



CITY OF PHOENIX WATER MANAGEMENT AND CONSERVATION PLAN



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City of Phoenix Water Management and Conservation Plan

Table of Contents

ES Executive Summary	1
Notice to Affected Local Governments	1
Schedule for WMCP Updates.....	1
Recommendations.....	1
1 Existing System	1-1
Introduction	1-1
Source of Supply and Water Rights	1-1
Service Area	1-4
Existing Water System	1-5
Current Demands	1-7
Water Loss.....	1-12
2 Water Conservation	2-1
Progress Report - Previous Conservation Measures	2-1
Water Use Measurement / Reporting Program	2-2
Current Conservation Measures	2-2
Conservation Goals	2-6
3 Water Curtailment	3-1
Introduction	3-1
Supply Assessment	3-1
Stages of Alert & Curtailment Actions	3-2
4 Water Supply Evaluation	4-1
Introduction	4-1
Future Population and Service Area	4-1
Future Water Demands	4-2
Schedule to Exercise Permits and Comparison of Projected Need to Available Sources	4-6
APPENDICES	
Appendix A - Water Management and Conservation Plan Affected Local Agency Comments	
Appendix B - Medford Water Commission 2017 Curtailment Plan	

ES | EXECUTIVE SUMMARY

The City of Phoenix (City) is a small community located in the Rogue Valley in Jackson County, Oregon. The City owns and operates the water system which serves residential, commercial, and industrial customers within the City limits. The City's most recent Water Management and Conservation Plan (WMCP) was submitted in 2003 and a Progress Report was submitted in 2009. This updated WMCP was prepared to meet the requirements of OAR 690-086 which is administered by the Oregon Water Resources Department (OWRD).

Because of its connection to the Medford Water Commission (MWC), the City's supply strategy is closely tied to the demands, capacity, and water rights of the MWC and its other wholesale customers. This regional group of water providers is in the initial stages of a coordinated water rights strategy (to be completed in 2019). Thus, this WMCP may require an update after this time to reflect the finalized regional water rights strategy. The City is not requesting Greenlight Water at this time but may do so in a future WMCP update as a result of the regional water rights strategy.

The attached chapters include a summary of the existing system, a description of current water rights, water conservation measures, the City's curtailment plan, and a supply evaluation as outlined in the *Water Management and Conservation Plans - A Guidebook for Oregon Municipal Water Suppliers, March 2015, Second Edition*.

This WMCP was developed in 2018. Due to turnover of City staff, submittal of the WMCP was delayed until 2020. The City was devastated by the Almeda Fire on September 8, 2020 and coordination with City Staff to get 2018 and 2019 data is not possible at this time. Therefore, the most current data available and presented in this WMCP is from 2017.

NOTICE TO AFFECTED LOCAL GOVERNMENTS

This WMCP was submitted to the following local governments for review:

- Medford Water Commission
- City of Talent
- City of Ashland

Comments from these agencies is attached as **Appendix A**.

SCHEDULE FOR WMCP UPDATES

- 2025 – WMCP Progress Report
 - Update status of Curtailment Plan (adoption of MWC's Curtailment Plan)
 - Update status of Water Rights Strategy and Schedule to Exercise Water Rights
 - Update status of Conservation Measures
- 2030 – WMCP Full Update

RECOMMENDATIONS

The following lists recommendations as a result of this WMCP:

- Formally adopt the Medford Water Commission's Water Curtailment Plan
- Implement additional conservation measures listed in **Table 2-4** (review rate structure, distribute conservation kits, and implement code changes).
- Implement 2-yr and 5-yr benchmarks to reduce water loss to 10 percent or less (refer to **Enhanced Conservation Measures in Chapter 2**).

1 | EXISTING SYSTEM

INTRODUCTION

The City of Phoenix (City) is a small community located in the Rogue Valley in Jackson County, Oregon. The City owns and operates the water system that serves residential, commercial, and industrial customers within the City limits. In 2017, the City served a population of approximately 4,605 through approximately 1,400 connections.

Water to the City is supplied from the Medford Water Commission (MWC). As a result, the City does not operate or maintain its own source of water, rather its operations are solely those of local storage and distribution. The City is responsible for providing quality water of sufficient quantities to its current and future customers.

SOURCE OF SUPPLY AND WATER RIGHTS

Historically, the City supplied its customers through local wells, but as of the 1980s, all of the City's water supply is purchased through a wholesale agreement with the Medford Water Commission (MWC). MWC is a regional water provider that supplies water to the City of Medford and six neighboring communities including the City of Phoenix. The MWC has two sources of supply. The primary source of water is Big Butte Springs that supplies approximately 26.4 million gallons per day (mgd) of water year-round to the system. When demands exceed this source of supply, the Duff Water Treatment Plant on the Rogue River is operated. The treatment plant normally operates from May through October and is currently being expanded to a capacity of 65 mgd.

The City has two separate supply connections to MWC: The Experiment Station Road Booster Pump Station (Experiment BPS) and the TAP (Talent-Ashland-Phoenix) Regional Booster Pump Station (Regional BPS).

The City's sources of supply are considered reliable and adequate for existing customers. The ability to reliably meet future customer's demands is discussed in Chapter 4.

MWC SUPPLY AGREEMENT

The City has a five-year supply agreement with MWC, approved in 2016 and expiring in 2021. This agreement contains a number of critical issues which impact the City. A summary of the current MWC Purchase Agreement is presented in **Table 1-1**. These agreements are renewed every five years to address demand forecast updates. MWC is restricted from entering into agreements for periods exceeding 20 years, but fully intends on supplying water to the City for the foreseeable future as demands continue.

**Table 1-1
Current MWC Purchase Agreement Pumping Rates**

Season/Time of Day	Maximum Pumping Rate	
	mgd	gpm
October – April, 5am – 11am	0.63	440
October – April, 12pm – 4am	1.87	1,300
May – September, 5am – 11am	1.71	1,190
May – September, 12pm – 4am	2.30	1,600

The maximum pumping rates established in the 2016 MWC Purchase Agreement are significantly lower than the maximum pumping rates from previous agreements. The City is planning to evaluate options of revising the operations and/or revising the purchase agreement with MWC as part of an upcoming TAP Water Master Plan.

WATER RIGHTS

The MWC supply agreement requires the City obtain its own water rights for the months of May through October. These water rights are outlined in **Table 1-2** attached at the end of this chapter. Water Right S-47672 allows Phoenix to withdraw up to 5.0 cubic feet per second (cfs) from the Rogue River in addition to the 400 acre-feet (AF) of stored water from Lost Creek Reservoir. Water right S-52650 allows Phoenix to withdraw 516.27 AF of water from Lost Creek Reservoir at a maximum rate of 3.1 cfs.

Permit S-47672 was fully developed in 1991. It would normally be appropriate for the City of Phoenix to seek a water right certificate for this permit. However, as the City obtains treated water from the MWC and works in cooperation with all of the cities that obtain water from the MWC, Phoenix agreed to wait to perfect this water right until MWC can demonstrate that it has the capacity to deliver water under this permit, plus all of the other water rights held by MWC and other cities that have been previously certificated. MWC recently prepared a water rights strategy to coordinate the water right development process between MWC and the wholesale city customers to assure that all partner cities, including Phoenix, have a time schedule for obtaining water rights certificates. Accordingly, the Oregon Water Resources Department (OWRD) has advised Phoenix to withdraw a previously submitted time extension for this permit and instead submit a Claim of Beneficial Use (COBU) with the caveat that OWRD be requested to place a hold on the COBU and not issue a certificate until MWC can coordinate the development of all the partners water rights. The City submitted the COBU for S-47672 on November 14, 2018 but agreed processing would be delayed by OWRD per this guidance.

On March 20, 2003, the City submitted an Extension of Time for Permit S-52650 (Application S-71996) for development of 600 AF. The City has already demonstrated the use of 516.27 AF of this permit. The Extension of Time was approved on February 8, 2019 and extends the deadline for full development of the 600 AF until October 1, 2030. The resulting Final Order includes a development limitation of the remaining 83.73 AF requiring approval of a Water Management and Conservation Plan (current allowed rate is 516.27 AF). No limitations were established regarding fish persistence.

The City holds water rights for a number of wells as presented in **Table 1-2**. The wells for municipal use are not connected to the distribution system, are not in use, and are not planned to be used in the future. The supplemental irrigation well is also not in use and not planned for future use due to high levels of boron. It is recommended that the City submit applications to cancel the well water rights.

Further development of the water rights is planned in collaboration with MWC and other regional water providers as part of a regional water rights strategy which started in 2019. The City is not requesting greenlight water at this time.

Reliability of Supply

The City is dependent on MWC for all of its water supply. A new supply opportunity from the City of Ashland is being explored in the Talent-Ashland-Phoenix (TAP) Water Master Plan. The City of Ashland gets water from the East and West Forks of Ashland Creek and operates its own water treatment plant.

ENVIRONMENTAL RESOURCES ISSUES

Medford Water Commission's 2017 WMCP summarizes the aquatic issues of concern for the Big Butte Creek watershed and Rogue River. The following excerpt can be found on page 2-40 of the 2017 MWC WMCP:

“Aquatic Resource Concerns

Anadromous fish species are present in the Big Butte Creek watershed, including Chinook and coho salmon and winter and summer steelhead. Only coho are listed as threatened (under the federal Endangered Species Act). However, the limit to their distribution is several miles downstream from MWC's Big Butte Springs diversions; coho are not present in the diversion reaches proper. Big Butte Creek is on DEQ's 303(d) list as water quality limited for dissolved oxygen, E. coli, and temperature from its mouth to the junction of the North and South Forks—some 7 river miles downstream of Big Butte Springs. The stream reaches near Big Butte Springs are not on the 303(d) list.

A number of anadromous fish species are present in the middle Rogue River, including coho, Chinook, and steelhead, of which only the Southern Oregon/Northern California Coast (SONCC) coho salmon is listed under the federal Endangered Species Act (Threatened). The middle Rogue River is considered critical habitat for SONCC coho (NMFS, 2014). There are several significant off-channel areas in the middle Rogue River with potential for use by salmon (DEA, 2016). Adult coho have rarely been observed spawning in the mainstem Rogue River, except in the immediate vicinity of Cole Rivers Hatchery where hatchery coho return (Oregon Department of Fish and Wildlife, 1989). Juvenile coho do not rear in the mainstem Rogue River; rather, they remain in the tributaries until out-migration during the spring freshet (DEA, 2016).

The substrate in the middle Rogue River consists of resistant cemented gravels that can act as sills or weirs, potentially forming beneficial riffles (Klingemann, 1987). These areas are currently stable relative to other portions of the river where the bed is more readily movable. Flow patterns can change easily with the deposition of gravel and cobble in other reaches of the river.

Temperatures in the middle Rogue River average between 16° and 17°C and are within the optimal range for migrating adult salmon, thus presenting no thermal barriers to migration.

The biggest water quality concerns in the middle Rogue River are bacteria, temperature, dissolved oxygen, nutrients, pH, chlorophyll, altered hydrology, habitat modification, sediment/turbidity, and mercury. Nitrates, bacteria, arsenic, and fluoride are of moderate concern for water quality (DEQ, 012). The middle Rogue River is water quality limited year-round for E. coli.”

None of the City’s disused wells are in an OWRD designated Critical Ground Water Area.

INTERCONNECTIONS

TAP Supply

In 1997, the City entered into a three-party agreement with the cities of Talent and Ashland to develop the TAP supply system. The agreement calls for a percentage share of the construction, operations, and maintenance cost and capacity of the system to be allocated to the three parties.

Table 1-3 below depicts that allocation.

**Table 1-3
TAP Cost and Capacity Allocation**

City	Percentage Allocation of Project Cost	2050 Capacity Allocation (mgd)	
		ADD*	PDD**
Talent	58.83%	1.858	3.972
Ashland	19.78%	1.600	1.600
Phoenix	21.78%	1.406	3.012

*Average Daily Demand (mgd)
** Peak Daily Demand (mgd)

The City’s system is supplied by MWC and interconnected with Talent and Ashland via the TAP supply.

SERVICE AREA

EXISTING SERVICE AREA AND LAND USE

The City’s current water service area coincides with the City limits. **Figure 1-1** presents the existing service area boundary as of 2017. Residents and businesses along Highway 99 to the north of the City are served by the Charlotte Ann Water District. The City does not serve customers outside of the City limits, nor any wholesale purchasers of water. The City recently acquired the services of several customers that were previously customers of the Charlotte Ann Water District whose parcels were located completely within the City limits. The City’s customer base is made up of residential connections with limited commercial and industrial users.

Existing land use and service area boundaries for the City are shown in **Figure 1-1**. Land use information was attained from the City's current zoning, with specific updates to known developments that differ from the City's Zoning Map updated March 8, 2018. Current zoning shows 42 percent of land use is devoted to single-family residential, 7 percent multi-family residential, 25 percent commercial, and 3 percent industrial.

POPULATION

The population within the City limits is 4,605 in 2017, as estimated from the Portland State University (PSU) College of Urban & Public Affairs Population Research Center (PRC).

EXISTING WATER SYSTEM

GENERAL

As discussed earlier, the City has two separate supply connections to MWC; the Experiment BPS and Regional BPS and the associated transmission piping. The supply system is illustrated in **Figure 1-2**.

Other than the two supply pump stations, the City's water system includes two distribution pump stations, three storage reservoirs, and approximately 25 miles of distribution piping. The majority of the City's customers are supplied by a single pressure zone with the exception of a few high-level customers located on a small hill in the south end of town near Amerman Road, that receive service from a continual running pump station. These facilities are described in further detail below. A hydraulic profile and figure of the existing system are depicted in **Figure 1-3** and **Figure 1-4**, respectively.

SUPPLY FACILITIES

The Experiment BPS is located near the intersection of Kings Highway and Experiment Station Road. Water from the MWC system is pumped from this station through approximately 6.5 miles of transmission mains.

Water is boosted to supply the City's two Shop Reservoirs located in the south part of the system at the City's operations center. The water is then pumped again utilizing the Shop Booster Pump Station (Shop BPS) to the main distribution system. These facilities were installed in 1982, when the City started obtaining water from MWC.

The TAP facilities consist of the TAP Regional BPS located on Samike Drive and a 24-inch transmission main that extends from the Regional BPS along Highway 99 to the City of Talent. Water is pumped from the MWC by one or more of the four pumps located in this facility to City's Eastside Reservoir. The reservoir provides the head to deliver flow to the Talent Booster Pump Station as shown in **Figure 1-3**. Talent subsequently pumps water to supply its customers and boosts water towards the City of Ashland, when required.

Table 1-4 outlines the pump capacity of the supply system.

**Table 1-4
City of Phoenix Supply Pump Stations**

	No. of Pumps	Horsepower (HP)	Rated Pumping Rate (GPM)	Normal Pump Rate (GPM)	Motor Type	Year Built	Backup Power
Regional BPS	2	125	3000	2000	VFD	2000	Onsite Generator & Fuel Tank
	2	50	1380	1000	Standard		
Experiment BPS	2	60	1200	1000	Standard	1982	Onsite Generator & Fuel Tank

Both supply pump stations are equipped with auxiliary power supplies. All water entering the City’s system is metered at one of the two main pump stations and a master meter is located on the south end of the City’s system on the 24-inch transmission line to record all water supplied to Talent and/or Ashland.

DISTRIBUTION SYSTEM PUMP STATIONS

The City has two distribution booster pump stations: one at the City Shops (Shop BPS) and the other on a small hill (Skyline BPS) located near the City Shops in the south part of the City. The Shop BPS boosts supply from the Shop Reservoirs to meet the pressure of the City’s main pressure zone, as set by the Eastside Reservoir, as seen in **Figure 1-3**.

Table 1-5 summarizes the distribution pump stations.

**Table 1-5
City of Phoenix Distribution Pump Stations**

	# of Pumps	Horsepower (HP)	Rated Pumping Rate (gpm)	Normal Pump Rate (gpm)	Motor Type	Year Built	Backup Power
Shop Pump Station*	2	40	720	500	VFD	1973	Onsite Generator & Fuel Tank
Skyline Pump Station	2	3	50	Varies	VFD	2002	Onsite Generator & Fuel Tank
	1	50**	1000	Varies	Standard		

* Pump station rebuilt and pumps replaced in 2000

**The 50 HP pump is a Fire Pump

STORAGE

The City has three active storage facilities. The two Shop Storage Reservoirs are located at the City operations center and receive the supply from the Experiment BPS. They have a combined capacity of 1.85 MG. The Eastside Reservoir with a capacity of 1.0 MG is located east of Interstate 5 directly above 3730 Fern Valley Road, the Pear Tree Truck Stop. This reservoir sets the hydraulic grade for the majority of the City’s customers as well as the TAP transmission system between Phoenix and Talent. The City reservoirs are summarized in **Table 1-6**.

**Table 1-6
Phoenix Storage Reservoirs**

Location	Material	Year Built	Base Elevation (ft)	Overflow Elevation (ft)	Diameter (ft)	Volume (MG)
Shop 1 Reservoir	Concrete	1973	1545.5	1565	55	0.35
Shop 2 Reservoir	Steel	1982	1545.5	1565	116	1.50
Eastside Reservoir	Concrete	2000	1657.5	1681	80	1.00
Skyline 1 Reservoir*	Steel	1967	1608	1636	38	0.25
Skyline 2 Reservoir*	Steel	1977	1608	1636	38	0.25

*Not in service

WATER DISTRIBUTION SYSTEM PIPING

The water distribution system consists of pipes ranging in size from 2 inches to 16 inches in diameter and are constructed from a variety of different materials. The total length of piping is approximately 131,000 feet. The system is in relatively good condition, is well looped, and has relatively low maintenance. **Figure 1-4** shows the water mains in the system color coded by pipe material. Outlined below in **Table 1-7** are the pipe material footage and diameters for the entire water distribution system (not including the 24-inch TAP piping).

Table 1-7
Phoenix Water Distribution System Piping

Material	Total Length of Distribution System Piping (ft)	Minimum Diameter (in)	Maximum Diameter (in)
Asbestos Cement	35,368	4	12
Ductile Iron	36,998	6	16
Galvanized	275	2	2
PVC C900	14,792	4	12
PVC PR200	36,405	6	12
Steel	1,874	2	6
Unknown	5,323	6	16
Total Length All Materials	131,034		

Note: Table does not include the 24-inch TAP piping.

CURRENT DEMANDS

HISTORICAL WATER PRODUCTION

A city's water supply, or production, is the total amount of water supplied to the system. For the City, total production is the water purchased from MWC. **Table 1-8** summarizes the total amount of water supplied in millions of gallons (MG) and millions of gallons per day (mgd) to the system from 2008 through 2017. A metering error was discovered and rectified in 2014, thus data from calendar year 2015 and forward is considered the most reliable supply data for the City.

**Table 1-8
Historical Water Production/Purchase**

Year	Annual MWC Purchase (mg)	ADD (mgd)	MDD (mgd)	Peaking Factor (MDD/ADD)
2008 ¹	296	0.81	1.45	1.79
2009 ¹	335	0.92	2.84	3.10
2010 ¹	301	0.83	2.06	2.50
2011 ¹	296	0.81	N/A ²	N/A ²
2012 ¹	327	0.89	1.87	2.09
2013 ¹	353	0.97	2.26	2.34
2014 ¹	310	0.85	1.90	2.24
2015	276	0.76	1.95	2.58
2016	272	0.75	2.17	2.91
2017	275	0.75	2.29	3.04
Average	304	0.83	2.09	2.51
Average 2015 – 2017¹	274	0.75	2.14	2.84

Note: ¹Accuracy of data not verified 2008 – 2014.
²MDD data not available for 2011.

Average Day Demand

Table 1-8 also presents the Average Day Demand (ADD) for the City. ADD is the total amount of water delivered to the system in a year divided by the number of days in the year. The ADD is determined from the historical water use patterns of the system and can be used to project future demands within the system. As seen in **Table 1-8**, ADD from 2008 through 2017 ranges from 0.75 mgd to 0.97 mgd; and the average ADD from 2015 to 2017, which has more accurate metering data, is 0.75 mgd.

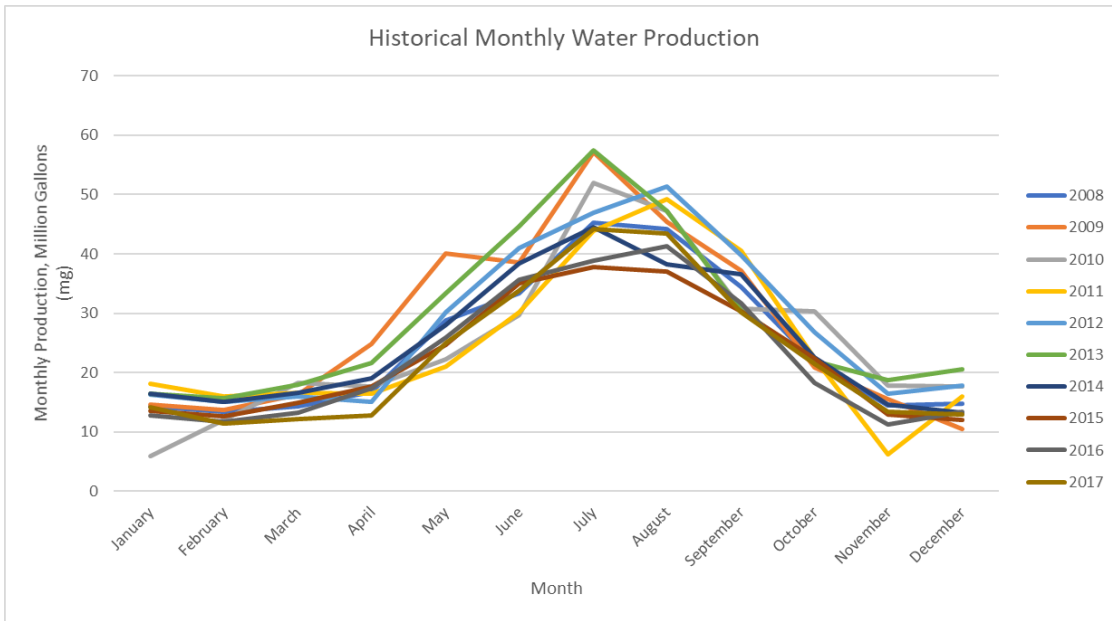
Seasonal Variation and Maximum Day Demand

Similar to other water systems in the northwest, the City's water use varies seasonally, typically peaking in the hot summer months due to high irrigation demands. **Chart 1-1** shows the historical amount of water supplied to the City's system for each month from 2008 to 2017. As seen in the chart, the City's highest water use typically occurs in July and August. Monthly water production increases from around 14 mg per month during winter months to approximately 46 mg per month during the summer months. Non-residential customers often peak at different times than residential customers throughout the year due to non-irrigation needs. However, it is common for communities with a higher number of residential customers, like the City, to observe peak demands driven by the residential irrigation water use.

Maximum Day Demand (MDD) is the maximum amount of water used throughout the system during a 24-hour period of a given year. **Table 1-8** presents the MDD from 2008 to 2017 based on MWC purchase data. The highest MDD occurred in 2009 with a peak of 2.84 mgd; however,

metering data may have been inaccurate during 2009. A metering error was discovered and rectified in 2014, thus data from calendar year 2015 and forward is considered the most reliable supply data for the City. The average MDD from 2015 to 2017, that has more accurate metering data, is 2.14 mgd. Projected MDD is often estimated as a factor of projected ADD, using what is called the MDD/ADD Peaking Factor. Using 2015 to 2017 data, the average MDD to ADD Peaking Factor is 2.84 (peaking factor is unitless).

**Chart 1-1
Historical Monthly Water Production**



HISTORICAL WATER CONSUMPTION

Water consumption is the amount of water used by all customers of the system, as measured by the customer’s meters. The City categorizes water customers into 20 different customer types for billing purposes. For planning purposes, the customers have been grouped into nine customer types according to similar demands per account. **Table 1-9** shows the number of connections, annual consumption, and average daily consumption per connection of each customer class for the City from 2012 to 2017.

**Table 1-9
Metered Consumption and Service Connections**

Number of Connections						
Customer Type	2012	2013	2014	2015	2016	2017
Single-family Residential	1,139	1,134	1,137	1,141	1,145	1,151
Multi-family Residential / Senior Housing	94	94	93	94	95	97
Mobile Home / RV Park	18	18	18	18	18	18
Commercial – Low	79	77	78	77	78	81
Commercial – Medium	25	24	26	25	25	26
Commercial – High	3	3	3	3	3	3
Industrial	4	4	4	4	4	4
Institutional	18	18	18	18	19	19
School	10	10	10	10	9	9
Total	1,390	1,382	1,387	1,390	1,396	1,408

Annual Consumption (mg)						
Customer Type	2012	2013	2014	2015	2016	2017
Single-family Residential	111	110	113	116	116	115
Multi-family Residential / Senior Housing	26	29	27	27	28	28
Mobile Home / RV Park	43	42	44	43	53	52
Commercial – Low	12	14	15	13	13	14
Commercial – Medium	15	14	14	19	18	16
Commercial – High	5	5	5	5	5	4
Industrial	4	2	1	1	1	1
Institutional	2	3	3	3	2	3
School	9	15	10	10	10	9
Total	226	233	231	236	244	242

Average Daily Water Use Per Account (gpd/account)

Customer Type	2012	2013	2014	2015	2016	2017	Average
Single-family Residential	266	266	273	278	278	274	274
Multi-family Residential / Senior Housing	765	831	784	796	801	795	795
Mobile Home / RV Park	6,499	6,326	6,760	6,555	8,032	7,879	7,008
Commercial – Low	427	511	513	460	450	474	472
Commercial – Medium	1,615	1,616	1,485	2,098	1,926	1,679	1,736
Commercial – High	4,467	4,588	4,157	4,157	4,259	3,888	4,252
Industrial	2,740	1,370	685	685	685	685	1,142
Institutional	267	396	401	410	349	368	365
School	2,338	4,132	2,781	2,749	2,911	2,863	2,962

Residential accounts are approximately 89 percent of all accounts. Residential consumption is approximately 59 percent of the total consumption. Commercial and industrial accounts make up approximately 8 percent of all accounts. Commercial and industrial consumption is approximately 14 percent of the total consumption. Institutional and school (public institution) accounts are approximately 2 percent and consumption is approximately 5 percent. **Table 1-10** compares the 2017 water use by sector to the data presented in the 2003 WMCP.

Table 1-10
Comparison of Water Use by Sector to 2003 WMCP

	2017	2003 WMCP
Residential accounts as percent of total accounts	89%	85%
Residential consumption as percent of total consumption	59%	63%
Industrial and commercial accounts as percent of total accounts	8%	Not identified
Industrial and commercial consumption as percent of total consumption	14%	25%
Public institution accounts as percent of total accounts	2%	Not identified
Public institution consumption as percent of total consumption	5%	12%

Large Water Users

Table 1-11 shows the largest water users of the system from 2015 to 2017, and their total amount of metered consumption for the year. The total water consumption of these water accounts represented approximately 20 percent of the system's total metered consumption on average from 2015 to 2017.

**Table 1-11
Largest Water Users**

Name	Address	Total Annual Consumption (gal)			
		2015	2016	2017	Average
Bear Lake MHC	300 Luman Rd	6,696,844	22,277,684	21,481,064	16,88,531
Phoenix-Talent School District	745 N Rose St	8,133,004	5,483,588	5,251,708	6,289,433
Holiday RV Park	201 N Phoenix Rd	4,138,684	4,234,428	3,728,780	4,033,964
Pear Tree Motel	3730 Fern Valley Rd	3,555,244	3,438,556	3,542,528	3,512,109
Pear Tree RV	3730 Fern Valley Rd	-	3,917,276	3,092,980	3,505,128
PSC-Restaurant	3730 Fern Valley Rd	3,105,696	2,564,144	2,894,012	2,854,617
PSC #24 Fuel Center	3730 Fern Valley Rd	2,440,724	-	-	2,440,724
Rogue Valley	4624 S Pacific Hwy	2,798,268	6,375,952	6,428,312	5,200,844
Bear Creek	610 N Main St	2,819,960	2,641,936	3,268,012	2,909,969
Home Depot	3345 Grove Rd	-	2,970,308	2,923,184	2,946,746
Greenway Village	4729 Pacific Hwy	2,280,652	-	-	2,280,652
Largest Water Users Total Consumption		35,969,076	53,903,872	52,610,580	47,494,509
Water System Total Metered Consumption		235,833,456	243,388,036	241,781,276	240,334,256
Percent of Total		15%	22%	22%	20%

Bulk Water Sales

The City allows bulk purchases of water to authorized account holders. Commonly, these are water trucks filling up using one of the City's two water fill-up stations. Purchased water is metered at the fill-up stations and the accounts are tracked and billed according to use. Water used by Rogue Valley Sewer Services (RVSS) for flushing sewer mains is also tracked and for planning purposes is included in bulk water sales. Bulk water meters consume only 0.04 percent of the City's total metered consumption. In 2016 and 2017 total bulk purchases averaged 87,959 gallons annually.

WATER LOSS

The difference between the amount of water supplied and the amount of authorized water consumption is considered to be unaccounted for water or water loss. Many issues contribute to water loss in a typical water system including water system leaks, inaccurate supply metering, inaccurate customer metering, illegal water system connections or water use, hydrant flushing, water main flushing, and malfunctioning telemetry and control equipment resulting in reservoir overflows.

The City’s water loss was calculated using data from 2015 to 2017 since those three years had the most reliable production data. **Table 1-12** shows the calculation of water loss as a percentage of total production. From 2015 to 2017 the average water loss was 12 percent. Future improvements to the water distribution system by the City should aim to reduce water loss to bring the water loss percentage down to or below 10 percent, a more acceptable level.

**Table 1-12
Water Loss**

Year	Total Annual Production (mg)	Total Annual Consumption (mg)	Water Loss (% of Production)
2015	276.30	235.83	15%
2016	272.30	243.39	11%
2017	274.60	241.78	12%
Average			12%

Data from 2018 and 2019 was not available when this WMCP was developed in 2018. The City experienced a devastating fire on September 8, 2020 and therefore, it is not feasible to coordinate with City Staff to add in 2018 and 2019 data at this time.

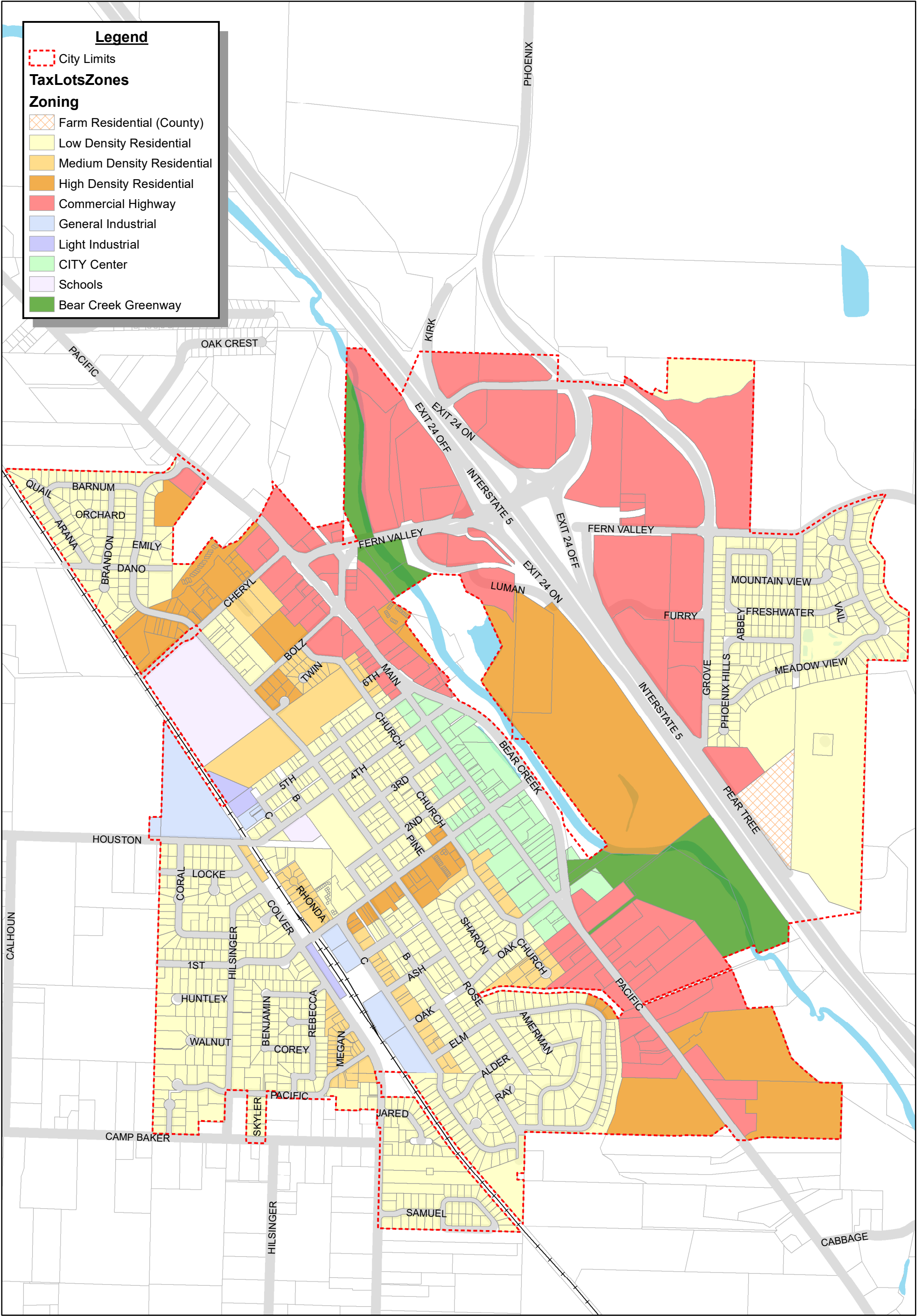
Table 1-2 City of Phoenix – Water Right Inventory

Application No.	Permit No.	Priority Date	Certificate No.	Transfer No.	Source	Use	Allowed Rate (cfs)	Actual Diversion				Authorized Completion Date	Notes/Environmental concerns
								Maximum Instantaneous Rate Diverted to Date (cfs)	Maximum Annual Quantity Diverted to Date (MG)	Average Monthly Diversion (MG)	Average Daily Diversion (Gallons)		
Municipal Water Rights													
S60890	S-47672	10/9/1980			Rogue River and Lost Creek Reservoir	Municipal	5.0 cfs in addition to 400 acre-ft	1.2 cfs	276 MG ¹	22.5 MG	750,000 Gallons	10/1/2001	
S71996	S-52650	11/15/1991			Rogue River and Lost Creek Reservoir	Municipal	3.1 cfs (516.27 acre-ft)					10/1/2030	
R60889	R8806	10/9/1980			Rogue River and Lost Creek Reservoir	Municipal	400 acre-ft	0	0	0	0	10/1/1985	
G4084	G3837	9/18/1967	39059		Anderson Creek Well 4, Well 5, Well 6	Municipal	0.15 cfs Well 4 0.33 cfs Well 5 0.10 cfs Well 6	0	0	0	0		Not used and not connected to the water distribution system. 2003 WMCP indicates that there were issues with water taste and odor from these wells.
		12/31/1914	GR1906		Anderson Creek Well 2	Municipal	0.4233 cfs	0	0	0	0		
		12/31/1912	GR1907		Bear Creek Well	Municipal	0.557 cfs	0	0	0	0		
Supplemental Irrigation Water Right													
G6009	G6827	2/27/1973	79220	T5489	Rogue River - Well	Supplemental Irrigation	0.1 cfs	0	0	0	0		Not used. 2003 WMCP indicates that this is not used due to high levels of boron.

1. A maximum total annual quantity of 353 MG was recorded as purchased from MWC in 2013 but the accuracy of data from 2008 to 2014 could not be verified. A metering error was discovered and rectified in 2014. The most reliable maximum annual quantity is 276 MG in 2015.
 2. The diversions in the table are water purchased from MWC. Since MWC provides wholesale water to multiple cities, it is difficult to determine the exact amount of water diverted for use in the City of Phoenix. MWC purchase amounts are the best estimate of water diverted for Phoenix.

Legend

- City Limits
- TaxLotsZones**
- Zoning**
- Farm Residential (County)
- Low Density Residential
- Medium Density Residential
- High Density Residential
- Commercial Highway
- General Industrial
- Light Industrial
- CITY Center
- Schools
- Bear Creek Greenway



J:\DATA\PHX\1018-019 WMP\DATA\GIS\PHOENIX_EXISTINGLANDUSEMAP.MXD BY: HFARRIS PLOT DATE: AUG 31, 2020 COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON NORTH FIPS 4601 FEET

RH2

NORTH

1 inch = 800 feet

0 205 410 820 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 1"



Figure 1-1
Existing Land Use
City of Phoenix
Water Management and Conservation Plan

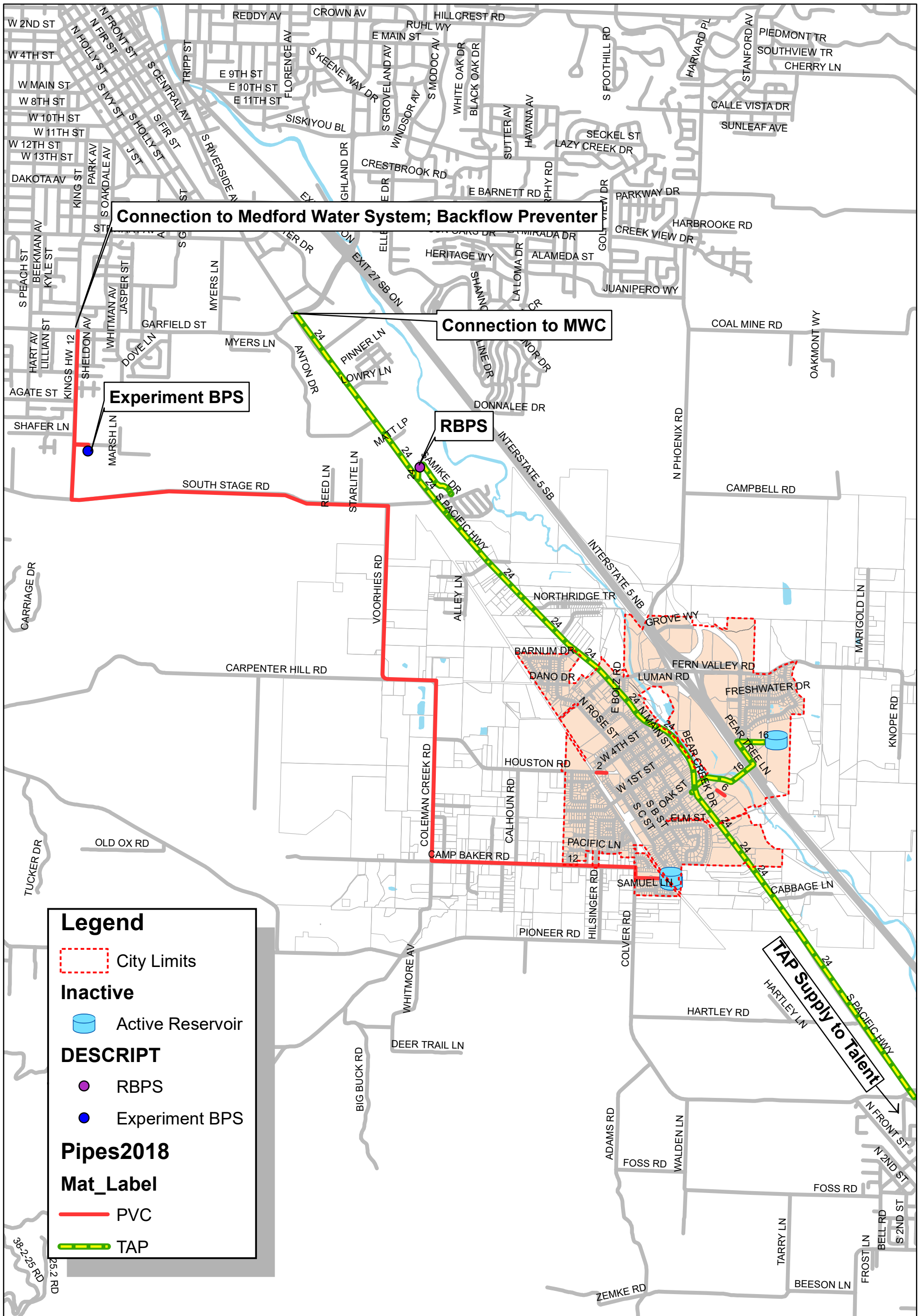
Vicinity Map



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J:\DATA\PHX\1018-019 WMP\DATA\GIS\PHOENIX_EXISTINGSUPPLYSYSTEM.MXD BY: HFARRIS PLOT DATE: AUG 31, 2020 COORDINATE SYSTEM: NAD 1983 STATEPLANE OREGON SOUTH FIPS 3602 FEET

RH2

NORTH

1 inch = 2,494 feet

0 650 1,300 2,600 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 1"



Figure 1-2 Existing Supply System City of Phoenix Water Management and Conservation Plan

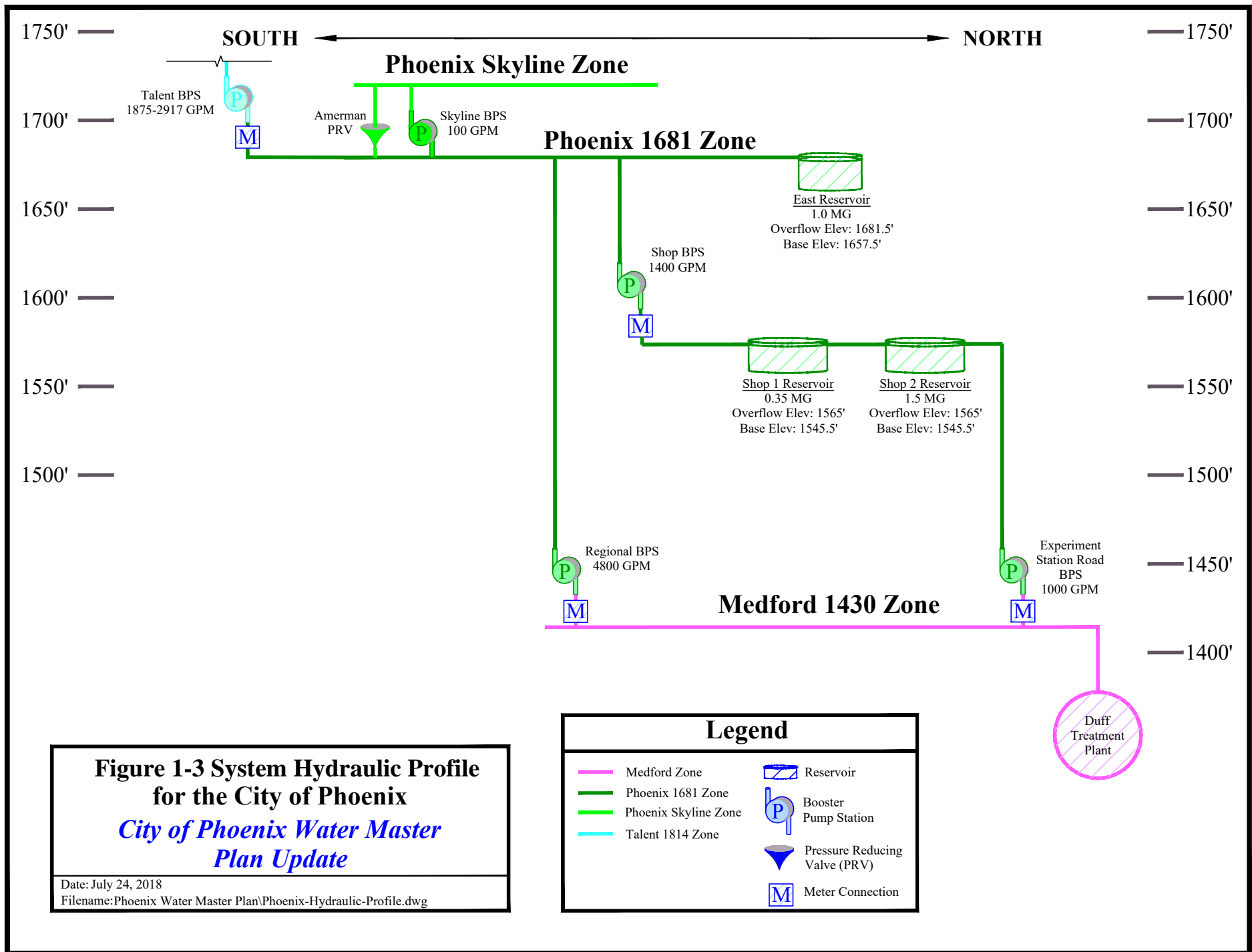
Vicinity Map

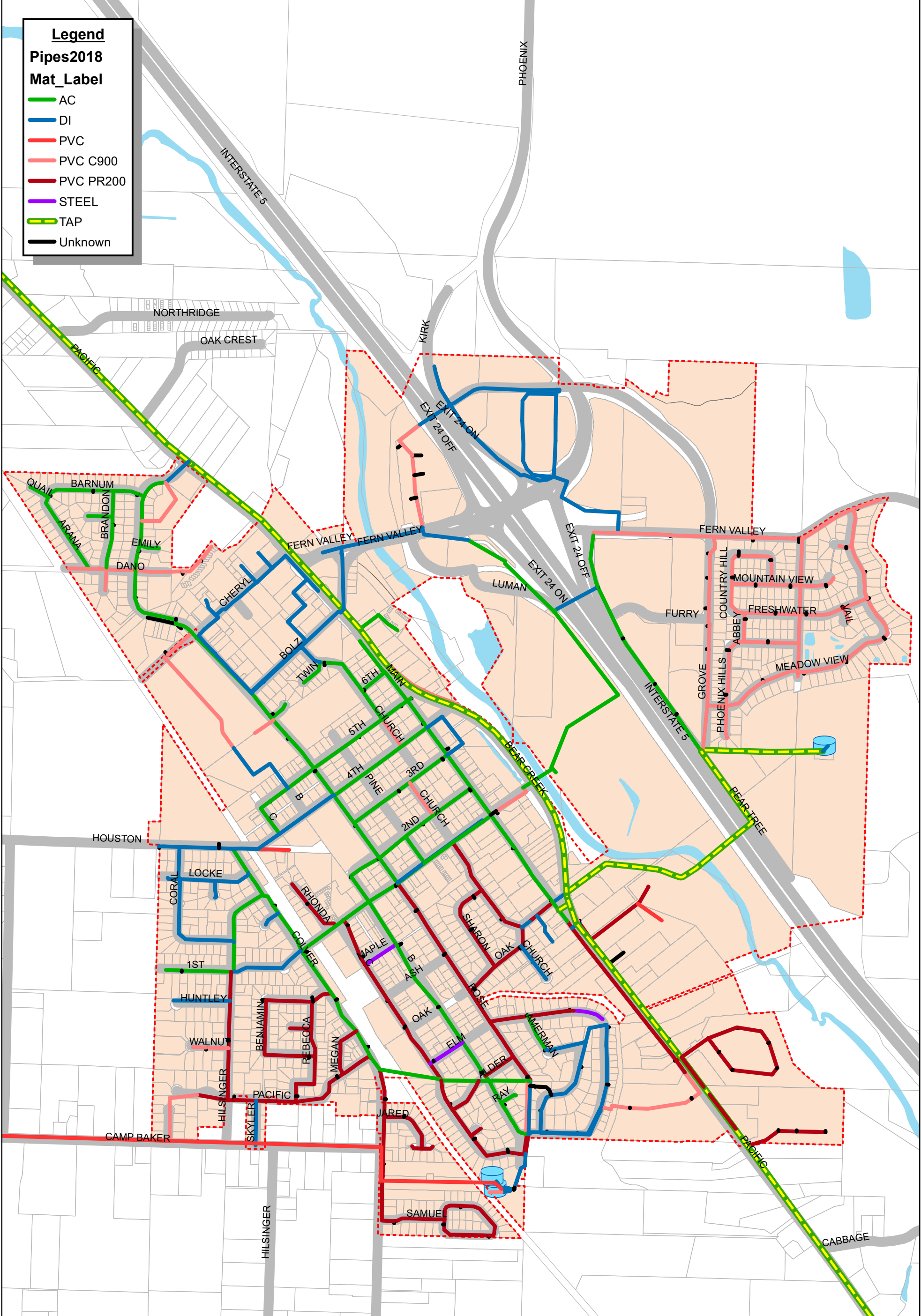
HERE: Garmin, (c) StreetMap contributors,

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J:\DATA\PHX\1018-019 WMP\DATA\GIS\PHOENIX_EXISTINGSYSTEMMAP_2018PIPES.MXD BY: HFARRIS PLOT DATE: AUG 31, 2020 COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON NORTH FIPS 4601 FEET

NORTH

1 inch = 800 feet

0 205 410 820 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 1"



Figure 1-4 Existing System Map City of Phoenix Water Management and Conservation Plan

Vicinity Map

HERE: Garmin, (c) StreetMap contributors,

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Legend

City Limits

Urban_Growth_Boundary_PHX

NAME

Medford

Phoenix

Urban_Reserves_PHX

NAME

MD-5

PH-1

PH-10

PH-1a

PH-3

PH-5

CompZone2018

CompZone

Residential Hillside

Low Density Residential

Medium Density Residential

High Density Residential

Residential Employment

Interchange Business

Commercial

Industrial

City Center District

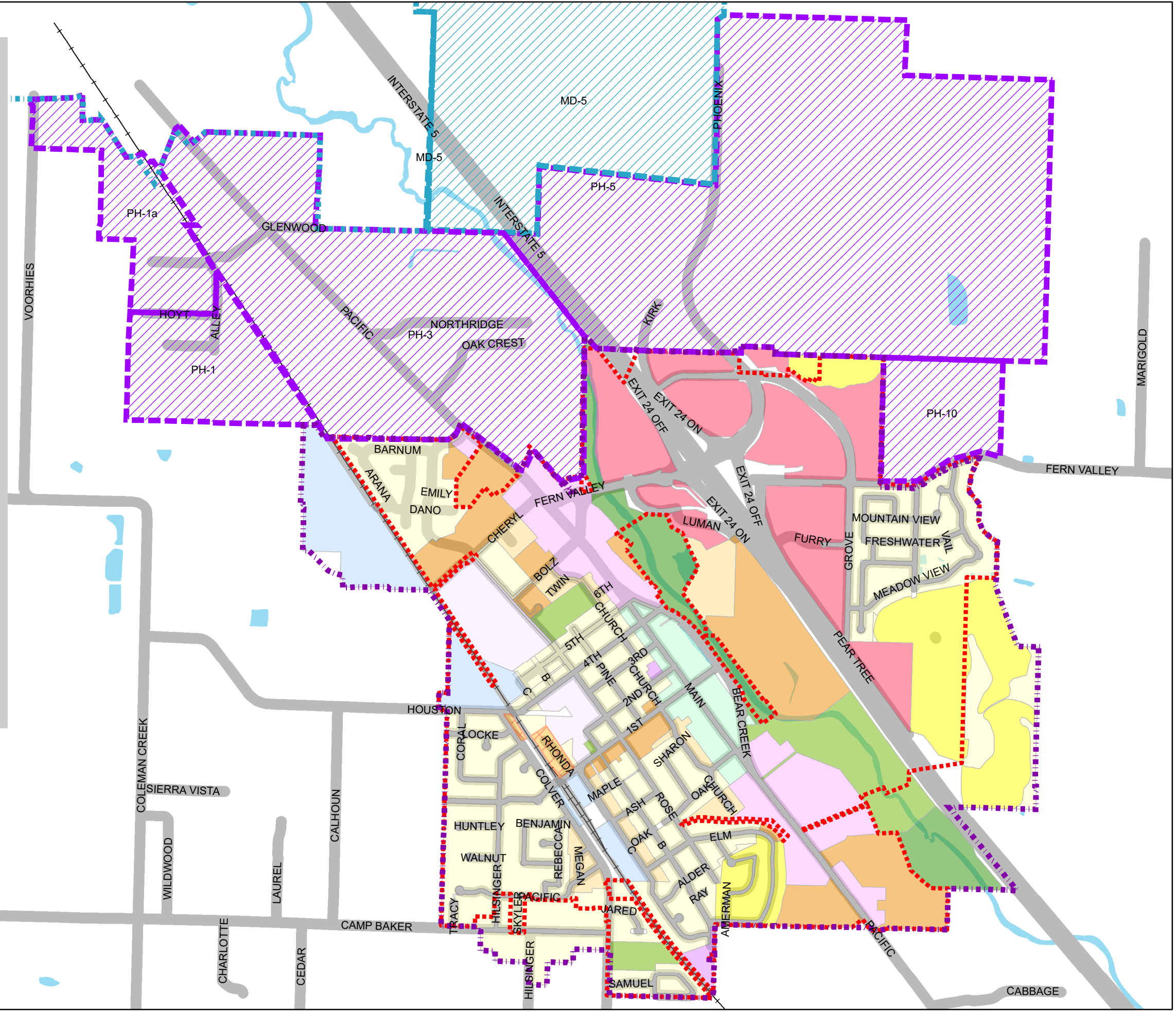
Public

Schools

Bear Creek Greenway

Parks and Open Space

Railroad



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Vicinity Map



COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON NORTH

BY: HFARRIS PLOT DATE: SEP 15, 2020

WMPDATA\GIS\PHOENIX_WMCP_FIG1-5_FUTURELANDUSEMAP_LANDSCAPE.MXD

Figure 1-5

**Future Land Use
City of Phoenix
Water Management
and Conservation Plan**



1 inch = 1,200 feet

0 305 610 1,220 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 1"



J:\DATA\PHX\1018-019_WMP\DATA\GIS\PHOENIX_WMCP_FIG1-5_FUTURELANDUSEMAP_LANDSCAPE.MXD

2 | WATER CONSERVATION

PROGRESS REPORT - PREVIOUS CONSERVATION MEASURES

The City's last Water Management Conservation Plan (WMCP) was prepared in 2003 and included the list of conservation measures shown in **Table 2-1**. Almost all conservation measures identified in the 2003 WMCP (with updates provided in the 2009 WMCP Five-Year Progress Report) have been implemented by the City. The exceptions are conservation kits and credit for installation of water efficient appliances as discussed below.

Table 2-1
2003 WMCP Conservation Measures

Conservation Measure	Previous WMCP Benchmark	Benchmark Met? (Y/N)
Leak Detection Survey	Every 5 Years	Y
Meter Testing and Replacement	On-going	Y
Water Audit	Monthly	Y
Leak Detection and Repair/ Replacement	On-going	Y
Public Information	Bi-Annually	Y
Efficient Fixtures in City Facilities	June 2005	Y
Rain Sensors in City Parks	April 2004	Y
Distribution of Conservation Kits	On-going	N
Credit for Installation of Water Efficient Appliances	On-going	N
Distribution of Lawn Watering Gauges (included in Conservation Kits)	On-going	N

DISTRIBUTION OF CONSERVATION KITS

A goal from the 2003 WMCP is to distribute conservation kits to high water users. The kits were planned to include:

- Lawn Watering Gauges
- Low-Flow Shower Heads
- Faucet Aerator for Kitchen Faucet
- Information on "Other Ways to Conserve Water"

The City is still interested in implementing a conservation kit program, but no program exists at this time.

CREDIT FOR INSTALLATION OF WATER EFFICIENT APPLIANCES

Another conservation goal identified in the 2003 WMCP was to provide one-time credit to customers who installed water efficient appliances such as dishwashers, toilets, and washing machines. No program for this has been put in place due to limitations in administrative staffing, and

the City does not foresee this changing. However, the City proactively and successfully encourages developers to install high efficiency appliances in new buildings including public buildings.

WATER USE MEASUREMENT / REPORTING PROGRAM

The City is in full compliance with OAR 690-085 which governs the City's water use measurement and reporting program. Reports are submitted by December 31 of each year. The City reports to Medford Water Commission (MWC) and MWC, in turn, reports to the State (OWRD) on behalf of the City. The City's water purchases are measured as the sum of the TAP meter and the second Phoenix supply meter at Experiment Station Road, minus the metered supply to the City of Talent. Thus, measurement of the City's production requires accurate metering for three significant meters. City staff and others identified errors and made repairs at two of these meters over the past several years; thus, the City's production data was inaccurate for some time prior to the year 2015, but has been considered accurate since then.

CURRENT CONSERVATION MEASURES

The City is actively working to conserve water. **Table 2-2** summarizes the City's current conservation measures, which are organized by the OWRD basic conservation measures required of all suppliers, and enhanced conservation measures required of select suppliers. As seen in the table, the City is actively implementing all basic conservation measures and some of the additional enhanced measures.

Because the City's water system leakage exceeds 10 percent (2017 water loss was 12 percent), the City has established two- and five-year benchmarks to meet OAR 690-086-0150(4e). The City implements a proactive leak detection and waterline repair program as described below. Under the requirements of OAR 690-086-0150(5), the City is required to implement enhanced conservation measures since it is proposing to expand or initiate the diversion of water under an extended permit for which environmental resource issues have been identified.

The following sections describe the City's implementation for basic and enhanced conservation measures. The City is not implementing any additional conservation measures above and beyond the OWRD requirements.

**Table 2-2
Current Conservation Measures**

Conservation Measure	Description	Measure Implemented? (Y/N)
<i>Basic Conservation Measures Required of All Water Suppliers:</i>		
Annual Water Audit	Annual water audit comparing billing information to water supplied	Y
Fully Metered System	Metering of all customers	Y
Meter Testing and Replacement Program	Test and replace water meters when reading meters or if a leak is reported by a customer	Y
Rate Structure	Based on the Quantity of Water Metered	Y
Leak Detection Program	System-wide leak detection and on-going repair and detection of leaks	Y
Public Education Program on Water Conservation	Provide water conservation tips and education to the public	Y
<i>Enhanced Conservation Measures Required of Select Suppliers:</i>		
Program to Reduce Leakage to 10%	Proactive leak management and pipe repair	Y
Rate Structure that Encourages Conservation	Tiered structure with increasing costs as water usage increases	Y
Technical and Financial Assistance		N
Retrofit/Replacement of Inefficient Water Using Fixtures		N
Water Reuse, Recycling, and Non-Potable Opportunities		N

BASIC CONSERVATION MEASURES

Annual Water Audit

The City documents production and consumption of water monthly. Data collection includes metered billing of customers, flow data from telemetry (SCADA), bulk sales, and hydrant utilization. Calculations are performed and presented in an annual water audit indicating “unaccounted for” water, otherwise known as water loss. As indicated in **Chapter 1**, the City’s average water loss over the last three years is approximately 12 percent. This is higher than the generally accepted goal of 10 percent, thus the City continues ongoing efforts to improve meter accuracy, water use accounting (such as bulk sales and hydrant flushing), and aggressive leak detection and repair.

Full Metering of the System

All sources of supply and all water customers in the City are fully metered.

Meter Testing and Maintenance Program

The City currently has an aggressive meter testing and maintenance program. In the past year, every school meter and a large commercial meter were replaced. Additionally, multiple single-family and multi-family residential meters were replaced. City staff check meters regularly and respond to any customer complaints. The City and MWC regularly calibrate the large supply meters. Meters larger than 1-inch are tested once every five years. Meters smaller than 1-inch are replaced every 10 to 15 years.

Rate Structure

All customer use in the City is monitored using metered accounts. **Table 2-3** below shows the City’s inclining block rate structure. The City has adopted a monthly base charge of \$36.09 for the first 5,000 gallons of water used. Beyond this base amount, the City charges an additional 1,000 gallons over the minimum in increasing block rates. This water rate structure encourages customers to stay within the 5,000 gallons base charge thus encouraging conservation. This rate structure therefore meets the rate structure goals of the enhanced conservation measures.

**Table 2-3
Current Inclining Block Rate Structure**

Minimum Billed Usage	5,000 Gallons (Applies to each single-family structure, multi-family structure, or mobile home park)
0 – 5,000 Gallons	\$36.09
Residential	
5,001 – 10,000 Gallons	\$1.98 per thousand gallons over minimum
10,001 – 50,000	\$2.45 per thousand gallons over 10,000
50,001 and over	\$2.55 per thousand gallons
Commercial and Industrial	
5,001 – 10,000 Gallons	\$1.98 per thousand gallons over minimum
10,001 – 50,000	\$2.45 per thousand gallons over 10,000
50,001 and over	\$2.55 per thousand gallons

Leak Detection Program

The City performed a system-wide leak detection survey in 2007. Additionally, leak detection and repair are regular parts of maintenance. Maintenance staff regularly check for leaks and respond to customer reports of leaks. Leaks in the City are largely caused by inadequate pipe materials or installation, joint failures, service line failures, and general aging. A full list of repairs is not available; however, progress can be seen by the fact that the City’s estimated leakage has dropped from 15 percent in 2015 to 12 percent in 2017. Data was not available for 2018 and 2019 at the time this plan was developed (in 2018).

Additionally, the City is proactively replacing its aging Asbestos-Cement (AC) pipe. The City has incomplete data on the age of pipes in the system but can make assumptions based on the age of

surrounding development. Pipes in the original downtown area that have not yet been replaced are likely candidates for future pipe replacement and leak reduction.

Public Education Program

The City historically provided water conservation flyers to the public that were available at City Hall and Public Works Departments and were also distributed at public meetings and events. Due to changes in staff, this practice has reduced in the last few years and needs to be reinstated.

ENHANCED CONSERVATION MEASURES

Program to Reduce Leakage to 10 Percent

As described above in leak detection, the City regularly identifies and fixes leaks. The City has an annual budget to replace aging pipe, which are common sources of leaks. Additionally, the City now monitors production vs. consumption data on a seasonal basis to track leakage estimates. It is assumed that with ongoing leak detection and pipe replacement, that the City will achieve a water loss of 10 percent or less. This assumption is used in the City's low demand projections.

The two-year benchmark for reducing water loss to 10 percent or less by continuing the leak detection and annual pipe replacement programs and monitoring production vs. consumption is August 2022. It is assumed that with the above listed efforts, the City will achieve a water loss of 10 percent or less in the next two years.

If these efforts are not effective at reducing water loss to below 10 percent, the City will employ a contractor such as American Leak Detection Services to perform a leak detection program to determine areas of leaks throughout the City until water loss is reduced to 10 percent or less. The five-year benchmark for completing these additional leakage reduction measures is August 2025.

Technical and Financial Assistance Programs

Technical and financial assistance programs recommended include rebates, cost-share programs, water audits, training in efficient equipment or actions, training for landscapers, contractors, etc., and parks and golf course irrigation efficiency assistance. As a small, largely residential community, the City has few if any large water users that would warrant financial or technical assistance. The City's larger park is irrigated with irrigation water. The City has considered issuing rebates for high-efficiency appliances and fixtures; however, the cost to administer these programs has prohibited the City from implementing these programs in the past.

A recent conservation study was developed by the Southern Oregon Municipal Water Conservation Work Group for municipal water providers in the Rogue Valley called the *Southern Oregon Water Conservation Strategies Plan* (2013, Maddaus). The study included a 30-year benefit-cost analysis of 27 applicable conservation measures considering the costs of implementation and offset costs of water supply from the MWC. The resulting benefit-cost ratios of the financial assistance programs are listed in **Table 2-4**. As seen in the table, none of the measures have a benefit-cost ratio above 1, indicating that the costs to implement are higher than their estimated benefit. The study did include toilet rebates in the recommended top-priority conservation strategy, even though the benefit-cost ratio is only 0.65. Due to these low benefit-cost ratios, the City is not planning to implement technical or financial assistance programs at this time. However, if programs to implement these measures are developed at a regional level (such as implemented by the MWC), the reduced administrative burden on City staff may warrant implementation. The City will continue

participation in regional conservation planning (largely led by MWC) to follow the development of these measures. The City is not requesting greenlight water at this time.

**Table 2-4
Benefit-Cost Ratios for Conservation Measures**

Conservation Measure	Benefit-Cost Ratio from Southern Oregon Conservation Strategies Plan
High-Efficiency Toilet Rebates	0.65
High-Efficiency Urinal Rebates	0.81
Hot Water on Demand Rebates	0.05
High-Efficiency Residential Washer Rebate	0.23
CII Clothes Washer Rebate	0.04
CII Rebates to Replace Inefficient Equipment	0.30
Financial Incentives for Irrigation and Landscape Upgrades (Residential)	0.04
Financial Incentives for Irrigation and Landscape Upgrades (Commercial)	0.20

Retrofit/Replacement of Inefficient Water Using Fixtures

The City plans to implement the previously identified program of distributing conservation kits that include faucet aerators, high-efficiency shower heads, and lawn watering gauges. The City will work to purchase supplies and assemble kits for distribution at public events and other customer interactions. The City’s goal is to regularly distribute conservation kits by 2025.

Rate Structure/Billing Practices for Conservation

While the City already implements an inclining block rate structure, it could be further structured to incentivize conservation. The City plans to review its rate structure by 2020 to assess a more conservation-focused rate structure that meets base operational costs and incentivizes lower water use.

Water Reuse, Recycling, and Non-Potable Opportunities

The City has limited opportunities for water reuse, recycling, and non-potable applications. The City does not own or operate a wastewater treatment plant; wastewater is conveyed and treated several miles away by the Rogue Valley Sewer Services and City of Medford. Additionally, the City has a limited number of parks, industrial customers, or large irrigation customers for which recycled water would provide benefits. As noted before, the City’s parks are mainly irrigated with irrigation water already. With no reuse supply water and very limited potential applications, implementing these measures is not applicable to the City.

Other Proposed Measures

The City is interested in implementing code requirements for high-efficiency appliances, efficient irrigation systems, and prohibition of waste. Code requirements for landscaping and efficient

irrigation systems showed a benefit-cost ratio of 3.63 in the 2013 Southern Oregon Conservation Strategies Plan. The City will plan to implement these code changes by 2025.

CONSERVATION GOALS

City conservation goals are to continue with all current conservation measures and to add the following conservation measures listed in **Table 2-5**.

Table 2-5
Future Conservation Goals

Conservation Measure	Description	Goal Completion Date
Public Education	Provide water conservation fliers at public events and have available at City Hall and Public Works.	2025
Conservation Kits	Distribute conservation kits to customers or give them away at community events.	2025
Code Requirement for High-Efficiency Appliances	Create a City ordinance requiring high-efficiency appliances in new buildings.	2025
Code Requirement for Efficient Irrigation for Landscaping	Develop water-conserving landscape and irrigation codes.	2025
Code Reduce of Water Waste	Develop a code that reduces water waste.	2025
Rate Structure Review	Perform a water rate structure review to evaluate the effectiveness of the existing inclined block rate structure.	2020

3 | WATER CURTAILMENT

INTRODUCTION

Water curtailment planning outlines actions for reducing water demand during emergency or drought conditions while maintaining essential water needs to City customers. The City developed its first Water Curtailment Plan in 1992 and amended it in 2003 to be fully compliant with OAR 690-019-0090. City Ordinance 13.04.120 formally adopts the 2003 City of Phoenix Water Curtailment Plan.

As a wholesale water customer of the Medford Water Commission (MWC), the City depends on the MWC supplies for reliability. A regional drought or water emergency would equally impact MWC customers as well as its wholesale customers, thus curtailment will be required at a regional level. The City's purchase agreement with the MWC (Appendix 1A, Article 11) states that during drought or emergency, the City is subject to the MWC Water Curtailment Plan, unless the City's approved plan is more stringent. It also states that the MWC will determine the level of curtailment and the City is responsible for enforcing the MWC plan.

In comparing the City's 2003 Water Curtailment Plan to the MWC's latest Water Curtailment Plan (2017), it was identified that the MWC Plan is more stringent. Thus, it is recommended that the City revise its' curtailment plan and/or formally adopt the MWC Plan (**Appendix B**). This update will need to be approved by the City Council and may take some months after completion of this WMCP. The following sections describe the MWC curtailment actions to reflect this recommendation.

SUPPLY ASSESSMENT

The City's two supply connections both come from the MWC, which has redundant supply sources (Big Butte Springs and the Rogue River) and a large networked transmission system to the points of delivery to Phoenix. However, the 2017 MWC Water Management and Conservation Plan identifies that if one of the two MWC sources were interrupted during summer peak demand season, curtailment would be necessary. The MWC identified the following potential causes of water supply shortages:

- Long-Term Drought
- Fire in the Big Butte Springs or Rogue River watersheds that affects water quality
- Contamination, such as from a chemical spill, that necessitates shutting down either water source
- Flooding that forces shutdown of one or more facilities
- Landslides or another natural disaster that damage water pipelines or facilities
- Power outages, particularly those impacting the Duff WTP
- Facility or equipment failure, either from natural or human causes

The City has not implemented curtailment in the past 20 years due to stable, consistent supply sources. The MWC provided Stage 1 notification of a possible water supply shortage due to planned work at the Duff Water Treatment Plant that coincided with low water storage in the Big Butte Springs system. During the drought years 2014 and 2015, MWC was able to meet all demands without implementing curtailment notifications.

STAGES OF ALERT & CURTAILMENT ACTIONS

As discussed above, it is recommended that the City adopt MWC's 2017 Curtailment Plan, as summarized in MWC's 2017 Water Management and Conservation Plan. MWC's curtailment plan is included in **Appendix B**. The stages of alert and curtailment actions are summarized in **Table 4-1** of the Curtailment Plan which is also shown below.

Table 4-1
MWC's 2017 Curtailment Plan

Stage	Initiating Conditions	Actions
1. Awareness of Potential Water Shortage	A series of indicators suggest that a future shortage is possible; these may include drought-related conditions or other supply factors	Raise public awareness about potential for water shortage through such means as general articles in newsletters, newspapers, website, and social media
2. Potential Water Shortage Alert	Continued and/or further indicators raise concerns about the ability to meet supply needs unless demand levels are reduced, or Sustained demand reaches 90 percent of supply	Enhance public awareness and outreach efforts to convey potential water shortage message Request voluntary water use reductions Consider rate surcharges
3. Water Shortage	Indicators show that supply and/or delivery capacities are strained to meet current demand levels; these may include: Sustained demand reaches 95% of supply or delivery capacities, or Water storage facility(ies) is/are not routinely refilling, and Manager determines that continuation could result in inability to meet fire protection or other essential needs.	Strengthen notification messages and further outreach methods regarding water shortage conditions. Impose mandatory restrictions on water use Consider potential enforcement of restrictions Consider rate surcharges or increase of charges from Stage 2
4. Severe Water Supply Shortage	Series of indicators show that water consumption levels must be immediately reduced; indicators may include: Sustained demand is exceeding normal supply or delivery capacities, or Water storage facility(ies) is/are only 2/3 full, and Manager determines that ability to meet fire protection or other essential need is jeopardized. Supply or delivery capacities have been reduced by up to 35%	Provide urgent notification messages; significant outreach/customer notification Impose further mandatory restrictions on water use Enforce restrictions Impose or increase rate surcharges
5. Emergency Water Supply Disruption	Major water use reductions are deemed necessary to avoid system failure, inadequate fire protection capability and/or to assure protection of water quality; indicators may include: Sustained demand continues to exceed supply or delivery capacities, or Water storage facility(ies) is/are only 1/3 full Supply source or major facility is lost, reducing supply or delivery capabilities to less than 65% of capacities	Provide extreme alert; urgent notification of customers, both by broadcast means and direct notification Only essential water use allowed Enforce significant restrictions on use Impose heightened rate surcharges

4 | WATER SUPPLY EVALUATION

INTRODUCTION

This chapter describes the City’s planned supply improvements to meet projected water demands. Below are descriptions of the City’s future service area, demand projections, and long-term supply strategy.

FUTURE POPULATION AND SERVICE AREA

POPULATION PROJECTION

According to the Portland State University (PSU) College of Urban & Public Affairs Population Research Center (PRC), the City should anticipate a 2040 population of 5,923 people. This represents a 29 percent growth over the 2017 population and equates to an average of 1.1 percent growth per year.

FUTURE SERVICE AREA AND LAND USE

City planning is coordinated with regional planning efforts under Jackson County. The City is an important partner of the County’s Greater Bear Creek Valley Regional Problem Solving (RPS) Plan. The goal is to establish a long-term land use plan that will coordinate the use of development lands among the partnering communities while preserving sufficient inventories of agricultural lands, open spaces, and shared community interests. In addition, the RPS plan recognizes the need for developing adequate infrastructure to support the noted growth and meeting the overall objectives of preserving a high standard of living throughout the Greater Bear Creek Valley.

Growth of the City’s water system is comprised of infill within the existing City limits, expansion to the Urban Growth Boundary (UGB), and expansion to Urban Reserve Areas. **Figure 1-5** presents the Comprehensive Plan Land Use and currently anticipated areas of expansion.

Under the RPS, the City is assigned a number of important growth areas (PH-1, PH-1a, PH-3, PH-5, and PH-10) that represent possible future service areas for the City. In addition, the City also has a few potential tracts of land identified within its present Urban Growth Boundary that may extend its municipal boundaries over the next 20 to 40 years. The City is considering amendments to its Comprehensive Plan to reflect that several previously identified areas of development are not buildable due to access and slope limitations.

The City’s agreement with MWC restricts the addition of any new customers unless they reside within the City’s municipal boundary. Hence, water service into any areas beyond the City’s current municipal boundary requires annexation.

From discussions with City staff, the PH-1, PH-1a, and PH-3 are not anticipated to be served by the City’s water system as they are served by the Charlotte Ann Water District. Residents and businesses in these areas are outside the City limits but are supported by urban services, and thus have little incentive to annex to the City. Thus, it is assumed for this WMCP that these areas will not be served by the City in the near future. The City would like to eventually annex all of these areas and/or take over the Charlotte Ann Water District. Further analysis would be required in the case that the City takes over the Charlotte Ann Water District.

The City is actively planning to accommodate its anticipated growth through infill and expansion (see **Chapter 1** for Existing Service Area & Land Use). The City’s planned growth has been categorized into three categories under this WMCP:

1. **Infill in the existing City limits.** Infill is the transition of existing land use into future planned land use as governed by the City’s Comprehensive Plan.
2. **Development up to the Urban Growth Boundary (UGB).** Development in the UGB is also determined by the City’s Comprehensive Plan.
3. **Development of Urban Reserve Areas.** Estimates for growth in these areas were provided by the City.

Table 4-1 summarizes the assumptions for timing and degree of development for both a low and high growth scenario in each of the three areas. The total growth of all new accounts was adjusted in the planning years to match the PRC population projections.

**Table 4-1
Growth Scenarios**

Growth Scenario	Area	5-Year (2025)	20-Year (2040)	Build-Out (Year Unknown)
Low	Current City Limits	Partial Infill Based on Current Comp Plan; Rate According to PSU Projections	Partial Infill Based on Current Comp Plan; Rate According to PSU Projections	Full Infill Based on Current Comp Plan
	Urban Growth Boundary	None	Full UGB Development	Full UGB Development
	Urban Reserve Areas	None	Partial PH-10	Full URA Development
High	Current City Limits	Partial Infill Based on Higher Density	Full Infill Based on Higher Density; Rate According to PSU Projections	Full Infill Based on Higher Density
	Urban Growth Boundary	None	Full UGB Development	Full UGB Development
	Urban Reserve Areas	Partial PH-5, Partial PH-10	Partial PH-10, Partial PH-5	Full URA Development

FUTURE WATER DEMANDS

Demand projections are based on several assumptions including anticipated growth of the City and estimated water use of existing and future customers. Because these factors vary, both a low and a high demand scenario were developed to bracket the potential range of demands the City could experience in the future. Demand projections are provided for 5-year, 20-year, and 50-year Build-Out scenarios. For simplification, these are translated to the years 2025, 2040, and 2070 (Build-Out). The following sections summarize the assumptions used for the City’s demand projections.

PLANNING ASSUMPTIONS

Growth assumptions summarized in **Table 4-1** were used to estimate low and high land use in the City's service area. To estimate the water use from new development, it is necessary to convert land use acreage to customer accounts using density assumptions. **Table 4-2** presents the density assumptions used for the different customer classifications for the low and high demand scenarios.

Table 4-2
Housing Density Assumptions

Customer Type	Low Projections	High Projections
	Accounts/Acre	Accounts/Acre
Single Family Residential	5.00	8.00
Multi-Family Residential/Senior Housing	1.00	3.75
Mobile Home/RV Park	0.75	1.25
Commercial – Low	1.00	1.10
Commercial – Medium	2.38	2.62
Commercial – High	3.00	3.30
Industrial	0.40	0.44
Institutional	0.45	0.50
School	0.45	0.50

The next step after converting the acreage of infill and growth to new accounts is to convert new accounts to equivalent residential units (ERUs). An ERU represents the typical water usage for one single-family residence. Other types of customers are compared to single-family residential customers by converting their usage to ERUs. **Table 4-3** presents the assumptions used for ERUs for existing and new customers. New residential customers use less water per account than existing customers due to higher efficiency appliances, plumbing, and irrigation, and are thus assumed to be 80-percent of an ERU. These assumptions are the same for the low and high demand scenarios.

Table 4-3
ERU Assumptions

Customer Type	Existing Customers ERUs/Account	New Customers ERUs/Account
Single Family Residential	1.0	0.8
Multi-Family Residential/Senior Housing	2.9	2.3
Mobile Home/RV Park	28.7	28.7
Commercial – Low	1.7	1.7
Commercial – Medium	6.1	6.1
Commercial – High	14.2	14.2
Industrial	2.5	2.5
Institutional	1.3	1.3
School	10.4	10.4

Table 4-4 presents the remaining demand projection assumptions used for projecting the low and high demand scenarios. The high demand scenario assumes an ERU value of 280 gpd/ERU, bulk sales increasing by 10 percent, a water loss value of 15 percent of total production (slightly more than the current 12 percent average), and a Maximum Day Demand (MDD) to Average Day Demand (ADD) peaking factor of 3.0. The low demand scenario reflects conservation elements and assumes a lower ERU value of 270 gpd/ERU, bulk sales matching current demands, a water loss value of 10 percent of total production to reflect leak reduction measures, and a MDD to ADD peaking factor of 2.6 which reflects more efficient summer water use.

**Table 4-4
Additional Demand Projection Assumptions**

Demand Category	Units	Demand Scenario	
		Low	High
ERU Value	gpd/ERU	270	280
Bulk Sales	gpd	241	265
Water Loss	% of Production	10%	15%
MDD/ADD Peaking Factor	unitless	2.60	3.00

DEMAND FORECASTS

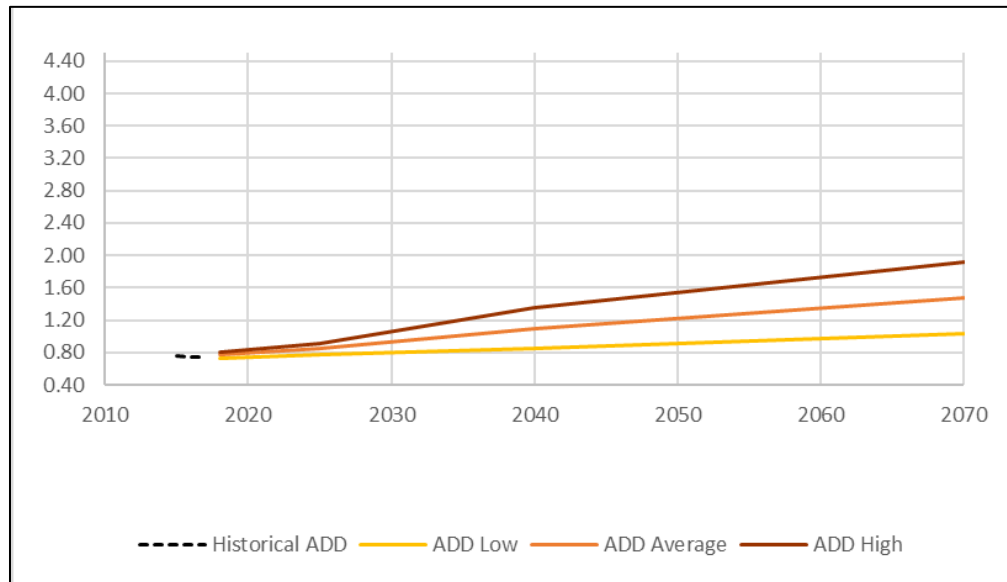
The City’s projected ERUs, ADD, and MDD for the planning periods used in this WCMP are summarized in **Table 4-5** and shown graphically in **Chart 4-1** and **Chart 4-2**. In addition to the low and high demand scenarios, the table presents the calculated average of the low and high demands as well. The average projection shows that ERUs are projected to increase from 2,449 in 2018 to 4,632 when the City is fully built-out including all Urban Growth and Urban Reserve Areas. At buildout, ADD is anticipated to range from 1.03 mgd to 1.92 mgd. This large range is due to the large variability in growth assumptions and the impacts of conservation. At buildout, MDD is anticipated to range from 2.68 to 5.76 mgd. This large range reflects the range of ADD, as MDD is calculated as a multiplier of ADD.

It is important to note that in **Chart 4-1**, the historical ADD and MDD prior to 2015 are not shown due to inaccurate metering prior to 2015.

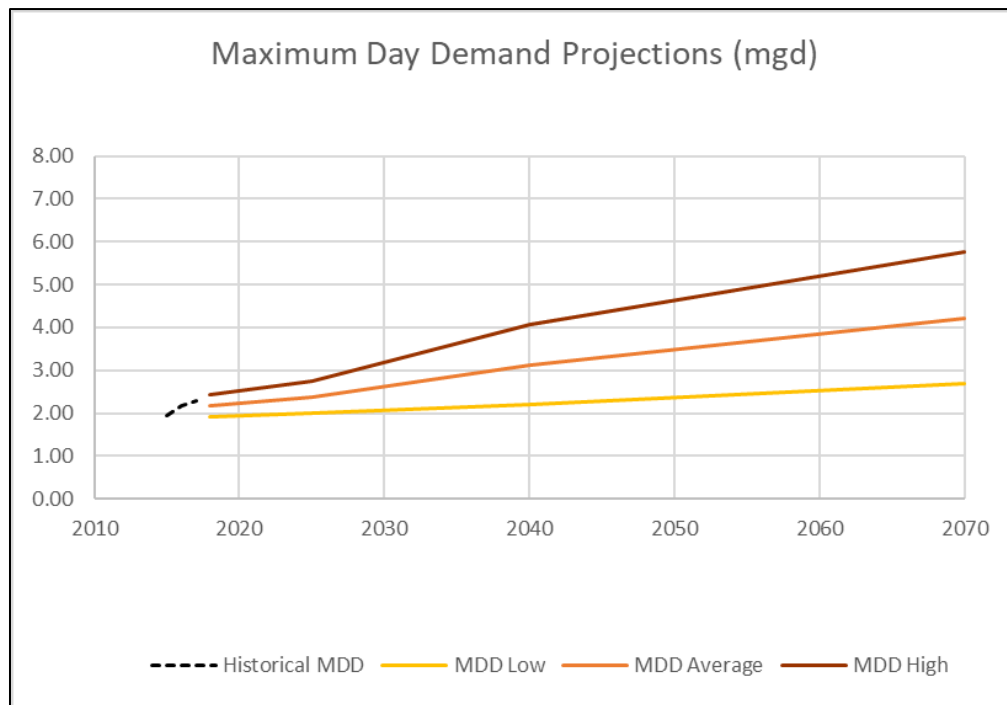
**Table 4-5
Future Water Demand Projections**

	2018	2025	2040	2070 (Build-Out)
ERUs Low	2,439	2,574	2,829	3,436
ERUs Average	2,449	2,677	3,468	4,632
ERUs High	2,459	2,780	4,106	5,828
ADD Low (mgd)	0.73	0.77	0.85	1.03
ADD Average (mgd)	0.77	0.84	1.10	1.48
ADD High (mgd)	0.81	0.92	1.35	1.92
MDD Low (mgd)	1.90	2.01	2.21	2.68
MDD Average (mgd)	2.17	2.38	3.13	4.22
MDD High (mgd)	2.43	2.75	4.06	5.76

**Chart 4-1
Average Day Demand Projections**



**Chart 4-2
Maximum Day Demand Projections**



CHARLOTTE ANN WATER DISTRICT

The Charlotte Ann Water District is located to the north of the City of Phoenix. Charlotte Ann is a private water district which receives water from the MWC independently from the City of Phoenix. Current Charlotte Ann Water District customers are outside the City limits, but inside designated Urban Reserves for the City (PH-1 and PH-1a). Because these customers have full urban services through varying utilities, they have little incentive to annex to the City and become City water customers. However, it is important to consider the potential for the City to eventually take over this water district and predict its impact on the City's water demands. Developing demands for this area is outside of the scope of this WCMP, however, the 2017 MWC Water Management and Conservation Plan predicts that the City's population would increase by 50 percent if the current portion of Charlotte Ann located within the Urban Reserve Areas of Phoenix were annexed entirely to the City. If the Charlotte Ann Water District was annexed, the change would most likely happen gradually. Another indication of the demands that may be expected is the current supply pump station capacity. The Charlotte Ann Water District has its own pump station which can supply up to 4 mgd to the Charlotte Ann system (Brown and Caldwell, Phoenix WMP 2007).

SCHEDULE TO EXERCISE PERMITS AND COMPARISON OF PROJECTED NEED TO AVAILABLE SOURCES

This section evaluates the City's water supplies for meeting existing and future demands of the water service area. Three limitations govern the City's water supplies: water rights, MWC purchase agreement flow rates, and pumping capacity. The following sections compare these three supply limitations to the City's current and projected demands and provide recommendations where needed.

WATER RIGHTS EVALUATION

As described in **Chapter 1**, the City's water rights allow an annual volume of 916.27 AF (298 MG) that is needed during the months of May through September per the City's MWC Purchase Agreement. The City's May through September demands (summer demands) comprise about 63 percent of all annual demands. The low, average, and high summer demand is shown in **Chart 4-3** and is compared to the City's permitted volumetric water rights. As seen in the chart, the allowed volumetric water rights exceed the summer demand projections until 2037 for the high projections, and beyond the planning horizon for the low projections.

For peak flow rates, the City's water rights together have a peak flow rate of 8.1 cfs (5.23 mgd). Compared to the MDD projections in **Chart 4-4**, the City's water rights exceed peak demands until the year 2060 under the high demand projections.

Certification of these rights and the schedule to exercise the permits is currently being developed as part of a regional water rights strategy led by MWC. The study considers regional demands and infrastructure capacity and developed a strategy for MWC and wholesale customers for further developing the existing rights. The resulting proposed schedule to exercise the permits will be submitted in the next WMCP Progress Report. The City is not seeking greenlight water at this time. The City does not anticipate the need to acquire new water rights in the next 20 years.

Chart 4-3
Water Rights Volumetric Capacity Evaluation

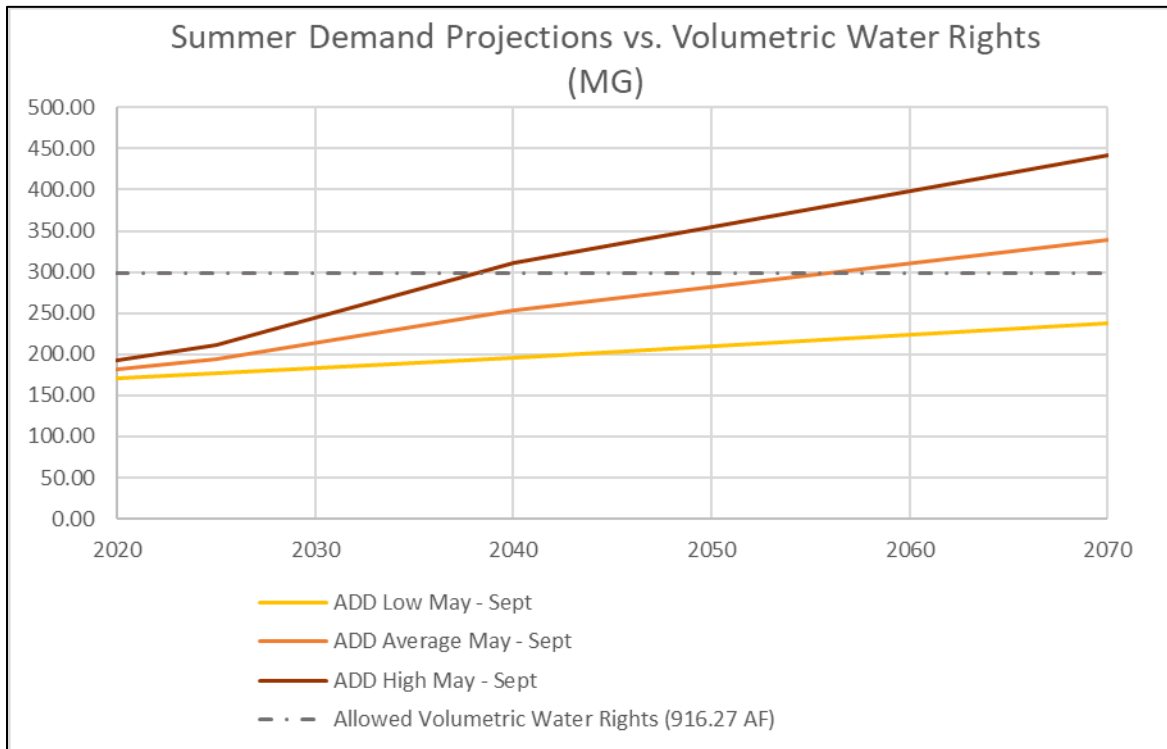
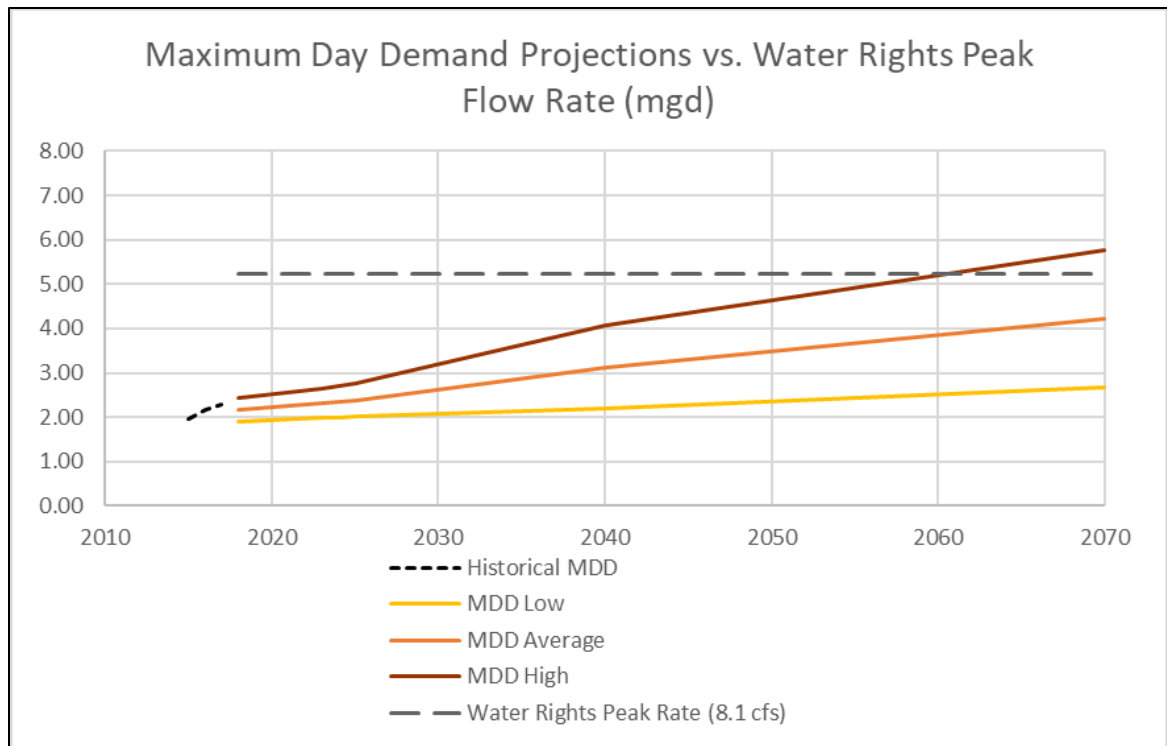


Chart 4-4
Water Rights Peak Capacity Evaluation



MWC PURCHASE AGREEMENT

As described in **Chapter 1**, the City's 2016 agreement with MWC allows a maximum purchase of 1,600 gpm (2.3 mgd) during summer months, and a maximum of 1,300 gpm (1.87 mgd) during the rest of the year. The MWC purchase agreement further restricts summer and non-summer usage between the hours of 5 AM and 11 AM to 1,190 gpm (1.71 mgd) and 440 gpm (0.63 mgd), respectively. In **Chart 4-5** and **Chart 4-6**, these values are graphed against the projected low, average, and high demand projections.

Chart 4-5 shows the City's projected ADD compared to maximum allowable purchased flows for October through April. As seen in the chart, the City's 2020 demands will likely exceed the MWC Purchase Agreement limitation of 0.63 mgd from 5 to 11 AM, however, the City operates its system to avoid pumping from MWC during this time period. The City's ADD is well below the October through April MWC peak flow rate for all other hours of the day.

Chart 4-6 shows MDD compared to maximum allowable purchased flows for May through September. The comparison indicates that the City will likely exceed the summer maximum purchase agreement of 1.71 mgd between the hours of 5 to 11 AM by 2020. Outside of these peak hours, the City's average MDD projection is just barely able to meet the purchase agreement limitation.

It is possible that the 2016 MWC purchase agreement, that is updated every five years, was based on inaccurate demand assumptions for the City due to supply metering issues prior to 2014.

Additionally, the agreement says that MWC will compare the total purchase agreement amounts for Phoenix, Talent, and Ashland against the combined meter reading of the TAP regional meter and Phoenix's second MWC meter. Though not evaluated for WCMP, the City may comply with the total purchase agreement given the measurement method that includes all TAP wholesale users.

It is recommended that the City review the purchase agreement with MWC to confirm the maximum purchase amounts and make sure future agreements meet the actual and projected City demands. These negotiations should also address the rate limitations during peak flow periods to reduce or remove the limited hours. This is recommended as part of a future TAP Water Master Plan.

Chart 4-5
Annual MWC Water Purchase Agreement Capacity Evaluation

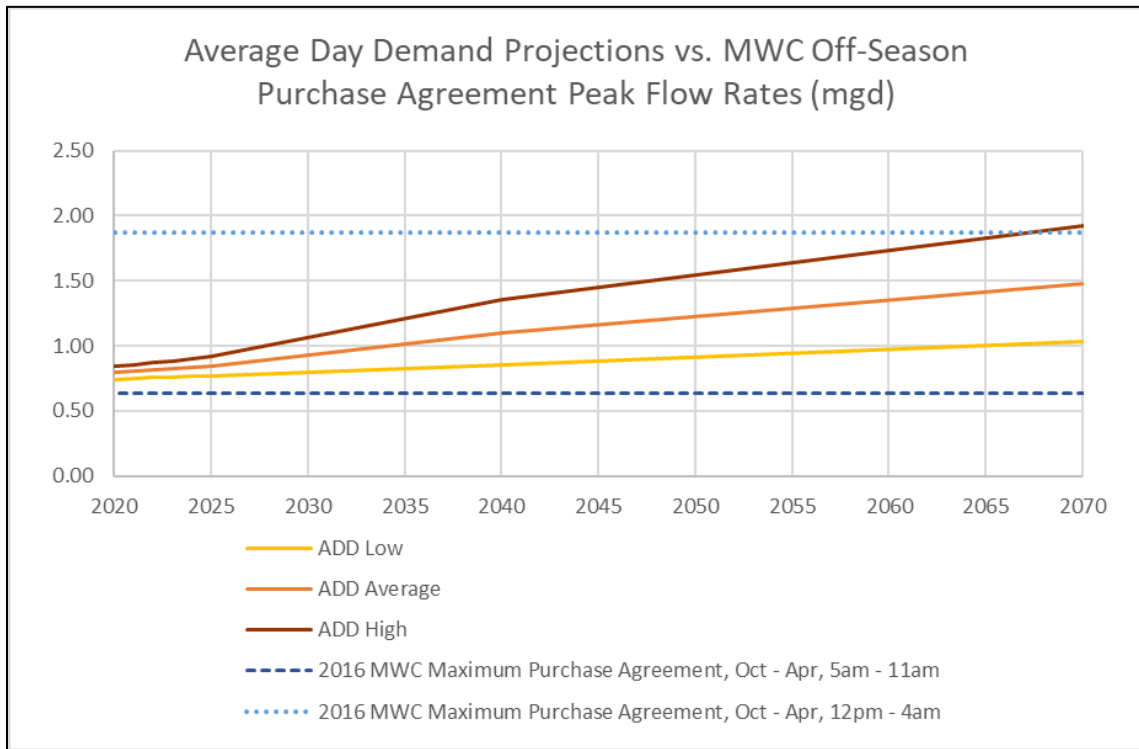
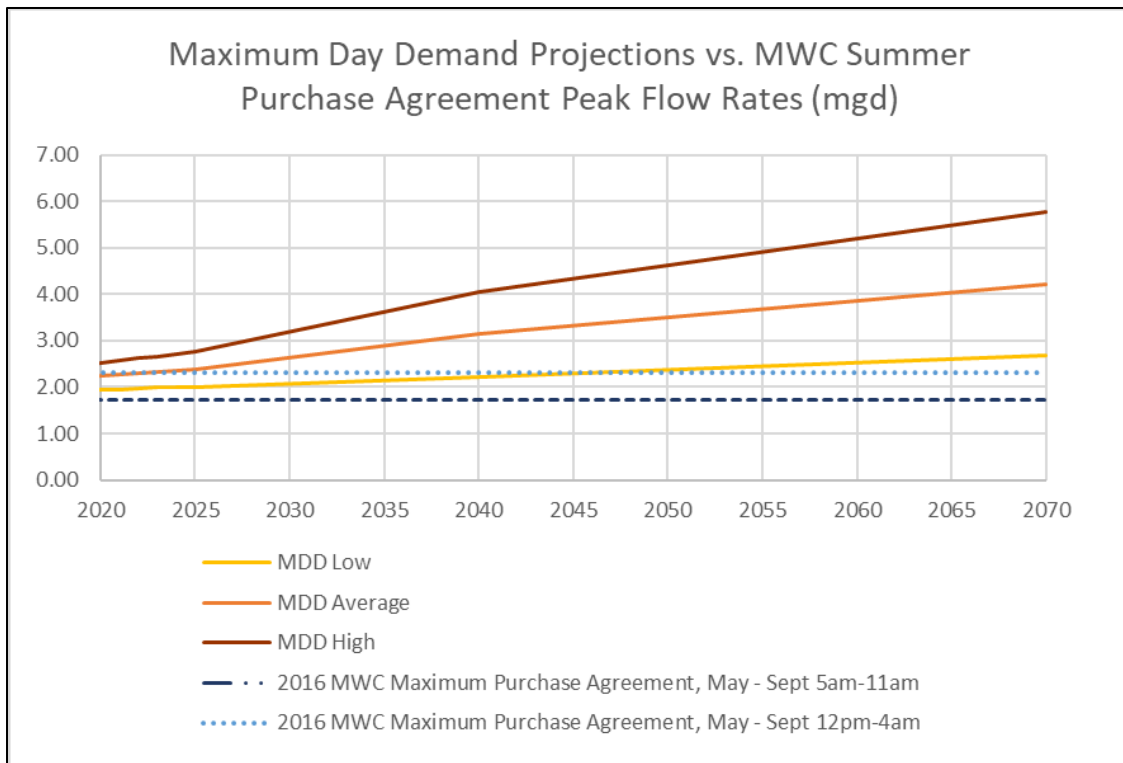


Chart 4-6
Peak MWC Water Purchase Agreement Capacity Evaluation



SUPPLY PUMPING CAPACITY

This section evaluates the capacity of the Regional Booster Pump Station (RBPS) and Experiment Station Road BPS (Experiment BPS) to meet current and future demands. Supply facilities must be capable of adequately and reliably supplying high-quality water to the system. In addition, supply facilities must provide a sufficient quantity of water at pressures that meet the requirements of OAR 333-061, Sections 0061-0062. The evaluation of the combined capacity of the sources in this section is based on the criteria that they provide supply to the system at a rate that is equal to or greater than the MDD of the system. This is consistent with City policies.

Table 4-6 compares the projected City demands to the combined firm and total pumping capacity of RBPS and Experiment BPS. Firm capacity is the capacity of a pump station when the single largest pump is offline. Though not an official criterion of the City, using firm capacity criteria provides redundancy allowing the pump station to still meet system needs on the day of the highest water demands even when a pump is not functioning. The Experiment BPS firm and total capacity (1,000 gpm; 1.44 mgd) are the same, as the pump station has two identical pumps but is limited to 1,000 gpm by the transmission system capacity.

This WMCP does not consider the full RBPS capacity for the City of Phoenix; the supply pumping capacity comparison in **Table 4-6** assumes 3.00 mgd of the RBPS pumping capacity for the City’s use, which is the maximum amount allotted to the City in the TAP Agreement. Thus, firm and total supply capacity for the City is 3,083 gpm, or 4.44 mgd. As seen in **Table 4-6**, these supplies have adequate capacity to meet the City’s demands through buildout. However, the City may need to participate in expansion of the RBPS to achieve its full 3.00 mgd allotment of the TAP system.

**Table 4-6
Phoenix Pumping Capacity Evaluation**

Year	Phoenix MDD Average Projections	Supply Capacity (Firm and Total)	Surplus/Deficit (mgd)
2018	2.17	4.44	2.27
2025	2.38	4.44	2.06
2040	3.13	4.44	1.31
Buildout 2070	4.22	4.44	0.22

SUPPLY CRITERIA

Additionally, the City’s supplies were compared to the City’s supply criteria as follows:

1. Criterion: The City should have sufficient water rights to meet demands from May through October 10 years in advance of anticipated demands. Confirming perfection of its water rights as part of the regional water rights strategy is recommended.
2. Criterion: The water system must have redundant sources of supply. Developing a new emergency source of supply through the City of Ashland is recommended to meet this criterion.
3. Criterion: There shall be adequate supply to meet total system MDD with the largest source out of service. This criterion used in the City’s last water master plan would require significant costs to develop a new supply source. Rather, it is recommended that the criterion be adjusted to meet ADD with firm supply capacity. With the RBPS offline, the Experiment

BPS could meet the average ADD projection beyond the year 2060, thus this criterion is assumed to be met.

4. Criterion: There must be adequate transmission capacity to convey MDD from the sources to the distribution system. This criterion is evaluated in the system analysis presented in the City's Water Master Plan.

NEW SUPPLIES

Due to the large anticipated growth northeast of the City (Growth Areas PH-5 and PH-10), an opportunity exists for the City to develop either a normal or emergency supply connection to the MWC system. A new supply connection would both serve the new growth areas and allow the City to eventually abandon the Experiment Station Road supply system. Abandoning the Experiment Station Road supply system is appealing because the pipeline is all located in non-City right-of-way, requiring boosting twice to meet system pressures, and the system is aging. The Experiment Station Road supply relies on the Shop BPS, which has limited capacity, to deliver the supply to the system.

A new supply in North Phoenix Road would require negotiating with MWC on purchasing capacity in their facilities to accommodate the City's demands and pressure requirements. This would likely include transmission lines and a pump station. The infrastructure connecting the City's system to a new MWC meter is anticipated to be installed as development occurs in PH-5.

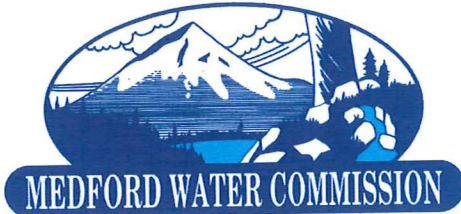
Additionally, it is likely that at some point the City may take over the Charlotte Ann Water District, which includes a connection to the MWC. This supply connection would allow abandoning the Experiment Station Road supply. The new supply from MWC would not require a new water right and it is not anticipated that the City will need to acquire a new water right in the next 20 years.

SUPPLY RECOMMENDATIONS

The results of the above supply analyses indicate that the City has sufficient water rights and pumping capacity through buildout. The following supply improvements are recommended:

- Confirm perfection of water rights as part of the regional water rights strategy. Submit a schedule to exercise permits with the next WMCP progress report.
- Expand the RBPS to meet the City's 3.0 mgd allotment of the TAP capacity. Timing and costs will be determined as part of the TAP Water Master Plan.
- Renegotiate the MWC purchase agreement to allow for meeting the City's projected summer demands and for avoiding the peak hour limitation.
- Coordinate with the City of Ashland to develop a new emergency supply from Ashland through the TAP system.
- Plan for a new MWC supply connection in North Phoenix Road and/or Charlotte Ann Water District.
- Plan for eventually abandoning the Experiment Station Road supply, unless development in northeast Phoenix does not occur.

Appendix A
Phoenix Water Management and Conservation Plan
Affected Local Agency Comments



February 25, 2019

RH2 Engineering, Inc.
Rachel Lanigan, PE, Project Manager
3523 Arrowhead Drive, Suite 200
Medford, OR 97504

Dear Rachel:

Our review of the Phoenix Water Management Conservation Plan (WMCP) has come up with the following, which are also highlighted in the attached Rev DS PHX WMCP Draft 2019220:

- On page ES-1: Use of MWC has not yet been established, thus should read Medford Water Commission (MWC)
- Page 1-1: The water quantity from the Big Butte Springs is 26.4 MGD not 25.4 MGD.
- Page 1-8: Table 1-7 is inaccurate; PVC C900 minimum diameter is 4" not 2". There is a high probability that Phoenix has Schedule 80 PVC 2"-3" within their system that is not noted in the table.
- Page 4-10: In the second paragraph is a statement about a new water source coming in along North Phoenix Road. The statement references "the Lone Pine Pump station" which is incorrect. It could be changed to state "a pump station" or just refer to "needed equipment".

If you wish to discuss these comments, please feel free to contact Dave Searcy, Conservation Coordinator, at (541)774-2435.

Sincerely,

Brad A. Taylor
General Manager

cc: Dave Searcy, Conservation Coordinator
Eric Johnson, Principal Engineer

200 S. Ivy Street, Room 177
Medford, Oregon 97501
Phone (541) 774-2430

www.medfordwater.org
water@medfordwater.org
Fax (541) 774-2555

Appendix B
Medford Water Commission 2017 Curtailment Plan

Curtailment Plan

This section describes the curtailment plan proposed for adoption by the MWC.

Overview

Curtailment planning is the development of proactive measures to reduce water demand if the water supply is reduced temporarily. Supply shortages could result from a number of situations, including those identified in this section.

The goal of this curtailment plan is to define objective criteria and actions to prepare MWC for management of water supplies in the event of diminished supply or reduced delivery capacity. This curtailment plan recognizes the need to maintain essential public health and safety while applying measures in an equitable manner that minimizes impacts on economic activity and lifestyle. Actions may include more restriction on uses deemed less essential.

Initial curtailment procedures were adopted by MWC in 1992. Those procedures were revised in conjunction with MWC's 2009 WMCP, both to comply with OAR Chapter 690, Division 86, and to reflect desired modifications. The plan herein builds on those previously adopted curtailment procedures. Minimal modifications have been made to the 2009 plan.

While this plan includes specific triggering conditions and defined procedures, it should be recognized that the circumstances to which this plan may apply could vary in terms of severity as well as whether they are anticipated or occur suddenly. The time of year during which curtailment is needed would also impact what types of actions might be appropriate. Some events might impact only a portion of the water system, with actions tailored accordingly.

This plan is intentionally thorough to enable a variety of options to be quickly identified for consideration in potentially stressed circumstances, with the understanding that some proposed actions might not be implemented or may be deferred to later curtailment stages. The objective of this plan is therefore to provide guidance, while allowing flexibility to respond according to specific circumstances.

Authority

The authority under which this plan will be implemented are the City of Medford Charter, and MWC's *Regulations Governing Water Service* handbook.

City of Medford Charter

Section 21 of the City of Medford Charter (1976) grants MWC the authority to "distribute, furnish, sell and dispose of water, and provide water service...on such terms and conditions as the Board of Water Commissioners determines to be in the best interests of the city." This provision allows for the imposition of curtailment measures necessary to preserve supply.

Regulations Governing Water Service Handbook

In addition, MWC has asserted authority to implement nonvoluntary curtailment or suspensions of water service through Section 15 of its *Regulations Governing Water Service* handbook. Review and revision of portions of that guidance document will be performed as needed to assure consistency with this WMCP. Amendments will include addition of provisions for curtailment-related rate surcharges. Relevant provisions of that handbook are paraphrased below.

The Medford Water Commission has the authority to terminate service and implement non-voluntary curtailment or suspensions of water service under the *Regulations Governing Water Service* handbook.

Following are brief descriptions of sections of these regulations relevant to curtailment actions. Portions of this document may be revised to better conform with this plan.

Section 6.12 Waste of Resource

This section provides procedures for addressing leak and waste abatement. While in later curtailment stages, the imposition of penalties would likely take priority over the provisions of this section, this section includes procedures that might be employed during lower stages of curtailment.

Section 9 Discontinuance of Service

Procedures and fees are set forth for termination and resumption of service, which are referenced within the Curtailment Plan.

Section 10 Appeals

While generally reflective of appeals of bills, procedures set forth in this section can be applied to appeals associated with the Curtailment Plan.

Section 15 Interruptions, Curtailments, Fluctuations and Shortages

This section addresses the Commission's commitment to supply satisfactory and continuous water service, but recognizes that there will at times be some degree of failure, interruption, or curtailment. It is further stipulated that MWC cannot and will not guarantee constant or uninterrupted delivery of water service and shall have no liability to its customers or any other persons for such interruptions.

Plan Implementation

Whenever possible, activation of this curtailment plan and stages thereof will be by a majority vote of the Board of Water Commissioners. However, actions under the plan may be initiated upon a determination of urgency by the Commission's Manager. The Board of Commissioners, by a majority vote, may rescind the determination upon finding that the emergency no longer exists, or that the original declaration was made in error.

The plan may be enacted for the entire system, or only in those geographic areas that are directly impacted by the water supply shortage. The Manager may broaden or restrict the scope of enactment at any time for the duration of the plan implementation.

As previously noted, several nearby cities and water districts also rely on the MWC to provide treated water to their jurisdictions. The Commission's 1992 curtailment plan was applicable to and adopted by these other entities. Some of the cities have subsequently prepared updated water management and conservation plans associated with their own water rights. This, coupled with revisions contained within this plan, resulted in curtailment plans that are not fully consistent between jurisdictions. To the extent that is practical, the MWC will encourage actions that are regionally consistent and which can therefore be deemed equitable and able to be communicated to the public with a unified message. If a wholesale entity is unwilling or unable to implement consistent actions, their individual actions should yield comparable reductions in water usage.

Water System Capacity Constraints and Historical Supply Deficiencies

MWC’s two water sources, Big Butte Springs (BBS) and the Rogue River, have continuously met the system’s needs with no service disruptions. Curtailment would be necessary only if capacity constraints and supply deficiencies arise.

Capacity Constraints

BBS water is transported through two transmission pipelines, each of which has a capacity of 13.2 mgd. These pipelines follow slightly different routes to town, lessening the potential for a single event to impact both pipelines simultaneously. During droughts, the available supply of the BBS has fallen below 26.4 mgd. Between 1991 and 2015, the Willow Creek Reservoir failed to completely fill on four occasions. Because of coordination of water rights with the Eagle Point Irrigation District, limitations on MWC’s water use from BBS were as low as approximately 20 mgd (31 cfs) at some points in time. The current summer capacity of the Rogue River supply is 45 mgd, as limited by the treatment capacity of the Duff WTP.

Current peak summer demands for the overall system have occasionally exceeded 60 mgd. Therefore, should either the BBS or the Rogue River supply be interrupted during peak summer periods, curtailment would be necessary. The water system currently relies entirely on the BBS supply during winter months, and failure of one or both BBS pipelines could also result in at least a short-term need for curtailment, either until the BBS supply could be fully restored or the Rogue River supply could be brought online.

Historical Supply Deficiencies

Alternate sources of supply available to MWC are limited. Local groundwater tends to be marginal in quantity, so drilling of wells to supplement supplies is not a viable option. MWC is the supplier of potable water to most neighboring cities, of which only Ashland operates a treatment facility of its own. While there is an interconnection with the City of Ashland, its primary purpose is to supplement Ashland’s water supplies by MWC, with limited potential for the reverse. Ashland is generally more impacted by drought than MWC; however, there might be potential to receive some water from the City of Ashland, depending on the time of year and whether the precipitating event was regional in nature. If Ashland did have surplus water available to use as an emergency supply, as a result of quantity and proximity, it would likely be limited to Talent and Phoenix.

In extreme circumstances, limited amounts of potable water might be available via water trucked from the cities of Grants Pass, Gold Hill, Rogue River, or Butte Falls. If only a portion of MWC’s system was compromised, limited amounts of water could also be trucked from other portions of the water system.

Level 2 treated wastewater from the regional reclamation plant might be a potential source for uses (such as dust control) that could utilize trucked nonpotable water. Local irrigation water may provide another potential option for nonpotable water, provided that irrigation supplies were not similarly subject to shortage.

Potential causes of water supply shortages include, but are not limited to the following:

- Long-term drought
- Fire in the BBS or Rogue River watersheds that affects water quality
- Contamination, such as from a chemical spill, that necessitates shutting down either water source
- Flooding that forces shutdown of one or more facilities
- Landslides or other natural disaster that damage water pipelines or facilities

- Power outages, particularly those impacting the Duff WTP
- Facility or equipment failure, either from natural or human causes

MWC’s history of curtailment actions is very limited. In May of 1992, MWC requested voluntary reductions of customer’s water usage for a brief period during a local outbreak of *Cryptosporidiosis*, which had resulted in MWC temporarily discontinuing use of its BBS supply until the source of the outbreak was determined. These requests were lifted once the BBS supply was found to be safe, and came back online.

MWC also referenced its 2009 curtailment plan in the spring of 2010 because replacement of fish screens at the Duff WTP was scheduled within the summer instream work window following a dry winter, during which Willow Lake did not fully fill. In recognition that water supplies could be limited by the combined impact of reduced withdrawal capacity and lower flows from the BBS drainage, in April, May, and June of 2010, MWC provided Stage I notification of a possible water supply shortage, including dissemination of a press release, newsletter article, and notification to wholesale city customers of actions that might become necessary. Further curtailment actions were not needed because weather during the critical summer work period was not extreme, and water supplies remained adequate to meet customer demands.

During the recent drought years of 2014 and 2015, MWC stressed the importance of wise water usage, and was able to meet all demands without specific curtailment actions or notifications.

Curtailment Stages and Contact List

MWC’s plan recognizes five stages of increasingly stringent curtailment response. The initiating conditions for each stage are presented in **Table 4-1**, along with the actions that would be taken. The initiating conditions provide guidelines, may not be all-inclusive, and might not impact customers within all portions of the MWC service area. Optimally the curtailment activities would be implemented in lower stages first, with each stage building on the prior stage; this sequence is preferred but not mandatory. Compliance measures would also likely be more acceptable to customers if voluntary and less restrictive measures have been attempted first. However, MWC could implement measures proportionate to a sudden disruption of service without prior notification or action. Upon implementation of a curtailment stage, ongoing reevaluation will occur to determine the appropriate curtailment status.

Table 4-1. Curtailment Stages

Stage	Initiating Conditions	Actions
1. Awareness of Potential Water Shortage	A series of indicators suggest that a future shortage is possible; these may include drought-related conditions or other supply factors	Raise public awareness about potential for water shortage through such means as general articles in newsletters, newspapers, website, and social media
2. Potential Water Shortage Alert	Continued and/or further indicators raise concerns about the ability to meet supply needs unless demand levels are reduced, or Sustained demand reaches 90 percent of supply	Enhance public awareness and outreach efforts to convey potential water shortage message Request voluntary water use reductions Consider rate surcharges
3. Water Shortage	Indicators show that supply and/or delivery capacities are strained to meet current demand levels; these may include: Sustained demand reaches 95 percent of supply or delivery capacities, or Water storage facility(ies) is/are not routinely refilling, and Manager determines that continuation could result in inability to meet fire protection or other essential needs.	Strengthen notification messages and further outreach methods regarding water shortage conditions Impose mandatory restrictions on water use Consider potential enforcement of restrictions Consider rate surcharges or increase of charges from Stage 2
4. Severe Water Supply Shortage	Series of indicators show that water consumption levels must be immediately reduced; indicators may include: Sustained demand is exceeding normal supply or delivery capacities, or Water storage facility(ies) is/are only 2/3 full, and Manager determines that ability to meet fire protection or other essential needs is jeopardized. Supply or delivery capacities have been reduced by up to 35%	Provide urgent notification messages; significant outreach/customer notification Impose further mandatory restrictions on water use Enforce restrictions Impose or increase rate surcharges
5. Emergency Water Supply Disruption	Major water use reductions are deemed necessary to avoid system failure, inadequate fire protection capability and/or to assure protection of water quality; indicators may include: Sustained demand continues to exceed supply or delivery capacities, or Water storage facility(ies) is/are only 1/3 full Supply source or major facility is lost, reducing supply or delivery capabilities to less than 65% of normal capacities	Provide extreme alert; urgent notification of customers, both by broadcast means and direct notification Only essential water use allowed Enforce significant restrictions on use Impose heightened rate surcharges

Table 4-2 provides a list of contacts for people of groups to notify during a curtailment event.

Table 4-2. Contact List

Contact Category	Contact
City of Medford Contacts	<ul style="list-style-type: none"> • City Manager • Department Directors
Customers	<ul style="list-style-type: none"> • Wholesale customers • Commercial, industrial and institutional customers • Highest water users • Schools • Domiciliary
Health Professionals	<ul style="list-style-type: none"> • Jackson County Health Department • Oregon Department of Human Services, Drinking Water Program • Hospitals
Landscape Interests	<ul style="list-style-type: none"> • Landscape contractors • Landscape architects • Nurseries • Landscape maintenance firms
Miscellaneous business interests	<ul style="list-style-type: none"> • Chamber of Commerce • Car Washes • Swimming pool contractors • Construction industry: commercial and utility contractors, Homebuilder’s Association • Rental management firms

Note:

This table contains a working list of contacts for easy reference in the event of imposition of curtailment actions. The list will be updated and modified by the Public Information Coordinator as deemed necessary. In addition to communication actions aimed at the general public, listed parties will be contacted directly as appropriate.

Curtailment Actions

Stage 1: Awareness of Potential Water Shortage

Stage 1 will be implemented to provide general awareness of the potential for water shortage based on preliminary indicators of reduced supplies. Voluntary, but nonspecific conservation activities will be encouraged. Under Stage 1, MWC will take the following actions:

1. Assemble a Water Shortage Action Team as identified in **Table 4-3** to determine the likelihood of a shortage and define outreach activities. This team will convene and meet regularly to assess water supply, distribution, and demand whenever it appears that a curtailment order may be necessary, as defined within the curtailment plan.
2. Notify Members of the Board of Water Commissioners.
3. Define appropriate internal actions to minimize waste or perception of waste by MWC operations. Determine whether activities such as main flushing and reservoir cleaning should be immediately reduced or accelerated to complete in advance of a potential higher level of curtailment. Contact landscape maintenance contractor responsible for MWC sites to request that sprinkler maintenance needs be addressed, and appropriate sprinkling schedules followed.
4. Notify officials of the City of Medford and wholesale city customers of the potential for a water supply shortage.

- Raise public awareness through general notification measures. This might consist of press releases or notices with monthly bills.

Table 4-3. Water Shortage Action Team

Team Member	Responsibilities
Primary Staff	
Manager	<ul style="list-style-type: none"> Contact: Commissioners, City Manager, Water Shortage Action Team members
Public Information Coordinator	<ul style="list-style-type: none"> Prepare and distribute press releases, and meet with media as spokesperson Notify other cities and water districts Prepare other public information materials
Conservation Coordinator	<ul style="list-style-type: none"> Provide direction, input, and enforcement of actions
Operations Superintendent	<ul style="list-style-type: none"> Monitor the distribution system, including reservoirs and pump stations Maintain production at Big Butte Springs
Water Treatment Plant Director	<ul style="list-style-type: none"> Maintain production at Duff Water Treatment Plant
Water Quality Director	<ul style="list-style-type: none"> Monitor water quality
Customer Service Supervisor	<ul style="list-style-type: none"> Obtain information from Public Information Coordinator and Manager Staff office to handle customer inquiries Monitor payment status of penalties and surcharges Switch phones from call forward if necessary
Principal Engineer	<ul style="list-style-type: none"> Be available to assist in all areas as directed by the Manager
All team members will keep the Manager informed on a regular basis.	
Additional Staff^a	
Finance Director	<ul style="list-style-type: none"> Keep team informed about financial impact of curtailment actions
Human Resources/Payroll Technician	<ul style="list-style-type: none"> Assist with hiring of additional staff if determined to be necessary Advise on status of employee overtime resulting from curtailment
Technical Services Coordinator	<ul style="list-style-type: none"> Inform team on relevant computer tasks that may be appropriate Modify billing programs as necessary to accommodate surcharges and penalties.
Additional parties added as deemed appropriate.	

^aAdditional MWC staff will also participate as part of the Water Shortage Action Team when it appears that staffing needs, expenses, and surcharges will become applicable.

Stage 2: Potential Water Shortage Alert

This status will activate more extensive outreach to inform customers of the potential for water shortages, and encourage voluntary conservation of water through specific recommended measures.

Stage 2 – MWC Actions

Under Stage 2, MWC actions will include the following:

- Convene the Water Shortage Action Team to assess the likelihood of a shortage, define demand reduction goals, define outreach activities, and evaluate the possible need for additional personnel to assist with outreach and customer assistance activities.
- Notify members of the Board of Water Commissioners.

3. Reevaluate appropriate internal actions to minimize waste or perception of waste by MWC operations. Remind landscape maintenance contractors responsible for MWC sites that sprinkler maintenance needs must be addressed and appropriate sprinkling schedules followed.
4. Notify City of Medford officials. Include information on actions relevant to the city.
5. Notify staff and officials of wholesale city and water district customers of the curtailment determination, along with their need to enact equivalent provisions to assure that their efforts are no less intense than those imposed by MWC. Inform them of water reduction goals.
6. Consider providing direct notification to others on the Contact List included as Table 4-2, such as:
 - a. Representatives from sectors that might be most influential in causing water usage reductions. At this stage, the focus would be on water uses that are considered less essential, such as landscape irrigation, rather than those that would result in economic impacts.
 - b. Businesses that could be impacted if Stage 3 status becomes necessary, such as car washes, pool contractors, and landscape contractors.
7. Consider implementation of temporary rate surcharges. These can be beneficial in promoting customer action, financing additional costs associated with curtailment (such as increased staffing, and the development and distribution of information materials and conservation devices), and in offsetting potential revenue losses from decreased sales.
8. Provide general notification to customers. Such notification will include a description of the current water situation, the reason for the requested actions, and a warning that mandatory restrictions may be implemented if voluntary measures are not sufficient to achieve water use reduction objectives or if conditions worsen. Include drinking water quality information in notices, so that the public understands the role of flushing in maintaining water quality.

MWC may request that notices be posted on bulletin boards, websites, public restrooms, and similar venues. Guidelines and conservation information will also be placed on the MWC website, including detailed information to facilitate customer's use of weather-based irrigation scheduling. Use of press releases to maximize notification is anticipated.
9. Consider initiating or expanding customer educational programs to assist customers in implementing curtailment actions. Examples might include presentations for homeowners and landscape managers, and site visits to provide assistance in adjusting sprinkler schedules.
10. Consider distribution of low-cost items such as toilet dye tablets, efficient showerheads, low-flow aerators, early closing toilet flappers, and hose nozzles, which would yield water savings and raise awareness of the water shortage situation.
11. Monitor and report results of curtailment efforts and progress in meeting demand reduction goals. Keep MWC employees informed.
12. Consider disseminating outreach materials such as (a) informational cards for restaurants and hotels to support water conservation practices (for example, not routinely serving water unless requested, and explaining towel and sheet laundering options), and (b) general information about actions customers can take to achieve requested water savings.

Stage 2 – Customer Actions

The following voluntary actions may be requested of customers when Stage 2 is triggered:

1. Reduce water use by the percentage determined to be the goal based on the comparable month in the prior year.
2. Manage landscape watering. The following guidelines are encouraged:
 - a. Water landscapes only between the hours of 9:00 p.m. to 6:00 a.m., if on automatic timers, and between the hours of 7:00 p.m. to 9:00 a.m., if performed manually.
 - b. Encourage use of timing devices when watering with hoses.
 - c. Suggest adherence to weather-based irrigation schedules, provided on the MWC website, the Lawn Watering Infoline, and other potential venues.
 - d. Encourage sprinkler maintenance and adjustment to repair leaks, and minimize conditions such as overspray and high pressure that result in obvious water waste.
3. When in use, equip hoses with nozzles that maximize effectiveness of the spray pattern and shut off when not activated.
4. Encourage repair of all known customer leaks.
5. Reduce vehicle washing and use facilities that recycle water. Manual car washing should include use of a bucket and hose equipped with a shutoff nozzle for brief wetting and rinsing.
6. Request that exterior paved surfaces be swept, rather than washed. If washing is necessary for such reasons as public health or safety, encourage the use of water brooms that provide maximum cleaning with minimum water usage.
7. Maintain swimming pools, hot tubs, ponds, and other water features in a manner that minimizes the need to fill or refill.
8. Integrate recirculation/reuse of water where appropriate. Examples include water features and heating/cooling equipment.
9. Request that the City of Medford and other city customers set good examples with their internal operations by implementation of the applicable items above, as well as the following:
 - a. Reduce water used in street sweeping.
 - b. Ask Fire Department to limit or avoid training exercises that use water.
 - c. Consider reducing use of any fountain or water spray recreational facility that does not recirculate water, and pursue actions needed to retrofit these facilities.
 - d. Identify important recreational facilities and fields in order to concentrate on preserving these, while decreasing water use at less critical facilities and fields.
10. Encourage restaurants to stop serving water unless requested by the customer. This action generates awareness for curtailment, and reduces use of water for washing glasses.
11. Encourage hotels and motels to discourage daily linen replacement by providing procedures for guests to opt for less frequent laundering.

Stage 3: Water Shortage

Stage 3 is similar to Stage 2 except that the voluntary measures will be made compulsory. This may be because of a worsening water supply situation or insufficient water savings from the voluntary measures. Additional nonessential water use will be prohibited.

Stage 3 – MWC Actions

MWC will take the following actions:

1. Reconvene the Water Shortage Action Team to assess the effectiveness of actions taken in Stage 2 and redefine demand reduction goals. Sector-specific targets for water use reductions may be developed. Define additional outreach and enforcement measures, and reassess the possible need for temporary staffing increases to assist with outreach, monitoring and enforcement.
2. Contact Members of the Board of Water Commissioners.
3. Review actions to minimize waste or perception of waste by MWC operations. Make appropriate reductions in hydrant and water line flushing without compromising water quality. Determine what internal actions can be taken for MWC to meet the percentage reduction goal being requested of other customers. Confirm that irrigation of MWC-owned sites is in conformance with requirements below.
4. Notify City of Medford officials/staff of the changed curtailment status. Include direct notification to departments of any actions that may be relevant to their operations.
5. Notify staff and officials of the wholesale city and water district customers of the changed curtailment status. Inform them of water reduction goals. If possible, provide assessments of their performance in Stage 2, based on meter readings and observations. Remind other cities of the need to enact equivalent provisions to assure that curtailment efforts are no less intense than those imposed by MWC.
6. Consider implementation of or increases to temporary rate surcharges. These can be beneficial in promoting customer action, financing additional costs associated with curtailment (such as increased staffing, development and distribution of information materials and conservation devices), and in offsetting potential revenue losses from decreased sales.
7. Contact high-use customers to encourage water use efficiency and the possible imposition of water reduction goals. Inform them of the potential future need for greater reductions, and solicit their input on how such reductions might be most equitably applied, while minimizing economic impact.
8. Contact others on the Contact List included as Table 4-2, with a focus on those who will be most impacted by current and possible future curtailment actions. As deemed appropriate, convene meetings to obtain input relative to potential actions that may be taken.
9. Expand notification and outreach activities to customers as defined by the Action Team. This may include targeting specific customer groups. For example, restaurants might be encouraged to avoid serving water except upon request, and motels might be encouraged to promote reduced linen laundering. Pursue translation and dissemination of information through Spanish-speaking media.
10. Monitor and report results of curtailment efforts and progress in meeting demand reduction goals. Keep MWC employees informed.

11. Disseminate outreach materials such as (a) informational cards for restaurants and hotels to support water conservation practices (for example, not routinely serving water, and explaining laundering options), and (b) general information about actions customers can take to achieve requested water savings.

Stage 3 – Customer Actions

Except as modified below, all voluntary customer actions recommended in Stage 2 become mandatory. The following modifications and additional restrictions also may be imposed:

1. Landscape watering will be subject to some or all of the following conditions. Landscapes installed within the previous 40 days will be allowed some flexibility to enable plant establishment.
 - a. Time-of-day guidelines included in Stage 2 become mandatory, except for areas irrigated completely with drip, soaker, or other watering method that applies water directly to the root zone without spray.
 - b. Use of hose bib mounted timing devices will be required when sprinkling from hoses.
 - c. Landscape irrigation should follow a weather-based schedule, which will be provided on the MWC website, the Lawn Watering Infoline, and by other means. This schedule may afford preference to ornamental trees and shrubs, which if lost would take years to reestablish. Lawn sprinkling schedules might encourage dormancy, watering at a lower percentage of ET to keep roots alive, but without the goal of maintaining a uniformly green appearance.
 - d. Sprinkling may be limited to certain days of the week. As an example, in July, properties with even addresses might irrigate on Sunday, Tuesday, and Friday, while properties with odd addresses would water on Monday, Thursday, and Saturday, with no irrigation occurring on Wednesdays to facilitate refilling of reservoirs. Schedules would vary according to season and specific circumstances.
 - e. Sprinklers and other irrigation components should be repaired, adjusted, and operated without waste. Prohibited waste may include, but would not be limited to leaks, overspray of more than 1 foot onto paved surfaces, misdirected spray patterns, obvious runoff, and operation at clearly excessive pressures.
2. Planting of new lawns and annual plants may be prohibited. Planting of shrubs and trees would be allowed, possibly subject to verified soil amendment and mulching (aimed at water retention), and/or irrigating with drip, soaker hose, or similar root zone water application method.
3. When in use, hoses must be equipped with nozzles that direct water and shut off when not activated.
4. Repair of all known customer leaks will be required.
5. Washing of personal motorbikes, motor vehicles, or recreational vehicles will not be allowed except at commercial washing facilities that practice wash water recycling, or by using a bucket and hose equipped with a shutoff nozzle for brief wetting and rinsing.
6. Except for vehicles that must be cleaned to maintain public health and welfare such as food carriers and solid waste transfer vehicles, washing of commercial vehicles will only be done in a facility that recycles water. Washing of vehicles for sale on commercial lots may be afforded less stringent washing regulations to enable limited washing on location, but at reduced schedules that result in significantly reduced water usage levels as compared to the prior year.

7. Washing of sidewalks, walkways, driveways, parking lots, tennis courts, and other hard-surfaced areas will not be allowed, except when necessary for public health and safety or to the minimal extent necessary to loosen caked-on mud or similar circumstances.
8. Except as needed for painting or construction, no washing of buildings and structures.
9. No water for a fountain or pond for aesthetic or scenic purposes unless it recycles water and is leak free (with refill demands being equivalent to the current ET rate). Noncompliant ponds that support fish will be afforded reasonable time to move fish or repair leaks.
10. Pools and hot tubs will not be drained, and will be managed to minimize the need to refill. This may include requirements for covering when not in use and other actions.
11. Water for initial filling of new swimming pools may be restricted. Pools already under construction prior to imposition of such regulations will be allowed to fill, but may be subject to rate and time-of-day restrictions.
12. Where potable water is used on golf courses, it will be restricted to watering only tees and greens.
13. Use of potable water for dust control or street cleaning may be disallowed or made subject to regulations setting maximum frequency or rate of application.
14. Restrictions may be placed on use of water from hydrants for any purpose other than firefighting and flushing deemed necessary to maintain water quality.
15. In addition to applicable items above, the City of Medford and wholesale city customers should adhere to the following:
 - a. Amend street-sweeping activities to minimize or eliminate use of potable water. If nonpotable water is used, this will be advertised on the sweeper.
 - b. Fire Department should discontinue training exercises that use water.
 - c. Cease use of decorative fountains.
 - d. Reduce hours of operation or make relevant operational changes to manage water use at pools or other water recreational facilities. Cease use of any water spray recreational facility that does not recirculate water.
 - e. Continue to decrease water use at fields and facilities determined to be less critical.
 - f. Retrofit restrooms in city-owned facilities with water efficient fixtures.
16. Stop serving water in restaurants unless requested by the customer. This action generates awareness for curtailment, and reduces use of water for washing glasses.
17. Hotels and motels should discourage daily linen replacement by providing procedures for guests to opt for less frequent laundering.

Stage 4: Severe Water Supply Shortage

At Stage 4, nonessential water use must be severely curtailed, and economic impacts cannot be avoided. The goals of MWC’s response will be to maintain water supplies necessary for health and safety needs of the community while minimizing economic hardship.

Stage 4 – MWC Actions

MWC will respond with the following actions:

1. The Water Shortage Action Team will meet to define updated demand reduction goals, review and assess actions taken to date, and evaluate new actions to be taken. Rationing protocols should be defined and uses prioritized. For example, fire suppression and critical sanitation needs for hospitals will be among uses given the highest priority.

If not already implemented, rate surcharges will be imposed. The need for additional temporary staffing for expanded outreach and enforcement of mandatory water restrictions also will be reassessed.
2. Contact members of the Board of Water Commissioners. A special Water Commission meeting may be called.
3. Reevaluate actions to minimize waste or perception of waste by MWC operations. Make appropriate reductions in hydrant and water line flushing without compromising water quality. Consider prohibition on activation and flushing of newly installed water lines or allow only during off-peak nighttime hours. Verify that irrigation of MWC-owned sites is in conformance with requirements below.
4. Notify staff and officials of the City of Medford of the changed curtailment status and updated water reduction goals. Direct notification will be made to individual departments that may be impacted by new regulations.
5. Notify staff and officials of the cities and districts that are MWC customers of the changed curtailment status, updated water reduction goals, and the continued need to maintain actions equivalent to those being taken by MWC. If possible, provide assessments of their performance in Stage 3, based on meter readings, observations, or both.
6. Expand notification and outreach efforts to convey the severity of the conditions, and possibly include outreach options listed for prior stages, but not yet taken. Translation and dissemination of information through Spanish-speaking media will be continued.
7. Notify high use customers of water volume limits and rationing protocols.
8. Contact and/or meet with others on the Contact List included as Table 4-2, particularly those who will be most impacted by current and possible future curtailment actions.
9. Identify possible sources of water that may be used to supplement supply for specific functions. This may include provision of nonpotable water for uses such as dust control or watering of high-priority landscapes or gardens.
10. Reconsider or continue distribution of low-cost items identified in Stage 3 that would yield water savings and raise awareness of the water shortage situation
11. Monitor and report results of curtailment efforts and progress in meeting demand reduction goals. Keep all MWC employees informed.

Stage 4 – Customer Actions

Except as modified below, provisions imposed on customers in Stage 3 will remain in effect, and options listed in that stage but not implemented, will be reassessed. The following additional or modified measures may also be adopted:

1. Water volume limits may be imposed on all customers.
2. Further restriction of landscape irrigation, with regulations to be provided on the MWC website, the Lawn Watering Infoline, and other potential venues, are as follows:
 - a. Watering of turf may be prohibited or allowed only one day per week to keep roots alive while grass goes dormant.
 - b. Shrub watering will follow a restrictive schedule, reflective of current ET or a fraction thereof, along with plant survival needs.
 - c. Tree watering will be accomplished with use of soaker hoses or similar methods that apply water directly to the root zone, rather than broadcast spraying. Frequency and volume allowed will be established through consultation with the City of Medford’s Arborist or other tree experts. Use of nonpotable water for this purpose may be encouraged.
 - d. Time-of-day watering provisions imposed in Stage 3 remain in effect for all spray irrigation.
 - e. Use of hose bib mounted timing devices will be required when irrigating from hoses.
 - f. Sprinkling will be limited to certain days of the week. Allowances will vary according to season and plant type.
 - g. Sprinklers and other irrigation components must be repaired, adjusted, and operated without waste as defined in Stage 3.
 - h. Exceptions to these regulations may be granted at the discretion of the Manager upon documentation that the landscape was installed within the previous 40 days or is deemed a high-priority public use area.
3. No planting new landscapes during Stage 4.
4. No construction or installation of new pools or hot tubs will be initiated during Stage 4, and existing pools and hot tubs may not be drained to less than 90 percent of capacity and refilled. Further restrictions on filling of pools and hot tubs might also be imposed. Exceptions may be granted by the Manager if the pool or hot tub’s use is required by a medical doctor’s prescription or is deemed a high-priority community recreational or health facility.
5. No water for a fountain or pond for aesthetic or scenic purposes unless necessary to support fish, and is leak free as defined in Stage 3. Measures will be taken to move fish to aquariums or other smallest reasonable tub or ponds.
6. Except for vehicles that must be cleaned to maintain public health and welfare such as food carriers and solid waste transfer vehicles, washing of vehicles will only be done in a facility that recycles water. This will apply to all vehicles, including motorbikes and recreational vehicles, whether personal, commercial, or displayed on sales lots.
7. No potable water use for dust control or street cleaning.
8. No new water line extension work will be initiated except as approved by MWC.

9. No use of water from hydrants except for firefighting and flushing deemed necessary to maintain water quality.
10. No water running to waste onto paved surfaces or into gutters.

Stage 5: Emergency Water Supply Disruption

Stage 5 reflects an extreme circumstance in which water available is considerably less than normal demands, and it is imperative that all customer sectors participate in immediate demand reductions. This situation is most likely to result from a sudden event that severely impacts a major system component or affects multiple system components simultaneously. Examples might include failure of a transmission main or intake structure, a chemical spill impacting a water source, a malevolent attack on the system or multiple failures resulting from an earthquake or flood. However, a less dramatic event such as an extended power outage affecting the Duff Treatment Plant, but not the majority of customers, could also lead to sudden and significant curtailment needs.

Stage 5 – MWC Actions

The goals of MWC’s response are to avert system shutdown, and prevent adverse health and safety impacts to the community. MWC will respond with the following actions:

1. The Water Shortage Action Team will convene to define demand reduction needs, and critical actions to be taken. Rationing protocols will be defined and water uses prioritized. Fire suppression and critical sanitation needs for hospitals will be among the uses given the highest priority.
2. Members of the Board of Water Commissioners will be contacted. An emergency Water Commission meeting may be called.
3. Notify the local news media to request their assistance in notifying the public of the severity of the situation. This will include dissemination of information through Spanish-speaking media.
4. Contact staff and officials of the City of Medford and of the cities and districts that are MWC customers. Inform them of water rationing determinations.
5. Contact the largest customers to inform them of applicable water rationing.
6. Mobilize MWC resources to perform rigorous public outreach and enforcement.
7. If deemed necessary, contact local law enforcement and fire departments to enlist help in notifying customers.
8. If water in the system is unsafe to drink, the Oregon Drinking Water Program will be contacted, and their assistance requested for responding to the problem.
9. If applicable, consider options for renting a water hauling truck and purchasing water from nearby communities, sending customers to a predesignated water distribution location, and supplying bottled water.

Stage 5 – Customer Actions

Customer water use restrictions in Stage 5 will include those listed in Stage 4, except as modified below:

1. Water volume limits will be imposed on all customers.
2. No irrigation of landscapes with potable water. If Stage 4 remains in effect for an extended duration, and ongoing actions are proving successful in adequately maintaining reservoir levels, limited watering directly to the root zones of significant large trees and shrubs may be exempted from this ban. Frequency and volume allowed will be established through consultation with the City

of Medford’s Arborist and/or other tree experts. Use of nonpotable water for this purpose may be encouraged.

3. No construction or installation of new pools or hot tubs will be initiated, and existing pools and hot tubs will not be drained and refilled. No water to refill swimming pools or hot tubs. Exceptions may be granted by the Manager if the pool or hot tub is deemed to serve an important community health function.
4. Strengthened rate surcharges will be imposed, particularly if Stage 5 curtailment is anticipated to be in place for an extended period.

Variances

MWC may, in writing, grant temporary variances for prospective uses of water otherwise prohibited after determining that because of unusual circumstances, failure to grant such variance would cause undue hardship or would adversely affect the health or safety of the applicant or the public. Variance requests will be made directly to a management-level employee designated by the MWC Manager.

Penalties

Violations of regulations identified in the Stages 3 through 5 may be enforced by MWC as follows:

1. First violation: Notice of Violation issued advising of the violation and informing of sanctions to be imposed if violations continue.
2. Second violation: Stage 3, a fine which is the greater of \$75 or 20 percent of the customer’s water charges for the prior month; Stage 4, a fine which is the greater of \$100 or 25 percent of the customer’s water charges for the prior month; Stage 5, a fine which is the greater of \$125 or 30 percent of the customer’s water charges for the prior month.
3. Third violation: Stage 3, a fine which is the greater of \$150 or 40 percent of the customer’s water charges for the prior month; Stage 4, a fine which is the greater of \$200 or 50 percent of the customer’s water charges for the prior month; Stage 5, a fine which is the greater of \$250 or 60 percent of the customer’s water charges for the prior month.
4. Fourth and subsequent violations: Stage 3, a fine which is the greater of \$300 or 80 percent of the customer’s water charges for the prior month; Stage 4, a fine which is the greater of \$400 or 90 percent of the customer’s water charges for the prior month; Stage 5, a fine which is the greater of \$500 or 100 percent of the customer’s water charges for the prior month.
5. Depending on the magnitude of curtailment in effect, reasonable time will be provided for offenses to be corrected. However, each day during which a violation occurs may be deemed a separate offense.
6. All fines will be added to monthly water charges. Failure to pay fines with associated monthly water bills may be regarded as an overdue water bill, with reminder notices and shutoff provisions applied as if payment of regular charges had not been made.
7. MWC may dispense with fines and terminate water service after the second violation if water waste is blatant and the offending party expresses a disregard for correction. A Notice of Intent to Terminate Water Service will be delivered as set forth in #8 below at least 24 hours prior to termination of service. Disconnected service will be restored if the customer does the following:

- a. Pays 50 percent of the amount owing on fines, as well as fees normally charged for restoration of service following termination for nonpayment of water bills. The remainder of the fine(s) may be paid with subsequent water bills.
- b. Gives suitable assurances to the MWC that the action causing the disconnection will not be repeated.

In addition to the foregoing, the MWC may, prior to restoration of services, install a flow-restrictor device on the customer's service.

8. MWC will deliver notices of violation, fines, and intent to terminate service to the occupant(s) of the premises or offending parties. If no occupant is present, MWC will leave the notice at the premises by a door hanger or similar means. MWC will also attempt to leave a phone message or mail notices by regular mail to the occupant at the address of the subject premises where the violation has occurred. If possible, efforts will also be made to notify the property owner or manager, if different from the occupant.
9. Provisions relative to termination of water service as set forth in #7 above do not apply to water service temporarily shut off in order to immediately eliminate significant waste when the occupant of the premises has not received full notification as set forth herein and is not at the premises to notify at the time of shutoff. Such shutoffs will not require notice, and will not be subject to reconnection terms set forth in #7, but may qualify as a violation subject to fines.

Appeals

Every party is entitled to go through the appeal process defined in Section 10 of the *Regulations Governing Water Service* handbook. This will apply to appeals of variances denied as well as fines imposed. When fines are appealed, 50 percent of the fine must still be paid when due, with the remainder deferred until a final decision is rendered on the appeal. Any amount paid that is overturned on appeal will be credited to the water account to which it was charged.

Modifications

MWC may modify or revise this plan, or any portion if deemed appropriate. Modifications of the plan can be approved by majority consent of the Board of Water Commissioners.

This policy is intended to conform to all applicable federal and Oregon State statutes. If any part is now, or becomes, in conflict with said statutes, only that portion which is determined to be in violation will become invalid.