Final

Water Management and Conservation Plan

Prepared for

City of Monroe, Oregon

April 2020

Prepared by

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1 Municipal Water Supplier Plan Elements

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

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

1.1 Introduction

The City of Monroe (City) is located in the southeast corner of Benton County. The City sits on the banks of the Long Tom River approximately at river mile (RM) 7.5. The City provides public utility services to city residents including the provision of drinking water. The City's Public Water System Identification number is 41-0540.

The purpose of this Water Management and Conservation Plan (WMCP or Plan) is to describe the development and implementation of water management and conservation measures that ensure sustainable water use. This Plan also discusses the City's future water needs.

1.2 Plan Requirement

The Oregon Water Resources Department (OWRD) issued Permit G-13575 to the City on January 29, 1999. Permit G-13575 authorizes appropriation of up to 0.18 cfs from a well within the Long Tom River basin (the City uses Well 2 for appropriation) and required that the City submit a WMCP within three years of permit issuance. The City submitted a draft WMCP to OWRD in April 2008 and OWRD reviewed the WMCP in November of 2013; no final action was taken on the plan. In addition, OWRD issued a final order on April 28, 2009, approving the City's request for an extension of time for Permit G-13575. The final order included a condition requiring the City to submit a WMCP within one year of final order issuance. Finally, on____2020, OWRD issued a final order approving an extension of time for the City's Permit G-10890 to October 1, 2034; the final order requires submittal of a WMCP within 3 years. (Permit G-10890 authorizes appropriation of up to 0.45 cfs from a well within the Long Tom River basin and the City uses Well 1 for appropriation).

This WMCP was developed in tandem with the City's Water Master Plan (WMP). Data and other information applicable both to the WMP and this WMCP were shared to ensure consistency among these documents.

1.3 Plan Organization

This WMCP fulfills the requirements of the Oregon Administrative Rules (OAR) adopted by the Water Resources Commission in December 2018 (OAR Chapter 690, Division 86). It describes water management, water conservation, and curtailment measures to guide the wise use and stewardship of the City's water supply.

The WMCP is organized into the following sections, each addressing specific sections of OAR Chapter 690, Division 86. Section 2 is a self-evaluation of the City's water supply, water use, water rights and water systems. The information developed for Section 2 is the foundation for the sections that follow. Section 3 discusses the City's current conservation measures and

presents the City's benchmarks for future efforts. Section 4 describes the City's water curtailment history, assesses the City's abilities to address water shortages, and describes actions when curtailment of supply is necessary. Section 5 draws on information from Sections 2 and 3 primarily to present the City's future water needs and how the City intends to meet future demand.

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

1.4 Affected Local Governments

OAR 690-086-0125(5)

The following governmental agencies may be affected by this WMCP:

- Benton County
- City of Monroe

Thirty days before submitting this WMCP to OWRD, the City made the draft WMCP available for review by the affected local government listed above along with a request for comments relating to consistency with the local government's comprehensive land use plan. The letter requesting comment and any comments received are in Appendix A.

1.5 Plan Update Schedule

OAR 690-086-1025(6)

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

1.6 Time Extension

OAR 690-086-0125(7)

The City is not requesting an extension of time to implement metering or a benchmark established in a previously approved plan.

2 Municipal Water Supplier Description

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

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

2.1 Terminology

The following terminology is used in this WMCP.

Production refers to the quantity of raw water delivered to the distribution system. The terms *production* and *demand* are used interchangeably in this WMCP. Production includes metered consumption (for example, residential, commercial, industrial, public, and irrigation customers), unmetered uses (firefighting, hydrant flushing, other), and water lost to leakage, reservoir overflow, evaporation, and other factors.

Consumption is equal to authorized metered and unmetered water use. Production volume minus consumption equals water loss. Water loss is equal to the sum of apparent and real losses. Apparent losses include unauthorized consumption and meter inaccuracies, among other loss types, and real losses include leakage.

Generally, production and consumption in municipal systems are expressed in units of mgd, but also may be expressed in cubic feet per second (cfs) or gallons per minute (gpm). One mgd is equivalent to 1.55 cfs or 694 gpm. For annual or monthly values, a quantity of water typically is reported in million gallons (MG). Water use per person (per capita use) is expressed in gallons per capita per day (gpcd).

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

- *Average day demand* (ADD) equals the total annual production divided by 365 days.
- *Maximum day demand* (MDD) equals the highest system demand that occurs on any single day during a calendar year. It is also called the one-day MDD or peak day demand.
- *Monthly demand* equals the total volume of water produced in a month divided by the number of days in the month.
- *Peaking factors* are the ratios of one demand value to another. The most common and important peaking factors are the ratio of the MDD to the ADD and the ratio of peak hour demand to MDD.

2.2 Water Sources

OAR 690-086-0140(1)

The City relies on surface water from the Long Tom River as its primary source of supply. The City also has additional sources of supply which are currently not in use, but held in reserve.

1) Wells 1 – 3: These wells served as the City's historical source of water, but are now held as back-up supply due to well water quality concerns.
2) A well: This unnamed well is an infiltration gallery located near the Long Tom River. It served as the City's original source of water, but is not in use due to water quality concerns. The City holds this source in reserve for future use.
3) Kyle Springs and Belknap Creek: These two sources are not currently in use due to concerns about water quality and source water protection. These sources are held in reserve by the City for future use.

2.3 Interconnections with Other Systems

OAR 690-086-0140(7)

The City does not have any interconnections with other systems.

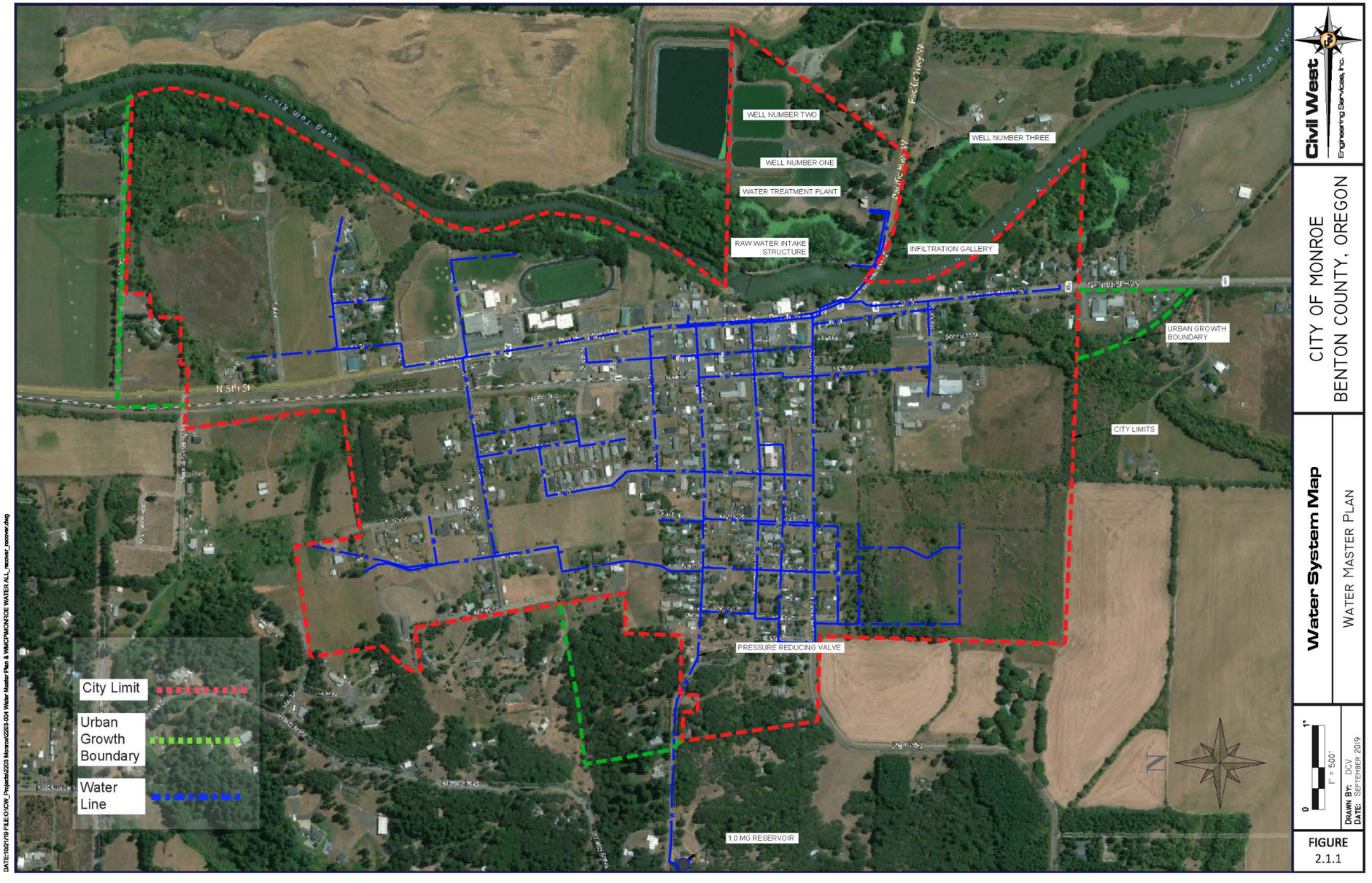
2.4 Intergovernmental Agreements

The City does not have any exchange agreements, intergovernmental cooperation agreements, or water supply or delivery contracts.

2.5 Current Service Area Description and Population

The City's current service area includes the entire area within the City's municipal boundary, or city limits, which measures approximately ½ square mile. Within the 20-year planning period of this WMCP, the City does not anticipate that its service area will expand beyond its current service area boundary, such that the current service area and future service area are the same. The current and future service area is identified as a red dashed line labeled as "City Limit" in the system schematic in **Exhibit 2-1**. The City population was 625 in 2018 according to population estimates published by the Portland State University (PSU) Population Research Center.

Exhibit 2-1. City of Monroe Current and Future Service Area and System Schematic from Water System Master Plan (2019)



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2.6 Demand

OAR 690-086-0140(4)

2.6.1 Annual and Per Capita Demand

Exhibit 2-2 and **Exhibit 2-3** presents the volumes of water appropriated annually from 2014 through 2018. Exhibit 2-2 shows historic population, annual and average daily use, and maximum day and maximum use. Annual water demand volumes were obtained from the City's water use reports annually submitted to OWRD and supplemented with City-recorded demand volumes for October through December in 2018. The volumes presented in Exhibit 2-2 are raw water volumes. The difference between the volumes of finished water and raw water demand is the volume of water used to flush the City's filters at the WTP, estimated at 4.2 MG per year. The peak season of use is the summer, as shown by the months in which demand was greatest during the year. July or August showed the greatest demands for each of the five years.

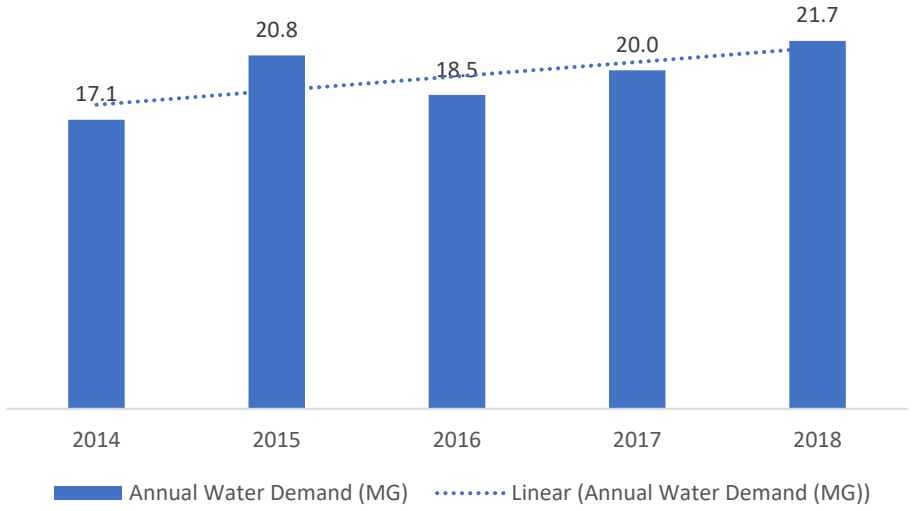
Exhibit 2-2. Historical Water Demand, 2014-2018

Year	PSU Population Estimate	Annual Water Demand		Average Daily Demand (gal)	Max Day Demand Estimate* (gal)	Max Month Demand	
		MG	gpcd			MG	Month
2014	620	17.1	75.4	46,719	93,439	1.7	August
2015	620	20.8	92.1	57,098	114,196	1.8	August
2016	620	18.5	81.8	50,720	101,441	2.2	August
2017	620	20.0	88.2	54,690	109,381	2.1	July
2018	625	21.7	95.1	59,452	118,904	3.0	August
Average	**621**	**19.6**	**86.5**	**53,736**	**107,472**	**2.2**	-
Max	**625**	**21.7**	**95.1**	**59,452**	**118,904**	**3.0**	-

*MDD is an estimate and calculated by multiplying the ADD by the estimated peaking factor of 2.

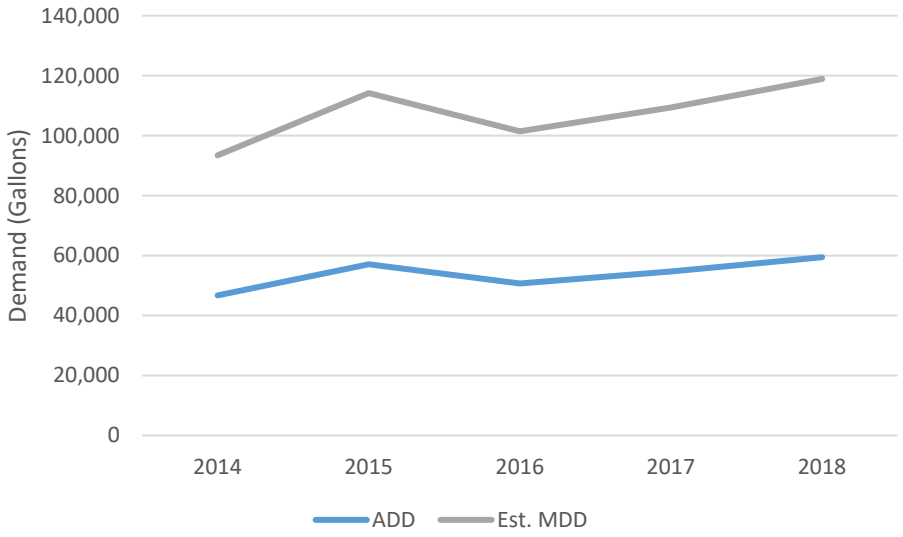
Over this five year period, annual demand averaged 19.6 MG and ranged from 17.1 MG in 2014 to 21.7 MG in 2018. Exhibit 2-3 presents annual demand graphically. An overall increasing trend in demand over these five years is shown by the trend line.

Exhibit 2-3. Annual Demand (MG), 2014-2018



Average Day Demand (ADD) averaged nearly 54,000 gallons and ranged from approximately 47,000 gallons to 59,000 gallons over the five year period. Since the City does not record daily demands, Maximum Day Demands (MDDs) were estimated by applying a peaking factor of two to annual ADDs, matching the methodology used in the City's WMP. The City selected a factor of two since a peaking factor of two is a typical industry standard value for the area. Historical volumes for ADD and MDD are presented in **Exhibit 2-4**.

Exhibit 2-4. ADD and MDD (Gallons), 2014-2018



The historical average per capita demand based was 86.5 gallons per capita per day (gpcd) with a high of 95.1 gpcd in 2018 and a low of 75.4 gpcd in 2014, as shown in Exhibit 2-2. These estimates were calculated by dividing annual demand by the population estimate for each year. Per capita demands for the City trend lower than the per capita demands of other water providers. For example, the City referenced the WMCPs of two smaller water utilities within a 20 mile radius from Monroe. The 2015 WMCP for the City of Harrisburg describes per capita

demands of 102 gpcd and the City of Veneta's 2012 WMCP notes a per capita demand of 110 gpcd.

2.7 Water Loss

OAR 690-086-0140(9)

The City calculated water loss by subtracting consumption volumes from demand volumes, less estimates of unmetered and authorized uses not otherwise captured in the consumption volumes. The City's calculation of water loss, obtained from the City's WSMP, is described below.

Demand volumes were taken from meter reads obtained from the City's finished water master meter during the period of July 2015 through September 2018. Finished water meter reads were available for 31 months during this period. An average monthly demand of 1,475,226 gallons was calculated using this available data.

Consumption volumes were based on billing data from the same months in which demand data was available. Average monthly consumption of 1,326,579 gallons during this same period was calculated from this data.

To estimate unmetered, authorized activities, the City identified the average monthly consumption attributable to uses by the fire department for training exercises and firefighting, hydrant flushing performed by the City, and use of reservoir water which served as feedwater for the WTP's chlorination/dechlorination system. These unmetered, authorized volumes were observed from October 2018 through August 2019. The average monthly value for these authorized, unmetered uses was 30,611 gallons, which was subtracted from the City's preliminary water loss estimate to obtain the City's final water loss volume of 118,036 gallons.[1] This monthly water loss volume was divided by the City's average monthly demand volume to obtain a water loss estimate of 8.0 percent (118,036 gal. ÷ 1,475,226 gal.). The full set of data used for this water loss calculation are found in Appendix B. This data set shows significant variations in water loss volumes from month to month. Because of these variations, the City's water loss estimate of 8 percent may not represent actual water losses during this period of time. Therefore, the City intends to pursue a remedy for these potential data inaccuracies as described in Section 3 in order to ensure the validity of future water loss estimates.

Since the data set for this water loss calculation is not comprehensive, the City intends to collect a complete demand data set annually in the future, as identified in a benchmark in Section 3.

[1] The City captured unmetered, authorized building contractor uses associated with development of the Red Hills subdivision for July through September of 2018 in its metered consumption volumes, labeling it as hydrant consumption.

2.8 Customer Characteristics and Use Patterns

OAR 690-086-0140(6)

Customer characteristics impact water usage. Understanding these characteristics is helpful when analyzing current customer consumption and forecasting future consumption patterns.

2.8.1 Customer Classes

For billing purposes, the City categorizes its customers into the three classes: Residential, Multifamily, and Commercial. At the end of 2018, the City had 225 Residential meter connections, 10 Multifamily meter connections, and 40 Commercial meter connections.

2.8.2 Annual Total Consumption

The following consumption information is based on the City's billing data from metered connections for the City's customers from 2015 through 2018. (The earliest consumption report which presented consumption by customer class generated for this WMCP captured consumption in the 2014/2015 fiscal year. Therefore, consumption for the 2014 calendar year is not presented.) Annual consumption by customer class is presented in **Exhibit 2-5** and further described in the following sections**.** Generally, from 2015 through 2018, overall consumption showed an increasing trend.

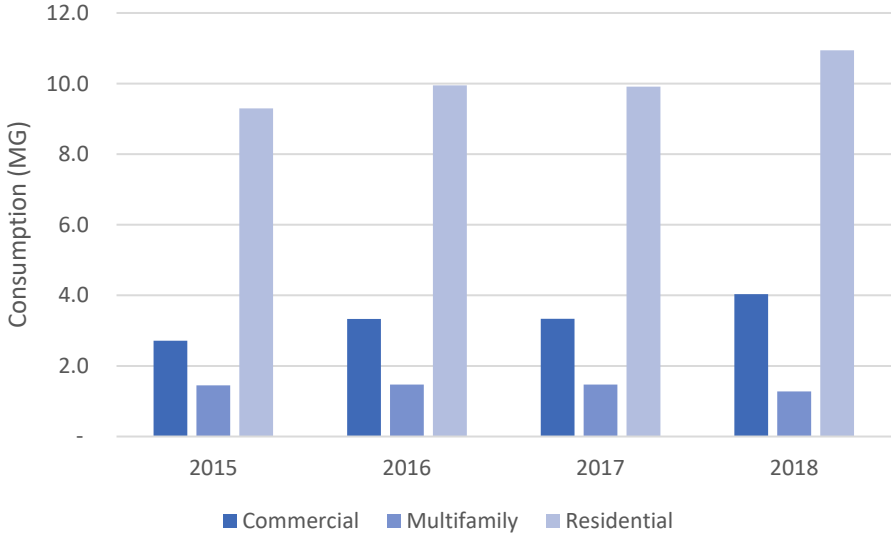
Exhibit 2-5. Annual Consumption by Customer Class (MG), 2015-2018

	2015	2016	2017	2018
Commercial	2.71	3.33	3.34	4.03
Multifamily	1.45	1.47	1.47	1.28
Residential	9.29	9.95	9.91	10.94
Total	**13.46**	**14.76**	**14.73**	**16.25**

2.8.3 Consumption by Class

Consumption data by class shown in Exhibit 2-6 is presented in **Exhibit 2-6** graphically.

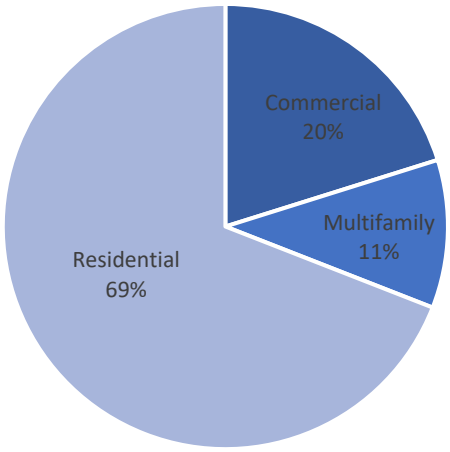
Exhibit 2-6. Consumption by Customer Class (MG), 2015-2018



The City's largest customer class by volume is the Residential class, followed by the Commercial class. Both customer classes displayed an increasing trend in consumption over this four year time period. Total annual consumption for the Multifamily class remained relatively stable over this time frame.

In 2018, the Residential class consumption represented 69 percent of total consumption, the Commercial class consumed 20 percent, and the Multifamily class consumed 11 percent. **Exhibit 2-7** presents this data graphically.

Exhibit 2-7. Consumption by Class as Percent of Total Consumption, 2018



2.8.4 Largest Customers

Exhibit 2-8 presents the monthly average consumption by the City's top 10 water users from May 2018 through April 2019. The list is comprised of six customers in the Commercial category, three in the Multifamily category, and one in the Residential category. Combined, these customers' average monthly consumption represented approximately 2.1 percent of the total average monthly consumption for all customer classes during this time period. The City's top 10 largest customers represent a relatively small percentage of overall consumption.

Exhibit 2-8. Largest Water Users, May 2018 – April 2019

Customer Category	Average Monthly Consumption (Gal)	Percent of Total Customer Consumption
Commercial	81,650	0.6%
Commercial	62,154	0.4%
Multifamily	27,268	0.2%
Multifamily	23,433	0.2%
Commercial	20,987	0.1%
Commercial	19,167	0.1%
Multifamily	18,114	0.1%
Commercial	17,019	0.1%
Commercial	15,100	0.1%
Residential	12,175	0.1%
Total	**297,067**	**2.1%**

2.9 Water Rights

OAR 690-086-0140(5)

The City holds three surface water certificates, three groundwater permits, and one groundwater certificate. **Exhibit 2-9** provides details about the City's surface and groundwater rights and these rights are also discussed below.

Surface water Certificate 91065 authorizes the use of 0.78 cubic feet per second (cfs) from the Long Tom River. This right is used as the primary source of water for the City. In addition to this surface right, the City holds surface water Certificate 5101 that authorizes diversion of up to 0.25 cfs from Kyle Springs and holds Certificate 23996 that authorizes diversion of up to 0.10 cfs from Belknap Creek. These latter two sources are not currently in use due to concerns about water quality and source water protection and are held in reserve by the City.

Groundwater Permit G-10890 authorizes appropriation from Well 1 for up to 0.45 cfs. The City submitted a claim of beneficial use (COBU) for partial perfection of Permit G-10890 for 0.154 cfs on April 13, 2009; this COBU is still pending review by OWRD. The remaining undeveloped portion of this right (0.296 cfs) is in permit status. In 2014, the City submitted an extension of time application for Permit G-10890 and on _____, 2020, OWRD issued a final order approving the extension application.

The City submitted a COBU for partial perfection of Permit G-13575 for 0.061 cfs on June 16, 2009, which is also still pending review by OWRD. The remaining undeveloped portion of Permit G-13575 of 0.119 cfs is in permit status.

Permit G-13575 has a development limitation of 0.09 cfs from a final order on extension dated April 28, 2009. The current completion date for Permit G-13575 is October 1, 2018; the City intends to submit an application for extension of time.

Permit G-17933 authorizes appropriation from Well 3 for up to 0.33 cfs; the completion date is January 4, 2038.

Groundwater Certificate 43629 authorizes appropriation from a well for up to 0.20 cfs. This water right is currently held in reserve due to water quality concerns.

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Exhibit 2-9. Water Rights

Application	Permit	Certificate	Priority Date	Completion Date	Type of Use	Source of Water	Authorized Rate	Max. Rate of Withdrawal to Date (cfs)	2018 Average Withdrawal (MG/mo.)	2018 Average Daily Diversions (mgd)	Five Year Average Monthly Diversion (MG/mo.)	Five Year Average Daily Diversion (mgd)
Ground Water Rights												
G-11769	G-10890	COBU for partial perfection pending at OWRD	12/2/1987	-	Municipal	Well No. 1	0.154	0.154	0	0	<0.01	<0.01
		-		10/1/2034*			0.296	0				
G-14759	G-13575	COBU for partial perfection pending at OWRD	5/26/1998	-	Municipal	Well No. 2	0.061	0.061	0	0	0	0
		-		10/1/2018			0.119**	0				
G-4392	G-4184	43629	9/27/1968	-	Municipal	Well	0.20	0.20	0	0	0	0
G-17268	G-17933	-	10/5/2009	1/4/2038	Municipal	Well No. 3	0.33	0	0	0	0	0
Surface Water Rights												
S-86270	S-54261	91065	4/21/2005	-	Municipal	Long Tom River	0.78	0.78	1.81	0.06	1.63	0.05
9202	6081	5101	11/7/1923	-	Municipal	Kyle Spring	0.25	0.25	0	0	0	0
24168	19008	23996	9/27/1949	-	Municipal	Belknap Creek	0.10	0.10	0	0	0	0

*As requested in the City's pending permit extension submitted in 2014. C-date on permit is October 1, 2008.
**Permit G-13575 has a development limitation of 0.09 cfs.

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2.10 Aquatic Resource Concerns

OAR 690-086-140(5) requires municipal water suppliers to identify the following for each of its water sources: 1) any listing of the source as water quality limited (and the water quality parameters for which the source was listed); 2) any streamflow-dependent species listed by a state or federal agency as sensitive threatened or endangered that are present in the source; and 3) any designation of the source as being in a critical groundwater area.

The City holds water rights for both ground and surface water. Therefore, this rule applies. The City's groundwater sources are not within an OWRD designated Critical Groundwater Area nor Groundwater Limited Area.

The Oregon Department of Environmental Quality's (DEQ) publishes the Integrated Report Assessment Database which identifies surface water bodies that are water quality limited and associated water quality limiting parameters. The information described below for the Long Tom River was drawn from DEQ's 2012 Integrated Report, otherwise known as DEQ's "303d list" which can be found on DEQ's web page at https://www.oregon.gov/deq/wq/Pages/WQ-Assessment.aspx.

The Long Tom River is on the DEQ's 303(d) list of water quality limited streams for multiple parameters at the City's authorized diversion point on the river, approximately RM 7.5. The Long Tom River at this point of diversion was listed for biological criteria (year round), dissolved oxygen (year round, non-spawning), E.coli (fall, winter, spring), iron (year round), lead (year round), and temperature (summer), based on a review of DEQ's 2012 Integrated Report. Neither Kyle Springs nor Belknap Creek are identified on DEQ's 303(d) list published by DEQ in the 2012 Integrated Report as water quality limited for any parameters.

The Long Tom River is within the Upper Willamette River Watershed Sub-Basin. This sub-basin and waters downstream of this sub-basin support several fish species that are listed as threatened, endangered, or sensitive under state and federal laws. The listed fish species that occur in these areas are summarized in **Exhibit 2-10.**

Exhibit 2-10. Federal and State-Listed Aquatic Species

Species	Evolutionarily Significant Unit (ESU)	Federal Listing	State Listing
Coho salmon (*Oncorhynchus kisutch*)	Lower Columbia River	Threatened	Endangered
Chinook salmon (*O. tshawytscha*)	Lower Columbia and Upper Willamette Rivers	Threatened	N/A
Coastal cutthroat trout (*O. clarkii clarkii*)	Lower Columbia River	Species of Concern	Sensitive
Steelhead trout (*O. mykiss*)	Lower Columbia River	Threatened	Sensitive-Critical (Summer)
	Upper Willamette River		Sensitive-Critical (Winter)
Chum salmon (*O. keta*)	Columbia River	Threatened	N/A
Western brook lamprey (*Lampetra richardsoni*)	No ESU listed	N/A	Sensitive
Pacific lamprey (*Entosphenus tridentatus*)	No ESU listed	N/A	Sensitive
Pacific Eulachon (*Thaleichthys pacificus)*	Southern DPS	Threatened	N/A
Green Sturgeon (*Acipenser medirostris*)	Southern DPS	Threatened	N/A
Oregon Chub *(Oregonichthys crameri)*	Lower Columbia	N/A	Sensitive-Critical
	Willamette SMU		Sensitive

2.11 Assessment of Water Supply

OAR 690-086-0140(3)

2.11.1 Surface Water Rights

The City's three surface water rights allow the City to divert up to 1.13 cfs. However, the City does not use Certificates 5101 and 23996 due to source protection issues raised by the Oregon Department of Health, making these two water rights unavailable for use.

The City's other surface water right, Certificate 91065, authorizes diversion of up to 0.78 cfs from the Long Tom River. This right serves as the City's primary source of supply. Comparing the City's historical five-year average ADD of 0.08 cfs (0.05 mgd) from 2014 through 2018 to the authorized rate of diversion for Certificate 91065 of 0.78 cfs, the City's water right is adequate to meet current demand. However, Certificate 91065 is conditioned to require that the City either obtain an alternate water supply for use during the period of June 15 to October 15 annually or secure a long-term contract and water use permit for use of stored water from Fern Ridge reservoir. The City has two years to select an alternative following the availability of a long-term contract. As required by Certificate 91065 the City provides the following update regarding "progress in securing a long-term contract and associated water right permit for the use of stored water from Fern Ridge Reservoir." Currently, the stored water in the Willamette Basin Projects (including Fern Ridge Reservoir) is not available for municipal use and it will not be available for municipal use (or for contracting with the U.S. Army Corps of Engineers) until

the reservoir space is reallocated and the reallocation is approved by Congress. The City is continuing to track the reallocation effort.

The Willamette Basin Review Study (reallocation study) was reinitiated in 2013. The goal of the study is to reallocate the storage space in the Willamette Basin Projects (13 reservoirs storing up to 1.64 million acre-feet of water) for Endangered Species Act-listed fish (F&W), agricultural irrigation (AI) and municipal and industrial water supply (M&I). In 2015, a full-scale reallocation feasibility study was initiated by the U.S. Army Corps of Engineers (USACE). In September 2018, following review of agency and public comments the USACE announced its Agency Recommended Plan (ARP) which is to proceed with reallocation Alternative C. Under reallocation Alternative C, 159,750 acre-feet of storage space would be allocated to M&I use. In June 2019, the National Marine Fisheries Service (NMFS) issued a Biological Opinion with a finding of jeopardy for salmon and steelhead, but included a number of Reasonable and Prudent Alternatives that may allow for the future contracting of up to 11,000 acre-feet for M&I use. In the fall of 2019 it is expected that the Chief's Report will be sent to USACE Headquarters and the Office of Management and Budget (OMB). Upon OMB accepting the report it will be passed along to the appropriate congressional committees. The timeline for being approved by OMB and congress and then establishing a municipal contracting program is uncertain, but likely several years out from now.

In addition to tracking the reallocation effort, the City continues to evaluate options for alternate sources of primary water supply, such as the City's groundwater rights, or the acquisition of an existing surface water right for use between June 15 and October 15. To date a specific water right has not been identified.

2.11.2 Groundwater Rights

The City holds Certificate 43629 which authorizes appropriation of 0.20 cfs of groundwater from an infiltration gallery. This well served as the City's primary water source until 1986 when the City began to rely on Permits G-10890 and G-13575 as its primary source of supply due to persistent turbidity and clogging of the infiltration gallery. The City does not currently use this gallery, but is holding this supply source in reserve for future use.

The combined authorized rate of appropriation for Permits G-10890 and G-13575 is 0.63 cfs. Historically, these rights served as the City's primary sources of supply. Low yields relative to anticipated future system demands and water quality concerns associated with groundwater from the Wells 1 and 2 led the City to stop use of these wells in 2008 and rely entirely on the Long Tom River as its primary source of supply.

The current groundwater yields from the point of appropriation for G-10890 (Well 1) and the point of appropriation for G-13575 (Well 2) are 69 gallons per minute (gpm) and 27 gpm, respectively. Combined, these wells can produce 96 gpm (0.21 cfs), or approximately 138,000 gpd from the aquifer and could serve as an important source of supply for the City in the future.

In addition to low yields, groundwater from these wells have concentrations of iron and manganese that are in excess of drinking water standards, specifically Secondary Maximum

Contaminant Levels (SMCLs).[2] Although elevated concentrations of these constituents do not pose a health hazard, high concentrations of these parameters are undesirable as they produce unpleasant aesthetic characteristics (e.g., taste, odor, and staining of clothing and fixtures).

Despite these issues related to yield and aesthetic water quality, these wells should suffice as backup supply during water supply shortages associated with the City's current primary water supply. Backup supply is important to the City given the challenge of treating the high seasonal turbidity of the Long Tom River.

Permit G-17933 authorizes appropriation of groundwater from Well 3. Water produced from Well 3 contains concentrations of chlorine, hardness, manganese, and total dissolved solids that are also in excess of SMCLs.

At this time, the City does not consider these three groundwater sources adequate in terms of water quality to meet long-term demands. In order to use these wells long-term, the City must address these water quantity and quality concerns. Water quantity issues (i.e. low yield) may be addressed through well refurbishment or development of additional wells within the aquifer. To address water quality concerns, the City may be able to upgrade its WTP, but at potentially great expense. At this time the City continues to evaluate the costs and benefits of its water supply options and maintains its groundwater rights for both back-up supplies and possible future use as a primary sources of supplies.

2.12 System Description

OAR 690-086-0140(8)

The City's system schematic is shown in Exhibit 2-1. The City's water system consists of wells, surface water intake, transmission and distribution lines, a WTP, a reservoir, and infrastructure and equipment appurtenant to these system components.

Supply is diverted from the Long Tom River using the City's raw water intake lines. Water is transmitted several hundred yards to the City's WTP for treatment. Finished water is sent to the City's one active reservoir which is 1 MG in capacity and then distributed to the City's customers. In summary, the primary assets of the water system include:

- An intake structure and associated piping on the Long Tom River
- An ultrafiltration technology-based treatment plant
- One potable 1 MG water storage reservoir
- One pressure reduction valve station
- A distribution system including fire service
- Two off-line water storage reservoirs

Monroe's current service area extends only to the city limits and the City anticipates that the service area will not expand its service area during the 20 year planning period. Exhibit 2-1 depicts the City's current and future service area as the red dotted line labeled "City Limits."

[2] SMCLs are non-enforceable guidelines for drinking water established as a guideline for aesthetic considerations, such as taste, color, and odor.

The City has one pressure zone. Raw water used to flush the filters in the City's WTP and finished water used in the WTP's dechlorination system are sent to the City's waste water treatment plant for treatment and release to the Long Tom River or held by the City in its lagoons until release to the Long Tom River is permitted per the City's wastewater discharge permit.

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3 Water Conservation Element

This section addresses the requirements of OAR 690-086-0150(1) – (6). This rule requires a description of specific required conservation measures and benchmarks, and additional conservation measures implemented by the City.

3.1 Progress Report

OAR 690-086-0150(1)

This is the City's first WMCP, therefore this rule does not apply.

3.2 Use and Reporting Program

OAR 690-086-0150(2)

The water measurement and reporting program of the City complies with the measurement and reporting standards in OAR Chapter 690, Division 85. The City collects monthly master meter reads for the Long Tom River raw water intake.

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

3.3 Other Conservation Measures

OAR 690-086-0150(3)

The City has not implemented other conservation measures beyond those described below.

3.4 Required Conservation Measures

OAR 690-086-0150(4)(a-f)

OAR 690-086-0150(4) 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

During the next five years, the City plans to initiate, continue, or expand the following conservation measures that are required of all municipal water suppliers when a condition of a water use permit, permit extension, or another order or rule requires a WMCP. The City's five-year benchmarks are also provided below and listed in **Exhibit 3-2** at the end of this section.

3.4.1 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. The results of the City's latest water audit was presented in Section 2. The City has not historically performed annual water audits, and has set a benchmark to perform these audits annually. To enable these calculations, the City will collect annual consumption and demand water volumes and estimate annual unmetered authorized and unauthorized water volumes.

Five-Year Benchmark: Starting in 2019, the City will begin performing annual water audits using annual demand water use data, annual consumption data, annual estimates of unmetered authorized and unauthorized uses, including its own water uses.

3.4.2 System-wide Metering

All customer water connections are metered and the City installs meters at all new customer water connections.

Five-Year Benchmark: The City will continue to require installation of meters at all customer connections.

3.4.3 Meter Testing and Maintenance

The City has an active meter testing and maintenance program. The City is currently testing its master meters located at its WTP, which includes the meters used to measure raw water diverted from the Long Tom River. These meters will be recalibrated if found to be outside of the manufacturers' recommended specifications of tolerance.

Like most water providers, the City finds that testing of small meters is cost-prohibitive. Therefore, the City has not established a meter testing and maintenance program for its customer meters, all of which are two-inches or less, but established a meter replacement program. The City is in the process of replacing all customer meters with Automatic Meter Reading (AMR) meters. Approximately half of all customer meters have been replaced as of September 2019 and the City anticipates that all customers' meters will be replaced by 2024. Thereafter, the City will replace customers' meters when the meters begin to provide unrealistic volumes given a customer's historic use.

During the monthly billing process, the City checks for unusual water volumes relative to previous consumption. When discovered, the City investigates the cause. If a faulty meter is determined to be the source of the problem, the City replaces the meter in question.

Five-Year Benchmark: The City will test and recalibrate its master meters every five years starting in 2020, continue to replace residential meters with AMR, and replace all customers' meters on an as-needed basis.

3.4.4 Water Rate Structure

The City's rate structure is based, in part, on the quantity of water metered at each service connection. In addition to a minimum monthly charge based on the customer classes Residential and Commercial, the City charges a rate for consumption over 4,000 gallons in increments of 1,000 gallons. **Exhibit 3-1** presents a summary of these charges, the details of

which are provided in a rate sheet found in Appendix C. The City reads customers' meters and bills customers monthly.

Exhibit 3-1. Water Charges

Service Type	Minimum Monthly Charge	Block Charges (Applicable to all Service Types)
Residential Service, Inside City Limits	$28.48	• 4,001 to 5,000 gallons, additional $11.50 • 5,001 to 6,000 gallons, additional $21.50 • 6,001 to 7,000 gallons, additional $32.50 • 7,001 to 8,000 gallons, additional $44.00 • 8,001 gallons and above, $15.00 per 1,000 gallons
Residential Service, Outside City Limits	$44.99	
Commercial Service, Inside City Limits	$44.99	
Commercial Service, Outside City Limits	$61.18	

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

3.4.5 Water Loss Analysis

This rule requires that a municipal water provider compares their water loss estimates as calculated through their annual water audit to a water loss threshold of 10 percent. If water loss exceeds this 10 percent threshold, the provider must provide a description and analysis that identifies potential factors for the loss and selected actions for remedy within two years of issuance of a final order from OWRD approving the WMCP. The City's water audit revealed historical water loss estimate of less than 10 percent. However, inspection of monthly water loss volumes revealed significant variations, with monthly losses ranging from -69 percent to 35 percent as shown in Appendix B. Given the variability of the available data, the City is currently not able to confirm its actual water loss volumes; therefore, the City will proceed under this rule as if the City's water loss exceeded 10 percent annually.

The monthly water loss variations are likely due to meter inaccuracies. As a result, the City established benchmarks to test and repair its master meters and replace its customer meters as discussed in Sections 3.4.3. Once completed, these activities should reduce variations in water loss calculations and increase the reliability of the City's future water loss estimates. If the City's water loss exceeds 10 percent after two years following the issuance of a final order approving this WMCP, the City will establish a proactive leak detection and repair program, line replacement program, or develop a water loss control program per AWWA standards within five years of final order issuance consistent with OWRD's rules.

Five-Year Benchmark: If, after two years of OWRD issuing a final order approving this WMCP, the City's water loss exceeds 10 percent, the City will implement a proactive leak detection and repair program, line replacement program, or develop a water loss control program per AWWA standards within 5 years of issuance of the final order.

3.4.6 Public Education

This rule requires the City to establish a public education program to encourage efficient indoor and outdoor water use that includes regular communication of the supplier's water conservation activities and schedule to customers. The City provides multiple opportunities for customers to learn about wise-water consumption and the City's efforts, as follows:

- The City includes conservation tips in its newsletter during the irrigation season.
- The City annually includes a conservation brochure as a "bill stuffer" with utility bills at start of the irrigation season.
- The City provides an accessible conservation brochure at City Hall for its customers.

Five-Year Benchmark: The City will continue to include indoor and outdoor conservation tips in its newsletter annually. In addition, the City will send a conservation brochure bill-stuffer annually at the start of the irrigation season along with utility bills and provide a water conservation-focused brochure at City Hall.

3.4.7 Additional Conservation Measures
OAR 690-086-0150(6)

OAR 690-086-0150(6) requires municipal water suppliers that either: (a) serve a population greater than 1,000 and propose to expand or initiate diversion of water under an extended permit for which resource issues have been identified, or (b) serve a population greater than 7,500, to provide a description of the specific activities, along with a five-year schedule to implement several additional conservation measures. The City estimates that it serves approximately 625 persons and the City is not proposing to expand the diversion of water under an extended permit. Therefore, this rule does not apply.

Exhibit 3-2. Conservation Benchmarks

Required Conservation Measures (OAR 690-086-0150)	2019 Benchmarks
(a) An annual water audit that includes a systematic and documented methodology for estimating any un-metered authorized and unauthorized uses and an analysis of the water supplier's own water use to identify alternatives to increase efficiency	Starting in 2019, the City will begin performing annual water audits using annual demand water use data, annual consumption data, and annual estimates of unmetered authorized and unauthorized uses, including its own water uses.
(b) If the system is not fully metered, a program to install meters on all un-metered water service connections	The City will continue to require installation of meters at all customer connections.
(c) A meter testing and maintenance program	The City will test and recalibrate its master meters every five yearsstarting in 2020, continue to replace residential meters with AMR, and replace all customers' meters on an as-needed basis.
(d) A rate structure under which customers' bills are based, at least in part, on the quantity of water metered at the service connections	The City will continue to bill customers based, in part, on the volume of water consumed.
(e) If the annual water audit indicates that system leakage exceeds 10 percent:	If, after two years of OWRD issuing a final order approving this WMCP, the City's water loss exceeds 10 percent, the City will implement a proactive leak detection and repair program, line replacement program, or develop a water loss control program per AWWA standards within 5 years of issuance of the final order.
(A) within 2 years of approval of the WMCP, the water supplier shall provide a description and analysis identifying potential factors for the loss and selected actions for remedy;	N/A
(B) if actions identified under subsection (A) do not result in the reduction of Water Losses to 10 percent or less, within five years of approval of the WMCP, the water supplier shall: (i) Develop and implement a regularly scheduled and systematic program to detect and repair leaks in the transmission and distribution system using methods and technology appropriate to the size and capabilities of the Municipal Water Supplier or a line replacement program detailing the size and length of pipe to be replaced each year; or,	N/A
(ii) Develop and implement a water loss control program consistent with American Water Works Association's standards.	N/A

(f) A public education program to encourage efficient water use and the use of low water use landscaping that includes regular communication of the supplier's water conservation activities and schedule to customers.	The City will continue to include conservation tips in its newsletter annually. In addition, the City will send a conservation brochure bill-stuffer annually at the start of the irrigation season along with utility bills and provide a water conservation-focused brochure at City Hall.

4 Water Curtailment Element

This section satisfies the requirements of OAR 690-086-0160. This rule requires a description of past supply deficiencies and current capacity limitation. It also requires inclusion of stages of alert and the associated triggers and curtailment actions for each stage.

4.1 Introduction

Curtailment planning is the development of proactive measures to reduce demand during water supply shortages. The City developed this curtailment plan by reflecting on the most likely events which may reduce the City's ability to meet system demands and cause water supply shortages. Those events include: 1) an earthquake, 2) a drought, 3) infrastructure failure, and 4) source water quality degradation.

4.2 History of System Curtailment Episodes

OAR 690-086-0160(1)

The City is not aware of any system curtailment episodes within the last 10 years.

4.3 Capability Assessment

The City evaluated its ability to continue to provide water during the four events described above and determined that it will be able to continue to meet or partially meet demand following some of these events. The results of this evaluation are as follows.

- Earthquake: The City's reservoir was constructed to withstand a major earthquake, though older water system infrastructure is more vulnerable to seismic events.
- Drought: A long-term drought could impinge the City's ability to meet system demands, however the City may access groundwater from its wells to meet system demands temporarily.
- Infrastructure failure: Should infrastructure fail due to a power outage, the City's WTP and pumps can run off a generator in order to continue to treat raw water and pump treated water to the City's reservoir. Partial or full mechanical failure of the City's WTP may cause enactment of the City's water curtailment plan and/or use of the City's wells.
- Source water quality degradation: Source water quality degrades during high turbidity events in the Long Tom River. The turbidity of the Long Tom River increases during seasons with high precipitation, slowing down the production capacity of the WTP due to clogging of the filters and frequent flushing of the filters for cleaning. The City is able to manage these events through various means and thereby has been able to continue to meet demand, but longer periods of unusually high turbidity (e.g. multiple weeks) could cause a supply shortage. In these cases the City's groundwater from the City's wells could augment water supply.

The City could continue to meet system demand during some of these events using stored water in the City's 1 MG reservoir, assuming the reservoir is not affected by the particular

event. The City maintains approximately 0.5 MG in the reservoir typically, which would enable the City to meet ADD for up to 9 days.

Based on this capability analysis, the City determined that it may be able to continue to meet water demand during some of the events listed above. However, the City deemed that its water system is vulnerable, at least in part, to some of these supply shortage events, resulting in the possibility that the City may not be able to maintain delivery during one of these events. The following curtailment plan will help the City respond to challenges posed by these potential events.

4.4 Curtailment Stages and Initiating Conditions

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

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

OAR 690-086-0160(3) requires water providers to describe water service difficulties or predetermined levels of severity of shortage that will trigger curtailment actions; the City has elected to use water service difficulties to serve as triggers to enact curtailment actions. Circumstances associated with the four events described in Section 4.3 that may lead to water service difficulties include loss or partial loss of supply and loss or partial loss of water treatment, transmission, distribution, and storage capacities. Water service difficulties are only difficulties if the City may not be able to or cannot meet demand, therefore demand is a component of the conditions described below that will trigger curtailment.

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

The initiating conditions described in Exhibit 4-1 are dependent upon the capacity of the system to meet demand. Water system capacity is determined by considering: 1) the rate of WTP production, 2) the volume of water in the reservoir, 3) capacity of the distribution system to meet system demand, 4) source availability, or 5) some combination thereof. The water system capacity will be determined on a case-by-case basis by City staff.

Exhibit 4-1. Curtailment Stages of Alert and Initiating Conditions

Curtailment Stages	Initiating Conditions (Triggers)
Stage 1: Initial	The capacity of the water system is compromised and the City may not be able to meet system demand.
Stage 2: Moderate	The capacity of the water system is compromised and occasionally cannot fully meet system demand.
Stage 3: Severe	The capacity of the water system cannot consistently and fully meet system demand..
Stage 4: Critical	Near complete loss or complete loss of the water system capacity to meet system demand.

4.5 Authority and Enforcement

The City may declare a water crisis state of emergency and implement this curtailment plan. The City has the authority to decrease or increase the curtailment stages or terminate curtailment activities. The City's Ordinance Number 216, Section 7, Paragraph 7 gives the Water Department the authority "to give preference in the matter of furnishing service to customers and interest of the Water Department from the standing of public convenience or necessity" in the event of supply shortages.

4.6 Curtailment Plan Implementation

OAR 690-086-0160(4)

The City's curtailment plan provides specific curtailment actions for each of the four curtailment stages. In Stage 1, voluntary actions are requested of customers. In the latter curtailment stages, mandatory actions are prescribed to restrict water use. In regard to the following lists of measures or restrictions, the City may revise, add, or remove specific measures or restrictions on water use or activities as needed, depending upon the circumstances of the event for which curtailment is necessary.

4.6.1 Stage 1: Initial (Voluntary)

The City will issue a general request for a voluntary reduction in water use by all users. The request will include a summary of the current water situation, the reason for the requested reduction in use, suggestions for conserving water, and a warning that mandatory cutbacks may be required if the voluntary measures do not sufficiently reduce water usage or the initiating event is not reduced in severity and the potential for shortage continues to exist. Examples of voluntary reductions include reductions to outdoor water use such as limiting irrigation of landscape and lawns to specific night and early morning hours and implementation of water conservation measures promoted by the City's conservation program.

4.6.2 Stage 2: Moderate (Mandatory)

The City will restrict the irrigation of lawns, gardens, and landscaping areas during certain hours of the day. Certain outside uses of water will be prohibited, including car washing, non-essential City uses of water, washing down sidewalks or parking lots, filling swimming, pools, using water for dust control and other uses. The installation of new water service connections will be temporarily discontinued.

4.6.3 Stage 3: Severe (Mandatory)

All outdoor uses of water will be restricted for any purpose other than fire-fighting. The only exceptions will be those specifically identified by the City.

4.6.4 Stage 4: Critical (Mandatory)

Stage 4 restrictions include those identified in Stage 3, plus a prohibition on all nonessential water use that do not maintain the health and safety of the public. The only exceptions will be those specifically identified by the City.

4.7 Notifications of Curtailment

The City has several communication channels that it can use to relay important information about a supply shortage, including its voluntary and mandatory measures. The City may rely on local radio, TV, and print media; mailers; bill stuffers; door hangers; social media; strategically-located sandwich boards; and its web site to communicate with its customers on an ongoing basis about a supply shortage. Notices and other forms of communication may include a description of the current water situation, the reason for the requested conservation measures, and a warning that mandatory restrictions will be implemented if voluntary measures are not sufficient to achieve water use reduction goals.

4.8 Drought Declaration

If a declaration of a severe drought in Benton 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 falls within a severe drought area declared by the Governor, such as Benton 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 Cities 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 Municipal Water Supply Element

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

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

5.1 Delineation of Service Area

OAR 690-086-0170(1)

The City's current and future service area is within the city limits, as described in Section 2 and delineated in Exhibit 2-1. Within the 20-year planning period, the City does not anticipate that its service area will expand beyond its current service area boundary.

5.2 Population Projections

OAR 690-086-0170(1)

The City's projected population in 2040 was obtained from the City's 2019 WMP. The population projection described in the WMP relied on a population forecast performed by the PSU Population Resource Center in 2017 for the years 2017 through 2067.[3] For the WMP, PSU's population forecast was revised to take into account an increase in population as a result of new growth not accounted for in PSU's forecast. Specifically, the City anticipates construction of a 55-unit subdivision, two commercial establishments (including a brewery), four new classrooms and a daycare, and eight new single family residences. The City estimates that these developments will add 163 persons and be completed by 2030. These 163 persons were added to the population projected by PSU. The population for 2030 was linearly interpolated using the WMP's 2040 population.

Exhibit 5-1 shows the City's population is projected to be 808 persons by 2030 and 822 by 2040.

Exhibit 5-1. Projected Population, 2029 and 2039

Year	Population
2018	625
2030	808
2040	822

These population projections account for projected growth only within the City's service area--the City does not intend to serve areas outside city boundaries in the future.

[3] Portland State University, Population Research Center, 2017, *Coordinated Population Forecast for Benton County, its Urban Growth Boundaries (UGB), and Area Outside UGBs 2017-2067*

5.3 Demand Forecast

OAR 690-086-0170(3)

Demand is anticipated to increase over time, driven by population increases and anticipated commensurate economic expansion. The City presents its demand forecast and summarizes the methodology below. The basis for this WMCP demand forecast was the demand forecast presented in Monroe's 2019 WMP.

The ADD forecast in the WMP was calculated based on a per capita formula. Using historical finished water demand, the City estimated the per capita rate in gallons per person per day (gpcd) was 78 gpcd and assumed that this rate would continue through the planning period. This per capita rate was multiplied by the population in 2040 to forecast the finished water ADD in 2040. The City forecasted MDD by applying a peaking factor of 2 to ADD. The applicable portions of the City's WMP are provided in **Appendix D** for reference.

For this WMCP, the City performed a similar calculation, but forecast *raw* water demand instead of finished water demand. As previously noted, the difference between the volumes of finished water and raw water demand is the volume of water used to flush the City's filters at its WTP. In order to incorporate these flushing volumes into the forecast, the City increased the per capita rate to account for these flushing volumes, as follows. The City's current average WTP flushing rate is 350,000 gallons per month, equivalent to 11,667 gallons per day (350,000 gallons/30 days). The rate of 11,667 gallons per day translates to 19 gpcd (11,667 gpd/625 persons in 2018), which was added to the City's finished water per capita rate to obtain an ADD per capita rate of 96 gpcd (19 gpcd + 78 gpcd).[4] This rate is greater by approximately one gallon compared to the City's highest observed per capita rate of 95.1 gpcd shown in Exhibit 2-2. This discrepancy is explained by the WMP's use of incomplete finished water data (as noted in this WMCP's Section 2.7) to estimate a per capita rate and the conversion of this incomplete data to raw water volumes as described above.

The City calculated ADD for 2030 and 2040 by multiplying the per capita rate of 96 gpcd by the population presented for those years in the previous section. MDD was calculated by multiplying ADD by a factor of 2. This forecast also accounts for the WTP flushing rate increasing in proportion to demand over time.

Based on this methodology, the City calculated an ADD of raw water demand in 2040 of 79,100 gallons and MDD of 158,200 gallons (0.24 cfs). **Exhibit 5-2** presents the City's forecast of (raw water) demand through 2040.

[4] During calculations, the values were rounded to the nearest whole number and therefore do not exactly sum to a value of 96 gpcd.

Exhibit 5-2. Demand Forecast, 2020-2040

Year	Population	ADD (gpd)*	MDD (gpd)*	MDD (cfs)**
2030	808	77,600	155,200	0.24
2040	822	79,100	158,200	0.24

*Rounded to the nearest hundreds.
**Rounded to the nearest hundredths.

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

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

The City's demand forecast projects an MDD of 0.24 cfs (158,200 gpd) within the 20-year planning period. Surface water Certificate 91065 authorizes diversions from the Long Tom River for up to 0.78 cfs which is adequate to meet this forecasted demand.

As described in Section 2, Certificate 91056 is conditioned to require that the City eventually obtain an alternative source of supply during the period of June 15 through October 15 of each year, such as acquiring an existing water right, or secure a long-term contract and water supply permit for use of stored water from Fern Ridge reservoir for this period. Currently, the City continues to maintain its groundwater permits (Permit G-10890, G-13575, and G-17933), as critical back-up and emergency sources of supply for use in offsetting any reductions in supply from the Long Tom River. However, the City may determine within this 20-year planning period that use of its existing groundwater supply as a primary source of supply is preferable to surface water based on the City's ongoing alternatives analysis for long-term supply. This alternatives analysis considers the outcome of the reallocation of federal storage water (described in Section 2), the potential cost and limitations on the use of stored water and associated contract, and the ability and cost of acquiring an existing surface water right. To this end, and based on information currently available to the City, the City's intended strategy for exercising existing permits includes the following.

Permit G-10890 (0.45 cfs) – Obtain a certificate based on the pending COBU for 0.154 cfs. Continue to hold in reserve the 0.296 cfs undeveloped portion of the permit in the near-term. As more alternatives analysis information becomes available, and as will be described in the 10 year update of this WMCP, the City may seek access to the undeveloped portion of this extended permit. At this time, the City is not seeking access to any of the 0.296 cfs undeveloped portion of Permit G-10890. As described in the City's 2014 permit extension application for Permit G-10890, the point of appropriation (POA) for Permit G-10890 (Well 1) does not currently have the capacity to produce the 0.296 cfs undeveloped portion of the permit. Thus, the City will likely seek an amendment to Permit G-10890 to allow appropriation from a new POA. By October 1, 2034, the City anticipates that it will have studied potential locations for the POA, obtained funding for well construction, obtained permit amendments as needed, and, installed the needed pre-treatment process.

Permit G-13575 (0.18 cfs) – Obtain a certificate based on the pending COBU for 0.061 cfs. Submit an application for an extension of time to October 1, 2034. Develop the remaining 0.029 cfs developed portion of the permit (0.09 cfs – 0.061 cfs = 0.029 cfs) within the timeframe of the extension approval and, similar to Permit G-10890 and hold the remaining portion of the

undeveloped permit (0.09 cfs) in reserve until additional information on alternative supplies becomes available. This will also be described in the City's 10 year update to this WMCP. Assuming the City determines that developing additional groundwater is feasible, the City will take steps to complete development of the permit.

Permit G-17933 (0.33 cfs) – Continue to evaluate the feasibility of developing this permit in light of information regarding alternative supply sources and as needed develop some or all of the permit by the current completion date of January 4, 2038. This will also be described in the City's 10 year update to this WMCP.

5.5 Alternative Sources

OAR 690-086-170(5)

OAR 690-086-0170(5) requires an analysis of alternative sources of water if any expansion or initial diversion of water allocated under existing permits is necessary to meet the City's demand forecast and redundancy needs. As described above, Monroe currently does not intend to expand diversion of its groundwater permits to meet the 10 and 20 year demand projections described above. Consequently, this rule does not apply.

5.6 Quantification of Maximum Rate and Monthly Volume

OAR 690-086-0170(6)

OAR 690-086-0170(6) requires a quantification of the maximum rate of withdrawal and maximum monthly use if any expansion or initial diversion of water allocated under an existing permit is sought. As described above, Monroe currently does not intend to expand diversion of its groundwater permits to meet the 10 and 20 year demand projections described above. Consequently, this rule does not apply.

5.7 Mitigation Actions under State and Federal Law

OAR 690-086-0170(7)

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

As described above, Monroe currently does not intend to expand diversion of its groundwater permits to meet the 10 and 20 year demand projections described above. Consequently, this rule does not apply.

5.8 New Water Rights

OAR 690-086-0170(8)

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

To the extent that the City needs additional water supply as an alternative to Certificate 91065 (per the water right conditions) the likely supply will come from acquisition of an existing water right. It may be possible that the City will seek to obtain a new water right for the use of stored water to *replace* the existing supply from Certificate 91065.

Appendix A

Letters to Affected Governments

GSI Water Solutions, Inc.

December 18, 2019

Greg Verret
Community Development Director
360 SW Avery Ave
Corvallis, OR 97333

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

Dear Mr. Verret:

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

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

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

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

Sincerely,
GSI Water Solutions Inc.

Adam Sussman
Principal Water Resources Consultant
asussman@gsiws.com

Enclosure

GSI Water Solutions, Inc.

December 18, 2019

Rick Hohnbaum
Administrator
City of Monroe
PO Box 486
664 Commercial St
Monroe, OR 97456

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

Dear Mr. Hohnbaum:

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

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

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

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Sincerely,
GSI Water Solutions Inc.

Adam Sussman
Principal Water Resources Consultant
asussman@gsiws.com

Enclosure

664 Commercial St
PO Box 486
Monroe, OR 97456
Voice – 541 847-5175
Fax – 541 847-5177

MEMORANDUM

DATE: December 3, 2020

TO: Rick Hohnbaum, City Administrator

Cc: Adam Sussman**,** GSI Water Solutions

FROM: Patrick Depa, Associate Planner

RE: Water Management & Conversation Plan/City's Comprehensive Plan

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Per the Oregon Administrative Rules Chapter 690, Division 86, when a Water Management and Conservation Plan (WMCP) is created for a local government, the city must provide comments back to the consulting firm doing the report if the report is or is not consistent with the City's Comprehensive Plan. The WMCP will provide a review of current conditions as well as future water demands and the estimate costs associated with the water system. The report will reflect the City's existing groundwater supply and recommendations of developing additional supply from groundwater. Both the Water Management and Conservation Plan (WMCP) along with two Technical Memorandums were reviewed for consistency.

Many chapters of the Comprehensive Plan discuss directly or indirectly the care of the City's water management and conservation plan pertaining to the health, safety and welfare of the city as well as its growth management. Among these are the goals and objectives associated with our natural resources, public facilities, infrastructure and urbanization. A successful public facility and service system is characterized by the timely, orderly, and efficient delivery of services at levels appropriate for planned land uses. The Comprehensive Plan mandates that the city identify opportunities for creative problem solving and cost effectiveness through coordinated planning efforts, while continually engaging in efforts to improve the quality, productivity, and sustainability of infrastructure in Monroe.

Both plans speak to the efficiency of facilities to reduce energy and resource use and work to ensure the facilities, utilities, and services for the community are maintained and improved to minimize or eliminate risks to the economy, public health, safety, and the environment. Both the WMCP and the Comprehensive Plan discuss the availability of public facilities, utilities, and services as a tool for guiding urbanization within Monroe in a manner that accommodates expected population and employment growth while maintaining the City's ability to continue providing existing services citywide. Finally, both plans insert the importance of service provider coordination, Intergovernmental Agreements (IGA's) and State and Federal regulations that work toward fiscally-sustainable compliance and regulatory consistency.

In summary, by comparing the goals and objectives of the documents, I found that the WMCP is consistent with the City's Comprehensive Plan pertaining to the service, quality and sustainability of Monroe's water management.

Appendix B

Water Loss Data

Appendix B: Water Loss Calculation

	Demand (Gal)	Consumption (Gal)	Authorized Unmetered Monthly Average (Gal)	Loss (Gal)	Loss %
Jul-15	1,648,000	1,482,227	30,611	135,162	8.20
Aug-15		1,469,343	30,611		
Sep-15		1,204,299	30,611		
Oct-15		1,235,350	30,611		
Nov-15		842,151	30,611		
Dec-15		1,179,779	30,611		
Jan-16	1,600,000	1,126,798	30,611	442,591	27.66
Feb-16	1,300,000	1,088,189	30,611	181,200	13.94
Mar-16	1,300,000	1,151,918	30,611	117,471	9.04
Apr-16		1,216,864	30,611		
May-16	1,411,000	1,054,088	30,611	326,301	23.13
Jun-16		1,245,560	30,611		
Jul-16	1,568,000	1,455,561	30,611	81,828	5.22
Aug-16	1,505,000	1,619,663	30,611	-145,274	-9.65
Sep-16	1,910,000	1,414,552	30,611	464,837	24.34
Oct-16	1,670,000	1,234,546	30,611	404,843	24.24
Nov-16	1,340,000	1,013,604	30,611	295,785	22.07
Dec-16		1,135,173	30,611		
Jan-17	1,480,000	1,333,132	30,611	116,257	7.86
Feb-17	1,620,000	1,017,496	30,611	571,893	35.30
Mar-17	1,400,000	1,042,429	30,611	326,960	23.35
Apr-17	1,200,000	1,216,864	30,611	-47,475	-3.96
May-17	1,400,000	1,091,971	30,611	277,418	19.82
Jun-17	1,300,000	1,353,271	30,611	-83,882	-6.45
Jul-17	1,430,000	1,349,780	30,611	49,609	3.47
Aug-17	1,510,000	1,551,335	30,611	-71,946	-4.76
Sep-17	1,770,000	1,407,883	30,611	331,506	18.73
Oct-17	1,580,000	1,100,473	30,611	448,916	28.41
Nov-17	1,420,000	1,236,227	30,611	153,162	10.79
Dec-17	1,190,000	1,024,524	30,611	134,865	11.33
Jan-18	1,230,000	2,052,356	30,611	-852,967	-69.35
Feb-18	1,390,000	1,182,674	30,611	176,715	12.71
Mar-18	1,280,000	1,303,993	30,611	-54,604	-4.27
Apr-18	900,000	1,471,990	30,611	-602,601	-66.96
May-18	1,680,000	1,093,225	30,611	556,164	33.11
Jun-18	1,130,000	1,283,270	30,611	-183,881	-16.27
Jul-18	1,420,000	1,658,712	30,611	-269,323	-18.97
Aug-18	1,970,000	1,829,569	30,611	109,820	5.57
Sep-18	2,180,000	1,881,626	30,611	267,763	12.28
Totals:	**45,732,000**	**41,123,946**	**-**	**3,659,113**	**8.00**
Ave. per month:	**1,475,226**	**1,326,579**	**30,611**	**118,036**	**8.00**

Demand Data Not Available.

Appendix C
Water Rates

RESIDENTIAL SERVICE

Residential – Inside city limits

Minimum monthly charge, first 4,000gallons	$28.48
4,001 to 5,000 gallons additional	$11.50
5,001 to 6,000 gallons additional	$21.50
6,001 to 7,000 gallons additional	$32.50
7,001 to 8,000 gallons additional	$44.00
8,001 gallons and above	$15.00 per 1,000 gallons

Residential – Outside city limits

Minimum monthly charge, first 4,000gallons	$44.99
4,001 to 5,000 gallons additional	$11.50
5,001 to 6,000 gallons additional	$21.50
6,001 to 7,000 gallons additional	$32.50
7,001 to 8,000 gallons additional	$44.00
8,001 gallons and above	$15.00 per 1,000 gallons

COMMERCIAL SERVICE

Commercial – Inside city limits

Minimum monthly charge, first 4,000gallons	$44.99
4,001 to 5,000 gallons additional	$11.50
5,001 to 6,000 gallons additional	$21.50
6,001 to 7,000 gallons additional	$32.50
7,001 to 8,000 gallons additional	$44.00
8,001 gallons and above	$15.00 per 1,000 gallons

Commercial – Outside city limits

Minimum monthly charge, first 4,000gallons	$61.18
4,001 to 5,000 gallons additional	$11.50
5,001 to 6,000 gallons additional	$21.50
6,001 to 7,000 gallons additional	$32.50
7,001 to 8,000 gallons additional	$44.00
8,001 gallons and above	$15.00 per 1,000 gallons

STORM WATER RATES

Single-family residential customers	$ 6.00
All other customers	$ 8.00

REVENUE BOND

Each Service connection	
Minimum monthly charge, first 4,000 gallons	$10.85
Each additional 1000 gallons	$ 2.12

WASTEWATER RATES

Flat rate for all residential users per the Equivalent Residential Unit rate at 4,000 gallons of water $35.47

Commercial rates are determined annually. Rate is $35.47 per EDU with a minimum charge of 1 EDU.

1 EDU = 4000 gallons

DELINQUENT CHARGES:

Payments are defined as delinquent if not paid by the 22nd of each month after the utility bills have been processed. All delinquent bills shall be assessed a late fee of one and one-half percent (1.5%) per month on all outstanding balances. If the account is unpaid after 60 days the city may assign the balance to a private collection agency. A collection fee of 25%, maximum of $200, may be added if assigned to an agency per ORS 697.105.

SHUT OFF NOTICES and RECONNECT CHARGES:

The City will provide notices for delinquent accounts that have not cleared past due amounts by the 10th of the month after the bill is determined delinquent. When the City finds it appropriate to provide a door hanger or other notice of pending termination of utility service a notice fee of $10 shall be added to the utility bill. In the event that services are disconnected, service will be reinstated only after all bills for service then due have been paid, or a payment plan acceptable to the City has been agreed to and adhered with, along with a reconnect charge of $35.

There will be a $25.00 fee assessed for all returned payments.

Payments can be made by mail to PO Box 486 Monroe, OR 97456, in person at City Hall at 664 Commercial St Monroe, OR 97456, or via our online bill pay system https://www.xpressbillpay.com/#/?org=CityofMonroeOR10553.

If you have any questions or concerns about your bill please contact Tracy Jensen, Finance Officer, at 541-847-5175 or via email at tracy.jensen@ci.monroe.or.us

Appendix D

City of Monroe 2019 Water Master Plan, Select Pages

City of Monroe

BENTON COUNTY, OREGON

Water Master Plan

October 2019

Civil West Engineering Services, Inc.

www.civilwest.com | Willamette Valley | North Coast | South Coast | Rogue Valley

4.3 Future Water Demand

4.3.1 Basis for Projections

Water demand estimates for future years are determined by multiplying the current unit demand values (gallons per person or per EDU) by the projected number of future users in the water system. It is assumed new users added to the system will consume water at the same rate as current users. Population projections are presented in Section 3.2, and unit water demand values are presented in Section 4.2. The projections are based on the county average annual growth rate of 0.20% - 0.30% for the planning period, as defined in Section 3.2.2.

4.3.2 Water Demand Projections

Demand projections for the planning period were calculated based on the following values for ADD and MDD from 2014 - 2019 data provided by the City:

- ADD unit demand = 78 gpcd
- MDD unit demand = 155 gpcd

The values in the lower table for the end of the planning period in 2040 are projected by multiplying the 2014 – 2019 demands by the ratio of projected 2040 population equivalent (822 persons) over the current certified population (625 persons). We are using an equivalent population to account for newly constructed users by water use:

- 55 single family residences in the Red Hills subdivision - population equivalent of approximately 124 persons
- 8 new homes built on the northside – population equivalent of 18 persons
- Dollar General – population equivalent of 5 persons
- Long Timber Brewpub – population equivalent of 16 persons

TABLE 4.3.2 – WATER DEMAND PROJECTIONS

Monroe 2014-2019 Data		Population =	625
Unit	**ADD**	**MDD**	**PHD**
gpd	48,467	96,935	193,870
Peaking Factor	1	2	4
gpcpd	78	155	310
Monroe 2040 Data		**Population =**	**822**
Unit	**ADD**	**MDD**	**PHD**
gpd	63,744	127,489	254,977
Peaking Factor	1	2	4
gpcpd	78	155	310

4.3.3 Future Unaccounted Water Assumptions

As discussed earlier in this section, unaccounted water in the City of Monroe averages 8.0%. This means the City is unable to account for all water they produce. This could be a result of:

- Meter inaccuracies (master and/or consumption)
- Accounting or entry errors
- Software glitches or errors
- Timing problems (between reading master vs. consumption)
- Not recording all public water use (fire, water plant, City Hall, parks, etc.)
- Actual leakage

Until it is known how much of the unaccounted water levels are a result of leakage, it is not appropriate to assume any change in the future water production rates. Making assumptions that future water demands would be less due to efforts, or results that are only hypothetical at this point, could potentially leave the City in a water supply deficit. However, if in the future the City reduces demand through leak repairs, conservation, or other proactive means, modifying projected water demands in plan updates would be appropriate. Until that time, the projected demands in this report should stand. Therefore, the projected water demands described include the current level of unaccounted water.