City of

Echo, Oregon

Water Management and Conservation Plan

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2022

WATER MANAGEMENT AND CONSERVATION PLAN

FOR

CITY OF ECHO, OREGON

2022

ANDERSON PERRY & ASSOCIATES, INC.

La Grande, Redmond, and Hermiston, Oregon
Walla Walla, Washington

 Job No. 1391-31

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Executive Summary

ES.1 Purpose of Plan

The City of Echo, Oregon, is submitting this Water Management and Conservation Plan (WMCP) in accordance with Oregon Administrative Rules (OAR) Chapter 690, Division 86. This WMCP is intended to meet the requirements of the Oregon Water Resources Department (OWRD) for a WMCP. This WMCP was completed in accordance with suggestions outlined in the *Water Management and Conservation Plan Guidebook* prepared by the League of Oregon Cities, Oregon Utilities Council, and Special Districts Association in association with the OWRD. This WMCP follows the "Suggested Outline of a Water Management and Conservation Plan" presented in Appendix E of the *Guidebook*. This WMCP outlines the City's water system needs for the next 20 years and also outlines practices and water system management methods to help track water use and demands as well as identify potential conservation measures.

ES.2 Water Management and Conservation Plan Key Elements

OAR 690-086-0130 lists criteria for the OWRD to approve a WMCP. This WMCP meets the approval criteria as listed hereafter.

- **Required Elements Under OAR 690-086-0125.** This section requires a municipal water supplier description, a water conservation element, a curtailment element, and a municipal supplier element, including a list of affected local government agencies this WMCP was made available to and a schedule for updating the WMCP. All of these items are included within this WMCP.
- **Affected Local Governments.** The cities/communities and other developed areas closest to the City of Echo include the City of Stanfield. Any actions taken by the City of Echo concerning their water system could impact the neighboring community of Stanfield. The City of Echo provided a draft copy of this WMCP to the City of Stanfield for local agency comment.
- **Projections of Future Water Needs.** Future water needs for the City of Echo are projected in Section 5.0. Presently, the City can meet water supply demands, including the peak daily demand (PDD), using both of its available basalt water supply wells. The City does not have adequate water supply redundancy. It is typical for a municipality to have available capacity in excess of projected PDDs and to have at least one backup supply source to provide supply redundancy and to help ensure water availability to customers. As discussed in this WMCP, the City's existing water supply system can keep up with PDDs. However, due to a lack of supply system redundancy, the City is pursuing a potential interconnection with the City of Stanfield's water system as an additional supply source.

Assuming current City water use characteristics do not change and the population growth of Echo occurs as estimated in the City's 2021 Water System Master Plan (WSMP) Update, the anticipated year 2026 (5-year), 2031 (10-year), 2036 (15-year), and 2041 (20-year) water system demands are shown on Table ES-1. These data do not include golf course demands.

TABLE ES-1
FUTURE ANTICIPATED WATER SYSTEM DEMANDS

Year	Population	Average Daily Demand (200 gpcd)		Peak Daily Demand (600 gpcd)	
		gpm	Daily Gallons	gpm	Daily Gallons
2021	657	91	131,400	274	394,200
2026	691	96	138,200	288	414,600
2031	726	101	145,200	303	435,600
2036	763	106	152,600	318	457,800
2041	802	111	160,400	334	481,200

gpcd = gallons per capita day (gallons per person per day)
gpm = gallons per minute

The daily demand for golf course irrigation is 350,000 gallons per day, or an average of 243 gpm. Golf course daily demand of 243 gpm plus the year 2041 peak daily demand of 301 gpm results in a total peak day demand of 544 gpm.

It should be noted that the assumed average daily demands (ADDs) and PDDs could vary from these values in the future. If water use characteristics for the City vary in the future, it would be wise to reevaluate these demands and, using the updated demand data, recompute the future estimated water system demands summarized herein.

The projected PDD required flow of 544 gpm in the year 2041 can be met by full operation of the two active basalt wells. Typically, peak hourly flows are met using water that is stored in the City's water storage reservoir, which has a capacity of 350,000 gallons when completely full. Based on the assumed population growth rate, a year 2041 population of 802, and the two available basalt supply wells, the City appears to have sufficient capacity to meet both current and projected ADDs and PDDs for the 20-year planning period. Well No. 3 has severe taste and odor issues due to high amounts of hydrogen sulfide present in the groundwater and is not operable, so it is not considered a viable municipal supply source. As a result, the City has some issues related to water system supply redundancy. Proposed improvements to address the lack of supply system redundancy have been recommended in the City's 2022 WSMP Update and are summarized later in this WMCP.

- **Water Conservation Measures (OAR 690-086-0150).** The City of Echo already practices and will continue to improve on all required conservation measures listed in OAR 690-086-0150. The City agrees to implement other/additional conservation measures as part of this WMCP effort, to include educational materials, master meter calibrations, and consideration of water rate modifications. A summary of the five-year benchmarks for the City's conservation activities is provided on Table ES-2.

TABLE ES-2
2023 CONSERVATION ELEMENT ACTIONS

Benchmark	Status/Action	Implementation Date	Anticipated Completion Date	Frequency
Measurement and Reporting	Compliant	Done	N/A	Annual
Fully Metered	Nearly Compliant	2023	2024	Ongoing
Annual Water Audit	Annual Plan	2023	Ongoing	Annual
Meter Testing and Maintenance Program				
Service and Calibrate Master Meters	Five-Year Plan	2023	2028	Five Years
Service Meter Replacement Program	Replace All Meters in System	2023	2024	When Needed
Leak Detection and Repair	Future	2028	2028	When Needed
Increasing Block Rate Structure Based on Use	Five-Year Plan	2023	2027	N/A
Public Education Program				
Consumer Confidence Report/City Website	Annual Plan	Done	Ongoing	Annual
Use of Low Water Use Irrigation Practices	Annual Plan	Ongoing	Ongoing	Annual
High Consumption Monitoring	Continuous Plan	Ongoing	Ongoing	Ongoing
OWRD Handouts Distributed, Placed on Website	Annual Plan	2023	2023	Annual
Water Reuse	N/A	N/A	N/A	N/A
Technical and Financial Assistance Program	Compliant	Ongoing	Ongoing	Ongoing
Future Potential Conservation Measures				
Retrofit Fixture Replacement Program	Future	Future	Future	Future
Use of Low Water Use Landscaping	Future	Future	Future	Future

The City of Echo believes focusing their efforts on the largest potential water saving items is the best conservation path forward. While all conservation efforts are important, completion of the annual water audit, ensuring all connections are metered, and having a meter replacement and calibration program will provide the most significant water supply savings.

- **Curtailment Plan**. The City has developed a Curtailment Plan, as summarized in Section 4.0 of this WMCP. Development of the Curtailment Plan is consistent with the requirements outlined in OAR 690-086-0160. The Curtailment Plan has four stages of alert, with specific implementation actions to help conserve water during each stage. The City also has an Emergency Response Plan as required by the Oregon Health Authority - Drinking Water Services to provide further guidance during water system-related emergencies.

The City has not perfected at full beneficial use any of the existing water rights. At one time, the City had perfected water use from Well No. 2; however, the water rights for this well have since been transferred to another City well as discussed later in this WMCP. The City of Echo anticipates engaging the services

of a Certified Water Rights Examiner to complete a Claim of Beneficial Use for the City's current groundwater basalt wells.

ES.3 Update Schedule for the Water Management and Conservation Plan

In accordance with regulations, the City of Echo intends to submit an updated WMCP at the required ten-year interval (2032). The update will provide a summary of the City's water use data and an updated forecast for when additional supply sources are anticipated to be required.

Section 1.0 - Introduction

This section discusses the purpose of the City of Echo's Water Management and Conservation Plan (WMCP) and provides a general system description (City data, connections, water rights), a summary of data sources utilized, input received during development, and a summary of the organizational layout of this WMCP.

1.1 Purpose of Water Management and Conservation Plan

The City of Echo completed a WMCP in 2012 that was submitted to the Oregon Water Resources Department (OWRD). Since completion of the 2012 WMCP, the City has not completed any major water system improvements; however, the City has secured funding and is intending to complete a significant water system improvements project in 2023. The project is anticipated to include improvements to the existing distribution system, upgrades to an existing well pump station, construction of a new well pump station, erection of a new water storage reservoir, construction of a new booster pump station, and development of an interconnection between the City of Echo's and the City of Stanfield's water systems.

Upon final order approving the City's 2012 WMCP, OWRD specified that the City must submit an updated WMCP meeting the requirements of Oregon Administrative Rules Chapter 690, Division 86 no later than February 28, 2022. This WMCP has been developed to meet this requirement.

1.2 General System Description

The City of Echo is located in Umatilla County, approximately 21 miles northwest of Pendleton, and 1 mile southeast of Interstate 84 on U.S. Highway 395. The population of Echo as of July 1, 2021, is 657 based on estimates provided by the Population Research Center at Portland State University (PSU). PSU provides population estimates in July of each year for that calendar year. A 20-year planning population of 802 for the year 2041 has been used for this document and for the City's 2022 Water System Master Plan (WSMP) Update.

The general location of the community is shown on Figure 1-1, Location and Vicinity Maps. A map of the water supply and storage systems is shown on Figure 1-2, Existing Supply Sources and Reservoir. The nearest community to the City of Echo is the City of Stanfield, which is approximately 3 miles north of Echo.

The City of Echo currently serves approximately 278 connections, with the majority of the connections being residential. A summary of the current connections is as follows:

- 253 residential connections (91.0 percent of total connections)
- 17 commercial connections (6.1 percent of total connections)
- 7 public connections (2.5 percent of total connections)
- 1 golf course connection (0.4 percent of total connections)
- 278 total connections

The City's golf course is the highest water user and is the primary user affecting the City's average daily, peak daily, and annual water use.

The City of Echo operates a water system that serves their community within the city limits and some areas within the urban growth boundary. The main components of the water system are discussed in greater detail in Section 2.0 of this WMCP and are briefly summarized hereafter.

1.3 Water Supply

General

The City currently has two active groundwater basalt supply wells (Wells No. 4 and 5) that have historically met all of the City's municipal water use needs. The City also has two inactive and inoperable wells, Wells No. 2 and 3. The location of each supply well is shown on Figure 1-2. Water rights information for the groundwater well sources is included in Appendix A. Well logs for each well are presented in Appendix B.

Well No. 2

Well No. 2 was originally constructed in 1947 to a depth of 520 feet and then deepened to 820 feet in 1964; however, during a water system improvements project in 1994, it was discovered that the well needed costly rehabilitation, so the City decided to drill a new well instead of trying to rehabilitate Well No. 2. After the pump and column were removed, a cover plate was welded to the casing. Well No. 2 has not been used since the cover plate was welded to the casing.

Well No. 3

Well No. 3 was originally constructed in 1951 to a depth of 490 feet. Currently, this well is not used because of significant taste and odor issues due to high amounts of hydrogen sulfide. Well No. 3 has not been operated since 2001 and the existing pump and motor are inoperable. According to City records, the well produced 240 gallons per minute (gpm) while in operation. This well is inoperable and unable to serve as an emergency backup water supply for the City.

Well No. 4

Well No. 4 was constructed in 1974 to a depth of 600 feet. In 1991, the water level in Well No. 4 dropped below the pump bowls, and the well became inoperable. During a water system improvements project completed in 1994, the well was deepened to approximately 1,045 feet, and a new pump was installed. According to City records, the well produces approximately 275 gpm during the winter months and drops to 175 gpm in the summer months. Well No. 4 is utilized as one of the City's two main municipal water sources.

Well No. 5

Well No. 5 was constructed in 1995 to a depth of 1,282 feet and is also used as one of the City's two main municipal water sources. The well is reportedly capable of producing approximately 790 gpm.

Proposed Water Supply Improvements

As part of an upcoming water system improvements project, the City is planning to construct improvements to the existing Well No. 4 pump station, construct a new pump station at the Well No. 5 site, and develop an interconnection between the City's water system and the City of Stanfield's water system. The proposed interconnection would provide redundancy to the City's water supply system and provide a water supply source to fill the proposed new water storage reservoir discussed later in this section. A more detailed description of the upcoming water supply improvements can be found in the City's 2022 WSMP Update.

1.4 Water Storage

Existing 350,000-Gallon Ground-Level Steel Reservoir

The City of Echo's existing municipal water storage system consists of one ground-level steel reservoir constructed in 1980. It has a capacity of 350,000 gallons. The reservoir is located adjacent to existing Well No. 5, north of Golf Course Road, along the east boundary of the golf course, as shown on Figure 1-2. This is a welded steel reservoir with an interior and exterior paint system for corrosion protection. The reservoir is approximately 21 feet tall with a diameter of 56.5 feet. Existing Wells No. 4 and 5 discharge directly into this reservoir.

Proposed Water Storage Improvements

As part of an upcoming water system improvements project, the City is planning to construct a new 500,000-gallon water storage reservoir that would store water supplied from the previously discussed interconnection with the City of Stanfield's water system. The new reservoir can also be filled through the distribution system using Wells No. 4 and 5. These storage improvements have been proposed to provide enough storage for the projected year 2041 storage needs. A more detailed description of the upcoming water storage improvements can be found in the City's 2022 WSMP Update.

1.5 Water Distribution System

The City's original water system was installed in 1904 when the City was first incorporated. The original water mains were likely wood stave or steel pipe. In 1980, a major system improvements project replaced the aging and deteriorating main lines and service lines with polyvinyl chloride and polyethylene pipe, respectively.

In general, the distribution system is fairly well looped and, for the most part, has larger diameter water main lines. Some areas have dead-end and/or undersized main lines. These areas are proposed to be improved in the City's upcoming water system improvements project.

An existing belowground packaged booster pump station was constructed in 1980. The booster pump station serves the higher elevation areas on the east side of the City near the golf course and Smith Drive, the cemetery, and homes near the cemetery. The booster pump station can also be used to augment fire flows in the lower elevation areas of the City as required. It initially operated with four pumps: a jockey pump, a 5 horsepower (Hp) pump, a 10 Hp pump, and a 30 Hp pump. Presently, the 3 Hp and 5 Hp pumps are inoperative. This booster pump station is proposed to be demolished as part

of the upcoming water system improvements project and replaced with a new booster pump station at the Well No. 5 site.

The City has a pressure reducing valve (PRV) station on Gerone Street near the school that allows water from the high level pressure zone to circulate into the low level pressure zone during high demand events. In the event that a fire were to occur in the lower pressure zone, the PRV would open, allowing increased flows to enter the lower pressure zone.

1.6 Interconnections

The City of Echo does not currently have interconnections with neighboring water systems; however, in the upcoming water system improvements project, developing the means to utilize Stanfield water to fill the proposed Echo reservoir. No private water systems are adjacent to the City.

1.7 Water Rights

The City holds water rights for its basalt supply wells. A summary of water rights information is provided on Table 1-1. Water rights are described in greater detail in Section 2.0 of this WMCP.

TABLE 1-1
WATER RIGHTS

Water Source	Application Number	Permit Number	Water Right Certificate	Transfer Number	Allowed Flow Volume (cfs/gpm)	Priority Date	Allowed Use
Well No. 2	U-175	U-168	19613	----	1.10/490[1]	1945	Municipal
Well No. 2	G-8865	G-8546	----	----	2.90/1,300	1978	Municipal
Well No. 3	G-21	G-64	34386	----	0.89/400[2]	1953	Municipal
Well No. 4	G-8865	G-8546	----	----	2.00/900	1978	Municipal
Well No. 5	U-175, G-21	U-168, G-64	92295	T 7045, T 7044	1.10/490[1,3], 0.89/400[2,3] Well No. 5 Total = 1.99/890	1945 1953	Municipal

[1]The quantity of water diverted at the new point of appropriation (Well No. 5), together with the quantity diverted at Well No. 2, will not exceed the quantity of water available from the original point of appropriation.

[2]The quantity of water diverted at the new point of appropriation (Well No. 5), together with the quantity diverted at Well No. 3, will not exceed the quantity of water available from the original point of appropriation.

[3]Well No. 2, Well No. 3, and Well No. 5 can continue to be used until the new certificates are issued, provided the amount of water used at any well or combination of the wells does not exceed the amount stipulated in the transfers.

cfs = cubic feet per second

1.8 Summary of Data Sources

Considerable information was utilized during preparation of this WMCP. The main sources are as follows:

- City records for water pumped from the existing water supply sources as well as water billing records

- City water system maps
- 1992 Engineering Study
- 2012 WMCP
- 2012 WSMP
- 2022 WSMP Update
- Certificates of water rights, water permits, and final orders available from the OWRD website
- Well logs from the OWRD website

1.9 Input During Water Management and Conservation Plan Development

Assistance was received from Echo public works staff, the city administrator, and other staff during preparation of this WMCP. Discussions with City staff regarding the data to include in the WMCP, potential implementation of conservation measures, etc., occurred during development of this WMCP. A draft WMCP was submitted to the City of Echo, the Umatilla County Planning Department, the City of Stanfield, and the OWRD for review and comment.

1.10 Document Organization

This WMCP has been organized around the *Water Management and Conservation Plan Guidebook* prepared by the League of Oregon Cities, Oregon Utilities Council, and Special Districts Association in association with the OWRD. The document follows the "Suggested Outline of a Water Management and Conservation Plan" presented in Appendix E of the *Guidebook*. This WMCP is separated into the following sections:

Executive Summary

The Executive Summary provides a brief overview of the City's overall WMCP, including the WMCP's purpose and key elements.

Section 1.0 - Overview

This section provides a brief overview of the City's WMCP, why it has been completed, WMCP regulatory requirements, a general description of the City's water system and water rights, and WMCP organization.

Section 2.0 - Municipal Water Supplier Description

This section summarizes the service area, customer base, population data, water use characteristics, and water sources. Water rights are also presented, including an assessment of the adequacy and reliability of supply sources. Implementation of a water audit is also discussed.

Section 3.0 - Water Conservation Element

This section summarizes the City's water use measurement and reporting and discusses water conservation elements to be considered for the water system. This section also includes a proposed implementation schedule for conservation items yet to be implemented.

Section 4.0 - Water Curtailment Element

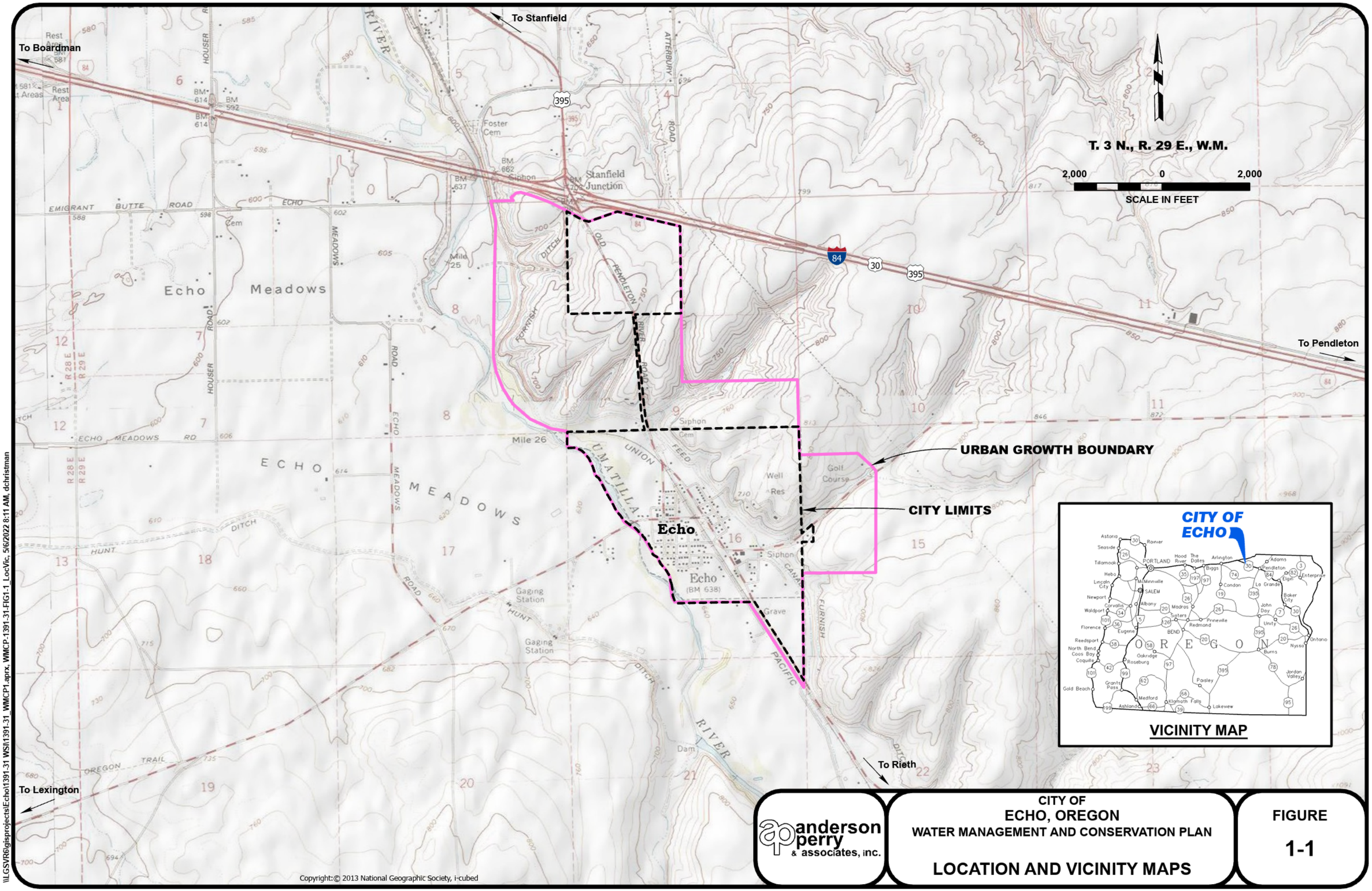
This section discusses events that have resulted in past curtailment situations and includes a Curtailment Plan. The Curtailment Plan includes an overview of the current curtailment program and the different stages of curtailment.

Section 5.0 - Municipal Water Supply Element

This section provides key data for water system planning including population projections, area development considerations, and water system demand forecasting. Based on the future demand estimates, a long-range water supply plan is presented for a 20-year period.

Appendices

The Appendices contain the following supporting information for this WMCP: Water Rights Information (Appendix A), Well Logs (Appendix B), Water Rate Structure (Appendix C), Consumer Confidence Report (Appendix D), Public Education Materials (Appendix E), and Local Jurisdiction Comments (Appendix F).



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CITY OF
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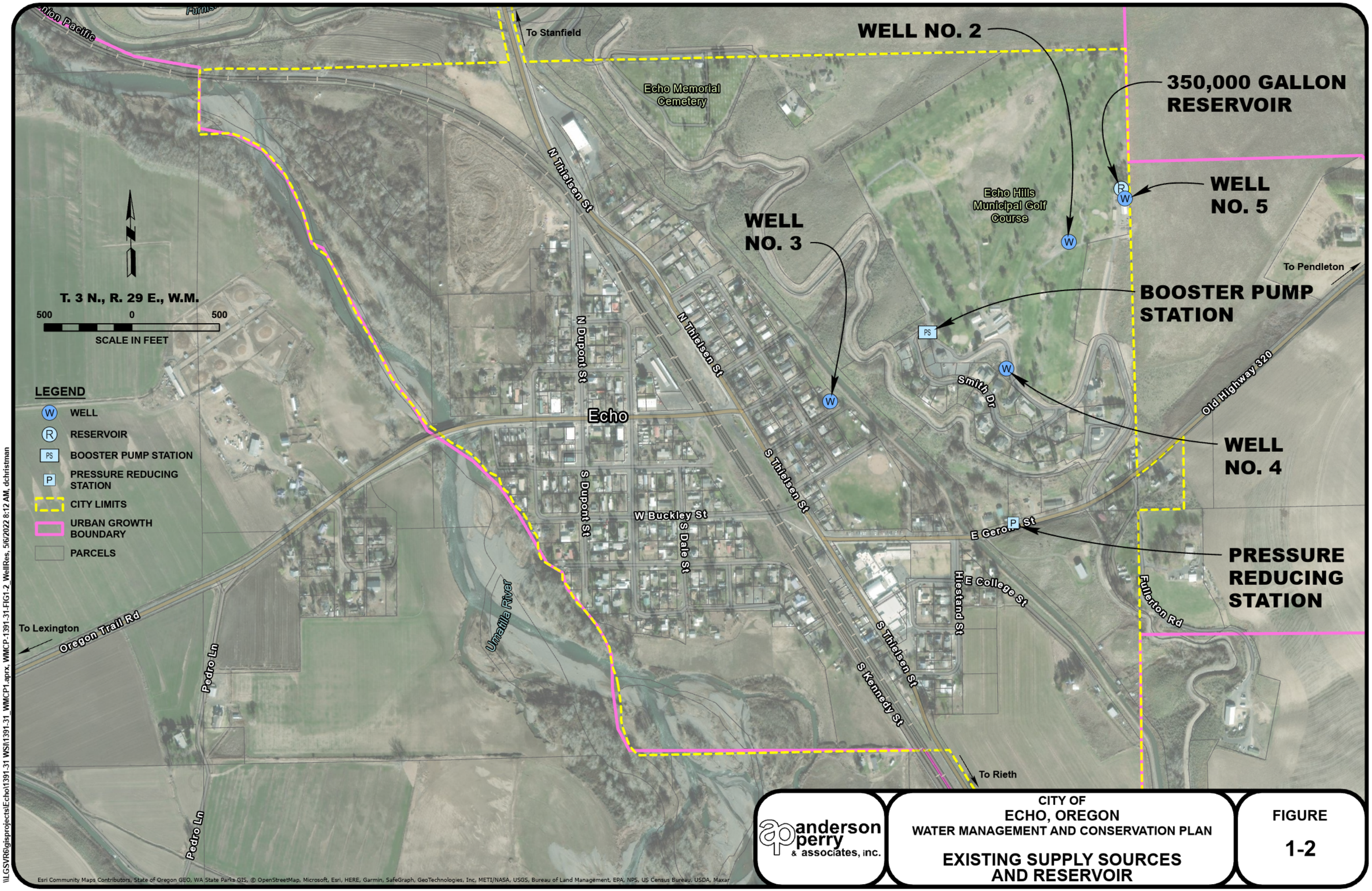
WATER MANAGEMENT AND CONSERVATION PLAN

LOCATION AND VICINITY MAPS

FIGURE
1-1



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CITY OF
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WATER MANAGEMENT AND CONSERVATION PLAN

EXISTING SUPPLY SOURCES AND RESERVOIR

FIGURE
1-2

Section 2.0 - Municipal Water Supplier Description

This section provides a summary of the basic data for the water system including the service area and population, water rights, water demands, customer list, a brief description of the overall water system, and a discussion of the efficiency of the water system, particularly the water supply system. This section provides the basic data for the water system to help evaluate future water supply needs for the City of Echo.

2.1 Service Area and Population

Service Area

The term "service area" refers to the area being served with water from the City's municipal water system. The present service area for the City primarily consists of developed lands within the boundaries of the city limits, including a few areas within the urban growth boundary (UGB). The existing service area, or the City limits, is shown on Figure 1-1. For the purposes of this Water Management and Conservation Plan (WMCP), it has been assumed that the future service area of the water system will mostly include the area within the UGB but outside the "permanent open space" zoning designation, as discussed in Section 5.0.

The current city limits encompass an area of approximately 520 acres, which includes recently annexed areas near Interstate 84 (I-84) and at the south city limits. Echo's present UGB includes several open areas that may also be developed within the planning period of this WMCP. If development occurs within the UGB, water system improvements will likely be needed and primarily would be distribution system improvements. Some higher elevation areas near I-84 would require a booster pump system to deliver adequate water system pressure. With development anticipated to occur in the near future, it would be wise to complete a study specific to the developments at that time. Such a study could focus in a more detailed manner on the improvements needed to properly serve the particular area to be developed.

The current city limits and UGB are shown on Figure 1-1 in Section 1.0 of this WMCP.

Population Estimates

The historical populations of the City of Echo from 1970 through 2021 are summarized on Table 2-1. The City's population projection for future anticipated demands is summarized in Section 5.0 of this WMCP.

TABLE 2-1
HISTORICAL POPULATION DATA

Year	Population
1970	479
1980	624
1990	500
2000	650
2010	700
2015	705
2016	705
2017	705
2018	710
2019	710
2020	632
2021	657

The annual population growth rate for each 10-year period, as well as the overall period from 1970 through 2020, is presented on Table 2-2.

TABLE 2-2
ANNUAL POPULATION GROWTH RATE DATA

Period	Population Change	Annual Population Growth Rate
1970 to 1980	145	2.68%
1980 to 1990	-124	-2.19%
1990 to 2000	150	2.66%
2000 to 2010	50	0.74%
2010 to 2020	-80	-1.21%
1970 to 2021	**178**	**0.62%**

As Table 2-2 demonstrates, the City of Echo has experienced an average annual population growth rate of 0.62 percent over the last 50 years of population history. This is a modest annual population growth rate, with two 10-year periods experiencing a negative growth rate and two others experiencing an annual growth rate of more than 2 percent. The most recent population estimate completed by the Portland State University (PSU) Population Research Center for July 2021 indicates a population of 657.

This WMCP provides a review of the past, present, and anticipated future of the City's water system and is intended to analyze the water system over an extended period to properly forecast future water system needs. The City completed a Water System Master Plan (WSMP) Update in accordance with Oregon Health Authority - Drinking Water Services requirements in 2022. The City adopted an annual population growth rate of 1.0 percent per year to be extended annually from 2021 for a 20-year planning period, for a year 2041 population of 802. Population projections relating to the City's water system supply are discussed in greater detail

in Section 5.0 of this WMCP. This growth rate will steadily increase water supply needs for future anticipated demands.

2.2 Water Supply Sources

The City of Echo currently meets all of its municipal water supply using both of the available groundwater basalt supply wells. As previously discussed, Well No. 2 has been sealed off and the water right has been transferred to Well No. 5; therefore, it is not included on the table below. Well No. 3 is also inoperable and is not considered a viable supply source. A summary of the City's water supply, based on supply capacity, is provided on Table 2-3. Table 2-3 shows the current flow capacity of only the supply sources utilized to meet demands placed on the system.

TABLE 2-3
CURRENT WATER SUPPLY CAPACITY

Water Source	Depth (feet)	Current Certificated Capacity (cfs/gpm)	Current Flow Capacity (gpm)	Percent of Total Supply Capacity[1]
Well No. 3[2]	490	0.89/400[3]	0	0
Well No. 4[4]	1,045	2.0/900	175 to 275	18
Well No. 5	1,282	1.1/490[5,6] 0.89/400[3,6]	790	82

[1]Percent of total supply calculations assumes a Well No. 4 capacity of 175 gpm.

[2]Well No. 3 is used only for emergency purposes due to taste and odor issues.

[3]The quantity of water diverted at the new point of appropriation (Well No. 5), together with the quantity diverted at Well No. 3, will not exceed the quantity of water available from the original point of appropriation.

[4]Well No. 4 reportedly has a capacity of 175 gpm during the summer and 275 gpm during the winter.

[5]The quantity of water diverted at the new point of appropriation (Well No. 5), together with the quantity diverted at Well No. 2, will not exceed the quantity of water available from the original point of appropriation.

[6]Wells No. 2, 3, and 5 can continue to be used until the new certificates are issued, provided the amount of water used at any well or combination of the wells does not exceed the amount stipulated in the transfers.

gpm = gallons per minute

cfs = cubic feet per second

2.3 Water Rights

The City of Echo has Oregon Water Resources Department permits to appropriate groundwater and to use the water for municipal purposes within specified areas for each of its wells. A summary of the water right information is presented on Table 2-4. Copies of the City's water rights and well permit information are presented in Appendix A. A summary of the City's water rights is also presented on Figure 2-1, Water Rights Inventory.

TABLE 2-4
WATER RIGHTS

Water Source	Application Number	Permit Number	Transfer Number	Certification Number (Full Beneficial Use)	Maximum Instantaneous Allowed Flow (cfs/gpm)	Maximum Annual Quantity Allowed (cf/MG)	Priority Date	Allowed Use
Well No. 2	U-175	U-168	N/A	19613 (Cancelled for T-7045)	1.10/490	34,689,600/257	8/24/1945	Municipal
Well No. 2	G-8865	G-8546	N/A	N/A	2.90/1,300	91,454,400/683	6/21/1978	Municipal
Well No. 3	G-21	G-64	N/A	34386 (Cancelled for T-7044)	0.89/400	28,067,040/210	9/24/1953	Municipal
Well No. 4	G-8865	G-8546	N/A	N/A	2.00/900	63,072,000/472	6/21/1978	Municipal
Well No. 5	U-175, G-21	U-168, G-64	T-7044 (0.89 cfs), T-7045 (1.10 cfs)	N/A	1.99/890	62,756,640/469	8/24/1945 9/24/1953	Municipal

cf = cubic feet

MG = million gallons

2.4 Water System Demands

To determine current water demands, well production records for the City's water supply system from October 2014 through September 2021 were reviewed. Monthly production data for Wells No. 4 and 5 for this period are shown on the following Charts 2-1, 2-2, and 2-3, respectively. Chart 2-3 shows monthly production for both wells combined. Charts 2-1 and 2-2 show that summer demands are typically four to five times winter demands, which is expected due to high irrigation demands during the area's arid summers. This is a typical winter to summer use ratio for eastern Oregon cities.

CHART 2-1
WELL NO. 4 MONTHLY PRODUCTION

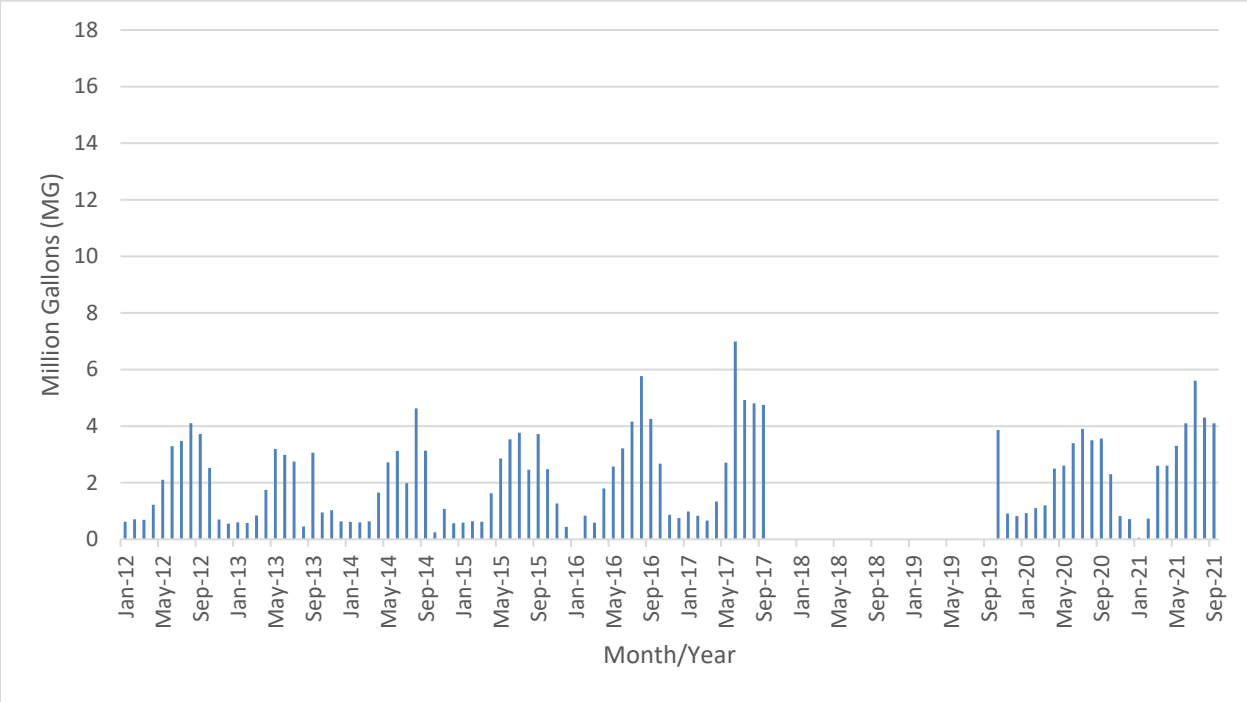


CHART 2-2
WELL NO. 5 MONTHLY PRODUCTION

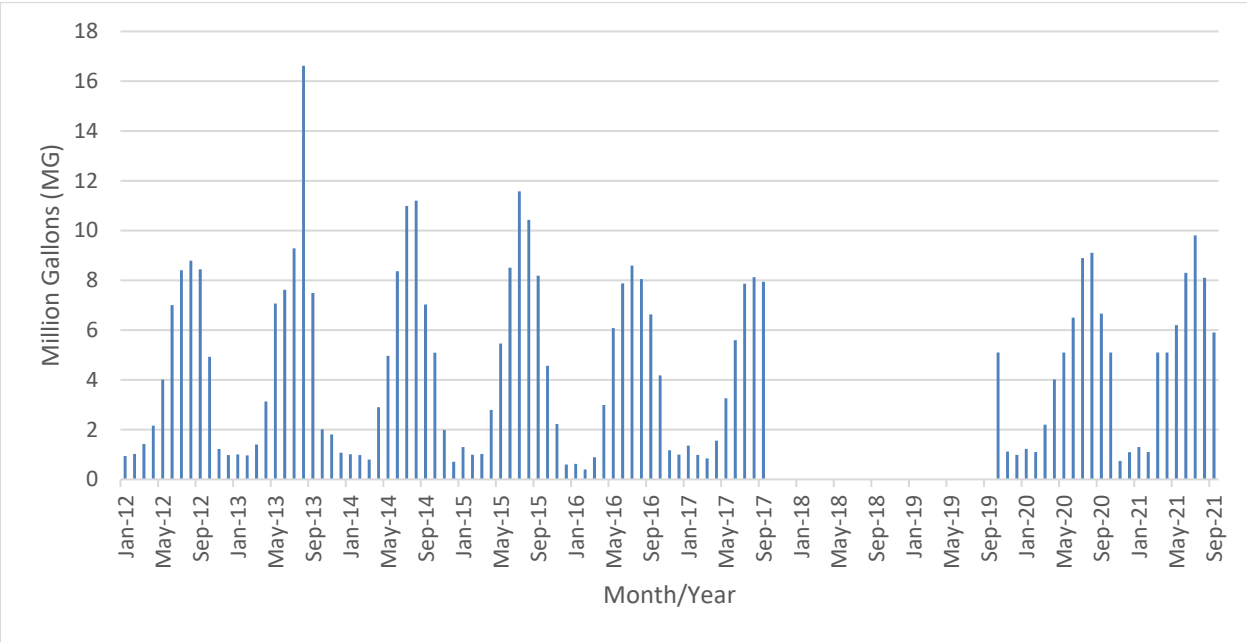
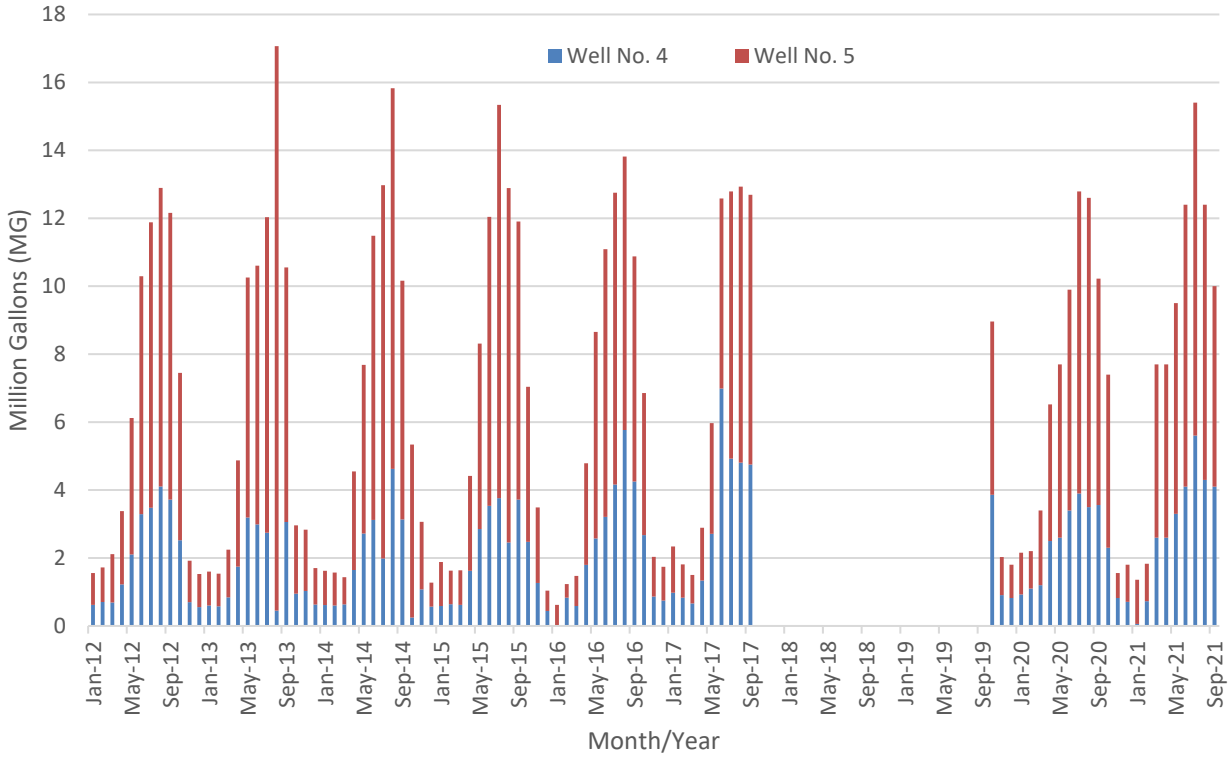


CHART 2-3
ANNUAL WATER USE, WELLS NO. 4 AND 5, 2012 THROUGH 2021



The calculation of the average per capita water use is shown on Table 2-5.

TABLE 2-5
WATER YEAR AVERAGE PER CAPITA WATER USE (OCTOBER TO SEPTEMBER)

Water Year	Population	Annual Water Production (MG)	Golf Course Usage (MG)	Average Daily Demand (not including Golf Course) (gpcd)
2015	705	79.7	29.4	196
2016	705	76.9	29.4	185
2017	705	76.1	30.7	176
2018	N/A[1]	N/A[1]	N/A[1]	N/A[1]
2019	N/A[1]	N/A[1]	N/A[1]	N/A[1]
2020	632	80.3	32.0	209
2021	657	89.1	36.2	221

[1]Water use data for the 2018-19 water year are not readily available.

gpcd = gallons per capita day (gallons per person per day)

The data summarized on Table 2-5 show a fairly steady total water use over the last seven years of data.

Average Daily Demands

Based on data from October 2014 through September 2021, the City's per-person water use has varied from a low of 176 gpcd in 2017 to a high of 221 gpcd in 2021. To stay consistent between planning documents, the 200 gpcd used in the City's 2022 WSMP Update will be used in this WMCP. The City's 200 gpcd average daily demand (ADD) is in the lower range of typical demands when compared to other cities with water meters in eastern Oregon and eastern Washington, as shown on Table 2-6.

Peak Daily Demands

Peak daily demands (PDD) usually occur during the period between June through September, which is when water use is normally at its greatest due to irrigation and other summer uses. PDDs can occur in other months but normally occur during the hottest period of the year. PDDs typically vary from 2.5 to 3.5 times more than ADDs. A peak factor of 3.0 was assumed from prior water use data in the City. Currently, for 657 people, this equates to 394,200 gallons per day or 274 gpm. A PDD of 600 was selected for planning purposes in this WMCP. The estimated PDD of 600 gpcd is comparable to other Oregon and Washington cities, as shown on Table 2-6.

TABLE 2-6
COMPARATIVE WATER USAGE TYPICAL FOR SMALL CITIES IN EASTERN OREGON AND EASTERN WASHINGTON, METERED SYSTEMS

Water System	ADD (gpcd)	PDD (gpcd)	Peak Factor (Peak Daily)	Population
Lostine, Oregon	170	545	3.2	250
White Salmon, Washington	176	452	2.6	3,761
Adams, Oregon	195	625	3.2	265
Weston, Oregon	195	834	4.3	670
Echo, Oregon (not including golf course use)	**200**	**600**	**3.0**	**657**
Umatilla, Oregon	210	483	2.3	4,686
Cove, Oregon	215	628	2.9	594
Baker City, Oregon	227	834	3.7	10,035
La Grande, Oregon	230	667	2.9	13,238
Union, Oregon	230	890	3.9	2,121
Prairie City, Oregon	234	549	2.3	1,195
Mt. Vernon, Oregon	240	585	2.4	617
Stanfield, Oregon	240	600	2.5	1,770
Athena, Oregon	250	710	2.8	1,142
Vale, Oregon	250	625	2.5	1,890
Island City, Oregon	270	810	3.0	989
John Day, Oregon	270	865	3.2	2,010
La Pine, Oregon	280	700	2.5	982
Enterprise, Oregon	284	582	2.0	1,940
Irrigon, Oregon	290	800	2.8	1,790
Milton-Freewater, Oregon	300	750	2.5	6,550
Boardman, Oregon	320	960	3.0	3,445
Helix, Oregon	323	1,130	3.5	155
Arlington, Oregon	325	1,040	3.2	615

Water System	ADD (gpcd)	PDD (gpcd)	Peak Factor (Peak Daily)	Population
Lexington, Oregon	325	1,150	3.5	260
Hines, Oregon	350	1,600	4.6	1,700
Echo, Oregon (including golf course use)	**372**	**669**	**1.8**	**657**
Joseph, Oregon	375	1,100	2.9	1,060
St. John, Washington	379	993	2.6	554
Ione, Oregon	461	1,865	4.0	250
Wallowa, Oregon	487	1,900	3.9	890
Halfway, Oregon	600	1,240	2.1	352

Based on data from the City's 2022 WSMP Update and additional analysis herein, ADDs and PDDs of 200 gpcd and 600 gpcd, respectively, were assumed. Utilizing these assumptions, Table 2-7 summarizes the anticipated ADD and PDD flow rates from the system, assuming a population of 657. These demands have also been summarized as a flow rate to provide the basis for comparison to water supply capacity.

TABLE 2-7
YEAR 2021 AVERAGE AND PEAK DAILY DEMAND DATA

Parameter	City Demand (gpcd)	City Demand (gpm)	Percentage of Current System Capacity of 965 gpm[1]
ADD	200	91	9.4
PDD	600	274	28.4

[1]The current capacity of the supply system is estimated at 965 gpm in the summer and 1,065 gpm in the winter. This capacity assumes only Wells No. 4 and 5 are used.

Water supply facilities (well pumps) are normally designed to meet PDDs without providing 24-hour service. It is preferable that well pumps operate a maximum of 18 hours per day, if possible. The current total production capability of Wells No. 4 and 5 is reportedly in the range of 965 gpm to 1,065 gpm depending on the time of year. This 965 to 1,065 gpm capacity can meet the current PDD of the community, which is 274 gpm, by operating up to approximately 6.8 hours per day. The 2021 PDD for the community and golf course is estimated to be 409 gpm. Wells No. 4 and 5 would need to operate approximately 10.2 hours per day to meet this estimated demand. This suggests that the existing supply system can generally keep up with demands, despite limited water supply redundancy.

2.5 Description of Customers Served

The City of Echo's water service accounts, as presented in the 2022 WSMP Update, are summarized on Table 2-8. The total water use for each main account type is also shown for comparison purposes for the period from October 2020 through September 2021. Table 2-8 shows residential water use accounts for approximately 45.8 percent of the total water use in the City of Echo. If the golf course use is not considered, residential use is approximately 72.9 percent of the total water use in Echo.

TABLE 2-8
WATER ACCOUNT INFORMATION

Account Type	Number of Accounts	Total Annual Use (gallons)	Average Annual Use Per Account (gallons)	Percentage of Total Water Use
Residential	253	36,768,240	145,329	45.8
Commercial	17	802,800	47,224	1.0
Public	7	12,844,800	1,834,971	16.0
Golf Course	1	29,829,000	29,829,000	37.2
TOTALS	**278**	**80,280,000**	**NA**	**100**

Note: Table 2-8 does not account for water use from unmetered connections.

Table 2-9 compares current water account information to historical data reported in the City's 2022 WSMP Update and the 2012 WMCP.

TABLE 2-9
HISTORICAL WATER ACCOUNT INFORMATION

	Number of Accounts Per Year	
Account Type	**2009**	**2021**
Residential	250	253
Commercial	16	17
Public	7	7
Golf Course	1	1
TOTALS	**274**	**278**

2.6 Water System Description

This section summarizes the City of Echo's water supply sources, storage reservoir, and distribution system. The locations of the water supply sources and storage reservoir are shown on Figure 1-2 in Section 1.0. In general, the City has two active basalt supply wells and one 350,000-gallon water storage reservoir. Each component of the water system is described in greater detail hereafter.

Water Supply

General

The City of Echo currently has four deep basalt groundwater supply wells, Wells No. 2, 3, 4, and 5, all of which are located within the city limits. Wells No. 3, 4, and 5 are capable of discharging directly into the City's existing 350,000-gallon ground-level reservoir. Well No. 2 was taken out of service around 1990 because a declining water table and reportedly not straight well bore prevented lowering the pump, which would have been required for proper operation. Wells No. 4 and 5 are the City's primary water sources. Well No. 3 is not currently operational. Well No. 3 has significant taste and odor issues due to a high concentration of hydrogen sulfide. The last time Well No. 3 was used was approximately 2001. Copies of the City's well logs and related data are presented in

Appendix B. A summary of each of the City's wells is discussed hereafter. All references to well depth are below ground surface.

Well No. 2

Well No. 2 was originally constructed in 1947 to a depth of 520 feet and then deepened to 820 feet in 1964. After improvements were made to the City's water system in 1980, Well No. 2 was used as a municipal irrigation well to irrigate the golf course. Plans for converting the well to a municipal well as part of the 1994-95 water system improvements project were abandoned when the City decided that rehabilitation of Well No. 2 could cost more and involve more risk than constructing a new well. This decision was made primarily because the well is reportedly not straight, which creates excess wear on pumping equipment. Well No. 2 cannot be considered a reliable supply source. The pump and pump column were removed from Well No. 2 and placed in Well No. 5 in 1995 when the golf course began to be irrigated directly from the municipal system. A cover plate was welded to the Well No. 2 casing after the pump and column were removed.

Well No. 3

Well No. 3 was originally constructed in 1951 to a depth of 490 feet. During a water emergency in 1991, Well No. 3 was the only operational well supplying water to the system when the water table in Well No. 4 dropped below the pump bowls. Well No. 3 reportedly produced approximately 240 gpm at that time. Currently, the Well No. 3 pump is not operational and the well is not a viable supply source. The well has significant taste and odor issues with hydrogen sulfide that limits the desirability of its use. The last time the well was used was approximately 2001. The impact of declining water levels on the capacity of Well No. 3 is unknown without conducting a pump test and monitoring well water levels. At this point there is no provision to pump the well to waste and perform a pump test with the current plumbing arrangement and the lack of usable equipment.

Well No. 4

Well No. 4 is one of two wells that the City regularly uses as a municipal water source. This well was originally constructed in 1974 to a depth of 600 feet. In 1991 the water level in the well dropped below the level of the pump bowls and the well became inoperable. Improvements to Well No. 4 in 1994 included deepening the well to 1,045 feet and installing a new pump. According to City records, the well produces approximately 275 gpm in the winter when well water levels rise and then drops to approximately 175 gpm in the summer when the well water level drops.

Well No. 5

Well No. 5 was constructed in 1995 to a depth of 1,282 feet and currently serves as one of the City's primary municipal water supply sources. In 1999 the groundwater level in Well No. 5 had declined to the point that an additional column and a larger pump needed to be installed in the well. This seemed to solve the problem until 2006, when

the pump quit operating and the City lost this supply well. Initially, the City believed that the well had gone "dry." However, when they had the pump column and pump pulled, they discovered the column pipe that had been installed in 1994 had corroded to the point that holes developed in a substantial portion of the pipe. The water pumped up the column by the pump would exit through the holes in the column and cascade back down the well. The City replaced 273 feet of the original column, installed a new pump, and lowered the pump to 800 feet below ground surface. To date, there have been no further problems with the operation of Well No. 5. Well No. 5 currently produces approximately 790 gpm throughout the year.

Water Storage

The City of Echo's existing municipal water storage consists of one ground-level steel reservoir constructed in 1980. It has a capacity of 350,000 gallons. The reservoir is located adjacent to the existing Well No. 5, north of Golf Course Road, along the east boundary of the golf course as shown on Figure 1-2 in Section 1.0. This welded steel reservoir has an interior and exterior paint system for corrosion protection. The reservoir is approximately 21 feet high with a diameter of 56.5 feet. Existing Wells No. 4 and 5 discharge directly into this reservoir.

A detailed inspection of the 350,000-gallon reservoir was completed on November 27, 2007, by LiquiVision Technology, Inc. The reservoir inspection report indicates that the exterior coating was in good condition, with small amounts of corrosion on the ringwalls, roof, and main entries (less than 0.03 percent of the surface was corroded). The exterior ladder and roof vent coating was reportedly in good condition, with little corrosion. The interior coating was also reported to be in good condition, with minute corrosion of the interior ladder, ringwalls, floor, center support column, and ceiling. The report also notes that the overflow pipe, inlet pipe, outlet pipe, and drain coating were in good condition, with 0.03 percent to 1 percent of the surface corroded. Per the inspection report, a reservoir in poor condition typically requires immediate repairs of structural related problems, and a reservoir in good condition typically does not require improvements, but optional repairs of cosmetic problems could be completed if desired. In June 2019, the City had the 350,000-gallon reservoir cleaned; however, no inspection report was completed at the time of the cleaning.

Water Distribution System

Historical information for the City of Echo's water distribution system was obtained from an engineering study of the water supply completed in 1992 by Anderson Perry & Associates, Inc., from City water system maps and Record Drawings, the City's 2012 WSMP, the City's 2022 WSMP Update, and City staff. The City's original water system was installed in 1904 when the City first incorporated. The original water mains were likely wood stave or steel pipe. In 1980, a major system improvements project replaced the aging and deteriorating main lines and service lines with polyvinyl chloride and polyethylene pipe. At that time, well improvements were made to Well No. 3, a new reservoir was constructed, and a booster pump station together with a pressure reducing station were installed. In 1994 and 1995, major improvements were made to the water supply system that included deepening Well No. 4 and the construction of Well No. 5.

In general, the distribution system is fairly well looped and for the most part has larger diameter water main lines. The existing distribution system layout, including fire hydrant and valve

locations and pipe size and locations, is shown on the Existing Water System Map contained in a pocket at the end of this WMCP. Water main lines and associated valves have been color coded based on pipe type for easy reference by City staff. If distribution system main lines or other system features are added in the future, the map can be easily updated as the improvements occur. Available resources were utilized to make the map as accurate as possible. The map is intended to be a schematic representation of the City's water system and inaccuracies may exist in the depiction of the system layout.

2.7 Existing Water Supply Reliability and Adequacy

Currently, the existing water system supply and storage components provide the City with a limited degree of redundancy. In the event of a power outage, the City will be totally reliant on their storage reserve. There is no backup generator or engine-driven fire pump to supply water. Currently, the storage reserve is not adequate. Therefore, the City is considering construction of a new storage reservoir that will provide considerably more reserve storage, significantly improving water supply reliability.

Many communities in eastern Oregon rely on wells as their primary water source, and properly constructed wells have proven to be dependable. When possible, it is preferred that communities have a backup supply well available in addition to the wells used to meet daily demands. This helps provide redundancy to the water supply system that allows one well to be taken out of service while others continue to operate. Currently, there is no backup supply capability for the primary well (Well No. 5), which provides approximately 82 percent of the City's everyday water supply. If a failure were to occur with this well, the City would be faced with an immediate water supply shortage since an equivalent backup supply is not available. Due to this fact, the City has considered options to obtain an additional water supply source. These options include an interconnection with the City of Stanfield or potentially drilling a new well.

2.8 Interconnections

The City of Echo currently does not have interconnections with neighboring water systems. However, the City is in discussions with the City of Stanfield about a potential connection for water supply from their water system. Because of the existing groundwater concerns near the City of Echo, it is recommended that Echo continue to pursue a supply connection with the City of Stanfield's water system rather than drilling a new well. Should Echo pursue an interconnection with the City of Stanfield, Echo will need to complete the process for adding the City of Stanfield's Well No. 5 as an additional point of appropriation for Echo's existing water rights. This will also give the City of Echo the ability to utilize unused water rights permit capacity, which would be a smart investment into the current and future reliability of the City's water system.

The proposed supply connection with the City of Stanfield would be located near the City of Stanfield's existing Well No. 5 and water storage reservoir near the Pilot Travel Center, just north of I-84 from the City of Echo. To provide adequate flows, it is recommended that Echo also construct a new booster pump station near the City of Stanfield's water storage reservoir. The booster pump station would serve as the mechanism to pump water from the City of Stanfield's water system to the City of Echo's new water storage reservoir. With a supply connection with the City of Stanfield; a new water storage reservoir; new backup power generation at Well No. 5; and new well pumps, motors, and discharge columns at Wells No. 4 and 5, the City's water supply reliability would be greatly enhanced.

2.9 System Efficiency

One important monitoring activity that should be performed by the City is to conduct a periodic audit of the volume of water supplied to the system versus the volume of water being metered and used by customers. To complete an accurate water audit, the City would need to compare master meter readings from each water supply source with the total meter readings of all users. To complete this, the City must first install water meters at all end-user connections or have an accurate means of estimating water use at the unmetered City connections.

Implementing a good water auditing method would help ensure water is being adequately accounted for in the City's distribution system and help determine if leaks are present. Monitoring water loss in the system can reduce the cost of operating and maintaining the system, whether it is through decreased power costs to operate pumps or the amount of maintenance performed in the field by the City. Leaking service lines can be identified prior to failure, and areas of system leakage can be isolated and repaired. The details of conducting a water audit can be accessed by the City from multiple resources, including the American Water Works Association.

Currently, the City does not routinely complete annual water audits but intends to begin doing so as part of the work plan outlined in this WMCP. The City has secured funding to upgrade all water meters in the water system, including installing meters on all unmetered connections. These improvements are scheduled to occur in 2023. Once new meters are in place, which will include new billing software, the City can complete a very accurate water audit. The more accurate audit would occur in 2024 after a year of water use data is available using the new water meters and new billing software.

To conduct a water audit to estimate "unaccounted for water," water pumped from the City's supply sources was compared to the total water billed to customers. This comparison was completed for the water years 2020 and 2021. The water audit data are shown on Table 2-10.

TABLE 2-10
WATER AUDIT RESULTS

Water Year	Total Water Pumped from the City's Supply Wells (gallons)	Total Water Billed to Customers (gallons)	Total Unbilled Water Use (gallons)	Total Water Loss (gallons)	Calculated Water Loss (Percent)
2019-20	80,280,000	70,800,000	7,000,000	2,480,000	3.1
2020-21	89,050,000	75,900,000	7,000,000	6,150,000	6.9

Unbilled water use consists of water that is not metered in the City's system. Values for unbilled water use are estimates provided by City staff. Unmetered connections include the following:

- Four residential mobile homes
- Seven RV connections
- City Hall
- City parks
- City golf course clubhouse

Most agencies desire unaccounted for water to be below 10 percent. The data summarized on Table 2-10 show that Echo has water loss below 10 percent. It is likely the water is not water loss due to leakage, rather, it is unaccounted for water that is not properly metered. The City intends to complete meter installations on all remaining unmetered connections so a more accurate water loss calculation can be completed. It is recommended the City complete a detailed water audit every year to help keep track of unaccounted for water and to help monitor if excessive water loss begins to occur.

WATER RIGHTS INVENTORY

Water Source	Application No.	Permit No.	Priority Date	Certificate No.	Transfer No.	Use	Maximum Allowed Rate (cfs)	Allowed Rate Under Development Limitations (cfs)	Actual Diversion				Authorized Completion Date	Source Issues *Identification of: - ST&E species present in the source; - Water quality limited parameters listed for the source; and/or - Source well(s) located within a Critical Ground Water Area*	Notes *(Facility Name, Reliability Issues or Problems, etc.)*
									Maximum Instantaneous Rate Diverted to Date (gpm)	Maximum Annual Quantity Diverted for Past Five Years (MG)[1]	Average Monthly Diversion for Past Five Years (MG)[1]	Average Daily Diversion for Past Five Years (Gallons)[1]			
Well No. 2[2]	U-175	U-168	8/24/1945	19613 (Cancelled for T-7045)	N/A	Municipal	1.10	N/A	490	0.0	0.00	0	10/1/2003	Well located in Stage Gulch CGWA	No longer in use. A cover plate has been welded to the well casing to permanently disable use.
Well No. 2	G-8865	G-8546	6/21/1978	N/A	N/A	Municipal	2.90	N/A	1,300	0.0	0.00	0	10/1/2028	Well located in Stage Gulch CGWA	No longer in use. A cover plate has been welded to the well casing to permanently disable use.
Well No. 3[3]	G-21	G-64	9/24/1953	34386 (Cancelled for T-7044)	N/A	Municipal	0.89	N/A	240	0.0	0.00	0	10/1/2032	Well located in Stage Gulch CGWA. High amounts of hydrogen sulfide have resulted in water taste and odor issues.	The City uses Well No. 3 only for emergency purposes due to high amounts of hydrogen sulfide causing taste and odor issues.
Well No. 4	G-8865	G-8546	6/21/1978	N/A	N/A	Municipal	2.00	N/A	275	31.2	2.39	78,360	10/1/2028	Well located in Stage Gulch CGWA	
Well No. 5[2,3,4]	U-175, G-21	U-168, G-64	8/24/1945, 9/24/1953	N/A	T-7044 (0.89 cfs), T-7045 (1.10 cfs)	Municipal	1.99	N/A	790	57.8	4.35	142,623	10/1/2032 (T-7044), 10/1/2003 (T-7045)	Well located in Stage Gulch CGWA	

Notes:

[1]The Actual Diversion data shown above for the past five years were obtained from actual well production data over the period from October 2014 through September 2021, except for the period of October 2017 through September 2019.

[2]The quantity of water diverted at the new point of appropriation (Well No. 5), together with the quantity diverted at Well No. 2, cannot exceed the quantity of water available from the original point of appropriation.

[3]The quantity of water diverted at the new point of appropriation (Well No. 5), together with the quantity of water diverted at Well No. 3, cannot exceed the quantity of water available from the original point of appropriation.

[4]Wells No. 2, No. 3, and No. 5 can continue to be used until the new certificates are issued, provided the amount of water used at any well or combination of the wells does not exceed the amount stipulated in the transfers.

cfs = cubic feet per second
CGWA = Critical Groundwater Area
gpm = gallons per minute
MG = million gallons
ST&E = Sensitive, threatened, and endangered

Section 3.0 - Water Conservation Element

This section outlines conservation measures the City of Echo is already implementing and conservation measures to be considered. The City's water use reporting and water rate structure are also summarized. The City's planned conservation measures and five-year benchmark goals are presented.

The City has implemented or intends to implement several of the mandatory conservation practices outlined in the *Water Management and Conservation Plan Guidebook*. The City's water system is, for the most part, fully metered and the City has methods in place for keeping track of water system components and water use. The City does not spend significant money repairing service meters but does replace some annually based on need. The City continuously monitors customers' water meters based on the monthly water meter readings. When water meters are demonstrating erroneous readings (based on average and historical consumption records for the particular account), the meters can be tested and/or replaced, as required. This method of meter repair and replacement has been effective for the City. The City has completed a basic water audit as part of this Water Management and Conservation Plan (WMCP). It is the City's goal to fully meter the municipal water system and complete an audit annually in the near future. Results of the most recent two-year period water audit completed for this WMCP are summarized in Section 2.0.

3.1 Previous Conservation Plan Efforts

The City completed a WMCP in 2012, which was submitted to and approved by the Oregon Water Resources Department (OWRD). This 2022 WMCP was prepared to meet Oregon Administrative Rules (OAR) Chapter 690, Division 86.

3.2 Water Use and Reporting

The City of Echo's water use reporting is completed in compliance with OAR 690-085. The report is submitted annually electronically on the OWRD website and on forms provided by the OWRD for each basalt well supply source used during the water year, starting October 1 and ending September 30 of the following year. Water use data for the 2018-19 water year are not readily available due to a transition of City staff. As recommended in the 2022 Water System Master Plan (WSMP) Update, new flowmeters are included in the proposed Well No. 5 pump station improvements to account for water usage from Wells No. 4 and 5 for reporting purposes, in accordance with OAR 690-085-0015(5).

The City currently has the capability to meter water usage from their supply wells. With the existing meters at the City's supply wells, the City has the capability of measuring the total flow from each supply well, which also represents the total flow delivered to the municipal water system. The usage data and record keeping afforded by the existing meters provide benefits to the City by allowing the City to analyze present trends and project future needs, as well as allowing for general equipment upkeep.

3.3 Rate Structure and Metering

According to OAR 690-086-0150(4)(d), a water supplier submitting a WMCP must have a rate structure in place that bills customers on the quantity of water metered at the service connection. As shown on

Table 3-1, the City charges a fixed base rate for each type of account. A copy of Resolution No. 484-2021 establishing the current water rates is included in Appendix C.

TABLE 3-1
WATER RATE INFORMATION

Usage Type	Allowable Use for Base Fee (gallons)	Monthly Cost
Residential/Small Commercial	5,000	$33.00 plus $1.00 per 1,000 gallons for usage beyond the base fee allowable use
Water Trucks	5,000	$100.00 plus $2.00 per 1,000 gallons for usage beyond the base fee allowable use
Non-Residential	5,000	$66.00 plus $2.00 per 1,000 gallons for usage beyond the base fee allowable use
Golf Course	5,000	$30.00 plus $0.50 per 1,000 gallons for usage beyond the base fee allowable use
School	50,000	$690.00 plus $2.50 per 1,000 gallons for usage beyond the base fee allowable use

The City charges customers based on the quantity of water metered at the service connection; therefore, the City meets this requirement. The City believes the rate structure satisfies the requirements of the *Guidebook*.

The City's water rate structure is considered to be a flat block rate structure, meaning additional water use is billed at the same rate no matter how much water is used. It is preferable, from a conservation standpoint, to have an increasing block rate structure that charges water customers more for more water used. It is believed an increasing block rate structure helps conserve water, since the cost of water increases as use increases. It is recommended that the City explore the option of adopting an increasing block rate structure to achieve optimal efficiency and conservation benefits.

3.4 Required Conservation Measures

Conservation measures required as outlined in the *Guidebook* are summarized herein, including the City of Echo's efforts in relation to each required task.

Full Metering of Water System

According to OAR 690-086-0150(4)(b), all cities should be fully metered, both supply sources and all customers. The majority of billed water service connections in the City of Echo's water system are metered; however, a few connections are not metered, specifically City-related connections that are not billed. It is recommended that the City install meters on the few remaining unmetered connections as soon as feasible to reach optimal compliance with this conservation requirement. The City intends to meter all remaining unmetered connections during their proposed 2023 meter upgrade project.

Water meters are read each month unless snow coverage inhibits efficient reading. When meters are read again after snow accumulation has melted, the customer is billed based on the

quantity of water used since the previous meter reading. Each service connection is billed on a monthly basis. Therefore, the City's current practices satisfy this conservation requirement.

Meter Testing and Maintenance Program

The City of Echo has a basic meter testing and maintenance program in place. The City's public works staff reads each water meter in the system generally once every month except for the winter period. If a meter is ever found to be defective, it is replaced with a new meter. One of the proposed improvements from the City's 2022 WSMP Update includes installing a radio read meter system. A radio read meter system would allow the City to read meters more efficiently. There are two types of radio read water meter systems. The more basic system allows the City to drive around the service area and read the meters using a mobile instrument. The time to read water meters is basically the time it takes to drive all the City streets. The mobile instrument is then taken to City Hall and downloaded onto a computer, then water meter bills are generated based on water use. The software allows for monitoring of non-typical events, such as abnormally high water use, to help identify potential leaks in service lines and homes. Radio read meter systems can also be set up with towers throughout the service area that can read water meters from tower locations and then transmit the data to City Hall. The tower systems can be activated from City Hall, meaning the city recorder or City staff can read meters simply with the push of a button. While more investment is needed for a tower-based system, either option would reduce the time it takes to read water meters and would result in more accurate meter readings with the meters upgraded to the latest technology.

Annual Water Audit

The results of two years of annual water audits for the water years 2020 and 2021 are summarized in Section 2.0 of this WMCP and repeated on Table 3-2 below.

TABLE 3-2
WATER AUDIT RESULTS

Water Year	Total Water Pumped from the City's Supply Wells (gallons)	Total Water Billed to Customers (gallons)	Total Unbilled Water Use (gallons)	Total Water Loss (gallons)	Calculated Water Loss (Percent)
2019-20	80,280,000	70,800,000	7,000,000	2,480,000	3.1
2020-21	89,050,000	75,900,000	7,000,000	6,150,000	6.9

The audit results show that, on average, the City of Echo had "unaccounted for water" below 10 percent. The City does not complete leak detection surveys. When suspected leaks are discovered by routine monitoring of flow records or monthly water billing data, the City determines the location of the leak and completes repairs as soon as practically possible.

The City intends to complete annual water audits as a regular practice from now into the future. By using monitoring techniques to identify suspected leaks, the City is proactively using the best management practices available to identify water losses and improve the distribution system.

Unbilled water use consists of water that is either not metered or metered but not billed. Unmetered connections include the following:

- Four residential mobile homes
- Seven RV connections
- City Hall
- City parks
- City golf course clubhouse

Most agencies desire unaccounted for water to be below 10 percent. The data summarized on Table 3-2 show that the City of Echo, for a typical year, has water loss below 10 percent. The average of the two water years shown on Table 3-2 is 5 percent. These results are below the industry goal of 10 percent for the last two years. It is likely the water loss is not due to leakage, rather, it is unaccounted for water that is not properly metered. It is recommended the City install meters on all unmetered connections to conduct a more accurate water audit.

To address potential water loss more aggressively, the City intends to implement the following items:

- Install water meters on all remaining unmetered connections.
- Pursue installing a new radio read water meter system that allows the City to more efficiently read water meters. Additionally, the radio read water meter system would allow the City to read water meters during the winter months when snow is on the ground. These improvements are anticipated to be complete in 2023 as part of the City's upcoming water system improvements project.

The measures to help address potential water loss and more accurately account for all water use will be implemented by 2025, which is expected to be the period this WMCP is approved by the OWRD. If these additional activities do not result in water loss continuing to be below 10 percent, the City will develop additional measures as required.

Most of the City's distribution system main lines are polyvinyl chloride, so the distribution system should be expected to experience minimal leaks. This will be verified by completing water audits on an annual basis. Because the City's distribution system is in good condition, the City does not believe a distribution system leak detection program is necessary. After efforts are completed to improve water use data and all connections are metered, if water audits in the next two years show water loss of more than 10 percent, distribution system main line leak testing in accordance with American Water Works Association standards will be implemented within five years of approval of this WMCP.

Rate Structure Based on Quantity of Water Metered

As stated earlier, the City's water rate structure is a flat block rate structure, meaning customers pay a flat rate for additional water used. The City currently has a water rate structure that charges customers based on water usage, meeting the requirement of this mandatory conservation measure. The City recognizes the potential need to create a new water use rate structure that would be considered an increasing block rate structure, meaning increased water use would cost more per water use block. The City agrees to consider an increasing block rate water rate structure over the next five-year period.

Public Education Program

The City of Echo will commit to implementing the following additional public education activities:

- Mailing the OWRD-provided water conservation handouts to all water customers with the annual Consumer Confidence Report, which is required to be mailed in July of each year. A copy of the handouts is included in Appendix E.
- Creating a water conservation section on the City's website to include additional water conservation handouts and low-use watering tips.
- Having water conservation handouts available on the front counter at City Hall.
- Posting links on the City's website to U.S. Environmental Protection Agency conservation resources and other potential energy efficiency programs.

Progress Report on Previous Water Management and Conservation Plans

In the City of Echo's 2012 WMCP, the City outlined conservation measures aimed at reducing water demand and water loss in the system. Since that document was submitted, the City has made some progress toward accomplishing their management and conservation goals. The City is preparing to complete a large-scale water system improvements project. This project will result in the entire system being newly metered, some new distribution system lines, and an additional supply source. Upon completion of the project, the City will be able to readily complete accurate annual water audits in addition to having significantly improved water supply reliability and redundancy.

3.5 Ongoing Conservation Measures

Water Use Measurement and Reporting Program

The City of Echo has meters at each water supply source. Daily readings from each source used are obtained and totaled for daily flow summaries and then added for total monthly flow as noted on monthly forms. Each year the City reports monthly water use from each supply source to the OWRD on the standard OWRD Annual Report forms.

Reporting Program Compliance

The City of Echo's water use measurement and reporting program appears to be in compliance with the measurement standards in the state's annual water use reporting program (OAR Chapter 690, Division 85).

3.6 Additional Conservation Measures

Retrofit or Fixture Replacement Program

The City of Echo does not have a retrofit or fixture replacement program in place at this time. The City has referred customers to fixture replacement programs potentially available from

Pacific Power for low-flow showerheads and the replacement of older toilets with newer, more efficient models.

Technical and Financial Assistance Program

According to OAR 690-086-0150(6)(b), water suppliers are required to have some sort of technical and financial assistance program based on the population size and resources that the city may have. The City of Echo does not have an official technical and financial assistance program; however, if a customer asks for advice on water-efficient fixtures, leaking service lines, watering practices, etc., a water specialist (public works crew) typically assists the customer with recommendations.

To address this requirement in the future, the City is planning to include on their website a notification that states the City does have technical service staff available to assist residents with water conservation solution recommendations free of charge. The City intends to implement this within the next five years, no later than 2027. The City believes having staff available for assistance and making that known to the public satisfies the technical and financial assistance program requirement.

Other Conservation Measures

The City has not identified any additional conservation measures that would result in significant water savings at this time. The City believes that the programs currently implemented are helping to achieve adequate conservation, and that the current water use rate is relatively low when compared to other eastern Oregon cities and largely attributable to necessary basic customer service needs and landscape maintenance. The City will continue to provide educational and awareness materials to all water users in an effort to improve water conservation measures.

Water Reuse

The City of Echo is currently discharging treated wastewater to the Umatilla River. However, as part of a 2021 Wastewater System Improvements project, the City will cease discharge to the Umatilla River and will begin disposing of treated effluent through evaporation. Any treated effluent that is not disposed of through evaporation will be pumped to the City of Stanfield's wastewater collection system for disposal.

Water Reuse, Recycling, and Non-Potable Water Opportunities

As stated above, the City is completing wastewater system improvements and will dispose of treated wastewater through evaporation in the future. Through this method of disposal, the City does not utilize the treated wastewater effluent to replace any use of potable water. The City is not aware of any opportunities to properly utilize treated wastewater that would reduce the municipal water system demand in a manner permissible by the Oregon Department of Environmental Quality.

Water Use Rate Structure to Promote Efficient Water Use

As mentioned previously, the City's water rate structure is considered a flat block rate structure. The City will consider an increasing block rate structure in the future to help promote future conservation. The City of Echo meets the requirements of OAR 690-086-0150. A copy of the current rate structure is included in Appendix C.

3.7 Summary of Benchmarks

The City of Echo intends to improve current conservation practices and also consider implementation of additional practices. A summary of benchmarks for the City's conservation activities is provided on Table 3-3.

TABLE 3-3
2022 CONSERVATION ELEMENT STATUS

Benchmark	Status
Measurement and Reporting	Compliant
Current Conservation Measures	
Leak Detection and Meter Replacement	Ongoing Program
Fully Metered	Nearly Completed, Will Complete in 2023
Public Information on Conservation Techniques	Ongoing Program
High Consumption Monitoring	Ongoing Program
Service Meter Replacement Program	Will be Completed in 2023
Master Meter Test and Calibration Program	Not Completed, Will Replace Master Meter in 2023 and Will Implement Moving Forward
Annual Water Audits	Annual Plan, Will Improve Program Moving Forward
Water Reuse	Ongoing Program

The City intends to continue improving upon their conservation practices to fully meet requirements and encourage resource conservation by the community. In setting dates for implementation of additional practices necessary to meet the stated requirements, the City has prepared the following benchmark summary, Table 3-4.

TABLE 3-4
2023 CONSERVATION ELEMENT ACTIONS

Benchmark	Status/Action	Implementation Date	Anticipated Completion Date	Frequency
Measurement and Reporting	Compliant	Done	N/A	Annual
Fully Metered	Nearly Compliant	2023	2023	Ongoing
Annual Water Audit	Annual Plan	2023	Ongoing	Annual
Meter Testing and Maintenance Program				
Service and Calibrate Master Meters	Five-Year Plan	2023	2028	Five Years
Service Meter Replacement Program	Replace All Meters in System	2023	2023	Ongoing
Leak Detection and Repair	Future	2028	2028	When Needed
Consider an Increasing Block Rate Structure Based on Use	Five-Year Plan	2023	2027	N/A
Public Education Program				
Consumer Confidence Report/City Website	Annual Plan	Done	Ongoing	Annual
Use of Low Water Use Irrigation Practices	Annual Plan	Ongoing	Ongoing	Annual
High Consumption Monitoring	Continuous Plan	Ongoing	Ongoing	Ongoing
OWRD Handouts Distributed, Placed on Website	Annual Plan	2023	2023	Annual
Water Reuse	N/A	N/A	N/A	N/A
Technical and Financial Assistance Program	Compliant	Ongoing	Ongoing	Ongoing
Future Potential Conservation Measures				
Retrofit Fixture Replacement Program	Future	Future	Future	Future
Use of Low Water Use Landscaping	Future	Future	Future	Future

The City of Echo believes focusing their efforts on the largest potential water saving items is the best conservation path forward. In addition, the City has relatively low per capita water use and has a water loss percentage below 10 percent. While all conservation efforts are important, completion of the annual water audit, ensuring all connections are metered, and having a meter replacement and calibration program will provide the most significant water supply savings.

Section 4.0 - Water Curtailment Element

This section outlines past events that have resulted in water system curtailment being required. This section also presents the City's Curtailment Plan, which outlines stages of curtailment and an implementation program to enact curtailment stages.

4.1 Past Water System Curtailment Events

The City of Echo has experienced two incidents of water supply deficiency in the last 20 years. Both deficiencies were due to well pump malfunctions. During these incidents, the City informally implemented a curtailment plan. Curtailment steps, such as rationing or voluntary conservation, were utilized. The City did not experience water shortages during these events because production from Well No. 4 and water stored in the reservoir, along with curtailment efforts, met the City's needs.

The City has been able to meet peak summer demands; however, the City is lacking in water supply redundancy. The City is intending to address the existing water supply redundancy issues by adding an additional point of appropriation in an upcoming water system improvements project. The proposed improvements include a water supply connection with the City of Stanfield's water system, along with an additional water storage reservoir and transmission line. Water supply reliability and redundancy are a requirement of the Oregon Health Authority - Drinking Water Services (DWS) for municipal water systems.

4.2 Objectives of Curtailment Program

Curtailment steps, such as rationing or voluntary conservation, should be available to utilize as necessary. The objectives of the Curtailment Plan are to recognize various levels of water supply alert status and provide the steps and procedures for the City Manager and public works staff to utilize during curtailment scenarios.

4.3 Curtailment Plan

Reduced levels of supply, increased demands, or capacity limitations of the water system can cause water shortages. A sustained problem in any of these three areas, or a combination of problems, would necessitate conservation or curtailment of water use. Therefore, it is important to identify events that trigger activation of the alert stage and subsequent curtailment actions. The alert levels, trigger criteria, curtailment actions, and an approach for enforcement are presented below.

The City of Echo has in place a Curtailment Plan with four stages of alerts. Each stage is based on the ability of the City's municipal water supply system to keep up with demands. The four-stage plan is as follows:

Stage 1 - Mild Alert Level

Curtailment Activities

For Stage 1 curtailment, the City will initiate voluntary irrigation and commercial use conservation for City water users. Curtailment action pertaining to system operation would include chlorinating the reservoir to ensure water quality.

Activation

The Stage 1 curtailment activities will be activated when the mayor or his/her assignee determines that the potential exists that demand will exceed the supply and storage capabilities of the water system. At the mild alert level, activation will be triggered in the event that Well No. 4 becomes inoperable, or the remaining system capacity falls below 790 gallons per minute (gpm), which is the capacity of Well No. 5. This stage will also be activated by the mayor in the case of supply or distribution malfunctions affecting all or any isolated sections of the system that may experience the need due to equipment or other system malfunctions. This voluntary conservation program will be initiated by the City using public notification through posters at high traffic areas.

Stage 2 - Moderate Alert Level

Curtailment Activities

Stage 2 curtailment will consist of stopping all outside watering by residential users, including no land irrigation and no unnecessary outdoor water use. Commercial water users will be required to reduce consumption by 20 percent. Curtailment action pertaining to system operation would include monitoring reservoir levels closely. Stage 1 curtailment activities would remain in place.

Activation

Stage 2 curtailment activities will be activated when the mayor or his/her assignee determines that the likelihood exists that demand will exceed the supply and storage capabilities of the water system. At the moderate alert level, activation will be triggered in the event that Well No. 5 becomes inoperable, or the remaining system capacity falls below 275 gpm. This stage will also be activated by the mayor in the case of supply or distribution malfunctions affecting all or any isolated sections of the system that may experience the need due to equipment or other system malfunctions. The Stage 2 curtailment activities will be initiated by the City using distribution of instructional flyers to customers, as well as notification actions established in Stage 1. In addition, direct contact of large commercial users and larger volume users such as parks and schools will also be conducted, and they will be asked to reduce consumption. Enforcement action will include City staff monitoring usage and reminding residential customers of curtailment activities.

Stage 3 - High Alert Level

Curtailment Activities

Stage 3 curtailment will consist of stopping all outside watering by residential users, including no land irrigation and no unnecessary outdoor water use. Commercial water users will be required to reduce consumption by 50 percent. Curtailment action pertaining to system operation will include manually operating Well No. 3 to keep water in the system, as well as chlorinating the reservoir to ensure water quality. For this to be an option, the City intends to investigate the operability of Well No. 3 and will consider new pumping equipment. Stage 1 and 2 curtailment activities would remain in place.

Activation

Stage 3 curtailment activities will be activated when the mayor or his/her assignee determines that demand will definitely exceed the supply and storage capabilities of the water system. At the high alert level, activation will be triggered by the temporary loss of Wells No. 4 and 5, or the remaining system capacity falls to 0 gpm without utilizing emergency backup Well No. 3 since it is currently inoperable. This stage will also be activated by the mayor in the case of supply or distribution malfunctions affecting all or any isolated sections of the system that may experience the need due to equipment or other system malfunctions. The Stage 3 curtailment activities will be initiated by the City using distribution of instructional flyers to customers, publishing newspaper notices, submitting public notices with local radio stations, as well as notification actions established in Stages 1 and 2. In addition, direct contact of large commercial users and larger volume users such as parks and schools will also be conducted, and they will be asked to significantly reduce consumption. Enforcement action will include City staff monitoring usage and reminding residential customers of curtailment activities.

Stage 4 - Emergency Alert Level

Curtailment Activities

Stage 4 curtailment will consist of all water use being limited to health, sanitation, and safety. Curtailment action pertaining to system operation will include manually operating Well No. 3 to keep water in the system, as well as chlorinating the reservoir to ensure water quality. Stage 3 curtailment will remain in place as well.

Activation

Stage 4 curtailment activities will be activated when the mayor or his/her assignee determines that an immediate health or safety hazard related to demand exceeding supply and storage capabilities of the system exists. At the emergency alert level, activation will be triggered by the complete loss of Wells No. 4 and 5 for an extended period, or if the reservoir has reached the half-full level with no practical means of refilling. Activation will also be triggered at the emergency alert level if the remaining system capacity falls to 0 gpm without utilizing emergency backup Well No. 3, or any supply situation of higher severity. This stage will also be activated by the mayor in the case of supply or distribution malfunctions affecting all or any isolated sections of the system that may experience the need due to equipment or other system malfunctions. Stage 4 will be activated by the use of radio and newspaper notices, distribution of instructional flyers, direct personal contact with commercial users, and, to the extent possible, door-to-door communication with residential customers. Enforcement action will include City staff and/or County sheriff staff monitoring usage, as well as the potential to issue fines as approved by City ordinance.

Loss of Water Supply Scenarios

Possible scenarios that could result in the City of Echo losing its water supply are limited primarily to system failures. Scenarios that could cause this problem include well pump

malfunction, well pump electrical service malfunction, a fire in the building housing well controls, a prolonged power outage, aquifer contamination, or declining aquifer levels below well pump set depths.

The City has four basalt groundwater supply wells, two of which are inactive, and regularly obtains its water from two of these four wells. Basalt aquifers are typically less susceptible to seasonal variations of rainfall when compared to alluvial wells. Basalt wells can be affected by longer term drought conditions. The City's current basalt supply wells are adequate to meet current needs, assuming well capacities continue at current levels, and assuming groundwater levels do not decline further in the future.

The City's two primary water supply wells have varying capacities, ranging from approximately 175 gpm for Well No. 4 to 790 gpm for Well No. 5. Thus, if the City were to lose the operation of Well No. 5, this could result in a serious water supply shortage. Supply from Well No. 3 is not readily available to be utilized in an emergency. This supply source is also not desirable due to taste and odor issues resulting from the presence of hydrogen sulfide.

Other water supply shortages that could result in reduced supply availability would be the failure of a transmission line from the existing reservoir. Wells No. 4 and 5 discharge into the storage reservoir, so loss of the transmission line would not result in a water supply shortage (from wells), rather, it would result in the loss of use of the stored water in the reservoir.

The City's municipal water system would have significantly improved water system reliability and redundancy with the addition of the proposed connection with the City of Stanfield's water supply and another reservoir and transmission line as recommended in the City's 2022 Water System Master Plan Update. With Echo's existing water supply sources, the City would have to experience a loss of two water supply wells to result in implementation of curtailment requirements to reduce water system demands. Once the City pursues the proposed improvements to the water supply system, the City's municipal water system is anticipated to be well equipped to reliably meet system demands with an additional supply source and standby power for both Wells No. 4 and 5.

Currently, the capacity and redundancy in the water supply system is limited due to the fact that Well No. 5 provides 82 percent of the City's water supply. If Well No. 5 were out of service for an extended period of time, the City would not be able to meet typical system demands, and water curtailment actions would be required.

An additional water supply capacity limitation is the lack of a backup power source. In the event of a power outage, the City would be totally reliant on the water reserves being held in the reservoir. Currently, there is no backup generator or engine-driven fire pump to supply water. In addition, the reservoir does not have adequate capacity to meet community water needs over an extended period of time. In the event of an extended power outage, the City would need to implement more significant curtailment actions until conditions return to normal.

In the event of aquifer contamination or declining aquifer levels, the City may be at risk of losing both Well No. 4 and Well No. 5 since they are believed to draw water from similar geologic formations and aquifers. The City does have the option of placing Well No. 3 on line and using it as an emergency backup water supply source, which would require installation of new pumping

equipment. Well No. 3 has experienced significant taste and odor issues in the past and has not been operated and water quality tested in many years. Well No. 3 may be able to provide adequate water supply capacity to sustain the City through an emergency situation once it is properly equipped.

Shortfalls Triggering Community Action

The City of Echo has adequate well capacity for the City's current needs and normally has storage available to help meet demands. With two operating wells, one reservoir, and a booster pump station, the City should be able to provide water to its customers in case of an emergency. The existing water system components provide the City with a limited degree of redundancy. In the event failure were to occur at one or both wells, the City would be faced with an immediate water supply shortage and would need to initiate community action to curtail water use, such as prohibiting lawn irrigation, car washing, etc. In the event conditions were to worsen, the City would need to initiate their Curtailment Plan as described earlier.

Capacity Limitations

The City of Echo currently has adequate water supply available to meet its needs. Thus, the City does not currently have capacity limitations. Peak summer demands require utilization of both active basalt supply wells with no well in reserve. The addition of Well No. 5 to the water supply system in 1995 has resulted in a significant improvement to the City's water supply. However, the system still lacks redundancy. An additional supply source needs to be pursued.

Plan of Action for Water Curtailment

The plan of action is summarized in the City's Curtailment Plan, as detailed in this Water Management and Conservation Plan.

4.4 Curtailment Plan Implementation Program

The City of Echo intends to follow the Curtailment Plan discussed herein and is currently considering adopting a water system curtailment ordinance.

Authorization to activate the Curtailment Plan and levels of alert as discussed above rests with the mayor and his/her assignee. Once the plan is activated, the City should notify the DWS, County sheriff, all water system customers, and others, as appropriate.

4.5 Emergency Response Plan

The City of Echo has an Emergency Response Plan for the water system that was completed in accordance with regulatory requirements of the DWS. The Emergency Response Plan is an excellent resource for City staff to utilize for steps, procedures, notifications, etc., to implement in the event of a water system emergency. It is recommended the City coordinate any future water system Curtailment Plan revisions with steps and actions that may be listed in the City's Emergency Response Plan. The Emergency Response Plan should be consistent with emergency efforts outlined herein for water system curtailment activities.

Section 5.0 - Municipal Water Supply Element

This section of the City of Echo's Water Management and Conservation Plan (WMCP) provides a summary of the information needed to estimate future long-term water supply needs for the City. Population projections are completed to provide the basis to estimate future average daily demands (ADDs) and peak daily demands (PDDs). Based on the future demand estimates, a long-range water supply plan is presented for a 20-year period.

5.1 Future Service Area

Current and Future Service Area

The term "service area" refers to the area being served with water from the City's municipal water system. As outlined in Section 2.0, the present service area for the City primarily consists of developed lands within the boundaries of the city limits. For the purposes of this WMCP, it has been assumed that the future service area of the water system will mostly include the area within the current urban growth boundary (UGB) but outside the "permanent open space" zoning designation. For reference, the City's current zoning is shown on Figure 5-1, Zoning Map.

The UGB area is situated east, north, and northwest of the present community. The city limits and UGB extend north to Interstate 84. Several larger undeveloped areas are present within the city limits, as well as outside the city limits but in the UGB. These include an area north of the City (excluding the residential development south of Bowman Road and west of Thielsen Road) and an area east of the City (east of the eastern city limits boundary, along both sides of Echo Road/Old Highway 320) (see Figure 1-1, Location and Vicinity Maps, in Section 1.0). These two areas, which total approximately 520 acres, are currently used for agricultural purposes. There is also an area south of the southern city limits boundary along Rieth Road, recently annexed into the city limits, that could potentially be developed. This area, approximately 20 acres, is also currently used for agricultural purposes.

The current city limits encompass an area of approximately 520 acres. The city limits are approximately 1 mile east to west and approximately 2.1 miles north to south. Many areas of undeveloped residential and industrial land currently exist within the city limits and UGB. With a significant area of open and undeveloped land available, the City has the potential for residential, commercial, and industrial growth.

Population Projections

The historical populations of the City of Echo from 1970 through the latest available population estimate (2021) are summarized on Table 5-1.

TABLE 5-1
HISTORICAL POPULATION DATA

Year	Population
1970	479
1980	624
1990	500
2000	650
2010	700
2015	705
2016	705
2017	705
2018	710
2019	710
2020	632
2021	657

The annual population growth rate for each 10-year period between the federal Census data, as well as the overall period from 1970 through 2021, is presented on Table 5-2.

TABLE 5-2
ANNUAL POPULATION GROWTH RATE DATA

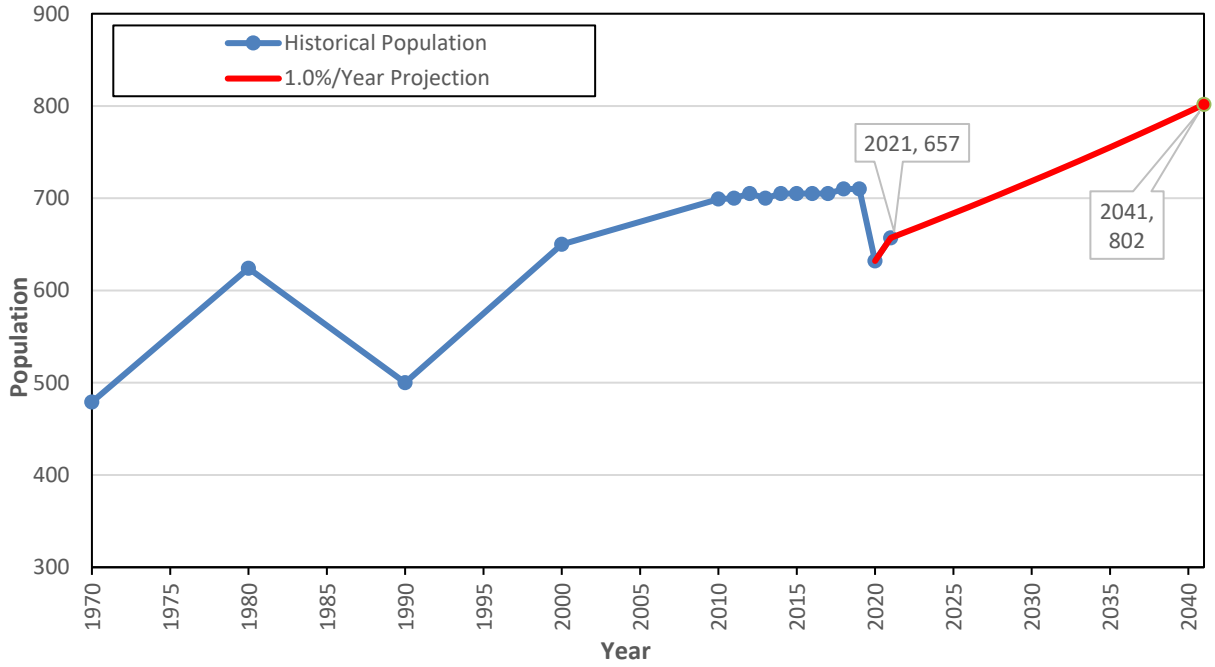
Period	Population Change	Annual Population Growth Rate
1970 to 1980	145	2.68%
1980 to 1990	-124	-2.19%
1990 to 2000	150	2.66%
2000 to 2010	50	0.74%
2010 to 2020	-80	-1.21%
1970 to 2021	**178**	**0.62%**

As Table 5-2 demonstrates, the City of Echo has experienced an average annual population growth rate of 0.62 percent over the last 50 years of population history. This is a modest annual population growth rate, with two 10-year periods between federal Censuses experiencing a negative growth rate and two others experiencing an annual growth rate of more than 2 percent.

This WMCP provides a review of the past, present, and anticipated future of the City's water system and is intended to analyze the water system over an extended period of time to properly forecast future water system needs. The City completed a Water System Master Plan (WSMP) Update in accordance with Oregon Health Authority - Drinking Water Services requirements in 2022. The City adopted an annual population growth rate of 1.0 percent per year to be extended annually from 2021 for a 20-year planning period. This City-adopted growth rate for the 2022 WSMP Update, resulting in a year 2041 population of 802, was assumed for this WMCP to be consistent with prior planning efforts.

The historical population from 1970 through 2021, as well as the projected population at an annual growth rate of 1.0 percent through the year 2041, is shown on Chart 5-1.

CHART 5-1
HISTORICAL AND PROJECTED POPULATION



Based on a 2021 population of 657 and a 1.0 percent annual population growth rate starting in 2021, the 20-year population projection results in 802 people by the year 2041. This population projection of 802 will be utilized in estimating the City's future water demands. Using a growth rate of 1.0 percent per year, as selected by the City, the population estimates shown on Table 5-3 have been developed in five-year increments through the year 2041.

TABLE 5-3
FUTURE POPULATION ESTIMATES

Year	Population Estimate (1.0 percent per year growth rate)
2010	632*
2021	657**
2026	691
2031	726
2036	763
2041	802

**2010 federal Census.*

***2021 Portland State University Population Research Center certified population estimate.*

It should be recognized that actual population growth could vary considerably from the estimates shown herein. Determining population growth for even five years into the future is an estimate at best. An industry could locate in Echo, resulting in growth significantly higher than anticipated. Alternatively, population growth could be much less than anticipated based on other factors. Therefore, it must be understood that future population projections are estimates at best and should be periodically reviewed and updated to reflect actual conditions.

5.2 Current Water Demands

The City of Echo's ADDs and PDDs, as summarized in Section 2.0 of this WMCP (based on the City's 2022 WSMP Update and additional analysis herein), are as shown on Table 5-4:

TABLE 5-4
CURRENT AVERAGE AND PEAK DAILY DEMANDS

Demand Condition	Demand (gpcd)	Demand (gpm)	Daily Demand (total gallons)	2021 Population
ADD	200	91	131,400	657
PDD	600	274	394,200	657

gpcd = gallons per capita day (gallons per person per day)

gpm = gallons per minute

The City of Echo can meet current PDDs by relying solely on Well No. 5. However, if Well No. 5 should need to be taken offline, the City would struggle to meet current PDDs using only Well No. 4. The combined capacity of the two basalt supply wells (965 gpm) exceeds the current needed PDD of 274 gpm.

5.3 Future Water Demands

Using the current estimated demands, future water demands for the City of Echo can be estimated based on future population projections. Table 5-5 summarizes anticipated ADDs and PDDs for future population projections.

TABLE 5-5
FUTURE ANTICIPATED WATER SYSTEM DEMANDS

		ADD (200 gpcd)		PDD (600 gpcd)	
Year	Population	gpm	Daily Gallons	gpm	Daily Gallons
2021	657	91	131,400	274	394,200
2026	691	96	138,200	288	414,600
2031	726	101	145,200	303	435,600
2036	763	106	152,600	318	457,800
2041	802	111	160,400	334	481,200

Note: Water demand data on Table 5-5 do not reflect current water use or projected water use by the City's golf course.

It should be noted that the assumed ADDs and PDDs could vary from these values in the future. If water use characteristics for the City vary in the future, it would be wise to reevaluate these demands and, using the updated demand data, recompute the future estimated water system demands summarized herein.

The projected PDD required flow of 334 gpm in the year 2041 can be met by full operation of the two active basalt wells. Peak hourly demand periods may require operation of both wells, in addition to the proposed water supply connection with the City of Stanfield's water supply, but peak hourly demands are typically only for a few hours during a PDD period. Typically, peak hourly flows are met using water stored in the City's reservoir, which holds 350,000 gallons when completely full. Based on the assumed population growth rate, a year 2041 population of 802, and the two available basalt supply wells, the City appears to have sufficient capacity to meet both current and projected ADDs and PDDs for the 20-year planning period. Adding the golf course demand to the year 2041 PDD results in a 409 gpm PDD, which can be met by Well No. 5 alone or both Wells No. 4 and 5. It should be noted that no supply redundancy is currently available.

5.4 Conservation Measures and Interties

The City of Echo does not currently need additional water rights or well permits. Once combined with the proposed water supply connection with the City of Stanfield's water system, the water rights and permits in place for the City's existing basalt wells would be sufficient to meet the City's 20-year projected water demands.

The City's average per capita water use of 200 gpcd is in the lower range of typical eastern Oregon cities. The City's per capita water use is not excessive. The City also has implemented some conservation measures that have helped conserve water. The City continues to make improvements to tighten operational control of the system with the goal of continuing to keep water loss below the industry standard goal of 10 percent. The City believes they are completing sufficient conservation measures at this time.

5.5 Potential Conservation Savings Compared to Increasing Supply Use

Based on the water system demands and available supply as outlined in this section, it is recommended that the City of Echo consider an additional water supply source in their upcoming water system improvements project to address the existing water supply redundancy issue. The City of Echo is committed to additional conservation measures to continue keeping the unaccounted for water percentage below 10 percent and to lower overall water demands.

5.6 Long-Range Supply Plan

As stated earlier in this WMCP, if the City successfully pursues the proposed water supply connection with the City of Stanfield's water system, the City of Echo does not anticipate the need for additional water supply sources in the next 20 years. Additional conservation measures could potentially help extend the need for additional supply further into the future. The City is committed to improving conservation to help reduce overall system demands.

5.7 Schedule of Beneficial Use

At this time the City has not perfected at full beneficial use the water rights for any of the City's wells. Although no longer in use, a water right of 1.1 cubic feet per second (cfs) (490 gpm) for Well No. 2, with a priority date of August 24, 1945, was originally permitted and then perfected for the well (Certificate 19613). In 1964, Well No. 2 was deepened to 820 feet. Then, Permit G-8546 to appropriate Waters of the State in the amount of 2.9 cfs (1,300 gpm) with a priority date of June 21, 1978, was issued. This appropriation was supplemental to Certificate 19613. Improvements completed in 1980 were made to increase the capacity of the well, but the well was never pumped at a high enough flow rate to make a Claim of Beneficial Use (COBU) for the total permitted amount of 2.9 cfs. Subsequent extensions to Permit G-8546 to complete the conditions of the permit and apply the water (2.9 cfs) to full beneficial use have been submitted to the Oregon Water Resources Department (OWRD). The last extension received from the OWRD extends Permit G-8546 to October 1, 2028.

In 1997, Transfer 7045 added Well No. 5 as an additional point of appropriation to Well No. 2. The transfer allowed 1.1 cfs to be withdrawn from Well No. 2, Well No. 5, or a combination thereof, and also cancelled water right Certificate 19613 until a new certificate is issued. The conditions detailed in the transfer were to be completed and the water was to be put to full beneficial use on or before October 1, 1998. Subsequently, when the conditions had not been met by October 1, 1998, the City applied to the OWRD for and received an extension of time to October 1, 2003. No further extensions to complete the conditions shown in the transfer have been applied for. The current status of Transfer 7045 on the OWRD website is shown as being inchoate, which means it is in an uncompleted state. Although technically there are no certificated water rights for either Well No. 2 or Well No. 5, and assuming Well No. 2 will not be used in the future, a certificated water right for Well No. 5 could be obtained by completing the conditions in Transfer 7045, documenting the amount of water being diverted, and submitting a COBU to the OWRD. The certificate priority date for the new water right would remain the same as the original certificate date of August 24, 1945.

Well No. 3 was originally constructed in 1951, under Permit No. G-64, to a depth of 490 feet. A water right of 0.89 cfs (400 gpm) with a priority date of September 24, 1953, was then perfected for the well (Certificate 34386). In 1997, Transfer 7044 approved Well No. 5 as an additional point of appropriation to Well No. 3. The transfer allowed 0.89 cfs to be withdrawn from Well No. 3, Well No. 5, or a combination thereof, but also cancelled water right Certificate 34386 until the flow being diverted from either Well No. 3 or Well No. 5 could be confirmed and a new certificate issued. The conditions detailed in the transfer were to be completed and the water was to be put to full beneficial use on or before October 1, 1998. Subsequently, when the conditions had not been met by October 1, 1998, the City applied to the OWRD for and received an extension of time to October 1, 2003. No further extensions to complete the conditions shown in the transfer have been applied for. The current status of Transfer 7044 on the OWRD website is inchoate, which means it is in an uncompleted state.

Although technically there are no certificated water rights for either Well No. 3 or Well No. 5, a certificated water right for Well No. 5 or Well No. 3, or a combination thereof, could be obtained by completing the conditions in Transfer 7044, documenting the amount of water being diverted, and submitting a COBU to the OWRD. The certificate priority date for the new water right would remain the same as the original certificate date of September 24, 1953.

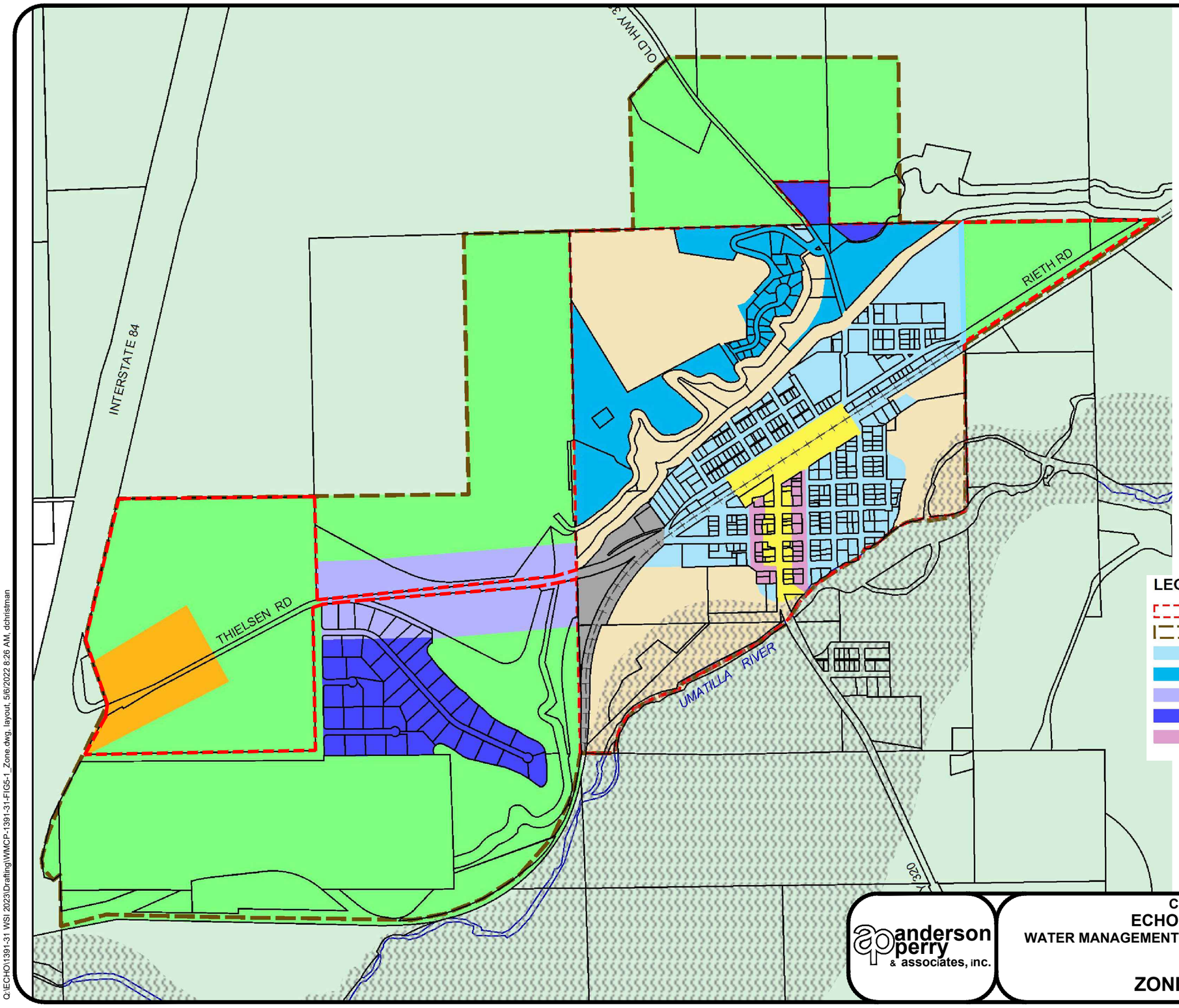
Well No. 4 is one of two wells that the City currently uses as a municipal water source. This well was originally constructed in 1974 to a depth of 600 feet. Thereafter, Permit No. G-8546 was issued with a

priority date of June 21, 1978, to pump the well at a rate up to 2.0 cfs (900 gpm). Improvements were also made to Well No. 4 in 1994 that included deepening the well to 1,045 feet. Subsequent extensions to complete the conditions of the permit and apply the water to full beneficial use have been submitted to the OWRD. The last extension granted by the OWRD extends Permit G-8546 to October 1, 2028.

Well No. 5 was constructed in 1995 to a depth of 1,282 feet and is currently used as the City's primary municipal water source. Well No. 5 was added as a point of appropriation to Well No. 2 and Well No. 3 through OWRD Transfers 7045 and 7044, respectively. Although the water right certificates for Wells No. 2 and 3 were cancelled by the transfers, a water right for Well No. 5 can be perfected by completing the conditions in Transfers 7044 and 7045, documenting the amount of water being diverted at Well No. 5, and submitting a COBU. The original priority date for the respective water rights transferred would remain in place. See the Wells No. 2 and 3 discussion for details of the transfer status.

5.8 Acquisition of New Water Rights

Due to the City of Echo's location within the Stage Gulch Critical Groundwater Area (CGWA), the City will not be able to obtain new water permits or rights. Designation of the Stage Gulch CGWA by the OWRD was based on data suggesting that water levels in the basalt aquifers were declining excessively, inferring that the available groundwater supply was being overdrawn. The action prohibited the issuance of new groundwater appropriation permits. It will be important for the City to complete the water supply development allowed by the City's present groundwater permits and perfect them into a permanent water right. This water rights work should be completed as part of the City's proposed 2023 Water System Improvements project. If any remaining undeveloped portions of the existing permits were to be taken from the City by potential future regulations, they probably would be difficult to regain. Nonetheless, the City has considerable operational flexibility to meet all anticipated demands over the 20-year planning period of this WMCP.



500 0 500 1000 1500
SCALE IN FEET

LEGEND

- City Limits
- Urban Growth Boundary
- R-1 - General Residential
- R-2 - Limited Residential
- R-3 - High Density Residential
- R-4 - Farm Residential
- RC - Residential Commercial
- C-1 - Central Commercial
- C-2 - Tourist Commercial
- POS - Permanent Open Space
- M-1 - Light Industrial
- F1 - Exclusive Farm Use
- EFU - Exclusive Farm Use (County)
- Flood Hazard Overlay

MAP DISCLAIMER: No warranty is made by Umatilla County as to the accuracy, reliability or completeness of this data. Parcel data should be used for reference purposes only. Not for legal use. Created in GeoMedia Pro by J.Alford, Umatilla County Planning Dept. 12/14/10
Update 7/23/13
y:workspace/planning/projects/city_zoning_maps/EchoZoning.gws

anderson perry & associates, inc.

CITY OF
ECHO, OREGON
WATER MANAGEMENT AND CONSERVATION PLAN

ZONING MAP

FIGURE
5-1

Q:\ECHO\1391-31 WSI 2023\Drafting\WMCP-1391-31-FIG5-1_Zone.dwg, layout, 5/6/2022 8:26 AM, dchristman

Appendices Table of Contents

APPENDIX A
Water Rights Information

Transfer Well No. 2 to Well No. 5
1.10 cfs

STATE OF OREGON

COUNTY OF UMATILLA

ORDER APPROVING AN ADDITIONAL POINT OF APPROPRIATION AND CHANGE IN PLACE OF USE

Pursuant to ORS 537.705, after notice was given and no objections were filed, and finding that no injury to existing water rights would result, this order approves, as conditioned or limited herein, TRANSFER 7045 submitted by

CITY OF ECHO
P.O. BOX 9
ECHO, OREGON 97826.

The right to be modified, as evidenced by Certificate 19613, was perfected under Permit U-168 with a date of priority of AUGUST 24, 1945. The right allows the use of WELL NO. 2, in the UMATILLA RIVER BASIN, for MUNICIPAL USE. The amount of water to which this right is entitled is limited to an amount actually beneficially used and shall not exceed 1.10 cubic feet per second, if available at the original well; NE¼ NE¼, SECTION 16, T 3 N, R 29 E, WM; SOUTH 26 DEGREES 18 MINUTES WEST 1582 FEET FROM THE NORTHEAST CORNER, SECTION 16, or its equivalent in case of rotation, measured at the well.

The use shall conform to any reasonable rotation system ordered by the proper state officer.

The authorized place of use is as follows:

NE¼
E½ NW¼
NE¼ SW¼
N½ SE¼
SECTION 16
TOWNSHIP 3 NORTH, RANGE 29 EAST, W.M.

The applicant proposes to add an additional point of appropriation to:

NE¼ NE¼, SECTION 16, T 3 N, R 29 E, WM; WELL NO. 5 - 850 FEET SOUTH AND 70 FEET WEST FROM THE NORTHEAST CORNER, SECTION 16.

The applicant also proposes to change the place of use to:

S½ NE¼
SECTION 7

E½
SECTION 8

NW¼ NE¼
SW¼ NE¼
SE¼ NE¼
NW¼
S½
SECTION 9

NW¼ SW¼
S½ SW¼
SECTION 10

NW¼
NW¼ SW¼
NE¼ SW¼
SECTION 15

N½
E½ NW¼
NE¼ SW¼
E½ SE¼
N½ SE¼
SECTION 16
TOWNSHIP 3 NORTH, RANGE 29 EAST, W.M.

THIS CHANGE TO AN EXISTING WATER RIGHT MAY BE MADE PROVIDED THE FOLLOWING CONDITIONS ARE MET BY THE WATER USER:

1. The proposed change shall be completed on or before October 1, 1998.

2. The quantity of water diverted at the new point of appropriation (well), together with the quantity diverted at the old point of appropriation, shall not exceed the quantity of water lawfully available from the original point of appropriation.

3. The water user shall install an in-line flow meter or other suitable device for measuring and recording the quantity of water used. The type and plans of the measuring device must be approved by the Department prior to beginning construction and shall be installed under the general supervision of the Department.

4. Water shall be acquired from the same aquifer as the original point of appropriation.

Certificate 19613 is canceled. When satisfactory proof of the completed change is received, a new certificate confirming this water right will be issued.

WITNESS the signature of the Water Resources Director, affixed AUG 08 1997.

Martha O. Pagel, Director

Well No. 2
Certificate Canced
Nas transfered to
Well No. 5
Application #: U-175
Permit #: U-168

CERTIFICATE NO. 19613

PERMIT No. U-168

APPLICATION FOR A PERMIT

To Appropriate the Underground Waters of the State of Oregon

I, City of Echo (Name of applicant)

of Echo (Postoffice), county of Umatilla,

state of Oregon, do hereby make application for a permit to appropriate the following described underground waters of the state of Oregon, SUBJECT TO EXISTING RIGHTS:

If the applicant is a corporation, give date and place of incorporation Municipal corporation, incorporated March 21, 1904, Echo, Oregon

1. Give name of nearest stream to which the well, tunnel or other source of water development is situated Umatilla River (Name of stream) tributary of Columbia River

2. The amount of water which the applicant intends to apply to beneficial use is 2.25 cubic feet per second.

3. The use to which the water is to be applied is drinking water, fire protection and general municipal purposes

4. The place where the water is to be pumped or developed is located South 26° 18' West 1582 feet from the N.E. corner of Section 16, Tp. 3, No. Range 29, E.W.M. in (Give distance and bearing from section corner) Umatilla County, Oregon

being within the SE¼ NE¼ of Sec. 16, Twp. 3N, R. 29 E., W. M., in the county of Umatilla.

5. The pipe line (Canal or pipe line) to be 300 feet miles in length, terminating in the SE¼ of NW¼ (Smallest legal subdivision) of Sec. 16, Twp. 3, North R. 29, W. M., the proposed location being shown throughout on the accompanying map.

6. The name of the well or other works is

DESCRIPTION OF WORKS

7. If the flow to be utilized is artesian, the works to be used for the control and conservation of the supply when not in use must be described.

8. The development will consist of a drilled well (Give number of wells, tunnels, etc.) having a diameter of 10 inches and an estimated depth of 300 feet.

CANAL SYSTEM OR PIPE LINE—

9. (a) Give dimensions at each point of canal where materially changed in size, stating miles from headgate. At headgate: width on top (at water line) ..... *feet; width on bottom* ..... *feet; depth of water* ..... *feet; grade* ..... *feet fall per one thousand feet.*

(b) At ..... *miles from headgate: width on top (at water line)* ..... *feet; width on bottom* ..... *feet; depth of water* ..... *feet; grade* ..... *feet fall per one thousand feet.*

(c) Length of pipe, ... *ft.; size at intake,* ..... *in.; size at* ..... *ft. from intake* ..... *in.; size at place of use* ..... *in.; difference in elevation between intake and place of use,* ..... *ft. Is grade uniform?* ..... *Estimated capacity,* ..... *sec. ft.*

10. If pumps are to be used, give size and type a turbine type of pump, size cannot be determined until well is completed and amount of lift known

Give capacity and type of motor or engine to be used electric power to be used, capacity not known until size of pump determined

11. If the location of the well, tunnel, or other development work is less than one-fourth mile from a natural stream or stream channel, give the distance to the nearest point on each of such channels and the difference in elevation between the stream bed and the ground surface at the source of development .....

12. Location of area to be irrigated, or place of use City of Echo

Township	Range	Section	Forty-acre Tract	Number Acres to Be Irrigated
3 N	29 E	16	NE¼	
			E½ NW¼	
			NE¼ SW¼	
			N½ SE¼	

(If more space required, attach separate sheet)

(a) Character of soil .....

(b) Kind of crops raised .....

MUNICIPAL SUPPLY—

13. (a) To supply the city of Echo

Umatilla (Name of) *County, having a present population of* about 500

and an estimated population of 1500 *in 19*50.

14. *Estimated cost of proposed works,* $ 7,000

15. *Construction work will begin on or before* October 15, 1945

16. *Construction work will be completed on or before* January 1, 1947

17. *The water will be completely applied to the proposed use on or before* January 1, 1947.

The City of Echo
(Signature of applicant)

By (Sgd) C. L. Gray
Mayor.

Signed in the presence of us as witnesses:

(1) W. H. Crary (Name), Echo, Oregon (Address of witness)

(2) Myrtle E. Smith (Name), Echo, Oregon (Address of witness)

Remarks:

STATE OF OREGON,
County of Marion, } *ss.*

This is to certify that I have examined the foregoing application, together with the accompanying maps and data, and return the same for completion

In order to retain its priority, this application must be returned to the State Engineer, with corrections on or before September 29, *1945.*

WITNESS my hand this 29th *day of* August, *1945.*

CHAS. E. STRICKLIN
STATE ENGINEER

By

Ed K. Humphrey, Assistant
md

STATE OF OREGON, }
County of Marion, } ss.

PERMIT

This is to certify that I have examined the foregoing application and do hereby grant the same, SUBJECT TO EXISTING RIGHTS and the following limitations and conditions:

The right herein granted is limited to the amount of water which can be applied to beneficial use and shall not exceed 2.25 *cubic feet per second measured at the point of diversion from the well or source of appropriation, or its equivalent in case of rotation with other water users, from* A Well

The use to which this water is to be applied is Municipal

If for irrigation, this appropriation shall be limited to - - - *of one cubic foot per second*

and shall be subject to such reasonable rotation system as may be ordered by the proper state officer.

The priority date of this permit is August 24, 1945

Actual construction work shall begin on or before December 20, 1946 *and shall thereafter be prosecuted with reasonable diligence and be completed on or before* October 1, 1947

Complete application of the water to the proposed use shall be made on or before October 1, 1948

WITNESS my hand this 20th *day of* December, *19*45.

CHAS. E. STRICKLIN
STATE ENGINEER

Application No. U-175
Permit No. U-168

PERMIT
TO APPROPRIATE THE UNDER-GROUND WATERS OF THE STATE OF OREGON

Division No. ..... *District No.* .....

This instrument was first received in the office of the State Engineer at Salem, Oregon, on the 24th *day of* August, *19*45, *at* 8:30 *o'clock A.M.*

Returned to applicant for correction:

Corrected application received:

Approved:
December 20, 1945

Recorded in Book No. 1 *of Permit, on page* U-168

CHAS. E. STRICKLIN
STATE ENGINEER

Fees paid $12.00

7 - 16

Wall No. 3
App#: G21
Parmit#: G64
0.89 cfs transferad (T701
to Wall No. 5 when
leaves 0.21 cfs

Form U-1-116-4-30

Permit No. G-64

APPLICATION FOR A PERMIT

To Appropriate the Underground Waters of the State of Oregon

I, City of Echo (Name of applicant)

of Echo (Mailing address), county of Umatilla

state of Oregon, do hereby make application for a permit to appropriate the following described underground waters of the state of Oregon. SUBJECT TO EXISTING RIGHTS:

If the applicant is a corporation, give date and place of incorporation

Municipal Corporation, Incorporated March 21st 1904 -- Echo, Oregon

1. Give name of nearest stream to which the well, tunnel or other source of water development is situated Umatilla River (Name of stream)

tributary of Columbia River

2. The amount of water which the applicant intends to apply to beneficial use is ~~cubic feet per second~~.

3. The use to which the water is to be applied is Drinking Water, Fire Protection, General Municipal Purposes

4. The well or other source is located [illegible] and [illegible]

[illegible] Lot 4 in Block 6 Koontz second [illegible]

[illegible] in the southeast quarter of the northwest [illegible]

[illegible] 3 N. R. 29 [illegible]

of Sec. 16

Umatilla

[illegible] line

[illegible] well [illegible]

DESCRIPTION [illegible]

CANAL SYSTEM OR PIPE LINE—

9. (a) Give dimensions at each point of canal where materially changed in size, stating miles from headgate. At headgate: width on top (at water line) ..... feet; width on bottom ..... feet; depth of water ..... feet; grade ..... feet fall per one thousand feet.

(b) At ..... miles from headgate: width on top (at water line) ..... feet; width on bottom ..... feet; depth of water ..... feet; grade ..... feet fall per one thousand feet.

(c) Length of pipe, ... ft.; size at intake, ... in.; size at ..... from intake ..... in.; size at place of use ..... in.; difference in elevation between intake and place of use, ... ft. Is grade uniform? ..... Estimated capacity, ... sec. ft.

10. If pumps are to be used, give size and type 12 Stage 10" Model E H Line Shaft Bowler Water Lub. Deep Well Turbine Pump with 50 HP 3 phase 1800 RPM Vertical Hollow Shaft Motor

Give horsepower and type of motor or engine to be used

11. If the location of the well, tunnel, or other development work is less than one-fourth mile from a natural stream or stream channel, give the distance to the nearest point on each of such streams and the difference in elevation between the stream bed and the ground surface at the source of development. Our 1/4 mile = 9 Blocks from [illegible] about 2000 ft.

12. Location of area to be irrigated, or place of use ..... Only inside [illegible]

Township N. or S.	Range E. or W. of Principal Meridian	Section	Forty-acre Tract	Number of Acres
[illegible]	22	16	NW¼ NW¼ SE¼ NE¼ NW¼ SW¼ SW¼ SW¼	

[illegible]

MUNICIPAL SUPPLY—

13. (a) To supply the city of Echo

[redacted] county, having a present population of about 500

and an estimated population of ..... in 19.....

14. Estimated cost of proposed works, $ 15,000

15. Construction work will begin on or before .....

16. Construction work will be completed on or before November 1961

17. The water will be completely applied to the proposed use on or before .....

City of Echo

(Signature of applicant)

City Recorder

Remarks: .....

STATE OF OREGON)
County of Marion.) ss.

This is to certify that I have examined the foregoing application, together with the accompanying plans and data and return the same for completion, fees

In order to retain its priority, this application must be returned to the State Engineer with corrections on or before December 21 19 55.

WITNESS my hand this 21st day of October 19 55

LUTIS A. STANLEY

STATE ENGINEER

Chris L. Wheeler, Assistant

STATE OF OREGON, } ss.
County of Marion,

PERMIT

This is to certify that I have examined the foregoing application and do hereby grant the same **SUBJECT TO EXISTING RIGHTS** *and the following limitations and conditions:*

The right herein granted is limited to the amount of water which can be applied to beneficial use and shall not exceed 1.11 *cubic feet per second measured at the point of diversion from the well or source of appropriation, or its equivalent in case of rotation with other water users, from* Well No. 3.

The use to which this water is to be applied is municipal.

If for irrigation, this appropriation shall be limited to - - *of one cubic foot per second or its equivalent for each acre irrigated and shall be further limited to a diversion of not to exceed acre feet per acre for each acre irrigated during the irrigation season of each year;*

The well shall be cased as necessary in accordance with good practice and if the flow is artesian the works shall include proper capping and control valve to prevent the waste of ground water.

The works constructed shall include an air line and pressure gauge or an access port for measuring line, adequate to determine water level elevation in the well at all times.

and shall be subject to such reasonable rotation system as may be ordered by the proper state officer.

The permittee shall install and maintain a weir, meter, or other suitable measuring device, and shall keep a complete record of the amount of ground water withdrawn.

The well shall be so cased as to prevent the loss of underground water.

The priority date of this permit is September 24, 1953

Actual construction work shall begin on or before December 20, 195[illegible] *and shall thereafter be prosecuted with reasonable diligence and be completed on or before October 1, 19*[illegible]

Complete application of the water to the proposed use shall be made on or before October 1, 19[illegible]

WITNESS my hand this 20th *day of* December, *19*[illegible]

[illegible]

B.C. - Extended to Oct. 1, 1960

G 64

PERMIT

TO APPROPRIATE THE UNDERGROUND WATERS OF THE STATE OF OREGON

This instrument was first received in the office of the State Engineer at Salem, Oregon, on the 24th day of September, 1953, at 8:00 o'clock A. M.

December 2[illegible], 1955

Transfer Well No. 3 to Well No. 5 for 0.89 cfs

STATE OF OREGON

COUNTY OF UMATILLA

ORDER APPROVING AN ADDITIONAL POINT OF APPROPRIATION AND CHANGE IN PLACE OF USE

Pursuant to ORS 537.705, after notice was given and no objections were filed, and finding that no injury to existing water rights would result, this order approves, as conditioned or limited herein, TRANSFER 7044 submitted by

CITY OF ECHO
P.O. BOX 9
ECHO, OREGON 97826.

The right to be modified, as evidenced by Certificate 34386, was perfected under Permit G-64 with a date of priority of SEPTEMBER 24, 1953. The right allows the use of WELL NO. 3, in the UMATILLA RIVER BASIN, for MUNICIPAL USE. The amount of water to which this right is entitled is limited to an amount actually beneficially used and shall not exceed 0.89 cubic foot per second, if available at the original well; SW¼ NE¼, SECTION 16, T 3 N, R 29 E, WM; 2000 FEET SOUTH AND 1700 FEET WEST FROM THE NORTHEAST CORNER, SECTION 16, or its equivalent in case of rotation, measured at the well.

The use shall conform to any reasonable rotation system ordered by the proper state officer.

The authorized place of use is as follows:

NE¼
E½ NW¼
NE¼ SW¼
N½ SE¼
SECTION 16
TOWNSHIP 3 NORTH, RANGE 29 EAST, W.M.

The applicant proposes to add an additional point of appropriation to:

NE¼ NE¼, SECTION 16, T 3 N, R 29 E, WM; WELL NO. 5 - 850 FEET SOUTH AND 70 FEET WEST FROM THE NORTHEAST CORNER, SECTION 16.

The applicant also proposes to change the place of use to:

S½ NE¼
SECTION 7

E½
SECTION 8

NW¼ NE¼
SW¼ NE¼
SE¼ NE¼
NW¼
S½
SECTION 9

NW¼ SW¼
S½ SW¼
SECTION 10

NW¼
NW¼ SW¼
NE¼ SW¼
SECTION 15

N½
E½ NW¼
NE¼ SW¼
E½ SE¼
N½ SE¼
SECTION 16
TOWNSHIP 3 NORTH, RANGE 29 EAST, W.M.

THIS CHANGE TO AN EXISTING WATER RIGHT MAY BE MADE PROVIDED THE FOLLOWING CONDITIONS ARE MET BY THE WATER USER:

1. The proposed change shall be completed on or before October 1, 1998.

2. The quantity of water diverted at the new point of appropriation (well), together with the quantity diverted at the old point of appropriation, shall not exceed the quantity of water lawfully available from the original point of appropriation.

3. The water user shall install an in-line flow meter or other suitable device for measuring and recording the quantity of water used. The type and plans of the measuring device must be approved by the Department prior to beginning construction and shall be installed under the general supervision of the Department.

4. Water shall be acquired from the same aquifer as the original point of appropriation.

Certificate 34386 is canceled. When satisfactory proof of the completed change is received, a new certificate confirming this water right will be issued.

WITNESS the signature of the Water Resources Director, affixed AUG 08 1997.

Martha O. Pagel, Director

Well No. 4
App. # : G-8865
Permit # : G8546

Application No. G-8865 Permit No. G 8546

RECEIVED
JUN 21 1978
WATER RESOURCES DEPT.
SALEM, OREGON

STATE OF OREGON WATER RESOURCES DEPARTMENT

Application for a Permit to Appropriate Ground Water

I, City of Echo, Oregon
(Name of Applicant)

of P.O. Box 669, Echo (ZIP 97826)
(Mailing Address) (City)

State of Oregon, , Phone No. 376-8341 do hereby
(Zip Code)

make application for a permit to appropriate the following described ground waters of the State of Oregon;

1. The development will consist of ~~a single deep~~ 2 wells (City Wells No. 4 & No. 2)
(Give number of wells, tile lines, infiltration galleries, etc.)
having a diameter of #2 8, 10, & 12" #4 10 inches and an estimated depth of #2 600 #4 620 feet.

2. The well or other source is to be located ..... ft. (N. or S.) and ..... ft. (E. or W.)
from the NE corner of SECTION 16
(Public Land Survey Corner)
#2 - S 17° 41' 08" W 1146.1 feet within NE¼ NE¼
(If there is more than one well, each must be described)
#4 - S 22° 02' 29" W 1959.6' being within the S.E. ¼ of the N.E. ¼ of
Sec. 16 Tp. 3 North R. 29 East, W. M., in the county of Umatilla

3. Location of area to be irrigated, or place of use if use other than irrigation.

Township	Range	Section	List ¼ ¼ of Section	List use and/or number of acres to be irrigated
3 N	29E	5	S½ SE¼	MUNICIPAL
		8	E ½	"
		9	NW¼ NE¼	"
			S ½ NE ¼ NW ¼	"
		10	S ½ W ½ SW ¼	"
			SE ¼ SW ¼	"
		15	NW ¼	"
		16	N ½ SW ¼ N ½	"
			NE ¼ SW ¼ N ½ SE ¼	"
		17	SE ¼ SE ¼ NE ¼ NE ¼	"

4. It is estimated that #2 45 #4 feet of the well will require ¼" thick 10" dia. casing.
both
5. Depth to water table is estimated 315 (Feet) Well drilled by #2 Ben Dreyer (Kind) (6-20-64) #4 Troy Griffin (Completed 8-2-74)

Form 690-3-0-1-77

6. *The amount of water which the applicant intends to apply to beneficial use is* ~~2.0~~ 4.9 *cubic feet per second or* ~~900~~ 2205 *gallons per minute.* being 2.9 cfs from well #2 and 2.0 cfs from well #4.

7. *The use to which the water is to be applied is* Municipal; ie: Domestic, industrial, recreational, irrigation, fire protection, etc.

8. *If the flow to be utilized is artesian, the works to be used for the control and conservation of the supply when not in use must be described.*

N.A.

9. *If the location of the well, or other development work is less than one-fourth mile from a natural stream channel, give the distance to the channel and the difference in elevation between the stream bed and the ground surface at the source of development.*

N.A.

10. *DESCRIPTION OF WORKS*

Include length and dimensions of supply ditch or pipeline, size and type of pump and motor, type of irrigation system to adequately describe the proposed distribution system.

To be submitted prior to new construction and reconstruction of the present water system.

11. *Construction work will begin on or before* June 20, 1978

12. *Construction work will be completed on or before* June 20, 1981

13. *The water will be completely applied to the proposed use on or before* June 20, 1984

14. *If the ground water supply is supplemental to an existing supply, identify the supply and existing water right.* Certificate 19613 and 34386

Application No. G-8865 *Permit No.* G 8546

Remarks:.....

.....

.....

.....

.....

.....

.....

.....

.....

Stanley G. Wallulis

Signature of Applicant

Stanley G. Wallulis, Echo City Engineer

This is to certify that I have examined the foregoing application, together with the accompanying maps and data, and return the same for.....

.....

In order to retain its priority, this application must be returned to the Water Resources Director with corrections on or before....., *19*.....

WITNESS my hand this ..... *day of*....., *19*.....

..... *Water Resources Director*

By .....

This instrument was first received in the office of the Water Resources Director at Salem, Oregon, on the 21st *day of* June, *19* 78, *at* 4:20 *o'clock* P *M.*

Application No. G-8865 *Permit No.* G-8546

Application No. G-8865 Permit No. G 8546

Permit to Appropriate the Public Waters of the State of Oregon

This is to certify that I have examined the foregoing application and do hereby grant the same, SUBJECT TO EXISTING RIGHTS INCLUDING THE EXISTING MINIMUM FLOW POLICIES ESTABLISHED BY THE WATER POLICY REVIEW BOARD and the following limitations and conditions:

The right herein granted is limited to the amount of water which can be applied to beneficial use and shall not exceed 4.9 *cubic feet per second measured at the point of diversion from the well or source of appropriation, or its equivalent in case of rotation with other water users, from* Wells #2 and #4; being 2.9 c.f.s. from Well #2 and 2.0 c.f.s. from Well #4.

The use to which this water is to be applied is municipal.

If for irrigation, this appropriation shall be limited to ..... *of one cubic foot per second or its equivalent for each acre irrigated and shall be further limited to a diversion of not to exceed* ..... *acre feet per acre for each acre irrigated during the irrigation season of each year;*

and shall be subject to such reasonable rotation system as may be ordered by the proper state officer.

The well shall be constructed in accordance with the General Standards for the Construction and Maintenance of Water Wells in Oregon.

The works constructed shall include an air line and pressure gauge or an access port for measuring line, adequate to determine water level elevation in the well at all times.

The permittee shall install and maintain a weir, meter, or other suitable measuring device, and shall keep a complete record of the amount of ground water withdrawn.

The priority date of this permit is June 21, 1978

Actual construction work shall begin on or before May 30, 1980 *and shall thereafter be prosecuted with reasonable diligence and be completed on or before October 1, 19* 80

Extended to Oct. 1985 Extended to October 1, 1990, 10-1-95, 10-1-2000

Complete application of the water to the proposed use shall be made on or before October 1, 19 81

Extended to Oct. 1985 Extended to October 1, 1990, 10-1-95, 10-1-2000

WITNESS my hand this 30th *day of* May, *19* 79

James E. Sexton

Water Resources Director

12A A

APPENDIX B
Well Logs

UMAT 1314

STATE ENGINEER
Salem, Oregon

UMAT 1314

Well Record

STATE WELL NO. 3N/29-16A(1)
COUNTY Umatilla Co.
APPLICATION NO. U-175

OWNER: City of Echo

MAILING ADDRESS:

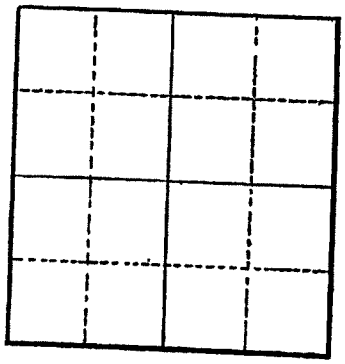
LOCATION OF WELL: Owner's No. 2

CITY AND STATE:

NE ¼ NE ¼ Sec. 16 T. 3 N. S., R. 29 E. W., W.M.

Bearing and distance from section or subdivision corner

Altitude at well



Section 16

TYPE OF WELL: drilled Date Constructed 1945-47

Depth drilled 520 Depth cased

CASING RECORD:

12"
10"
8"

FINISH:

AQUIFERS:

WATER LEVEL:

300 ' below land surface

PUMPING EQUIPMENT: Type H.P.
Capacity G.P.M.

WELL TESTS:

Drawdown ft. after hours G.P.M.

Drawdown ft. after hours G.P.M.

USE OF WATER None-abandoned 1951 Temp. °F.
SOURCE OF INFORMATION U-175, 19
DRILLER or DIGGER
ADDITIONAL DATA:
Log X Water Level Measurements Chemical Analysis Aquifer Test

REMARKS:

When in use, well furnished about 260 g.p.m.

State Printing 89316

410

UMAT 1314

STATE ENGINEER
Salem, Oregon

State Well No. 3N/29-16A(1)
County Umatilla Co.
Application No. U-175

Well Log

Owner: City of Echo Owner's No. 2

Driller: Date Drilled 1945-47

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Soil, gravel, and hardpan	0	37	37
Clay, red; and gravel hardpan	37	72	35
Pea gravel and red clay	72	83	11
Rock, blue, hard from 115 to 125 feet	83	125	42
Rock hard	125	257	132
Basalt, hard	257	263	6
Basalt, very hard	263	274	11
Rock, brown	274	278	4
Rock, hard	278	296	18
Basalt, hard gray	296	410	114
Basalt, black	410	437	27
Basalt, black, water at 442 and 490 feet	437	498	61
Rock, and green clay	498	520	22

UMAT 1314

Wagner, N.S., 1949, Ground-water studies in Umatilla and Morrow Counties: Oregon Dept. of Geol. + Min Ind. Bull. 41.

Echo City
Well name

Index number -- 77-N
3N-29E-16-K
File number
(Code: Tp., R., Sec., ¼ Sec.)

LOCATION:

Umatilla County

Umatilla Quadrangle

3N Tp. 29E Range 16 Section SE¼ of NE¼ Fractional section

D	C	B	A
E	F	G	H
M	L	K	J
N	P	Q	R

STATISTICS:

Well type-Dug ___ Drilled X Driven ___
Final depth 520'

Elevation (land surface) ___ ft. above ___ below ___

Use status- domestic* ___ industrial ___ irrigation ___ municipal X
*includes stock wells

Well status- abandoned ___ dry hole ___ producer X

City of Echo
Owners name
Address

A. M. Edwards
Original drillers name
Address Lexington, Oregon

Date of drilling Oct. 1945 to Sept. 1947

This record compiled by H.S.W. from data secured from the following sources:

Driller

Deepened ___ re-cased ___ cleaned ___ by ___

Date compiled October 1947

Date ___

Material	Thickness (feet)	Depth (feet)	Remarks
Soil	4	4	Casing log and pump test
Gravel and hardpan	26	30	data entered on last log
Dirt	5	35	sheet.
Loose sand and gravel	2	37	
Red clay	7	44	
Loose gravel	2	46	
Hardpan	6	52	
Rock	4	56	
Red clay	6	62	
Soft red rock	10	72	70 - some water
Soft red rock	5	77	at 75 - lost most water
Pea gravel	1¼	78¼	
Red clay	5	83¼	
Yellow rock with boulders	14¾	98	
Blue rock, broken and mud	12	110	Some water
Blue rock	5	115	
Hard rock, mud and blue clay			
between layers of boulders	10	125	
Solid rock	8	133	
Broken "cube" basalt	9	142	Very slow drilling
Blue gray basalt	10	152	
Broken "cube basalt" 8" followed by very hard basalt	14	166	
Blue and gray basalt, 8" seam of brown shale followed by	18	184	
Blue and gray basalt	30	214	
Shale and rock in 6" ave. layers	18	232	
Hard, solid clay	7	239	
Green shale	2	241	
Green shale, hard	16	257	Water at 257
Basalt	6	263	
Basalt - extremely hard	11	274	
Blue basalt - alternate soft and hard layers	4	278	
Brown rock	8	286	
Hard basalt	4	290	
Alternate hard rock and clay in 6" to 8" layers	6	296	
Crevices	4	300	Water dropped 28'
Blue rock and some clay layers	28	328	
Hard basalt	62	390	
Extremely hard basalt	16	406	
Seams and crevices in basalt	4	410	Water dropped 50'
Very hard basalt	1	411	
Shale	1	412	
Blue rock with crevices	8	420	
Very hard gray basalt	5	425	

(continued)

Medium soft blue rock	12	437	
Black basalt	5	442	Water at 442
Boulder and crevice	1	443	Water and some sand. Drilled 5 hours with no penetration.
Black basalt (and water course	17	460	Water dropped to 220' level
Hard boulders and soft spots	30	490	
Green clay seams a few inches thick between basalt layers	8	498	
Hard basalt	22	520	Bottom of hole
Casing log:			
12¼" hole to 169'			
10" hole to 169' to 336'			
8¼" hole 336' to 520'.			
Cased 169' with 10" casing.			
Pump test with 6" deep well pump at capacity output gave yield of 200 g.p.m.			
Drawdown with above equipment was 60' at 100 g.p.m. - No difference noted with greater yield.			
Temp. H₂O is 67°F.			

Gabert
Well name

Index number -- 119-N
2S-23E-32
File number
(Code: Tp., R., Sec., ¼ Sec.)

LOCATION:

Morrow County

Unnamed Quadrangle

2S Tp. 23E Range 32 Section NE¼ Fractional section

D	C	B	A
E	F	G	H
M	L	K	J
N	P	Q	R

STATISTICS:

Well type-Dug ___ Drilled x Driven ___
Final depth 275'

Elevation (land surface) ___ ft. above ___ below ___

Use status- domestic* x industrial ___ irrigation ___ municipal ___
*includes stock wells

Well status- abandoned ___ dry hole ___ producer x

Gabert Holmes
Owners name
Address Portland, Oregon

Fred Nichorsa
Original drillers name
Address Ione, Oregon

Date of drilling Summer, 1947

This record compiled by W.S.W. from data secured from the following sources:

Driller and Morrow County Recorder

Deepened ___ re-cased ___ cleaned ___ by ___

Date compiled October 1947

Date ___

Material	Thickness (feet)	Depth (feet)	Remarks
Top soil	2½	2½	5 5/8" hole.
Shelly boulder formation	24½	27	
Soft formation with little clay	8	35	
Blue basalt	34	69	Trace water at 50 feet.
Hard gray basalt	13	82	
Brown porous rock	7	89	
Hard blue rock	7	96	
Black to brown porous rock	14	110	
Moderately hard blue rock	26	136	
Very hard gray rock	19	155	
Hard blue porous basalt	5	160	
Hard solid blue basalt	6	166	
Brown porous rock	6	172	
Moderately hard black rock	8	180	
Gray rock	4	184	
Brown porous rock	10	194	

STATE ENGINEER
Salem, Oregon

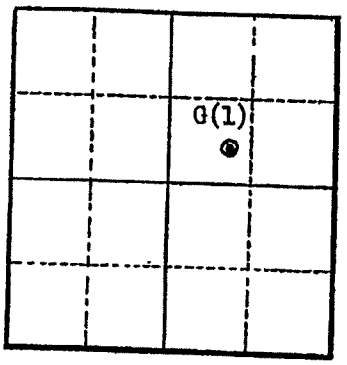
UMAT 1315

Well Record

STATE WELL NO. 3N/29-16G(1)
COUNTY Umatilla
APPLICATION NO. G- 21

OWNER: City of Echo
MAILING ADDRESS:
CITY AND STATE: Echo, Oregon

LOCATION OF WELL: Owner's No. 3
SW ¼ NE ¼ Sec. 16 T. 3 N. R. 29 E. W.M.
Bearing and distance from section or subdivision corner S.39°30'W. 2640' from NE cor. of sec. 16



Altitude at well
TYPE OF WELL: Drilled Date Constructed 1951
Depth drilled 490' Depth cased
Section 16

CASING RECORD:
16 inch
12 inch

FINISH:

AQUIFERS:
Basalt

WATER LEVEL:
95 feet in 1951

PUMPING EQUIPMENT: Type Turbine 12 stage H.P.
Capacity 400 G.P.M.

WELL TESTS:
Drawdown 60 ft. after 6 hours 400 G.P.M.
Drawdown ft. after hours G.P.M.

USE OF WATER Municipal Temp. °F., 19
SOURCE OF INFORMATION USGS G- 64
DRILLER or DIGGER A.A. Durand & Son
ADDITIONAL DATA:
Log X Water Level Measurements Chemical Analysis Aquifer Test

REMARKS:

State Printing 69218

341

STATE ENGINEER
Salem, Oregon

State Well No. 3N/29-16 G (
County Umatilla
Application No. G - 21

Well Log

Owner: City of ECHO Owner's No. 3

Driller: A. A. Durland & Son Date Drilled 1951

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Soil brown	0	14	14
Gravel, water bearing	14	25	11
Basalt, broken, & gravel	25	32	7
Basalt, hard	32	35	3
Basalt, gray, hard, swl - 10 ft.	35	85	50
Basalt, black, medium Hard	85	103	18
Basalt, black, broken	103	116	13
Clay, blue	116	118	2
Basalt, black, broken	118	132	14
Basalt, black, broken, medium hard (137'-138')	132	159	27
Basalt, black, medium hard, broken	159	164	5
Basalt, black, swl - 10 ft.	164	179	15
Basalt, black, broken, & soft clay	179	184	5
Basalt, gray, hard	184	187	3
Basalt, gray, medium hard	187	275	88
Basalt, black, soft, swl - 107 ft.	275	290	15
Basalt, black	290	360	70
Basalt, gray, hard	360	362	2
Basalt, gray, very hard	362	406	44
Basalt, gray, fine	406	430	24
Basalt, black, soft, broken	430	435	5
Basalt, gray, hard, swl - 100 ft.	435	490	55

NOTICE TO WATER WELL CONTRACTOR
The original and first copy of this report are to be filed with the
STATE ENGINEER, SALEM, OREGON 97310 within 30 days from the date of well completion.

UMAT 1311

RECEIVED
AUG 7 1974
STATE ENGINEER
SALEM, OREGON

WATER WELL REPORT
STATE OF OREGON
(Please type or print) (Do not write above this line)

State Well No. 3N/29E-16
State Permit No. G-8546
Well #4

(1) OWNER:
Name City of Echo
Address Echo, Oregon 97826

(2) TYPE OF WORK (check):
New Well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:
Rotary ☒ Driven ☐
Cable ☐ Jetted ☐
Dug ☐ Bored ☐

(4) PROPOSED USE (check):
Domestic ☐ Industrial ☐ Municipal ☒
Irrigation ☐ Test Well ☐ Other ☐

(5) CASING INSTALLED:
Threaded ☐ Welded ☐
10" Diam. from 0 ft. to 415 ft. Gage .250
" Diam. from ft. to ft. Gage
" Diam. from ft. to ft. Gage

(6) PERFORATIONS:
Perforated? ☐ Yes ☒ No
Type of perforator used
Size of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

(7) SCREENS:
Well screen installed? ☐ Yes ☒ No
Manufacturer's Name
Type Model No.
Diam. Slot size Set from ft. to ft.
Diam. Slot size Set from ft. to ft.

(8) WELL TESTS:
Drawdown is amount water level is lowered below static level
Was a pump test made? ☒ Yes ☐ No If yes, by whom?
Yield: 656 gal./min. with 18 ft. drawdown after 13 hrs.
" " "
" " "
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m.
Temperature of water Depth artesian flow encountered ft.

(9) CONSTRUCTION:
Well seal—Material used Cement
Well sealed from land surface to 45 ft.
Diameter of well bore to bottom of seal 14 in.
Diameter of well bore below seal 10 in.
Number of sacks of cement used in well seal 20 sacks
Number of sacks of bentonite used in well seal sacks
Brand name of bentonite
Number of pounds of bentonite per 100 gallons of water lbs./100 gals.
Was a drive shoe used? ☒ Yes ☐ No Plugs Size: location ft.
Did any strata contain unusable water? ☐ Yes ☒ No
Type of water? depth of strata
Method of sealing strata off
Was well gravel packed? ☐ Yes ☒ No Size of gravel:
Gravel placed from ft. to ft.

(10) LOCATION OF WELL:
#4 WSB
County Umatilla Driller's well number
¼ ¼ Section 16 T. 3N. R. 29E. W.M.
Bearing and distance from section or subdivision corner
Tax lot 3200

(11) WATER LEVEL: Completed well.
Depth at which water was first found 353 ft.
Static level 315 ft. below land surface. Date 7-15-74
Artesian pressure lbs. per square inch. Date

(12) WELL LOG:
Diameter of well below casing 10"
Depth drilled 600 ft. Depth of completed well 600 ft.

Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. *Report each change in position of Static Water Level and indicate principal water-bearing strata.*

MATERIAL	From	To	SWL
Topsoil	0	5	
Claystone	5	20	
Rock, brown	20	37	
Basalt	37	146	
Rock, med. black	146	289	
Basalt	289	341	
Basalt, hard, gray	341	353	
Rock, porous, black	353	415	W.B.
Basalt, black	415	441	
Basalt, hard gray	441	512	
Rock, black + blue claystone	512	532	
Rock, med. gray	532	548	
Rock, brown	548	554	
Basalt	554	585	
Rock, porous	585	600	W.B.

Work started 5-20 1974 Completed 8-1 1974
Date well drilling machine moved off of well 6-4 1974

Drilling Machine Operator's Certification:
This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.
[Signed] James T Leith (Drilling Machine Operator) Date 8-5, 1974
Drilling Machine Operator's License No. 665

Water Well Contractor's Certification:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Name TROY GRIFFIN (Person, firm or corporation) (Type or print)
Address 900 HERMISTON AVE, HERMISTON, ORE
[Signed] Troy Griffin (Water Well Contractor)
Contractor's License No. 65 Date 8-1, 1974

(USE ADDITIONAL SHEETS IF NECESSARY)

SP*45656-119

5

STATE OF OREGON

WATER WELL REPORT

(as required by ORS 537.765)

FEB - 9 1994

WATER RESOURCES DEPT.
SALEM, OREGON

UMAT 5970

3N/29E/16aa

(START CARD) # 46232

(1) OWNER:

Well Number 5

Name City of Echo

Address P.O. Box 9

City Echo State OR Zip 97826

(2) TYPE OF WORK:

XX New Well ☐ Deepen ☐ Recondition ☐ Abandon

(3) DRILL METHOD:

☐ Rotary Air ☐ Rotary Mud ☒ Cable

XX Other Reverse Circulation Rotary

(4) PROPOSED USE:

☐ Domestic XX Community ☐ Industrial ☐ Irrigation

☐ Thermal ☐ Injection ☐ Other

(5) BORE HOLE CONSTRUCTION:

Special Construction approval ☒ Yes ☐ No Depth of Completed Well 1282 ft.

Explosives used ☐ Yes ☒ No Type Amount

HOLE Diameter	From	To	SEAL Material	From	To	Amount sacks or pounds
20	0	206	Bentonite	0	6	20 sks
15	206	955	Cement Grout	6	955	560 sks
10	955	1282				+60 sks sand

How was seal placed: Method XX A ☐ B ☒ C ☐ D ☐ E

XX Other Bentonite was manually placed dry

Backfill placed from ft. to ft. Material

Gravel placed from ft. to ft. Size of gravel

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	Pitless Unit	+1	5	std	X	☐	XX	☐
	12	5	955	.375	XX	☐	XX	☐
	20	6	107	.375	X	☐	XX	☐
					☐	☐	☐	☐
Liner:	10x8	945	950	std	X	☐	XX	☐
	8	950	1282	.250	X	☐	XX	☐

except at screens

Final location of shoe(s) 955

(7) PERFORATIONS/SCREENS:

XX Perforations Method Factory mill cut

XX Screens Type V shape wire wrap Material 304ss

Screens: From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
1070	1075	.150		8	PS	☐	☐
1080	1085	.150		8	PS	☐	☐
1250	1255	.150		8	PS	☐	☐
1265	1270	.150		8	PS	☐	☐
						☐	☐

(8) WELL TESTS: Minimum testing time is 1 hour

XX Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

also see attached graphs of 24 hour test/recovery

Yield gal/min	Drawdown	Drill stem at	Time
522	26		2 hr.
1034	61		2nd - 2 hr.
1450	101		3rd - 2 hr.
1760	136		4th - 2 hr.

Temperature of Water 84°F Depth Artesian Flow Found

Was a water analysis done? ☐ Yes By whom

Did any strata contain water not suitable for intended use? ☐ Too little

☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other

Depth of strata:

SE1 9405

(9) LOCATION OF WELL by legal description:

County Umatilla Latitude Longitude

Township 3N N or S Range 29E E or W. WM.

Section 16 NE ¼ NE ¼

Tax Lot 100 Lot Block Subdivision

Street Address of Well (or nearest address) Golf Course Road
Echo, OR

(10) STATIC WATER LEVEL:

153 ft. below land surface. Date 10/26/93

Artesian pressure lb. per square inch. Date

(11) WATER BEARING ZONES:

Depth at which water was first found 1st significant @ 662

From	To	Estimated Flow Rate	SWL
662	674	?	456
screened/perforated interval		see (8)	see
see (7)			(10)

(12) WELL LOG:

Ground elevation approx. 800

Material	From	To	SWL
see attached log			
'J' receptor & bell reducer			
Perforations in 8" liner are all 3/16x3 slots			
32 slots per foot. Perforated interals are:			
	From	To	
160 slots	1065	1070	
160 slots	1075	1080	
160 slots	1085	1090	
640 slots	1175	1195	
160 slots	1245	1250	
320 slots	1255	1265	
320 slots	1270	1280	

Date started 5/12/93 Completed 1/7/94

(unbonded) Water Well Constructor Certification:

I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to my best knowledge and belief.

WWC Number 1578

Signed Date 1/28/94

(bonded) Water Well Constructor Certification:

I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon well construction standards. This report is true to the best of my knowledge and belief.

WWC Number 649

Signed Date 1/28/94

ORIGINAL & FIRST COPY - WATER RESOURCES DEPARTMENT SECOND COPY - CONSTRUCTOR THIRD COPY - CUSTOMER 9809C 10/91

City of Echo Well No. 5
Start Card No. 46232
by Schneider Drilling Co.

Depth From	Depth To	Description
0	6	Sand & gravel, brown
6	11	Gravel, 5"-, & sand, w/some clay, brown
11	21	Clay & gravel, 3"-, brown
21	32	Clay, brown, w/coarse sand & small gravel
32	38	Gravel & sand, cemented
38	52	Clay, brown, soft, sandy, w/some cs & small gravel
52	55	Gravel, 3"- & sand, cemented, brown
55	57	Gravel, 3"- & sand, med, cemented, brown
57	67	Gravel, 1/2"-, cem, w/some clay, brown
67	70	Gravel, 1-1/2"-, cem, w/some clay, brown
70	76	Clay, brown, w/claystone & some gravel, small
76	84	Clay, brown, sandy, & claystone
84	90	Gravel, 3/4"-, & sand, cem, w/some clay, brn
90	93	Clay, brown, sandy, & claystone
93	105	Gravel, 3"-, & clay, tan-brown
105	115	Basalt, gray, hard
115	118	Basalt, blk & red, fractured, med
118	124	Basalt, red & blk, fractured, med
124	125	Basalt, drk red & blk, frac, w/some cs
125	130	Basalt, drk red & blk, frac, med
130	131	Basalt, drk gray & red, frac, med
131	132	Basalt, drk gray & red, frac, med-hard
132	140	Basalt, drk red, frac, med
140	180	Basalt, gray, w/some frac, hard
180	191	Basalt, gray, fractured, hard
191	192	Basalt, blk & red, ves, medium, w/cs, blue-grn
192	193	Basalt, blk & red, brkn, ves, med, w/some cs, blue-grn
193	200	Basalt, brown, med, some frac, some cs, blue-grn
200	203	Basalt, gray, w/some brown
203	206	Basalt, brn & gry, med-hd, frac, w/some cs, blue-grn
206	207	Basalt, lt gray, frac, med-hard
207	215	Basalt, gray, frac, hard
215	216	Basalt, gray, med, broken, w/some cs, blue-grn
216	220	Basalt, gray & brown, med, brkn, ves, w/cs, blue-grn
220	225	Basalt, gray & red, med, brkn, w/some cs, blue-grn
225	230	Basalt, gray, med-hard, brkn, w/some cs, blue-grn
230	235	Basalt, gray, med-hard, brkn
235	237	Basalt, gray, hard, frac

237	241	Basalt, gray & brown, hard, frac
241	243	Basalt, gry & brn, med-hd, frac, w/some cs, blue-grn
243	244	Basalt, gray, med-hard, frac, w/some cs, blue-grn
244	250	Basalt, gray, hard, frac
250	252	Basalt, gray & brown, med-hard, frac
252	258	Bslt, gry & brn, med, brkn, ves, w/some cs, blue-grn
258	268	Basalt, gray, med-hard, frac
268	275	Basalt, gray & brn, med, brkn, w/some cs, blue-grn
275	285	Basalt, gray, med-hard, brkn, w/some cs, blue-grn
285	295	Basalt, gray, med-hard, frac
295	300	Basalt, gray, med, brkn, w/some claystone, blue-grn
300	313	Basalt, gray, med-hard, frac
313	315	Basalt, gray & brn, med, brkn, w/some cs, blue-grn, & sandstone, lt brown
315	326	Basalt, gray & brown, med, brkn, ves, w/cs, blue-grn
326	328	Basalt, gray, med, brkn
328	338	Basalt, gray, hard, brkn
338	341	Basalt, gray, med-hard, brkn, w/some cs, blue-grn
341	343	Bslt, gry, frac, hard, some ves, w/some cs, blue-grn
343	349	Basalt, gray, ves, hard, w/some cs, blue-grn
349	353	Basalt, gray w/green, ves, hard
353	358	Basalt, gray, w/some frac, hard
358	365	Basalt, gray w/blue, ves, hard
365	367	Basalt, gray w/some frac, hard
367	379	Basalt, gray, frac, some ves, hard, w/some cs, blue
379	393	Basalt, gray, w/some blue, frac, hard
393	398	Basalt, gray, hard
398	412	Basalt, gray, w/some frac, hard
412	419	Basalt, gray, ves, med, w/cs, blue-grn
419	433	Basalt, gray, ves, frac, med, w/some cs, blue-grn
433	478	Basalt, gray, frac, some ves, hard
478	499	Basalt, gray, frac, some ves, hard, w/cs, blue-grn
499	569	Basalt, gray, some frac, hard
569	572	Basalt, black & gray, frac, hard
572	576	Basalt, gray, frac, hard
576	578	Basalt, gray, frac, hard, w/some cs, blue
578	581	Basalt, grn-gray, med, frac, w/clay & cs, gray
581	583	Bslt, gry-brn, frac, ves, med, clay & cs, brn-blue-grn
583	586	Basalt, gry & brown w/grn, frac, ves, med
586	597	Basalt, gray, frac, ves, med, w/cs, blue-grn
597	602	Basalt, gray w/blue, frac, ves
602	622	Basalt, gray, frac, hard
622	627	Basalt, gray, frac, w/some ves, hard
627	659	Basalt, gray, frac, hard
659	662	Basalt, gray & red-brn, med-hard, frac
662	666	Basalt, rusty-red, med-soft, ves, w/cs, blue-grn
666	672	Basalt, red-brn, med-soft, w/cs, light grn

672	674	Basalt, gray-brn, med-hard, frac, ves
674	704	Basalt, gray, hard, frac
704	714	Basalt, gray & brn, med-soft, ves, brkn
714	717	Basalt, black, med-soft, ves, brkn
717	719	Basalt, black, med-soft, brkn, ves, w/cs, light grn
719	724	Basalt, drk gray & brn, w/some cs, blue-grn
724	726	Basalt, gray, med-hard, frac, w/some cs, blue-grn
726	728	Basalt, gray, hard, broken, ves
728	739	Basalt, gray, hard, fractured
739	740	Basalt, drk gray, hard, fractured
740	743	Basalt, drk gray, hard, frac, some quartz
743	754	Basalt, black, soft, some quartz, cs layers, grn
754	759	Basalt, gray & brown, med-soft, ves, cs, grn
759	787	Basalt, dk gray, med-soft, ves, some cs, grn
787	790	Basalt, dk gray, hard, fractured
790	793	Bslt, dk gry, med-hard, frac, ves, some quartz & cs, grn
793	796	Basalt, gray, hard, frac
796	805	Basalt, dk gray, med-hard, frac, ves
805	808	Basalt, gray, med-hard, broken
808	812	Basalt, gray, med-hard, frac
812	816	Basalt, gray, hard, frac
816	826	Basalt, med, dk gray, med-hard, frac
826	834	Basalt, dk gray, med-hard, frac, ves
834	838	Basalt, gray, med-hard, frac
838	851	Basalt, gray, hard, frac
851	854	Bslt, gry & grn, md-sft, well frac, some cs, blk-grn
854	861	Basalt, brown, med, well frac, w/cs, yellow
861	868	Basalt, gray, hard, frac
868	869	Basalt, brown & gray, med, well frac, w/cs, yellow
869	874	Basalt, gray, hard, frac
874	884	Basalt, blk, med-soft, ves, w/cs, blue-grn
884	887	Basalt, dk gray, med-hard, frac, some ves
887	890	Basalt, dk gray, med-hard, frac
890	898	Basalt, dk gray, med, brkn, ves, w/cs, blue-grn
898	903	Basalt, brn-red, med, brkn, ves, w/cs, blue-grn
903	905	Basalt, gray & brn, med, brkn, ves, w/cs, blue-grn
905	909	Basalt, gray, med-hard, frac, some ves, w/some cs, blue-grn
909	916	Basalt, gray, med-hard, frac
916	931	Basalt, gray, hard, frac
931	940	Basalt, dk gray, med-hd, brkn, ves, w/cs, blue-grn
940	942	Basalt, dk gray, med-hard, brkn
942	961	Basalt, dk gray, hard, frac, w/some quartz
961	969	Basalt, gray, m-h, frac, some cs, gray
969	977	Basalt, gray, soft, brkn, ves, w/cs, blue-grn
977	983	Basalt, brn, broken, soft, w/cs, blue-grn
983	985	Basalt, red-brn, brkn, soft, w/clay & cs, brn-grn

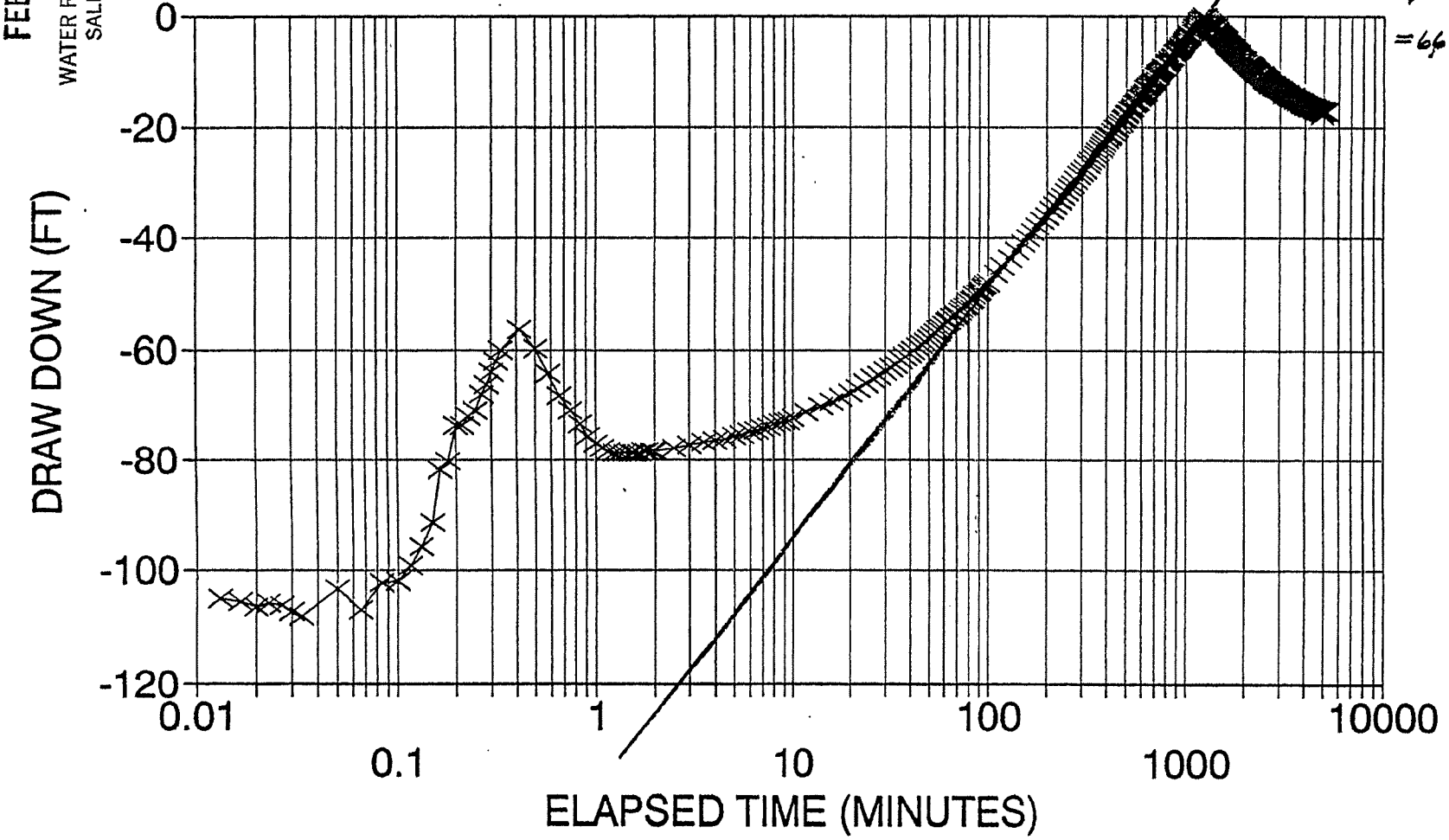
985	987	Basalt, soft, brkn, ves, claystone, blue-grn & brn
987	989	Basalt, dk gry, brkn, soft, w/cs, blue-grn, some quartz
989	991	Basalt, gray-brn, med, brkn, w/cs, blue-grn
991	993	Basalt, gray & brown, med, frac
993	995	Basalt, dk gray, med, frac, w/cs, blue-grn
995	999	Basalt, brn, med, frac, w/some cs, blue-grn
999	1002	Basalt, gray, med, frac, w/some cs, blue-grn
1002	1017	Basalt, gray, hard, frac
1017	1018	Basalt, gray & red, brkn, med-soft, w/cs, blue-grn
1018	1019	Basalt, red, brkn, ves, med, w/cs, blue-grn
1019	1020	Basalt, gray w/red, brkn, med, ves, w/cs, blue-grn
1020	1029	Basalt, gray, med, brkn, ves, w/cs, blue-grn
1029	1036	Basalt, brown, med, frac
1036	1062	Basalt, gray, hard, frac
1062	1064	Basalt, gray, frac, med-hard
1064	1067	Basalt, brn-gray, frac, med
1067	1069	Basalt, yellow & red, frac, med-soft, w/some clay
1069	1074	Basalt, yellow & red, some ves, brkn, soft
1074	1077	Basalt, yellow-brn, brkn, some ves, med-soft
1077	1080	Basalt, red-brn, brkn, some ves, soft
1080	1091	Basalt, red, brkn, some ves, soft
1091	1092	Basalt, dk red w/some yellow-brn, brkn, ves, soft
1092	1094	Basalt, gray, frac, med
1094	1095	Basalt, brn w/orange, ves, frac, med, w/cs, blue
1095	1100	Basalt, brn-gray, ves, frac, med, w/some cs, blue
1100	1103	Basalt, gray w/red, frac, med, some quartz
1103	1108	Basalt, gray w/blue, frac, some ves, med-hard
1108	1112	Basalt, gray, some ves, frac, med-hard, w/cs, blue-grn
1112	1174	Basalt, gray, frac, hard
1174	1176	Basalt, gray, some red, med-hard, frac, w/some cs, blue-grn
1176	1178	Basalt, gray & red, med, frac, w/cs, blue-grn
1178	1179	Basalt, red, med-soft, frac, w/some sandstone, coarse, blue-grn
1179	1180	Basalt, red, med, frac, w/some ves
1180	1185	Basalt, red-brn, med-hard, frac
1185	1189	Basalt, red w/some drk gray, med-soft, ves
1189	1192	Basalt, brown w/some red & gray, med, brkn, some ves
1192	1193	Basalt, brn, med-hard, frac, some ves
1193	1194	Basalt, gray-brn, med-hard, frac
1194	1245	Basalt, gray, med-hard, frac
1245	1267	Basalt, gray w/some brn, med-soft, brkn, ves, w/cs, blue-grn, & some ss, blue-grn
1267	1268	Bslt, gry w/some brn, md-sft, brkn, ves, w/cs, blue-grn, w/some ss, crse, blue-grn
1268	1275	Basalt, gray & brownish red, med-soft, brkn, ves
1275	1282	Basalt, gray w/some brn, med-hard, frac

W32040.ECH

ECHO WELL #5

10/28-29/93 RECOVERY FROM 24HR TEST

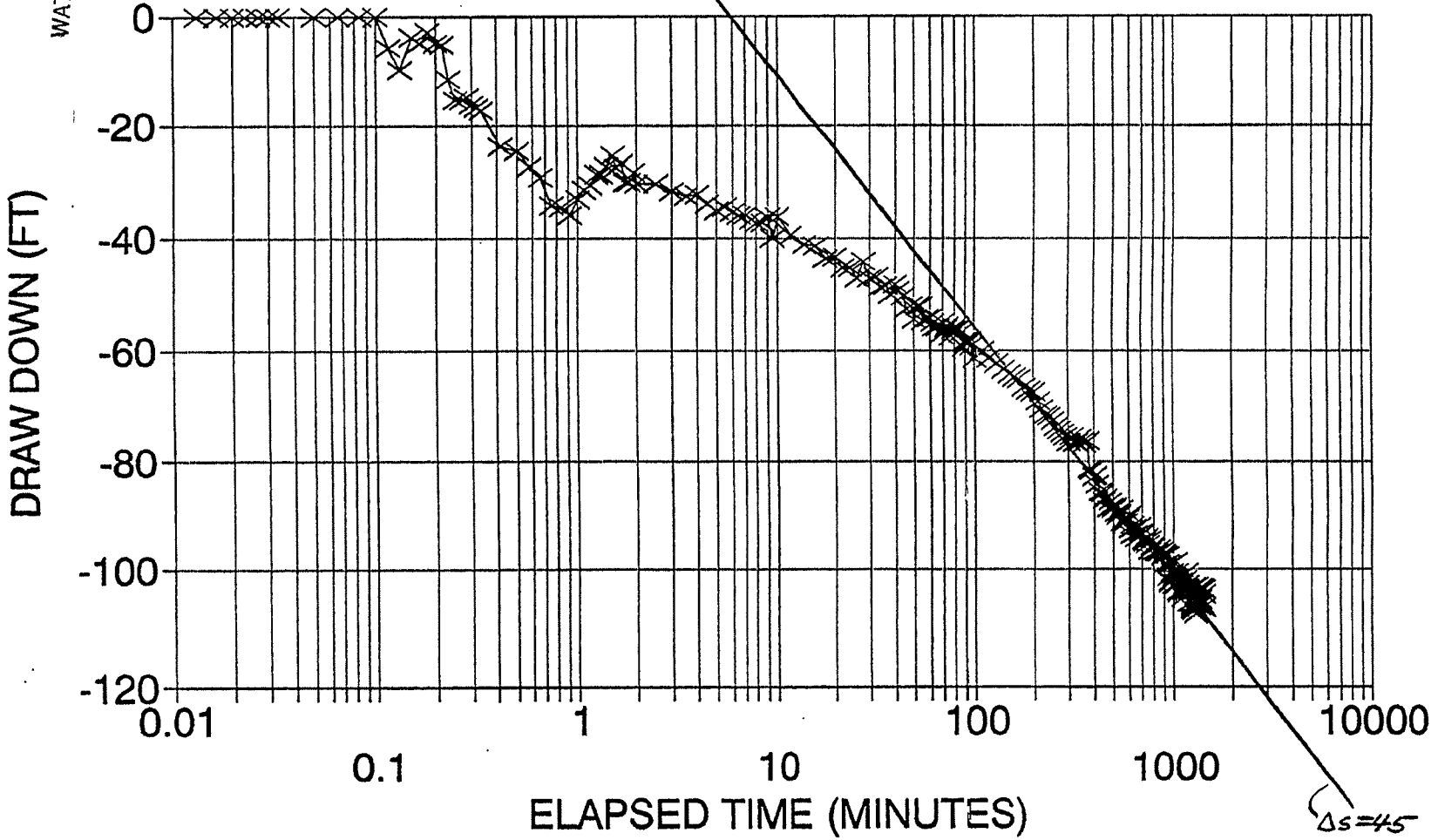
SWL 157.5



ECHO WELL #5

10/28/93-AVG. FLOW 1137 GPM-SWL 157.5

24 HOUR CONSTANT RATE TEST



$T = \frac{264 \cdot Q}{\Delta s}$

$= 4670$ gpd/ft

APPENDIX C
Water Rate Structure

Blocking Meter Access: after 2nd written notice fee is **$25**.

Upon 3rd written notice: The City shall tag and tow the vehicle or move any debris onto the property of the occupant at no cost to the City and any damages shall be the responsibility of the owner. Customer will be billed for City staff or paid contractor time, equipment and any costs associated with removing debris blocking the access to the meter.

WATER RATES EFFECTIVE JULY 1, 2021 BILLING

Water Residential/small commercial:
Water Minimum Charge for up to 1st 5,000 gallons----**$33.00**
All over 5,001gallons shall be **$1.00** per 1,000 gallons.

Water Trucks: **$100** first tank up to 5,000 gallons, plus **$2.00** per 1,000 gallons thereafter. Customer shall fill out an application for service.

Water Non-resident rate: Double residential rate **$66** per meter

Golf Courses: $30 for up to 1st 5,000 gallons & **$.50** per 1000 gallons thereafter

School: Minimum charge for up to 50,000 gallons **$690** per month.
Over 50,001 gallons **$2.50** per 1,000 gallons

Water Industrial or large commercial: rate to be negotiated by contractor with the City Administrator and City Council.

Late Fee: Failure to pay utility bill by the 25th of each month is: **$12** per occurrence.

Reconnect Fee: **$40** Public Works Department hours 7 AM – 3:30 PM M-F
$80 After Hours

Fees charged in the Clerk's Office:

Fax Charges:

1st Page	**$2.00**
All Additional Pages	**$.50 each**

Making Copies:

Standard Size Paper

One Sided	**$.10 each**
Two sided	**$.15 each**

Legal Size Paper

One Sided	**$.20 each**
Two Sided	**$.30 each**

Standard Size Colored Paper & Colored Printing

One Sided	**$.25**
Two Sided	**$.50**

Scanning Per Page

1st Page	**$2.00**
All Additional Pagers	**$.50**

Fee for Returned Checks

Each Occurrence	**$12.00**

RESOLUTION 484-2021

A RESOLUTION ADOPTING FEES FOR UTILITIES, OTHER FEES AND AMENDING RESOLUTION 435-16.

WHEREAS, due to increasing costs for operations and maintaining the City's aging water system; and

WHEREAS, the office cost for supplies and staff time have risen and these increases are reflected in the fee structure; and

NOW THEREFORE, the Common Council of the City of Echo resolves to adopt the attached fee schedule which shall become effective with the July 1 billing.

Adopted by the Common Council of the City of Echo this _____ day of _____, 2021.

_____
Mayor Chad Ray

Attest:

_____
David Slaght, City Admin.-Recorder

APPENDIX D
Consumer Confidence Report

Oregon Health Authority

CCR CERTIFICATION FORM

OHA Drinking Water Services

Submit to OHA-DWS at Time of CCR Delivery or No Later than October 1 *see footnote

Community Water System Name:

PWS ID No: 41- 00270 For calendar year: 2020

The community water system named above hereby confirms that its Consumer Confidence Report has been distributed to customers (and appropriate notices of availability have been given). Further, the system certifies that the information contained in the report is correct and consistent with the compliance monitoring data previously submitted to the primacy agency.

CCR certified by name: Cytat Echo Title: Public Works Director

Phone No: (541) 376 6038

Date CCR certified: 4-25-2021 Date CCR distributed to customers: 4-26-2021

CCR Delivery Certification (check all items below that apply)

- [x] Paper CCR was distributed by mail or other direct delivery method to all bill-paying customers
- [x] Electronic delivery. Check box below and describe how customers may request a paper copy:
  - [x] Notification ([x] mail or [ ] email - check all that apply) that CCR is available on website: _____
  - [ ] CCR sent as an attachment to email (for example, portable document format-PDF)
  - [x] CCR sent as an embedded image in body of email
- [x] "Good faith" efforts were used to reach non-bill paying consumers. Those efforts may include a mix of the following methods, as recommended by OHA-DWS:
  - [x] Posting the CCR on a publicly accessible Internet site at website: _____ (required for systems serving at least 100,000 persons)
  - [x] Mailing the CCR to postal patrons within the service area
  - [x] Mailing a notification (for example, postcard) to postal patrons within the service area that the CCR is available on website: _____
  - [x] Advertising availability of the CCR in news media
  - [x] Publication of CCR in local newspaper
  - [x] Posting the CCR in public places. Locations: _____
  - [x] Delivery of multiple copies to single bill addresses serving several people such as: apartments, businesses, and large private employers
  - [x] Delivery to community organizations
  - [x] Electronic newsletter or listserv, or notice of availability via social media outlets

Email: dwp.dmce@state.or.us **Mail:** OHA-Drinking Water Services P.O. Box 14350, Portland, OR 97293-0350 **Fax:** (971) 673-0694

* If the CCR has been distributed, it is recommended that this form be sent to Drinking Water Services at the same time a copy of the CCR is sent to the program; but by rule, the certification form is due no later than Oct 1 annually.

Updated May 2018

2020Annual Drinking Water Report

City of Echo

April 25th 2021

We're pleased to present to you this year's Annual Quality Water Report. This report is designed to inform you about the quality water and services we deliver to you every day. Our constant goal is to provide you with a safe and dependable supply of drinking water. We want you to understand the efforts we make to continually improve the water treatment process and protect our water resources. We are committed to ensuring the quality of your water. Our water source is ground water from the Reservoir Well #5 UMAT5970 and The Golf Course well #4 UMAT5842.

I'm pleased to report that our drinking water is safe and meets federal and state requirements.

If you have any questions about this report or concerning your water utility, please contact Justin Northern, our certified drinking water operator at (541) 376-6038. We want our valued customers to be informed about their water utility. If you want to learn more, please contact us for the next regularly scheduled meeting date, time and location.

The City of Echo routinely monitors for constituents in your drinking water according to Federal and State laws. This table shows the results of our monitoring for the period of January 1st to December 31st, 2020. As water travels over the land or underground, it can pick up substances or contaminants such as microbes, inorganic and organic chemicals, and radioactive substances. All drinking water, including bottled drinking water, may be reasonably expected to contain at least small amounts of some constituents. It's important to remember that the presence of these constituents does not necessarily pose a health risk.

In this table you will find many terms and abbreviations you might not be familiar with. To help you better understand these terms we've provided the following definitions:

Non-Detects (ND) - laboratory analysis indicates that the constituent is not present.

Parts per million (ppm) or Milligrams per liter (mg/l) - one part per million corresponds to one minute in two years or a single penny in $10,000.

Parts per billion (ppb) or Micrograms per liter - one part per billion corresponds to one minute in 2,000 years, or a single penny in $10,000,000.

Parts per trillion (ppt) or Nanograms per liter (nanograms/l) - one part per trillion corresponds to one minute in 2,000,000 years, or a single penny in $10,000,000,000.

Parts per quadrillion (ppq) or Picograms per liter (picograms/l) - one part per quadrillion corresponds to one minute in 2,000,000,000 years or one penny in $10,000,000,000,000.

Picocuries per liter (pCi/L) - picocuries per liter is a measure of the radioactivity in water.

Millirems per year (mrem/yr) - measure of radiation absorbed by the body.

Million Fibers per Liter (MFL) - million fibers per liter is a measure of the presence of asbestos fibers that are longer than 10 micrometers.

Nephelometric Turbidity Unit (NTU) - nephelometric turbidity unit is a measure of the clarity of water. Turbidity in excess of 5 NTU is just noticeable to the average person.

Action Level - the concentration of a contaminant which, if exceeded, triggers treatment or other requirements which a water system must follow.

Treatment Technique (TT) - (mandatory language) A treatment technique is a required process intended to reduce the level of a contaminant in drinking water.

Maximum Contaminant Level (MCL) - (mandatory language) The "Maximum Allowed" (MCL) is the highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.

Maximum Contaminant Level Goal (MCLG) - (mandatory language) The "Goal"(MCLG) is the level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

Maximum Residual Disinfectant Level (MRDL) – (mandatory language) The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

Maximum Residual Disinfectant Level Goal (MRDLG) – (mandatory language) The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

TEST RESULTS						
Contaminant	Violation Y/N	Level Detected	Unit Measurement	MCLG	MCL	Likely Source of Contamination
Microbiological Contaminants						
1. Total Coliform Bacteria	N	Absent	Present/ Absent	0	presence of coliform bacteria in 5% of monthly samples	Naturally present in the environment
2. Fecal coliform and *E.coli*	N	Absent	Present/ Absent	0	a routine sample and repeat sample are total coliform positive, and one is also fecal coliform or *E. coli* positive	Human and animal fecal waste
3. Turbidity	N			n/a	TT	Soil runoff
Radioactive Contaminants						
4. Beta/photon emitters	N		mrem/yr	0	4	Decay of natural and man-made deposits
5. Alpha emitters	N	ND	pCi/l	0	15	Erosion of natural deposits
6. Combined radium	N		pCi/l	0	5	Erosion of natural deposits
7. Uranium1	N	0.0006	µg/L	01	301	Erosion of natural deposits
Inorganic Contaminants						
8. Antimony	N		ppb	6	6	Discharge from petroleum refineries; fire retardants; ceramics; electronics; solder
9. Arsenic	N		ppb	n/a	.01	Erosion of natural deposits; runoff from orchards; runoff from glass and electronics production wastes
10. Asbestos	N	N	MFL	7	7	Decay of asbestos cement water mains; erosion of natural deposits
11. Barium	N		ppm	2	2	Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits
12. Beryllium	N		ppb	4	4	Discharge from metal refineries and coal-burning factories; discharge from electrical, aerospace, and defense industries
13. Cadmium	N		ppb	5	5	Corrosion of galvanized pipes; erosion of natural deposits; discharge from metal refineries; runoff from waste batteries and paints

14. Chromium	N		ppb	100	100	Discharge from steel and pulp mills; erosion of natural deposits
15. Copper	N		ppm	1.3	AL=1.3	Corrosion of household plumbing systems; erosion of natural deposits; leaching from wood preservatives
16. Cyanide	N		ppb	200	200	Discharge from steel/metal factories; discharge from plastic and fertilizer factories
17. Fluoride	N		ppm	4	4	Erosion of natural deposits; water additive which promotes strong teeth; discharge from fertilizer and aluminum factories
18. Lead	N		ppb	0	AL=15	Corrosion of household plumbing systems, erosion of natural deposits
19. Mercury (inorganic)	N		ppb	2	2	Erosion of natural deposits; discharge from refineries and factories; runoff from landfills; runoff from cropland
20. Nitrate (as Nitrogen)	N	ND	ppm	10	10	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits
21. Nitrite (as Nitrogen)	N		ppm	1	1	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits
22. Selenium	N		ppb	50	50	Discharge from petroleum and metal refineries; erosion of natural deposits; discharge from mines
23. Thallium	N		ppb	0.5	2	Leaching from ore-processing sites; discharge from electronics, glass, and drug factories
Synthetic Organic Contaminants including Pesticides and Herbicides						
24. 2,4-D	N	ND	ppb	70	70	Runoff from herbicide used on row crops
25. 2,4,5-TP (Silvex)	N	ND	ppb	50	50	Residue of banned herbicide
26. Acrylamide	N	ND		0	TT	Added to water during sewage/wastewater treatment
27. Alachlor	N	ND	ppb	0	2	Runoff from herbicide used on row crops
28. Atrazine	N	ND	ppb	3	3	Runoff from herbicide used on row crops
29. Benzo(a)pyrene (PAH)	N	ND	nanograms/l	0	200	Leaching from linings of water storage tanks and distribution lines
30. Carbofuran	N	ND	ppb	40	40	Leaching of soil fumigant used on rice and alfalfa
31. Chlordane	N	ND	ppb	0	2	Residue of banned termiticide
32. Dalapon	N	ND	ppb	200	200	Runoff from herbicide used on rights of way
33. Di(2-ethylhexyl) adipate	N	ND	ppb	400	400	Discharge from chemical factories
34. Di(2-ethylhexyl) phthalate	N	ND	ppb	0	6	Discharge from rubber and chemical factories
35. Dibromochloropropane	N	ND	nanograms/l	0	200	Runoff/leaching from soil fumigant used on soybeans, cotton, pineapples, and orchards
36. Dinoseb	N	ND	ppb	7	7	Runoff from herbicide used on soybeans and vegetables
37. Diquat	N	ND	ppb	20	20	Runoff from herbicide use

38. Dioxin [2,3,7,8-TCDD]	N	ND	picograms/l	0	30	Emissions from waste incineration and other combustion; discharge from chemical factories
39. Endothall	N	ND	ppb	100	100	Runoff from herbicide use
40. Endrin	N	ND	ppb	2	2	Residue of banned insecticide
41. Epichlorohydrin	N	ND		0	TT	Discharge from industrial chemical factories; an impurity of some water treatment chemicals
42. Ethylene dibromide	N	ND	nanograms/l	0	50	Discharge from petroleum refineries
43. Glyphosate	N	ND	ppb	700	700	Runoff from herbicide use
44. Heptachlor	N	ND	nanograms/1	0	400	Residue of banned termiticide
45. Heptachlor epoxide	N	ND	nanograms/1	0	200	Breakdown of heptachlor
46. Hexachlorobenzene	N	ND	ppb	0	1	Discharge from metal refineries and agricultural chemical factories
47. Hexachlorocyclo-pentadiene	N	ND	ppb	50	50	Discharge from chemical factories
48. Lindane	N	ND	nanograms/l	200	200	Runoff/leaching from insecticide used on cattle, lumber, gardens
49. Methoxychlor	N	ND	ppb	40	40	Runoff/leaching from insecticide used on fruits, vegetables, alfalfa, livestock
50. Oxamyl [Vydate]	N	ND	ppb	200	200	Runoff/leaching from insecticide used on apples, potatoes and tomatoes
51. PCBs [Polychlorinated biphenyls]	N	ND	nanograms/l	0	500	Runoff from landfills; discharge of waste chemicals
52. Pentachlorophenol	N	ND	ppb	0	1	Discharge from wood preserving factories
53. Picloram	N	ND	ppb	500	500	Herbicide runoff
54. Simazine	N	ND	ppb	4	4	Herbicide runoff
55. Toxaphene	N	ND	ppb	0	3	Runoff/leaching from insecticide used on cotton and cattle
Volatile Organic Contaminants						
56. Benzene	N	ND	ppb	0	5	Discharge from factories; leaching from gas storage tanks and landfills
57. Carbon tetrachloride	N	ND	ppb	0	5	Discharge from chemical plants and other industrial activities
58. Chlorobenzene	N	ND	ppb	100	100	Discharge from chemical and agricultural chemical factories
59. o-Dichlorobenzene	N	ND	ppb	600	600	Discharge from industrial chemical factories
60. p-Dichlorobenzene	N	ND	ppb	75	75	Discharge from industrial chemical factories
61. 1,2 - Dichloroethane	N	ND	ppb	0	5	Discharge from industrial chemical factories
62. 1,1 - Dichloroethylene	N	ND	ppb	7	7	Discharge from industrial chemical factories
63. cis-1,2-ichloroethylene	N	ND	ppb	70	70	Discharge from industrial chemical factories
64. trans - 1,2 - Dichloroethylene	N	ND	ppb	100	100	Discharge from industrial chemical factories
65. Dichloromethane	N	ND	ppb	0	5	Discharge from pharmaceutical and chemical factories
66. 1,2-	N	ND	ppb	0	5	Discharge from industrial chemical

Dichloropropane						factories
67. Ethylbenzene	N	ND	ppb	700	700	Discharge from petroleum refineries
68. Styrene	N	ND	ppb	100	100	Discharge from rubber and plastic factories; leaching from landfills
69. Tetrachloroethylene	N	ND	ppb	0	5	Leaching from PVC pipes; Discharge from factories and dry cleaners
70. 1,2,4 - Trichlorobenzene	N	ND	ppb	70	70	Discharge from textile-finishing factories
71. 1,1,1 - Trichloroethane	N	ND	ppb	200	200	Discharge from metal degreasing sites and other factories
72. 1,1,2 - Trichloroethane	N	ND	ppb	3	5	Discharge from industrial chemical factories
73. Trichloroethylene	N	ND	ppb	0	5	Discharge from metal degreasing sites and other factories
74. TTHM3 [Total trihalomethanes]	N	TTHM=.002 15 HAA5=ND	ppb	0	80 or 1003	By-product of drinking water chlorination
75. Toluene	N	ND	ppm	1	1	Discharge from petroleum factories
76. Vinyl Chloride	N	ND	ppb	0	2	Leaching from PVC piping; discharge from plastics factories
77. Xylenes	N	ND	ppm	10	10	Discharge from petroleum factories; discharge from chemical factories

Microbiological Contaminants:
(1) Total Coliform. Coliforms are bacteria that are naturally present in the environment and are used as an indicator *that other, potentially-harmful, bacteria may be present. Coliforms were found in more samples than allowed and this* was a warning of potential problems.
(2) Fecal coliform/E.Coli. Fecal coliforms and E. coli are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these wastes can cause short-term effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for infants, young children, and people with severely compromised immune systems.
(3) Turbidity. Turbidity has no health effects. However, turbidity can interfere with disinfection and provide a medium for microbial growth. Turbidity may indicate the presence of disease-causing organisms. These organisms include bacteria, viruses, and parasites that can cause symptoms such as nausea, cramps, diarrhea, and associated headaches.

Radioactive Contaminants:
(4) Beta/photon emitters. Certain minerals are radioactive and may emit forms of radiation known as photons and beta radiation. Some people who drink water containing beta and photon emitters in excess of the MCL over many years may have an increased risk of getting cancer.
(5) Alpha emitters. Certain minerals are radioactive and may emit a form of radiation known as alpha radiation. Some people who drink water containing alpha emitters in excess of the MCL over many years may have an increased risk of getting cancer.
(6) Combined Radium 226/228. Some people who drink water containing radium 226 or 228 in excess of the MCL over many years may have an increased risk of getting cancer.
(7) Uranium. Some people who drink water containing uranium in excess of the MCL over many years may have an increased risk of getting cancer and kidney toxicity.

Inorganic Contaminants:
(8) Antimony. Some people who drink water containing antimony well in excess of the MCL over many years could experience increases in blood cholesterol and decreases in blood sugar.
(9) Arsenic. Some people who drink water containing arsenic in excess of the MCL over many years could experience skin damage or problems with their circulatory system, and may have an increased risk of getting cancer.
(10) Asbestos. Some people who drink water containing asbestos in excess of the MCL over many years may have an increased risk of developing benign intestinal polyps.
(11) Barium. Some people who drink water containing barium in excess of the MCL over many years could experience an increase in their blood pressure.
(12) Beryllium. Some people who drink water containing beryllium well in excess of the MCL over many years could develop intestinal lesions.
(13) Cadmium. Some people who drink water containing cadmium in excess of the MCL over many years could experience kidney damage.
(14) Chromium. Some people who use water containing chromium well in excess of the MCL over many years could experience allergic dermatitis.
(15) Copper. Copper is an essential nutrient, but some people who drink water containing copper in excess of the action level over a relatively short amount of time could experience gastrointestinal distress. Some people who drink water containing copper in excess of the action level over many years could suffer liver or kidney damage. People with Wilson's Disease should consult their personal doctor.

(16) Cyanide. Some people who drink water containing cyanide well in excess of the MCL over many years could experience nerve damage or problems with their thyroid.
(17) Fluoride. Some people who drink water containing fluoride in excess of the MCL over many years could get bone disease, including pain and tenderness of the bones. Children may get mottled teeth.

(18) Lead. Infants and children who drink water containing lead in excess of the action level could experience delays in their physical or mental development. Children could show slight deficits in attention span and learning abilities. Adults who drink this water over many years could develop kidney problems or high blood pressure.

(19) Mercury (inorganic). Some people who drink water containing inorganic mercury well in excess of the MCL over many years could experience kidney damage.

(20) Nitrate. Infants below the age of six months who drink water containing nitrate in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue-baby syndrome.

(21) Nitrite. Infants below the age of six months who drink water containing nitrite in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue-baby syndrome.

(22) Selenium. Selenium is an essential nutrient. However, some people who drink water containing selenium in excess of the MCL over many years could experience hair or fingernail losses, numbness in fingers or toes, or problems with their circulation.

(23) Thallium. Some people who drink water containing thallium in excess of the MCL over many years could experience hair loss, changes in their blood, or problems with their kidneys, intestines, or liver.

Synthetic organic contaminants including pesticides and herbicides:
(24) 2,4-D. Some people who drink water containing the weed killer 2,4-D well in excess of the MCL over many years could experience problems with their kidneys, liver, or adrenal glands.
(25) 2,4,5-TP (Silvex). Some people who drink water containing silvex in excess of the MCL over many years could experience liver problems.
(26) Acrylamide. Some people who drink water containing high levels of acrylamide over a long period of time could have problems with their nervous system or blood, and may have an increased risk of getting cancer.
(27) Alachlor. Some people who drink water containing alachlor in excess of the MCL over many years could have problems with their eyes, liver, kidneys, or spleen, or experience anemia, and may have an increased risk of getting cancer.
(28) Atrazine. Some people who drink water containing atrazine well in excess of the MCL over many years could experience problems with their cardiovascular system or reproductive difficulties.
(29) Benzo(a)pyrene [PAH]. Some people who drink water containing benzo(a)pyrene in excess of the MCL over many years may experience reproductive difficulties and may have an increased risk of getting cancer.
(30) Carbofuran. Some people who drink water containing carbofuran in excess of the MCL over many years could experience problems with their blood, or nervous or reproductive systems.
(31) Chlordane. Some people who drink water containing chlordane in excess of the MCL over many years could experience problems with their liver or nervous system, and may have an increased risk of getting cancer.
(32) Dalapon. Some people who drink water containing dalapon well in excess of the MCL over many years could experience minor kidney changes.
(33) Di (2-ethylhexyl) adipate. Some people who drink water containing di (2-ethylhexyl) adipate well in excess of the MCL over many years could experience general toxic effects or reproductive difficulties.
(34) Di (2-ethylhexyl) phthalate. Some people who drink water containing di (2-ethylhexyl) phthalate in excess of the MCL over many years may have problems with their liver, or experience reproductive difficulties, and may have an increased risk of getting cancer.
(35) Dibromochloropropane (DBCP). Some people who drink water containing DBCP in excess of the MCL over many years could experience reproductive difficulties and may have an increased risk of getting cancer.
(36) Dinoseb. Some people who drink water containing dinoseb well in excess of the MCL over many years could experience reproductive difficulties.
(37) Dioxin (2,3,7,8-TCDD). Some people who drink water containing dioxin in excess of the MCL over many years could experience reproductive difficulties and may have an increased risk of getting cancer.
(38) Diquat. Some people who drink water containing diquat in excess of the MCL over many years could get cataracts.
(39) Endothall. Some people who drink water containing endothall in excess of the MCL over many years could experience problems with their stomach or intestines.
(40) Endrin. Some people who drink water containing endrin in excess of the MCL over many years could experience liver problems.
(41) Epichlorohydrin. Some people who drink water containing high levels of epichlorohydrin over a long period of time could experience stomach problems, and may have an increased risk of getting cancer.
(42) Ethylene dibromide. Some people who drink water containing ethylene dibromide in excess of the MCL over many years could experience problems with their liver, stomach, reproductive system, or kidneys, and may have an increased risk of getting cancer.
(43) Glyphosate. Some people who drink water containing glyphosate in excess of the MCL over many years could experience problems with their kidneys or reproductive difficulties.
(44) Heptachlor. Some people who drink water containing heptachlor in excess of the MCL over many years could experience liver damage and may have an increased risk of getting cancer.
(45) Heptachlor epoxide. Some people who drink water containing heptachlor epoxide in excess of the MCL over many years could experience liver damage, and may have an increased risk of getting cancer.
(46) Hexachlorobenzene. Some people who drink water containing hexachlorobenzene in excess of the MCL over many years could experience problems with their liver or kidneys, or adverse reproductive effects, and may have an increased risk of getting cancer.

(47) Hexachlorocyclopentadiene. Some people who drink water containing hexachlorocyclopentadiene well in excess of the MCL over many years could experience problems with their kidneys or stomach.
(48) Lindane. Some people who drink water containing lindane in excess of the MCL over many years could experience problems with their kidneys or liver.
(49) Methoxychlor. Some people who drink water containing methoxychlor in excess of the MCL over many years could experience reproductive difficulties.
(50) Oxamyl [Vydate]. Some people who drink water containing oxamyl in excess of the MCL over many years could experience slight nervous system effects.
(51) PCBs [Polychlorinated biphenyls]. Some people who drink water containing PCBs in excess of the MCL over many years could experience changes in their skin, problems with their thymus gland, immune deficiencies, or reproductive or nervous system difficulties, and may have an increased risk of getting cancer.
(52) Pentachlorophenol. Some people who drink water containing pentachlorophenol in excess of the MCL over many years could experience problems with their liver or kidneys, and may have an increased risk of getting cancer.
(53) Picloram. Some people who drink water containing picloram in excess of the MCL over many years could experience problems with their liver.

(54) Simazine. Some people who drink water containing simazine in excess of the MCL over many years could experience problems with their blood.

(55) Toxaphene. Some people who drink water containing toxaphene in excess of the MCL over many years could have problems with their kidneys, liver, or thyroid, and may have an increased risk of getting cancer.

Volatile Organic Contaminants:
(56) Benzene. Some people who drink water containing benzene in excess of the MCL over many years could experience anemia or a decrease in blood platelets, and may have an increased risk of getting cancer.
(57) Carbon Tetrachloride. Some people who drink water containing carbon tetrachloride in excess of the MCL over many years could experience problems with their liver and may have an increased risk of getting cancer.
(58) Chlorobenzene. Some people who drink water containing chlorobenzene in excess of the MCL over many years could experience problems with their liver or kidneys.
(59) o-Dichlorobenzene. Some people who drink water containing o-dichlorobenzene well in excess of the MCL over many years could experience problems with their liver, kidneys, or circulatory systems.
(60) p-Dichlorobenzene. Some people who drink water containing p-dichlorobenzene in excess of the MCL over many years could experience anemia, damage to their liver, kidneys, or spleen, or changes in their blood.
(61) 1,2-Dichloroethane. Some people who drink water containing 1,2-dichloroethane in excess of the MCL over many years may have an increased risk of getting cancer.
(62)1,1-Dichloroethylene. Some people who drink water containing 1,1-dichloroethylene in excess of the MCL over many years could experience problems with their liver.
(63) cis-1,2-Dichloroethylene. Some people who drink water containing cis-1,2-dichloroethylene in excess of the MCL over many years could experience problems with their liver.
(64) trans-1,2-Dicholoroethylene. Some people who drink water containing trans-1,2-dichloroethylene well in excess of the MCL over many years could experience problems with their liver.
(65) Dichloromethane. Some people who drink water containing dichloromethane in excess of the MCL over many years could have liver problems and may have an increased risk of getting cancer.
(66) 1,2-Dichloropropane. Some people who drink water containing 1,2-dichloropropane in excess of the MCL over many years may have an increased risk of getting cancer.
(67) Ethylbenzene. Some people who drink water containing ethylbenzene well in excess of the MCL over many years could experience problems with their liver or kidneys.
(68) Styrene. Some people who drink water containing styrene well in excess of the MCL over many years could have problems with their liver, kidneys, or circulatory system.
(69) Tetrachloroethylene. Some people who drink water containing tetrachloroethylene in excess of the MCL over many years could have problems with their liver, and may have an increased risk of getting cancer.
(70) 1,2,4-Trichlorobenzene. Some people who drink water containing 1,2,4-trichlorobenzene well in excess of the MCL over many years could experience changes in their adrenal glands.
(71) 1,1,1,-Trichloroethane. Some people who drink water containing 1,1,1-trichloroethane in excess of the MCL over many years could experience problems with their liver, nervous system, or circulatory system.
(72) 1,1,2-Trichloroethane. Some people who drink water containing 1,1,2-trichloroethane well in excess of the MCL over many years could have problems with their liver, kidneys, or immune systems.
(73) Trichloroethylene. Some people who drink water containing trichloroethylene in excess of the MCL over many years could experience problems with their liver and may have an increased risk of getting cancer.
(74) TTHMs [Total Trihalomethanes]. Some people who drink water containing trihalomethanes in excess of the MCL over many years may experience problems with their liver, kidneys, or central nervous systems, and may have an increased risk of getting cancer.
(75) Toluene. Some people who drink water containing toluene well in excess of the MCL over many years could have problems with their nervous system, kidneys, or liver.
(76) Vinyl Chloride. Some people who drink water containing vinyl chloride in excess of the MCL over many years may have an increased risk of getting cancer.
(77) Xylenes. Some people who drink water containing xylenes in excess of the MCL over many years could experience damage to their nervous system.

What does this mean?

All sources of drinking water are subject to potential contamination by substances that are naturally occurring or man-made. These substances can be microbes, inorganic or organic chemicals and radioactive substances. All drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that the water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the Environmental Protection Agency's Safe Drinking Water Hotline at 1-800-426-4791.

"If present, elevated levels of Lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. The City of Echo Water System is responsible for providing high quality of drinking water, but cannot control the variety of components used in plumbing .components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on Lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline, or at http://www.epa.gov//safewater/lead."

APPENDIX E
Public Education Materials

Saving Water inside the home

We can all do our part to lessen the effects of limited water supplies this summer. We can start by conserving the water we use today. Here you will find helpful and common tips for saving water inside your home.

☑ Monitor your water bill

Checking your water bill for unusually high water use can alert you to leaks in your home. Knowing how much water your household typically uses make this easier to determine. If your water use seems high, first determine if the increase is due to changes in your daily routine. If not, you may have a leak.

☑ Periodically test and check for water leaks

If it's easy to find, check your water meter before and after a two-hour period when no water is being used. If the meter does not read exactly the same, you probably have a leak. Common household leaks include: running toilets, dripping faucets, and other leaking valves. If leaks are found, repairing them in a timely manner will not only conserve water, but will save you money by reducing your water bill.

Toilet leaks are often easy to detect. One way to check is to remove the tank lid, then drop 1 dye tablet or 10 drops of food coloring into the tank. (*Dye tablets may be available from your local water provider.*) Put the lid back on the toilet tank and come back in 10 to 15 minutes. If the water in the bowl has changed color, you have a leak. If the water hasn't turned a color, everything is okay.

Grabbing a wrench to repair a leaky faucet is simple, inexpensive, and can save up to 140 gallons of water per week. These types of leaks are often caused by faulty washers that don't allow your faucet to shut off properly. Faulty washers can be replaced fairly easily and inexpensively (*typically for less than $1*), which can help you save water and reduce your water bill.

☑ Wash only full loads

The average American household uses about 23 percent of its water running the clothes washer and dishwasher. Just one partially full load can waste 5 – 10 gallons of water.

☑ Wash fruits and vegetables in a pan of water

Avoid continually running water to clean those fruits and veggies. You can also save water by composting your food, instead of running it down the garbage disposal. You'll save water every time.

☑ Defrost food in the fridge

Rather than using running water to thaw food, for water efficiency as well as food safety, defrost food in the refrigerator.

☑ Keep drinking water in the fridge, re-purpose those ice cubes

Instead of running the tap until the water turns cold, keep a pitcher on hand in the fridge. This way, every drop of water goes down you and not the drain. For those ice cubes that hit the floor instead of your glass, don't toss them. Instead, drop them in a house plant.

☑ Turn off the water faucet while brushing your teeth

Doing so will save up to 4 gallons per minute. That's up to 200 gallons a week for a family of four.

☑ Plug the sink on purpose

When shaving, plug the sink instead of running the water to rinse your razor and save up to 300 gallons per month.

☑ Flush only when necessary

Don't use the toilet to flush tissues. Drop tissues in the trash instead of flushing them.

☑ Shorten your shower

Trimming a minute or two off your normal shower time can save up to 150 gallons per month. Keeping the shower time to less than 5 minutes can save the average household up to 1,000 gallons per month. Turning the water off while washing your hair can save up to 150 gallons a month.

☑ Retrofit old showerheads, faucets, and aerators

You can save up to 40 percent of the water used for showering by replacing an older showerhead with a water efficient model. Look for WaterSense® models, which use less than 2 gallons per minute. Your local water provider may offer water conservation kits that often include a water-efficient showerhead and other water-reducing devices. Replacing old, inefficient faucets and aerators with WaterSense® labeled models can save the average family 700 gallons of water each year, equivalent to 40 showers. Some water suppliers offer indoor water conservation kits that include water-efficient faucet aerators.

☑ Replace that old toilet

By replacing old, inefficient toilets with more water-efficient WaterSense® labeled models, the average family can reduce water used for toilets by 20 to 60 percent – or close to 13,000 gallons of water conserved every year! That's a savings of more than $110 per year in water costs, and $2,200 over the lifetime of the toilet. Many municipal water providers offer a rebate for replacing an old toilet with one that uses no more than 1.6 gallons per flush.

☑ Consider a dual-flush toilet

It has two flush options: a half-flush for liquid waste and a full-flush for solid waste. A standard water-efficient toilet uses approximately 1.6 gallons per flush, which is about the amount of water a dual-flush toilet uses for the solid waste option. The half-flush option for liquid waste only uses about 0.9 gallon per flush. An average family of four can save approximately 7,000 gallons per year by switching to a dual-flush toilet.

☑ Determine how much water you use

Access the Alliance for Water Efficiency's water calculator to get an estimate of how much water your household uses. The calculator also compares your estimated water usage to an average home and a highly efficient home. Visit http://www.home-water-works.org/calculator.

Photo Credit: R. Nial Bradshaw, Creative Commons

Saving Water outside the home

We can all do our part to lessen the effects of limited water supplies this summer. We can start by conserving the water we use today. Here you will find helpful and common tips for saving water outside your home.

☑ Adjust sprinklers & water when it's cool

Sprinklers should water your lawn and garden, not the street or sidewalk. Most automatic irrigation timers are set to go off in the early morning (5:00 am – 7:00 am); therefore, utilities must often super-size their facilities to meet early morning demands. Setting irrigation timers at other times of the morning or night (11:00 pm – 5:00 am), when temperatures are cooler, helps minimize evaporation and shave peak water usage.

☑ Inspect your irrigation system

Look for leaks, broken lines, or blockage in the lines. A well maintained system will save you money, time, and water. Even little things like a shut-off nozzle for your garden hose can save you about 5 – 7 gallons each minute.

☑ Water established lawns about 1 inch per week

You may need slightly more during hot, dry weather. Some water providers will use a "*weekly watering number*" that is based on local weather conditions to help customers determine exactly how much water their gardens and landscapes need each week.

☑ Adjust your watering schedule

Whether you have a manual or automatic system, be sure to adjust your watering schedule throughout the irrigation season. Adjusting the amount of water used to match weather conditions (watering more when it is hot and dry, less when it is cooler and wet) helps you water your landscape more efficiently.

☑ Apply the amount of water your soil can absorb

Water thoroughly, but infrequently. If runoff or puddling occurs, break longer watering sessions into several short sessions allowing water to soak into the soil between each session.

☑ Consider using water-saving technology

Weather-based irrigation controllers, which act as a thermostat for your sprinkler system, use local weather data to determine when and how much water to use. Soil moisture sensors water plants based on their needs by measuring the amount of moisture in the soil and tailoring the irrigation schedule accordingly. Rainfall shutoff devices and rain sensors help decrease water wasted in the landscape by turning off the irrigation system when it is raining.

☑ Adjust your mower to a higher setting

A taller lawn provides shade to the roots and helps retain soil moisture, so your lawn needs less water.

☑ Aerate your soil

Soil can become compacted during home construction or from normal foot traffic. Aerating your soil with a simple lawn aerator can increase the infiltration of water into the ground, improving water flow to the root zone and reducing water runoff.

☑ Replace lawns

Consider replacing some lawn areas with low water use plants and ornamental grasses. They are easier to maintain than turf, don't need as much water, and look beautiful. Seek out native plants that are appropriate to your local climate and soil conditions. Once established, these plants require little water beyond normal rainfall, are very low maintenance, require little to no pesticides or fertilizer, and are more resistant to pests and diseases than are other species.

☑ Use mulch around shrubs & garden plants

Doing so helps reduce evaporation, inhibit weed growth, moderate soil temperature, and prevent erosion. Types of mulch include bark chips, grass clippings, straw, leaves, stones, and brick chips. Leave a few inches of space between trunks of woody plants and organic mulches to prevent rot.

☑ Group plants together

Creating a garden with "watering zones" allows you to give each plant the water it requires – not too much, not too little.

☑ Minimize or eliminate fertilizer

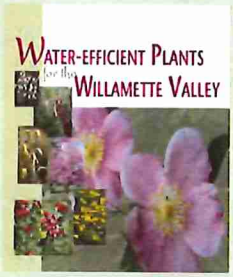
Fertilizer encourages thirsty new growth, causing your landscape to require additional water. Minimize or eliminate the use of fertilizer where possible. If you do need fertilizer, look for a product that contains "natural organic" or "slow-release" ingredients. These fertilizers feed plants slowly and evenly, helping to create healthier plants with strong root systems and no excessive "top growth." Moreover, using "slow-release" fertilizers can reduce nutrient run-off into ground and surface waters, protecting natural resources.

☑ Use a broom and a bucket

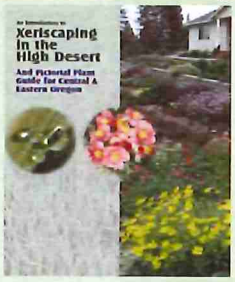
Sweep patios, sidewalks and driveways clean with a broom, instead of using a hose. Instead of using a running hose, fill a bucket with water to wash your car. A hose equipped with a shut-off nozzle would also work.

Helpful Landscaping Guides

Western Oregon



Central & Eastern Oregon



Southern Oregon

APPENDIX F
Local Jurisdiction Comments

(Forthcoming)