendix A

Letters to Affected Governments



December 12, 2024

Daniel Dougherty
Planning Director
Wasco County, Planning Division
2705 East Second Street
The Dalles, OR 97085
danield@co.wasco.or.us

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

Dear Mr. Dougherty,

The City of the Dalles (City) has developed a Water Management and Conservation Plan (WMCP) to fulfill the requirements of the Oregon Water Resources Department.

Under these rules, a water supplier must make its draft WMCP available for review by affected local governments, seeking comments related to consistency with the local governments' comprehensive land use plans. We are providing you an electronic version of the City's draft WMCP for your review.

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

If you have any comments or questions, please feel free to contact me at 971-236-2550 or thenkle@gsiws.com.

Sincerely,
GSI Water Solutions Inc.

A handwritten signature in black ink that reads "Tim Henkle". The signature is written in a cursive, flowing style.

Tim Henkle
Water Resources Consultant

Enclosure



December 12, 2024

Jeb Miller
District Manager
Chenoweth Water People's Utility District
P.O. Box 870
The Dalles, OR 97058
jebm@chenowithwaterpud.com

Subject: Water Management and Conservation Plan for the City of The Dalles

Dear Mr. Miller,

The City of the Dalles (City) has developed a draft Water Management and Conservation Plan (WMCP) to fulfill the requirements of the Oregon Water Resources Department.

Given the relationship between the City and your agency, we are providing you with an electronic copy of the draft WMCP as a courtesy. If you have any comments or questions, please feel free to contact me at 971-236-2550 or thenkle@gsiws.com.

Sincerely,
GSI Water Solutions Inc.

A handwritten signature in black ink that reads "Tim Henkle". The signature is written in a cursive, flowing style.

Tim Henkle
Water Resources Consultant

Enclosure