City of

Burns, Oregon

WATER SYSTEM MASTER PLAN

2021

anderson perry & associates, inc.

engineering · surveying · natural resources

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WATER SYSTEM MASTER PLAN

FOR

CITY OF BURNS, OREGON

2021

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ANDERSON PERRY & ASSOCIATES, INC.

La Grande, Redmond, and Hermiston, Oregon
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Job No. 308-36

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Executive Summary

Introduction

This Executive Summary briefly summarizes the results of the Water System Master Plan (WSMP) prepared by Anderson Perry & Associates, Inc., for the City of Burns, Oregon. The recommendations outlined hereafter have been developed in cooperation with the Burns City Council and City staff. The focus of this WSMP has been on the overall water system, including the water supply, storage, and distribution systems. This WSMP includes an analysis of the existing system and its performance, evaluation of system needs, and development of a financial plan and project implementation plan. Included in this Executive Summary is a brief discussion of the existing water system, the water system improvements selected by the City Council, the current financial status of the Water Department, and a preliminary project implementation plan. For a more detailed discussion of the information presented in this Executive Summary, please refer to the individual chapters of this WSMP.

Service Population and Planning Period

For the purpose of this WSMP, the current population of 2,835, as estimated by the Portland State University Population Research Center, will be utilized. The population forecast estimated an average annual growth of 0.0 percent per year for the 20-year planning period between 2021 and 2041. To be conservative, the Burns City Council elected to use an annual growth rate of 0.5 percent per year for the 20-year planning period. This population forecast results in an increase from the certified 2020 population of 2,835 to a population of 3,132 in 2041.

Summary of Supply, Storage, and Distribution System Evaluation and Needs

Supply

The current capacity of the City's five groundwater wells is approximately 4,720 gallons per minute (gpm) or 3,540 gpm if the wells are operated 18 hours per day, as recommended in this WSMP. This capacity is anticipated to exceed the City's peak daily supply demands for the 20-year planning period. Due to the City having adequate water for the 20-year planning period, no additional water supply is needed at this time. The only recommended improvements related to the City's water supply system currently are an additional backup motor generator and well transducers to monitor water levels in the City's wells.

Storage

The needed storage for the 20-year planning period is approximately 2.2 million gallons (MG). The City currently has one operating storage reservoir, the 2.0 MG glass-fused-to-steel bolted reservoir. Based on the water storage demands over the 20-year planning period, this results in a storage deficit of approximately 170,000 gallons. As discussed later in this WSMP, the 2041 storage requirements of approximately 2.2 MG would be under extreme circumstances. The 2.0 MG reservoir is in good condition. At this time, no water storage improvements are proposed. It is recommended that the 2.0 MG reservoir be maintained and inspected regularly.

Distribution

Throughout the City's distribution system, several areas cannot currently provide adequate fire flows. Undersized, dead-end, and old distribution system piping within the City has led to low fire flow capacity and issues with water circulation in these areas. Therefore, some areas need improvement, namely areas with undersized main lines and dead-end lines. In addition to some of the distribution piping not providing adequate fire flows, a few gaps in the City's fire hydrant distribution should be addressed. The City also has existing fire hydrants that should be replaced due to age.

Further discussion related to the City's existing water supply, storage, and distribution systems can be found in Chapters 3, 4, and 5 of this WSMP.

Selected Water System Improvements

The selected water system improvements discussed in this WSMP are briefly summarized hereafter. The selected improvements summarized below address the City's needs for improved distribution system reliability, increased fire flows, and other miscellaneous water system improvements.

Water Supply Improvements

The City of Burns is currently served by five primary groundwater wells (Wells No. 1, 2, 3, 4, and 5) to meet system demands. Because the City's five groundwater wells exceed the supply demands over the 20-year planning period, no additional water supply is recommended at this time. The selected supply improvements include upgrades to the existing system, which include an additional backup mobile generator and well transducers to monitor water levels in the City's wells.

Water Storage Improvements

The City's existing water storage reservoir meets the City's immediate operating, equalization, fire reserve, and emergency reserve storage needs, as presented in Chapter 4. The existing water storage capacity is slightly less than the projected storage capacity required at the end of the 20-year planning period; however, it is acknowledged that these storage demands would be under extreme circumstances. The City has also elected to use a conservative population projection. Also, as discussed further in the WSMP, the City of Burns shares a connection to the City of Hines' water system. In effect, this provides additional "storage capacity" to the City of Burns in the case of an emergency. At this time, no water storage improvements are proposed. The City should continue to maintain and inspect the 2.0 MG reservoir and should consider increasing water circulation as outlined in Chapter 4 to promote reservoir water quality.

Water Distribution System Improvements

Several areas in the distribution system cannot provide adequate fire flows and some areas have undersized main lines and dead-end lines. New lines are needed to provide enhanced looping and circulation capabilities. Recommended water distribution system improvements are identified on Figure 5-3 in Chapter 5. These undersized main lines and dead-end lines are recommended to be replaced and new main lines and fire hydrants installed as part of an improvements project.

Summary of Estimated Costs for Selected Improvements

The year 2021 estimated costs for the selected water system improvements are outlined below. The total estimated project cost includes construction, administrative, legal, engineering, and contingencies together with other project costs.

Estimated Distribution System Construction Costs		
Supply System Improvements	$	277,000
Existing Distribution System Improvements		4,749,000
Other Estimated Project Costs		2,320,000
Total Estimated Project Cost (2021 Dollars)	**$**	**7,346,000**

Current Financial Status

The annual cost of operating and maintaining the Burns water system is summarized on Figure 7-1 in Chapter 7. A graphical plot of the City of Burns' water system budget, showing total revenue and total expenditures, is provided on Chart 7-1. The total expenditures from fiscal year 2020 were inflated at 5 percent per year as shown on Chart 7-1. The chart indicates that expenditures will likely increase to $414,000 in the budget year 2023-24. This trend in expenditure increases will likely continue and will need to be reflected in future budgeting. It is recommended the City continue allocating funds to the Water Reserve Fund to cover future maintenance and replacement costs of equipment and facilities. Pump replacement, water meter repairs, reservoir repairs, etc., are all items that periodically require funds to maintain a healthy water system.

A major financial commitment will be required by the City to implement part or all of the selected water system improvements outlined in this WSMP. An increase in water rates will also be required to fund part or all of the selected system improvements. Based on the anticipated future Water Department operation, maintenance, and replacement cost and potential debt capacity needed to fund improvements, as presented in Chapter 7, the City should anticipate an average monthly water rate increase per connection of $15 to $20 per month, depending on available funding options to complete all of the selected system improvements.

Proposed Improvement Implementation Plan

Should the City wish to proceed with the identified water system improvements, the following implementation plan outlines the key steps the City would need to undertake. It is important to note that it usually takes approximately two to three years, at a minimum, from the date a city decides to proceed with an improvements project until the project is completed and serving the community. The following implementation plan begins in September 2021 and assumes a three-year implementation schedule. It should be noted that these implementation steps, as presented on Table ES-1, may be different if the City elects to delay the project and pursue improvements in the future.

TABLE ES-1
IMPLEMENTATION PLAN AND SCHEDULE

	Item	Completion Date
1.	Initiate funding discussions with Business Oregon and Rural Development. Hold a "One Stop" meeting with agencies.	September 2021
2.	Work with Business Oregon to submit a Project Notification and Intake Form (if Business Oregon funding is identified as a potential source of funds).	Fall 2021
3.	Conduct a public outreach and education program.	Winter 2021
4.	Submit funding application(s) to agencies.	Winter 2021
5.	Finalize project funding.	Spring 2022
6.	Design system improvements.	Summer 2022 to Summer 2023
7.	Complete Environmental and Cultural Resource Reports and permitting.	Summer 2022 to Summer 2023
8.	Bid and award construction contract.	Fall 2023
9.*	Construct system improvements.	Summer 2023 to Fall 2024
10.	Close out project.	Winter 2024

**Additional construction time may be needed for inclement weather.*

The key to implementing the City of Burns' water system improvements is the City's ability to acquire funding that will allow water rates to remain as low as possible. The City should work closely with its citizens through public meetings to inform them of the system needs and the necessity for increased water user costs. Overall, the proposed water system improvements will provide a much improved and more reliable water system that should serve the City of Burns for many years.

Chapter 1 - Introduction

Purpose of the Study

This Water System Master Plan (WSMP) represents the results of an evaluation of the City of Burns' municipal water system. The City's previous WSMP was prepared in 1998 by M.A. Palmer & Sons, of Burns, Oregon. Per Oregon Revised Statutes, a water system serving 300 connections or more is required to have a current WSMP. Therefore, funding for an updated and current WSMP was secured during spring 2018 through a Technical Assistance Grant administered by Business Oregon. As Engineer of Record for the City of Burns, Anderson Perry & Associates, Inc., was designated to prepare this WSMP, and a Work Order was executed on June 15, 2018, authorizing the work.

This WSMP is intended to satisfy the criteria of the Oregon Health Authority - Drinking Water Services and Oregon Administrative Rules 333-061-0060. This WSMP addresses the needs and design criteria for a 20-year planning period; evaluates the adequacy of the existing water source, storage, and distribution systems; and develops a financial plan for implementing the recommended improvements.

Organization of the Study

This WSMP is divided into seven main chapters with an Executive Summary. Specifically, the WSMP includes the following:

1. An Executive Summary of the overall WSMP that describes present water system deficiencies, the selected improvements for achieving service goals and correcting deficiencies, and the recommended implementation schedule for constructing improvements.

2. Chapter 1, Introduction, discusses the objectives of the WSMP, describes the community and environment, and provides a brief history of the past development and operation of the City's water system.

3. Chapter 2, Water System Requirements, develops the data upon which the system is evaluated and any recommended improvements to the system are based. Data regarding elements such as service area, population, land use, water use, fire flows, and state and federal regulations are presented. A description of the water quality and level of service goals (design criteria) for the water system considering existing and anticipated future regulatory requirements, non-regulatory water quality needs of water users, flow and pressure requirements, capacity needs related to water use, and fire flow needs is also provided. These data, goals, and requirements are summarized in the design criteria presented in this chapter.

4. Chapter 3, Water Supply, discusses the operation, capacity, and quality of the existing water supply system with respect to existing and future system demands. Information concerning water rights for the appropriation of water from the City's sources is presented.

5. Chapter 4, Water Storage, discusses the existing storage reservoirs and presents the four primary components of water storage relative to the City's design criteria.

6. Chapter 5, Distribution System, evaluates the existing distribution system facilities, water quality testing results that may be related to the distribution system, the overall circulation of water through the distribution system, and examines fire flow capabilities. Existing deficiencies and deficiencies likely to develop during the 20-year planning period are also identified. Recommendations regarding improvements to the distribution system are included.

7. Chapter 6, Selected Water System Improvements, presents a summary of the water supply, storage, and distribution system improvements as developed in Chapters 3, 4, and 5 of this WSMP that were selected for implementation by the City. Cost estimates are developed for each recommended water system improvement.

8. Chapter 7, Project Financing and Implementation, provides a description of alternatives to finance water system improvements, which include user rates, taxes, local financing, and financing assistance programs. Operation, maintenance, and replacement costs are projected for both the existing system and future system improvements. Potential water rate needs are developed, and rate implementation procedures are identified. A recommended water system improvements implementation process, including an evaluation of financing alternatives and identification of key implementation steps, is also provided.

9. The appendices contain copies of the water system information referenced in this WSMP that are the basis for this WSMP. The appendices are also provided as a reference for City staff. This information includes well logs and water rights information, water quality test results, applicable City ordinances, and other applicable water system information.

Sources of Information

The conclusions and recommendations outlined in this WSMP are based on data, information, and records provided by the City. This information includes, but is not limited to, distribution system layout, past flow records (supply and usage), financial data (operational cost, revenues, and cost distribution), and a description of the system operation, condition of system components, problem areas, etc. Therefore, the recommendations and conclusions are dependent, in part, on the completeness and accuracy of the information provided.

Periodic Water System Master Plan Review

This WSMP should be periodically reviewed and updated to stay current with population growth, water system demands, and changing state and federal regulations. It is recommended this WSMP be reviewed at five-year intervals and updated at ten-year intervals, or as growth and conditions dictate.

Objectives of the Water System Master Plan

1. Outline the status of the existing water system and describe its current operation and system deficiencies.

2. Establish planning criteria including service area boundaries; population growth projections; past, present, and future water usage patterns; fire flow requirements; federal and state standards; system pressures; and service goals.

3. Analyze the individual components of the existing water supply system considering capacity, compliance with current water quality standards, water rights, condition of components, and operational dependability. Develop the water supply needs for the 20-year planning period, and identify cost-effective alternatives for meeting long-term water supply needs, including alternatives for correcting existing system deficiencies, as necessary.

4. Analyze the existing water storage facilities considering capacity, condition of reservoirs, and distribution system pressures. Assess the City's storage capacity considering emergency, operating, equalization, and fire reserve storage. Identify the water system's storage requirements for the 20-year planning period.

5. Develop a GIS-based map of the distribution system, including line sizes and hydrant locations, to a reasonable degree of accuracy and certainty.

6. Using a computer model, analyze the hydraulic capacity and system pressures in the existing water distribution system under average daily and peak daily demand conditions. Identify distribution system deficiencies such as low system pressures, low fire flow capacities, dead-end or undersized lines, etc. Identify opportunities for distribution system improvements to address any noted deficiencies.

7. Review the status of the existing Water Department financial condition considering historical water system revenues, operation and maintenance (O&M) costs, and debt service, including the adequacy of existing water user fees. Project the future cost of O&M, capital improvement investments, and debt service for the water system. Develop a finance plan for meeting system needs, including general user rate charges and outside financial assistance.

8. Provide information regarding potential state and federal grant and loan programs that may be available to assist the City in implementing any needed system improvements.

9. Prepare a summary identifying current and future water system needs with their associated estimated costs. Provide recommendations for meeting the water system's needs for the 20-year planning period.

10. Provide an implementation schedule for recommended water system improvements, outlining the key steps the City would need to take to implement the improvements.

Regional Setting

The City of Burns is located in the northern portion of Harney County, adjacent to and north of the City of Hines in the Harney Basin. The basin is an old, dry lakebed, nearly flat, and the Silvies River crosses it from a northerly direction. The basin lies at the northern edge of the Great Basin in southeastern Oregon. The Silvies River, flowing from the north, and the Donner und Blitzen River, flowing from the south, form the waters of Malheur and Harney Lakes and the wetlands of the Malheur National Wildlife Refuge.

Harney Basin near Burns, Oregon.

According to the 2010 Census, Harney County is the largest county in the state with an area of 10,133 square miles. The population is estimated to be 7,360 according to the Portland State University Population Research Center. Harney County is the most sparsely populated county in the state, with a population density of 0.7 people per square mile according to the 2010 Census. The City of Burns is located at approximately 4,147 feet above mean sea level (MSL). Steens Mountain to the south and east is at an elevation of nearly 10,000 feet above MSL.

The climate in the summer is typically dry with clear days. Winter brings snow and frozen soils. According to the Western Regional Climate Center, temperatures vary from an average minimum of 30˚ Fahrenheit (F) to an average maximum of 60˚F throughout the year. The average annual precipitation in Burns is approximately 11 inches.

The communities of Burns and Hines are intersected by Highway 395, which provides north/south access, Highway 20 with east/west access, and Highway 78 with access to and from the south and east.

According to the Oregon Employment Department, Harney County's economy consists mainly of forest products, agriculture, and ranching. Government employment makes up a sizable portion of the workforce and economy, with 40 percent of the workforce employed by federal, state, and local governments.

Study Area

The study area consists of the incorporated city limits and land within the urban growth boundary (UGB). Population projections herein are based on growth within the UGB. This WSMP focuses mainly on serving the areas within the existing city limits. Location and vicinity maps, as well as the study area, are shown on Figure 1-1 at the end of this chapter.

Soils

The soils throughout Burns are generally cobbly loams and silt loams. The major types are Fury silt loam, Widowspring silt loam, and Ninemile-Reluctan-Rubble land complex. These soils have slopes between 0 and 2 percent with the exception of Ninemile-Reluctan-Rubble land complex, which has slopes between 2 and 30 percent. The soils are classified as Farmland of Statewide Importance. For a more detailed description of soil groups and types in and around the City of Burns, refer to the "Soil Survey of Harney County Area, Oregon," completed by the Natural Resources Conservation Service.

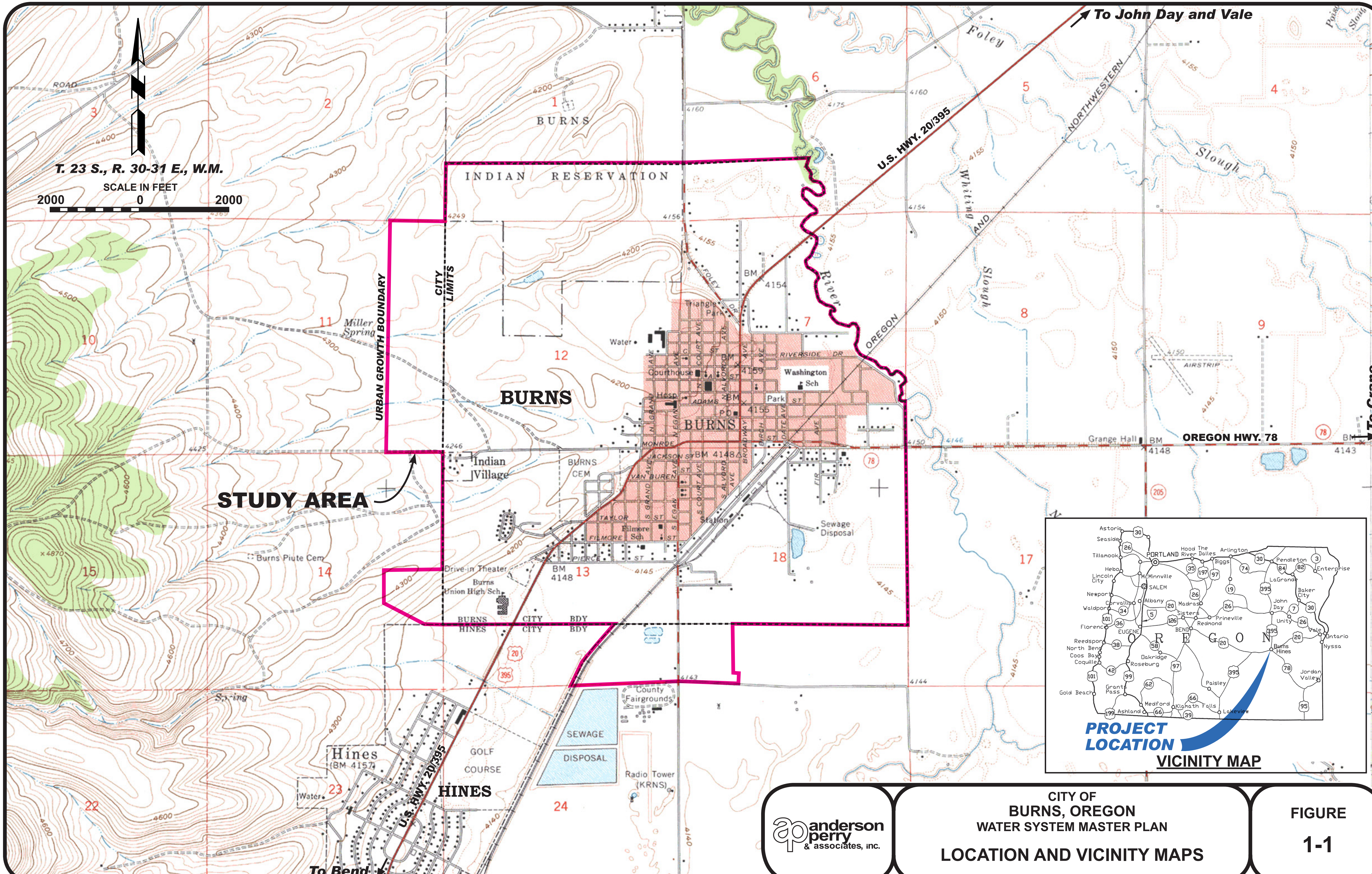
Water System History

According to the City's website, the City was named after the Scottish poet Robert Burns. The City was established in January 1884 and incorporated in 1889. The water system in use today was constructed around 1929 to 1930 with additional wells added in 1959, 1974, and 1977.

Wells No. 1 and 2 were constructed in 1930, in conjunction with the completion of the original 100,000-gallon steel elevated reservoir. Wells No. 1 and 2 are located west of N. Harney Avenue. Well No. 3 was constructed in 1959 and is located along N. Grand Avenue. Well No. 4 was constructed in 1974 and is located near S. Alvord Avenue. Well No. 5 was constructed in 1977 and is located behind Burns High School along Saginaw Avenue N.

The original storage system consisted of a 100,000-gallon elevated steel reservoir. The 100,000-gallon reservoir was constructed in the late 1920s on the hill west of Henry L. Slater Elementary School. Use of this reservoir has been discontinued, as it does not have adequate storage capacity and its elevation does not allow for sufficient pressure in the upper areas of the system. In 2002, a new 2.0 million gallon (MG) glass-fused-to-steel bolted reservoir was constructed. The reservoir is approximately 100 feet in diameter and 36 feet tall. This new 2.0 MG reservoir is located west of the City of Burns along W. Monroe Street and is the City's only source of storage.

The original distribution system was constructed of steel pipe ranging in size from 4 to 12 inches in diameter. In recent years, the City has been removing the steel pipe and replacing it with polyvinyl chloride pipe when leaks occur. As part of the 2002 Water System Improvements project, distribution system improvements were made to create two separate pressure zones. These improvements included piping modifications as well as the installation of seven pressure reducing valves. The locations of the primary components of the water system are shown on Figure 1-2.



CITY OF
BURNS, OREGON
WATER SYSTEM MASTER PLAN
LOCATION AND VICINITY MAPS

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FIGURE 1-1

Job# 308-36-020 Jun. 21, 2018 lbauer

LEGEND

- RESERVOIR
- WELL
- BOOSTER PUMP STATION
- BURNS CITY LIMITS
- HINES CITY LIMITS
- BURNS URBAN GROWTH BOUNDARY

WELL NO. 1 AND WELL NO. 2

ELEVATED RESERVOIR (NOT IN USE)

WELL NO. 3

2,000,000 GALLON GLASS-FUSED-TO-STEEL BOLTED RESERVOIR

FAIRVIEW HEIGHTS BOOSTER PUMP STATION

WELL NO. 5

WELL NO. 4

1,500 0 1,500

SCALE IN FEET

NOTE

WATER DISTRIBUTION SYSTEM NOT SHOWN. REFER TO CHAPTER 5 FOR A COMPREHENSIVE DISCUSSION AND EVALUATION OF THE DISTRIBUTION SYSTEM.

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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CITY OF
BURNS, OREGON
WATER SYSTEM MASTER PLAN

WATER SYSTEM COMPONENTS

FIGURE
1-2

Chapter 2 - Water System Requirements

Introduction

This chapter presents basic information from which criteria have been developed for evaluating the City of Burns' existing water system and for defining and sizing the required components of the system for the 20-year planning period. Information concerning the service area, population projections, water use, and state and federal requirements is presented.

Service Area

The term "service area" refers to the area being served with water from the City's water system. The present service area primarily consists of the developed lands within the boundaries of the urban growth boundary (UGB). For the purposes of this Water System Master Plan (WSMP), the future service area will remain the same. The City's zoning map, showing zoning classifications within the service area, is shown on Figure 2-1.

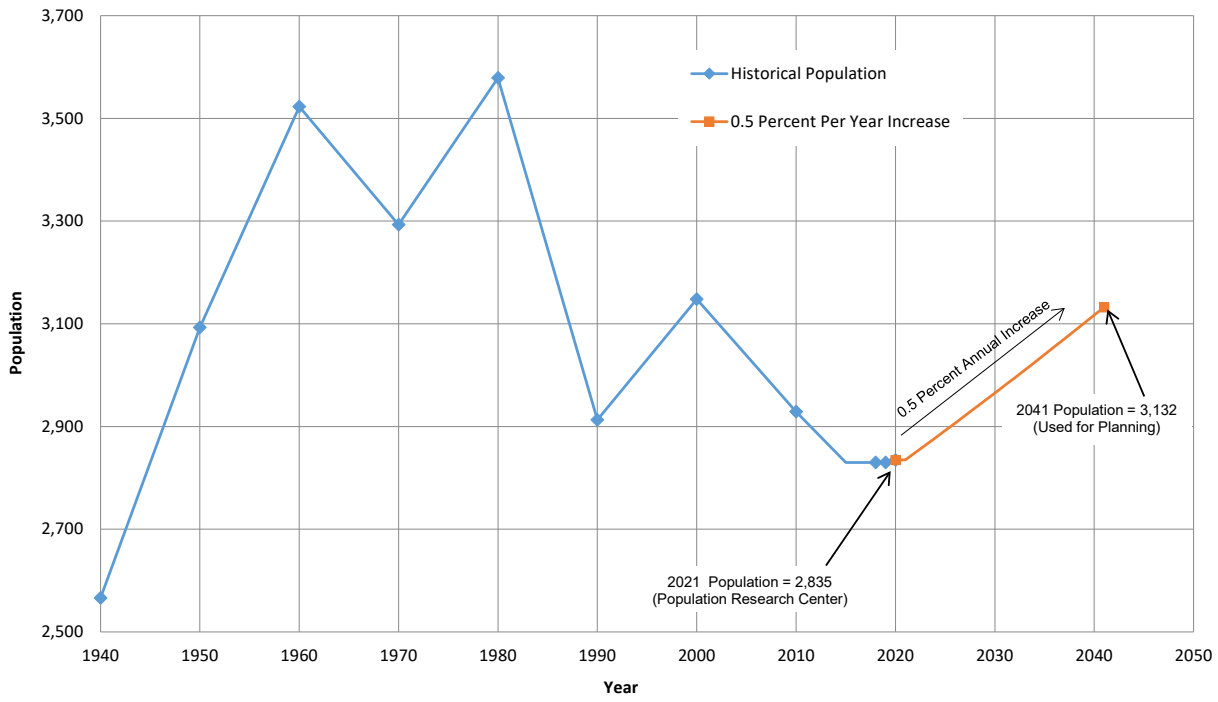
Many areas with large tracts of undeveloped land currently exist within the city limits (see Figures 1-1 and 1-2 in Chapter 1). With a significant area of open, undeveloped land available, the City has the potential for residential, commercial, and industrial growth. Considering this, potential system improvements are focused on users within the city limits. The elevations of undeveloped areas are similar to surrounding areas already served by the water system, with some residential areas at higher elevations. Issues related to the service area and service limits of the existing water system are discussed in more detail in Chapter 5.

Service Population and Planning Period

To estimate the demands that may be placed on a municipal water system, a determination of the population to be served must be made. Population estimates must be made with reference to time. Projections are usually made on the basis of an annual percentage change estimated from past growth rates, tempered by future expectations. It is difficult to accurately predict the population of a small community over an extended period of time. The addition or closure of a major business, industry, or recreational use in the area could significantly affect the population and the overall water system needs.

In accordance with Oregon Revised Statutes 195.025 and 195.036, the Portland State University Population Research Center (PRC) is responsible for establishing and maintaining population forecasts for cities in Oregon. According to the PRC, the certified 2020 population for the City of Burns is 2,835. For the purposes of this WSMP, the current population of 2,835, as estimated by the PRC, will be utilized for the 2021 planning population. This number represents the population within the UGB. The historical and projected populations and average annual growth rates (AAGR) are presented on Chart 2-1 as well as Table 2-1. It should be noted that the 0.5 percent AAGR shown on Chart 2-1 and Table 2-1 is the percent growth used in the analysis per a decision by the City Council. The PRC forecasted an AAGR of 0.0 percent for the City of Burns for the years of 2018 to 2043, and -0.2 percent for Harney County for the years 2018 to 2043. For the purposes of this WSMP, the 0.5 percent increase will be used to conservatively estimate future population growth for the City of Burns.

CHART 2-1
HISTORICAL AND PROJECTED POPULATION



As shown on Chart 2-1 and Table 2-1, the assumed 0.5 percent annual increase results in a planning population in the year 2041 of 3,132. It should be recognized, however, that over the planning period of this WSMP, actual growth could exceed or fall below the figures projected by the PRC. In small, rural communities the population is usually directly related to the success of local commercial or industrial business.

TABLE 2-1
HISTORICAL AND FORECASTED POPULATIONS AND AVERAGE ANNUAL GROWTH RATES FOR BURNS, OREGON, PROVIDED BY PORTLAND STATE UNIVERSITY'S POPULATION RESEARCH CENTER

Historical			Forecasted			
2000	2010	AAGR (2000-2010)	AAGR (2018-2043)	AAGR*	2021	2041
3,148	2,929	-0.7%	0.0%	0.5%	2,835	3,132

**AAGR used per a decision by the City Council*

Land Use

The current zoning in the City is shown on Figure 2-1. The City has several land use classifications that have been identified within the city limits: Indian Trust (IT), Commercial (C), Exclusive Farm Use (EFU), Industrial (I), Light Industrial (IL), Heavy Industrial (IH), Open Space (OS), Public Facility (P-PF), Multiple Family Residential (RM), and Single Family Residential (RS), and Single Family/Mobile Home (RS/MH). The zoning map also identifies County zoning classifications for land use outside the city limits, some of which are inside the UGB: Farm Ranch Use-160 AC (EFRU-1), Farm Ranch Use-80 AC (EFRU-2), Indian Trust (IT), Rural Residential (R-1), and Rural Commercial (C-1). Commercial areas are primarily located in

the City's core and in the downtown area along Highway 20. Residential areas surround the core commercial area. The majority of the City's industrial area is located in the south/southeast portion of the City.

In general, the City of Burns has significant area available for residential expansion, inside both the city limits and the UGB. There are also areas available for commercial and industrial expansion. Land use areas, potential demands on a water system, and areas where growth is anticipated to occur are important factors to consider when analyzing the City's water system capability to meet current and future needs. While it is not anticipated that large residential growth will occur during the 20-year planning period, larger commercial or industrial users could locate in Burns. Any future distribution system improvements should also consider these potential areas of expansion when considering pipe size and location.

Regulatory Requirements

The City's water system comes under the jurisdiction of the Oregon Health Authority - Drinking Water Services (DWS). The DWS assumed primacy (responsibility) from the U.S. Environmental Protection Agency (EPA) in February 1986 for enforcement of the federal Safe Drinking Water Act (SDWA). Therefore, the City is currently, and will principally be, working with the DWS as the regulating agency with regard to their water system. As part of these requirements the City is required to publish annual Consumer Confidence Reports; a copy of the 2020 report is located in Appendix A.

Regulatory Background

The SDWA was originally passed by Congress in 1974 to protect public health by regulating the nation's public drinking water supply. The law was amended in 1986 and 1996 and requires many actions to protect drinking water and its sources, including rivers, lakes, reservoirs, springs, and groundwater wells. The primary regulations associated with the SDWA address requirements concerning trace minerals, compounds, and microorganisms that may affect the health of water consumers. The SDWA provides monitoring, testing requirements, reporting, recordkeeping, and public notification procedures in the event of noncompliance.

The 1986 amendments to the SDWA included provisions for wellhead protection, new monitoring for certain substances, filtration for certain surface water systems, disinfection for certain groundwater systems, and restrictions on lead content in pipe solder and plumbing.

The 1996 amendments to the SDWA also included provisions for consumer confidence reporting, stronger protection for microbial contaminants and disinfection byproducts, operator certification, lowering maximum contaminant levels (MCLs), and source water assessments.

The Arsenic Rule, which became effective in February 2002, lowered the MCL for arsenic allowed in a community water system from 50 parts per billion (ppb) to 10 ppb. The City has not received any violations of this rule within the last five years.

Enacted in 1981, the Oregon Drinking Water Quality Act established periodically amended statutes and subsequent administrative rules to enforce, at a minimum, the federal SDWA requirements. The DWS administers and enforces drinking water quality standards for public water systems in Oregon. The agency focuses resources in the areas of highest public health benefit and promotes voluntary

compliance with state and federal drinking water standards. The DWS also emphasizes prevention of contamination through source water protection, provides technical assistance to water system owners, and provides water system operator training. The DWS also works closely with public water systems to ensure public notification is made in accordance with regulatory guidelines when required. If the City is unaware of their compliance status or in need of regulatory guidance, it is recommended that the regional DWS office in Pendleton be contacted.

Recent Regulatory History (Past 15 Years)

Following is a list of regulations that have been enacted in the last 15 years:

1. **Reduction of Lead in Drinking Water Act.** This act requires any new installation or purchase of materials used in potable locations to be "lead-free." Lead-free has been redefined as "(A) not containing more than 0.2 percent lead when used with respect to solder and flux; and (B) not more than a weighted average of 0.25 percent lead when used with respect to the wetted surfaces of pipes, pipe fittings, plumbing fittings, and fixtures." This law was enacted on January 4, 2014. Oregon requires drinking water components to be National Sanitation Foundation/American National Standards Institute Standard 61-compliant to meet the intent of this law.

2. **Stage 2 Disinfectants and Disinfection Byproduct Rule (D/DBPR).** This rule focuses on public health protection by limiting exposure to disinfection byproducts. The D/DBPR specifically targets total trihalomethanes and five haloacetic acids that can form in water through disinfectants used to control microbial pathogens. This rule applies to all community water systems (CWS) and non-transient, non-community (NTNC) water systems that add a primary or residual disinfectant other than ultraviolet light. Stage 2 of the D/DBPR was enacted in 2012 for large CWS and NTNC water systems and in October 2013 for all CWS and NTNC water systems.

3. **Unregulated Contaminant Monitoring Rule (UCMR) 3.** The EPA uses the UCMR program to collect data for contaminants suspected to be present in drinking water that do not have health-based standards set under the SDWA. Every five years, the EPA develops a new list of UCMR contaminants that is largely based on the Contaminant Candidate List. Oregon Administrative Rule 333-061-0043 requires CWS to report detection of unregulated contaminants in their annual Consumer Confidence Report.

4. **Revised Total Coliform Rule.** This rule requires that total coliform samples be collected by public water systems at sites that are representative of water quality throughout the distribution system according to a written sample site identification plan. Total coliform occurrence will continue to be investigated; however, it is no longer associated with an MCL. Emphasis will not be placed on the MCL for *E. coli* because it is a reliable indicator of fecal contamination. Monitoring changes were made that include reducing the number of repeat samples to collect after a routine coliform positive from four to three.

Potential Regulatory Changes

Following is a list of regulations that may be enacted in the future:

1. **Lead and Copper Rule (LCR) Long-Term Revisions.** The LCR is a treatment technique rule. This rule was proposed by the EPA in late 2019 and is proposed to be enacted in 2021. The rule requires public water systems take further actions to minimize lead and copper in drinking water. The goals for the revisions are to identify areas that are most impacted, strengthen treatment requirements, replace lead service lines, increase sampling reliability, improve risk communication, and protect children in schools.

2. **Radon in Drinking Water Rule.** This rule would attempt to reduce airborne and waterborne radon concentrations to limit exposure levels. This rule would apply to CWS that use groundwater or mixed groundwater and surface water. The proposal is currently on hold, and the EPA has no timeline for publishing this rule.

3. **Fourth Contaminant Candidate List (CCL4) Regulatory Determinations.** The CCL4 is currently in draft form. The EPA has made a preliminary determination to regulate strontium, which is currently still pending. Two new nominated contaminants, manganese and nonylphenol, have been added for the final publication.

4. **Carcinogenic Volatile Organic Chemicals (cVOC) Rule.** The EPA is developing a proposed national primary drinking water regulation for a group of 16 known cancer-causing compounds, including eight currently regulated cVOCs and up to eight from the Third Contaminant Candidate List.

5. **Perchlorate Rule.** The EPA is developing a proposed national primary drinking water regulation for perchlorate. Perchlorate may cause adverse health effects. Scientific research indicates that this contaminant can disrupt the thyroid's ability to produce hormones needed for normal growth and development.

6. **Hexavalent Chromium.** The EPA currently regulates hexavalent chromium as part of the total chromium drinking water standard. New information on health effects has become available since the original standard was set, and the EPA is reviewing this information to determine whether new health risks need to be addressed. The state of California has already implemented a hexavalent chromium-specific MCL.

7. **Fluoridation.** Fluoride MCLs may be lowered in the future as the health impacts of fluoride are fully realized. The current MCL of 4 parts per million could be reduced to 1 or less. This lower MCL could require systems with naturally occurring fluoride above the MCL to treat to reduce levels.

8. **Cybersecurity.** Executive Order 13636: Improving Critical Infrastructure Cybersecurity was established in February 2013. The order calls for development of a voluntary, risk-based cybersecurity framework. The EPA will make an evaluation as to whether any additional authority and/or regulations to address cybersecurity in the water sector are needed.

Regulatory Violations

According to the DWS, there have been no violations or public notices for the City in the last five years.

Regulatory Requirements Summary

The information presented herein is intended to provide the City with a brief summary of the regulations and possible future regulations that may affect operation of the City's water system. These regulations continue to expand and will require careful attention to maintain compliance. It is recommended that the City consult periodically with the DWS to ensure compliance with current regulatory requirements and to address any regulatory questions or issues.

Water System Sanitary Survey

The DWS conducts sanitary surveys of water systems for communities to assist in identifying potential contamination sources that may impact water quality. These surveys are generally scheduled to occur every five years.

The City's latest water system sanitary survey was conducted on July 29, 2020, and is included in Appendix B. No significant deficiencies or rule violations were identified during the survey.

Water Demand

Future water demands, for the purpose of identifying needed future water system improvements, can be estimated from past water use data and population projections. Water use data are usually expressed in terms of various rates of water used for various periods of time. This allows components of the water system to be sized for the maximum demands that will be placed on them. The rates of water use that are important in evaluating a water system are the average daily demand (ADD), which is the total amount of water used during a one-year period divided by 365 days; the peak daily demand (PDD), which is the maximum total amount of water used during any 24-hour period; and the peak hour or peak instantaneous demand, which is a measure of the maximum flow of water at any given time.

Water supply facilities are normally designed to accommodate the PDD. As a rule, a well should be sized for supplying the needed water during the PDD without continuous 24-hour operation. For example, if the water usage during high demand summer months required a well pump to operate 18 hours or more per day to keep up with the PDD, the situation may warrant the addition of another well or other water supply source to provide some backup capability and to not over-stress the well pumping equipment. Booster pumps and distribution pipelines are generally sized to deliver peak instantaneous demands because they must be capable of meeting the highest demand. Storage reservoirs are sized to make up the difference between water supply capacity and peak water use rates, at a minimum. Additional capacity (reserve) is usually provided in water storage reservoirs for both emergencies and fire suppression.

Per Capita Water Use

To be utilized for projecting future water demands, past water use data must be converted to a per capita (per person) rate of use. This is done by dividing the average daily and peak daily water use rates by the number of people being served by the water system. These water demand rates are expressed as gallons per capita per day (gpcd). These values, multiplied by a population projected for some future year, then give estimated total demand rates for that year.

Historical Average Water Use

To determine current water demands, production records from January 2015 to September 2020 for the City's water supply system were reviewed. Population data for the same time frame were also utilized.

Monthly well production for the City's well sources for January 2015 to September 2020 is shown on Charts 2-2 through 2-7. Note that the scale related to the volume of water pumped varies among charts.

CHART 2-2
WELL NO. 1 WATER PRODUCTION 2015-20

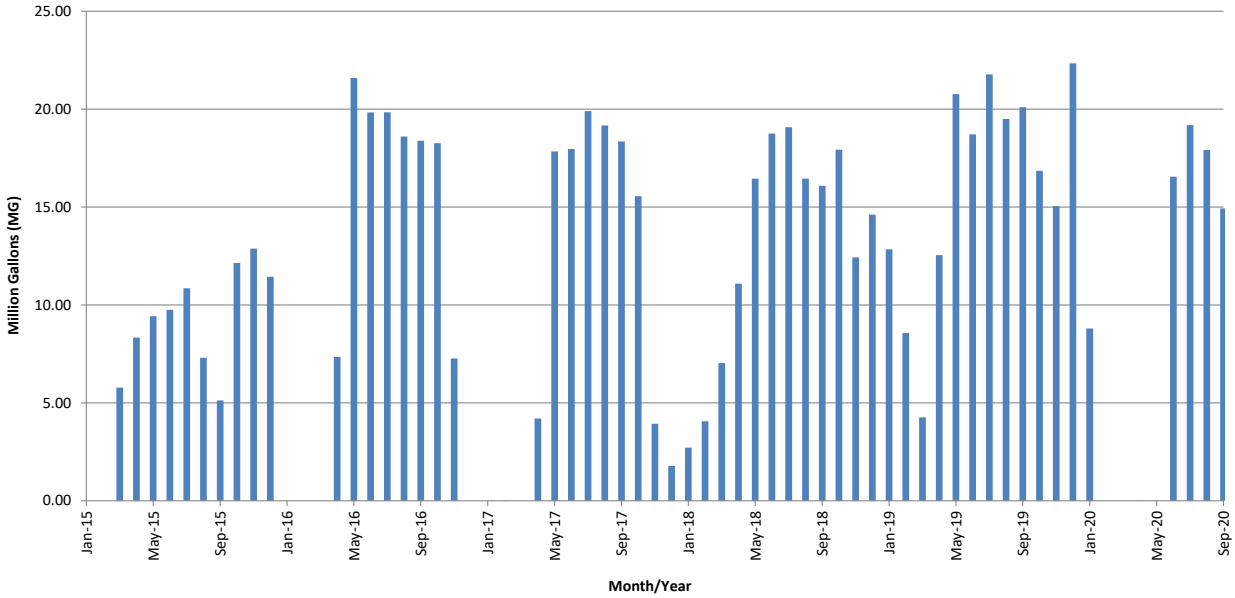


CHART 2-3
WELL NO. 2 WATER PRODUCTION 2015-20

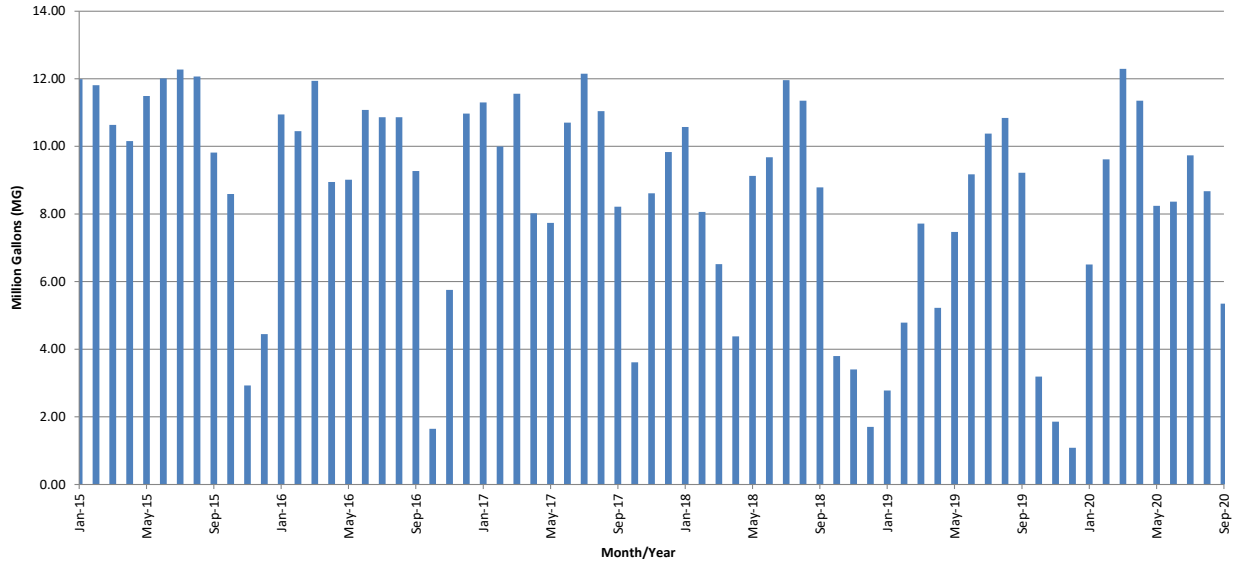


CHART 2-4
WELL NO. 3 WATER PRODUCTION 2015-20

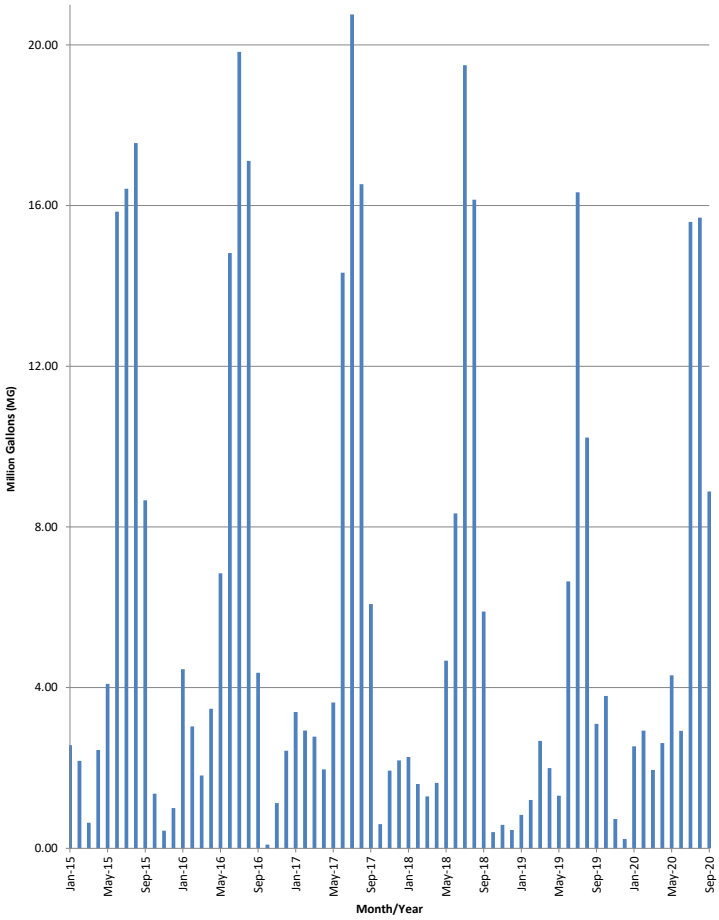


CHART 2-5
WELL NO. 4 WATER PRODUCTION 2015-20

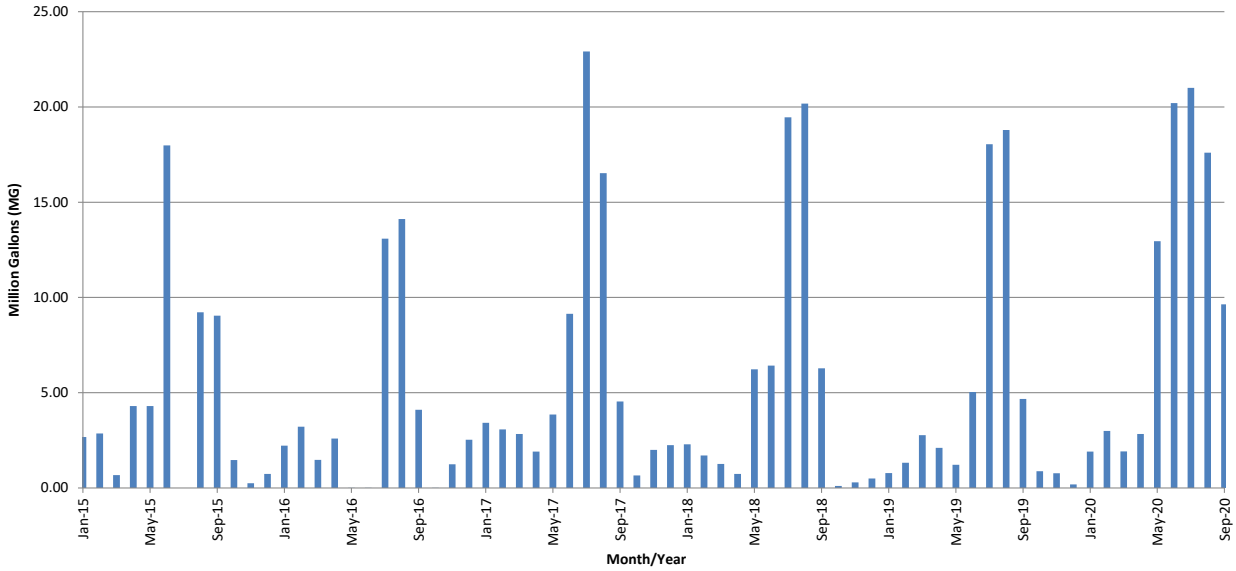


CHART 2-6
WELL NO. 5 WATER PRODUCTION 2015-20

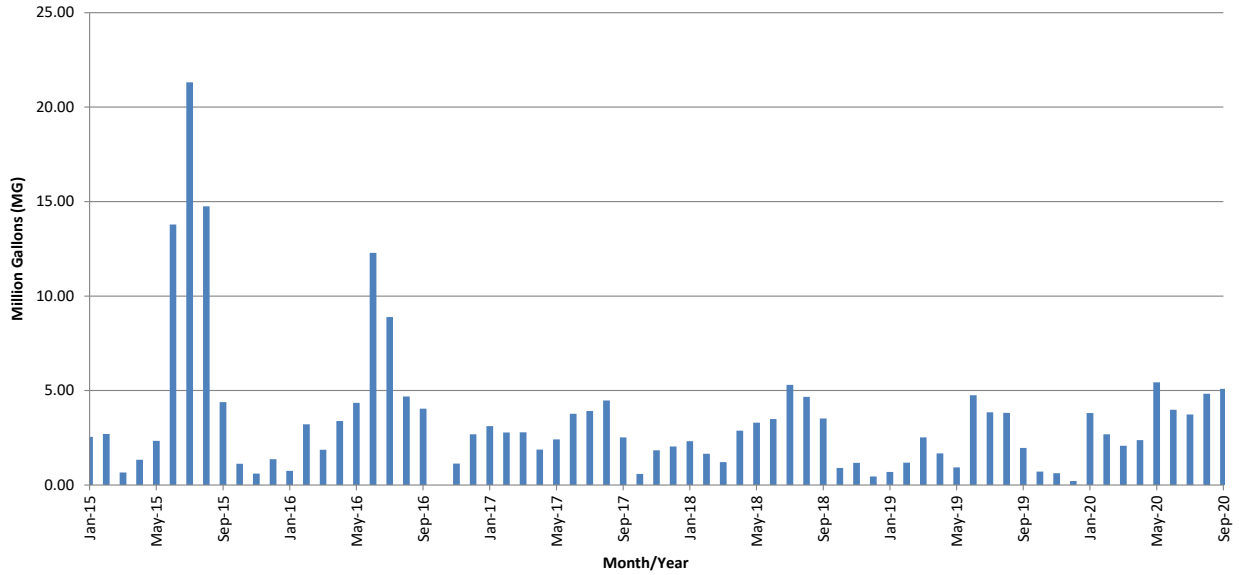
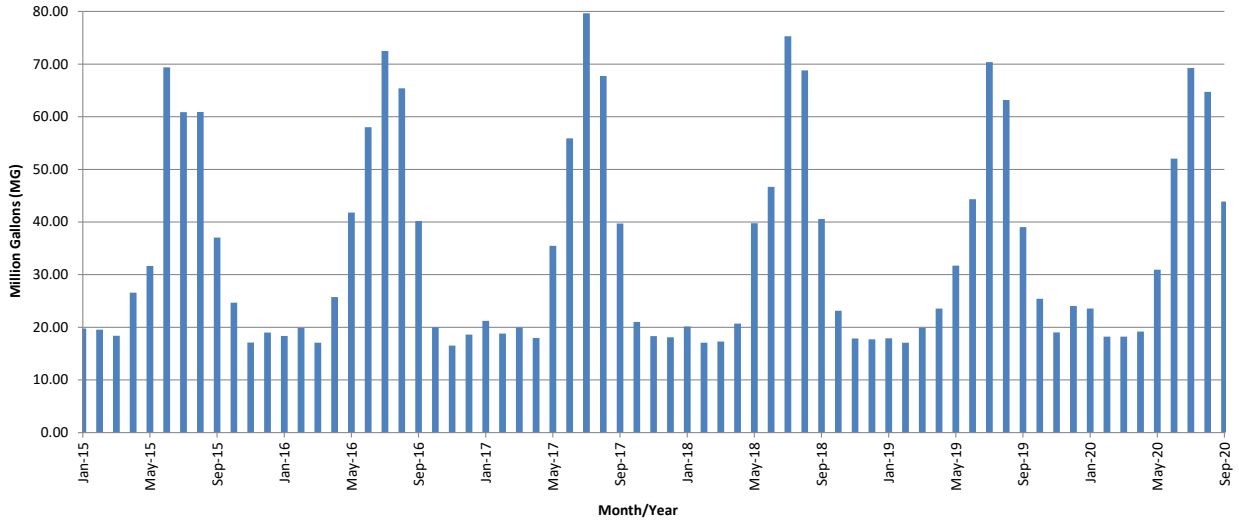


CHART 2-7
TOTAL WATER PRODUCTION 2015-20



Average Daily Demands

For planning purposes, ADDs are developed as an average per capita daily flow. Average per capita daily flow is calculated by dividing the total annual volume of water produced by the population, divided by 365 days per year. ADDs are calculated for January 2015 through September 2020 on Table 2-2 below.

TABLE 2-2
AVERAGE DAILY DEMAND

Year	Population[1]	Annual Water Production (MG)	Average Daily Demand		
			gpd	gpm	gpcd
2015	2,830	403.02	1,104,155	767	390
2016	2,830	414.42	1,135,392	788	401
2017	2,830	413.85	1,133,839	787	401
2018	2,830	405.16	1,110,015	771	392
2019	2,830	395.65	1,083,968	753	383
2020[2]	2,835	340.02	1,240,941	862	438

[1]Populations were obtained from PRC's certified estimates for the years shown.

[2]Annual water production reflects totals from January through September only.

gpd = gallons per day

gpm = gallons per minute

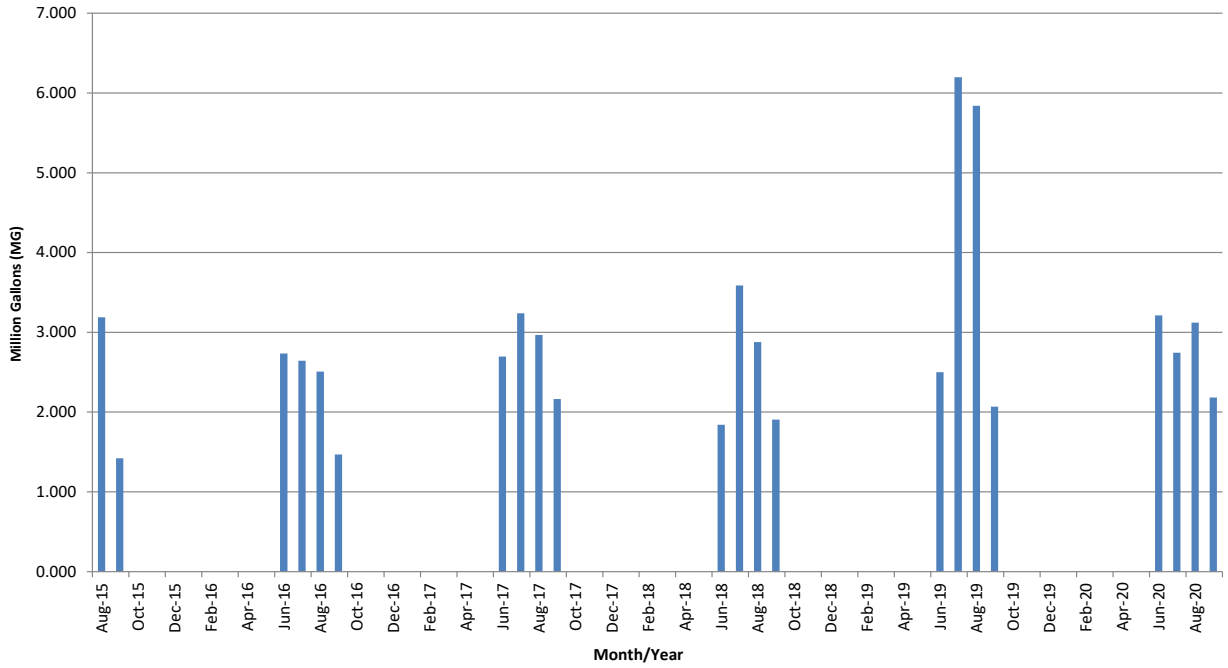
MG = million gallons

For this WSMP, an average daily flow of 401 gpcd was selected for planning purposes to project future demand needs. This approximately represents the average ADD from January 2015 to September 2020. Four hundred and one gpcd is higher than average, which could be an indication of leaks in the old distribution system piping.

Peak Daily Demands

PDDs 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. The PDD in each month from August 2015 through September 2020 is shown on Chart 2-8. Daily data are not available prior to August 2015; therefore, no amounts prior to August 2015 are included in the analysis.

CHART 2-8
PEAK DAILY DEMAND
AUGUST 2015 TO SEPTEMBER 2020



Note: Peak day totals for July 2019 and August 2019 are considered outliers. The peak day total for July 2018 was used for calculation purposes.

The PDD displayed above is from recorded well production. The highest PDD in previous years, not including outliers, occurred in July 2018, with a value of 3.59 MG. For planning purposes, the July 2018 value of approximately 3.59 MG will be used. Values close to this peak demand have also been seen in subsequent years. To present the PDD in gpcd, the 3.59 MG was divided by the existing population of 2,835 to get 1,265 gpcd.

The City's 401 gpcd average water demand is in the high range of typical demands when compared to other water systems with water meters in eastern Oregon, as shown on Table 2-3. Table 2-3 is sorted by ADD in ascending order.

TABLE 2-3
COMPARATIVE WATER USAGE TYPICAL FOR SMALL WATER SYSTEMS
IN EASTERN OREGON (METERED SYSTEMS)

City	ADD (gpcd)	PDD (gpcd)	Peak Factor (peak daily)	Population[1]
Echo, Oregon	175	525	3.0	700
Prineville, Oregon	176	405	2.3	8,889
Ice Fountain Water District, Oregon	207	621	3.0	1,921
Umatilla, Oregon	210	483	2.3	4,686
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

City	ADD (gpcd)	PDD (gpcd)	Peak Factor (peak daily)	Population[1]
Vale, Oregon	250	625	2.5	1,890
Hermiston, Oregon	250	600	2.4	17,730
John Day, Oregon	270	865	3.2	2,010
Stanfield, Oregon	275	660	2.4	2,130
Boardman, Oregon[2]	275	960	3.5	3,445
Enterprise, Oregon	284	582	2.0	1,940
Irrigon, Oregon	290	800	2.8	1,790
Ontario, Oregon[3]	296	533	1.8	11,485
Milton-Freewater, Oregon	300	750	2.5	6,550
Hines, Oregon	350	1,600	4.6	1,700
Burns, Oregon	**401**	**1,265**	**3.2**	**2,835**

[1]Population estimates reflect the time period when demands were calculated.

[2]Includes only City water use (does not include the Port of Morrow).

[3]Includes all users except Heinz.

The ADD and PDD assumed for planning purposes are summarized on Table 2-4. These demands have also been summarized as a flow rate to provide the basis for comparison to water supply capacity. The assumed population for determining the actual daily demand rates is 2,835, as discussed earlier in this chapter.

TABLE 2-4
YEAR 2021 TOTAL, AVERAGE, AND PEAK DAILY DEMAND DATA

Parameter	System Demand (gpcd)	Total Demand (gpm)	Approximate Percentage of System Capacity (Assumed Total Capacity of 4,720 gpm)
ADD	401	790	16.74
PDD	1,265	2,491	52.78

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. 1, 2, 3, 4, and 5 is 500 gpm, 300 gpm, 900 gpm, 1,200 gpm, and 3,000 gpm, respectively. Running these five wells at full capacity would exceed the combined water rights of 4,720 gpm. Therefore, the maximum allowable flow from the City's water rights was used for the analysis. The combined capacity of the wells exceeds the current ADD as well as the estimated PDD.

Description of Customers Served

The City of Burns' water service accounts, as of January 2021, are summarized on Table 2-5.

TABLE 2-5
WATER ACCOUNT INFORMATION

Account Type	Number of Accounts	Percent of Total Accounts
Residential	1,218	85
Commercial*	211	15
TOTAL	**1,429**	**100**

**Commercial users consist of schools, churches, City property, and businesses.*

Table 2-5 shows residential water users account for approximately 85 percent of the total water users in the City, while commercial users account for approximately 15 percent.

Fire Demand

Fire Protection Ratings

Flow rates for fire suppression in residential, commercial, and industrial areas within developed communities are usually determined from the size, density, and occupancy of buildings, type of construction materials, and desired fire insurance rating. Incorporated cities and some rural areas are given a fire suppression rating by Insurance Services Office, Inc. (ISO). The rating is used by insurance companies to determine the cost for providing fire insurance to home and business owners. ISO's fire suppression rating schedule is used to review those features of available public fire protection that have a significant influence on minimizing damage once a fire has begun. These features include receiving and handling fire alarms; the fire district's manpower, equipment, and training; and the capability of the water system to provide the needed fire flows.

ISO periodically evaluates fire suppression capabilities of incorporated cities and rural fire districts. The numerical ratings range from Class 1 to Class 10, with Class 1 indicating the highest fire suppression capability and Class 10 the lowest. A Class 10 rating is reserved for unprotected areas that have no fire department and no water supply system. Most protected areas outside of cities have a Class 9 rating, and most small, rural cities with municipal water systems are rated Class 8, 7, or 6 depending on the strength of their water system and fire department.

ISO's fire suppression rating schedule evaluates the City's fire department capabilities and the domestic water supply capacity on an approximately equal basis (50 percent and 40 percent of the rating schedule, respectively). To reduce the cost of fire insurance in a community, improvements usually must be made to the fire department, the water system, or both, depending on their present condition. It is difficult to determine possible fire insurance savings on commercial buildings because the insurance costs are determined by many other factors related to the type of occupancy and the type of building construction.

The ISO rating for Burns, based on the 2016 evaluation, is Class 3/3Y. The City has an above-average rating for typical rural communities of similar size. Improving the rating as a result of water system improvements is likely not possible. The ISO rating information is presented in Appendix C.

Recommended Fire Flows

ISO also recommends fire flows for various conditions in both residential and commercial settings. Recommended fire flows for residential areas are set forth in the 2012 ISO schedule as shown below.

Distance Between Buildings	Required Fire Flows
Over 30 feet	500 gpm
21 to 30 feet	750 gpm
11 to 20 feet	1,000 gpm
10 feet or less	1,500 gpm

Recommended fire flows for commercial buildings are based on many factors including building size, construction materials used, and what is housed in the building.

The Oregon Fire Code (OFC) requires a minimum flow of 1,000 gpm in residential areas and a minimum of 1,500 gpm for a minimum of two hours in all other occupancies. These requirements increase with square footage of the building and can be quite large for commercial and institutional buildings such as schools. These fire flows must be maintained with a system-wide minimum of 20 pounds per square inch (psi) residual pressure. Attaining the required fire flows for commercial areas may not be realistically achievable. The OFC has an allowance for decreases in fire flows for small communities (if approved by the local fire chief) where development of full fire flows is impractical.

The ISO recommends needed fire flow protection rates for both residential and commercial districts to receive full credit ratings. ISO does not consider needed fire flows of more than 3,500 gpm in determining the Public Protection classification for cities. The fire flow design criterion for this WSMP is based on the typical maximum fire flow recommended by ISO, which is 3,500 gpm for a two-hour duration. This maximum fire flow is typically recommended for school areas, industrial areas, and other high-density development. For residential areas, a minimum fire flow design criterion of 1,500 gpm was originally used. However, the required improvements to produce 1,500 gpm in the entire study area were not financially feasible; therefore, 1,200 gpm was used. This value is slightly higher than the minimum flow allowed by the OFC.

Available Fire Flow

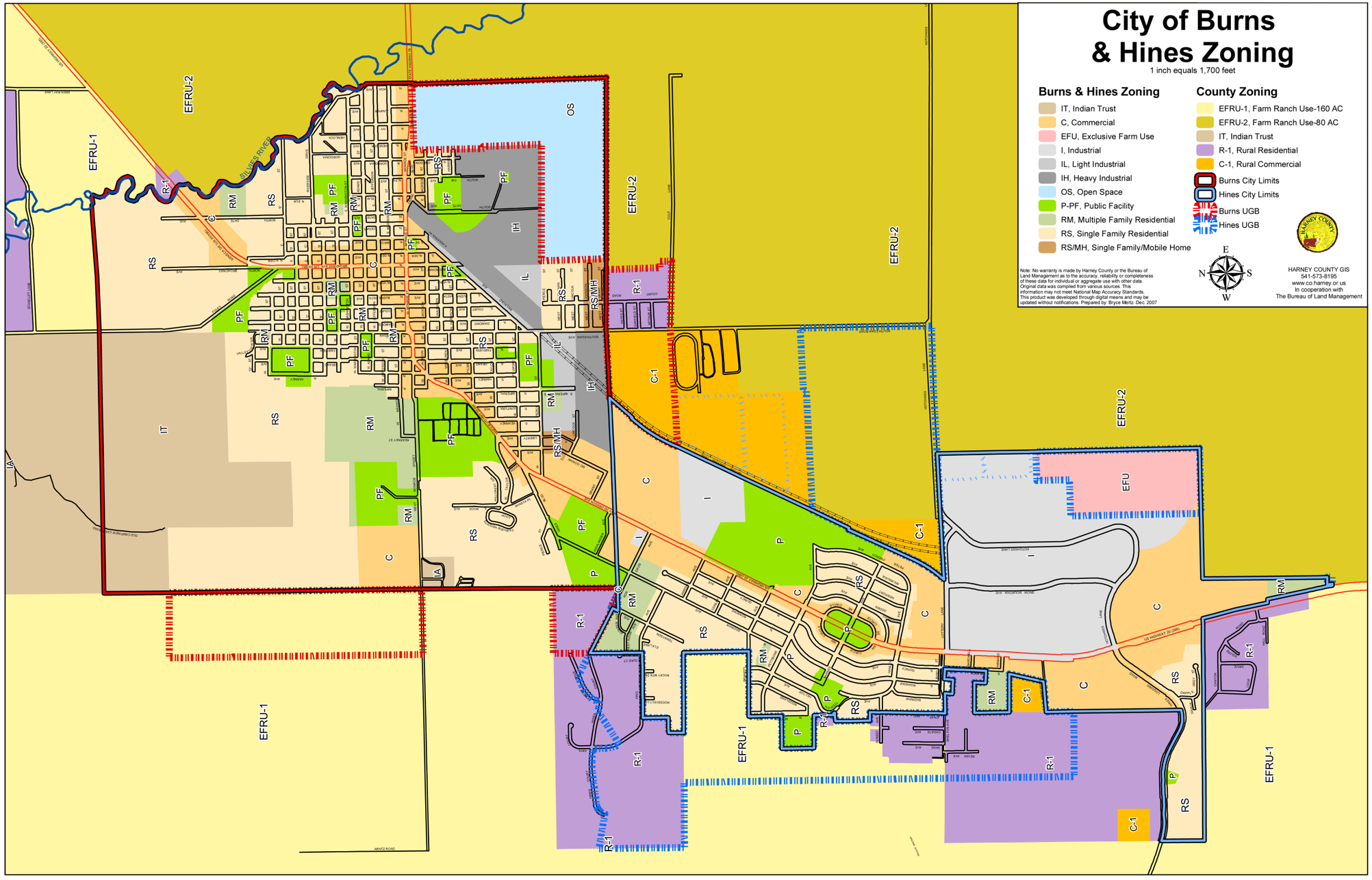
The 2016 ISO Hydrant Flow Data Summary provided fire flow test results from several areas within the City. Based on the test results, the City's water system is generally able to deliver water flows ranging from approximately 240 to 2,120 gpm at individual fire hydrants while maintaining working distribution system pressures from 21 to 60 psi. A copy of the fire hydrant flow test results is included in Appendix C. Refer to Chapter 5 for a more detailed discussion of fire flow capacity.

Design Criteria

In establishing design standards for a water system, primary consideration must be given to state and federal rules and regulations governing water quality and construction standards for water systems. These regulations, as previously stated, are set by both the EPA and DWS. In addition to these public health and safety requirements, many other factors control the design parameters for municipal water

systems. The City must evaluate factors such as financial feasibility, philosophy and policies of the City Council, past system performance and service, and expectations of the water users. All of these factors are important and can influence the standards by which water system improvements are made.

Figure 2-2 presents a summary of the water system design criteria for evaluating the existing water system and developing improvements to satisfy present and future needs. Application of these criteria is discussed further in the specific chapters that address the water supply, storage, and distribution system facilities. Figure 2-2 presents design criteria based on the estimated present service population of 2,835 and present estimated ADD and PDD. Design criteria are shown for the year 2041 based on a 0.5 percent population increase per year in the City. Storage volumes are derived from calculations summarized in Chapter 4. The design criteria presented on Figure 2-2 are used as base information in later chapters for evaluating existing and future system needs and capability.



MAP OBTAINED FROM CITY OF HINES/HARNEY COUNTY GIS DEPARTMENT
www.co.harney.or.us

anderson perry & associates, inc.

CITY OF
BURNS, OREGON
WATER SYSTEM MASTER PLAN

ZONING MAP

FIGURE
2-1

X:\Projects\Burns\308-36 WSMP\308-36-020 WSMP\Burns WSMP ZoningMap.indd, 12/02/20, 7:37 AM

DESIGN CRITERIA

	Year 2021	Year 2041 with 0.5 Percent Per Year Growth
Design Population[1]	2,835	3,132
Supply		
Average Daily Demand (gpcd)	401	401
Average Daily Flow (gpd)	1,137,000	1,256,000
Average Daily Flow (gpm)	790	872
Peak Daily Demand[2] (gpcd)	1,265	1,265
Peak Daily Flow[2] (gpd)	3,587,000	3,962,000
Peak Daily Flow (gpm)	2,491	2,751
Peak Hourly Flow[3] (gpm)	6,227	6,878
Estimated Supply Flow Available[4] (gpm)	4,720	4,720
Estimated Supply Flow Required[5] (gpm)	3,320	3,670
Fire Demand		
Residential (gpm)	1,000	1,000
Commercial/Public (gpm)	3,500	3,500
Duration (hour)	2	2
Minimum Residual Line Pressure Under Peak Demands Plus Fire Flow (psi)	20	20
Storage		
Operating Storage[6] (gal)	176,000	176,000
Equalization Storage[7] (gal)	226,000	324,000
Fire Reserve[8] (gal)	420,000	420,000
Emergency Reserve[9] (gal)	1,137,000	1,256,000
Total Recommended Storage (gal)	1,959,000	2,176,000
Total Existing Storage[10] (gal)	2,000,000	2,000,000
Potential Storage Need (gal)	0	176,000

gal = gallons
gpcd = gallons per capita per day
gpd = gallons per day
gpm = gallons per minute
psi = pounds per square inch
WSMP = Water System Master Plan

[1] Population based on Portland State University Population Research Center's estimates for the City of Burns for 2020. A population growth of 0.5 percent was requested by the City Council.

[2] The peak day occurred on July 24, 2018.

[3] 2.5 times peak daily flow.

[4] The current capacity of Wells No. 1 through 5 is assumed to be 5,900 gpm (13.15 cfs) if all wells were pumped at full capacity. For this WSMP, the amount allowed by the City's water rights (4,720 gpm) will be used for planning purposes.

[5] Total capacity required to operate well pumps a maximum of 18 hours per day and meet peak daily demands.

[6] Assumes a reservoir operating level of 3 feet in the reservoir.

[7] Difference between peak hourly flow and available supply for a 2.5-hour period. Year 2041 available supply assumed to be 4,720 gpm.

[8] 3,500 gpm flow for two-hour duration, assuming only storage is used.

[9] One-day supply at average daily demand, assuming only storage is used.

[10] Available existing storage is approximately 2,000,000 gallons.

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CITY OF
BURNS, OREGON
WATER SYSTEM MASTER PLAN

WATER SYSTEM DESIGN CRITERIA

FIGURE 2-2

Chapter 3 - Water Supply

Introduction

This chapter includes a description of the City of Burns' current water supply system and a discussion of its capacity to meet present and future needs. The current water supply system consists of five groundwater wells. Needs and concerns associated with the water supply are discussed. Water rights are also described.

Present Water Supply and Controls

General

The City's water supply system consists of five groundwater wells. Wells No. 1 and 2 are both located near the City's original 100,000-gallon steel elevated reservoir, west of N. Harney Avenue. Well No. 3 is located along N. Grand Avenue. The two most recently drilled wells are Wells No. 4 and 5. Well No. 4 was constructed in 1974 and is located near S. Alvord Avenue. Well No. 5 was constructed in 1977 and is located behind Burns High School along Saginaw Avenue N. The locations of the wells are shown on Figure 1-2 in Chapter 1.

Critical Groundwater Areas

The City's wells are not located in an area designated by the Oregon Water Resources Department (OWRD) as critical groundwater or groundwater limited. However, in 2016, the OWRD proposed modifications to the Malheur Lake Basin program that identified the Greater Harney Valley Groundwater Area of Concern. The Malheur Lake Basin program is detailed in Oregon Administrative Rule (OAR) 690-512. The OAR, as well as an exhibit of the Greater Harney Valley Groundwater Area of Concern, is included in Appendix D. The groundwater levels in Harney Valley appear to be declining; rather than declaring a Critical Groundwater Area, the OWRD intends to use the Groundwater Area of Concern designation as a means of limiting additional groundwater withdrawal in the basin. According to the Malheur Lake Basin program, the OWRD will not accept any additional groundwater permit applications, unless the application meets several exceptions. Since 2016, the OWRD and U.S. Geological Survey have been conducting research to determine the status of groundwater levels in the Harney Valley. Draft findings and updates to basin program rules are anticipated in 2021.

Well No. 1 pump station building.

Wells No. 1 and 2

Well No. 1 was drilled to a depth of 251 feet and has 12-inch casing that extends to 150 feet. At the time of drilling, 8-inch screens, a vertical turbine line shaft pump, and a 50 horsepower (Hp) motor were installed. The static water level for Well No. 1 at the time of drilling was 85 feet. City staff have expressed concern over the deteriorating condition of the Well No. 1 pump

station building. It is recommended that the building be rehabilitated when the City has funds available.

Well No. 2 was drilled to a depth of 253 feet and has a 12-inch casing that extends to 150 feet. At the time of drilling, 8-inch screens, a vertical turbine line shaft pump, and a 50 Hp motor were installed. The static water level for Well No. 2 at the time of drilling was 85 feet. Well No. 2 is located approximately 250 feet from Well No. 1.

Well No. 3

Well No. 3 was drilled to a depth of 304 feet and has 16-inch steel casing that extends to approximately 144 feet. At the time of drilling, 8-inch galvanized cone screens were also installed; however, the depth of placement was not specified by the driller. Also, at the time of drilling, a vertical turbine line shaft pump and a 100 Hp motor were installed. The static water level for Well No. 3 at the time of drilling was 14 feet.

Well No. 4

Well No. 4 was drilled utilizing a 20-inch hole to a depth of 22 feet, then narrowing to a 16-inch hole that extends to a depth of 290 feet. Well No. 4 has a 16-inch steel casing installed from the surface to a depth of 133 feet. At the time of drilling, a vertical turbine line shaft pump and a 100 Hp motor were installed. The static water level for Well No. 4 at the time of drilling was 13 feet.

Well No. 5

Well No. 5 was drilled utilizing a 24-inch hole to a depth of 40 feet, then narrowing to an 18-inch hole that extends to a depth of 355 feet. Well No. 5 has a casing that begins 1-1/2 feet above the surface and extends to 355 feet. Perforations in the casing are reported to be from 140 to 355 feet. At the time of drilling, a vertical turbine line shaft pump and a 200 Hp motor were installed. The static water level for Well No. 5 at the time of drilling was 30 feet.

A summary of the information regarding the City's five wells is provided on Table 3-1. Well records and well logs (where available) for the City's wells are included in Appendix E.

TABLE 3-1
BURNS WELL INFORMATION

Well No.	OWRD Well Log No.	Depth (feet)	Historical Static Water Level (feet)	Pump Motor (Hp)	Estimated Capacity[1] (gpm)	Water Right Withdrawal Rate (gpm)
1	23/30-12J HARN 282	251	85	50	500	450
2	23/30-12J HARN 283	253	85	50	300	450
3	23/30-12R HARN 289	304	14	100	900	675
4	23S/31E - 18BC HARN 478	290	13[2]	100	1,200	990
5	23S/30 - 3CB	355	30	200	3,000	2,155

[1]Capacities estimated by City staff.
[2]Well log indicates static water level of 13 feet and 4 inches.
gpm = gallons per minute

City of Hines Intertie

In addition to the City's five groundwater wells, the City's water system can also be provided water from the City of Hines's water system. A bi-directional pressure reducing valve (PRV) is located between Hines and Burns, near Highway 20. This PRV is used to provide emergency water to either water system. For instance, if a high water demand event such as a fire occurred in Burns, the system pressure would drop to a level that would cause the PRV to open and provide additional water from the City of Hines's water system. Since the PRV is a bi-directional valve, water could also flow from the Burns water system to the Hines water system if a high water demand event occurred in Hines. During normal operating conditions, the PRV remains closed. A formal agreement between the two cities should be developed or re-established to ensure future use.

Water Quality, Disinfection, and Treatment

The City has had few issues with water quality in the past. Currently, the City is not required to disinfect or treat water from its wells. Well No. 2 is currently equipped with emergency disinfection equipment. This equipment includes a chlorination tank and metering pump. It should be noted that tetrachloroethylene has been detected at Well No. 4 in the past. All of the sample results indicating levels of tetrachloroethylene have been well below the maximum contaminant limit of 0.005 mg/L.

Control System Equipment and Operational Controls

The City's five wells are monitored by a telemetry system controlled by a central supervisory control and data acquisition system located at the City Public Works maintenance shop. The master control panel is located at the maintenance shop, and remote telemetry units are located at all five wells. The five wells are operated based on reservoir water level set points that are measured at the 2.0 million gallon (MG) reservoir. The current reservoir water level settings that control operation of the City's wells are outlined on Table 3-2.

TABLE 3-2
BURNS WELL OPERATION

Well No.	Well On Reservoir Water Level (feet)	Well Off Reservoir Water Level (feet)
1	34	34.5
2	33.5	34.5
3	32	34.5
4	31.5	34
5	33	34

Well No. 4 is located in a separate pressure zone than the 2.0 MG reservoir and Wells No. 1, 2, 3, and 5. Because of this, Well No. 4 is operated off the reservoir water level and system pressures in the lower zone. As indicated on Table 3-2 above, Well No. 4 will turn on when the reservoir water level reaches 31.5 feet. Due to the different pressure zones and PRVs throughout the system, Well No. 4 is not capable of pumping water to the reservoir. To prevent Well No. 4 from "over-pressurizing" the lower zone, a system pressure set point of 80 pounds per square inch is used to dictate when Well No. 4 turns off.

Well Maintenance

Well Capacity

Wells require periodic maintenance to keep them functioning properly and working efficiently. Many wells lose efficiency over time. The result of lost efficiency is either decreased yield (gpm) or greater pumping drawdown, which results in higher pumping costs and loss of production.

Specific capacity (production in gpm per foot of drawdown) is a measure of a well's ability to yield water. Wells can lose efficiency and capacity for a variety of reasons, including mechanical clogging, bacterial clogging, and loss of pump efficiency. Observing changes in a well's specific capacity over time will alert a well owner of developing well efficiency problems.

It is recommended that the City perform specific capacity pumping tests either annually or biannually on each well. The results should be recorded and plotted on a graph over time. A Specific Capacity Test is easily performed by pumping the well using the existing well pump and documenting the static water levels, drawdown, and pumping rate of the well. This is best done during a period when the well has been sitting idle for a few weeks. The idle time is needed to normalize the well's static water level. A reduction in specific capacity will indicate problems with the well and the need to take corrective action before the problem becomes irreversible.

Rehabilitation work may include a variety of approaches depending on the nature of lost efficiency. Rehabilitation work may be accomplished using mechanical cleaning or non-mechanical methods, such as shocking with percussion apparatuses, chemical addition, or chlorination. In some cases, it may be necessary to use a combination of mechanical and non-mechanical methods. Generally, the longer rehabilitation work is delayed, the greater the risk that the lost capacity cannot be recovered. Tracking well production over an extended period of time by performing this relatively simple Specific Capacity Test will provide good information to project and budget for maintenance activity

that may be required on the well. If specific capacity has not decreased but pumping rates have decreased, this may indicate a problem with the pump rather than the well.

Static Water Level Trends

The static water level is the depth to water in a well when the well has not been pumped for a certain period of time. Over time, the static water level of a well can be the best indicator of the status and condition of the underlying aquifer. A reduction in static water level could indicate the aquifer is being depleted faster than it can be recharged. It is important to observe any trends in static and pumping water levels in the City's wells. Currently, the City does not have the ability to consistently monitor water levels in its wells on a regular basis. The City conducts annual drawdown tests to evaluate their well water levels. With the recent changes in the Malheur Lake Basin program and the declaration of the Greater Harney Valley Groundwater Area of Concern, the City should consider more frequent monitoring of the water levels in its wells. Data collected can then be plotted over time to observe any trends.

Water Rights

The City of Burns holds three municipal water rights issued by the State of Oregon for its groundwater sources. Copies of the City's water rights certificates are presented in Appendix F. The water rights information is summarized on Table 3-3.

TABLE 3-3
WATER RIGHTS

Permit Number	Water Right Certificate Number	Point of Appropriation	Allowed Flow Volume (cfs/gpm)	Priority Date	Allowed Use
G-1417	32175	Wells No. 1, 2, and 3	Well No. 1 - 1.0/450 Well No. 2 - 1.0/450 Well No. 3 - 1.5/675	June 1, 1959	Municipal
G-6090	61061	Well No. 4	2.2/990	October 9, 1974	Municipal
G-8453	62213	Well No. 5	4.8/2,155	October 16, 1978	Municipal

cfs = cubic feet per second

Water Supply Analytical Testing

General Supply Well Testing Data

Summaries of analytical data related to the City's water quality testing were obtained from the Oregon Health Authority - Drinking Water Services' (DWS) website. The City's wells have been sampled for the constituents required by the DWS, including total and fecal coliforms, volatile organic compounds, synthetic organic compounds, inorganic compounds, radiological agents, pesticides, fluoride, nitrates, nitrites, arsenic, asbestos, and several metals.

As shown in the City's testing data in Appendix G, most constituents were either not detected or levels were below the corresponding U.S. Environmental Protection Agency (EPA) primary drinking water maximum contaminant levels. The City has no reoccurring water quality violations and has

received few alerts. A summary of alerts and violations as provided by the DWS website is also included in Appendix G.

Distribution System Water Quality Testing

Although the distribution system is discussed in greater detail in Chapter 5, a brief discussion of distribution system sample analytical testing is presented herein. The City routinely obtains samples from the distribution system for analysis of total coliforms and *E. coli*. In general, coliforms are not present in routine distribution system samples. Positive coliform tests have not been reported since November 30, 2010. The City has not experienced a positive test result for *E. coli* in the last ten years. Total coliform bacteria are considered an indicator organism and are commonly found in the environment (e.g., soil or vegetation). When only total coliform bacteria are detected in drinking water, the likely source is environmental, and fecal contamination is not likely. However, if environmental contamination can enter the system, that may indicate there is a way for pathogens to enter the system; therefore, it is important to find the source and resolve the issue.

The City also obtains samples from the distribution system for chemical analysis of lead and copper. In the last two decades, all detected concentrations of lead and copper were less than the corresponding EPA action levels. Results from the City's coliform, lead, and copper tests are summarized in the DWS water quality testing summaries in Appendix H.

Source Water Assessment Report

The 1996 amendments to the Safe Drinking Water Act require states to provide the information needed by public water systems to develop drinking water protection plans if they chose to do so. The information provided includes the identification of the area most critical to maintaining safe drinking water (i.e., the Drinking Water Protection Area [DWPA], an inventory of potential sources of contamination within the DWPA, and an assessment of the relative threat that these potential sources pose to the water system). In Oregon, the principal agency involved with the source water assessments is the DWS. The DWS completed a Source Water Assessment Report for the City of Burns' water supply wells in October 2004. A copy of the Source Water Assessment Report is included in Appendix I.

The Source Water Assessment Report includes information related to the City's water sources, including delineation of the source water protection area, a sensitivity analysis, an inventory of potential contamination sources, the susceptibility of the drinking water sources, and recommended uses of the Source Water Assessment Report. The DWPA delineation is intended to identify the area that supplies the system's drinking water. The DWPA is designated for projected one-year, two-year, and five-year time of travel periods for water from the aquifer to enter Burns' water supply sources. Figures showing the DWPA, the times of travel for groundwater to the wells, and potential contamination sources are included in the Source Water Assessment Report.

The Source Water Assessment Report indicates the groundwater source for the wells is considered highly sensitive to contamination at Wells No. 1, 2, and 3. Wells No. 1 and 2 are deemed highly sensitive because of a lack of information regarding the installed casing seals. Well No. 3 is highly sensitive to contamination because of the inadequate construction of its casing seal and the lack of data regarding the thickness of the cement seal. The overall water system sensitivity is also increased by the age of the wells, the presence of highly permeable soils within the DWPAs, and the presence of nitrate (1.9 to 3 milligrams per liter) for all wells.

Water Supply Design Criteria

As presented in Chapter 2, the planning period for this Water System Master Plan (WSMP) extends to the year 2041. The 2020 certified population of the City of Burns is 2,835. This population has been assumed as the current population for planning purposes. With the assumed 0.5 percent per year population increase, the projected population for the year 2041 is 3,132. It should be noted the 0.5 percent increase has been used to conservatively predict the City of Burns' 2041 population. The Portland State University Population Research Center has predicted a 0.0 percent change over the 20-year planning period for Harney County. Table 3-4 shows the average daily and peak daily demands (PDDs), based on the population data and the City's current water use characteristics.

TABLE 3-4
PROJECTED WATER DEMANDS

Year	Population	Average Daily Flow (gpm)	Peak Daily Flow (gpm)
2021	2,835	790	2,491
2041	3,132	872	2,751

Water supply facilities are normally designed to meet PDDs without having to provide 24-hour service. The current total production capability of the City's water system is approximately 5,900 gpm. However, for this WSMP, the amount allowed by the City's water rights (4,720 gpm) has been used for planning purposes. This allows the City to provide approximately 3,000 gpm if the wells are operated at the suggested maximum of 18 hours per day. Despite high PDDs during the summer months, the City is equipped to provide water for peak flows.

It should be noted that future changes in the City's projected population, water use characteristics, and/or available supply could affect these assumptions. The City should periodically review this information to ensure additional water supply, beyond that recommended herein, is not needed sooner than anticipated to meet City demands.

Water Supply Reliability

The reliability of the water supply is one of the most important components of any water system. Because the health and safety of the community depends on a reliable water source, high priority should be given to help ensure a municipal water system always has the ability to meet the water needs of its customers. A number of factors, such as mechanical failures, water quality concerns, power outages, primary water transmission line failures, etc., can affect the reliability of a water supply. It is nearly impossible to ensure 100 percent reliability of any system; however, having proper system components can reduce the risk of a water supply failure.

The City uses groundwater wells for its water supply. In general, a groundwater well source is less susceptible to seasonal fluctuations in weather patterns, drought, or contamination than a surface water source. Although the City's water sources have been reliable, certain events could affect the City's water supply. When evaluating the system's performance, several potential weaknesses were identified as follows:

- Source contamination
- Contamination in reservoir

Due to the missing well logs and lack of information regarding the seals on the City's wells, source contamination is potentially a significant concern. If contamination were to occur at the wellhead, the City would be limited in how to address the contamination.

Currently, the City has an emergency backup power supply located at Well No. 4 (diesel motor) and Well No. 5 (mobile generator). In the event of a power outage, the City will be reliant on Well No. 4, the mobile generator, storage reserves, and the intertie with the City of Hines. All five wells are equipped with the appropriate electrical equipment to receive power from the mobile generator.

Potential contamination of water stored in the reservoirs, reservoir security, and storage volume are discussed in more detail in Chapter 4.

Well No. 4 diesel pump motor and well pump.

Supply System Deficiencies

Overall, the City's water supply system has sufficient capacity and redundancy and the components are in relatively good condition. All individual components along with associated buildings should be inspected regularly and updated as needed.

With the existing backup diesel motor at Well No. 4 and the mobile generator stationed at Well No. 5, the City is prepared to handle power outages. If the City desired a form of redundancy, it may be wise to acquire a second mobile generator to serve other infrastructure during a power outage.

As previously discussed, the City does not currently have the means to measure the depth of the water in the five wells. An air line or transducer-type water level monitoring device should be installed at the City's wells to monitor water levels over time. This information will be vital to the City if groundwater levels in the area decline over time.

The system deficiencies described above should be addressed as part of an improvements project. The estimated cost to address the deficiencies is shown on Figure 3-1.

Summary

At this time, the City has enough source capacity to meet current and future demands. As discussed earlier, it is desirable to have enough source capacity to provide for PDDs without requiring the well pumps to operate 24 hours a day. As shown on Figure 2-2 in Chapter 2, the 2041 peak daily flow requirement is estimated to be 2,751 gpm. The current capacity from the City's five wells is approximately 4,720 gpm, which is the maximum allowed based on the City's water rights. It is not recommended the City increase its supply capacity at this time; however, modifications to the existing supply system are recommended as discussed previously in this chapter.

CITY OF BURNS, OREGON
WATER SYSTEM MASTER PLAN
SUPPLY SYSTEM IMPROVEMENTS COST ESTIMATE
(Year 2021 Costs)

NO.	DESCRIPTION	UNIT	UNIT PRICE	ESTIMATED QUANTITY	TOTAL PRICE
1	Mobilization/Demobilization (5%)	LS	$ 13,000	All Req'd	$ 13,000
2	Project Safety	LS	4,000	All Req'd	4,000
3	Well Transducers and Control Modifications (five)	LS	120,000	All Req'd	120,000
4	Backup Mobile Generator	LS	140,000	All Req'd	140,000
				Subtotal Construction Costs	**$ 277,000**
				Construction Contingency (15%)*	41,000
				Total Estimated Construction Cost	**$ 318,000**
				Preliminary, Design, and Construction Engineering (20%)	63,000
				TOTAL ESTIMATED IMPROVEMENTS COST (2021 DOLLARS)	**$ 381,000**

*The construction industry is experiencing material shortages and unpredictable prices in 2021. A 15 percent contingency has been added to try to accommodate this. This amount may or may not be adequate to account for potential material cost inflation.

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CITY OF
BURNS, OREGON
WATER SYSTEM MASTER PLAN

SUPPLY SYSTEM IMPROVEMENTS COST ESTIMATE

FIGURE 3-1

Chapter 4 - Water Storage

Introduction

This chapter presents information about the water storage facilities for the City of Burns. The purpose for storage in municipal water systems is discussed. The condition and needs of the City's existing storage reservoirs are outlined, and recommended storage requirements to meet current and 2041 design criteria are presented. The types of storage facilities generally available are outlined.

General

Water storage facilities are constructed to serve several purposes. First, storage reservoirs are often used to provide control for well or booster pump system operation. When a reservoir drops a few feet or more from the full level, the water level can be used as a control for well pump or booster pump activation. The amount of storage required for this type of control is called "operating storage." Second, stored water must be available to supply water during periods in which the demand for water exceeds the available water supply. This reserve is called "equalization storage." Third, reserve storage is usually provided to supply unusually high, short-duration demands, such as fire flows. This is referred to as "fire reserve." Finally, reserve storage is also often provided for emergencies that may arise and interfere with production from water supply sources. Such emergencies could be created by power outages, mechanical equipment failure, or sudden water contamination. The amount of storage to be provided for an emergency depends on the likelihood and the impact of such an occurrence. The amount of emergency storage provided usually becomes a balance between what is needed and what can be afforded. This storage allowance is usually called "emergency reserve."

Storage facilities can be located at approximately the same elevation as the water distribution system. Storage facilities of this type require continuous operation of a booster pump system to maintain distribution system pressure. Storage facilities can also be elevated, in which case the water is stored at an elevation considerably above the distribution system to generate adequate system pressure. For example, a water elevation 120 feet above a distribution system would be required to generate a distribution system static pressure of approximately 50 pounds per square inch. Reservoirs may be elevated by locating them on natural ground high enough above the service area or by construction on top of a steel support frame.

Storage reservoirs are generally constructed of steel, reinforced concrete, or prestressed concrete. The choice is usually based on an economic analysis made for the particular installation. Reservoirs may be constructed either aboveground or buried, with the choice made based on cost, location, and community acceptance. The remainder of this chapter reviews the City's existing storage facilities, presents a discussion of future storage needs, and provides alternatives for satisfying those needs.

Existing Facilities

The City's existing municipal water storage consists of two water storage reservoirs with a total reported storage volume of 2.0 million gallons (MG).

Elevated Reservoir

The original storage system consisted of a 100,000-gallon elevated steel reservoir. The 100,000-gallon reservoir was constructed in the late 1920s on the hill west of Henry L. Slater Elementary School. Use of this reservoir has been discontinued as it does not have adequate storage capacity and its elevation does not allow for sufficient pressure in the upper areas of the system. Since use of this reservoir has been discontinued, it is not discussed further in this Water System Master Plan (WSMP).

Bolted Steel Reservoir

In 2002, a new 2.0 MG glass-fused-to-steel bolted reservoir was constructed. The reservoir is approximately 100 feet in diameter and 36 feet tall. This 2.0 MG reservoir is located west of the City of Burns along W. Monroe Street and is the City's only source of storage.

The 2.0 MG glass-fused-to-steel bolted reservoir built in 2002.

The most recent inspection of the bolted steel reservoir was completed on July 15, 2016, by Engineering America. A copy of the Inspection Report for the bolted steel reservoir is located in Appendix J. According to the Inspection Report, the bolted steel reservoir is in overall good condition. Some individual components are listed in fair condition. The roof access hatch door is missing a roof hatch gasket and some staining on the exterior glass coating could be cleaned from the sheet surface.

Engineering America recommended that the roof hatch gasket be replaced, the City perform a water analysis to determine the proper level of cathodic protection, and that a mixer should be installed to provide thorough mixing of the tank to reduce water age, stagnation, stratification, short-circuiting, and cold-climate ice buildup. Engineering America also recommended the City continue with regular inspections and maintenance.

System Pressures Provided by the Bolted Steel Reservoir

The City of Burns has three pressure zones serving the distribution system, with the upper and lower system pressure zones provided by the elevation of the bolted steel reservoir. The third pressure zone is provided by the Fairview Heights booster pump and is discussed in greater detail in Chapter 5. Pressures in the upper and lower pressure zones are dictated by the set points of seven pressure reducing valves (PRVs). Although the distribution system is discussed in greater detail in Chapter 5, distribution system pressures are discussed briefly hereafter as they relate to the existing storage reservoir. Fire flow capacity, as well as the evaluation of the distribution system, is discussed in Chapter 5.

Ground elevations in the current city limits of Burns range from a low of approximately 4,145 feet above mean sea level (MSL) to as high as 4,334 feet above MSL. The 2.0 MG reservoir sits outside the City at

approximately 4,330 feet above MSL. This represents a service elevation difference of approximately 185 feet. Currently, the City has PRVs to help control pressures throughout the system. At the time this WSMP was written, the lowest elevation users in the City have static water pressures up to 80 pounds per square inch (psi), and the highest elevation users have static water pressures as low as 40 psi.

Refer to Chapter 5 for a discussion of the water modeling performed as part of this WSMP, which discusses varying system demand conditions and their impact on distribution system pressures.

Storage Requirements

Water storage is usually provided for several purposes. Various methods are used to calculate the volumes of each type of storage component required. Most involve a rational approach to estimating the volume of each storage component consisting of operating, equalization, fire reserve, and emergency reserve. The decision can then be made as to which component controls and which storage volumes will be necessary. For example, the decision may be made to provide storage for operating, equalization, and fire reserve only, assuming any emergency storage would be available from the fire reserve or the City of Hines intertie. The City Council determined that all four storage components listed below should be considered when evaluating the City's potential storage needs. Refer to the design criteria presented on Figure 2-2 in Chapter 2 for further information on the storage components discussed herein.

Operating Storage

Operating storage is generally provided to facilitate operation of wells or booster pumps in a water system. For example, when water system demands result in the water level lowering in a reservoir, the water level will reach a certain point that can be used to trigger activation of well pumps to refill the reservoir. The storage needed to activate water supply sources is typically referred to as operating storage. This zone of operation can be set as desired but is often set to help ensure circulation occurs during each pump run cycle, allowing water to cycle through the reservoir to help maintain water quality while keeping the reservoir as full as possible.

As previously discussed, the bolted steel reservoir has a diameter of 100 feet and is 36 feet tall. Well No. 5 is currently set to begin operation when the reservoir water level reaches 33 feet and cease operation when the reservoir water level reaches 34 feet. It is recommended that the City expand this operating window to at least 3 feet to increase circulation. For the purpose of this WSMP, an operating storage of 3 feet in the bolted steel reservoir is being used. This results in an operating storage of approximately 176,000 gallons.

Equalization Storage

Equalization storage should be provided to balance the difference between peak hour demand and water supply capacity during a peak day demand period. An empirical method for estimating the required equalization storage uses the difference between the peak hourly flow and the peak water supply availability for a specific number of peak hours per day. For the purposes of this evaluation, 2.5 hours of peak hourly flow has been assumed. Based on providing the current estimated peak hourly flow of 6,227 gallons per minute (gpm) for 2.5 hours and using the current supply available, equalization storage of 226,000 gallons is required. Due to the projected increase in population, the

required equalization storage is anticipated to increase to 324,000 gallons during the 20-year design period.

Fire Reserve

Reserve storage for fire suppression is usually determined from either the Insurance Services Office, Inc. (ISO) recommended fire flow or the fire flow recommended by the City's fire chief. Based on the typical maximum fire flow recommended by ISO, a 3,500 gpm fire flow with a two-hour duration has been set as the design fire flow for the City as discussed in Chapter 2. A total of 420,000 gallons of fire reserve storage is needed to sustain a fire flow of 3,500 gpm for a two-hour duration.

Emergency Reserve and Hines Intertie

Emergency storage is usually provided for a minimum of one to three days' supply in the event of a power outage, mechanical problems, or other problem that would interrupt the reliable supply of water. In most cases, this would be the minimum amount of time to repair or replace a well pump or other equipment. In addition to storage reserves, the City does have an emergency power supply to operate Well No. 4 in the event of a power outage and a mobile generator located at Well No. 5. To serve the City for one day of emergency reserve at the average daily demand, approximately 1.1 MG would be needed. The required emergency reserve is anticipated to increase to 1.2 MG during the 20-year planning period.

It should be noted that an interconnection between the Burns and Hines water systems exists. A bi-directional PRV is located at this connection and is reported to allow water to move between the two systems in times of low pressure in either system. The City should maintain this PRV and essentially utilize the City of Hines's water system as a secondary emergency water source. A formal agreement between the two cities should be developed or re-established. The PRV needs to be inspected on an annual basis and verified to be operating properly.

Storage Components Summary

Regarding all four of the storage components discussed previously, a total of approximately 1.9 MG of storage is needed to meet current demands. Currently, the City's 2.0 MG storage capacity exceeds the total recommended storage for operating storage, equalization storage, fire reserve, and emergency reserve of approximately 1.9 MG. Future storage needs may exceed the projections shown on Figure 2-2 if further development of high water use industries in the industrial park occurs. Based on the projections shown on Figure 2-2, the City may need additional storage of approximately 127,000 gallons. However, this assumes extreme situations with power outages and fire events. With the City's ability to produce backup power and the intertie with the City of Hines, it is not recommended that the City construct storage improvements at this time.

Preserving Reservoir Water Quality

To preserve water quality in storage reservoirs, water needs to adequately circulate in and out of the reservoir. This is often done by providing separate inlet and outlet pipes to and from reservoirs and, when possible, connecting a water supply source directly to the reservoir. When the water level in the reservoir drops, the water supply source can be called to fill the reservoir, providing a continuous fresh supply of water from the reservoir into the water distribution system.

The existing operational situation with the City's 2.0 MG glass-fused-to-steel bolted reservoir and the remote water supply sources can potentially limit circulation. When a reservoir has a common transmission pipe allowing water in and out of the reservoir, water flows out of the reservoir to the system, resulting in a declining water level in the reservoir. Eventually, the City's water supply pumps are called to operate to fill the reservoir, which reverses the flow in the transmission main to fill the reservoir back up. Unless a significant volume of water is taken from the reservoir in each cycle, the water does not get fully exchanged in the transmission line. This could lead to water stagnation and water quality issues. Fresh supply water could simply be moved back and forth in the transmission line and not actually be delivered to the reservoir. The City's existing 2.0 MG glass-fused-to-steel bolted reservoir is currently operating in this manner. This concept is visually presented on Figure 4-1. Stagnant water that is not properly exchanged in the reservoir will show a drop in chlorine levels, potentially allowing bacteria and other organisms to develop in the water. Ideally, the reservoir would be supplied with water from a dedicated supply source and the reservoir inlet pipe could be installed on the opposite side of the reservoir from the outlet pipe with an inlet nozzle to encourage water circulation. With the City's existing reservoir piping alignment, it is recommended that the City periodically consume up to 15 feet of the reservoir level prior to replenishing the supply from the supply source. This will prevent water stagnation and circulate fresh water into the system. Another option to prevent water stagnation in the City's reservoir could be adding a mixing device as indicated in the Engineering America reservoir inspection report, shown in Appendix J.

Storage Reservoir Alternatives

No storage reservoir alternatives were developed for this WSMP, as the City currently has adequate storage capacity to meet current and future needs.

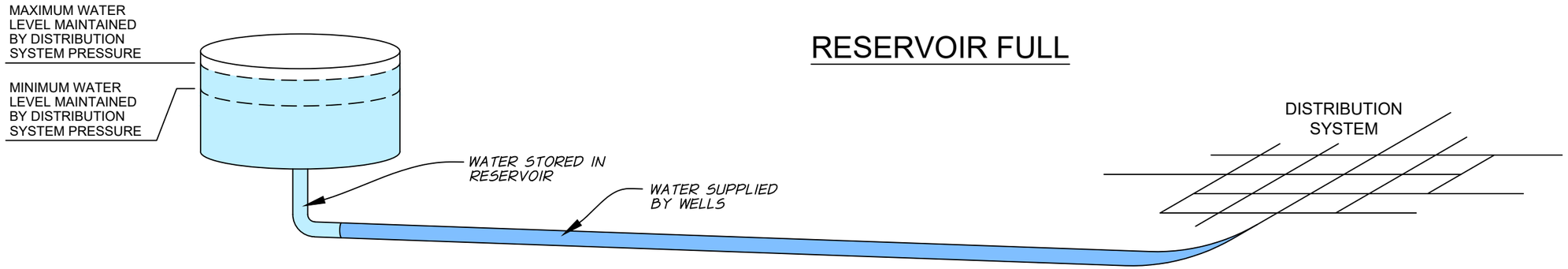
Summary

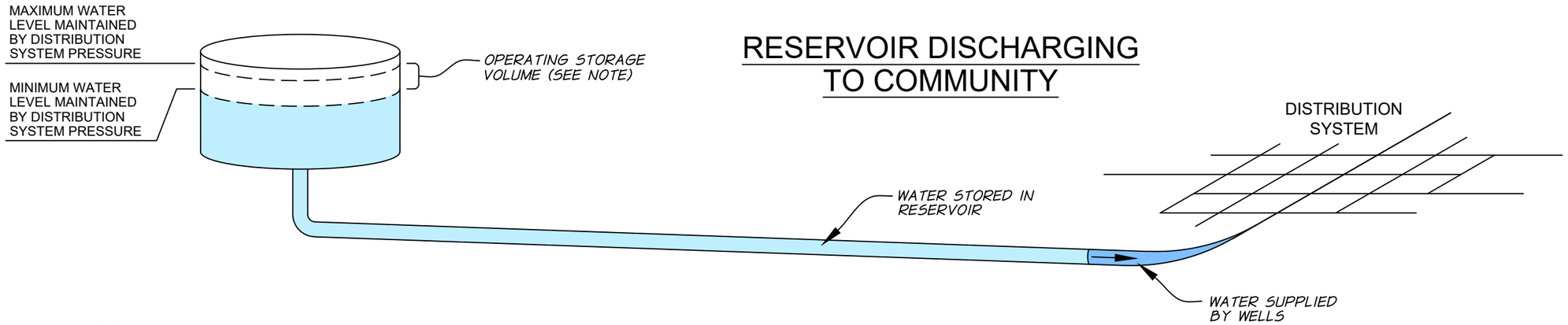
The City currently has one operating storage reservoir, the 2.0 MG bolted steel reservoir. The reservoir is in overall good condition and improvements are not currently required for the City of Burns to continue to reliably serve its users. The needed storage for the 2041 planning period is approximately 2.1 MG. However, as previously discussed, these storage requirements would be under extreme circumstances. The current storage volume is approximately 2.0 MG.

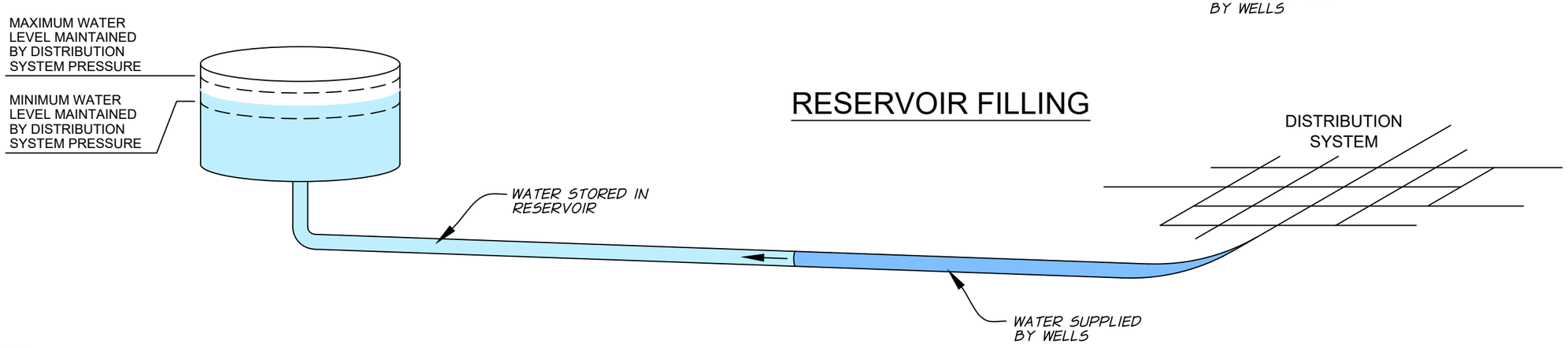
System pressure is provided by the elevation of the bolted steel reservoir, which essentially "floats" off of the distribution system. Static water system pressures throughout the system appear to be adequate, with static system pressures between approximately 40 and 80 psi. System pressures are also separated into three separate pressure zones, regulated by the City's seven PRVs and the Fairview Heights Booster Pump Station.

It is recommended the bolted steel reservoir be maintained and inspected on a regular basis to ensure all repairs are performed in a timely manner. As future development occurs an additional storage reservoir may need to be added.

Also, it is recommended a formal agreement between the City of Burns and the City of Hines be developed or re-established for the bi-directional PRV located between the cities.







NOTE

IF OPERATING STORAGE VOLUME IS NOT LARGE ENOUGH, THE WATER STORED IN THE RESERVOIR MAY NOT BE EXCHANGED WITH FRESH WATER SUPPLIED BY THE WELLS THROUGH THE DISTRIBUTION SYSTEM.

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CITY OF
BURNS, OREGON
WATER SYSTEM MASTER PLAN

2 MG GLASS-FUSED-TO-STEEL BOLTED RESERVOIR WATER EXCHANGE SCHEMATIC

FIGURE
4-1

Chapter 5 - Distribution System

Introduction

This chapter discusses the City of Burns' existing water distribution system, which delivers water to residential and commercial users. Components of the distribution system include pipelines, isolation and control valves, water meters, water service lines, and fire hydrants. The distribution system has been evaluated for both present and future needs. Improvements have been developed to address identified deficiencies and provide future service to help meet both Oregon Health Authority - Drinking Water Services (DWS) requirements and Oregon Fire Code (OFC) fire flow requirements. Cost estimates for the recommended distribution system improvements are presented at the end of this chapter.

Existing System

Historical information for the City's water distribution system was obtained from the Water System Master Plan (WSMP) prepared in 1998 by M.A. Palmer & Sons, and from City water system maps provided by the City of Burns and the Harney County GIS Department.

The City's original distribution system was constructed of steel and cast-iron pipe ranging in size from 4 to 12 inches in diameter. In 1976, a major water system improvements project was completed that included replacing small and older steel pipes along with major looping of the water distribution system. In 2002, another improvements project was completed that included the installation of a 16-inch polyvinyl chloride (PVC) transmission pipeline from the reservoir to the distribution system along with other new 8-inch PVC pipe. The 2002 improvements project also included construction of the reservoir and seven pressure reducing valve (PRV) stations to create two pressure zones within the distribution system. The locations of the water system's primary components are shown on Figure 1-2 in Chapter 1.

The existing distribution system layout, including fire hydrant locations and pipe size and locations, is shown on the Existing Water System Map contained in a pocket at the end of this WSMP. Available resources were utilized to make the map as accurate as possible. There may be inaccuracies in the depiction of the water distribution system layout, and the possibility exists that water distribution system lines and other features are present at locations not shown on the map or are not positioned as shown. The Existing Water System Map has been prepared electronically; therefore, if distribution system main lines or other system features are added in the future, the map can easily be updated so the City has the most accurate and up-to-date map available.

The Existing Water System Map developed as part of this WSMP shows that approximately 63 percent of the distribution system piping is composed of 6-inch or larger diameter pipes. The remaining 37 percent is 2- and 4-inch diameter pipes, with the majority being 4-inch. Many of the 4-inch diameter pipes are believed to be the original steel or cast-iron pipes. Both the 2- and 4-inch diameter pipelines limit hydraulic capacity and are too small to support fire hydrants.

In general, the distribution system contains some dead-end and/or undersized main lines exist, which can limit capacity and water circulation in the system. These areas are discussed in more detail later in this chapter.

Water Meters

All services within the City's system are metered, including City-owned properties. The City routinely maintains meters and replaces them as necessary. The City should continue to maintain and replace meters as required.

Water Loss

A periodic audit of the volume of water supplied to the system versus the volume of water being metered and used by customers is an important monitoring activity the City should perform. To complete an accurate water audit, the City would need to compare master meter readings from each water supply source with the cumulating meter readings of all users.

Implementing a good water auditing method would help ensure water is being adequately accounted for in the City's distribution system and would 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, areas of system leakage can be isolated, and many other operational advantages can be realized. The details of conducting a water audit can be provided to the City through multiple resources, including the American Water Works Association.

Distribution System Pressure

As discussed in Chapter 4, the City of Burns has three pressure zones serving the distribution system. The upper and lower zone pressures are provided by the elevation of the bolted steel reservoir. The third pressure zone supplies flow and pressure to Fairview Heights through the Fairview Heights Booster Pump Station. Elevations within the City of Burns range from approximately 4,145 to 4,334 feet above mean sea level.

Fairview Heights Booster Pump Station.

The upper and lower zone pressures are provided by the bolted steel reservoir that operates at a high water level of approximately 4,365 feet. According to the hydraulic model completed as part of this WSMP, the normal operating pressures in the high- and low-pressure zones during 2021 peak daily demand (PDD) range from approximately 51 to 85 pounds per square inch (psi) in the upper pressure zone and approximately 51 to 74 psi in the lower pressure zone. Water is conveyed and pressures are reduced from the upper zone to the lower zone through seven PRV stations.

The Fairview Heights pressure zone is fed from the Fairview Heights Booster Pump Station. The booster pump station consists of two pumps with a capacity of 150 gallons per minute (gpm) and 480 gpm, respectively. The pumps pull water from the lower pressure zone and boost the pressure to serve the Fairview Heights area. The pressures within the Fairview Heights pressure zone range from approximately 75 to 108 psi utilizing the 2021 PDD within the hydraulic model. The City has indicated one of the booster pump motors required replacement in 2020. Since then, there have been no issues.

The City of Burns generally has adequate pressure throughout the system as shown on Figure 5-1.

Distribution System Water Quality

Coliform Bacteria

As discussed in Chapter 3, the City typically obtains three routine samples per month from the distribution system for analysis of total and fecal coliforms. Routine sample results on file with the DWS were reviewed for the period from January 2002 through March 2021. These test results are included in Appendix H. For this period, ten samples tested positive for total coliforms. The most recent sample occurred in November 2010. No samples over this period were positive for fecal coliforms or *E. coli* bacteria. Based on these test results, it does not appear that the City has any regularly occurring issues with coliform bacteria in the distribution system.

Lead and Copper

The City has also obtained samples from the distribution system to satisfy chemical analysis requirements for total lead and copper. Tests were conducted in 1993, 1994, 1996, 1997, 1998, 2001, 2004, 2008, 2011, 2014, 2017, and 2020. Initially, 20 samples were obtained for the 1993 and 1994 tests. Ten samples were obtained for subsequent test events after 1994, with the exception of 2014 when the City obtained 20 samples. The DWS database lists the highest lead concentrations detected for these sampling events, which ranged from 0.0000 to 0.0093 milligrams per liter (mg/L). The U.S. Environmental Protection Agency (EPA) action level for total lead in municipal water systems is 0.015 mg/L. Copper was also detected in the samples at maximum concentrations ranging from 0.0000 to 0.1100 mg/L. The EPA action level for copper is 1.3 mg/L. Based on the lead and copper analytical results for sampling from 1993 to 2020, all detected concentrations of lead and copper were less than their corresponding EPA action levels. A copy of the lead and copper analytical results summary sheet from the DWS database is included in Appendix H.

Fire Protection

General

The City's existing water supply, storage, and distribution system provides adequate fire protection to most of the system, although some areas of the City do not have adequate fire protection. DWS regulations and the 2019 OFC require the entire water system remain above 20 psi residual pressure while fire flow demands are placed on the system. The City of Burns generally has adequate pressure in the system during fire flow events but has several areas that do not provide the recommended fire flow discussed in Chapter 2. A computer model of system fire flows, along with recommended improvements to address fire flow deficiencies, is discussed in more detail later in this chapter.

Fire Hydrant Flow Tests

For this WSMP, the City completed flow tests on several fire hydrants in the distribution system. These test results have been tabulated and are included in Appendix K for reference. Based on the City's individual hydrant flow test results, the City's water system is able to deliver fire flows ranging from approximately 500 to 1,275 gpm with residual pressures of 34 to 68 psi at nearby hydrants. These flows are the measured flows observed during flow tests. Higher fire flows may be available if more than one hydrant is tested at a time and system pressures are allowed to drop further. It

should also be noted that the operating status of the wells were unknown during the time of these tests. It is possible that flows could be higher or lower depending on the hydrant location with respect to the wells and the operating status of the wells during the fire flow event.

Theoretical Fire Flows

In some cases, such as in Insurance Services Office, Inc. (ISO) fire hydrant flow capacity reporting, the available flow from a fire hydrant is calculated using a theoretical formula. The formula assumes the water supply "feeding" the tested area is generally not limited and the 20 psi residual pressure resulting from the fire flow occurs where the hydrants are being tested. In reality, there are likely other connections in the distribution system, such as users in the City on small diameter main lines or at higher elevation areas, that would fall below 20 psi sooner than the formula predicts. Considering this, the theoretical formula can overestimate available fire flows at 20 psi. The hydraulic computer modeling completed as part of this WSMP, as discussed later in this chapter, should present more accurate available fire flows.

Fire Hydrant Limitations

The fire flow tests completed by the City are generally conducted by opening one fire hydrant at a time, while ISO fire flow tests are conducted by opening multiple fire hydrants at one time. If large enough main lines are present, individual fire hydrants can typically provide flows in the range of 800 to 1,200 gpm from a small port and nearly 2,000 gpm from both small ports and the larger "pumper" port, assuming the hydrant has a large port. During a fire there will be some water use from others on the system, so the actual available flow in the distribution system will be less due to other uses and pipeline pressure losses resulting from higher flows.

Generally, the City's water system provides adequate fire flows to most of the City. However, several areas need improvement to provide adequate fire flows. The discussion presented herein is intended to provide caution concerning the actual available fire flows from the City's distribution system and fire hydrants. There are a few isolated areas within the City that have fire flows of 500 gpm or less. These areas have small diameter main lines feeding the fire hydrants and/or on dead-end lines. Commercial and industrial zoned areas have higher flows available than other portions of the City, but there are areas that do not meet the recommended fire flows of 3,500 gpm while maintaining 20 psi in the system.

Fire Hydrant Coverage

OFC outlines maximum recommended fire hydrant spacing depending on several factors, such as fire flow requirements of the area, the number of fire hydrants in the area, if the area is on a dead-end street or has limited access, etc. As required by the 2019 OFC, the maximum spacing between any two hydrants for a fire flow requirement of 1,750 gpm or less is 500 feet, and as little as 350 feet for a fire flow requirement of 3,500 to 4,000 gpm. The maximum required distance from any point of a street or road frontage to a hydrant is 250 feet for 1,750 gpm or less and 210 feet for 3,500 to 4,000 gpm.

The spacing of the City's existing hydrants was analyzed to identify areas not covered in accordance with the maximum spacing and frontage distance to a fire hydrant. The City's existing fire hydrants,

as identified on the Existing Water System Map, are typically spaced approximately 500 feet apart, although some areas of the City have hydrant coverage gaps.

To assist with the fire hydrant spacing analysis, a Fire Hydrant Coverage Map showing existing and proposed fire hydrants was prepared. This map is contained in a pocket at the end of this WSMP. In preparing the Fire Hydrant Coverage Map, the Existing Water System Map was utilized by placing 500-foot diameter circles around each existing hydrant, then adding the proposed hydrants, also with 500-foot diameter circles around each.

Approximately 199 existing fire hydrants are located in the City of Burns. Forty-seven hydrants are proposed to be added to the distribution system, 16 of which are considered "high priority" and 31 of which are considered "medium priority." If the proposed hydrants were to be located on existing pipes, the small diameter main lines would not provide adequate fire flow. If these hydrants are to be installed, it is recommended that the main line be upgraded to provide sufficient fire flow to the new hydrants. The improvements involving the 31 "medium priority" hydrants have been included in a "Future Distribution System Improvements" cost estimate. These improvements are discussed in more detail later in this chapter.

Areas with limited fire hydrant coverage become readily apparent on the map. Undeveloped areas were not included in this analysis, as it is assumed hydrants would be installed along with other required utilities when these areas are developed.

City staff and the local fire department have also indicated that the 36 existing fire hydrants are old and require replacement. It is recommended that these hydrants be replaced as part of an improvements project.

It should be recognized that this analysis was completed for general compliance to average recommended spacing and frontage distance to a hydrant. The City may wish to modify these requirements, depending on the fire flow demands of a particular area, as recommended by the City's fire chief. This analysis is intended to provide the City with a basic idea of areas lacking fire coverage. It is recommended the City install fire hydrants in areas needing improved coverage as part of an improvements project. All fire hydrant installations should be reviewed and approved by the City's fire chief.

Water System Modeling

General

As part of this WSMP, a detailed water model of the City's water system was developed to analyze system pressures, hydraulic capacity, and available fire flows from the City's fire hydrants. A general description and the results of each computer run performed for both the existing and improved water systems are described herein. More detailed information for the water model, including supporting data tables for each computer run, has been summarized in a separate bound document, titled "City of Burns, Oregon - Water System Computer Model Summary - 2021." It is recommended the reader refer to that document for additional computer model information.

To develop the model, the Existing Water System Map (included at the end of this WSMP) was first produced showing all pipes (location and size), pipe interconnections, and hydrant locations. On the

water model maps, each pipe was assigned a number for reference (e.g., P-45). Junctions at pipeline intersections and at key locations, such as hydrants, were assigned junction numbers (e.g., J-50 or H-20). The pipe and junction distribution system labels are shown on the map in the Water System Computer Model Summary. Elevations at the locations of water system features such as reservoirs, pipe connections, wells, hydrants, etc., were obtained from an elevation contour map developed utilizing light detection and ranging data.

The model evaluates pressure and flows in the distribution system during a simulated water use demand. Available fire flows are then determined under different demand conditions. Typical water system demands used for the computer model include the average daily demand (ADD) and the PDD previously discussed in Chapter 2.

The model also utilizes detailed information about the distribution system pipes. Each individual pipe was assigned a roughness coefficient. Typically, the roughness coefficient is based on the type of pipe material, such as PVC, ductile iron, asbestos cement, steel, etc., but the majority of the pipe material in the system is unknown. Where pipe type was known, the associated roughness for that pipe type was used. Most of the unknown pipe material is believed to be older steel pipe and a roughness coefficient for steel pipe was used. This allows the model program to calculate water main line pressure losses under any demand condition desired, including fire flow analyses. Junctions were identified in the model, which allowed the model to know where and at what elevation pipe intersections occur. Water demands can then be placed on the distribution system at each junction (node) to simulate ADD or PDD use demands.

Model Overview

The model of the City's water distribution system was developed utilizing the Innovyze InfoWater, Version 12.4. Demand scenarios for years 2021 and 2041 were derived from the design criteria presented in Chapter 2. Fire flow test data, provided by the City, were used to calibrate the model and check the accuracy compared to field conditions. The model was calibrated by adjusting pipe roughness coefficients to simulate available flows and system pressures similar to those reported in the City's fire hydrant tests, where possible. The model provided similar results for the majority of the fire flow tests that the City conducted. However, one area in the distribution system could not be calibrated to match the fire hydrant flow data. This area is located near Well No. 1, which is believed to have been operating during the City's fire flow. Flow from Well No. 1 was also added to the model during the calibration; however, the model was reducing the pressure, which would not have occurred in the field. The discrepancies between the model and system conditions in the field could be due to incorrect pipe sizes, missing pipe connections, or other field conditions. In general, the model depicts the existing system conditions relatively well based on the majority of the available hydrant test data. The Innovyze InfoWater model reports are included in the Water System Computer Model Summary.

A water model run provides distribution system pipe flows and junction pressure under a given demand on the system. To represent current conditions, the year 2021 water system demands were selected and distributed evenly among the junctions in the distribution system. The demand conditions used in modeling the system are as follows:

- Year 2021 PDD. The current PDD for the City of Burns is estimated to be 1,265 gallons per capita per day, or 2,491 gpm, at the current population of 2,835. With approximately 536

junctions in the existing system water model, this represents a PDD of approximately 4.65 gpm at each junction.

The existing system pressures under the above demand scenario are presented on Figure 5-1. As shown on Figure 5-1, the system pressure generally ranges between 50 and 85 psi, with a portion of the Fairview Heights area with pressures exceeding 100 psi. The City has adequate pressure to meet DWS regulations, and improvements are not required to provide additional pressure to the system.

Figure 5-2 presents the fire flow available in the existing system under the 2021 PDD. As discussed previously, fire flow capacities of 1,000 gpm are required in residential areas and approximately 3,500 to 4,000 gpm are required in commercial, industrial, and institutional areas, according to the OFC and as recommended by ISO. Figure 5-2 shows some significant areas in the system not capable of providing adequate fire flow. The southeast industrial area, some of the downtown commercial area, southwest residential area, and a few other isolated portions of the City are unable to provide adequate fire flows.

To provide adequate fire flow capacity, recommended distribution system improvements are shown on Figure 5-3. The distribution system improvements are separated into two categories. The proposed improvements shown as dashed lines are improvements that would increase existing pipe sizes while the improvements shown as solids lines are proposed pipe additions. All of the improvements shown would result in improved fire flows throughout the system along with removal of dead-end lines and improved system looping. As discussed previously, a total of 47 hydrants are proposed to be added to the system to meet spacing requirements. Thirty-one of the proposed hydrants would be located on smaller diameter main lines that would be unable to provide sufficient fire flows at the hydrant. The majority of the pipelines that are proposed to increase in size are 4-inch lines and are believed to be old steel lines that cause continual maintenance issues. These distribution system improvements are discussed in greater detail later in this chapter.

The model confirmed that, for the most part, the City's existing distribution system is fairly well looped, provides adequate pressures, and has adequate capacity for delivering fire flows to most residential areas. Other areas, particularly on the southeast industrial area, some of the downtown commercial area, southwest residential area, and a few other isolated portions of the system need improvements to meet fire flow requirements. The improvements shown on Figure 5-3 will help increase fire flows throughout the distribution system. Figure 5-4 presents the available fire flow in the water system after the proposed distribution system improvements are incorporated. Figure 5-4 confirms that after the improvements are incorporated, the system should be able to provide at least 3,000 gpm to the major commercial and industrial portions of the system with only a couple of isolated areas providing slightly less.

Limitations of Water Model Results

It is important to note that reported fire flows from the model analysis indicate theoretical distribution system piping capacity. Actual field conditions and headloss in fire hydrants may reduce fire flows beyond what is indicated. Individual fire hydrants generally also have a maximum capacity of 1,000 to 1,500 gpm, so multiple hydrants may need to be operated to attain the flows indicated in the model.

Undersized Main Lines

Many cities have adopted minimum water main line size standards requiring at least 6-inch diameter and, often, 8-inch diameter be installed when a fire hydrant is required. The significant capacity advantages of an 8-inch diameter main line compared to a 6-inch line normally outweigh the small additional cost to install an 8-inch line.

For the purpose of this WSMP, undersized mains have been identified as those mains that do not allow the fire demand and minimum pressure criteria shown on Figure 2-2 in Chapter 2 to be met. Several areas within the City's distribution system have undersized main lines. The improvements shown in dashed lines on Figure 5-3 are described in more detail below.

- Hillcrest Drive - A 4-inch diameter line extends from the booster pump station approximately 1,060 feet to the intersection of Hillcrest Drive and Rock Avenue.
- W. Taylor Street - A 6-inch diameter line starts at the intersection of W. Taylor Street and Hillcrest Drive and continues for approximately 85 feet to the intersection of W. Taylor Street and Fairview Heights Loop.
- S. Shasta Place - A 4-inch diameter line extends from the intersection of S. Shasta Place and W. Taylor Street approximately 560 feet to approximately the intersection of S. Shasta Place and W. Filmore Street.
- W. Filmore Street - A 4-inch diameter line extends from the intersection of S. Shasta Place and W. Filmore Street approximately 700 feet to approximately the intersection of W. Filmore Street and W. Pierce Street.
- W. Pierce Street - A 4-inch diameter line extends west along W. Pierce Street from the intersection of W. Pierce Street and W. Filmore Street approximately 590 feet.
- S. Egan Road - A 4-inch diameter line extends south from the intersection of S. Egan Road and W. Arthur Street approximately 925 feet.
- S. Harney Avenue - A 4-inch diameter line extends south from the intersection of S. Harney Avenue and Highway 20 approximately 1,330 feet to the intersection of S. Harney Avenue and W. Taylor Street.
- S. Fairview Avenue - A 4-inch diameter line extends south from the intersection of N. Fairview Avenue and W. Madison Street approximately 1,900 feet to the intersection of S. Fairview Avenue and W. Taylor Street.
- S. Buena Vista Avenue - A 4-inch diameter line extends south from the intersection of S. Buena Vista Avenue and Highway 20 approximately 390 feet to the intersection of S. Buena Vista Avenue and W. Jackson Street.
- E. Railroad Avenue - A 4-inch diameter line extends southwest from the intersection of E. Railroad Avenue and S. Alder Avenue approximately 420 feet to the intersection of E. Railroad Avenue and S. Broadway Avenue.
- S. Date Avenue - A 4-inch diameter line extends from the southern end of S. Date Avenue approximately 2,350 feet north to the intersection of S. Date Avenue and E. Jackson Street, then heads directly west approximately 330 feet to E. Industrial Street.

- S. Gordonia Avenue - A 4-inch diameter line extends south from approximately the intersection of S. Gordonia Avenue and Highway 78 approximately 750 feet to the intersection of S. Gordonia Avenue and E. Van Buren Street.
- E. Van Buren Street - A 4-inch diameter line extends west from the intersection of E. Van Buren Street and S. Gordonia Avenue approximately 1,100 feet to S. Date Avenue.
- S. Fir Avenue - A 4-inch diameter line extends south from the intersection of E. Van Buren Street and S. Fir Avenue approximately 490 feet.
- Highway 78 - A 4-inch diameter line extends west from approximately the intersection of N. Gordonia Avenue and Highway 78 approximately 700 feet to the intersection of Highway 78 and N. Elm Avenue.
- S. Elm Avenue - A 4-inch diameter line extends south from the intersection of Highway 78 and S. Elm Ave approximately 450 feet to the intersection of S. Elm Avenue and E. Jackson Street.
- Highway 78 - A 6-inch diameter line extends west from the intersection of Highway 78 and S. Elm Avenue approximately 1,430 feet to the intersection of Highway 78 and Highway 20.
- N. Alder Avenue - A 6-inch diameter line extends north from the intersection of Highway 78 and N. Alder Avenue approximately 1,130 feet to the intersection of N. Alder Avenue and E. Washington Street.
- N. Birch Avenue - A 4-inch diameter line extends north from the intersection of Highway 78 and N. Birch Avenue approximately 1,130 feet to the intersection of N. Birch Avenue and E. Washington Street.
- N. Cedar Avenue - A 4-inch diameter line extends north from the intersection of E. D Street and N. Cedar Avenue approximately 270 feet to the intersection of N. Cedar Avenue and E. E Street.
- E. E Street - A 4-inch diameter line extends east from the intersection of E. E Street and N. Cedar Avenue approximately 150 feet to the intersection of N. Date Avenue and E. E Street.
- N. Date Avenue - A 4-inch diameter line extends north from the intersection of E. E Street and N. Date Avenue approximately 1,970 feet.
- N. Broadway Avenue - A 4-inch diameter line extends north from the intersection of N. Broadway Avenue and W. Park Street approximately 1,500 feet along N. Broadway Avenue.
- N. Alvord Avenue - A 6-inch diameter line extends north from the intersection of N. Alvord Avenue and E. Washington Street approximately 1,090 feet to the intersection of N. Alvord Avenue and E. D Street.
- N. Alvord Avenue - A 4-inch diameter line extends north from the intersection of N. Alvord Avenue and W. D Street approximately 250 feet to the intersection of N. Alvord Avenue and W. E Street.
- N. Buena Vista Avenue - A 4-inch diameter line extends north from the intersection of W. B Street and N. Buena Vista Avenue approximately 540 feet to the intersection of N. Buena Vista Avenue and W. D Street.
- N. Court Avenue - A 4-inch diameter line extends north from the intersection of N. Court Avenue and W. Adams Street approximately 850 feet to the intersection of N. Court Avenue and W. B Street.

- N. Diamond Avenue - A 4-inch diameter line extends north from the intersection of N. Diamond Avenue and W. Adams Street approximately 290 feet to the intersection of N. Diamond Avenue and W. Washington Street.
- W. Monroe Street - A 6-inch diameter line extends west from the intersection of W. Monroe Street and W. Madison Street approximately 300 feet.
- W. Madison Street - A 6-inch diameter line extends north from the intersection of W. Monroe Street and W. Madison Street approximately 285 feet, then heads east 1,040 feet to the intersection of W. Madison Street and N. Imperial Avenue.
- N. Imperial Avenue/W. Adams Street - A 6-inch diameter line extends north from the intersection of N. Imperial Avenue and W. Madison Street approximately 550 feet, then heads east approximately 930 feet onto W. Adams Street.
- N. Harney Avenue/N. Grand Avenue - A 4-inch diameter line extends east from N. Harney Avenue approximately 240 feet to N. Grande Avenue. The line runs approximately 30 feet to the north of W. Madison Street.

Dead-End Main Lines

The City's distribution system is fairly well looped. However, there are a few areas in the distribution system with dead-end main lines. It is difficult to eliminate all dead-end water mains from a system. Physical limitations, such as stream crossings, state highway crossings, undeveloped land, or other limitations (such as no customers in the area) can result in dead-end lines. Often these lines are eventually looped as expansion occurs. The areas where new mains are proposed to eliminate dead-end lines are shown as solid lines on Figure 5-3 and are as follows:

- Highway 20 - An 8-inch diameter line dead-ends approximately 560 feet southwest of the intersection of Highway 20 and W. Pierce Street on the east side of Highway 20. This line can be connected to a 6-inch line on the west of Highway 20.
- W. Buchanan Street and W. Johnson Street - A 6-inch diameter line dead-ends approximately 1,370 feet east of the intersection of W. Buchanan Street and S. Egan Avenue; a 6-inch diameter line dead-ends approximately 1,370 feet east of the intersection of W. Johnson Street and S. Egan Avenue. These lines can be connected to eliminate the dead-ends.
- S. Fir Avenue - A 4-inch diameter line dead-ends approximately 475 feet south of the intersection of S. Fir Avenue and E. Van Buren Street. This line can be connected to the line on S. Date Avenue, approximately 700 feet to the west.
- N. Court Avenue and N. Egan Avenue - To create a loop and increase redundancy, a proposed line will extend from the intersection of N. Court Avenue and W. Adams Street approximately 540 feet to the intersection of W. Adams Street and N. Egan Avenue.
- W. Adams Street - A 6-inch diameter line dead-ends approximately 110 feet west of the intersection of W. Adams Street and N. Egan Avenue. This line can be connected to the 10-inch line on N. Egan Avenue to eliminate the dead-end.
- N. Harney Avenue and W. G Street - A 6-inch diameter line dead-ends approximately 100 feet southwest of the intersection of N. Harney Avenue and N. Kearney Avenue; a 4-inch diameter

line dead-ends approximately 60 feet to the east of the intersection of W. G Street and N. Harney Avenue. These two lines can be connected to eliminate the dead-ends.

- W. C Street - A 12-inch diameter line at the intersection of W. C Street and N. Fairview Avenue can be connected to a 10-inch diameter line at the intersection of W. C Street and N. Egan Avenue to create a loop and increase redundancy.

It is important to note that easements may be required across private property to loop these existing main lines. These easements would allow both the pipe installation and future maintenance activities to occur. Ideally, easements for water mains are 20 feet wide but are recommended to be a minimum of 10 feet wide.

A GIS system establishes a web-based mapping and information tracking system for the City's water utility system assets. The GIS database system is built around an accurate water system map that has water system features, such as valves, hydrants, key features, etc., located very accurately with survey quality coordinates. The intent of this accurate location exercise is so water system features can be located at night, under snowpack, when buried by gravel and dirt, when paved over accidentally, etc. The database also allows the user to populate data within the database for system features, such as valve size and type, when last exercised, etc. Water system operators have found property prepared and used GIS database systems become invaluable to the everyday operation, maintenance, and tracking of water system components and performance.

The first step to develop a GIS database system is to convert existing CAD-based water maps into a GIS database map. This conversion process typically involves, at a minimum, the key features of the water system. These features include well and booster pump system locations, reservoir locations, water main lines, valves, hydrants, water meters, PRVs, main line blowoffs, etc. These features are accurately located to prepare a very accurate water system map. The database includes data tables for each feature to allow data to be entered into the system, such as hydrant type, fire flow capacity, when last exercised, painted, etc.

The second step is to develop the online database system for operator and staff use. The database system allows for water system operators to access water system map information on a laptop computer, tablet, or a smart phone. The database is prepared using available aerial imagery so the features can be accurately shown relative to real area features. The GIS database also allows the water system user with the ability to enter system data while in the field, using a smart phone, so the water system database is updated regularly by City staff.

Recommended Distribution System Improvements

In general, the City's distribution system is fairly well looped but has several undersized main lines and dead-end lines. The undersized and dead-end main lines in the system result in fire flow capacity limitations and water circulation issues. Some of these lines have been recommended for upgrading where improved fire flow capacities are needed. It is recommended the City complete improvements to the distribution system to eliminate as many undersized main lines as possible, loop the dead-end main lines, and provide improved system fire flow capacities in areas lacking adequate fire flows. Key main line improvements have been identified to meet the following objectives:

1. Improve water quality and circulation by replacing old, undersized, deteriorating pipe.

2. Increase flow capacity in the existing system to provide adequate fire flows to residential, commercial, and industrial areas, and improve water circulation.

3. Install fire hydrants and associated piping to better cover residential, commercial, and industrial areas.

Recommended distribution system improvements are shown on Figure 5-3. The improvements shown on Figure 5-3 have been separated into two categories to help the City prioritize the improvements. The two categories are "Existing System Improvements" and "Long-term Improvements." The following provides a general description of each improvement category.

Existing System Improvements

The highest priority improvements are included in the "Existing System Improvements." These improvements include the installation of 16 new fire hydrants and distribution system piping to improve water quality and circulation by replacing old, undersized, and deteriorating main lines. The proposed distribution piping improvements will eliminate dead-ends and ultimately increase fire flows. The proposed piping improvements can be seen on Figure 5-3.

Long-Term Improvements

To keep the project financially feasible, the improvements that are considered a "medium priority" have been categorized into "Long-term Improvements." The majority of these improvements include the installation of fire hydrants and associated piping throughout the distribution system to help provide adequate flows. Although these improvements are considered "medium priority," it is strongly recommended the City pursue these improvements during the 20-year planning period. The proposed long-term improvements are shown on Figure 5-3.

A cost estimate detailing the improvements for both categories is shown on Figure 5-5.

Maintenance Records

One of the important operational functions regarding the City's distribution system is to keep accurate records of various system components. These records become valuable as time passes in terms of planning future improvements and replacing old or deteriorated components. It is recommended the City keep accurate records on all water meters installed so, in the future, these meters can be periodically pulled, checked for accuracy, and replaced as needed. The City should also keep records of all hydrants, valves, and other distribution system components. As discussed previously in this chapter, the City can implement a GIS mapping system to assist in record keeping of the City's water system assets. The distribution system evaluation in this WSMP did not include determining existing fire hydrant, valve, and water meter condition. Hydrants should be checked, at least annually, for proper operation, and all water valves should be exercised, at least annually, with records kept on their operating condition, location, etc.

Summary

In general, the City's distribution piping system is in relatively good condition, although several areas currently cannot provide adequate fire flow. Undersized, dead-end, and old distribution system piping

within the City lead to low fire flow capacity and issues with water circulation in these areas; therefore, some areas need improvement, namely areas with undersized main lines and dead-end lines. Improvements outlined in this chapter include installing water main lines to replace old, undersized, and deteriorating lines; improving system looping, circulation, and fire flow capacities; and installing fire hydrants to improve hydrant coverage. These improvements were selected to address key areas of concern to improve fire flow capacity in the system.

LEGEND

- HYDRANT
- EXISTING RESERVOIR
- EXISTING WELL
- BOOSTER PUMP STATION
- 50 PSI CONTOUR
- 60 PSI CONTOUR
- 70 PSI CONTOUR
- 80 PSI CONTOUR
- 90 PSI CONTOUR
- 100 PSI CONTOUR
- EXISTING DISTRIBUTION SYSTEM
- BURNS CITY LIMITS
- HINES CITY LIMITS
- BURNS URBAN GROWTH BOUNDARY

1,500 0 1,500

SCALE IN FEET

NOTE

1. SYSTEM PRESSURES SHOWN ARE BASED UPON A HYDRAULIC COMPUTER MODEL. SYSTEM PRESSURES SHOULD BE FIELD VERIFIED PRIOR TO MAKING IMPROVEMENTS.

WELL NO. 1
AND WELL NO. 2

WELL NO. 3

2 MG RESERVOIR

FAIRVIEW HEIGHTS
BOOSTER PUMP STATION

WELL NO. 5

CITY OF HINES
CONNECTION

WELL
NO. 4

4308 ft
4293 ft
4157 ft
4155 ft
4150 ft
4248 ft
4341-ft
4158 ft
4147 ft
4149 ft
4510 ft

Burns
Indian Village
Valley Golf Club
Highway 78
Highway 205
Silvies River

Armtz-Rd
Monroe-Ln
W-Monroe-St
W-Madison-St
W-Jackson-St
W-Taylor-St
W-Fillmore-St
W-Pierce-St
W-Roe-Davis-Ave
W-King-Ave
Hines-Blvd
Hines-Ct
Culp-Ln
Switch-Canyon-Rd
W-Pettibone
Foley-Dr
Fry-Rd
Stafford-Ln-S
N-Date-Ave
N-Broadway-Ave
E-Washington-St
E-Adams-St
E-Jefferson-St
E-Madison-St
E-Rivers-Edge-Dr
S-Egan-Ave
S-Egan-Rd
S-Court-Ave
N-Tennyson-Ave
N-Saginaw-Ave
N-Roanoke-Ave
S-McGowan-Ave
S-Fairview-Ave
N-Fairview-Ave
N-Buena-Vista-Ave
N-Alvord-Ave
N-Cedar-Ave
N-Egan-Ave
N-Laurel-Ave
S-Date-Ave
E-Indiana-St
S-Railroad-Ave
N-Railroad-Ave
Oregon-Ave

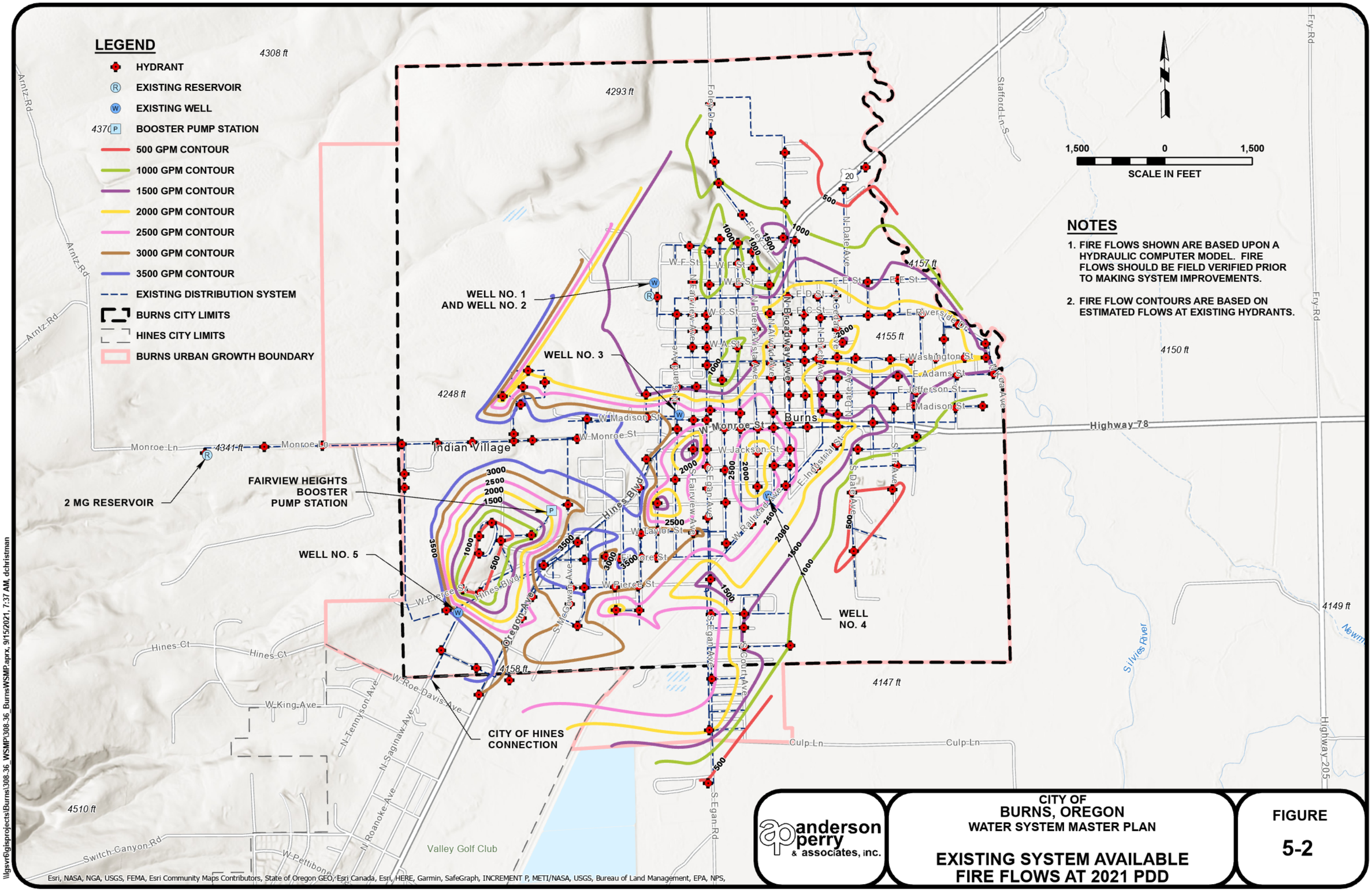
Esri, NASA, NGA, USGS, FEMA, Esri Community Maps Contributors, State of Oregon GEO, Esri Canada, Esri, HERE, Garmin, SafeGraph, INCREMENT P, METI/NASA, USGS, Bureau of Land Management, EPA, NPS,

anderson perry & associates, inc.

CITY OF
BURNS, OREGON
WATER SYSTEM MASTER PLAN

EXISTING SYSTEM PRESSURES
AT 2021 PDD

FIGURE
5-1



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anderson perry & associates, inc.

CITY OF
BURNS, OREGON
WATER SYSTEM MASTER PLAN

EXISTING SYSTEM AVAILABLE FIRE FLOWS AT 2021 PDD

FIGURE
5-2

LEGEND

- EXISTING RESERVOIR
- EXISTING WELL
- BOOSTER PUMP STATION
- EXISTING DISTRIBUTION SYSTEM

EXISTING SYSTEM IMPROVEMENTS

- INCREASE PIPE SIZE TO 8"
- INCREASE PIPE SIZE TO 10"
- INCREASE PIPE SIZE TO 12"
- 8" PIPE ADDITION
- 10" PIPE ADDITION
- 12" PIPE ADDITION
- NEW FIRE HYDRANT ASSEMBLY
- EXISTING FIRE HYDRANT ASSEMBLY TO BE REPLACED

LONG TERM IMPROVEMENTS

- INCREASE PIPE SIZE TO 8"
- 8" PIPE ADDITION
- BURNS CITY LIMITS
- HINES CITY LIMITS
- BURNS URBAN GROWTH BOUNDARY

1,500 0 1,500
SCALE IN FEET

WELL NO. 1 AND WELL NO. 2

ELEVATED RESERVOIR (NOT IN USE)

WELL NO. 3

2 MG RESERVOIR

FAIRVIEW HEIGHTS BOOSTER PUMP STATION

WELL NO. 5

WELL NO. 4

CITY OF HINES CONNECTION

Burns

Indian Village

Valley Golf Club

4308 ft
4293 ft
4370 ft
4341 ft
4248 ft
4157 ft
4155 ft
4150 ft
4149 ft
4147 ft
4158 ft
4510 ft

Esri, NASA, NGA, USGS, FEMA, Esri Community Maps Contributors, State of Oregon GEO, Esri Canada, Esri, HERE, Garmin, SafeGraph, INCREMENT P, METI/NASA, USGS, Bureau of Land Management, EPA, NPS,

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CITY OF
BURNS, OREGON
WATER SYSTEM MASTER PLAN

RECOMMENDED DISTRIBUTION SYSTEM IMPROVEMENTS

FIGURE
5-3

LEGEND

- HYDRANT
- EXISTING RESERVOIR
- EXISTING WELL
- BOOSTER PUMP STATION
- 1000 GPM CONTOUR
- 1500 GPM CONTOUR
- 2000 GPM CONTOUR
- 2500 GPM CONTOUR
- 3000 GPM CONTOUR
- 3500 GPM CONTOUR
- DISTRIBUTION SYSTEM PIPING
- BURNS CITY LIMITS
- HINES CITY LIMITS
- BURNS URBAN GROWTH BOUNDARY

WELL NO. 1
AND WELL NO. 2

ELEVATED RESERVOIR
(NOT IN USE)

WELL NO. 3

FAIRVIEW HEIGHTS
BOOSTER
PUMP STATION

2 MG RESERVOIR

WELL NO. 5

WELL
NO. 4

CITY OF HINES
CONNECTION

1,500 0 1,500
SCALE IN FEET

NOTES

1. FIRE FLOWS SHOWN ARE BASED UPON A HYDRAULIC COMPUTER MODEL. FIRE FLOWS SHOULD BE FIELD VERIFIED PRIOR TO MAKING SYSTEM IMPROVEMENTS.
2. FIRE FLOW CONTOURS ARE BASED ON ESTIMATED FLOWS AT EXISTING HYDRANTS.

4308 ft
4293 ft
4370 ft
4341 ft
4248 ft
4157 ft
4155 ft
4150 ft
4158 ft
4147 ft
4149 ft
4510 ft

Burns
Indian Village
Valley Golf Club
Highway 78
Highway 205
Culp Ln
Monroe Ln
W Monroe St
W Jackson St
W Pierce St
W King Ave
Hines Blvd
Hines Ct
Switch Canyon Rd
W Pettibone
Armtz Rd
Fry Rd
Stafford Ln S
Silvies River
Newm

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CITY OF
BURNS, OREGON
WATER SYSTEM MASTER PLAN

PROPOSED SYSTEM AVAILABLE
FIRE FLOWS AT 2041 PDD

FIGURE
5-4

PRELIMINARY COST ESTIMATE
(YEAR 2021 COSTS)

NO.	DESCRIPTION	UNIT	UNIT PRICE	ESTIMATED QUANTITY	TOTAL PRICE
Existing Distribution System Improvements					
1	Mobilization/Demobilization	LS	$ 225,000	All Req'd	$ 225,000
2	Temporary Protection and Direction of Traffic/Project Safety	LS	50,000	All Req'd	50,000
3	8-inch Polyvinyl Chloride (PVC) Water Line, including Valves	LF	70	23,000	1,610,000
4	10-inch PVC Water Line, including Valves	LF	90	6,500	585,000
5	12-inch PVC Water Line, including Valves	LF	110	3,500	385,000
6	Connection to Existing Main Line	EA	2,500	96	240,000
7	Existing Fire Hydrant Connection to New Main Line	EA	3,000	60	180,000
8	New Fire Hydrant and Auxiliary Valve Assembly	EA	5,000	16	80,000
9	Replace Existing Fire Hydrant with New Fire Hydrant	EA	4,000	36	144,000
10	Existing Water Service Connection to New Main Line	EA	500	200	100,000
11	Asphalt Surface Restoration	SY	80	13,800	1,104,000
12	Gravel Surface Restoration	SY	10	4,600	46,000
				Estimated Construction Cost	**$ 4,749,000**
				Construction Contingency Cost (15%)*	712,000
				Total Estimated Construction Cost	**$ 5,461,000**
				Preliminary, Design, and Construction Engineering (20%)	1,092,000
				TOTAL ESTIMATED IMPROVEMENT COST (2021 DOLLARS)	**$ 6,553,000**

NO.	DESCRIPTION	UNIT	UNIT PRICE	ESTIMATED QUANTITY	TOTAL PRICE
Long-Term Distribution System Improvements					
1	Mobilization/Demobilization	LS	$ 29,000	All Req'd	$ 29,000
2	Temporary Protection and Direction of Traffic/Project Safety	LS	5,000	All Req'd	5,000
3	8-inch PVC Water Line, including Valves	LF	70	3,000	210,000
4	Connection to Existing Main Line	EA	2,500	20	50,000
5	Existing Fire Hydrant Connection to New Main Line	EA	3,000	5	15,000
6	New Fire Hydrant and Auxiliary Valve Assembly	EA	5,000	31	155,000
7	Existing Water Service Connection to New Main Line	EA	500	20	10,000
8	Asphalt Surface Restoration	SY	80	1,700	136,000
				Estimated Construction Cost	**$ 610,000**
				Construction Contingency Cost (15%)*	91,000
				Total Estimated Construction Cost	**$ 701,000**
				Preliminary, Design, and Construction Engineering (20%)	140,000
				TOTAL ESTIMATED IMPROVEMENT COST (2021 DOLLARS)	**$ 841,000**

*The construction industry is experiencing material shortages and unpredictable prices in 2021. A 15 percent contingency has been added to try to accommodate this. This amount may or may not be adequate to account for potential material cost inflation.

anderson perry & associates, inc.

CITY OF
BURNS, OREGON
WATER SYSTEM MASTER PLAN

DISTRIBUTION SYSTEM IMPROVEMENTS
PRELIMINARY COST ESTIMATE

FIGURE
5-5

Chapter 6 - Selected Water System Improvements

Introduction

This chapter summarizes the selected improvements identified as part of this Water System Master Plan (WSMP) to address the City of Burns' water system deficiencies and support anticipated growth and increased demands. The selected improvements have been categorized by existing and long-term improvements. The intent of this approach is to provide a financially feasible approach to the improvements to be completed during the 20-year planning period. Improvements in each category are outlined, and estimated costs are presented.

Improvements needed to serve the existing system have been categorized to limit the burden on existing rate payers. The intent of this chapter is to give the City a list of improvements that should be implemented as funds are available.

Summary of Improvements

Presented hereafter is a summary of the recommended improvements that have been identified based on the evaluation and modeling efforts completed as part of this WSMP. A map of the selected improvements is presented on Figure 6-1. A cost estimate for the selected improvements is shown on Figure 6-2. For a more comprehensive discussion with respect to the different elements (supply, storage, and distribution) of the water system and detailed evaluation, the reader is encouraged to reference other chapters in this WSMP.

Water Supply

The City of Burns is currently served by five primary groundwater wells (Wells No. 1, 2, 3, 4, and 5) to meet system demands. As discussed in Chapter 3, the City currently has enough source capacity to meet current and future demands. At this time, the only recommendations are an additional backup mobile generator to help the water supply system in the event of a power outage and installing well transducers to monitor the water level inside the City's wells.

Water Storage

Currently, the City's existing water storage reservoir meets the City's immediate and anticipated operational needs. As explained in Chapter 4, it would take extreme circumstances for the City's storage capacity to not meet future needs. At this time, the only recommendation is the City periodically draw down their 2.0 million gallon (MG) reservoir at least 15 feet to circulate water through the system and prevent water stagnation.

Water Distribution

As outlined in Chapter 5, areas in the distribution system cannot provide adequate fire flows and undersized main lines exist. Improvements outlined in Chapter 5 include installing water main lines

to supply water to areas within the city limits; increasing existing fire flows; eliminating dead-ends to improve looping, circulation, and fire flow capacities; and installing fire hydrants to improve hydrant coverage. These improvements were selected to address key areas of concern to improve fire flow capacity and pressures in the systems.

Improvements Plan

Supply System Improvements

The intent of the supply system improvements is to provide the City with the ability to monitor the water depth in their wells. This will be accomplished by installing well transducers and making various control modifications. In addition to the well transducer improvements, the City has a need to increase their backup power. To accommodate this, a backup mobile generator will be provided as part of the improvements project. These selected supply system improvement are shown on Figure 6-1.

Existing Distribution System Improvements

The intent of the existing distribution system improvements is to improve a large portion of the City's distribution system in one large-scale project. The project will include installation of new distribution piping to help provide improved fire flows and eliminate undersized and dead-end main lines, which will ultimately provide enhanced looping and circulation capabilities. These selected water distribution system improvements are shown on Figure 6-1. In addition to the proposed distribution piping improvements, 16 fire hydrants that are considered "high priority" will be installed to eliminate gaps within distribution system along with an additional 36 new hydrants to replace existing old hydrants.

Future Distribution System Improvements

The intent of the future distribution system improvements is to improve the City's fire hydrant distribution by addressing 31 "medium priority" fire hydrants and associated piping to provide adequate flows to the proposed fire hydrants. In several cases, the main lines are not adequate to serve the proposed hydrants and, thus, should be improved during the long-term improvements. The "medium priority" hydrants are not considered an immediate need; however, it is strongly recommended the City consider completing these improvements during the 20-year planning period.

Estimated Costs

The City's distribution system improvements and associated costs are shown on Figures 6-1 and 6-2, respectively. Costs have been projected to 2023, assuming that is the time construction will begin. If the City does not complete the selected improvements in 2023, it is recommended the estimated costs be increased by an annual inflation rate of 3 to 5 percent, depending on market conditions, to account for potential increases in project costs.

Environmental and Cultural Resource Review

A cursory environmental and cultural resource review was completed for the selected improvements. The review included a desktop survey evaluation, including analysis of wetlands, endangered species, cultural resources, and hazardous materials. A memorandum prepared by Anderson Perry & Associates, Inc., summarizing this evaluation is included in Appendix L. The cursory review indicated no major environmental or cultural resource obstacles exist. As funding is acquired to complete the design and construction of the selected improvements, a more thorough environmental analysis should be completed.

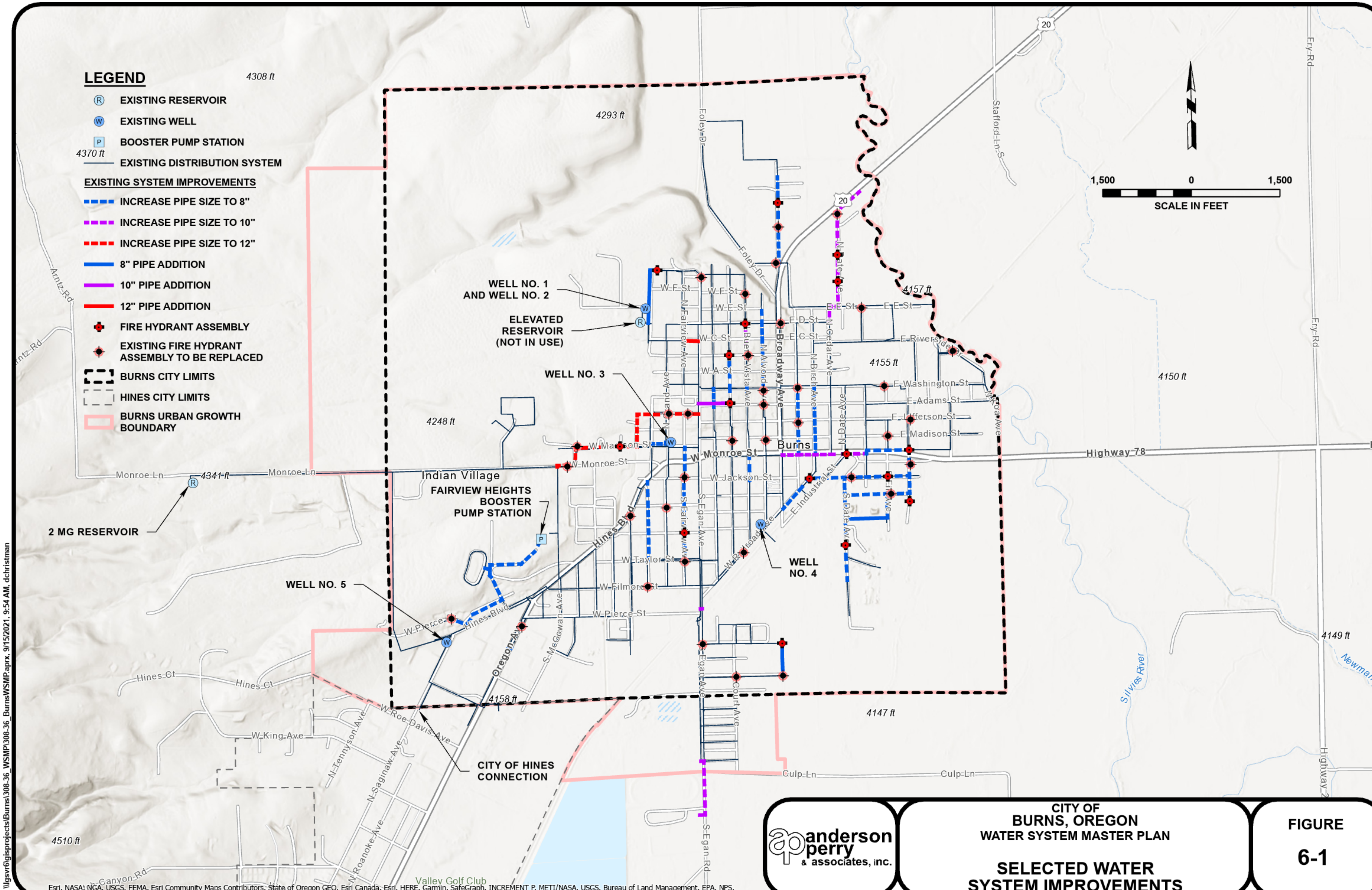
General Operation and Maintenance Recommendations

Diligent operation and maintenance (O&M) activities for the various water system components are critical for providing a reliable water system that is efficiently operated. One of the most valuable tools in analyzing present trends and projecting future needs of a water system and for general equipment maintenance is to have accurate and complete records. Data should be kept by the City on such items as daily flows from master meters, water quality tests, as-built records on all underground piping, service line and tap locations, etc. Methodically kept records will be a tremendous asset to the City in operating and maintaining the water system.

The following recommendations are intended to provide general guidance to the City and are not intended to constitute a comprehensive list of O&M activities related to the water systems. Several recommendations are related to the selected improvements previously discussed in this chapter. The recommended O&M activities and suggested recurrence intervals are as follows:

- Obtain an additional generator for backup power redundancy.
- Periodically draw down the 2.0 MG reservoir approximately 15 feet to circulate water through the system and prevent water stagnation.
- Implement a GIS mapping system to track water system assets.

Implementation and continued practice of these measures should help the City's water system continue to serve the community for many years to come.


LEGEND
EXISTING RESERVOIR
EXISTING WELL
BOOSTER PUMP STATION
EXISTING DISTRIBUTION SYSTEM
EXISTING SYSTEM IMPROVEMENTS
INCREASE PIPE SIZE TO 8"
INCREASE PIPE SIZE TO 10"
INCREASE PIPE SIZE TO 12"
8" PIPE ADDITION
10" PIPE ADDITION
12" PIPE ADDITION
FIRE HYDRANT ASSEMBLY
EXISTING FIRE HYDRANT ASSEMBLY TO BE REPLACED
BURNS CITY LIMITS
HINES CITY LIMITS
BURNS URBAN GROWTH BOUNDARY
WELL NO. 1 AND WELL NO. 2
ELEVATED RESERVOIR (NOT IN USE)
WELL NO. 3
2 MG RESERVOIR
FAIRVIEW HEIGHTS BOOSTER PUMP STATION
WELL NO. 5
WELL NO. 4
CITY OF HINES CONNECTION
Indian Village
Burns
W Monroe St
Highway 78
N Broadway Ave
Hines Blvd
1,500
0
1,500
SCALE IN FEET
CITY OF
BURNS, OREGON
WATER SYSTEM MASTER PLAN
SELECTED WATER SYSTEM IMPROVEMENTS
FIGURE
6-1
anderson perry & associates, inc.
Esri, NASA, NGA, USGS, FEMA, Esri Community Maps Contributors, State of Oregon GEO, Esri Canada, Esri, HERE, Garmin, SafeGraph, INCREMENT P, METI/NASA, USGS, Bureau of Land Management, EPA, NPS,
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CITY OF BURNS, OREGON
WATER SYSTEM MASTER PLAN
SELECTED WATER SYSTEM IMPROVEMENTS
PRELIMINARY COST ESTIMATE

Estimated Construction Costs (As Presented in Chapters 3 and 5)*		
Supply System Improvements	$	277,000
Existing Distribution System Improvements		4,749,000
Construction Contingency*		754,000
Total Estimated Construction Costs (2021 Dollars)	**$**	**5,780,000**
Other Estimated Project Costs**		
Legal	$	50,000
Administration		50,000
Easements		20,000
Environmental Assessment		30,000
Cultural Resource Evaluation and Report		50,000
Cultural Resource Monitoring		150,000
Preliminary, Design, and Construction Engineering		1,156,000
Oregon Department of Transportation Permit(s)		5,000
Regulatory Agency Reporting, Review, and Testing Fees		5,000
Record Drawings and GIS Mapping		50,000
Subtotal Other Project Costs (2021 Dollars)	**$**	**1,566,000**
TOTAL ESTIMATED PROJECT COST (2021 DOLLARS)	**$**	**7,346,000**
TOTAL ESTIMATED PROJECT COST (2023 DOLLARS)***	**$**	**8,099,000**

*The construction industry is experiencing material shortages and unpredictable prices in 2021. A 15 percent contingency has been added to try to accommodate this. This amount may or may not be adequate to account for potential material cost inflation.

**Does not include long-term improvement costs.

***Assumes a 5 percent annual project cost inflation.

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CITY OF
BURNS, OREGON
WATER SYSTEM MASTER PLAN
SELECTED WATER SYSTEM IMPROVEMENTS
PRELIMINARY COST ESTIMATE

FIGURE
6-2

Chapter 7 - Project Financing and Implementation

Introduction

This chapter evaluates the financial status of the City's Water Department and outlines alternatives for financing water system improvements. A summary of state and federal funding programs is presented, including a review of funding options potentially available to the City for the water system improvements. To construct some or all of the selected improvements, a financing plan acceptable to the City of Burns must be developed to complete the improvements. Because of the estimated cost of the improvements, financing resources should include a low-interest loan coupled with grant funds, if available.

Although a detailed analysis of the City's current water rate structure is beyond the scope of this Water System Master Plan (WSMP), some discussion of the existing rate structure and current and future water system budgets is included. As a general rule, most utility rate structures include funding for periodic minor system improvements and maintenance, staff payroll costs, and a set-aside for future improvements. The set-aside is typically for smaller items, such as a new well pump, new meters, etc. The City has also received funding to complete a water rate study that will present water rate options to fund the selected water system improvements while maintaining adequate revenue to support operation and maintenance (O&M) and other system expenditures.

Current Water Use Rates and Revenue

The O&M of the existing water system is financed through the City's annual budget. The City's fund includes expenses and revenues from both the water and wastewater systems. For the purpose of this WSMP, it has been assumed that the revenue generated by the water system accounts for half of the revenues in the account, and that the wastewater system accounts for the other half. Revenue is obtained from water user customer billings and connection fees.

Water Use Rates

The current base water rate, paid every other month, for residential and commercial services inside city limits varies according to meter size starting at $44.00 for 5/8-inch and 3/4-inch meters, up to $616.25 for a 4-inch meter. The base water rate per month for connections outside city limits is the same as the rates inside city limits, plus 50 percent of the monthly base water rate for each meter size. A volume charge of $0.0025 per cubic foot of water used is also included.

The rates were set by Resolution No. 20-688, which took effect on June 24, 2020. The current monthly water rates and number of connections are summarized on Table 7-1. A copy of Resolution No. 20-688 is included in Appendix M.

TABLE 7-1
2020 WATER RATE INFORMATION

Meter Size	Connections	Base Rate Billed Every Other Month	Water Usage Rate
3/4- and 5/8-inch inside city limits (ICL)	1,247	$44.00	$0.0025 per cubic foot
1 inch ICL	87	$61.60	$0.0025 per cubic foot
1-1/2 inches ICL	9	$79.10	$0.0025 per cubic foot
2 inches ICL	22	$127.60	$0.0025 per cubic foot
3 inches ICL	1	$484.15	$0.0025 per cubic foot
4 inches ICL	4	$616.25	$0.0025 per cubic foot
3/4- and 5/8-inch outside city limits (OCL)	55	$66.00	$0.0025 per cubic foot
1 inch OCL	1	$92.40	$0.0025 per cubic foot
1-1/2 inches OCL	1	$118.70	$0.0025 per cubic foot
2 inches OCL	1	$191.40	$0.0025 per cubic foot
3 inches OCL	0	$726.30	$0.0025 per cubic foot
4 inches OCL	1	$924.30	$0.0025 per cubic foot

The revenue generated from the City's water rates is presented on Table 7-2. Water rate revenue generated in fiscal year 2019-20 was $443,280. Using an annual user fee revenue amount of $443,280 and assuming approximately 1,429 billed accounts, the City has an average monthly water user fee of approximately $25.85.

TABLE 7-2
WATER DEPARTMENT REVENUE[1]

Fiscal Year	Water User Fee Revenue[2]	Total Revenue
2015-16	$403,836	$427,501
2016-15	$425,921	$444,814
2017-18	$430,552	$464,837
2018-19	$435,535	$475,637
2019-20	$443,280	$482,671

[1]Information obtained from audited financials for the City of Burns.

[2]Water user fee revenue includes charges for services only and does not include miscellaneous income such as water connection/extension fees, interest income, lease income, and other miscellaneous income.

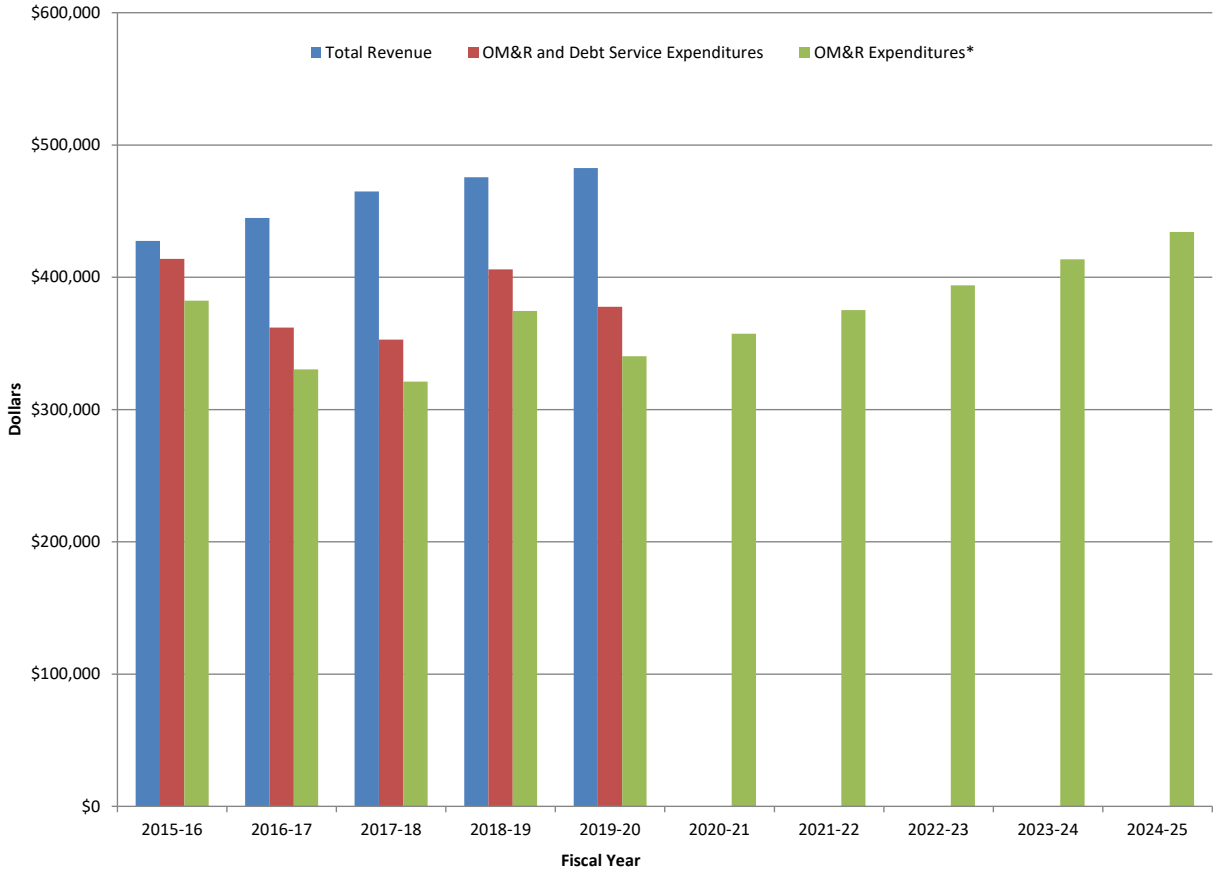
Current Financial Status

The annual cost of operating and maintaining the Burns water system is summarized on Figure 7-1. Similarly to the City's revenue, the fund expenses include expenses for both the water and sewer systems. For the purposes of this analysis, the expenses for the water system were assumed to account for half of the expenses in the City's water and sewer fund. The costs presented were obtained from the City's audited financial statements, and include all costs for the water system, such as operation, maintenance, and replacement (OM&R) and staff payroll.

Historical and Projected Budget Trends

The City's Water Department revenues have exceeded annual OM&R and debt service expenditures for all five years for which data were available. A graphical plot of the City's water system budget, showing total revenue and total expenditures, is shown on Chart 7-1. It is worth noting that the total OM&R expenditures shown do not include interdepartmental and inter-fund transfers.

CHART 7-1
HISTORICAL AND PROJECTED CITY WATER BUDGET



**Assumed to be half of the combined water and sewer fund OM&R expenditures.*

By inflating the 2019-20 total expenditures, the total expenditures in a future year can be estimated, assuming no changes to the water system occur. The annual increase in expenditures for the City of Burns has been assumed to be 5 percent per year and indicates that OM&R expenditures will reach approximately $414,000 by budget year 2023-24, which is when construction is projected to occur.

Transfers to Other Funds

In the past, the City has transferred funds from the Water Department Fund to several other funds, including the General Fund. Transfers from the Sewer and Water Department Fund to these other funds are excluded as expenditures on Figure 7-1.

Existing Debt

Currently, one loan is being paid by the Water Department Fund, which is detailed below. The City has other debt service payments being paid from the Water and Sewer fund; however, the Oregon Economic and Community Development Department (OECDD) (currently known as Business Oregon) loan detailed below is assumed to be the only "Water Department" related debt.

Oregon Economic and Community Development Department

The City entered into an agreement with OECDD to borrow $846,431 to construct the 2.0 million gallon glass-fused-to-steel bolted reservoir. Payments are due annually with an annual interest rate of 4.11 percent. The outstanding balance as of June 30, 2020, was $146,193. Payments are $62,482 per year. Table 7-3 provides the future payments required from the Water and Sewer Fund. It should be noted that the current debt for the Water Department will be paid in full after 2023.

TABLE 7-3
OREGON ECONOMIC AND COMMUNITY DEVELOPMENT DEPARTMENT
LOAN PAYMENTS FROM WATER AND SEWER FUND

Fiscal Year Ending June 30	Principal	Interest	Total	Remaining Balance	Water Fund Payment
2021	$57,054	$5,428	$62,482	$93,047	$31,241
2022	59,423	3,059	62,482	62,173	31,241
2023	29,716	611	30,326	-	15,163
TOTAL	**$146,193**	**$9,098**	**$155,290**	**-**	**$77,645**

Water System Improvements Funding

To pursue the selected water system improvements discussed in Chapter 6, the City may need to obtain outside funding assistance. A number of state and federal grant and loan programs can provide assistance on municipal improvement projects to utility districts, cities, and counties. These programs offer various levels of funding aimed at different types of projects. These include programs administered by Rural Development (RD) under the U.S. Department of Agriculture (USDA), the U.S. Economic Development Administration (EDA), the Business Oregon - Infrastructure Finance Authority (IFA), and others.

These agencies can provide low-interest loan funding and possibly grant funding for assisting rural communities on public works projects. Most of these agencies require increases in existing water rates to support loans for system improvements as a condition of receiving monies. Some of the funding programs provide funding only if the improvements address documented water quality compliance issues. A summary of potential funding programs follows.

Summary of Potential Funding Programs

The following section briefly summarizes the primary funding programs available to assist the City with a water system improvements project. It should be noted that the monthly user rates discussed in this section can represent a combination of monthly usage fees and taxes.

Federal Grant and Loan Programs

U.S. Department of Agriculture Rural Development

This agency can provide financial assistance to communities with a population of less than 10,000 through both loans and direct grants. Under the loan program, the agency purchases local bonds. The interest rate for these bonds is dependent on the median household income (MHI) of the community and other factors and varies from year to year based on other economic factors nationally. The fixed interest rate varies but is generally approximately 3.0 to 4.0 percent with a repayment period of up to 40 years. In fall 2021, interest rules are ranging from 1.5 to 2.5 percent. However, it is anticipated that these rates will increase. Due to this, the standard 3.0 to 4.0 percent has been utilized in this analysis. Applying for this type of funding is a fairly lengthy process involving development of an environmental report and a detailed funding application.

The agency presently requires communities to establish average residential user costs in the range of similar systems with similar demographics before the community qualifies for grant funds. It should be noted that loans without grant funds may be acquired from RD that may not require rates to reach this level, depending on the results of an RD funding analysis. The user costs must provide sufficient revenue to pay for all system OM&R costs and pay for the local debt service incurred as a result of the project. All project costs above this level may be paid for by grant funds, up to given limits, which are usually not more than 45 percent of the total project cost. The objective of the RD loan/grant program is to keep the cost for utilities in small, rural communities at a level that is similar to what other communities are paying.

Another of the agency's requirements is that loan recipients establish a reserve fund of 10 percent of the bond repayment during the first 10 years of the project, which can make the net interest rate higher if such a reserve does not already exist. The RD program requires either revenue or general obligation bonds to be established through the agency for the project (refer to the Local Financing Options section of this chapter for further discussion). These bonds can usually be purchased for a period of 40 years if grant funding is also received. A combination loan and grant from RD may be an option for the City to implement water system improvements.

U.S. Economic Development Administration

The EDA has grant and loan funds similar to those available through the IFA's Special Public Works Fund (SPWF) program. Monies are available to public agencies to fund projects that stimulate the economy of an area, and the overall goal of the program is to create or retain jobs. The EDA has invested a great deal of money in Oregon to fund public works improvement projects in areas where new industries were locating or planned to locate in the future. In addition, the agency has a program known as the Public Works Impact Program to fund projects in areas with extremely high rates of unemployment. This program is targeted toward creating additional jobs and reducing the unemployment rate in the area. Unless the City's water system improvements can be linked directly to industrial expansion or job retention, the City will not be in a competitive position to receive funding under these EDA programs.

State Grant and Loan Programs - Business Oregon

Safe Drinking Water Revolving Loan Fund

This is primarily a loan program for the construction and/or improvement of public and private water systems to address regulatory compliance issues. This is accomplished through two separate programs: the Safe Drinking Water Revolving Loan Fund (SDWRLF) for collection, treatment, distribution, and related infrastructure, and the Drinking Water Protection Loan Fund (DWPLF) for protection of sources of drinking water prior to system intake. The SDWRLF program normally lends up to $6 million per project. Loan amounts greater than $6 million may be approved by the IFA Board. The standard SDWRLF loan term is 20 years or the useful life of project assets, whichever is less. Loan terms up to 30 years may be available for "disadvantaged communities." This program offers subsidized interest rates for all successful projects. Interest rates for a standard loan start at 80 percent of the state/local bond rate. Interest rates for loans to disadvantaged communities are based on a sliding scale between the interest rate for a standard loan and 1 percent. Communities may be eligible for some of the principal on their SDWRLF loan to be "forgiven." This forgivable loan feature is similar to a grant and is offered to disadvantaged communities. Special consideration, including partial principal forgiveness, is provided to projects qualifying or having Green Project Reserve components.

The DWPLF program normally lends up to $100,000 per project. Loan amounts greater than $100,000 may be available. A grant may be available from the DWPLF for the City's proposed improvements depending on available funds.

Water/Wastewater Financing Program

This is a loan and grant program that provides for the design and construction of public infrastructure when needed to ensure compliance with the Safe Drinking Water Act (SDWA) or the Clean Water Act (CWA). To be eligible, a system must have received, or is likely to soon receive, a notice of non-compliance by the appropriate regulatory agency associated with the SDWA or the CWA.

While primarily a loan program, grants are available for municipalities that meet the eligibility criteria. The loan/grant amounts are determined by financial analysis of the applicant's ability to afford a loan (debt capacity, repayment sources, current and projected utility rates, and other factors). The maximum loan term is 25 years or the useful life of the infrastructure financed, whichever is less. The maximum loan amount is $10 million per project and is determined by financial review and may be offered through a combination of direct and/or bond-funded loans. Loans are generally repaid with utility revenues or voter-approved bond issues. A limited tax general obligation pledge may also be required. Creditworthy applicants may be funded through sale of state revenue bonds.

The maximum grant is $750,000 per project based on a financial analysis. An applicant is not eligible for grant funds if the applicant's annual MHI is equal to or greater than 100 percent of the state average MHI for the same year.

Community Development Block Grant Program

The primary objective of the Community Development Block Grant (CDBG) program is the development of viable (livable) urban communities by expanding economic opportunities and providing decent housing and a suitable living environment principally for persons of low and moderate incomes.

This is a federally funded grant program. The state receives an annual allocation from Housing and Urban Development for the CDBG program. Grant funding is subject to applicant need, availability of funds, and any other restrictions in the state's Method of Distribution (i.e., program guidelines). It is not possible to determine how much, if any, grant funds may be awarded prior to an analysis of the application and financial information.

Eligibility for the CDBG program requires that greater than 51 percent of persons within the community fall into the low to moderate income (LMI) category. According to the City and County demographics utilized by IFA, in 2019 the City of Burns had approximately 54.2 percent of the population within the LMI category. Typically, a community will only receive CDBG funding if a compliance issue exists. Because the City of Burns has an old, leaking distribution system that could be considered a compliance issue, CDBG funding could be a realistic funding option.

Special Public Works Fund

The SPWF program was established by the Oregon Legislature in 1985 to provide primarily loan funding for municipally owned infrastructure and other facilities that support economic and community development in Oregon. Loans and grants are available to municipalities for planning, designing, purchasing, improving, and constructing municipally owned facilities, replacing owned essential community facilities, and emergency projects as a result of a disaster.

For design and construction projects, loans are primarily available; however, grants are available for and limited to projects that will create and/or retain traded-sector jobs. A traded-sector industry sells its goods or services into nationally or internationally competitive markets. The maximum grant award is $500,000 or 85 percent of the project cost, whichever is less. The grant amount per project is based on up to $5,000 per eligible job created or retained. Loans range in size from less than $100,000 to $10 million. The SPWF is able to offer very attractive interest rates that reflect tax-exempt market rates for very good quality creditors. Loan terms can be up to 25 years or the useful life of the project, whichever is less. Unless the City of Burns can tie the needed improvements to job creation, the SPWF is not a likely funding source for water system improvements.

For Business Oregon Programs - Contact Regional Coordinator

Since program eligibility and funds availability may change from year to year, potential applicants are encouraged to contact their respective Regional Coordinator to obtain the most accurate and up-to-date information for each program.

Preliminary Equivalent Dwelling Units

When projecting future revenue for a water system, an equivalent dwelling unit (EDU) analysis is usually completed. One EDU is intended to represent the average residential water use for a given city. As an example, a residential account in Burns would represent one EDU.

The City of Burns does not use EDUs to bill customers. The City bills according to meter size and consumption as defined in Resolution No. 20-688 (see Appendix M). The meter size the City utilizes to determine the base rate for each customer is shown on Table 7-1. Table 7-4 below shows the relationship between the base rate for each meter size compared to a standard residential meter (5/8- or 3/4- inch). The meter size factor is determined by taking the base rate for the given meter size and dividing that number by the base rate for a standard residential meter.

TABLE 7-4
BASE RATE COMPARISON

Meter Size	Connections	Base Rate Per Month	Meter Size "Factor"	Total Base Rates (EDU)
3/4- and 5/8-inch ICL	1,247	$44.00	1	1,247
1 inch ICL	87	$61.60	1.4	118
1-1/2-inch ICL	9	$79.10	1.8	16
2-inch ICL	22	$127.60	2.9	64
3-inch ICL	1	$484.15	11	11
4-inch ICL	4	$616.25	14	56
3/4- and 5/8-inch OCL	55	$66.00	1.5	83
1 inch OCL	1	$92.40	2.1	2
1-1/2-inch OCL	1	$118.70	2.7	3
2-inch OCL	1	$191.40	4.4	4
3-inch OCL	-	$726.30	16.5	-
4-inch OCL	1	$924.30	21	21
TOTAL	**1,429**			**1,625**

In lieu of a typical EDU analysis, where average residential water consumption is the main factor behind a "base rate," a meter size factor can be considered an equivalent analysis. Most funding agencies will use EDUs as a basis for estimating future annual revenue and debt capacity for a city. The EDU determination is intended to equitably distribute water costs among all users. The EDU determination helps funding agencies determine the maximum loan (debt) amount a city can incur prior to being considered for grant funds for their water system improvements project. The analysis presented hereafter for the City's future water rate revenue and estimated debt capacity is based on the preliminary determination of 1,625 EDUs.

Debt Repayment Options and Loan Capacity

To determine the City's ability to fund a water system improvements project, Figures 7-2 and 7-3 were prepared. Several assumptions were made, as follows:

1. For Figure 7-2, water user fee revenue is based on the preliminary determination of 1,625 EDUs.

2. For Figure 7-2, OM&R costs for the budget year 2023-24 were set at $414,000 per year. The budget year 2023-24 was used, as this would be the time period in which a project could be under construction. The OM&R costs were estimated using the historical total expenditures and proposed inflation shown on Chart 7-1.

3. For Figures 7-2 and 7-3, future debt service was calculated based on RD financing (at 3.0 percent interest for a 40-year repayment period), the typical IFA-based loan program (at 4.0 percent interest for a 20-year period), and the SDWRLF disadvantaged community allowance (at 1.0 percent interest for 30 years), depending on which financing program is able to assist the City.

4. Ten percent of the net annual funds available to service debt were set aside under the RD scenario to create a reserve account in accordance with RD requirements. IFA does not require reserve funds to be set aside.

The data shown on Figure 7-2 provide a general idea of the amount of debt the City could afford to service with various average monthly user rates. The impact of various loan terms established by funding agencies on average monthly user rates is also shown on Figure 7-2. Figure 7-3 provides a general idea of the impact to property taxes for varying interest rates and loan amounts if the debt payment is supported by property taxes only.

It is important to note that the estimated debt service capacities shown on Figure 7-2 are based on the current estimate of 1,625 EDUs. It should be recognized that this is only a preliminary analysis, and the financial assumptions and figures presented in this WSMP should be refined as project implementation proceeds in the future and in the event agreements are worked out with funding agencies. If the City incurs further debt prior to obtaining loan or grant funds, these figures will need to be adjusted accordingly to reflect the debt payment requirements for the overall City budget.

Potential Rate Requirements to Fund System Improvements

In some cases, RD can provide a combination of grant and loan monies for a project of this type, depending on water rate requirements. This indicates the City may be in a position to receive grant funds from this program if average water user rates are increased as required to meet RD requirements.

Business Oregon is currently using 1.25 percent of a community's five-year MHI as the basis for residential monthly water user cost requirements to be eligible for grant funding. In the City of Burns' case, the five-year MHI is $33,944. This MHI results in a required monthly residential water user cost of $35.36 to qualify for low-interest loan or grant funding. Business Oregon's residential rate requirement is also based on an assumed residential use of 7,500 gallons per month. With the City's current rates (see Table 7-1), if a residential water user consumed 7,500 gallons in a month, the associated cost would be $24.51. Therefore, to reach the 1.25 percent MHI threshold, the City would need to increase monthly water rates by approximately $11 to obtain low-interest loans and/or grant funds through Business Oregon. However, additional rate increases may be required to fund the full scope of the selected water system improvements.

Debt Repayment Using Property Tax Revenue

Under the Oregon Property Tax Limitation-Measure 5, property tax rates can be used to repay water system improvements costs through property tax revenues. Figure 7-3 lists the increases in property tax rates required to finance loan amounts solely with property taxes.

It should be noted that debt repayment may also be achieved by some combination of water user fees and property taxes.

Potential Project Funding Options

If an improvements project is pursued, it is recommended that the City thoroughly investigate potential funding sources available through Business Oregon and the federal government to ensure the best funding package is obtained for the project.

Of the various funding programs, the most likely sources of funding for the project would be RD, SDWRLF for Disadvantaged Communities, and/or the Water/Wastewater Financing Program. To complete all of the selected improvements, grant funds coupled with low-interest loan funds will need to be acquired. Actual funding amounts and breakdowns will be based on a financial review completed by the agencies and could vary from estimated amounts shown here.

Project "One Stop" Meeting

To evaluate all potential project funding options, a "One Stop" meeting is generally requested by the City. "One Stop" meetings are typically scheduled in Salem where representatives of USDA RD, Business Oregon, and other funding agencies meet with the City to discuss the project and funding needs. This joint meeting provides a forum to evaluate and identify the most suitable funding package for the project and the City. To avoid requiring City representatives to travel to Salem, Business Oregon has recently been holding these meetings locally and/or virtually. After the meeting, the City is usually invited to submit a funding application to the preferred funding program(s) identified in the "One Stop" meeting.

Local Financing Options

Regardless of the ultimate project scope and agency from which funds are obtained, the City may need to develop authorization to incur debt (i.e., bonding) for the selected project improvements. The need to develop authorization to incur debt depends on funding agency requirements and provisions in the City Charter. The need for bonding by the City has been eliminated by most state funding programs. However, if a bond election is required, there are generally two options the City may use for its bonding authority: general obligation bonds and revenue bonds. General obligation bonds require a vote of the people to give the City the authority to repay the debt service through tax assessments, water revenues, or a combination of both. The taxing authority of the City provides the guarantee for the debt. Revenue bonds are financed through revenues of the water system. Authority to issue revenue bonds can come in two forms. One would be through a local bond election similar to that needed to sell a general obligation bond, and the second would be through Council action authorizing the sale of revenue bonds if the City Charter allows. If more than 5 percent of the registered voters do not object to the bonding authority resolution during a 60-day remonstrance period, the City would have authority to sell these revenue bonds.

It should be noted that Oregon law currently requires a 50 percent voter turnout to pass a bonded debt tax measure, unless the election is held in November of an even numbered year. These November elections in even-numbered years require only a majority of those who voted to pass a bonded debt tax measure. Due to current tax measure limitations in the State of Oregon, careful consultation with experienced, licensed bonding attorneys should be made if the City begins the process of obtaining bonding authority for the proposed water system improvements.

Project Implementation

For the City of Burns to successfully implement the water system improvements presented herein, the City will need to coordinate directly with RD, Business Oregon, and other potential funding agencies to aggressively pursue federal, state, and potentially local financing opportunities provided through low-interest loans and potential grants. It is recommended that the City pursue funding for the full project, to maximize potential grant and low-interest loan opportunities.

Project Development Action Items

The City of Burns needs to perform the following action items and proposed implementation plan to complete the proposed water system improvements project. The steps outlined are general in nature and include the major steps that need to be undertaken.

1. The City will need to finalize and adopt this WSMP and selected improvements once agencies review the draft WSMP.

2. The City needs to contact the RD area specialist and the Business Oregon regional coordinator to initiate funding discussions.

3. The City will need to schedule a “One Stop” meeting with the funding agencies to discuss potential funding options for the proposed improvements.

4. If Business Oregon funding is identified as a potential source in the “One Stop” meeting, the City and Business Oregon will draft a Project Notification and Intake Form (PNIF).

5. The City will need to hold public information meetings to inform its citizens of the need for and the scope of the project, to answer questions, and to explain the need for increases in user fees. Some funding programs (such as RD) have specific requirements that need to be addressed in public meetings.

6. Working with the various funding agencies, the City will need to develop a funding plan for the desired improvements.

7. The City will need to prepare funding applications for the water system improvements project and submit them to the appropriate funding agencies. The City will need to budget appropriate up-front funds to go through the funding application process.

Implementation Plan

Should the City wish to proceed with the selected water system improvements, the following proposed implementation plan outlines the key steps the City would need to undertake. It is important to note that it usually takes approximately two to three years, at a minimum, from the date a city decides to proceed with an improvements project until the project is completed and serving the community. The following Implementation Plan used September 2021 as a starting date, and assumes a three-year implementation schedule. It should also be noted that these implementation steps, as presented hereafter, may be different if the City elects to delay the project and pursue improvements in the future.

TABLE 7-5
IMPLEMENTATION PLAN AND SCHEDULE

	Item	Completion Date
1.	Initiate funding discussions with Business Oregon and RD. Hold a "One Stop" meeting with agencies.	September 2021
2.	Work with Business Oregon to submit a PNIF (if Business Oregon funding is identified as a potential source of funds).	Fall 2021
3.	Conduct a public outreach and education program.	Winter 2021
4.	Submit funding application(s) to agencies.	Winter 2021
5.	Finalize project funding.	Spring 2022
6.	Design system improvements.	Summer 2022 to Summer 2023
7.	Complete Environmental and Cultural Resources Reports and Permitting.	Summer 2022 to Summer 2023
8.	Bid and award construction contract.	Fall 2023
9.	Construct system improvements.	Winter 2023 to Fall 2024
10.	Close out project.	Winter 2024

**Additional construction time may be needed for inclement weather.*

The key to implementing the City of Burns' water system improvements is the City's ability to acquire funding that will allow water rates to remain as low as possible. It is recommended the City aggressively pursue project funding upon completion of this WSMP.

The City should work closely with its citizens through public meetings to inform them of the system needs and the necessity for increased water user costs. If a project in the range of $8,099,000 is pursued, the City may need to plan on raising average (in-town) residential water costs to the range of $40 per month if only conventional loan funds are available to help fund the proposed improvements. To reduce the financial impact to rate payers, it will be vital that the City seek low-interest loans coupled with grant funds. It is also good practice to increase rates, as required, to adequately fund O&M of the existing and improved water system and to keep up with inflation.

Summary

The water system improvements outlined herein are anticipated to provide Burns with a higher quality water system with significantly improved reliability, while bringing the City into compliance with current

regulations and codes. The identified distribution system improvements will help improve water circulation, improve distribution system water quality, and significantly improve fire flow capacities in several key areas of the City. Overall, the proposed water system improvements will provide a much improved and more reliable water system that should serve the City of Burns for many years.

CITY OF BURNS, OREGON
WATER SYSTEM MASTER PLAN
HISTORICAL WATER DEPARTMENT FUNDS

	Revenue			Expenditures[1]							
Fiscal Year	Water Sales Revenue[1]	Other Income[2]	Total Revenue	Personal Services	Materials and Services	Capital Outlay	Total OM&R Expenditures[3]	Debt Service[4]	Inter-fund Transfers	Total Expenditures	Net Operating Income (Loss)
2015-16	$ 403,836	$ 23,665	$ 427,501	$ 214,499	$ 104,439	$ 63,387	$ 382,325	$ 31,571	$ 42,000	$ 455,896	$ (28,395)
2016-17	$ 425,921	$ 18,893	$ 444,814	$ 202,917	$ 105,802	$ 21,682	$ 330,401	$ 31,539	$ 42,000	$ 403,940	$ 40,874
2017-18	$ 430,552	$ 34,285	$ 464,837	$ 208,165	$ 113,029	$ -	$ 321,194	$ 31,765	$ 43,000	$ 395,959	$ 68,878
2018-19	$ 435,535	$ 40,102	$ 475,637	$ 215,887	$ 132,231	$ 26,392	$ 374,510	$ 31,442	$ 43,660	$ 449,612	$ 26,025
2019-20	$ 443,280	$ 39,391	$ 482,671	$ 222,796	$ 108,292	$ 9,261	$ 340,349	$ 37,424	$ 45,343	$ 423,116	$ 59,555

Notes:

[1] The City of Burns has one fund (Water and Sewer Fund) for both water and sewer revenues and expenses. For the purpose of this analysis, it was assumed that each system received half of the system revenues and covered half of the expenses reported on the City's audits.

[2] Other Income is from interest income, leases, and miscellaneous income.

[3] Refers to operation, maintenance, and replacement. Does not include transfers to/from other funds or Debt Service.

[4] Includes Debt Service principal and interest.

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CITY OF
BURNS, OREGON
WATER SYSTEM MASTER PLAN
HISTORICAL WATER DEPARTMENT FUNDS

FIGURE 7-1

CITY OF BURNS, OREGON
WATER SYSTEM MASTER PLAN
PRELIMINARY WATER RATE ANALYSIS FOR LOAN CAPACITY
2023-24 BUDGET YEAR

RATES[1,2]	REVENUE[3]	EXPENDITURES			FINANCING OPTIONS		
User Cost	User Fee Revenue	Estimated OM&R Costs[4]	Existing Debt Service [5]	Revenue Available for Future Debt Service[6]	RD Loan Capacity[7]	Typical Business Oregon Loan Capacity[8]	SDWRLF Disadvantaged Community Capacity[9]
$ 22	$ 429,000	$ 414,000	$ -	$ 15,000	$ 312,000	$ 204,000	$ 387,000
$ 24	$ 468,000	$ 414,000	$ -	$ 54,000	$ 1,123,000	$ 734,000	$ 1,394,000
$ 26	$ 507,000	$ 414,000	$ -	$ 93,000	$ 1,935,000	$ 1,264,000	$ 2,400,000
$ 28	$ 546,000	$ 414,000	$ -	$ 132,000	$ 2,746,000	$ 1,794,000	$ 3,407,000
$ 30	$ 585,000	$ 414,000	$ -	$ 171,000	$ 3,557,000	$ 2,324,000	$ 4,413,000
$ 32	$ 624,000	$ 414,000	$ -	$ 210,000	$ 4,369,000	$ 2,854,000	$ 5,420,000
$ 34	$ 663,000	$ 414,000	$ -	$ 249,000	$ 5,180,000	$ 3,384,000	$ 6,426,000
$ 36	$ 702,000	$ 414,000	$ -	$ 288,000	$ 5,991,000	$ 3,914,000	$ 7,433,000
$ 38	$ 741,000	$ 414,000	$ -	$ 327,000	$ 6,803,000	$ 4,444,000	$ 8,439,000
$ 40	$ 780,000	$ 414,000	$ -	$ 366,000	$ 7,614,000	$ 4,974,000	$ 9,446,000
$ 42	$ 819,000	$ 414,000	$ -	$ 405,000	$ 8,425,000	$ 5,504,000	$ 10,452,000
$ 44	$ 858,000	$ 414,000	$ -	$ 444,000	$ 9,237,000	$ 6,034,000	$ 11,459,000
$ 46	$ 897,000	$ 414,000	$ -	$ 483,000	$ 10,048,000	$ 6,564,000	$ 12,465,000
$ 48	$ 936,000	$ 414,000	$ -	$ 522,000	$ 10,859,000	$ 7,094,000	$ 13,472,000

EDU = equivalent dwelling unit
OM&R = operation, maintenance, and replacement
RD = Rural Development
SDWRLF = Safe Drinking Water Revolving Loan Fund

Notes:

[1] The current residential base rate is $44, billed every two months. The average user cost will be slightly higher than this, once usage is considered.

[2] Base rates are based on meter size. A consumptive charge is also assessed; see Resolution 20-668 in Appendix M.

[3] Revenue is based on the current (2021) number of water accounts. Revenue is calculated as the product of the average user cost times the number of EDUs (1,625).

[4] Estimated OM&R cost for budget year 2023-24.

[5] The City currently has Existing Debt Service principal and interest from an Oregon Economic and Community Development Department (currently known as Business Oregon) loan in the amount of $62,482 ($31,241 from the Water Department) per year. This long-term debt will be paid off in the 2022-23 fiscal year. It is assumed this debt can be paid off prior to the proposed water system improvements commencing.

[6] Revenue available for future debt service = Revenue - Estimated OM&R Costs - Existing Debt Service principal and interest.

[7] Assumes loan funding at 3.0 percent for 40 years (loan capacity determined after 10 percent reserve payment removed from revenue available for debt service). Values rounded to nearest $1,000.

[8] Assumes loan funding at 4.0 percent for 20 years. Values rounded to the nearest $1,000.

[9] Assumes loan funding at 1.0 percent for 30 years. Values rounded to the nearest $1,000.

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CITY OF
BURNS, OREGON
WATER SYSTEM MASTER PLAN
PRELIMINARY WATER RATE
ANALYSIS FOR LOAN CAPACITY
2023-24 BUDGET YEAR

FIGURE
7-2

CITY OF BURNS, OREGON
WATER SYSTEM MASTER PLAN
PRELIMINARY PROPERTY TAX ANALYSIS FOR
WATER SYSTEM BONDING CAPACITY
2023-24 BUDGET YEAR

Typical Rural Development Loan

Loan Amount	Interest Rate[1]	Loan Period	Estimated Annual Payment	Estimated Annual Tax Rate Increase per $1,000[2]	Estimated Annual Tax Increase for a $100,000 Home	
					Monthly	Annually
$ 1,000,000	3.00%	40 Years	$ 43,262	$ 0.30	$ 2.48	$ 30
$ 2,000,000	3.00%	40 Years	$ 86,525	$ 0.60	$ 4.97	$ 60
$ 3,000,000	3.00%	40 Years	$ 129,787	$ 0.89	$ 7.45	$ 89
$ 4,000,000	3.00%	40 Years	$ 173,050	$ 1.19	$ 9.94	$ 119
$ 5,000,000	3.00%	40 Years	$ 216,312	$ 1.49	$ 12.42	$ 149
$ 6,000,000	3.00%	40 Years	$ 259,574	$ 1.79	$ 14.91	$ 179
$ 7,000,000	3.00%	40 Years	$ 302,837	$ 2.09	$ 17.39	$ 209
$ 8,000,000	3.00%	40 Years	$ 346,099	$ 2.39	$ 19.88	$ 239

Typical SDWRLF Loan

Loan Amount	Interest Rate[1]	Loan Period	Estimated Annual Payment	Estimated Annual Tax Rate Increase per $1,000[2]	Estimated Annual Tax Increase for a $100,000 Home	
					Monthly	Annually
$ 1,000,000	4.00%	20 Years	$ 73,582	$ 0.51	$ 4.23	$ 51
$ 2,000,000	4.00%	20 Years	$ 147,164	$ 1.01	$ 8.45	$ 101
$ 3,000,000	4.00%	20 Years	$ 220,745	$ 1.52	$ 12.68	$ 152
$ 4,000,000	4.00%	20 Years	$ 294,327	$ 2.03	$ 16.90	$ 203
$ 5,000,000	4.00%	20 Years	$ 367,909	$ 2.54	$ 21.13	$ 254
$ 6,000,000	4.00%	20 Years	$ 441,491	$ 3.04	$ 25.36	$ 304
$ 7,000,000	4.00%	20 Years	$ 515,072	$ 3.55	$ 29.58	$ 355
$ 8,000,000	4.00%	20 Years	$ 588,654	$ 4.06	$ 33.81	$ 406

SDWRLF for Disadvantaged Community Loan

Loan Amount	Interest Rate[1]	Loan Period	Estimated Annual Payment	Estimated Annual Tax Rate Increase per $1,000[2]	Estimated Annual Tax Increase for a $100,000 Home	
					Monthly	Annually
$ 1,000,000	1.0%	30 Years	$ 38,748	$ 0.27	$ 2.23	$ 27
$ 2,000,000	1.0%	30 Years	$ 77,496	$ 0.53	$ 4.45	$ 53
$ 3,000,000	1.0%	30 Years	$ 116,244	$ 0.80	$ 6.68	$ 80
$ 4,000,000	1.0%	30 Years	$ 154,992	$ 1.07	$ 8.90	$ 107
$ 5,000,000	1.0%	30 Years	$ 193,741	$ 1.34	$ 11.13	$ 134
$ 6,000,000	1.0%	30 Years	$ 232,489	$ 1.60	$ 13.35	$ 160
$ 7,000,000	1.0%	30 Years	$ 271,237	$ 1.87	$ 15.58	$ 187
$ 8,000,000	1.0%	30 Years	$ 309,985	$ 2.14	$ 17.80	$ 214

[1] Actual loan interest rates could vary.

[2] The annual tax rate increase is based on the City of Burns's 2019-20 assessed valuation of 145,026,939. It was also assumed that 100 percent of taxes would be collected. Typically, a small percentage of taxes are not paid, which would require the estimated tax rate to be increased slightly from what is shown here.

SDWRLF = Safe Drinking Water Revolving Loan Fund

Appendices Table of Contents

APPENDIX A
2020 Consumer Confidence Report

2020 Annual Drinking Water Quality Report
City of Burns

We're very pleased to provide you with this year's Annual Water Quality Report. We want to keep you informed about the excellent water and services we have delivered to you over the past year. Our goal is and always has been, to provide to you a safe and dependable supply of drinking water. Our water source, are wells located in five different locations within the City of Burns, each well is approximately three hundred feet deep, with a total pumping capacity of five thousand gallons per minute and storage of two million gallons.

At this time we are providing a clean quality water without continuous chlorinating. We have an ongoing cross connection program to protect the quality of the delivered water from reentering the piping system due to backflow or back siphoning. (i.e. Underground irrigation systems, hot tubs, swimming pools or any other undesirable substance that would affect the quality of our drinking water.)

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

The 1996 Amendments to the Safe Drinking Water Act require that all states conduct Source Water Assessments for public water systems within their boundaries. The assessments consist of (1) identification of the Drinking Water Protection Area, i.e., the area at the surface that is directly above that part of the aquifer that supplies groundwater to our wells, (2) identification of potential sources of pollution within the Drinking Water Protection Area, and (3) determining the susceptibility or relative risk to the well water from those sources. The purpose of the assessment is to provide water systems with the information they need to develop a strategy to protect their drinking water resource if they choose. The respective Drinking Water Programs of the Department of Human Services and Environmental Quality have completed the assessment for our system. A copy of the report is on file at City Hall.

If you have any questions about this report or your water utility, please contact. Michael Berry at 541-573-5255 or 541-573-6711 between the hours of 8:am and 5:pm. Mon. – Fri.
We want our valued customers to be informed about their water utility. If you want to learn more, please attend any of our regularly scheduled City of Burns Council Meetings. They are held on the second and fourth Wednesday of the month at 6:pm.

The City of Burns 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 Due to the size of are system we are required to monitor once every three years instead of annually, for regulated contaminants. The results of the data presented are from the most recent sampling in accordance with the regulations. 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:

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

TEST RESULTS

Contaminant	Violation Y/N	Unit Measurement	MCLG	MCL	Likely Source of Contamination
Microbiological Contaminants					
1. Total Coliform Bacteria	N		0	1	Naturally present in the environment
Inorganic Contaminants	Range of level Detected Minimum Maximum				
2. Arsenic	N	2.6 ppb – 3.7 ppb	N//a	10 ppb	Erosion of natural deposits; runoff from orchards; runoff from glass and electronics production wastes
3. Barium	N	0.0131 ppm – 0.0147 ppm	2	2 ppm	Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits
4.Selenium	N	0.00 ppb – .616 ppb	N/a	50 ppb	Discharge from petroleum and metal refineries;Erosion of natural deposits
5. Gross Alpa,EXCL.Radon&U	N	1.400 PCI/L		15.000 PCI/L	Erosion of natural deposits
6. Nickel	N	.00 Mg/l – .00077 Mg/l		0.1	Metal alloys, electroplating, batteries, chemical production
7. Copper	N	0.00378 ppm – 0.12 ppm	1.3	AL=1.3	Corrosion of household plumbing systems; erosion of natural deposits; leaching from wood preservatives
8. Fluoride	N	0 ppm – 0.22 ppm	4	4 ppm	Erosion of natural deposits; water additive which promotes strong teeth; discharge from fertilizer and aluminum factories
9. Lead	N	.151 ppb – 4.64 ppb	0	AL=15	Corrosion of household plumbing systems, erosion of natural deposits
10. Sodium	N	16.9 Mg/l – 29.4 Mg/l	N/a	N/a	Natural deposit.
11. Nitrate (as Nitrogen) + Nitrite	N	1.34 ppm – 1.99 ppm	10	10 ppm	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits
12. Uranium	N	.6 ug/l – 3.8 ug/l		30 ug/l	Erosion of natural deposits
13.Tectrachlorethylene	N	0.00 ppb – 0.51 ppb		5 ppb	Associated with dry cleaning and petroleum byproducts

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.

MCL's are set at very stringent levels. To understand the possible health effects described for many regulated constituents, a person would have to drink 2 liters of water every day at the MCL level for a lifetime to have a one-in-a-million chance of having the described health effect.

Total Coliform: The Total Coliform Rule requires water systems to meet a stricter limit for coliform bacteria. Coliform bacteria are usually harmless, but their presence in water can be an indication of disease-causing bacteria. When coliform bacteria are found, special follow-up tests are done to determine if harmful bacteria are present in the water supply. If this limit is exceeded, the water supplier must notify the public by newspaper, television or radio. To comply with the stricter regulation, we have added chlorine in the distribution system for thirty days, and will do this once a year to eliminate bacteria growth in the distribution system.

In our continuing efforts to maintain a safe and dependable water supply it may be necessary to make improvements in your water system. The costs of these improvements may be reflected in the rate structure. Rate adjustments may be necessary in order to address these improvements.

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of infection by cryptosporidium and other microbiological contaminants are available from the Safe Drinking Water Hotline (800-426-4791).

Please call our office if you have questions. (541-573- 5255)

We at City of Burns work around the clock to provide top quality water to every tap. We ask that all our customers help us protect our water sources, which are the heart of our community, our way of life and our children's future.

Thank You

Michael Berry
Public Works Dir.
City of Burns

APPENDIX B
Water System Sanitary Survey - 2020

PUBLIC HEALTH DIVISION
Drinking Water Services
Kate Brown, Governor

Oregon Health Authority
750 SE Emigrant Ave., Suite 150
Pendleton, OR 97801
(541) 276-8006
FAX (541) 276-4778
www.healthoregon.org/dwp

August 27, 2020

Pedro Zabala
City of Burns
242 S. Broadway Ave.
Burns, Oregon 97720

Re: Water System Survey at Burns Water Department, PWS ID# 4100153

Dear Pedro:

Thank you and Michael Berry for your time and assistance in conducting a **Water System Survey at the City of Burns Water Department on July 29, 2020**. The main purpose of the survey is to evaluate the entire water system in terms of supplying safe drinking water to the public. I have enclosed a copy of the report for your records. Please let me know if any corrections need to be made.

No significant deficiencies or rule violations were identified. Please note the following comments and/or recommendations:

1. The Drinking Water Program has established criteria for determining whether a system should be considered to have "outstanding performance." Systems that are designated outstanding performers may have their water system survey frequency reduced from every 3 years to every 5 years. Congratulations, your water system met the established criteria. Therefore, your next water system survey will be scheduled in 5 years. I have enclosed a certificate along with a handout that describes the outstanding performance criteria such that you can assure your system continues to meet these criteria.
2. The city's Emergency Response Plan and Operation & Maintenance Manual should be reviewed and updated as needed.
3. The sampling schedules for arsenic have been reduced to once every nine years. A summary of your monitoring requirements can be found on pages 11-12 of the report. Please maintain a copy of this page and refer to it for scheduling future monitoring.
4. It is my understanding that a new Water System Master Plan is in the process of being drafted by Anderson Perry & Associates.

If you have any questions, concerns, or would like this in an alternate format, please contact me at (541) 966-0900 or by email at william.h.goss@dhsoha.state.or.us . Your cooperation is appreciated.

Sincerely,

William Goss, P.E.
Regional Engineer

cc: OHA-DWS, Portland
Brandon Mahon, P.E., Anderson Perry & Associates (pdf copy only)

encl: survey report, outstanding performer certificate, outstanding performer criteria

Deficiency Summary

Surveyor: Bill Goss

Date Corrective Action Plan is due: N/A **County:** Harney

Yes	No	Significant Deficiencies and Rule Violations:	Date to be corrected	Date corrected
☐	☒	**Source:**		
		Well construction:		
		Spring/other source:		
☐	☒	**Treatment:**		
		Surface water treatment:		
		Disinfection:		
		Other treatment:		
☐	☒	**Finished Water Storage:**		
☐	☒	**Distribution:**		
☐	☒	**Monitoring:**		
☐	☒	**Management & Operations:**		
☐	☒	**Operator Certification:**		
☐	☒	**Other Rule Violations:**		

Comments:
No significant deficiencies or rule violations.

☐ **Source Deficiencies:**

Well Construction Deficiencies:
- ☐⊕ Sanitary seal and casing not watertight
- ☐⊕ Does not meet setbacks from hazards
- ☐⊕ Wellhead not protected from flooding
- ☐⊕ No raw water sample tap
- ☐⊕ No treated sample tap (if applicable)
- ☐⊕ No screen on existing well vent

Spring Source Deficiencies:
- ☐⊕ Springbox not impervious durable material
- ☐⊕ No watertight access hatch/entry
- ☐⊕ No screened overflow
- ☐⊕ Does not meet setbacks from hazards
- ☐⊕ No raw water sample tap
- ☐⊕ No treated sample tap (if applicable)

☐ **Treatment Deficiencies/Violations:**

Surface Water Treatment Deficiencies:
- ☐+ Turbidity standards not met - *0030(3)*
- ☐+ Turbidimeters not calibrated per manufacturer or at least quarterly - *0036(5)(b)(A)(ii)*
- ☐⊕ Incorrect location for turbidity monitoring
- ☐⊕ If serving > 3,300 people no alarm or auto plant shut off for low chlorine residual
- ☐+ For conventional or direct filtration: No alarm or plant shut off for high turbidity
- ☐⊕ For conventional filtration: Settled water not measured daily
- ☐⊕ For conventional or direct filtration: Turbidity profile not conducted on individual filters at least quarterly
- ☐⊕ For cartridge filtration: Filters not changed according to mfg. rec. pressure differential
- ☐⊕ For cartridge filtration: No pressure gauges before and after cartridge filter
- ☐+ For membrane filtration: Direct integrity testing does not meet requirements under -0036(5)(d)
- ☐+ For membrane filtration: Turbidimeter not present on each unit *-0036(5)(d)(C) or -0050(4)(c)(G)*
- ☐+ For membrane filtration: O&M manual doesn't include a diagnosis/repair plan *-0065(4)(c)*
- ☐⊕ For diatomaceous earth filtration: Body feed not added with influent flow

Disinfection Deficiencies/Violations:
- ☐+ DPD/EPA approved method not used - *0036(9)(e)*
- ☐+ Free chlorine residual not maintained - *0032(3/5)*
- ☐+ Chlorine not measured & recorded - *0036(9)*
- ☐+ Minimum CT required not met all times - *0032(3/5)*
- ☐⊕ No means to adequately determine flow rate on contact chamber effluent line
- ☐+ pH, Temperature, and chlorine residual not measured daily at first user - *0036(5)(a/b)*
- ☐⊕ Failure to calculate CT values correctly
- ☐⊕ No means to adequately determine disinfection contact time under peak flow and minimum storage conditions

UV Disinfection Violations (OAR 333-0050(5)(k)):
- ☐+ Bypass around UV system
- ☐+ Lamp sleeve not cleaned
- ☐+ Lamp not replaced per manufacturer
- ☐+ No intensity sensor with alarm or shut-off

Other Treatment Violations:
- ☐+ Non-NSF approved chemicals - *0087(6)*
- ☐+ Corrosion control parameters not met - *0034*

☐ **Distribution System Violations:**
- ☐+ System pressure < 20 psi - *0025(7)*

Cross Connection (OAR 333-061-0070):
- ☐+ No ordinance or enabling authority (CWS)
- ☐+ Annual Summary Report not issued (CWS)
- ☐+ Testing records not current (CWS, NTNC, TNC)
- ☐+ No Cross Connection Control Specialist (CWS ≥ 300 connections)

☐ **Finished Water Storage Deficiencies:**
- ☐⊕ Hatch not locked or adequately secured
- ☐⊕ Roof and access hatch not watertight
- ☐⊕ No flap valve, screen, or equivalent on drain
- ☐⊕ No screened vent

☐ **Monitoring Violations:**
- ☐+ Monitoring not current - *0025(1)*
- ☐+ Unaddressed MCL violations or LCR AL exceedances - *0030*
- ☐+ No Coliform Sampling Plan - *0036(6)(a)(I)*

☐ **Management & Operations Violations:**
- ☐+ No operations and maintenance manual - *0065(4)*
- ☐+ Emergency response plan not completed - *0064(1)*
- ☐+ Major modifications not approved (plan review) - *0050*
- ☐+ Master plan not current (≥ 300 con.) - *0060(5)*
- ☐+ Annual CCR not distributed (CWS) - *0043(1)(a)*
- ☐+ PNC or out of compliance with AO
- ☐+ Public notice not issued as required - *0042*

☐ **Operator Certification Violations:**
- ☐+ No certified operator at required level - *0065(2)*
- ☐+ No protocol for under certified operator - *0225(2)*

☐ **Other Rule Violations:** _____

⊕ Significant deficiency per OAR 333-061-0076
+ Rule violation per OAR 333-061-XXX

Inventory and Narrative

☒ **Outstanding Performer**					
Type:	**Status**	**Size**	**Season:**	☒ All year	☐ Seasonal
☒ Community (C) ☐ Non-Transient Non-Community (NTNC) ☐ Transient Non-Community (TNC) ☐ Non-EPA (NP)	Population:	2835	Begins: (mm/dd)	1/1	
	Connections:	1500	Ends: (mm/dd)	12/31	
License:	☒ Not Lic. ☐ Health Dept. ☐ Ag		**Service Area Characteristics:**		MU
Responsible Agency:	☒ State ☐ County ☐ Ag		**Owner Type:**		4
Minimum WS Certification Requirements:	WD: 2	WT: N/A	☐ FE	☐ Small WS	☐ N/A

Primary Administrative Contact (Mailing Address):			
Contact Name:	Pedro Zabala/Michael Berry	Phone:	(541) 573-6711 (shop)
Title:	Public Works Director	Cell:	( )
Street Address:	242 S. Broadway Ave.	Emergency #:	( )
City/State/Zip:	Burns, OR 97720	Email:	pzabala@ci.burns.or.us
Legal/Owner Address:			
Contact Name:		Phone:	( )
Title:		Cell:	( )
Street Address:		Fax:	(541) 573-5622
City/State/Zip:		Email:	
System Physical Address:			
Contact Name:		Phone:	( )
Title:		Cell:	( )
Street Address:		Emergency #:	( )
City/State/Zip:		Email:	

Emergency Systems Available:				
Name:	City of Hines	**PWS ID#:**	**41**	00382

Narrative:

The water system consists of five wells, a 2 MG storage reservoir, and distribution piping. The water is untreated, but hypochlorination equipment is installed at wells #2 and #5 if needed. The older elevated storage tank was taken out of service.

Service area characteristic and owner type codes:

Service Area Characteristics		
Primary	**Secondary**	**CODE**
Residential	City or Town	**MU**
	Mobile Home Park	**MP**
	Subdivision	**SU**
	Rural	**RA**
	Other	**OR**
Transient	Recreation (parks, campground, beaches, ski areas, marinas)	**PA**
	Service Station	**SS**
	Summer Camp	**SK**
	Restaurant/Store	**RS**
	Highway Rest Area	**HR**
	Hotel/Motel, B&B	**HM**
	Other (visitor ctr, church)	**OT**
Non-Transient Non-Community	School	**SC**
	Institution	**IN**
	Medical Facility	**MF**
	Industrial/Agricultural	**IA**
	Day Care Center	**DC**
	Other	**OA**
	Interstate Carrier	**IC**
Other	Wholesaler (sells water)	**WH**
	Other Area	**OT**

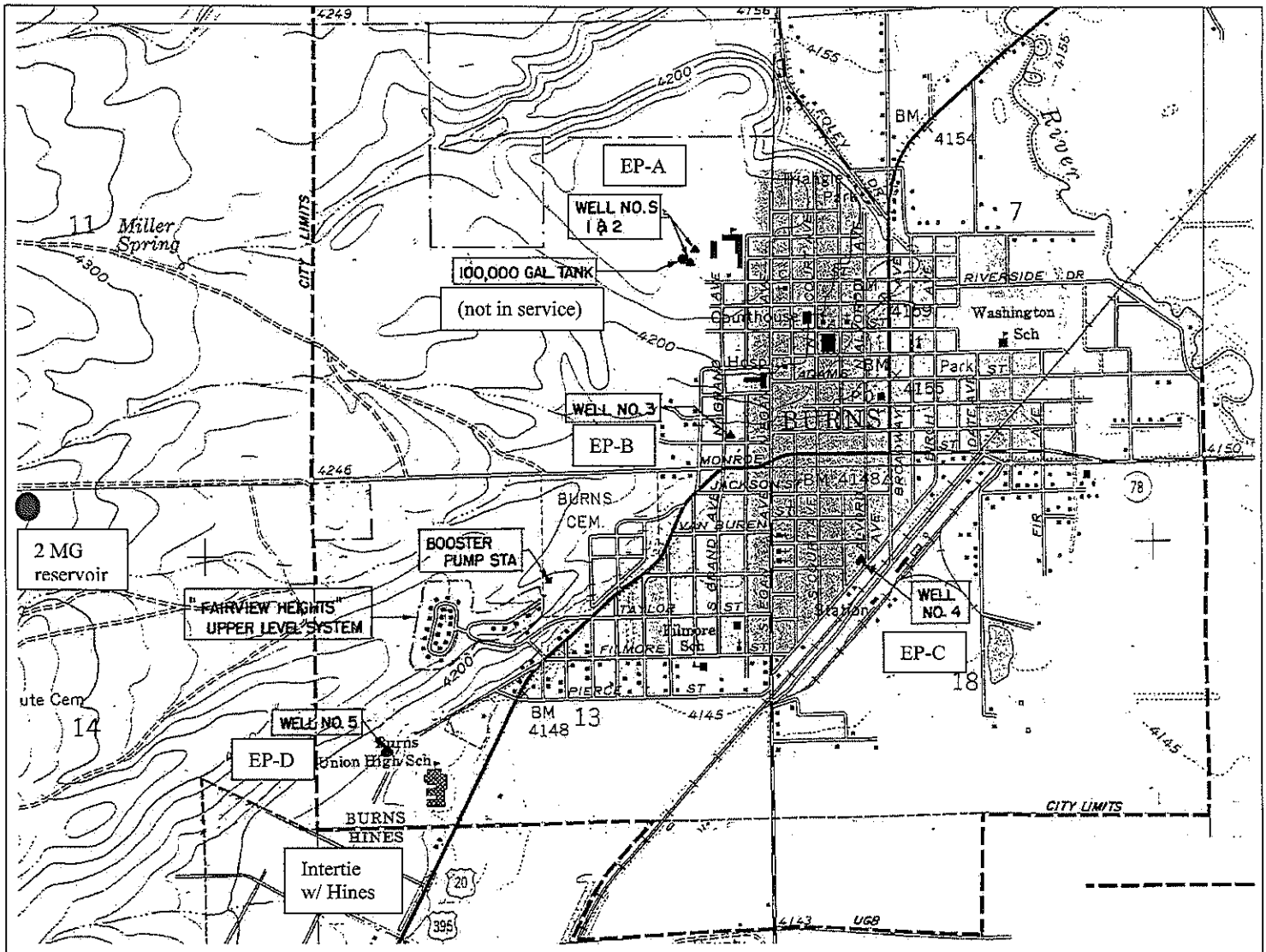
Determining System Type				
Population/ Daily Use	**Number of Connections**	**>25 Same Daily Users**	**≥25 Year Round Residents**	**System Type**
<10	**<4**	**No**	**No**	**Not a System**
10 – 24	**4-14**	**_**	**_**	**State Reg/Non-EPA**
25+	**_**	**No**	**No**	**Transient Non-Community**
25+	**_**	**Yes**	**No**	**Non-Transient Non-Community**
25+	**15+**	**Yes**	**Yes**	**Community**

Coliform Bacteria Sampling			
Community systems	Monthly samples based on population*		
Non-Transient, Transient, State-Regulated Systems	**Groundwater population served**		**Surface water**
	≤1000 1 per quarter	>1000 Monthly based on population*	Monthly sampling based on population*
Non-Community systems operating seasonally	Monthly samples based on population*		

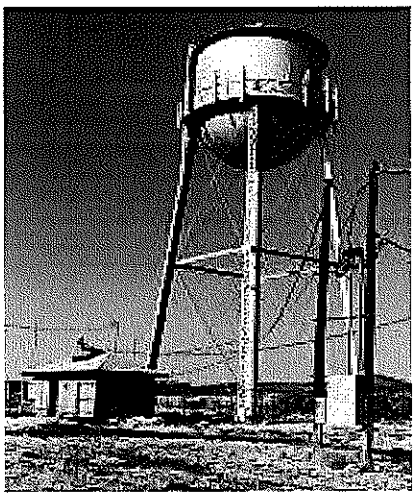
Owner Type	Code
Federal Government	**1**
Private	**2**
State Government	**3**
Local Government	**4**
Mixed Public/Private	**5**

* Population	Samples per month
Up to 1,000	**1**
1,001 to 2,500	**2**
2,501 to 3,300	**3**
etc.	**See rules or call DWS**

Water System Schematic



2 MG reservoir



Old reservoir (not in service) and well #2 building

Source Information

ID	Entry Points (Location where water enters distribution and is sampled)	Source Type (Ground, Surface, GWUDI, Purchased ground, Purchased surface)	Availability (Permanent, Seasonal*, Emergency) *If seasonal, indicate begin/end dates	Begin (M/D)		End (M/D)	
A	EP for Wellfield (Wells 1 & 2)	Ground	Permanent				
B	EP for Well #3	Ground	Permanent				
C	EP for Well #4	Ground	Permanent				
D	EP for Well #5	Ground	Permanent				

ID	Sources (Contributing to Entry Point)	Land Use*	Capacity (GPM)	Source Type (Ground, Surface, GWUDI, Purchased ground, Purchased surface)	Availability (Permanent, Seasonal, Emergency, Abandoned, Disconnected)
AA	Well #1	G, L	750	Ground	Permanent
AB	Well #2	G, L	450	Ground	Permanent
BA	Well #3	G	900	Ground	Permanent
CA	Well #4	G, L	1300	Ground	Permanent
DA	Well #5	G	1900	Ground	Permanent

*Land Use Codes: (A) **Pristine Forest** (B) **Irrigated Crops** (C) **Non-Irrigated Crops** (D) **Pasture** (E) **Light Industry** (F) **Heavy Industry** (G) **Urban-Sewered Area** (H) **Rural On-Site Sewage Disposal** (I) **Urban On-Site Sewage Disposal** (J) **Rangeland** (K) **Managed Forest** (L) **Commercial** (M) **Recreational Use**

Yes **No**

☐ ☐ Has the water system implemented strategies to protect their drinking water sources? (e.g., posting source area signs, notifying residents of hazardous waste collection events, provide residents information about maintaining their septic systems, abandoning unused wells, etc.)

☐ ☐ Is the water system interested in protecting their drinking water sources from contamination? If yes, contact regional geologist at 541-726-2587.

Comments:
Wells 1 and 2 are used as primary sources. Wells 3,4, and 5 turn on in rotation as needed.

Well Information

Source ID#: SRC-	AA		AB		BA		CA		DA			
Source Name:	Well #1		Well #2		Well #3		Well #4		Well #5			
Well log available?*	☒ Y	☐ N	☒ Y	☐ N	☒ Y	☐ N	☒ Y	☐ N	☒ Y	☐ N	☐ Y	☐ N
Well log ID (e.g., COLU123, L12345)	HARN282		HARN283		HARN289		HARN478		HARN290			
	Yes	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**
Well active?	☒	☐	☒	☐	☒	☐	☒	☐	☒	☐	☐	☐
Pitless adaptor?	☐	☒	☐	☒	☐	☒	☐	☒	☐	☒	☐	☐
• Sanitary seal & casing watertight?	☒	☐	☒	☐	☒	☐	☒	☐	☒	☐	☐	☐
• Raw water sample tap?	☒	☐	☒	☐	☒	☐	☒	☐	☒	☐	☐	☐
• Treated water sample tap? ☒N/A	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
• If vented, properly screened?	☒	☐	☒	☐	☒	☐	☒	☐	☒	☐	☐	☐
• Wellhead protected from flooding?	☒	☐	☒	☐	☒	☐	☒	☐	☒	☐	☐	☐
Concrete slab around casing?	☒	☐	☒	☐	☒	☐	☒	☐	☒	☐	☐	☐
Casing height ≥12-in. above slab/grade?	☒	☐	☒	☐	☒	☐	☒	☐	☒	☐	☐	☐
Flowmeter?	☒	☐	☒	☐	☒	☐	☒	☐	☒	☐	☐	☐
Pressure gauge?	☒	☐	☒	☐	☒	☐	☒	☐	☒	☐	☐	☐
Pump to waste piping?	☒	☐	☒	☐	☒	☐	☒	☐	☒	☐	☐	☐
• Well meets setbacks from hazards?	☒	☐	☒	☐	☒	☐	☒	☐	☒	☐	☐	☐
If no, identify list of hazard(s) within the setback and the distance to the hazard.... HAZARD: DISTANCE (ft.):												
Protective housing?	☒	☐	☒	☐	☒	☐	☒	☐	☒	☐	☐	☐
If yes, does it have:												
Heat?	☒	☐	☒	☐	☒	☐	☒	☐	☒	☐	☐	☐
Light?	☒	☐	☒	☐	☒	☐	☒	☐	☒	☐	☐	☐
Floor drain?	☐	☒	☐	☒	☐	☒	☒	☐	☒	☐	☐	☐
Well pump removal provision?	☒	☐	☒	☐	☒	☐	☒	☐	☒	☐	☐	☐
Pump Type: (vertical turbine, submersible, centrifugal, shallow jet, deep jet)	vertical turbine		vertical turbine		vertical turbine		vertical turbine		vertical turbine			
Bearing lubrication: (oil, or water)	water		water		water		water		water			
Pumping capacity (gpm)	750		450		900		1300		1900			

*If no well log available, record any known information regarding depth of well, depth of grout seal, year of installation, or casing diameter in the comments section below.

Comments:
Wells 2 and 5 have chlorination systems that can be used if needed. Wells 1 and 2 have a common pump to waste line. Vent screen on well 4 casing was replaced during the survey. Wells 4 and 5 have emergency generators available.

Potential Sanitary Hazards
(From OAR 333-061-0050(2)(a)(E))

The following sanitary hazards are not allowed within 100 feet of a well or spring:

- Any existing or proposed pit privy
- Subsurface sewage disposal drain field
- Cesspool
- Solid Waste disposal site
- Pressure sewer line
- Buried fuel storage tank
- Animal yard, feedlot, or animal waste storage
- Untreated storm water or gray water disposal
- Chemical (including solvent, pesticides, and fertilizers)storage, usage, or application)
- Fuel transfer or storage
- Mineral resource extraction
- Vehicle or machinery maintenance or long term storage
- Junk / auto / scrap yard
- Cemetery
- Unapproved well
- Well that has not been properly abandoned or of unknown or suspect construction
- Source of pathogenic organisms
- Any other similar public health hazards

The following are not allowed within 50 feet of a well or spring:

- Gravity sewer line
- Septic Tank

Exemptions to these setbacks must be listed and documented within the plan approval letter and in an approved construction waiver standard.

If a surface water source is located within 500 feet of a well or spring, please note the water body name and the distance to the well or spring. All groundwater sources within 500 feet to a surface water source should be considered for potential surface water influence. Check the file for correspondence. If a review has been done indicate results in comment section. If not, contact the Springfield office 541-726-2587.

Storage and Pressure Tanks

Number	Name	Tank Type (G)round, (E)levated, (P)ressure	Tank Material (Concrete, Steel, Redwood, Plastic, Other)	Year Built	Volume (gal.)
1	reservoir	Ground	steel	2002	2 MG
2	old reservoir (not in use - emerg. only)	Elevated	steel	1926	(100,000)

Total Volume: 2 MG

Reservoir Number:	1									
Reservoir Features	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**
Fence/gate?	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐
● Hatch secured (e.g. locked, bolted, etc.)?	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐
● All tank access points watertight?	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐
● Screened vent?	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐
Overflow?	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐
● Overflow protected (screen/flap/valve)?	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐
Drain to daylight?	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐
Water level gauge?	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐
Bypass piping? (● if used for contact time)	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐
Alarm for high or low levels?	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐
Separate inlet/outlet?	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐
Approved interior coating?	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐
Exterior in good condition?	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐
Annual interior/exterior inspection?	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐
Cleaning schedule?	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐
Continuously disinfected? (● post '81 redwood)	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐
Pressure Tanks										
Accessible for maintenance?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Bypass piping?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Drain?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Pressure relief device?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Air bladder/diaphragm?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Valve for adding air?	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Comments

2 MG reservoir overflow outlet has a duckbill valve with an air gap. Divers are scheduled to inspect reservoir in 2021. The old elevated reservoir is not in service and has no water in it.

Distribution System Information

Service Area and Facility Map

Yes	No	
☒	☐	Does the system have a service area and facility map (indicate features on map):

- ☒ Water lines (including size and material)
- ☐ Treatment facilities
- ☒ Storage facilities (reservoirs)
- ☐ Sampling points
- ☒ Sources-wells & withdrawal points
- ☒ Pressure zones
- ☐ Pressure regulating valves
- ☐ Booster pumps

Distribution Data

Yes	No		Comments
☒	☐	• System pressure ≥ 20 psi?	~70 psi in town
☒	☐	Water system leakage <10%?	
☒	☐	Hydrants or blowoffs on all dead ends? ☐ N/A	
☒	☐	Routine flushing? (How often)	once/year with Fire Dept. help
☒	☐	Adequate valving?	
☒	☐	Routine valve turning? (How often)	approx. every other year
☐	☒	Does the distribution system have asbestos cement (AC) pipe?	

***If yes,** verify asbestos sampling is completed on Water Quality Monitoring Page (CWS, NTNC).*

Cross Connection Control (CWS, NTNC, and TNC)

Yes	No	N/A		Comments
☒	☐	☐	• Assemblies tested annually? (CWS, NTNC, TNC)	57 of 67 (85%) tested in 2019
☒	☐	☐	• Ordinance or enabling authority? (CWS)	on file
☒	☐	☐	• Annual Summary Report submitted? (CWS)	
☒	☐	☐	• Certified Cross Connection Control Specialist? (CWS ≥ 300 connections)	Roy Crafts

Comments:

Some of the backflow assemblies that were not tested were at service connections that were shut off (closed businesses).

Water Quality Monitoring

Contaminant	N/A	Number & Frequency	Next Tests Due
Entry Point A (Wells 1 & 2):			
Arsenic	☐	once every 9 years	2029
Inorganic Chemicals (Including Nitrite)	☐	once every 9 years	2026
Nitrate	☐	annually	2021
Radionuclides (Community Water Systems Only):			
Gross Alpha	☐	once every 6 years	2021
Radium 226/228	☐	once every 9 years	2023
Uranium	☐	once every 6 years	2023
SOCs	☐	once every 3 years	2021
VOCs	☐	once every 3 years	2023
Entry Point B (Well 3):			
Arsenic	☐	once every 9 years	2029
Inorganic Chemicals (Including Nitrite)	☐	once every 9 years	2029
Nitrate	☐	annually	2021
Radionuclides (Community Water Systems Only):			
Gross Alpha	☐	once every 9 years	2023
Radium 226/228	☐	once every 9 years	2023
Uranium	☐	once every 6 years	2023
SOCs	☐	once every 3 years	2023
VOCs	☐	once every 3 years	2023
Entry Point C (Well 4):			
Arsenic	☐	once every 9 years	2029
Inorganic Chemicals (Including Nitrite)	☐	once every 9 years	2029
Nitrate	☐	annually	2021
Radionuclides (Community Water Systems Only):			
Gross Alpha	☐	once every 9 years	2023
Radium 226/228	☐	once every 9 years	2023
Uranium	☐	once every 6 years	2023
SOCs	☐	once every 3 years	2023
VOCs	☐	once every 3 years	2023
Tetrachloroethylene	☐	annually	2021
Entry Point D (Well 5):			
Arsenic	☐	once every 9 years	2029
Inorganic Chemicals (Including Nitrite)	☐	once every 9 years	2029
Nitrate	☐	annually	2021
Radionuclides (Community Water Systems Only):			
Gross Alpha	☐	once every 9 years	2023
Radium 226/228	☐	once every 9 years	2023
Uranium	☐	once every 6 years	2023
SOCs	☐	once every 3 years	2023
VOCs	☐	once every 3 years	2023
Distribution System Sampling:			
Coliform Bacteria	☐	3 per month	ongoing
Lead and Copper # sites: 10	☐	one set every 3 years	summer 2023

Contaminant	N/A	Number & Frequency	Next Tests Due
Other Sampling:			
Source Water Coliform	☐	as needed after a coliform detection	TBD

Yes	No		
☒	☐	• Is all required monitoring current?	
☒	☐	Are samples collected at the correct locations in the system?	
☐	☐	• Have all MCL violations or LCR AL exceedances been addressed? ☒ N/A	no MCL violations
☐	☐	DBP's collected at correct locations? ☒ N/A	
☒	☐	• Does the system have a written coliform sampling plan?	

Does the plan include:

Yes	No		Yes	No	
☒	☐	Sample collection protocol	☒	☐	Rotation schedule
☒	☐	Distribution map	☒	☐	Repeat locations
☒	☐	Sample site locations	☒	☐	Source locations ☐ N/A

Comments:
Samples go through Box R Lab, either by courier, Les Schwab, or by mail. Tetrachloroethylene samples required at EP-C/Well #4 annually due to ongoing detections.

Management & Operations

O&M Manual and Emergency Response Plan

Yes	No	
☐	☐	• Does system have an operation and maintenance manual?
☐	☐	• Does system have an emergency response plan?
☐	☐	Do any system components have auxiliary power?
		If yes, describe:

Operator Certification

Yes	No	N/A	
☒	☐		• Is the DRC identified and certified at the appropriate level?
		☐	If the DRC is a contract operator, how do they work with the system?
☐	☐	☐	• Does system have written protocols for under-certified operators?

Plan Review/Master Plan

Yes	No	N/A	
☒	☐	☐	• Have all major modifications been approved by DWS?
☒	☐	☐	• Does the system have a current (<20 yr. old) master plan? (Not required if < 300 connections)
			What year was the plan completed? 2000 by Cork Palmer, P.E.

Compliance Status

Yes	No	N/A	
☒	☐		• Is water system in compliance (all orders resolved and not a priority non-complier)?
☐	☐	☒	• Does the system issue public notice as required?
☒	☐	☐	• Are consumer confidence reports sent to users each year?

Comments:
Michael Berry to assume DRC responsibilities. Roy Crafts has WD1 certification. Brandon Mahon with Anderson-Perry & Associates is working on a new master plan. A draft for review is expected to be done before the end of the year.

Oregon Health Authority
Drinking Water Services

This is to certify that the

City of Burns

has successfully met the criteria for

Outstanding Performance

during the last Water System Survey conducted on
July 29th, 2020

David H. Emme, Manager
Drinking Water Services
Oregon Health Authority

APPENDIX C
Insurance Service Office, Inc., Rating Information and Hydrant Flow Tests

1000 Bishops Gate Blvd. Ste. 300
Mt. Laurel NJ 08054-5404

t 1.800.444.4554 Opt 2
f 1.800.777.3929

October 26, 2015

Ms. Dauna Wensenk, Administrator
Burns
242 S Broadway
Burns, Oregon, 97720

RE: Burns, Harney County, Oregon
Public Protection Classification: 03/3Y
Effective Date: February 01, 2016

Dear Ms. Dauna Wensenk,

We wish to thank you Dave Cullins and Chief Scott Williamson for your cooperation during our recent Public Protection Classification (PPC) survey. ISO has completed its analysis of the structural fire suppression delivery system provided in your community. The resulting classification is indicated above.

If you would like to know more about your community's PPC classification, or if you would like to learn about the potential effect of proposed changes to your fire suppression delivery system, please call us at the phone number listed below.

ISO's Public Protection Classification Program (PPC) plays an important role in the underwriting process at insurance companies. In fact, most U.S. insurers – including the largest ones – use PPC information as part of their decision- making when deciding what business to write, coverage's to offer or prices to charge for personal or commercial property insurance.

Each insurance company independently determines the premiums it charges its policyholders. The way an insurer uses ISO's information on public fire protection may depend on several things – the company's fire-loss experience, ratemaking methodology, underwriting guidelines, and its marketing strategy.

Through ongoing research and loss experience analysis, we identified additional differentiation in fire loss experience within our PPC program, which resulted in the revised classifications. We based the differing fire loss experience on the fire suppression capabilities of each community. The new classifications will improve the predictive value for insurers while benefiting both commercial and residential property owners. We've published the new classifications as "X" and "Y" — formerly the "9" and "8B" portion of the split classification, respectively. For example:

- A community currently graded as a split 6/9 classification will now be a split 6/6X classification; with the "6X" denoting what was formerly classified as "9."
- Similarly, a community currently graded as a split 6/8B classification will now be a split 6/6Y classification, the "6Y" denoting what was formerly classified as "8B."
- Communities graded with single "9" or "8B" classifications will remain intact.
- Properties over 5 road miles from a recognized fire station would receive a class 10.

PPC is important to communities and fire departments as well. Communities whose PPC improves may get lower insurance prices. PPC also provides fire departments with a valuable benchmark, and is used by many departments as a valuable tool when planning, budgeting and justifying fire protection improvements.

ISO appreciates the high level of cooperation extended by local officials during the entire PPC survey process. The community protection baseline information gathered by ISO is an essential foundation upon which determination of the relative level of fire protection is made using the Fire Suppression Rating Schedule.

The classification is a direct result of the information gathered, and is dependent on the resource levels devoted to fire protection in existence at the time of survey. Material changes in those resources that occur after the survey is completed may affect the classification. Although ISO maintains a pro-active process to keep baseline information as current as possible, in the event of changes please call us at 1-800-444-4554, option 2 to expedite the update activity.

ISO is the leading supplier of data and analytics for the property/casualty insurance industry. Most insurers use PPC classifications for underwriting and calculating premiums for residential, commercial and industrial properties. The PPC program is not intended to analyze all aspects of a comprehensive structural fire suppression delivery system program. It is not for purposes of determining compliance with any state or local law, nor is it for making loss prevention or life safety recommendations.

If you have any questions about your classification, please let us know.

Sincerely,

Dominic Santanna

Dominic Santanna
Manager -National Processing Center

cc: Dave Cullins, Water Superintendent, Burns Water Dept
Chief Scott Williamson, Chief, BURNS FIRE DEPARTMENT
Ms. MISSY OUSLEY, Communications Supervisor, HARNEY COUNTY 911

Background Information

Introduction

ISO collects and evaluates information from communities in the United States on their structure fire suppression capabilities. The data is analyzed using our Fire Suppression Rating Schedule (FSRS) and then a Public Protection Classification (PPC™) grade is assigned to the community. The surveys are conducted whenever it appears that there is a possibility of a PPC change. As such, the PPC program provides important, up-to-date information about fire protection services throughout the country.

The FSRS recognizes fire protection features only as they relate to suppression of first alarm structure fires. In many communities, fire suppression may be only a small part of the fire department's overall responsibility. ISO recognizes the dynamic and comprehensive duties of a community's fire service, and understands the complex decisions a community must make in planning and delivering emergency services. However, in developing a community's PPC grade, only features related to reducing property losses from structural fires are evaluated. Multiple alarms, simultaneous incidents and life safety are not considered in this evaluation. The PPC program evaluates the fire protection for small to average size buildings. Specific properties with a Needed Fire Flow in excess of 3,500 gpm are evaluated separately and assigned an individual PPC grade.

A community's investment in fire mitigation is a proven and reliable predictor of future fire losses. Statistical data on insurance losses bears out the relationship between excellent fire protection – as measured by the PPC program – and low fire losses. So, insurance companies use PPC information for marketing, underwriting, and to help establish fair premiums for homeowners and commercial fire insurance. In general, the price of fire insurance in a community with a good PPC grade is substantially lower than in a community with a poor PPC grade, assuming all other factors are equal.

ISO is an independent company that serves insurance companies, communities, fire departments, insurance regulators, and others by providing information about risk. ISO's expert staff collects information about municipal fire suppression efforts in communities throughout the United States. In each of those communities, ISO analyzes the relevant data and assigns a PPC grade – a number from 1 to 10. Class 1 represents an exemplary fire suppression program, and Class 10 indicates that the area's fire suppression program does not meet ISO's minimum criteria.

ISO's PPC program evaluates communities according to a uniform set of criteria, incorporating nationally recognized standards developed by the National Fire Protection Association and the American Water Works Association. A community's PPC grade depends on:

- **Needed Fire Flows**, which are representative building locations used to determine the theoretical amount of water necessary for fire suppression purposes.
- **Emergency Communications**, including emergency reporting, telecommunicators, and dispatching systems.
- **Fire Department**, including equipment, staffing, training, geographic distribution of fire companies, operational considerations, and community risk reduction.
- **Water Supply**, including inspection and flow testing of hydrants, alternative water supply operations, and a careful evaluation of the amount of available water compared with the amount needed to suppress fires up to 3,500 gpm.

Data Collection and Analysis

ISO has evaluated and classified over 48,000 fire protection areas across the United States using its FSRS. A combination of meetings between trained ISO field representatives and the dispatch center coordinator, community fire official, and water superintendent is used in conjunction with a comprehensive questionnaire to collect the data necessary to determine the PPC grade. In order for a community to obtain a grade better than a Class 9, three elements of fire suppression features are reviewed. These three elements are Emergency Communications, Fire Department, and Water Supply.

A review of the **Emergency Communications** accounts for 10% of the total classification. This section is weighted at **10 points**, as follows:

- Emergency Reporting 3 points
- Telecommunicators 4 points
- Dispatch Circuits 3 points

A review of the **Fire Department** accounts for 50% of the total classification. ISO focuses on a fire department's first alarm response and initial attack to minimize potential loss. The fire department section is weighted at **50 points**, as follows:

- Engine Companies 6 points
- Reserve Pumpers 0.5 points
- Pump Capacity 3 points
- Ladder/Service Companies 4 points
- Reserve Ladder/Service Trucks 0.5 points
- Deployment Analysis 10 points
- Company Personnel 15 points
- Training 9 points
- Operational considerations 2 points
- Community Risk Reduction 5.5 points (in addition to the 50 points above)

A review of the **Water Supply** system accounts for 40% of the total classification. ISO reviews the water supply a community uses to determine the adequacy for fire suppression purposes. The water supply system is weighted at **40 points**, as follows:

- Credit for Supply System 30 points
- Hydrant Size, Type & Installation 3 points
- Inspection & Flow Testing of Hydrants 7 points

There is one additional factor considered in calculating the final score – **Divergence**.

Even the best fire department will be less than fully effective if it has an inadequate water supply. Similarly, even a superior water supply will be less than fully effective if the fire department lacks the equipment or personnel to use the water. The FSRS score is subject to modification by a divergence factor, which recognizes disparity between the effectiveness of the fire department and the water supply.

The Divergence factor mathematically reduces the score based upon the relative difference between the fire department and water supply scores. The factor is introduced in the final equation.

PPC Grade

The PPC grade assigned to the community will depend on the community's score on a 100-point scale:

PPC	Points
1	90.00 or more
2	80.00 to 89.99
3	70.00 to 79.99
4	60.00 to 69.99
5	50.00 to 59.99
6	40.00 to 49.99
7	30.00 to 39.99
8	20.00 to 29.99
9	10.00 to 19.99
10	0.00 to 9.99

The classification numbers are interpreted as follows:

- Class 1 through (and including) Class 8 represents a fire suppression system that includes an FSRS creditable dispatch center, fire department, and water supply.
- Class 8B is a special classification that recognizes a superior level of fire protection in otherwise Class 9 areas. It is designed to represent a fire protection delivery system that is superior except for a lack of a water supply system capable of the minimum FSRS fire flow criteria of 250 gpm for 2 hours.
- Class 9 is a fire suppression system that includes a creditable dispatch center, fire department but no FSRS creditable water supply.
- Class 10 does not meet minimum FSRS criteria for recognition, including areas that are beyond five road miles of a recognized fire station.

New PPC program changes effective July 1, 2014

We have revised the PPC program to capture the effects of enhanced fire protection capabilities that reduce fire loss and fire severity in Split Class 9 and Split Class 8B areas (as outlined below). This new structure benefits the fire service, community, and property owner.

New classifications
Through ongoing research and loss experience analysis, we identified additional differentiation in fire loss experience within our PPC program, which resulted in the revised classifications. We based the differing fire loss experience on the fire suppression capabilities of each community. The new PPC classes will improve the predictive value for insurers while benefiting both commercial and residential property owners. Here are the new classifications and what they mean.

Split classifications
When we develop a split classification for a community — for example 5/9 — the first number is the class that applies to properties within 5 road miles of the responding fire station and 1,000 feet of a creditable water supply, such as a fire hydrant, suction point, or dry hydrant. The second number is the class that applies to properties within 5 road miles of a fire station but beyond 1,000 feet of a creditable water supply. We have revised the classification to reflect more precisely the risk of loss in a community, replacing Class 9 and 8B in the second part of a split classification with revised designations.

What's changed with the new classifications?
We've published the new classifications as "X" and "Y" — formerly the "9" and "8B" portion of the split classification, respectively. For example:

- A community currently displayed as a split 6/9 classification will now be a split 6/6X classification; with the "6X" denoting what was formerly classified as "9".
- Similarly, a community currently graded as a split 6/8B classification will now be a split 6/6Y classification, the "6Y" denoting what was formerly classified as "8B".
- Communities graded with single "9" or "8B" classifications will remain intact.

Prior Classification	New Classification
1/9	1/1X
2/9	2/2X
3/9	3/3X
4/9	4/4X
5/9	5/5X
6/9	6/6X
7/9	7/7X
8/9	8/8X
9	9

Prior Classification	New Classification
1/8B	1/1Y
2/8B	2/2Y
3/8B	3/3Y
4/8B	4/4Y
5/8B	5/5Y
6/8B	6/6Y
7/8B	7/7Y
8/8B	8/8Y
8B	8B

What's changed?
As you can see, we're still maintaining split classes, but it's how we represent them to insurers that's changed. The new designations reflect a reduction in fire severity and loss and have the potential to reduce property insurance premiums.

Benefits of the revised split class designations

- To the fire service, the revised designations identify enhanced fire suppression capabilities used throughout the fire protection area
- To the community, the new classes reward a community's fire suppression efforts by showing a more reflective designation
- To the individual property owner, the revisions offer the potential for decreased property insurance premiums

New water class
Our data also shows that risks located more than 5 but less than 7 road miles from a responding fire station with a creditable water source within 1,000 feet had better loss experience than those farther than 5 road miles from a responding fire station with no creditable water source. We've introduced a new classification —10W — to recognize the reduced loss potential of such properties.

What's changed with Class 10W?
Class 10W is property-specific. Not all properties in the 5-to-7-mile area around the responding fire station will qualify. The difference between Class 10 and 10W is that the 10W-graded risk or property is within 1,000 feet of a creditable water supply. Creditable water supplies include fire protection systems using hauled water in any of the split classification areas.

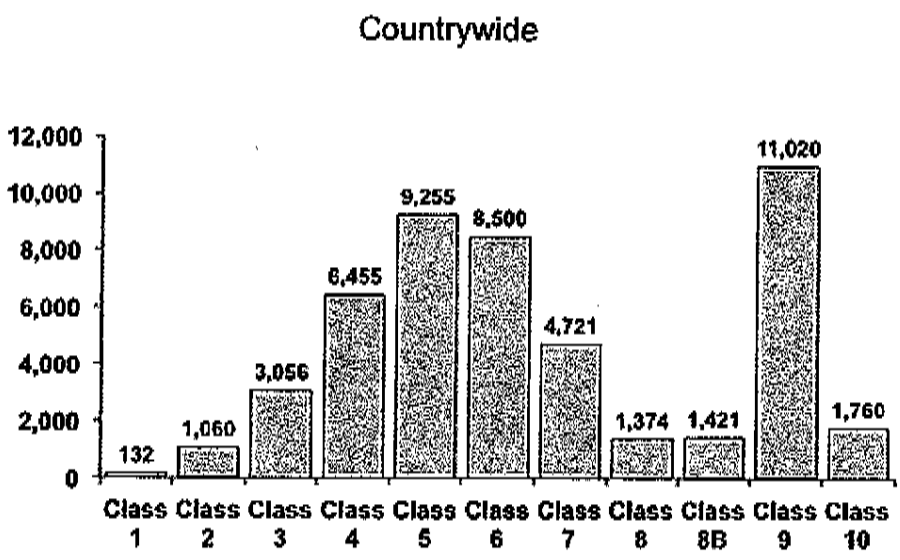
What's the benefit of Class 10W?
10W gives credit to risks within 5 to 7 road miles of the responding fire station and within 1,000 feet of a creditable water supply. That's reflective of the potential for reduced property insurance premiums.

What does the fire chief have to do?
Fire chiefs don't have to do anything at all. The revised classifications went in place automatically effective July 1, 2014 (July 1, 2015 for Texas).

What if I have additional questions?
Feel free to contact ISO at 800.444.4554 or email us at PPC-Cust-Serv@iso.com.

Distribution of PPC Grades

The 2015 published countrywide distribution of communities by the PPC grade is as follows:



Assistance

The PPC program offers help to communities, fire departments, and other public officials as they plan for, budget, and justify improvements. ISO is also available to assist in the understanding of the details of this evaluation.

The PPC program representatives can be reached by telephone at (800) 444-4554. The technical specialists at this telephone number have access to the details of this evaluation and can effectively speak with you about your questions regarding the PPC program. What's more, we can be reached via the internet at www.isomitigation.com/talk/.

We also have a website dedicated to our Community Hazard Mitigation Classification programs at www.isomitigation.com. Here, fire chiefs, building code officials, community leaders and other interested citizens can access a wealth of data describing the criteria used in evaluating how cities and towns are protecting residents from fire and other natural hazards. This website will allow you to learn more about the PPC program. The website provides important background information, insights about the PPC grading processes and technical documents. ISO is also pleased to offer Fire Chiefs Online — a special, secured website with information and features that can help improve your PPC grade, including a list of the Needed Fire Flows for all the commercial occupancies ISO has on file for your community. Visitors to the site can download information, see statistical results and also contact ISO for assistance.

In addition, on-line access to the FSRS and its commentaries is available to registered customers for a fee. However, fire chiefs and community chief administrative officials are given access privileges to this information without charge.

To become a registered fire chief or community chief administrative official, register at www.isomitigation.com.

PPC Review

ISO concluded its review of the fire suppression features being provided for Burns. The resulting community classification is **Class 03/3Y**.

If the classification is a single class, the classification applies to properties with a Needed Fire Flow of 3,500 gpm or less in the community. If the classification is a split class (e.g., 6/XX):

- The first class (e.g., "6" in a 6/XX) applies to properties within 5 road miles of a recognized fire station and within 1,000 feet of a fire hydrant or alternate water supply.
- The second class (XX or XY) applies to properties beyond 1,000 feet of a fire hydrant but within 5 road miles of a recognized fire station.
- Alternative Water Supply: The first class (e.g., "6" in a 6/10) applies to properties within 5 road miles of a recognized fire station with no hydrant distance requirement.
- Class 10 applies to properties over 5 road miles of a recognized fire station.
- Class 10W applies to properties within 5 to 7 road miles of a recognized fire station with a recognized water supply within 1,000 feet.
- Specific properties with a Needed Fire Flow in excess of 3,500 gpm are evaluated separately and assigned an individual classification.

FSRS Feature	Earned Credit	Credit Available
Emergency Communications		
414. Credit for Emergency Reporting	1.80	3
422. Credit for Telecommunicators	3.60	4
432. Credit for Dispatch Circuits	1.95	3
440. Credit for Emergency Communications	7.35	10
Fire Department		
513. Credit for Engine Companies	5.73	6
523. Credit for Reserve Pumpers	0.11	0.50
532. Credit for Pump Capacity	3.00	3
549. Credit for Ladder Service	3.84	4
553. Credit for Reserve Ladder and Service Trucks	0.00	0.50
561. Credit for Deployment Analysis	9.57	10
571. Credit for Company Personnel	3.42	15
581. Credit for Training	2.42	9
730. Credit for Operational Considerations	2.00	2
590. Credit for Fire Department	30.09	50
Water Supply		
616. Credit for Supply System	26.87	30
621. Credit for Hydrants	2.62	3
631. Credit for Inspection and Flow Testing	4.80	7
640. Credit for Water Supply	34.29	40
Divergence	-5.11	–
1050. Community Risk Reduction	4.64	5.50
Total Credit	71.26	105.50

Emergency Communications

Ten percent of a community's overall score is based on how well the communications center receives and dispatches fire alarms. Our field representative evaluated:

- Communications facilities provided for the general public to report structure fires
- Enhanced 9-1-1 Telephone Service including wireless
- Computer-aided dispatch (CAD) facilities
- Alarm receipt and processing at the communication center
- Training and certification of telecommunicators
- Facilities used to dispatch fire department companies to reported structure fires

	Earned Credit	Credit Available
414. Credit Emergency Reporting	**1.80**	3
422. Credit for Telecommunicators	**3.60**	4
432. Credit for Dispatch Circuits	**1.95**	3
Item 440. Credit for Emergency Communications:	**7.35**	**10**

Item 414 - Credit for Emergency Reporting (3 points)

The first item reviewed is Item 414 "Credit for Emergency Reporting (CER)". This item reviews the emergency communication center facilities provided for the public to report fires including 911 systems (Basic or Enhanced), Wireless Phase I and Phase II, Voice over Internet Protocol, Computer Aided Dispatch and Geographic Information Systems for automatic vehicle location. ISO uses National Fire Protection Association (NFPA) 1221, *Standard for the Installation, Maintenance and Use of Emergency Services Communications Systems* as the reference for this section.

Item 410. Emergency Reporting (CER)	Earned Credit	Credit Available
A./B. Basic 9-1-1, Enhanced 9-1-1 or No 9-1-1 For maximum credit, there should be an Enhanced 9-1-1 system, Basic 9-1-1 and No 9-1-1 will receive partial credit.	20.00	20
1. E9-1-1 Wireless Wireless Phase I using Static ALI (automatic location identification) Functionality (10 points); Wireless Phase II using Dynamic ALI Functionality (15 points); Both available will be 25 points	25.00	25
2. E9-1-1 Voice over Internet Protocol (VoIP) Static VoIP using Static ALI Functionality (10 points); Nomadic VoIP using Dynamic ALI Functionality (15 points); Both available will be 25 points	10.00	25
3. Computer Aided Dispatch Basic CAD (5 points); CAD with Management Information System (5 points); CAD with Interoperability (5 points)	5.00	15
4. Geographic Information System (GIS/AVL) The PSAP uses a fully integrated CAD/GIS management system with automatic vehicle location (AVL) integrated with a CAD system providing dispatch assignments.	0.00	15
Review of Emergency Reporting total:	60.00	100

Item 422- Credit for Telecommunicators (4 points)

The second item reviewed is Item 422 "Credit for Telecommunicators (TC)". This item reviews the number of Telecommunicators on duty at the center to handle fire calls and other emergencies. All emergency calls including those calls that do not require fire department action are reviewed to determine the proper staffing to answer emergency calls and dispatch the appropriate emergency response. NFPA 1221, *Standard for the Installation, Maintenance and Use of Emergency Services Communications Systems*, recommends that ninety-five percent of emergency calls shall be answered within 15 seconds and ninety-nine percent of emergency calls shall be answered within 40 seconds. In addition, NFPA recommends that ninety percent of emergency alarm processing shall be completed within 60 seconds and ninety-nine percent of alarm processing shall be completed within 90 seconds of answering the call.

To receive full credit for operators on duty, ISO must review documentation to show that the communication center meets NFPA 1221 call answering and dispatch time performance measurement standards. This documentation may be in the form of performance statistics or other performance measurements compiled by the 9-1-1 software or other software programs that are currently in use such as Computer Aided Dispatch (CAD) or Management Information System (MIS).

Item 420. Telecommunicators (CTC)	Earned Credit	Credit Available
A1. Alarm Receipt (AR) Receipt of alarms shall meet the requirements in accordance with the criteria of NFPA 1221	**20.00**	**20**
A2. Alarm Processing (AP) Processing of alarms shall meet the requirements in accordance with the criteria of NFPA 1221	**10.00**	**20**
B. Emergency Dispatch Protocols (EDP) Telecommunicators have emergency dispatch protocols (EDP) containing questions and a decision-support process to facilitate correct call categorization and prioritization.	**20.00**	**20**
C. Telecommunicator Training and Certification (TTC) Telecommunicators meet the qualification requirements referenced in NFPA 1061, *Standard for Professional Qualifications for Public Safety Telecommunicator,* and/or the Association of Public-Safety Communications Officials - International (APCO) *Project 33.* Telecommunicators are certified in the knowledge, skills, and abilities corresponding to their job functions.	**20.00**	**20**
D. Telecommunicator Continuing Education and Quality Assurance (TQA) Telecommunicators participate in continuing education and/or in-service training and quality-assurance programs as appropriate for their positions	**20.00**	**20**
Review of Telecommunicators total:	**90.00**	**100**

Item 432 - Credit for Dispatch Circuits (3 points)

The third item reviewed is Item 432 "Credit for Dispatch Circuits (CDC)". This item reviews the dispatch circuit facilities used to transmit alarms to fire department members. A "Dispatch Circuit" is defined in NFPA 1221 as "A circuit over which an alarm is transmitted from the communications center to an emergency response facility (ERF) or emergency response units (ERUs) to notify ERUs to respond to an emergency". All fire departments (except single fire station departments with full-time firefighter personnel receiving alarms directly at the fire station) need adequate means of notifying all firefighter personnel of the location of reported structure fires. The dispatch circuit facilities should be in accordance with the general criteria of NFPA 1221. "Alarms" are defined in this Standard as "A signal or message from a person or device indicating the existence of an emergency or other situation that requires action by an emergency response agency".

There are two different levels of dispatch circuit facilities provided for in the Standard – a primary dispatch circuit and a secondary dispatch circuit. In jurisdictions that receive 730 alarms or more per year (average of two alarms per 24-hour period), two separate and dedicated dispatch circuits, a primary and a secondary, are needed. In jurisdictions receiving fewer than 730 alarms per year, a second dedicated dispatch circuit is not needed. Dispatch circuit facilities installed but not used or tested (in accordance with the NFPA Standard) receive no credit.

The score for Credit for Dispatch Circuits (CDC) is influenced by monitoring for integrity of the primary dispatch circuit. There are up to 0.90 points available for this Item. Monitoring for integrity involves installing automatic systems that will detect faults and failures and send visual and audible indications to appropriate communications center (or dispatch center) personnel. ISO uses NFPA 1221 to guide the evaluation of this item. ISO's evaluation also includes a review of the communication system's emergency power supplies.

Item 432 "Credit for Dispatch Circuits (CDC)" = 1.95 points

Fire Department

Fifty percent of a community's overall score is based upon the fire department's structure fire suppression system. ISO's field representative evaluated:

- Engine and ladder/service vehicles including reserve apparatus
- Equipment carried
- Response to reported structure fires
- Deployment analysis of companies
- Available and/or responding firefighters
- Training

	Earned Credit	Credit Available
513. Credit for Engine Companies	**5.73**	6
523. Credit for Reserve Pumpers	**0.11**	0.5
532. Credit for Pumper Capacity	**3.00**	3
549. Credit for Ladder Service	**3.84**	4
553. Credit for Reserve Ladder and Service Trucks	**0.00**	0.5
561. Credit for Deployment Analysis	**9.57**	10
571. Credit for Company Personnel	**3.42**	15
581. Credit for Training	**2.42**	9
730. Credit for Operational Considerations	**2.00**	2
Item 590. Credit for Fire Department:	**30.09**	**50**

Basic Fire Flow

The Basic Fire Flow for the community is determined by the review of the Needed Fire Flows for selected buildings in the community. The fifth largest Needed Fire Flow is determined to be the Basic Fire Flow. The Basic Fire Flow has been determined to be 3000 gpm.

Item 513 - Credit for Engine Companies (6 points)

The first item reviewed is Item 513 "Credit for Engine Companies (CEC)". This item reviews the number of engine companies, their pump capacity, hose testing, pump testing and the equipment carried on the in-service pumpers. To be recognized, pumper apparatus must meet the general criteria of NFPA 1901, *Standard for Automotive Fire Apparatus* which include a minimum 250 gpm pump, an emergency warning system, a 300 gallon water tank, and hose. At least 1 apparatus must have a permanently mounted pump rated at 750 gpm or more at 150 psi.

The review of the number of needed pumpers considers the response distance to built-upon areas; the Basic Fire Flow; and the method of operation. Multiple alarms, simultaneous incidents, and life safety are not considered.

The greatest value of A, B, or C below is needed in the fire district to suppress fires in structures with a Needed Fire Flow of 3,500 gpm or less: **3 engine companies**

a) **2 engine companies** to provide fire suppression services to areas to meet NFPA 1710 criteria or within 1½ miles.

b) **3 engine companies** to support a Basic Fire Flow of 3000 gpm.

c) **3 engine companies** based upon the fire department's method of operation to provide a minimum two engine response to all first alarm structure fires.

The FSRS recognizes that there are **3 engine companies** in service.

The FSRS also reviews Automatic Aid. Automatic Aid is considered in the review as assistance dispatched automatically by contractual agreement between two communities or fire districts. That differs from mutual aid or assistance arranged case by case. ISO will recognize an Automatic Aid plan under the following conditions:

- It must be prearranged for first alarm response according to a definite plan. It is preferable to have a written agreement, but ISO may recognize demonstrated performance.
- The aid must be dispatched to all reported structure fires on the initial alarm.
- The aid must be provided 24 hours a day, 365 days a year.

FSRS Item 512.D "Automatic Aid Engine Companies" responding on first alarm and meeting the needs of the city for basic fire flow and/or distribution of companies are factored based upon the value of the Automatic Aid plan (up to 1.00 can be used as the factor). The Automatic Aid factor is determined by a review of the Automatic Aid provider's communication facilities, how they receive alarms from the graded area, inter-department training between fire departments, and the fire ground communications capability between departments.

For each engine company, the credited Pump Capacity (PC), the Hose Carried (HC), the Equipment Carried (EC) all contribute to the calculation for the percent of credit the FSRS provides to that engine company.

Item 513 "Credit for Engine Companies (CEC)" = 5.73 points

Item 523 - Credit for Reserve Pumpers (0.50 points)

The item is Item 523 "Credit for Reserve Pumpers (CRP)". This item reviews the number and adequacy of the pumpers and their equipment. The number of needed reserve pumpers is 1 for each 8 needed engine companies determined in Item 513, or any fraction thereof.

Item 523 "Credit for Reserve Pumpers (CRP)" = 0.11 points

Item 532 – Credit for Pumper Capacity (3 points)

The next item reviewed is Item 532 "Credit for Pumper Capacity (CPC)". The total pump capacity available should be sufficient for the Basic Fire Flow of 3000 gpm. The maximum needed pump capacity credited is the Basic Fire Flow of the community.

Item 532 "Credit for Pumper Capacity (CPC)" = 3.00 points

Item 549 – Credit for Ladder Service (4 points)

The next item reviewed is Item 549 "Credit for Ladder Service (CLS)". This item reviews the number of response areas within the city with 5 buildings that are 3 or more stories or 35 feet or more in height, or with 5 buildings that have a Needed Fire Flow greater than 3,500 gpm, or any combination of these criteria. The height of all buildings in the city, including those protected by automatic sprinklers, is considered when determining the number of needed ladder companies. Response areas not needing a ladder company should have a service company. Ladders, tools and equipment normally carried on ladder trucks are needed not only for ladder operations but also for forcible entry, ventilation, salvage, overhaul, lighting and utility control.

The number of ladder or service companies, the height of the aerial ladder, aerial ladder testing and the equipment carried on the in-service ladder trucks and service trucks is compared with the number of needed ladder trucks and service trucks and an FSRS equipment list. Ladder trucks must meet the general criteria of NFPA 1901, *Standard for Automotive Fire Apparatus* to be recognized.

The number of needed ladder-service trucks is dependent upon the number of buildings 3 stories or 35 feet or more in height, buildings with a Needed Fire Flow greater than 3,500 gpm, and the method of operation.

The FSRS recognizes that there are **1 ladder companies** in service. These companies are needed to provide fire suppression services to areas to meet NFPA 1710 criteria or within 2½ miles and the number of buildings with a Needed Fire Flow over 3,500 gpm or 3 stories or more in height, or the method of operation.

The FSRS recognizes that there are **0 service companies** in service.

Item 549 "Credit for Ladder Service (CLS)" = 3.84 points

Item 553 – Credit for Reserve Ladder and Service Trucks (0.50 points)

The next item reviewed is Item 553 "Credit for Reserve Ladder and Service Trucks (CRLS)". This item considers the adequacy of ladder and service apparatus when one (or more in larger communities) of these apparatus are out of service. The number of needed reserve ladder and service trucks is 1 for each 8 needed ladder and service companies that were determined to be needed in Item 540, or any fraction thereof.

Item 553 "Credit for Reserve Ladder and Service Trucks (CRLS)" = 0.00 points

Item 561 – Deployment Analysis (10 points)

Next, Item 561 "Deployment Analysis (DA)" is reviewed. This Item examines the number and adequacy of existing engine and ladder-service companies to cover built-upon areas of the city.

To determine the Credit for Distribution, first the Existing Engine Company (EC) points and the Existing Engine Companies (EE) determined in Item 513 are considered along with Ladder Company Equipment (LCE) points, Service Company Equipment (SCE) points, Engine-Ladder Company Equipment (ELCE) points, and Engine-Service Company Equipment (ESCE) points determined in Item 549.

Secondly, as an alternative to determining the number of needed engine and ladder/service companies through the road-mile analysis, a fire protection area may use the results of a systematic performance evaluation. This type of evaluation analyzes computer-aided dispatch (CAD) history to demonstrate that, with its current deployment of companies, the fire department meets the time constraints for initial arriving engine and initial full alarm assignment in accordance with the general criteria of in NFPA 1710, *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments.*

A determination is made of the percentage of built upon area within 1½ miles of a first-due engine company and within 2½ miles of a first-due ladder-service company.

Item 561 "Credit Deployment Analysis (DA)" = 9.57 points

Item 571 – Credit for Company Personnel (15 points)

Item 571 "Credit for Company Personnel (CCP)" reviews the average number of existing firefighters and company officers available to respond to reported first alarm structure fires in the city.

The on-duty strength is determined by the yearly average of total firefighters and company officers on-duty considering vacations, sick leave, holidays, "Kelley" days and other absences. When a fire department operates under a minimum staffing policy, this may be used in lieu of determining the yearly average of on-duty company personnel.

Firefighters on apparatus not credited under Items 513 and 549 that regularly respond to reported first alarms to aid engine, ladder, and service companies are included in this item as increasing the total company strength.

Firefighters staffing ambulances or other units serving the general public are credited if they participate in fire-fighting operations, the number depending upon the extent to which they are available and are used for response to first alarms of fire.

On-Call members are credited on the basis of the average number staffing apparatus on first alarms. Off-shift career firefighters and company officers responding on first alarms are considered on the same basis as on-call personnel. For personnel not normally at the fire station, the number of responding firefighters and company officers is divided by 3 to reflect the time needed to assemble at the fire scene and the reduced ability to act as a team due to the various arrival times at the fire location when compared to the personnel on-duty at the fire station during the receipt of an alarm.

The number of Public Safety Officers who are positioned in emergency vehicles within the jurisdiction boundaries may be credited based on availability to respond to first alarm structure fires. In recognition of this increased response capability the number of responding Public Safety Officers is divided by 2.

The average number of firefighters and company officers responding with those companies credited as Automatic Aid under Items 513 and 549 are considered for either on-duty or on-call company personnel as is appropriate. The actual number is calculated as the average number of company personnel responding multiplied by the value of AA Plan determined in Item 512.D.

The maximum creditable response of on-duty and on-call firefighters is 12, including company officers, for each existing engine and ladder company and 6 for each existing service company.

Chief Officers are not creditable except when more than one chief officer responds to alarms; then extra chief officers may be credited as firefighters if they perform company duties.

The FSRS recognizes **0.24 on-duty personnel** and an average of **13.00 on-call personnel** responding on first alarm structure fires.

Item 571 "Credit for Company Personnel (CCP)" = 3.42 points

Item 581 – Credit for Training (9 points)

Training	Earned Credit	Credit Available
A. Facilities, and Use For maximum credit, each firefighter should receive 18 hours per year in structure fire related subjects as outlined in NFPA 1001.	2.51	35
B. Company Training For maximum credit, each firefighter should receive 16 hours per month in structure fire related subjects as outlined in NFPA 1001.	7.21	25
C. Classes for Officers For maximum credit, each officer should be certified in accordance with the general criteria of NFPA 1021. Additionally, each officer should receive 12 hours of continuing education on or off site.	4.81	12
D. New Driver and Operator Training For maximum credit, each new driver and operator should receive 60 hours of driver/operator training per year in accordance with NFPA 1002 and NFPA 1451.	3.21	5
E. Existing Driver and Operator Training For maximum credit, each existing driver and operator should receive 12 hours of driver/operator training per year in accordance with NFPA 1002 and NFPA 1451.	3.79	5
F. Training on Hazardous Materials For maximum credit, each firefighter should receive 6 hours of training for incidents involving hazardous materials in accordance with NFPA 472.	0.50	1
G. Recruit Training For maximum credit, each firefighter should receive 240 hours of structure fire related training in accordance with NFPA 1001 within the first year of employment or tenure.	2.05	5
H. Pre-Fire Planning Inspections For maximum credit, pre-fire planning inspections of each commercial, industrial, institutional, and other similar type building (all buildings except 1-4 family dwellings) should be made annually by company members. Records of inspections should include up-to date notes and sketches.	2.81	12

Item 580 "Credit for Training (CT)" = 2.42 points

Item 730 – Operational Considerations (2 points)

Item 730 "Credit for Operational Considerations (COC)" evaluates fire department standard operating procedures and incident management systems for emergency operations involving structure fires.

Operational Considerations	Earned Credit	Credit Available
Standard Operating Procedures The department should have established SOPs for fire department general emergency operations	50	50
Incident Management Systems The department should use an established incident management system (IMS)	50	50
Operational Considerations total:	100	100

Item 730 "Credit for Operational Considerations (COC)" = 2.00 points

Water Supply

Forty percent of a community's overall score is based on the adequacy of the water supply system. The ISO field representative evaluated:

- the capability of the water distribution system to meet the Needed Fire Flows at selected locations up to 3,500 gpm.
- size, type and installation of fire hydrants.
- inspection and flow testing of fire hydrants.

	Earned Credit	Credit Available
616. Credit for Supply System	26.87	30
621. Credit for Hydrants	2.62	3
631. Credit for Inspection and Flow Testing	4.80	7
Item 640. Credit for Water Supply:	34.29	40

Item 616 – Credit for Supply System (30 points)

The first item reviewed is Item 616 "Credit for Supply System (CSS)". This item reviews the rate of flow that can be credited at each of the Needed Fire Flow test locations considering the supply works capacity, the main capacity and the hydrant distribution. The lowest flow rate of these items is credited for each representative location. A water system capable of delivering 250 gpm or more for a period of two hours plus consumption at the maximum daily rate at the fire location is considered minimum in the ISO review.

Where there are 2 or more systems or services distributing water at the same location, credit is given on the basis of the joint protection provided by all systems and services available.

The supply works capacity is calculated for each representative Needed Fire Flow test location, considering a variety of water supply sources. These include public water supplies, emergency supplies (usually accessed from neighboring water systems), suction supplies (usually evidenced by dry hydrant installations near a river, lake or other body of water), and supplies developed by a fire department using large diameter hose or vehicles to shuttle water from a source of supply to a fire site. The result is expressed in gallons per minute (gpm).

The normal ability of the distribution system to deliver Needed Fire Flows at the selected building locations is reviewed. The results of a flow test at a representative test location will indicate the ability of the water mains (or fire department in the case of fire department supplies) to carry water to that location.

The hydrant distribution is reviewed within 1,000 feet of representative test locations measured as hose can be laid by apparatus.

For maximum credit, the Needed Fire Flows should be available at each location in the district. Needed Fire Flows of 2,500 gpm or less should be available for 2 hours; and Needed Fire Flows of 3,000 and 3,500 gpm should be obtainable for 3 hours.

Item 616 "Credit for Supply System (CSS)" = 26.87 points

Item 621 – Credit for Hydrants (3 points)

The second item reviewed is Item 621 "Credit for Hydrants (CH)". This item reviews the number of fire hydrants of each type compared with the total number of hydrants.

There are a total of 199 hydrants in the graded area.

620. Hydrants, - Size, Type and Installation	Number of Hydrants
A. With a 6 -inch or larger branch and a pumper outlet with or without 2½ -inch outlets	158
B. With a 6 -inch or larger branch and no pumper outlet but two or more 2½ -inch outlets, or with a small foot valve, or with a small barrel	11
C./D. With only a 2½ -inch outlet or with less than a 6 -inch branch	30
E./F. Flush Type, Cistern, or Suction Point	0

Item 621 "Credit for Hydrants (CH)" = 2.62 points

Item 630 – Credit for Inspection and Flow Testing (7 points)

The third item reviewed is Item 630 "Credit for Inspection and Flow Testing (CIT)". This item reviews the fire hydrant inspection frequency, and the completeness of the inspections. Inspection of hydrants should be in accordance with AWWA M-17, *Installation, Field Testing and Maintenance of Fire Hydrants.*

Frequency of Inspection (FI): Average interval between the 3 most recent inspections.

Frequency	Points
1 year	30
2 years	20
3 years	10
4 years	5
5 years or more	No Credit

Note: The points for inspection frequency are reduced by 10 points if the inspections are incomplete or do not include a flushing program. An additional reduction of 10 points are made if hydrants are not subjected to full system pressure during inspections. If the inspection of cisterns or suction points does not include actual drafting with a pumper, or back-flushing for dry hydrants, 20 points are deducted.

Total points for Inspections = 2.40 points

Frequency of Fire Flow Testing (FF): Average interval between the 3 most recent inspections.

Frequency	Points
5 years	40
6 years	30
7 years	20
8 years	10
9 years	5
10 years or more	No Credit

Total points for Fire Flow Testing = 2.40 points

Item 631 "Credit for Inspection and Fire Flow Testing (CIT)" = 4.80 points

Divergence = -5.11

The Divergence factor mathematically reduces the score based upon the relative difference between the fire department and water supply scores. The factor is introduced in the final equation.

Community Risk Reduction

	Earned Credit	Credit Available
1025. Credit for Fire Prevention and Code Enforcement (CPCE)	**1.78**	2.2
1033. Credit for Public Fire Safety Education (CFSE)	**1.84**	2.2
1044. Credit for Fire Investigation Programs (CIP)	**1.02**	1.1
Item 1050. Credit for Community Risk Reduction	**4.64**	**5.50**

Item 1025 – Credit for Fire Prevention Code Adoption and Enforcement (2.2 points)	Earned Credit	Credit Available
Fire Prevention Code Regulations (PCR) Evaluation of fire prevention code regulations in effect.	10.00	10
Fire Prevention Staffing (PS) Evaluation of staffing for fire prevention activities.	0.83	8
Fire Prevention Certification and Training (PCT) Evaluation of the certification and training of fire prevention code enforcement personnel.	5.50	6
Fire Prevention Programs (PCP) Evaluation of fire prevention programs.	16.00	16
Review of Fire Prevention Code and Enforcement (CPCE) subtotal:	32.33	40

Item 1033 – Credit for Public Fire Safety Education (2.2 points)	Earned Credit	Credit Available
Public Fire Safety Educators Qualifications and Training (FSQT) Evaluation of public fire safety education personnel training and qualification as specified by the authority having jurisdiction.	7.50	10
Public Fire Safety Education Programs (FSP) Evaluation of programs for public fire safety education.	26.00	30
Review of Public Safety Education Programs (CFSE) subtotal:	33.50	40

Item 1044 – Credit for Fire Investigation Programs (1.1 points)	Earned Credit	Credit Available
Fire Investigation Organization and Staffing (IOS) Evaluation of organization and staffing for fire investigations.	8.00	8
Fire Investigator Certification and Training (IQT) Evaluation of fire investigator certification and training.	4.50	6
Use of National Fire Incident Reporting System (IRS) Evaluation of the use of the National Fire Incident Reporting System (NFIRS) for the 3 years before the evaluation.	6.00	6
Review of Fire Investigation Programs (CIP) subtotal:	18.50	20

Summary of PPC Review
for
Burns

FSRS Item	Earned Credit	Credit Available
Emergency Communications		
414. Credit for Emergency Reporting	1.80	3
422. Credit for Telecommunicators	3.60	4
432. Credit for Dispatch Circuits	1.95	3
440. Credit for Emergency Communications	7.35	10
Fire Department		
513. Credit for Engine Companies	5.73	6
523. Credit for Reserve Pumpers	0.11	0.5
532. Credit for Pumper Capacity	3.00	3
549. Credit for Ladder Service	3.84	4
553. Credit for Reserve Ladder and Service Trucks	0.00	0.5
561. Credit for Deployment Analysis	9.57	10
571. Credit for Company Personnel	3.42	15
581. Credit for Training	2.42	9
730. Credit for Operational Considerations	2.00	2
590. Credit for Fire Department	30.09	50
Water Supply		
616. Credit for Supply System	26.87	30
621. Credit for Hydrants	2.62	3
631. Credit for Inspection and Flow Testing	4.80	7
640. Credit for Water Supply	34.29	40
Divergence	-5.11	–
1050. Community Risk Reduction	4.64	5.50
Total Credit	71.26	105.5

Final Community Classification = 03/3Y

INSURANCE SERVICES OFFICE, INC.

HYDRANT FLOW DATA SUMMARY

City Burns

County Oregon(Harney) State OREGON (36) Witnessed by: Insurance Services Office Date: Jul 29, 2015

TEST NO.	TYPE DIST.*	TEST LOCATION	SERVICE	FLOW - GPM $Q=(29.83(C(d^2)p^{0.5}))$ INDIVIDUAL HYDRANTS			TOTAL	PRESSURE PSI STATIC	PRESSURE PSI RESID.	FLOW -AT 20 PSI NEEDED **	FLOW -AT 20 PSI AVAIL.	REMARKS***	MODEL TYPE
1		Industrial Ave, east of Birch	Burns Water Dept, 2	750	750	0	1500	67	28	3500	1700		
10		W Monroe St and west end of city limits	Burns Water Dept, 1	1690	2020	0	3710	57	47	2500	7500		
11		Hines Blvd and west of Harney Ave	Burns Water Dept, 2	2020	0	0	2020	69	52	2250	3600		
12		Fairview Heights Loop - south hydrant	Burns Water Dept, 3	1150	0	0	1150	72	21	1000	1100		
13		Public R/W and Oregon Ave	Burns Water Dept, 2	2020	0	0	2020	70	60	3500	4800		
2		Broadway Ave and Monroe St	Burns Water Dept, 2	2120	0	0	2120	68	51	3500	3700		
3		N Alvord Ave and W "E" St	Burns Water Dept, 2	1910	0	0	1910	50	32	2500	2500		
4		Broadway Ave and Monroe St	Burns Water Dept, 2	920	920	0	1840	68	47	2250	2900		
5		E "D" St and N Birch Ave	Burns Water Dept, 2	750	750	0	1500	66	54	1000	3100		
6		N Fairview Ave and W "E" St	Burns Water Dept, 1	710	710	0	1420	54	30	4000	1700		
6 A		N Fairview Ave and W "E" St	Burns Water Dept, 1	710	710	0	1420	54	30	3000	1700		
7		W Buchanan St and S Eagan Ave	Burns Water Dept, 2	240	240	0	480	71	58	750	1000		
8		E Egan Ave & W "A" St.	Burns Water Dept, 1	820	820	0	1640	61	36	1750	2100		
9		W Monroe St and N Court Ave	Burns Water Dept, 1	920	920	0	1840	68	54	2250	3600		

THE ABOVE LISTED NEEDED FIRE FLOWS ARE FOR PROPERTY INSURANCE PREMIUM CALCULATIONS ONLY AND ARE *NOT* INTENDED TO PREDICT THE MAXIMUM AMOUNT OF WATER REQUIRED FOR A LARGE SCALE FIRE CONDITION.

THE AVAILABLE FLOWS ONLY INDICATE THE CONDITIONS THAT EXISTED AT THE TIME AND AT THE LOCATION WHERE TESTS WERE WITNESSED.

*Comm = Commercial; Res = Residential.

**Needed is the rate of flow for a specific duration for a full credit condition. Needed Fire Flows greater than 3,500 gpm are not considered in determining the classification of the city when using the Fire Suppression Rating Schedule.

*** (A)-Limited by available hydrants to gpm shown. Available facilities limit flow to gpm shown plus consumption for the needed duration of (B)-2 hours, (C)-3 hours or (D)-4 hours.

APPENDIX D
Oregon Administrative Rule 690-512 Malheur Lake Basin Program and Exhibit of the Greater Harney Valley Groundwater Area of Concern

WATER RESOURCES DEPARTMENT
CHAPTER 690
DIVISION 512
MALHEUR LAKE BASIN PROGRAM

690-512-0010
Classifications

(1) Except as provided in OAR 690-512-0020, the groundwater and surface water of the Malheur Lake Basin are classified for direct appropriation of, or storage and use of, water for domestic, livestock, irrigation, municipal, quasi-municipal, industrial, mining, agricultural water use, commercial, power development, forest management, public uses, road watering, dust abatement and wildlife refuge management.

(2) Definitions of classified uses. Except as specified in these rules, and unless the context requires otherwise, the definitions in OAR 690-300-0010 apply except that "public uses" are defined in OAR 690-077-0010(27). "Exempt groundwater uses" are those uses defined in ORS 537.545.

Stat. Auth.: 536.300, 536.340 & 537
Stats. Implemented:
Hist.:

NOTE: The Malheur Lake Basin is delineated on the agency Map 12.6, dated January 1, 1966.

690-512-0020
Groundwater use in the Greater Harney Valley Groundwater Area of Concern

(1) The Greater Harney Valley Groundwater Area of Concern (GHVGAC) is established to ensure that groundwater in the GHVGAC is appropriated within the capacity of the resource and that new appropriations of groundwater assure the maintenance of reasonably stable groundwater levels and prevent depletion of the groundwater resource. Current data, comprising substantial evidence, indicate that groundwater levels are declining in areas of the GHVGAC. Additional allocation of groundwater within the GHVGAC may exacerbate these declines. A comparison between estimated annual recharge and previously allocated groundwater volumes indicates that groundwater is fully allocated in some areas of the basin. Subject to further study, the Department will not allocate additional groundwater permits unless the permit is issued consistent with OAR 690-512 rules. For the purpose of this rule, the GHVGAC is as described and shown in Exhibit 1.

(2) Except as provided in subsections (4), (5), (6), and (7) of this section, groundwater in the GHVGAC is classified only for exempt groundwater uses as specified in ORS 537.545.

(3) In processing applications to appropriate and use groundwater within the GHVGAC, the Department may not find that the proposed use will ensure the preservation of the public welfare,

safety and health unless the use is classified, and unless water is available for the proposed new use as described in subsections (4), (5), (6), and (7) of this section.

(4) Voluntary Cancellations for Groundwater Availability. Notwithstanding OAR 690-300-0010(57) and except for exempt groundwater uses, for the purposes of processing applications pursuant to ORS 537.621 and OAR 690-310-0130, an applicant who agrees to application of these rules to a completed pending application may request the Department find that groundwater is available for the proposed use(s) in the GHVGAC consistent with this subsection. In reviewing an application for a permit to appropriate groundwater, the Department may find that groundwater is available if:

(a) The proposed use does not have the potential for substantial interference as determined pursuant to OAR 690-009; and,

(b) The total rate and duty of the proposed groundwater use is offset by the contemporaneous and voluntary cancellation or partial cancellation of an existing primary groundwater certificate or primary permit within the GHVGAC as provided in subsection (c) of this section; and,

(c) The primary groundwater certificate or primary groundwater permit that is voluntarily cancelled or partially cancelled is not subject to forfeiture or cancellation for non-use and is equal or greater in rate, duty and acreage as compared to the rate, duty and acreage of the new appropriation sought; and,

(d) The application was pending and the groundwater right being cancelled was subject to transfer, permit amendment, or has a pending application for an extension of time that is subsequently approved, as of April 15, 2016; and the applicant has provided confirmed offset water to the Department by April 15, 2019.

(e) Notwithstanding subsection (2) of this section, if groundwater is available for a proposed new use consistent with this subsection and if the use is the type of use described in OAR 690-512-0010(1), the proposed use will be considered a classified use.

(5) Any primary permits or primary certificates that are voluntarily cancelled or partially cancelled within the GHVGAC that have not been specifically identified as offset for an application pending before the Department under section (4) will be made available for offset for pending applications under section (4) on the basis of priority determined by the tentative priority date.

(6) Groundwater Availability Where Voluntary Cancellation is not Sought. If an applicant does not elect to pursue processing of a pending groundwater application under subsection (4) of this section, and the well or wells associated with the pending application are located in the Northwest or South sub-areas of the GHVGAC, the applicant may request the Department to process a pending application pursuant to this subsection. These two sub-area locations are shown on Exhibit 1, and are designated based on limited groundwater level trend information. For the purposes of this subsection and processing applications pursuant to ORS 537.621 and

OAR 690-310-0130, and notwithstanding OAR 690-300-0010(57), groundwater is available for appropriation to new proposed uses on pending applications in these sub-areas in the GHVGAC, if:

(a) The proposed use does not have the potential for substantial interference pursuant to OAR 690-009;

(b) Since April 15, 2016, there has not been a total of 7,600 acre feet of irrigation permits issued in the Northwest sub-area, and 1,660 acre feet of irrigation permits in the South sub-area. For the purposes of allocating water under this subsection, applications will be processed in the order they are received by the Department.

(c) Permits issued according to this subsection shall be conditioned to prohibit use of water if, based on the Department's Harney Basin groundwater study, the Department cannot make a finding that the groundwater use is within the capacity of the resource, is not over appropriated, or will not cause injury to senior water users. The permit holder may provide offset water in the manner described in subsection (4) within three years of the final report being issued. The Department shall make the findings described in this subsection for each permit issued under Section 6 within one year of completing the Harney Basin groundwater study. The Department's findings described in this subsection shall include site-specific substantial evidence.

(d) The application was pending as of April 15, 2016, and the applicant confirms to the Department in writing, within 6 months of April 15, 2016, that they wish for their permit to be issued under section (6) of these rules.

(e) If groundwater is available for a proposed new use consistent with this subsection and if the use is the type of use described in OAR 690-512-0010(1), the proposed use will be considered a classified use.

(7) Each permit issued according to subsections (4) and (6) must be conditioned as follows:

(a) Include a requirement for construction of a dedicated observation well at a location determined by the Department, to the same depth as the production well, within 6 months of permit issuance, or the permit may be cancelled. This 6 month deadline shall not be extended. Failure to construct a dedicated observation well within 6 months of permit issuance shall cause the watermaster to regulate off any future use under the permit.

(b) All groundwater pumping authorized by this permit is prohibited if March groundwater levels indicate 18 feet or more of decline has occurred, as measured in the observation well or any authorized irrigation well, when compared to the first March measurement. Subsequent groundwater pumping may occur with Department approval during the year(s) a subsequent March groundwater level measurement indicates the groundwater level at the observation well has recovered to less than 18 feet of decline when compared to the first March measurement.

(c) Notwithstanding OAR 690-008-0001(8b and 8c), all permits issued in the GHVGAC must

include the following condition: Any well authorized under this permit shall be located more than 1,320 feet from any existing senior exempt, permitted or certificated well(s) not owned by the permit holder. Any well authorized on this permit, when located between 1,320 feet and 2,640 feet of any senior exempt, permitted or certificated well not owned by the permit holder, shall immediately cease pumping groundwater if Department staff, during investigation of a complaint, determine 10 feet or more of measured groundwater level interference related to the authorized well use has occurred in the complainant's senior exempt, permitted or certificated well.

(8) The Department shall keep an accounting, and track the status of, existing groundwater permits, certificates and groundwater applications pending within the GHVGAC as of April 15, 2016. This information shall be provided to any person upon request. Updated information shall also be kept and made available at the Watermaster's office in Burns.

(9) The Department shall report annually on the implementation of these rules to the Water Resources Commission early each calendar year beginning in 2017. The Commission may amend these rules to adjust the boundaries of the GHVGAC, or amend or repeal these rules. The Department's report to the Commission shall include at least the following information:

(a) New groundwater permits issued within the GHVGAC after April 15, 2016;

(b) An update on groundwater level data, and the groundwater study to assist the Department and Commission in understanding the aquifer system in the study area, and;

(c) Staff recommendations, if any, regarding whether this section of rules should be amended or repealed.

(10) The Department study referenced in 690-512-0020(1) shall be designed to collect substantial data on the groundwater flow system in the GHVGAC. The final report containing study findings shall be scientifically peer-reviewed. The study is planned to be completed by the end of the year 2020.

(11) The Department shall plan and conduct the study in coordination with a local Groundwater Study Advisory Committee (SAC) to be jointly appointed by the Department and the Harney County Court. The committee may include, but not be limited to: local irrigators, well drillers, irrigation/pump contractors, members of the scientific community, a representative of the Harney County Court, conservation and instream interests, and interested members of the public. The Department will work with the SAC and individual water users to encourage the collection and use of hydrogeologic data. As part of the study process, the Department shall review and consider relevant data provided by or through the Groundwater SAC. The Department shall report quarterly to the Groundwater SAC to provide updates on the study status, data analyses and preliminary findings, and shall collaborate with the SAC with regard to actions and decisions that may result from the study. The Department shall provide the SAC a draft of the groundwater study report for review and comment prior to publishing the final report. The final groundwater study report shall be peer-reviewed.

(12) Within 1 year after the Groundwater Study discussed in subsection 11 has been published by the Department, the Department will convene a Rules Advisory Committee to explore whether there is a need for updates or changes to these rules. Members of the Groundwater Study Advisory Committee will be invited to participate on the Rules Advisory Committee.

Stat. Auth.: ORS 536.340(1)(a), 537.525(3),(5),(7) and (8), 537.621(2), 537.777(1), & 537.780(1) and (1)(h)
Stats. Implemented:
Hist.:

NOTE: Exhibits referenced are available from the agency.

690-512-0090
Whitehorse and Willow Creeks

Willow Creek and tributaries, and Whitehorse Creek and tributaries are withdrawn from future appropriations except as described in the order of the Water Resources Commission effective April 24, 1992.

Stat. Auth.: ORS 536.410
Stats. Implemented: ORS 536.410
Hist.:

690-512-0100
Home Creek Reservations

(1) Reservations of water for economic development are established pursuant to ORS 537.249 and 537.356 economic benefits through both instream and out-of-stream uses of water. 4,550 acre-feet of unappropriated water in Home Creek and tributaries are reserved for multipurpose storage for future economic development as allowed under ORS 537.356 with a priority date of February 25, 2009.

(2) "Multipurpose reservoir", as used in OAR 690-512-0100 means a reservoir storing water to serve more than two potential beneficial uses including but not limited to irrigation, power generation, municipal water supply, recreation and flow augmentation for instream purposes.

(3) Reservations of water for future economic development allocate surface water for storage in multipurpose reservoirs.

(4) For the purposes of review of applications to store reserved water under OAR chapter 690, division 310, and subject to the provisions of section (6), the reserved quantities of water listed in OAR 690-512-0100(1) are available for appropriation.

(5) The determination of water availability under section (4) shall not substitute for consideration during the public interest review of site-specific information related to the capacity of the resource to support the proposed project, as required under OAR chapter 690, division 310.

(6) In addition to the requirements of ORS Chapter 537 and applicable rules, the Department will only issue an order approving an application for a permit to store water in the Home Creek basin reserved under any reservation if it first finds:

(a) The proposed reservoir and any water rights secondary with the storage right are consistent with the purpose and intent of the reservation following consultation with Harney County Court;

(b) The proposed reservoir and any water rights secondary to the storage right will protect instream values, including but not limited to instream flows and water quality based upon a written assessment of these values developed in consultation with Department of Fish and Wildlife and Department of Environmental Quality; and

(c) Whether minimum bypass flows are required.

(7) In addition to the requirements of ORS Chapter 537 and applicable rules, any final order approving an application for a permit to store water and any order for water rights secondary with the storage right under the Home Creek Reservation shall contain the findings required in (6)(a)–(c) above, and will also contain conditions that:

(a) Set the appropriate storage season,

(b) Ensure no injury to senior water rights, including instream water rights,

(c) Protect instream values; and

(d) Set minimum bypass flows if identified under (6)(c) above.

(8) If the Department has not received applications for multipurpose reservoir permits for the full quantity of reserved water by July 1, 2014, the Department shall provide the Parties involved in the Home Creek Settlement Agreement with a progress report on development of the reservations. The report shall include information on the continued need for the reservations and the quantities of water reserved. The Department shall continue to provide progress reports at five year intervals while these rules are in effect unless the Department receives applications for multipurpose reservoir permits for the full quantity of reserved water.

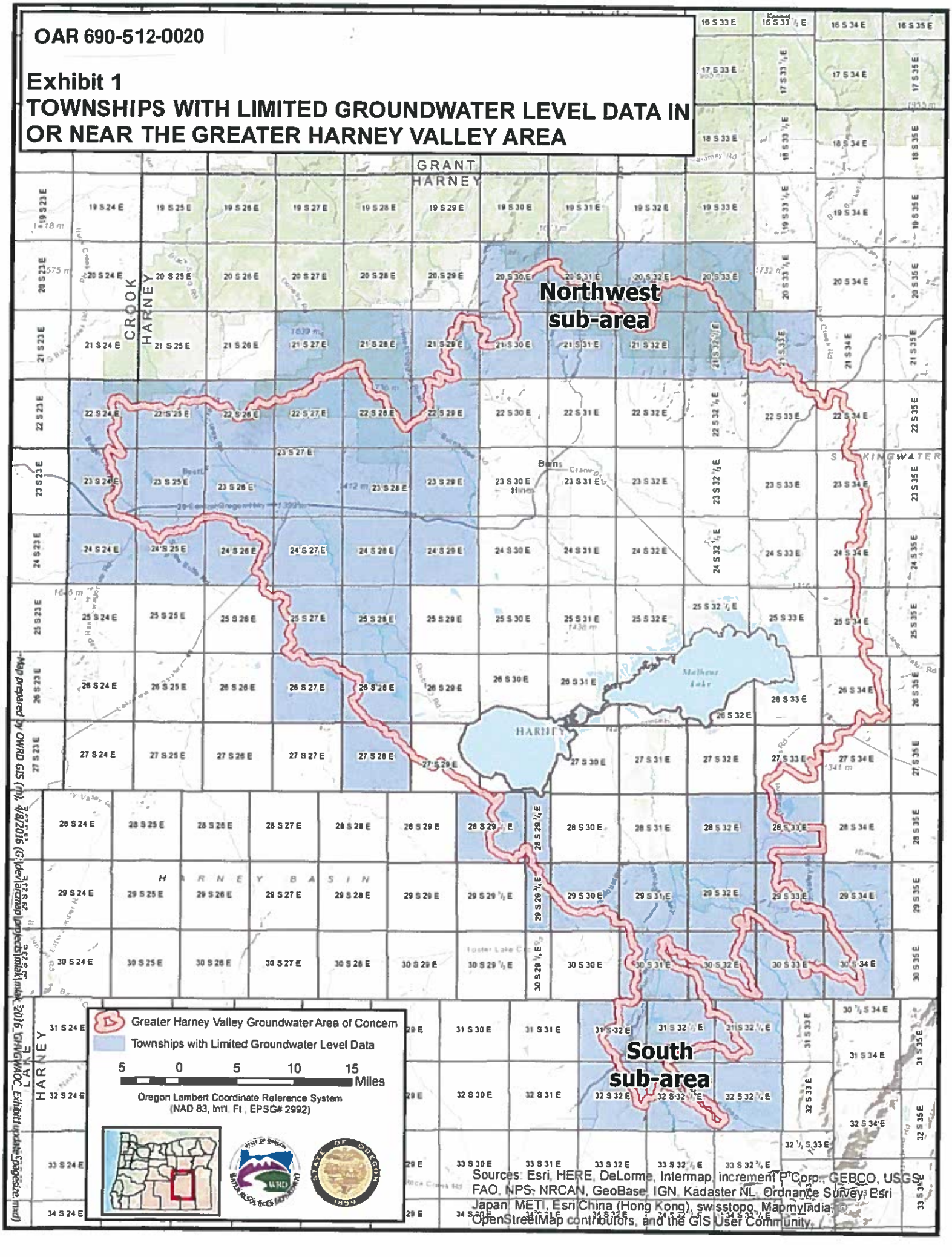
(9) If the Department has not received applications for multipurpose reservoir permits for the full quantity of water reserved by July 1, 2029, applications for remaining quantities of unallocated water under OAR 690-0512-0100(1) may not be accepted after July 1, 2029, unless this deadline is extended through rulemaking by the Water Resources Commission.

Stat. Auth.: ORS 536 & 537
Stats. Implemented: ORS 536.310, 537.249, 537.356 & 537.358
Hist.: WRD 2-2009, f. 6-18-09, cert. ef. 7-1-09

Note: These rules were filed with the Office of the Secretary of State and took effect on April 15, 2016. The rules are subject to non-substantive modifications such as renumbering and correction of typographical errors pursuant to ORS 183.360 (2)(a) when published by the Secretary of State.

OAR 690-512-0020

Exhibit 1
TOWNSHIPS WITH LIMITED GROUNDWATER LEVEL DATA IN OR NEAR THE GREATER HARNEY VALLEY AREA



APPENDIX E
Well Records and Logs

RECEIVED
7 1959
STATE ENGINEER

A# G1490

File Original and First Copy with the STATE ENGINEER, SALEM, OREGON

WATER WELL REPORT
STATE OF OREGON

Harn 282

State Well No. 23/30-12 J

State Permit No.

(1) OWNER:
Name City of Burns
Address Burns, Ore

(2) LOCATION OF WELL:
County Harney Owner's number, if any— #1
NE ¼ SE ¼ Section 12 T. 23 S R. 30 E W.M.
Bearing and distance from section or subdivision corner
S 0° 15' W 241' and
W 90° 30' N 979' from the
NE Corner of the SE 1/4
Sec. 12

(3) TYPE OF WORK (check): Existing
New Well ☐ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 11.

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

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

(6) CASING INSTALLED: Threaded ☒ Welded ☐
12" Diam. from 0 ft. to 150 ft. Gage
" Diam. from ft. to ft. Gage
" Diam. from ft. to ft. Gage

(7) 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.
perforations from ft. to ft.
perforations from ft. to ft.

SCREENS: Well screen installed ☒ Yes ☐ No
Manufacturer's Name Fairbanks Morse
Type 8" Section Model No. FM Co
Diam. Slot size Set from ft. to ft.
Slot size Set from ft. to ft.

(9) CONSTRUCTION:
Was well gravel packed? ☐ Yes ☐ No Size of gravel: Not Known
Gravel placed from ft. to ft.
Was a surface seal provided? ☒ Yes ☐ No To what depth? ? ft.
Material used in seal— Cement
Did any strata contain unusable water? ☒ Yes ☐ No
Type of water? ? Depth of strata ?
Method of sealing strata off Casing

(10) WATER LEVELS:
Static level 85' ft. below land surface Date 12-10-58
Artesian pressure lbs. per square inch Date

Log Accepted by:
[Signed] City of Burns (Owner) Date 1925, 19

(11) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? ☒ Yes ☐ No If yes, by whom? A.A. Durand + Son
Yield: 800 gal./min. with 27 ft. drawdown after 4 hrs.
" " " "
" " " "
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow 0 g.p.m. Date
Temperature of water 58 F Was a chemical analysis made? ☒ Yes ☐ No

(12) WELL LOG: Diameter of well 12 inches.
Depth drilled 251 ft. Depth of completed well 251 ft.
Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
Log of well Lost unable to secure copy from Drillers. OLD WELL - RECORDS NOT AVAILABLE - DATA according to best of memory. B.A.D. 8/1/59		

Work started 19 Completed 1925 19

(13) PUMP:
Manufacturer's Name Fairbanks Morse
Type: Deep Well Turbine H.P. 50

Well Driller's Statement:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME A. A. DURAND & SON (Person, firm, or corporation) (Type or print)
Address P.O. Box 437, Walla Walla, Wn.
Driller's well number City Well No. 1
[Signed] Paul Durand (Well Driller)
License No. Date 8/1, 1959

(USE ADDITIONAL SHEETS IF NECESSARY)

A#G1490

File Original and First Copy with the STATE ENGINEER, SALEM, OREGON

WATER WELL REPORT
STATE OF OREGON

Harn 283

State Well No. 23/30-12J

State Permit No.

(1) OWNER:
Name City of Burns
Address Burns, Ore.

(2) LOCATION OF WELL:
County Harney Owner's number, if any— #2
NE ¼ SE ¼ Section 12 T. 23 S R. 30 E W.M.
Bearing and distance from section or subdivision corner
S 0° 15' W 9' and W 90° 30' N 910' from the NE Corner of the SE ¼ Section 12

(3) TYPE OF WORK (check): Existing
New Well ☐ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 11.

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

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

(6) CASING INSTALLED: Threaded ☐ Welded ☐
12" Diam. from 0 ft. to 150 ft. Gage
" Diam. from ft. to ft. Gage
" Diam. from ft. to ft. Gage

(7) 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.
perforations from ft. to ft.
perforations from ft. to ft.

SCREENS: Well screen installed ☐ Yes ☐ No
Manufacturer's Name Fairbanks Morse
Type 8" Suction Model No. FM Co
Diam. Slot size Set from ft. to ft.
Slot size Set from ft. to ft.

(9) CONSTRUCTION:
Was well gravel packed? ☐ Yes ☐ No Size of gravel: Not Known
Gravel placed from ft. to ft. ?
Was a surface seal provided? ☒ Yes ☐ No To what depth? ? ft.
Material used in seal— Cement
Did any strata contain unusable water? ☒ Yes ☐ No
Type of water? ? Depth of strata ?
Method of sealing strata off Casing

(10) WATER LEVELS:
Static level 85 ft. below land surface Date 12-10-58
Artesian pressure lbs. per square inch Date

Log Accepted by:
[Signed] City of Burns (Owner) Date 1926, 19

(11) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? ☒ Yes ☐ No If yes, by whom? A. A. Durand & Son
Yield: 800 gal./min. with 27 ft. drawdown after 4 hrs.
" " " "
" " " "
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m. Date
Temperature of water 58°F Was a chemical analysis made? ☒ Yes ☐ No

(12) WELL LOG: Diameter of well inches.
Depth drilled 253 ft. Depth of completed well ft.
Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
Log of well lost unable to secure copy from drillers		
OLD WELL RECORDS NOT AVAILABLE DATA ACCORDING TO BEST OF MEMORY Geo. 8/1/59		

Work started 19 . Completed 1929 19

(13) PUMP:
Manufacturer's Name Fairbanks Morse
Type: Deep Well Turbine H.P. 50

Well Driller's Statement:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME A. A. Durand & Son (Person, firm, or corporation) (Type or print)
Address P.O. Box 437, Walla Walla, Wn
Driller's well number City Well No. 2
[Signed] Paul Durand (Well Driller)
License No. Date 8/1, 1959

(USE ADDITIONAL SHEETS IF NECESSARY)

RECEIVED
AUG 7 1959

A#G1490

Harn 289

WATER WELL REPORT

STATE OF OREGON

State Well No. 23/30-12R

State Permit No.

File Original and First Copy with the STATE ENGINEER, SALEM, OREGON

(1) OWNER:

Name City of Burns

Address Burns, Oregon

(2) LOCATION OF WELL:

County Harney Owner's number, if any— #3

SE ¼ SE ¼ Section 12 T. 23 S R. 30 E W.M.

Bearing and distance from section or subdivision corner

N 0° 15' E 292' thence N 89° 45' W 470' from SE Corner Sec. 12

(3) TYPE OF WORK (check): Existing

New Well ☐ Deepening ☐ Reconditioning ☐ Abandon ☐

If abandonment, describe material and procedure in Item 11.

(4) PROPOSED USE (check):

Domestic ☐ Industrial ☐ Municipal ☒

Irrigation ☐ Test Well ☐ Other ☐

(5) TYPE OF WELL:

Rotary ☐ Driven ☐

Cable ☒ Jetted ☐

Dug ☐ Bored ☐

(6) CASING INSTALLED:

Threaded ☒ Welded ☐

16" Diam. from 0 ft. to 143 10 ft. Gage

" Diam. from ft. to ft. Gage

" Diam. from ft. to ft. Gage

(7) 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.

perforations from ft. to ft.

perforations from ft. to ft.

(8) SCREENS:

Well screen installed ☒ Yes ☐ No

Manufacturer's Name Byron Jackson

Type 8" Galvanized Cove Model No.

Dia. Slot size Set from ft. to ft.

Slot size Set from ft. to ft.

(9) CONSTRUCTION:

Was well gravel packed? ☒ Yes ☐ No Size of gravel: Not Stated

Gravel placed from — ft. to — ft.

Was a surface seal provided? ☒ Yes ☐ No To what depth? 20 ft.

Material used in seal— Cement

Did any strata contain unusable water? ☒ Yes ☐ No

Type of water? ? Depth of strata ?

Method of sealing strata off Casing

(10) WATER LEVELS:

Static level 14 ft. below land surface Date 12-10-50

Artesian pressure lbs. per square inch Date

Log Accepted by:

[Signed] City of Burns (Owner) Date 12-10, 19 50

(11) WELL TESTS:

Drawdown is amount water level is lowered below static level

Was a pump test made? ☒ Yes ☐ No If yes, by whom? R.J. Strasser Drilling Co.

Yield: 1280 gal./min. with 81 ft. drawdown after 1 hrs.

" 1000 " 58 " 2 "

" 300 " 39 " ½ "

Bailer test gal./min. with 0 ft. drawdown after 2 hrs.

Artesian flow g.p.m. Date

Temperature of water 54°F Was a chemical analysis made? ☒ Yes ☐ No

(12) WELL LOG:

Diameter of well 16" inches.

Depth drilled 304 ft. Depth of completed well 304 ft.

Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
Surface Dirt	0	9
Sand	9	18
Soft Rock	18	24
Hard Gray Rock	24	46
Decomposed Rock	46	76
Hard Gray Rock	76	84
Decomposed Rock	84	99
Hard Gray Rock	99	103
Plumis Rock	103	140
Porous Rock	140	164
Red Rock	164	181
Hard Gray Rock	181	199
Hard Rough Gray Rock	199	221
Hard Gray Rock	221	249
Hard Rough Gray Rock	249	267
Broken formation Blk. Rock	267	272
White Pumice	272	280
Soft Rock Mixed	280	293
Hard Grey Rock	293	304

Work started 11-3 19 50 Completed 12-11 19 50

(13) PUMP:

Manufacturer's Name Byron Jackson

Type: Deep Well Turbine H.P. 100

Well Driller's Statement:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME R.J. STRASSER DRILLING CO.
(Person, firm, or corporation) (Type or print)

Address 8110 S.E. SUNSET LANE PORTLAND, ORE.

Driller's well number

[Signed] (Well Driller)

License No. 10 Date July 17, 1959

(USE ADDITIONAL SHEETS IF NECESSARY)

Harney

23/30-12R(1)

217

Oregon State Board of Health

SANITARY ENGINEERING LABORATORY

REPORT OF MINERAL ANALYSIS OF WATER

Location of source Burns Description of source Well #3

Analysis by M.H.P. Date 3/17/54 Collected by _____ Date 2/19/54

RESULTS

	Parts per million
Turbidity	
Color: Apparent	True 7
Odor: Hot	Cold
Total Solids	142
Loss on Ignition	41
Silicon (SiO_2)	41
Chloride (Cl)	2.1
Sulfate (SO_4)	2.9
Calcium (Ca)	10.6
Magnesium (Mg)	6.1
Aluminum (Al)	0
Orthophosphates (PO_4)	.1
Metaphosphates $(PO_3)_6$	
Alkalinity (as $CaCO_3$): Carbonate	0
Bicarbonate	70
Hardness (as $CaCO_3$)	50
Sodium and Potassium (as Na)	5.2
Iron (Fe)	.3
Manganese (Mn)	0.
Fluoride (F)	.3
Carbon Dioxide (CO_2)	7
pH 7.3	
Remarks	

PHE-10

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.

WATER WELL REPORT

STATE OF OREGON

RECEIVED
OCT 31 1974
STATE ENGINEER
SALEM, OREGON

(Please type or print) (Do not write above this line)

State Well No. 23S/31E-18bc

State Permit No.

Harney 478

(1) OWNER:

Name City of Burns

Address Burns, Oregon

(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 ☐

CASING INSTALLED:

Threaded ☐ Welded ☑

16" Diam. from +2 ft. to 133 ft. Gage .250

" Diam. from ft. to ft. Gage

" Diam. from ft. to ft. Gage

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? Harney Farm Supply

Yield: 1737 gal./min. with 17'1" ft. drawdown after 5 hrs.

" " "

" " "

Bailer test 90 gal./min. with 5 ft. drawdown after 2 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 22 ft.

Diameter of well bore to bottom of seal 20 in.

Diameter of well bore below seal 16 in.

Number of sacks of cement used in well seal 56 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 Surface depth of strata 125T

Method of sealing strata off Casing & Cement

Was well gravel packed? ☐ Yes ☑ No Size of gravel: —

Gravel placed from — ft. to — ft.

(10) LOCATION OF WELL:

County Harney Driller's well number

SW ¼ NW ¼ Section 18 T. 23S R. 31E W.M.

Bearing and distance from section or subdivision corner

(11) WATER LEVEL: Completed well.

Depth at which water was first found 240 ft.

Static level 13'4" ft. below land surface. Date 8-7-74

Artesian pressure — lbs. per square inch. Date —

(12) WELL LOG:

Diameter of well below casing 16"

Depth drilled 290 ft. Depth of completed well 290 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
Clay - Brown	0	12	
Clay & Conq. Brown	12	22	13'4"
Clay & Conq. Gray	22	26	
Clay & Conq. Brown	26	72	
Clay - Brown	72	91	
Pumice	91	93	
Clay & Conq - Brown	93	125	
Clay - Brown	125	137	
Clay & Conq. Brown	137	160	
Clay - Brown	160	242	
Cinders - Red	242	290	

Work started 7-5 1974 Completed 8-8 1974

Date well drilling machine moved off of well 8-9 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] Gordon Davidson (Drilling Machine Operator) Date 8-29, 1974

Drilling Machine Operator's License No. 685

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 Davidson Drilling (Person, firm or corporation) (Type or print)

Address 626 N.W. Pershall-Redmond, Ore.

[Signed] Gordon Davidson (Water Well Contractor)

Contractor's License No. 548 Date 8-29, 1974

(USE ADDITIONAL SHEETS IF NECESSARY)

SP*45656-119

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.

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

RECEIVED JUL 25 1977 WATER RESOURCES DEPT. SALEM, OREGON

RECEIVED JUL 15 1977 WATER RESOURCES DEPT. SALEM, OREGON

State Well No. 23S/30E-13C

State Permit No. Harney

(1) OWNER:
Name City of Burns
Address Burns Oregon

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

(3) TYPE OF WELL:
Rotary [ ] Driven [ ]
Cable [X] Jetted [ ]
Dug [ ] Bored [ ]

(4) PROPOSED USE (check):
Domestic [ ] Industrial [ ] Municipal [X]
Irrigation [ ] Test Well [ ] Other [ ]

CASING INSTALLED:
Threaded [ ] Welded [X]
16" Diam. from +1½ ft. to 355½ ft. Gage 250
" Diam. from ft. to ft. Gage
" Diam. from ft. to ft. Gage

PERFORATIONS:
Perforated? [X] Yes [ ] No
Type of perforator used mill cut
Size of perforations ⅛ in. by 3 in.
3360 perforations from 140 ft. to 355½ ft.
perforations from ft. to ft.
perforations from ft. to ft.

(7) SCREENS:
Well screen installed? [ ] Yes [X] 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? [X] Yes [ ] No If yes, by whom? DRILLER
Yield: 1500 gal./min. with 32' ft. drawdown after 24 hrs.
2000 " 38 " 2 "
" " "
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 40 ft.
Diameter of well bore to bottom of seal 24 in.
Diameter of well bore below seal 18 in.
Number of sacks of cement used in well seal 50 sacks
Number of sacks of bentonite used in well seal 0 sacks
Brand name of bentonite
Number of pounds of bentonite per 100 gallons of water lbs./100 gals.
Was a drive shoe used? [ ] Yes [X] No Plugs Size: location ft.
Did any strata contain unusable water? [ ] Yes [X] No
Type of water? depth of strata
Method of sealing strata off
Was well gravel packed? [ ] Yes [X] No Size of gravel:
Gravel placed from ft. to ft.

(10) LOCATION OF WELL:
County HARNEY Driller's well number
NW ¼ SW ¼ Section 13 T. 23S R. 30E W.M.
Bearing and distance from section or subdivision corner

(11) WATER LEVEL: Completed well.
Depth at which water was first found 35 ft.
Static level 30 ft. below land surface. Date April
Artesian pressure lbs. per square inch. Date

(12) WELL LOG:
Diameter of well below casing 18
Depth drilled 355½ ft. Depth of completed well 355½ 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
brown clay	0	10	
brown sandstone	10	128	
purple rock (hard)	128	136	
pink clay	136	168	
pink rock	168	193	
clay light brown pink with gravel mixed in clay	193	250	
black rock	250	288	
red black cinders yellow pumice	288	290	35
black rock	290	298	
red black cinders white pumice	298	327	35
black rock	327	351	
white pumice	351	353	35
black rock	353	355½	

Work started April 4 19 77 Completed June 16 19 77
Date well drilling machine moved off of well June 26 19 77

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] Earl Simms (Drilling Machine Operator) Date July 1, 1977
Drilling Machine Operator's License No. 608

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 Western Drilling Co (Person, firm or corporation) (Type or print)
Address Box 851
[Signed] J. W. McClusta (Water Well Contractor)
Contractor's License No. 426 Date July 2, 1977

(USE ADDITIONAL SHEETS IF NECESSARY)

SP*45656-119

APPENDIX F
Water Rights Documents

STATE OF OREGON

COUNTY OF HARNEY

CERTIFICATE OF WATER RIGHT

THIS CERTIFICATE ISSUED TO

CITY OF BURNS
CITY HALL
90 WEST WASHINGTON
BURNS, OREGON 97710

confirms the right to use the waters of A WELL in the SILVIES RIVER BASIN for the purpose of MUNICIPAL USE.

The right has been perfected under Permit G-8453. The date of priority is OCTOBER 16 1978. The right is limited to not more than 4.8 CUBIC FEET PER SECOND or its equivalent in case of rotation, measured at the well.

The well is located as follows:

SE 1/4 NW 1/4, SECTION 13, T 23 S, R 30 E, W.M.; 2320 FEET SOUTH AND 2950 FEET WEST FROM NE CORNER, SECTION 13.

The right shall conform to such reasonable rotation system as may be ordered by the proper state officer.

A description of the place of use under the right, and to which such right is appurtenant, is as follows:

S 1/2
SECTION 1

ALL
SECTION 12

ALL
SECTION 13
TOWNSHIP 23 SOUTH, RANGE 30 EAST, W.M.

ALL
SECTION 18

S 1/2
NW 1/4
S 1/2 NE 1/4
NW 1/4 NE 1/4
SECTION 7

SW 1/4
SW 1/4 SE 1/4
SECTION 6
TOWNSHIP 23 SOUTH, RANGE 31 EAST, W.M.

The right to the use of the water for the above purpose is restricted to beneficial use on the lands or place of use described.

WITNESS the signature of the Water Resources Director, affixed this date AUGUST 31, 1989.

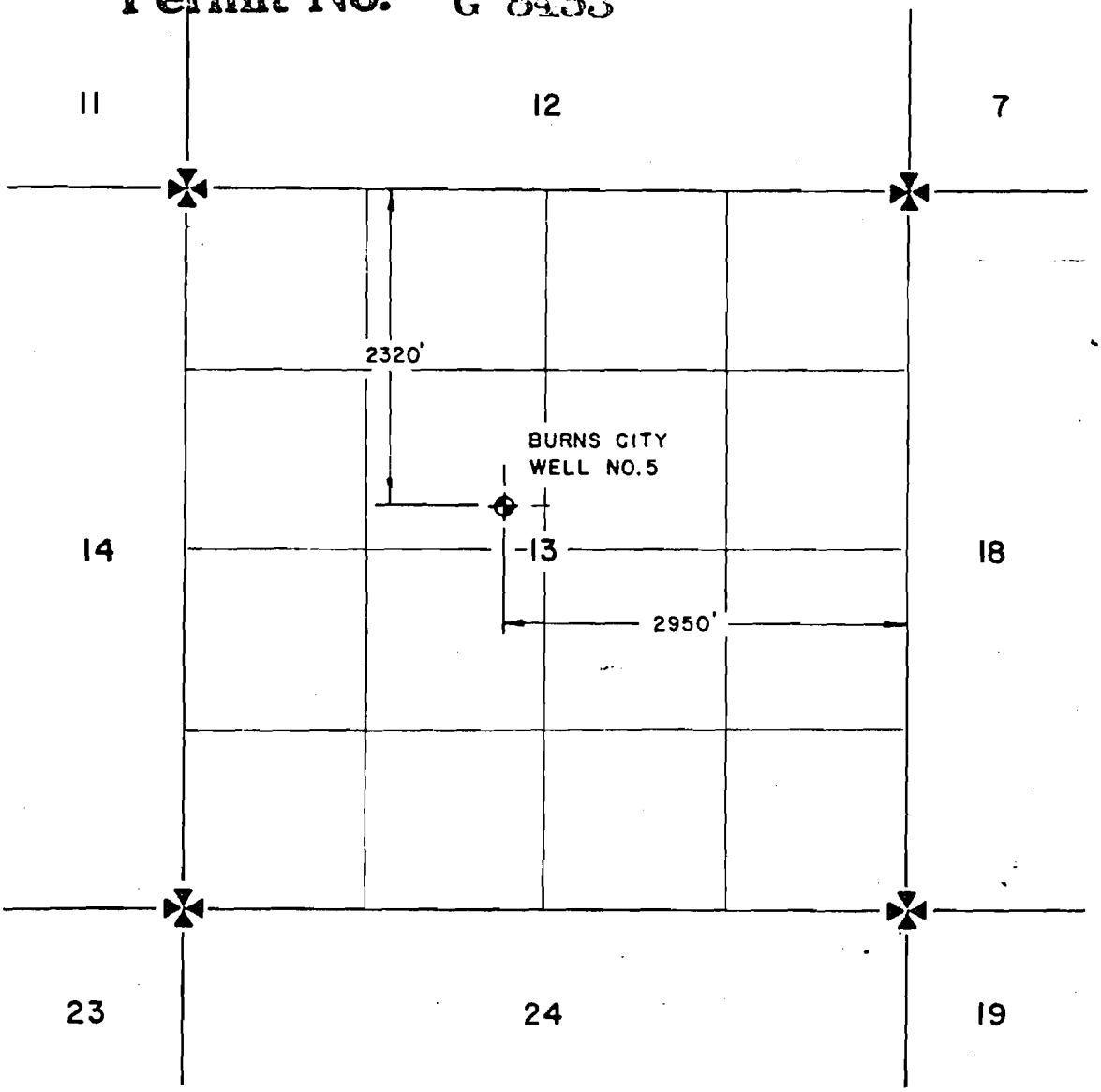
/s/ WILLIAM H. YOUNG
Water Resources Director

Recorded in State Record of Water Right Certificates numbered 62213

G-8971.VLC

G-8453
62213

Application No. G-8971
Permit No. G 8453



T23S, R30E, W.M.,
HARNEY CO., OREGON

NORTH

Design By	Drawn By	Checked By	Approv. By	Survey By	Date	Scale	Drawing No.
	J.C.	G.H.			9-28-78	4"= 1 mi	0249.003.A9

CENTURY WEST ENGINEERING CORPORATION BEND, OREGON

STATE OF OREGON

COUNTY OF HARNEY

CERTIFICATE OF WATER RIGHT

This Is to Certify, That CITY OF BURNS

of 90 W. Washington Street, Burns, State of Oregon, has made proof to the satisfaction of the STATE ENGINEER of Oregon, of a right to the use of the waters of Wells Nos. 1, 2, and 3

a tributary of Silvies River for the purpose of municipal

under Permit No. G-1417 of the State Engineer, and that said right to the use of said waters has been perfected in accordance with the laws of Oregon; that the priority of the right hereby confirmed dates from June 1, 1959

that the amount of water to which such right is entitled and hereby confirmed, for the purposes aforesaid, is limited to an amount actually beneficially used for said purposes, and shall not exceed 3.5 cubic feet per second, being 1.0 c.f.s. from well No. 1, 1.0 c.f.s. from well No. 2, and 1.5 c.f.s. from well No. 3,

or its equivalent in case of rotation, measured at the point of diversion from the stream. The point of diversion is located in the Well #1 & 2, NE¼ SE¼; Well #3, SE¼ SE¼, Section 12, T. 23 S., R. 30 E., W. M.; well locations: #1, S. 241.0 feet, W. 990.0 feet; #2, S. 25.0 feet W. 910.0 feet, both from E¼ corner Section 12; #3, (cont. below)

The amount of water used for irrigation, together with the amount secured under any other right existing for the same lands, shall be limited to - - - - - - - - - of one cubic foot per second per acre,

(cont. from above)
N. 350.0 feet W. 490.0 feet from SE corner of Section 12.

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

A description of the place of use under the right hereby confirmed, and to which such right is appurtenant, is as follows:

E½
Section 12
NE¼
E½ NW¼
N½ SW¼
N½ SE¼
Section 13
T. 23 S., R. 30 E., W. M.

S½ SW¼
Section 6

W½
SE¼
W½ NE¼
Section 7
NE¼
NW¼
N½ SW¼
N½ SE¼
Section 18
T. 23 S., R. 31 E., W. M.

The right to the use of the water for the purposes aforesaid is restricted to the lands or place of use herein described.

WITNESS the signature of the State Engineer, affixed this date. May 24, 1965

CHRIS L. WHEELER
State Engineer

Recorded in State Record of Water Right Certificates, Volume 24, page 32175

STATE OF OREGON

COUNTY OF HARNEY

CERTIFICATE OF WATER RIGHT

THIS CERTIFICATE ISSUED TO

CITY OF BURNS
CITY HALL
90 WEST WASHINGTON
BURNS, OREGON 97720

confirms the right to use the waters of WELL NO. 4 in the SILVIES RIVER BASIN for the purpose of MUNICIPAL USES.

The right has been perfected under Permit G-6090. The date of priority is OCTOBER 9, 1974. The right is limited to not more than 2.2 CUBIC FEET PER SECOND or its equivalent in case of rotation, measured at the well.

The well is located as follows:

NW 1/4 NW 1/4, SECTION 18, T 23 S, R 31 E, W.M.; 1090 FEET SOUTH & 1010 FEET EAST FROM NW CORNER SECTION 18.

A description of the place of use under the right, and to which such right is appurtenant, is as follows:

S 1/2
SECTION 1

SECTION 12

SECTION 13
TOWNSHIP 23 SOUTH, RANGE 30 EAST, W.M.

S 1/2
NW 1/4
S 1/2 NE 1/4
NW 1/4 NE 1/4
SECTION 7

SW 1/4
SW 1/4 SE 1/4
SECTION 6

SECTION 18
TOWNSHIP 23 SOUTH, RANGE 31 EAST, W.M.

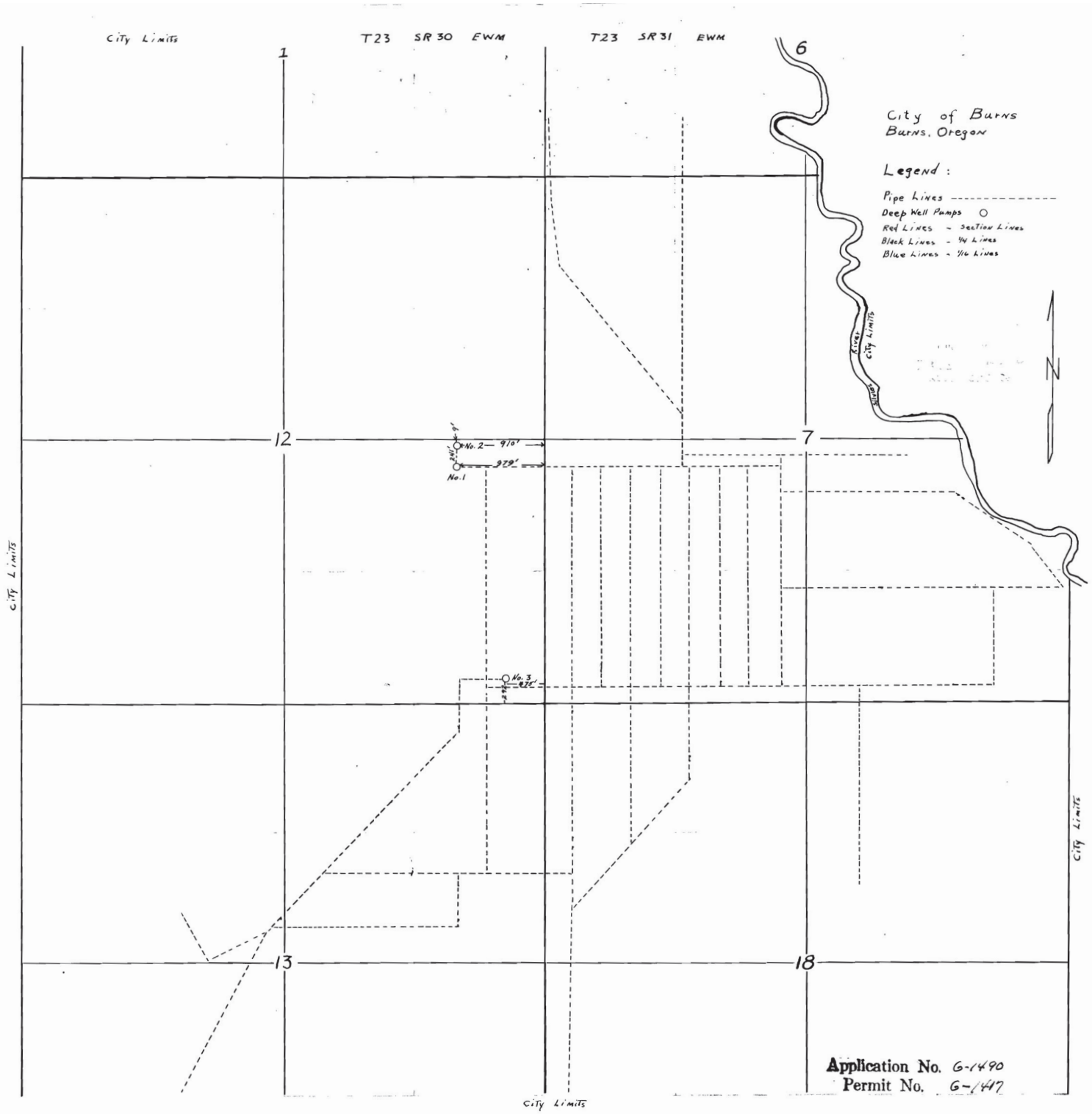
The right to the use of the water for the above purpose is restricted to beneficial use on the lands or place of use described.

WITNESS the signature of the Water Resources Director, affixed this date MAY 19, 1989.

/s/ WILLIAM H. YOUNG
Water Resources Director

Recorded in State Record of Water Right Certificates numbered 61061

G-6685.VLC


City Limits
T23 SR 30 EWM
T23 SR 31 EWM
1
6
12
7
13
18
City of Burns
Burns, Oregon
Legend :
Pipe Lines
Deep Well Pumps
Red Lines - Section Lines
Black Lines - ¼ Lines
Blue Lines - 1/16 Lines
River
City Limits
N
No. 2 — 970'
No. 1
No. 3
City Limits
City Limits
City Limits
Application No. G-1490
Permit No. G-1417

32175

SALEM, OREGON No. G- 1417

APPLICATION FOR A PERMIT

To Appropriate the Ground Waters of the State of Oregon

I, CITY OF BURNS, OREGON
(Name of applicant)

of 90 West Washington Street, county of Harney,
(Postoffice Address)

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

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

Incorporated February 17th 1899, by act of the State Legislature

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

2. The amount of water which the applicant intends to apply to beneficial use is Six cubic feet per second or [illegible] gallons per minute. see details separate sheet attached.

3. The use to which the water is to be applied is [illegible]
municipal supply

4. The well or other source is located [illegible] ft. [illegible] (N. or S.) and [illegible] ft. [illegible] (E. or W.) from the [illegible] corner of [illegible] See Separate sheet attached.
(Section or subdivision)
(If preferable, give distance and bearing to section corner)
(If there is more than one well, each must be described. Use separate sheet if necessary)
being within the boundaries [illegible] of the City of Burns, Harney County, Oregon.

5. The Pipe Line is [illegible] 13.79 miles
(Canal or pipe line)
in length, [illegible]
(Smallest legal subdivision)
[illegible], the proposed location being shown throughout on the accompanying map.

6. The name of the well or other works is City of Burns Water Department

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 [illegible] consists of three deep wells.
(Give number of wells, tunnels, etc.)
[illegible]
(Kind)
(Feet)
See separate sheet

G1— —2.5M

...at each point of canal where materially changed in size, stating miles from ... width on top (at water line) ..... feet; width on bottom ..... feet; depth of water ..... feet; grade ..... feet fall per one

(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.; 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 Pumps No. 1 and No. 2 Deep Well Turbine 800GPM. Electric 50 H.P. Hollow Shaft Motor., water lubricated bearings. Pump No. 3 Deep Well Turbine Electric 100 Hp Hollow Shaft Motor, water lubricated 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 channels and the difference in elevation between the stream bed and the ground surface at the source of development

Wells No. 1 and No. 2 are 3/4 miles from Silvies River and 80 feet higher in elev.

Well No. 3 is 7/8 mile from Silvies River and 30 feet higher in elev.

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

Township N. or S.	Range E. or W. of Willamette Meridian	Section	Forty-acre Tract	Number Acres To Be Irrigated
23 SR 30	EWM	1	S½ SW¼, S½ SE¼	160 AREA OF USE
23 SR 30	EWM	12	All	640
23 SR 30	EWM	13	NE¼, NW¼, N½ SW¼, N½ SE¼	480
23 SR 31	EWM	6	S½ SW¼	80
23 SR 31	EWM	7	NW¼, SW¼, SE¼, W½ NE¼	480
23 SR 31	EWM	18	NE¼, NW¼, N½ SW¼, N½ SE¼	480

(If more space required, attach separate sheet)

Character of soil Native rock - Limestone - Sandy loam.

Kind of crops raised Wild hay - Alfalfa - Grains -

Continuation sheet
Application for Permit

1417

Item. 4. Well No. 1 is located in the NE 1/4 of SE 1/4 Section 12 T23 SR30 EWM and being 241 feet South and 979 feet West of the NE corner of the SE quarter of the above section.

Well No. 2 is located in the NE 1/4 of SE 1/4 Section 12 T23 SR30 EWM and being 9 feet South and 910 ffet West of the NE corner of the SE quarter of the above section.

Well No. 3 is located in the SE 1/4 of the SE 1/4 Section 12 T23 SR30 EWM and being 292 feet North and 475 feet West of the SE corner of Section 12 T23 SR30 EWM.

Item. 8. The development consists of a well having a diameter of 12" and an estimated depth of 251 feet. It is estimated that 100 feet of the well has steel casing. Depth to water is 85 feet on Well No. 1.

A further development consists of a well having a diameter of 12" and an estimated depth of 253 feet. It is estimated that 100 feet of the well has steel casing. Depth to water is 85 feet on Well No. 2.

A further development consists of a well having a diameter of 16" and an estimated depth of 304 feet. It is estimated that 85 feet of the well has steel casing. Depth to water is 12 feet.

Item. 2. Wells No. 1 and No 2 have a capacity of 1.85 cubic feet per second each, and well No. 3 has a capacity of 2.30 cubic feet per second.

1417

MUNICIPAL SUPPLY

12. To supply the city of Burns, Oregon

in Harney county, having a present population of 3650

and an estimated population of 7500 in 1975

ANSWER QUESTIONS 14, 15, 16, 17 AND 18 IN ALL CASES

14. Estimated cost of [redacted] works, $500,000.00

15. Construction work will begin on or before completed

16. Construction work will be completed on or before yearly construction program

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

18. If the ground water supply is supplemental to an existing water supply, identify any application for permit, permit, certificate or adjudicated right to appropriate water, made or held by the applicant.

City of Burns Oregon
Geo. P. Hughet, Recorder
(Signature of applicant)

Remarks: [redacted]

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 October 12, 1959.

WITNESS my hand this 11th day of August, 1959.

LEWIS A. STANLEY
STATE ENGINEER

By James W. Carver, Jr.
James W. Carver, Jr.
ASSISTANT

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 6.0 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 Nos. 1, 2 and 3, being 1.65 c.f.s. from well No. 1; 1.05 c.f.s. from well No. 2 and 2.30 c.f.s. 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; .....

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

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.

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 1, 1959

Actual construction work shall begin on or before September 22, 1960 and shall thereafter be prosecuted with reasonable diligence and be completed on or before October 1, 1960

Complete application of the water to the proposed use shall be made on or before October 1, 1961

WITNESS my hand this 22nd day of September, 1959

Lewis A. Stanley
STATE ENGINEER

Application No. G-1490

Permit No. G-1417

PERMIT
TO APPROPRIATE THE GROUND WATERS OF THE STATE OF OREGON

This instrument was first received in the office of the State Engineer at Salem, Oregon, on the 1st day of June, 1959, at 4:45 o'clock P. M.

Returned to applicant:

Approved:
September 22, 1959

Recorded in book No. 6 of Ground Water Permits on page 1117

LEWIS A. STANLEY
STATE ENGINEER

Drainage Basin No. 12 page 30

State Printing

RECEIVED
OCT 9 1974
STATE ENGINEER
SALEM, OREGON

"CERTIFICATE NO. 6106"

Permit No. G- G 6090

APPLICATION FOR A PERMIT

To Appropriate the Ground Waters of the State of Oregon

I, City of Burns, Oregon
(Name of applicant)
of ..... (Postoffice Address), county of Harney,
state of Oregon, do hereby make application for a permit to appropriate the following described ground waters of the state of Oregon, SUBJECT TO EXISTING RIGHTS:

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

August 16, 1924 Burns, Oregon

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

2. The amount of water which the applicant intends to apply to beneficial use is ..... cubic feet per second or 1.000 gallons per minute.

3. The use to which the water is to be applied is Municipal Supply

4. The well or other source is located 1090 ft. S. (N. or S.) and 1010 ft. E. (E. or W.) from the NW. corner of Section 18 (Section or subdivision)

(If preferable, give distance and bearing to section corner)

(If there is more than one well, each must be described. Use separate sheet if necessary)

being within the NW ¼ of the NW ¼ of Sec. 18, Twp. 23S, R. 31E, W. M., in the county of Harney.

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

6. The name of the well or other works is . Well No. 4

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.

Closed System

8. The development will consist of a well (Give number of wells, tunnels, etc.) having a diameter of 16 inches and an estimated depth of 290 feet. It is estimated that ..... feet of the well will require 133 (Kind) casing. Depth to water table is estimated 13 (Feet)

G 6090

G 6090

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.; 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 .....Vertical Turbine Pump..... 10 inch discharge

Give horsepower and type of motor or engine to be used .....125 H.P. Electric Motor with diesel auxillary.

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

N/A

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

Township N. or S.	Range E. or W. of Willamette Meridian	Section	Forty-acre Tract	Number Acres To Be Irrigated
23 S	30 E	1	South $\frac{1}{2}$	
23 S	30 E	12	All	
23S	30 E	13	All	
23S	31 E	18	All	
23 S	31 E	7	South $\frac{1}{2}$	
23 S	31 E	7	NW $\frac{1}{4}$	
23 S	31 E	7	S$\frac{1}{2}$ NE$\frac{1}{2}$	
23S	31 E	7	NW $\frac{1}{4}$ NE $\frac{1}{4}$	
23 S	31 E	6	SW $\frac{1}{4}$	
23 S	31 E	6	SW $\frac{1}{4}$ SE $\frac{1}{4}$	

(If more space required, attach separate sheet)

Character of soil ..... N/A

Kind of crops raised ..... N/A

G 6090

MUNICIPAL SUPPLY—

13. To supply the city of Burns, Oregon

in Harney county, having a present population of 3300

and an estimated population of 4448 in 1985

ANSWER QUESTIONS 14, 15, 16, 17 AND 18 IN ALL CASES

14. Estimated cost of proposed works, $ Well - $11,700; Pumping Facilities $33,000

15. Construction work will begin on or before Well Completed August, 1974, Pumping Facilities - December, 1974.

16. Construction work will be completed on or before December 31, 1975

17. The water will be completely applied to the proposed use on or before April, 1976

18. If the ground water supply is supplemental to an existing water supply, identify any application for permit, permit, certificate or adjudicated right to appropriate water, made or held by the applicant.

x Dale White, Mayor
(Signature of applicant)

Remarks:

Well No. 4 Completed on August 9, 1974

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 correction and completion

In order to retain its priority, this application must be returned to the State Engineer, with corrections on or before January 7, 1975.

WITNESS my hand this 7th day of November, 1974

CHRIS L. WHEELER
STATE ENGINEER

By Thomas E. Shook
ASSISTANT

RECEIVED
NOV 22 1974
STATE ENGINEER
SALEM, OREGON

G 6090

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 2.2 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. 4

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

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 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.

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 October 9, 1974

Actual construction work shall begin on or before December 22, 1976 and shall thereafter be prosecuted with reasonable diligence and be completed on or before October 1, 1977
Extended to Oct. 1, 1982

Complete application of the water to the proposed use shall be made on or before October 1, 1978
Extended to Oct. 1, 1982

WITNESS my hand this 22nd day of December, 1975

WATER RESOURCES DIRECTOR STATE ENGINEER F.H. B

Application No. G-6285
Permit No. G- G 6090

PERMIT
TO APPROPRIATE THE GROUND WATERS OF THE STATE OF OREGON

This instrument was first received in the office of the State Engineer at Salem, Oregon, on the 9th day of October, 1974, at 8:00 o'clock A. M.

Returned to applicant:

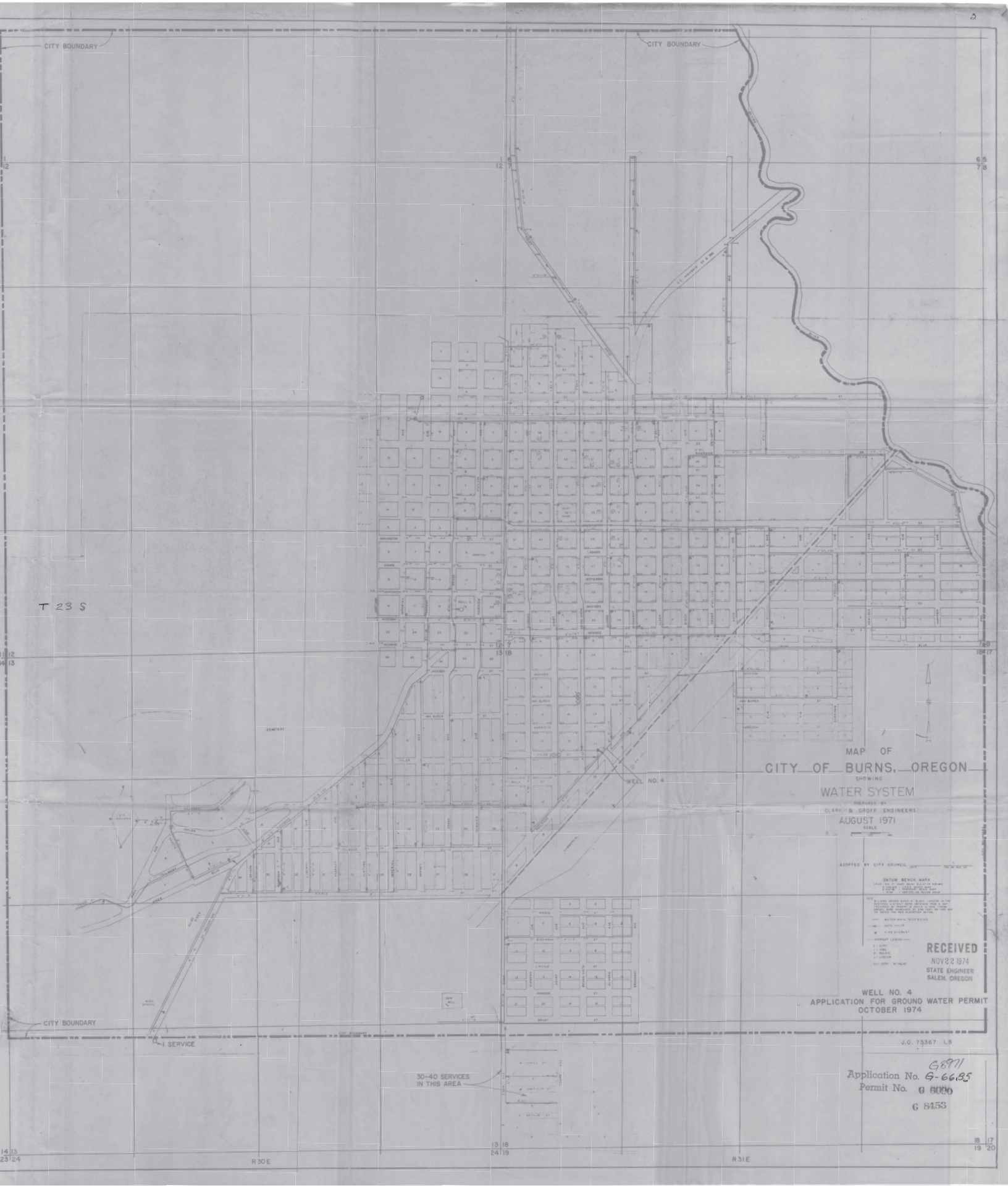
Approved:

Recorded in book No. ..... of Ground Water Permits on page G 6090

STATE ENGINEER

Drainage Basin No. 42 page 35

Fees $34.00



MAP OF
CITY OF BURNS, OREGON
SHOWING
WATER SYSTEM
PREPARED BY
CLARY B. GROFF ENGINEERS
AUGUST 1971
SCALE

ADOPTED BY CITY COUNCIL

DATUM BENCH MARK

RECEIVED
NOV 22 1974
STATE ENGINEER
SALEM, OREGON

WELL NO. 4
APPLICATION FOR GROUND WATER PERMIT
OCTOBER 1974

J.O. 73367 LB

Application No. G8971 G-6685
Permit No. G 8000
G 8453

"CERTIFICATE NO. 62213"

Application No. G-8971 Permit No. G 8453

STATE OF OREGON WATER RESOURCES DEPARTMENT

Application for a Permit to Appropriate Ground Water

RECEIVED
OCT 16 1978
WATER RESOURCES DEPT.
SALEM, OREGON

I, City of Burns
(Name of Applicant)

of City Hall, 90 West Washington, Burns
(Mailing Address) (City)

State of Oregon, 97710 Phone No. 573-2383 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 one well
(Give number of wells, tile lines, infiltration galleries, etc.)

having a diameter of 16 inches and an estimated depth of 353 feet.

2. The well or other source is to be located 2320 ft. S (N. or S.) and 2950 ft. W (E. or W.)

from the NE corner of Section 13, T23S, R30E, Willamette Meridian
(Public Land Survey Corner)

.....
(If there is more than one well, each must be described)

.....being within the SE ¼ of the NW ¼ of

Sec. 13 Tp. 23S R. 30E, W. M., in the county of Harney

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
23S	30E	1	S½	
		12	All	
		13	All	
23S	31E	18	All	
		7	S½	
		7	NW¼	
		7	S½, NE¼	
		7	NW¼, NE¼	
		6	SW¼	
		6	SW¼, SE¼	

4. It is estimated that 350 feet of the well will require 16 inch (Kind) casing.

5. Depth to water table is estimated 50 (Feet) Well drilled by Gaines Construction

Form 690-3-0-1-77

6. The amount of water which the applicant intends to apply to beneficial use is 5.57 cubic feet per second or 2500 gallons per minute.

7. The use to which the water is to be applied is municipal supply

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.

Vertical Tubine Pump: Water lubricated, 150 foot setting,
1800 rpm, 2500 gpm, 240' TDH, 200 HP

11. Construction work will begin on or before April 7, 1977

12. Construction work will be completed on or before June 30, 1978

13. The water will be completely applied to the proposed use on or before Sept. 28, 1978

14. If the ground water supply is supplemental to an existing supply, identify the supply and existing water right. N/A

Application No. G-8971 Permit No. G-8453

Remarks: Well No. 5 has been constructed and modifications to the Burns City Water System have been performed under EDA Project No. 07 51 03747.

Phyllis Harris
Signature of Applicant
City Recorder

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 16th day of October, 19 78, at 8:00 o'clock A M.

Application No. G-8971 *Permit No.* G 8453

Application No. G-8971 Permit No. G 8453

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 5.57 *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 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 October 16, 1978

Actual construction work shall begin on or before March 2, 1980 *and shall thereafter be prosecuted with reasonable diligence and be completed on or before October 1, 19*80

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

WITNESS my hand this 2nd *day of* March, *19*79

James E. Sexson

Water Resources Director

APPENDIX G
Oregon Health Authority - Drinking Water Services Alert and Violation Summaries

PWS ID: 00153 ---- BURNS WATER DEPARTMENT

Alerts indicate water quality tests with analytical results greater than the detection limit or one-half of the maximum allowable contaminant level which may require some follow-up actions by Drinking Water Services. See the Contacts link for reports on follow-up actions. Alerts are not water quality violations. Violations for this water system can be found here.

Alert Type Abbreviations: CHEM = Chemical, COLI = Coliform, SODIUM = Sodium*

**Non-alert (water quality notice)*

Results: 56 alerts found for this water system. Show response time

Water Quality Alerts

Alert ID	Sample Date	Alert Date	Source ID	Source Name	Alert Type	Contaminant	Result	Alert Level	MCL	Contact Report
CHEM8947	04/28/2020	05/26/2020	EP-D	EP for WELL #5	SODIUM*	SODIUM	20.6	20		
CHEM8940	04/28/2020	05/19/2020	EP-C	EP for WELL #4	SODIUM*	SODIUM	29.4	20		
CHEM8933	04/28/2020	05/05/2020	EP-C	EP for WELL #4	CHEM	TETRACHLOROETHYLENE	0.00051	0.0005	0.005	05/06/2020
CHEM7710	06/28/2017	09/28/2017	EP-A	EP FOR WELLFIELD (WELLS #1 & #2)	SODIUM*	SODIUM	23.6	20		
CHEM7637	07/05/2017	07/18/2017	EP-C	EP for WELL #4	CHEM	TETRACHLOROETHYLENE	0.00074	0.0005	0.005	07/18/2017
CHEM7222	07/25/2016	07/28/2016	EP-C	EP for WELL #4	CHEM	TETRACHLOROETHYLENE	0.00096	0.0005	0.005	
CHEM6926	10/13/2015	10/23/2015	EP-C	EP for WELL #4	CHEM	TETRACHLOROETHYLENE	0.00055	0.0005	0.005	
CHEM6898	09/29/2015	10/07/2015	EP-C	EP for WELL #4	CHEM	TETRACHLOROETHYLENE	0.00067	0.0005	0.005	
CHEM6738	06/10/2015	06/15/2015	EP-C	EP for WELL #4	CHEM	TETRACHLOROETHYLENE	0.00117	0.0005	0.005	
CHEM6656	02/25/2015	03/16/2015	EP-C	EP for WELL #4	CHEM	TETRACHLOROETHYLENE	0.00107	0.0005	0.005	
CHEM6525	10/21/2014	11/05/2014	EP-C	EP for WELL #4	CHEM	TETRACHLOROETHYLENE	0.00112	0.0005	0.005	
CHEM6364	07/02/2014	07/17/2014	EP-C	EP for WELL #4	CHEM	TETRACHLOROETHYLENE	0.00126	0.0005	0.005	
CHEM6334	06/03/2014	06/25/2014	EP-C	EP for WELL #4	SODIUM*	SODIUM	25	20		
CHEM6326	06/03/2014	06/19/2014	EP-C	EP for WELL #4	CHEM	TETRACHLOROETHYLENE	0.00103	0.0005	0.005	
CHEM5063	06/08/2011	09/28/2011	EP-C	EP for WELL #4	SODIUM*	SODIUM	21.7	20		
CHEM4966	06/08/2011	07/21/2011	EP-B	EP for WELL #3	SODIUM*	SODIUM	21.8	20		
COLI8618	11/09/2010	11/12/2010	DIST-A	620 E E ST HB	COLI	COLIFORM, TOTAL (TCR)	Present	Present	Present	11/15/2010
COLI8504	10/21/2010	10/25/2010	DIST-A	1393 Foley Dr HB	COLI	COLIFORM, E. COLI	Present	Present	Present	10/25/2010
COLI8504	10/21/2010	10/25/2010	DIST-A	1393 Foley Dr HB	COLI	COLIFORM, TOTAL (TCR)	Present	Present	Present	10/25/2010
COLI8486	10/19/2010	10/21/2010	DIST-A	1393 foley dr hb	COLI	COLIFORM, E. COLI	Present	Present	Present	10/21/2010
COLI8486	10/19/2010	10/21/2010	DIST-A	1393 foley dr hb	COLI	COLIFORM, TOTAL (TCR)	Present	Present	Present	10/21/2010
COLI8318	09/23/2010	09/27/2010	DIST-A	432 n grand hb	COLI	COLIFORM, TOTAL (TCR)	Present	Present	Present	09/30/2010
COLI8318	09/23/2010	09/27/2010	DIST-A	735 s liberty hb	COLI	COLIFORM, TOTAL (TCR)	Present	Present	Present	09/30/2010
CHEM3328	07/29/2008	01/21/2009	EP-C	EP for WELL #4	CHEM	TETRACHLOROETHYLENE	0.00083	0.0005	0.005	01/21/2009
COLI6071	01/16/2009	01/20/2009	DIST-A	Distribution System	COLI	COLIFORM, TOTAL (TCR)	Present	Present	Present	
COLI6067	01/14/2009	01/16/2009	DIST-A	Distribution System	COLI	COLIFORM, TOTAL (TCR)	Present	Present	Present	
CHEM3247	07/29/2008	12/03/2008	EP-A	EP FOR WELLFIELD (WELLS #1 & #2)	CHEM	DI(2-ETHYLHEXYL) - PHTHALATE	0.00133	0.0006	0.006	
CHEM3247	07/29/2008	12/03/2008	EP-C	EP for WELL #4	CHEM	DI(2-ETHYLHEXYL) - PHTHALATE	0.00106	0.0006	0.006	
CHEM3247	07/29/2008	12/03/2008	EP-D	EP for WELL #5	CHEM	DI(2-ETHYLHEXYL) - PHTHALATE	0.00074	0.0006	0.006	
CHEM3199	07/29/2008	10/20/2008	EP-B	EP for WELL #3	SODIUM*	SODIUM	21.9	20		
CHEM3199	07/29/2008	10/20/2008	EP-C	EP for WELL #4	SODIUM*	SODIUM	26.5	20		
CHEM2509	05/01/2007	06/07/2007	EP-C	EP for WELL #4	CHEM	DI(2-ETHYLHEXYL) - PHTHALATE	0.00173	0.0006	0.006	
COLI3779	11/20/2006	11/24/2006	DIST-A	Distribution System	COLI	COLIFORM, TOTAL (TCR)	Present	Present	Present	
COLI3766	11/14/2006	11/20/2006	DIST-A	Distribution System	COLI	COLIFORM, TOTAL (TCR)	Present	Present	Present	
CHEM1734	07/11/2005	09/29/2005	EP-A	EP FOR WELLFIELD (WELLS #1 & #2)	CHEM	DI(2-ETHYLHEXYL) - PHTHALATE	0.0019	0.0006	0.006	
CHEM1734	07/11/2005	09/29/2005	EP-C	EP for WELL #4	CHEM	DI(2-ETHYLHEXYL) - PHTHALATE	0.0009	0.0006	0.006	
CHEM1734	07/11/2005	09/29/2005	EP-C	EP for WELL #4	CHEM	PICLORAM	0.0002	0.0001	0.5	
CHEM1734	07/11/2005	09/29/2005	EP-A	EP FOR WELLFIELD (WELLS #1 & #2)	SODIUM*	SODIUM	22.5	20		
CHEM1734	07/11/2005	09/29/2005	EP-A	EP FOR WELLFIELD (WELLS #1 & #2)	SODIUM*	SODIUM	23.1	20		

CHEM1734	07/11/2005	09/29/2005	EP-C	EP for WELL #4	SODIUM*	SODIUM	33.1	20		
COLI2335	08/15/2005	08/22/2005	DIST-A	Distribution System	COLI	COLIFORM, TOTAL (TCR)	Present	Present	Present	
COLI2335	08/15/2005	08/22/2005	DIST-A	Distribution System	COLI	COLIFORM, TOTAL (TCR)	Present	Present	Present	
COLI2335	08/15/2005	08/22/2005	DIST-A	Distribution System	COLI	COLIFORM, TOTAL (TCR)	Present	Present	Present	
COLI2335	08/15/2005	08/22/2005	DIST-A	Distribution System	COLI	COLIFORM, TOTAL (TCR)	Present	Present	Present	
COLI2335	08/15/2005	08/22/2005	DIST-A	Distribution System	COLI	COLIFORM, TOTAL (TCR)	Present	Present	Present	
COLI2335	08/15/2005	08/22/2005	DIST-A	Distribution System	COLI	COLIFORM, TOTAL (TCR)	Present	Present	Present	
COLI2335	08/15/2005	08/22/2005	DIST-A	Distribution System	COLI	COLIFORM, TOTAL (TCR)	Present	Present	Present	
COLI2335	08/15/2005	08/22/2005	DIST-A	Distribution System	COLI	COLIFORM, TOTAL (TCR)	Present	Present	Present	
COLI2308	08/10/2005	08/15/2005	DIST-A	Distribution System	COLI	COLIFORM, TOTAL (TCR)	Present	Present	Present	
COLI2308	08/10/2005	08/15/2005	DIST-A	Distribution System	COLI	COLIFORM, TOTAL (TCR)	Present	Present	Present	
COLI1684	11/10/2004	11/19/2004	DIST-A	Distribution System	COLI	COLIFORM, TOTAL (TCR)	Present	Present	Present	
COLI1671	11/10/2004	11/16/2004	DIST-A	Distribution System	COLI	COLIFORM, TOTAL (TCR)	Present	Present	Present	
CHEM243	10/21/2002	12/31/2002	EP-A	WELLFIELD (WELLS #1 & #2)	SODIUM*	SODIUM	28.5	20		
CHEM243	10/21/2002	12/31/2002	EP-A	WELLFIELD (WELLS #1 & #2)	SODIUM*	SODIUM	22.5	20		
CHEM243	10/21/2002	12/31/2002	EP-B	EP for WELL #3	SODIUM*	SODIUM	22.2	20		
CHEM243	10/21/2002	12/31/2002	EP-D	EP for WELL #5	SODIUM*	SODIUM	22	20		

**Non-alert (water quality notice)*

Archived Alerts (SWS database)

Date	Source	Chemical	Results mg/l	MCL mg/l
01/14/2003		Coliform		
10/28/2002		Coliform		
01/20/1998		Coliform		
12/10/1997		Coliform		
04/09/1997		Coliform		
09/25/1995		Coliform		
08/23/1995		Coliform		
01/17/1995		Coliform		
11/07/1994		Coliform		
10/24/1994		Coliform		
11/15/1993		Coliform		
11/09/1993		Coliform		
10/22/1993		Coliform		
10/18/1993		Coliform		
10/06/1993		Coliform		
10/04/1993		Coliform		
09/29/1993		Coliform		
09/23/1993		Coliform		
09/20/1993		Coliform		
09/16/1993		Coliform		
08/23/1993		Coliform		
07/21/1999	CA--WELL #4	Sodium	25.2	
07/21/1999	DA--WELL #5	Sodium	20.7	
08/20/1996	A--WELLFIELD (WELLS #1 & #2)	Sodium	24	
08/20/1996	CA--WELL #4	Sodium	32	
09/15/1993	CA--WELL #4 - WELL #4	Sodium	21.4	
10/14/1992	C--WELL #4	Tetrachloroethylene	0.0008	0.005
12/09/1991	C--WELL #4	Tetrachloroethylene	0.0011	0.005
10/15/1991	C--WELL #4	Tetrachloroethylene	0.0012	0.005
07/10/1991	C--WELL #4	Tetrachloroethylene	0.0012	0.005
01/30/1991	C--WELL #4	Tetrachloroethylene	0.0009	0.005
09/15/1993	DA--WELL #5 - WELL #5	Thallium Total	0.0017	0.002

Oregon Public Health
Drinking Water Data Online

Oregon Health Authority

PWS ID: 00153 ---- BURNS WATER DEPARTMENT

For questions regarding these violations contact: REGION 1 ---- Bill Goss/Amy Word ---- (541) 276-8006

Violations are displayed for the last 5 years only.

Click here to see public notices.

No violations for this water system.

For all compliance errors, please contact Chuck Michael, DWS Compliance Specialist, at 971-673-0420.

Click here for more information on system scores and how they are calculated, including the point values of specific violations.

Violation history last updated 11/16/2020, 4 hours ago.

For further information on this public water system, click on the area of interest below:
System Info :: Report for Lenders :: Alerts :: Violations :: Compliance & Enforcement :: Contacts & Advisories :: Site Visits :: Public Notice
Coliform Summary :: Coliform Results :: Sampling Schedule for Coliform :: Groundwater/GWUDI Source Details :: Plan Review :: Annual Fee
Chemical Group Summary :: Latest Chemical Results :: Entry Point Detects :: Single Analyte Results
Chemical Schedule Summary :: Chemical Schedule Details
Lead & Copper :: Corrosion Control (LCR) :: Nitrate :: Arsenic :: Radionuclides :: GWR 4-Log :: LT2 :: Cyanotoxins
DBPs :: TOC & Alkalinity :: DBP Sample Sites :: FANLs :: MRDL :: Turbidity :: SWTR :: RAA :: LRAA

APPENDIX H
Oregon Health Authority - Drinking Water Services Coliform, Lead, and Copper Testing Summaries

Oregon Public Health
Drinking Water Data Online

Introduction :: Data Search Options :: WS Name Look Up :: WS ID Look Up :: DWS Home :: DWS Rules :: Quick Data Links

PWS ID: 00153 ---- BURNS WATER DEPARTMENT

Lead and Copper Compliance Actions

- No lead and copper schedules found.

Action Levels: Lead = 0.015 mg/L; Copper = 1.3 mg/L

All detailed results

Lead and Copper 90th Percentile Summary Results and Consumer Notices*

Sample Dates	Date Received	Sample Count	Duration	Lead (mg/L)	Copper (mg/L)	Consumer Notice Date*
Jul 30, 2020 - Aug 04, 2020	Aug 17, 2020	10	3Y	0.0014	0.0738	08/26/2020
Jun 20, 2017 - Jun 28, 2017	Jul 11, 2017	10	3Y	0.0021	0.0555	07/26/2017
Aug 05, 2014 - Aug 06, 2014	Aug 15, 2014	20	3Y	0.0040	0.0482	
Jun 02, 2011 - Jun 08, 2011	Jul 07, 2011	10	3Y	0.0018	0.0370	
Sep 24, 2008 - Sep 24, 2008	Nov 06, 2008	10	3Y	0.0029	0.0486	
Aug 17, 2004 - Aug 18, 2004	Apr 15, 2005	10	3Y	0.0000	0.1100	
Jan 01, 1999 - May 10, 2001	Nov 05, 2001	10	3Y	0.0000	0.0000	
Jan 01, 1998 - Sep 10, 1998	Jan 04, 1999	10	YR	0.0010	0.0650	
Jan 01, 1997 - Sep 18, 1997	Oct 08, 1997	10	YR	0.0093	0.0510	
Jan 01, 1996 - Sep 11, 1996	Oct 31, 1996	10	YR	0.0021	0.0300	
Jul 01, 1994 - Sep 15, 1994	Oct 18, 1994	20	6M	0.0031	0.0620	
Jul 01, 1993 - Dec 22, 1993	Jan 18, 1994	20	6M	0.0012	0.0570	

*Consumer notice date is the date water customers were notified of their tap results. Consumer notice records are not available prior to 2016.

Oregon Public Health
Drinking Water Data Online

Introduction :: Data Search Options :: WS Name Look Up :: WS ID Look Up :: DWS Home :: DWS Rules :: Quick Data Links

Coliform fact sheet

PWS ID: 00153 ---- BURNS WATER DEPARTMENT

Current Coliform Summary History

Samples Required	Sample Type	Sampling Period Type
3	RT	MONTH

Spreadsheet

Number of Samples Reported

Period End Date	Routines Reported	Routine TC+	Routine FC+	Repeats Reported	Repeat TC+	Repeat FC+	Period Type
Dec 31, 2020	0	0	0	0	0	0	3Y
Oct 31, 2020	3	0	0	0	0	0	MN
Sep 30, 2020	3	0	0	0	0	0	MN
Aug 31, 2020	3	0	0	0	0	0	MN
Jul 31, 2020	3	0	0	0	0	0	MN
Jun 30, 2020	3	0	0	0	0	0	MN
May 31, 2020	3	0	0	0	0	0	MN
Apr 30, 2020	3	0	0	0	0	0	MN
Mar 31, 2020	3	0	0	0	0	0	MN
Feb 29, 2020	3	0	0	0	0	0	MN
Jan 31, 2020	3	0	0	0	0	0	MN
Dec 31, 2019	3	0	0	0	0	0	MN
Nov 30, 2019	3	0	0	0	0	0	MN
Oct 31, 2019	3	0	0	0	0	0	MN
Sep 30, 2019	3	0	0	0	0	0	MN
Aug 31, 2019	3	0	0	0	0	0	MN
Jul 31, 2019	3	0	0	0	0	0	MN
Jun 30, 2019	3	0	0	0	0	0	MN
May 31, 2019	3	0	0	0	0	0	MN
Apr 30, 2019	3	0	0	0	0	0	MN
Mar 31, 2019	3	0	0	0	0	0	MN
Feb 28, 2019	3	0	0	0	0	0	MN
Jan 31, 2019	3	0	0	0	0	0	MN
Dec 31, 2018	3	0	0	0	0	0	MN
Nov 30, 2018	3	0	0	0	0	0	MN
Oct 31, 2018	3	0	0	0	0	0	MN
Sep 30, 2018	3	0	0	0	0	0	MN
Aug 31, 2018	3	0	0	0	0	0	MN
Jul 31, 2018	3	0	0	0	0	0	MN
Jun 30, 2018	3	0	0	0	0	0	MN
May 31, 2018	3	0	0	0	0	0	MN
Apr 30, 2018	3	0	0	0	0	0	MN
Mar 31, 2018	3	0	0	0	0	0	MN
Feb 28, 2018	3	0	0	0	0	0	MN
Jan 31, 2018	3	0	0	0	0	0	MN
Dec 31, 2017	0	0	0	0	0	0	3Y
Dec 31, 2017	3	0	0	0	0	0	MN
Nov 30, 2017	3	0	0	0	0	0	MN
Oct 31, 2017	3	0	0	0	0	0	MN
Sep 30, 2017	3	0	0	0	0	0	MN
Aug 31, 2017	3	0	0	0	0	0	MN
Jul 31, 2017	3	0	0	0	0	0	MN
Jun 30, 2017	3	0	0	0	0	0	MN
May 31, 2017	3	0	0	0	0	0	MN
Apr 30, 2017	3	0	0	0	0	0	MN
Mar 31, 2017	3	0	0	0	0	0	MN
Feb 28, 2017	3	0	0	0	0	0	MN
Jan 31, 2017	3	0	0	0	0	0	MN
Dec 31, 2016	3	0	0	0	0	0	MN
Nov 30, 2016	3	0	0	0	0	0	MN
Oct 31, 2016	3	0	0	0	0	0	MN
Sep 30, 2016	3	0	0	0	0	0	MN

Aug 31, 2016	3	0	0	0	0	MN
Jul 31, 2016	3	0	0	0	0	MN
Jun 30, 2016	3	0	0	0	0	MN
May 31, 2016	3	0	0	0	0	MN
Apr 30, 2016	3	0	0	0	0	MN
Mar 31, 2016	3	0	0	0	0	MN
Feb 29, 2016	3	0	0	0	0	MN
Jan 31, 2016	3	0	0	0	0	MN
Dec 31, 2015	3	0	0	0	0	MN
Nov 30, 2015	3	0	0	0	0	MN
Oct 31, 2015	3	0	0	0	0	MN
Sep 30, 2015	3	0	0	0	0	MN
Aug 31, 2015	3	0	0	0	0	MN
Jul 31, 2015	3	0	0	0	0	MN
Jun 30, 2015	3	0	0	0	0	MN
May 31, 2015	3	0	0	0	0	MN
Apr 30, 2015	3	0	0	0	0	MN
Mar 31, 2015	3	0	0	0	0	MN
Feb 28, 2015	3	0	0	0	0	MN
Jan 31, 2015	3	0	0	0	0	MN
Dec 31, 2014	0	0	0	0	0	3Y
Dec 31, 2014	3	0	0	0	0	MN
Nov 30, 2014	3	0	0	0	0	MN
Oct 31, 2014	3	0	0	0	0	MN
Sep 30, 2014	3	0	0	0	0	MN
Aug 31, 2014	3	0	0	0	0	MN
Jul 31, 2014	3	0	0	0	0	MN
Jun 30, 2014	3	0	0	0	0	MN
May 31, 2014	3	0	0	0	0	MN
Apr 30, 2014	3	0	0	0	0	MN
Mar 31, 2014	3	0	0	0	0	MN
Feb 28, 2014	3	0	0	0	0	MN
Jan 31, 2014	3	0	0	0	0	MN
Dec 31, 2013	3	0	0	0	0	MN
Nov 30, 2013	3	0	0	0	0	MN
Oct 31, 2013	3	0	0	0	0	MN
Sep 30, 2013	3	0	0	0	0	MN
Aug 31, 2013	3	0	0	0	0	MN
Jul 31, 2013	3	0	0	0	0	MN
Jun 30, 2013	3	0	0	0	0	MN
May 31, 2013	3	0	0	0	0	MN
Apr 30, 2013	3	0	0	0	0	MN
Mar 31, 2013	3	0	0	0	0	MN
Feb 28, 2013	3	0	0	0	0	MN
Jan 31, 2013	3	0	0	0	0	MN
Dec 31, 2012	3	0	0	0	0	MN
Nov 30, 2012	3	0	0	0	0	MN
Oct 31, 2012	3	0	0	0	0	MN
Sep 30, 2012	3	0	0	0	0	MN
Aug 31, 2012	3	0	0	0	0	MN
Jul 31, 2012	3	0	0	0	0	MN
Jun 30, 2012	3	0	0	0	0	MN
May 31, 2012	3	0	0	0	0	MN
Apr 30, 2012	3	0	0	0	0	MN
Mar 31, 2012	3	0	0	0	0	MN
Feb 29, 2012	3	0	0	0	0	MN
Jan 31, 2012	3	0	0	0	0	MN
Dec 31, 2011	3	0	0	0	0	MN
Nov 30, 2011	3	0	0	0	0	MN
Oct 31, 2011	3	0	0	0	0	MN
Sep 30, 2011	3	0	0	0	0	MN
Aug 31, 2011	3	0	0	0	0	MN
Jul 31, 2011	3	0	0	0	0	MN
Jun 30, 2011	3	0	0	0	0	MN
May 31, 2011	3	0	0	0	0	MN
Apr 30, 2011	3	0	0	0	0	MN
Mar 31, 2011	3	0	0	0	0	MN
Feb 28, 2011	3	0	0	0	0	MN

Jan 31, 2011	3	0	0	0	0	0	MN
Dec 31, 2010	5	0	0	0	0	0	MN
Nov 30, 2010	3	**1**	0	**3**	0	0	MN
Oct 31, 2010	5	0	0	0	0	0	MN
Sep 30, 2010	3	**2**	0	**6**	0	0	MN
Aug 31, 2010	4	0	0	0	0	0	MN
Jul 31, 2010	3	0	0	0	0	0	MN
Jun 30, 2010	3	0	0	0	0	0	MN
May 31, 2010	3	0	0	0	0	0	MN
Apr 30, 2010	3	0	0	0	0	0	MN
Mar 31, 2010	3	0	0	0	0	0	MN
Feb 28, 2010	3	0	0	0	0	0	MN
Jan 31, 2010	3	0	0	0	0	0	MN
Dec 31, 2009	3	0	0	0	0	0	MN
Nov 30, 2009	3	0	0	0	0	0	MN
Oct 31, 2009	3	0	0	0	0	0	MN
Sep 30, 2009	3	0	0	0	0	0	MN
Aug 31, 2009	3	0	0	0	0	0	MN
Jul 31, 2009	3	0	0	0	0	0	MN
Jun 30, 2009	3	0	0	0	0	0	MN
May 31, 2009	3	0	0	0	0	0	MN
Apr 30, 2009	3	0	0	0	0	0	MN
Mar 31, 2009	3	0	0	0	0	0	MN
Feb 28, 2009	3	0	0	0	0	0	MN
Jan 31, 2009	3	0	0	0	0	0	MN
Dec 31, 2008	3	0	0	0	0	0	MN
Nov 30, 2008	3	0	0	0	0	0	MN
Oct 31, 2008	3	0	0	0	0	0	MN
Sep 30, 2008	3	0	0	0	0	0	MN
Aug 31, 2008	3	0	0	0	0	0	MN
Jul 31, 2008	3	0	0	0	0	0	MN
Jun 30, 2008	3	0	0	0	0	0	MN
May 31, 2008	3	0	0	0	0	0	MN
Apr 30, 2008	3	0	0	0	0	0	MN
Mar 31, 2008	3	0	0	0	0	0	MN
Feb 29, 2008	3	0	0	0	0	0	MN
Jan 31, 2008	3	0	0	0	0	0	MN
Dec 31, 2007	3	0	0	0	0	0	MN
Nov 30, 2007	3	0	0	0	0	0	MN
Oct 31, 2007	4	0	0	0	0	0	MN
Sep 30, 2007	3	0	0	0	0	0	MN
Aug 31, 2007	3	0	0	0	0	0	MN
Jul 31, 2007	3	0	0	0	0	0	MN
Jun 30, 2007	3	0	0	0	0	0	MN
May 31, 2007	3	0	0	0	0	0	MN
Apr 30, 2007	3	0	0	0	0	0	MN
Mar 31, 2007	3	0	0	0	0	0	MN
Feb 28, 2007	3	0	0	0	0	0	MN
Jan 31, 2007	3	0	0	0	0	0	MN
Dec 31, 2006	4	0	0	0	0	0	MN
Nov 30, 2006	4	**1**	0	**3**	**1**	0	MN
Oct 31, 2006	3	0	0	0	0	0	MN
Sep 30, 2006	3	0	0	0	0	0	MN
Aug 31, 2006	3	0	0	0	0	0	MN
Jul 31, 2006	4	0	0	0	0	0	MN
Jun 30, 2006	3	0	0	0	0	0	MN
May 31, 2006	3	0	0	0	0	0	MN
Apr 30, 2006	3	0	0	0	0	0	MN
Mar 31, 2006	3	0	0	0	0	0	MN
Feb 28, 2006	3	0	0	0	0	0	MN
Jan 31, 2006	3	0	0	0	0	0	MN
Dec 31, 2005	3	0	0	0	0	0	MN
Nov 30, 2005	3	0	0	0	0	0	MN
Oct 31, 2005	3	0	0	0	0	0	MN
Sep 30, 2005	5	0	0	0	0	0	MN
Aug 31, 2005	3	**2**	0	**12**	**8**	0	MN
Jul 31, 2005	3	0	0	0	0	0	MN
Jun 30, 2005	3	0	0	0	0	0	MN

May 31, 2005	3	0	0	0	0	0	MN
Apr 30, 2005	3	0	0	0	0	0	MN
Mar 31, 2005	3	0	0	0	0	0	MN
Feb 28, 2005	3	0	0	0	0	0	MN
Jan 31, 2005	3	0	0	0	0	0	MN
Dec 31, 2004	5	0	0	0	0	0	MN
Nov 30, 2004	3	**2**	0	**6**	0	0	MN
Oct 31, 2004	3	0	0	0	0	0	MN
Sep 30, 2004	3	0	0	0	0	0	MN
Aug 31, 2004	3	0	0	0	0	0	MN
Jul 31, 2004	3	0	0	0	0	0	MN
Jun 30, 2004	3	0	0	0	0	0	MN
May 31, 2004	3	0	0	0	0	0	MN
Apr 30, 2004	3	0	0	0	0	0	MN
Mar 31, 2004	3	0	0	0	0	0	MN
Feb 29, 2004	3	0	0	0	0	0	MN
Jan 31, 2004	3	0	0	0	0	0	MN
Dec 31, 2003	3	0	0	0	0	0	MN
Nov 30, 2003	3	0	0	0	0	0	MN
Oct 31, 2003	3	0	0	0	0	0	MN
Sep 30, 2003	3	0	0	0	0	0	MN
Aug 31, 2003	3	0	0	0	0	0	MN
Jul 31, 2003	3	0	0	0	0	0	MN
Jun 30, 2003	3	0	0	0	0	0	MN
May 31, 2003	3	0	0	0	0	0	MN
Apr 30, 2003	3	0	0	0	0	0	MN
Mar 31, 2003	3	0	0	0	0	0	MN
Feb 28, 2003	5	0	0	0	0	0	MN
Jan 31, 2003	3	**1**	0	**3**	0	0	MN
Dec 31, 2002	3	0	0	0	0	0	MN
Nov 30, 2002	5	0	0	0	0	0	MN
Oct 31, 2002	3	**1**	0	**3**	0	0	MN
Sep 30, 2002	3	0	0	0	0	0	MN
Sep 30, 2002	1	0	0	0	0	0	QT
Aug 31, 2002	3	0	0	0	0	0	MN
Jul 31, 2002	2	0	0	0	0	0	MN
Jun 30, 2002	3	0	0	0	0	0	MN
May 31, 2002	6	0	0	0	0	0	MN
Apr 30, 2002	3	0	0	0	0	0	MN
Mar 31, 2002	3	0	0	0	0	0	MN
Feb 28, 2002	3	0	0	0	0	0	MN
Jan 31, 2002	3	0	0	0	0	0	MN

Show results prior to 01/01/2002

APPENDIX I
Source Water Assessment Report

SOURCE WATER ASSESSMENT REPORT

Summary of Analysis

City of Burns
Burns, Oregon
Harney County
PWS #4100153

October, 2004

Prepared By

Oregon Department of Human Services
Health Services
Drinking Water Program

And

Oregon Department of Environmental Quality
Water Quality Division
Drinking Water Protection

DHS
Oregon Department of Human Services

DEQ
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Available in Alternate Formats by contacting the DHS DWP at (541) 726-2587

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1. Introduction

The Source Water Assessment Program, mandated by the 1996 Amendments to the Safe Drinking Water Act, requires that states provide the information needed by public water systems to develop drinking water protection plans if they choose. That information includes the identification of the area most critical to maintaining safe drinking water, i.e., the Drinking Water Protection Area, an inventory of potential sources of contamination within the Drinking Water Protection Area, and an assessment of the relative threat that these potential sources pose to the water system.

The intent of this report is to present our conclusions regarding the source water assessment analysis for your water system. It is our hope that this information will be used as a basis for reducing the risk of contamination to your water source through the development of a voluntary Drinking Water Protection Plan (DWPP). Should you decided to proceed with the development of a DWPP, this document can serve as the foundation for the plan. If, however, a more in depth analysis of the local hydrogeology, water system susceptibility, and/or the water system specific assumptions is needed to help promote the development of a DWPP, a more comprehensive assessment analysis can be made available to you by contacting either the DHS Project Manager or the DHS Drinking Water Program Groundwater Coordinator.

The methodology that the Source Water Assessment results are based on is included in the Appendix (see "Source Water Assessment Methodology"). This section includes a discussion of the source water assessment project; groundwater basics; and the processes involved with conducting the delineation, sensitivity analysis, potential contaminant source inventory, and overall water system susceptibility. Therefore, it is our intention that the assessment results, identified in this portion of the report, be used in conjunction with the methodology and rational presented in the Appendix. For instance, if questions arise regarding our conclusions with respect to a specific element of the assessment (i.e. type of delineation used, aquifer sensitivity, well construction sensitivity, etc.), the methodology that lead to our conclusions can be reviewed in the Appendix for further clarification.

We believe public awareness is a powerful tool for protecting drinking water and that the information provided in this report will help you increase local awareness regarding land use activities and local drinking water quality. We have also included a groundwater fact sheet and a list of Oregon specific drinking water protection information and resources in Appendices as well.

2. Water System Background

The Burns Water Department is a publicly-owned water system located in Harney County serving approximately 3,000 individuals through 1500 connections. Drinking water is supplied by five wells (Nos.1 – 5). No water treatment is considered necessary at this time.

2.1 Location of the Drinking Water Sources

We have located your drinking water source using a Trimble GeoExplorer II Global Positioning System (GPS) unit. The data has been differentially corrected to remove some of the common positioning errors. The location of the source(s), with the corresponding Drinking Water Protection Area, has been placed in a Geographic Information System (GIS) layer and projected onto a USGS 7.5 minute topographic map that is included within this report. In order to be consistent with the topographic map, the projection uses the NAD1927 datum. The latitude and longitude values given on the map and below, however, reflect a projection in the more commonly used WGS1984 datum.

Data collection specifics include:

- 150 individual measurements,
- linked to a minimum of four satellites,
- a PDOP of less than 6 (pertains to precision of measurement), and
- a signal to noise ratio of greater than 5.

The raw data was subjected to differential correction using the PATHFINDER software. The location data for your drinking water source(s) using the WGS84 datum is as follows:

Source	Latitude	Longitude
Well 1- Source AA	43° 35' 34.178" N	119° 03' 46.075" W
Well 2- Source AB	43° 35' 32.081" N	119° 03' 47.129" W
Well 3- Source BA	43° 35' 11.740" N	119° 03' 41.080" W
Well 4- Source CA	43° 34' 57.587" N	119° 03' 21.223" W
Well 5- Source DA	43° 34' 39.165" N	119° 04' 33.372" W

2.2 Source Construction

No detailed well report is available for Well 1. Records indicate that the well was drilled in 1926 and that the well depth is 251 feet. Twelve-inch casing extends to 100 feet. Examining other well reports from this section suggests that groundwater occurs at depths in excess of 150 feet.

All of the reports indicate that the static water level (depth to water in the well when it is not being pumped) is shallower than the aquifer. The static water level for Well 1 was reported as 85 feet. Given the age of the well, and the absence of a well report, it is appropriate to consider the well construction as inadequate. This is particularly the case for the casing seal, whose purpose is to prevent shallow water from gaining access to the aquifer.

As with Well 1, no detailed well report is available for Well 2. Records from 1959 indicate that the well was drilled in 1926 and that the well depth is 253 feet. Twelve-inch casing extends to 150 feet. The static water level was reported to be 85 feet. As with Well 1, the age of the well, and the absence of a well report, indicate that the well construction is likely inadequate.

Well 3 was completed in December, 1958. A 16-inch hole was drilled to a total depth of 304 feet. The depth in which groundwater was encountered was not reported. The static water level was reported as 14 feet. Sixteen-inch steel casing was installed from the surface to a depth of 144 feet. The driller reported installing screens, but did not specify depth of placement. The well is open hole from 144 to 304 feet. Cement was placed in the annular space between the casing and the hole to a depth of 20 feet to serve as a casing seal. This seal is considered inadequate because the casing seal should have extended to at least 29 feet (into hard bedrock) and there is no data regarding the thickness of the cement seal. A minimum of two inches of cement surrounding the casing is required.

Well 4 was completed in August, 1974. A 20-inch hole was drilled to a depth of 22 feet with a 16-inch hole continuing to 290 feet. The depth in which groundwater was encountered was reported as 240 feet. The static water level was reported as 13 feet. Sixteen-inch steel casing was installed from the surface to a depth of 133 feet. No perforations or screens were placed. The well is open hole from 133 to 290 feet. Cement was placed in the annular space between the casing and the hole to a depth of 22 feet to serve as a casing seal. This seal is considered adequate.

Well 5 was completed in June, 1977. A 24-inch hole was drilled to a depth of 40 feet with an 18-inch hole continuing to 355 feet. The depth in which groundwater was encountered was reported as 35 feet, however production levels of water were found at depths greater than ~290 feet. The static water level was reported as 30 feet. Casing was installed from 1.5 feet above surface to a depth of 355 feet. The driller reported perforating the casing from 140 to 355 feet. Cement was placed in the annular space between the casing and the hole to a depth of 40 feet to serve as a casing seal. Specifically the seal was placed in a manner to seal out the shallow water encountered at 35 feet. This seal is considered adequate.

The well reports for the wells are in the Appendix.

2.3 Nature and Characteristics of the Aquifer

The aquifer supplying drinking water to the City of Burns's Water System Wells consists of lava flows, ash flow deposits and sediments associated with volcanism in northern most Great Basin.

As described in the well construction discussion above, the depth to first water encountered in the wells is deeper than the static water level after well completion. This implies that the groundwater is under pressure and that the aquifer should be considered confined, i.e., there are persistent materials of low permeability separating the aquifer from the surface. Based on the well report, the aquifer probably consists of porous interflow zones in the basalts and ash flow deposits. The low permeability materials consist of more dense members of these rock formations.

3. Delineation Results

The purpose of the Drinking Water Protection Area (DWPA) delineation is to identify the area at the surface which overlies the critical portion of the aquifer that's supplying groundwater to the water system's well(s) and/or spring(s). Therefore, DHS Drinking Water Program staff have collected and reviewed data for the purpose of delineating the DWPA for your water system. The area included in the DWPA is designed to approximate the next 10 or 15 years of groundwater supply for the water system, depending on delineation method, and is shown in the Appendix as Figure 1. We have enhanced the usefulness of the DWPA map by identifying additional five-year, two-year, and one-year "Time-Of-Travel Zones" inside the DWPA.

The scope of work for this portion of the assessment included interviewing the water system operator, researching written reports, reviewing well logs, and establishing a base map of the delineated area. Based on the service population and the potential for mutual interference of the wells (see Appendix I for explanation of delineation process), the delineation of the DWPAs for the wells were accomplished using GPTRAC, an analytical model included in the WHPA (Wellhead Protection Area) software (Blandford and Huyakorn, 1991) (See Appendix for explanation of delineation process). The resulting DWPAs for the City of Burns's wells are shown in the Appendix as Figure 1. Specific information regarding the parameters used in the delineation process including; the delineation method, estimated pump rate, and aquifer characteristics can be found in "Parameters Used in Delineation Model" in the Appendix.

4. Sensitivity Analysis Results

After the Drinking Water Protection Area (DWPA) has been identified, aquifer susceptibility to potential contaminant sources inside the DWPA can be evaluated. Aquifer susceptibility is dependent on two factors, the natural environment's characteristics that permit migration of a contaminant into the aquifer (i.e., aquifer sensitivity) and the presence, distribution, and nature of the potential contaminant sources within the DWPA. It should be understood that the public water system's drinking water source cannot be susceptible to contamination, even if potential contaminant sources are present, unless the aquifer or the constructed source water intake are sensitive to contamination. Therefore, the intent of the sensitivity analysis is to identify those areas within the DWPA where the aquifer is most sensitive to contamination. The analysis is based on data collected or generated during the DWPA delineation process and is designed to meet the needs of other existing or developing programs such as Monitoring Waivers and the Groundwater Rule.

The results of the sensitivity analysis are provided in the tables that follow. Information and sensitivity ratings regarding the aquifer and water quality are provided in Table 4.1 while information and sensitivity ratings regarding the well and its construction is provided in Table 4.2. A clarification of the ratings is provided as comments where appropriate.

Based on this analysis, the drinking water source is considered highly sensitive to contamination at Wells 1, 2 and 3. This determination is based on the fact that no information is available regarding the casing seals for Wells 1 and 2, and the inadequate construction of the casing seal at Well 3

Also contributing to sensitivity is the age of all of the wells, the occurrence of highly permeable soils within the DWPAs of all of the wells, and the occurrence of nitrate up to 1.9 to 3 mg/L range for all wells. Although this concentration is below the drinking water standard of 10 mg/L, it is above what can be reliably attributed to natural sources of nitrate and implies that a pathway exists between a nitrate source at or near the surface and the aquifer.

Table 4.1 Aquifer Sensitivity Analysis.

	Sensitivity			
Parameter	**H**	**M**	**L**	**Comments**
Depth to first water-bearing zone below casing seal (feet).			✔	Wells 1 and 2=Unk; Well 3=29(?);Well 4=240;Well 5=288
Aquifer characteristics and hydraulic nature.			✔	Wells 1 and 2=Unk; Wells 3, 4 and 5=Confined
Overburden thickness (feet) and characteristics.		✔		Wells 1 and 2=Unk; Interbedded volcanic rocks at 29 for Well 3; at 240 for Well 4;at 248 for Well 5
Highest soil sensitivity in Protection Area.	✔			
Traverse potential score (10 = High).			✔	Wells 1 and 2=Unk; Well 3=5(?); Well 4=1.5; Well 5=1
Infiltration potential score (10 = High).		✔		Wells 1 and 2=Unk; Well 3=3(?); Wells 4 and 5=1
Organic chemical detections.			✔	None for Wells 1, 2, 3 and 5; PCE detected at Well 4 up to 0.0012 mg/L in 1991-92. Samples since have been non-detections
Inorganic chemical detections.			✔	None
Source related coliform detections.			✔	None detected.
Nitrate concentrations (Drinking Water Standard = 10 mg/L).		✔		Up to 3.0 for Wells 1 and 2; 2.93 for Well 3;1.93 for Well 4; 2.65 for Well 5
Fractured bedrock near surface in Protection Area.			✔	None present.
Other wells score (Significant Risk = 400).			✔	Wells 1, 2 and 3=34; Well 4=97; Well 5=58
Surface water within 500 feet of wellhead.			✔	None
Other: Sodium exceeding 20 mg/L[1]				Sodium = 32 mg/L

1. It is recommended that if the sodium content exceeds 20 mg/L that the system notify its customers so that anyone who is on a prescribed low-sodium diet can notify their doctor of this source of sodium in their diet.

Table 4.2 Well 1 Construction Sensitivity Analysis.				
	Sensitivity			
Parameter	**H**	**M**	**L**	**Comments**
Casing depth (ft).				Wells 1=100; Well 2=150; Well 3=144; Well 4=133; Well 5=355
Casing seal depth (ft).				Wells 1 and 2=Unk; Well 3=20; Well 4=22; Well 5=40
Well construction setback deficiencies from site visit.			✔	None observed.
Well report information missing or unknown.			✔	No
Casing seal information missing or unknown.	✔			Yes for Wells 1 and 2=Yes
Casing seal material.			✔	Well 1=Unk; Wells 2, 3, 4 and 5=Cement
Well open to multiple aquifers (commingling suspected).			✔	No
Casing seal construction.	✔			Wells 1, 2 and 3=Inadequate; Wells 4 and 5=Adequate
Year Constructed.		✔		Wells 1 and 2=1926; Well 3=1958; Well 4=1974; Well 5=1977

5. Potential Contaminant Source Inventory

An inventory of potential contamination sources was performed within the Drinking Water Protection Area and the results are shown in Figure 2 in the Appendix. The primary intent of the inventory was to identify and locate significant potential contaminant sources of concern. This inventory was conducted by reviewing applicable state and federal regulatory databases and land use maps, interviewing persons knowledgeable of the area, and conducting a windshield survey by driving through the drinking water protection area to field locate and verify as many of the potential contaminant source activities as possible. It is important to remember the sites and areas identified are only potential sources of contamination to the drinking water. Environmental contamination is not likely to occur when contaminants are used and managed properly.

5.1 Potential Contaminant Sources within the Two-Year Time-of-Travel Zone for the Wells

The delineated two-year time of travel zone is primarily dominated by commercial and residential land use. Eleven potential contaminant sources (Reference Numbers 1, 24, 25, 26, 28, 37, 38, 40, 41, 43 and 46) on Figure 2 and Appendix C, Table 2) were identified in the two-year time-of-travel zone. The potential contaminant sources within the two-year time-of-travel all have relatively higher to moderate risk rankings with the exception of the school, which presents a lower risk to the drinking water supply. The higher to moderate risk sites include: several underground storage tanks unknown status, high-density housing, three auto repair shops, two auto supply stores, a state highway and a railroad.

5.2 Potential Contaminant Sources Between the Two-Year and Fifteen-Year Time-of-Travel Zones for the Wells

The drinking water protection area within the five-year and ten-year time-of-travel zones is primarily occupied by commercial land use. A total of thirty-five potential contaminant sources were identified in this area which are detailed on Table 2 in Appendix C and include several gas stations, two parks, several auto repair shops, several oil companies, two schools, three utility companies, city and county maintenance facilities, a cemetery, a storage facility, an RV Park, several auto dealerships with maintenance shops, a gravel company and a sewage treatment plant. All pose a relatively higher to moderate risk to the drinking water supply with the exception of the schools, RV Park and mini storage which poses a lower risk. Three potential contaminant sources found within the 2-yr time-of-travel (Highway 20, the railroad and housing), extend from the 2-yr TOT into the 15-yr TOT. These land uses occur throughout the drinking water protection area and are shown on Figure 2 in the location nearest to the well.

This review of the presence of potential contaminant sources within the Burns Water Department's drinking water protection area provides a quick look at the potential sources of contaminants that could, if improperly managed, adversely impact the city's drinking water source. Even very small quantities of certain contaminants can significantly impact water bodies.

6. Susceptibility of the Drinking Water Source

In general, Potential Contaminant Sources (PCSs) within the shorter time-of-travel zones pose a greater risk than those in the longer time-of-travel zones. Also of concern is the location and distribution of these sources with respect to high and moderately sensitive areas. Overlaying the PCS location map (Figure 2 in Appendix) on top of the sensitivity map for the water system provides a tool to determine the susceptibility of the community's drinking water supply to contamination from each PCS (see Figure 3 in Appendix).

6.1 Aquifer Susceptibility to Potential Contaminant Sources Inside the Drinking Water Protection Area.

Table 6.1, indicates the relationship between potential contaminant source risk, aquifer sensitivity, and estimated contaminant arrival time at the well, wellfield, and/or spring. The community can use the PCS location numbers on the inventory map in conjunction with the displayed aquifer sensitivity and relative risk rankings for each PCS from Table 2 in the Appendix to identify the susceptibility of the drinking water source to contamination from each PCS and take steps to reduce the risk accordingly.

We have attempted to quantify the relative susceptibility of the water system with regard to the PCSs present in the Drinking Water Protection Area (DWPA) using Table 6.1. Across the top of the table, each Time-of-Travel (TOT) zone is subdivided to account for areas of high, moderate, and low sensitivity that may exist between each TOT. Potential contaminant source risk categories (high, moderate, and low) are listed down the left hand side of the table. The relative aquifer susceptibility to each PCS is demonstrated by the shading of each cell in the table. Cells that are shaded dark gray indicate a highly-susceptible condition, light gray shaded cells indicate a moderately-susceptible condition, and white cells indicate conditions of low susceptibility. The number in each cell indicates the number of potential contaminant sources that meet the conditions for that cell. Cells that do not contain a number indicate that there are no known potential contaminant sources that meet the conditions for the cell. Potential contaminant sources that meet the specific criteria for a cell in Table 6.1 can be identified by reviewing Table 2 in the Appendix. The number of potential contaminant sources is totaled across the bottom of the table.

Table 6.1. City of Burns Susceptibility as a Function of PCS Risk, TOT Zone, and Aquifer Sensitivity.									
	2-Yr TOT			2- to 5-Yr TOT			5- to 15-Yr TOT		
	High	Mod	Low	High	Mod	Low	High	Mod	Low
High Risk PCSs	5			12			14	1	
Moderate Risk PCSs	6			1	1		3		
Low Risk PCSs				1			2		
Total PCSs	11			14	1		19	1	

The distribution of high, moderate, and low sensitivity areas inside the Drinking Water Protection Area can be determined using either soil sensitivity (permeability) or the mapped distribution of Traverse Potential (TP) or Infiltration Potential (IP). In the case of the City of Burns water system we have decided to rely upon soil permeability as an indicator of sensitivity (See tables 2a and 2b for factors that might increase or decrease sensitivity). Moderately to highly permeable soils are found within the Drinking Water Protection Area. The IP score calculated for each well indicates a lower sensitive condition due to low rainfall amounts, the character of the geologic materials separating the surface and the aquifer, and depth to the aquifer (See Table 4.1). Therefore, it is reasonable to assume that the natural aquifer sensitivity to contamination throughout the DWPA is low to moderate (see pattern of soil permeability distribution in Figure 2).

During the potential contaminant source inventory, a total of 64 potential contaminant sources were identified at 46 separate locations inside the DWPA. If any of these potential contaminant sources have been identified as an area-wide source, they have been evaluated with respect to each time-of-travel zone in which they occur. As a result, the total number of potential contaminant sources evaluated in the above susceptibility table may exceed the number identified on the potential contaminant source inventory map (Figure 2 of the Appendix).

As indicated in the above table, 11 potential contaminant source locations occur inside the 2-year TOT, 15 source locations fall between the 2- and 5-year TOTs, and 20 source locations have been identified between the 5- and 15-year TOTs. Of the potential contaminant sources identified inside the 2-year TOT, 6 are of high-risk, 6 are of moderate-risk; there are not sources of low-risk. Based on the analysis results shown in the relative susceptibility table, we consider the City of Burns to be highly susceptible to the moderate and high-risk potential contaminant sources identified inside the 2-year TOT (Potential contaminant Source Reference Nos. 1, 24, 25, 26, 28, 37, 38, 40, 41, 43 and 46 Figure 3 in the Appendix). **Therefore we recommend that these potential contaminant sources not only be addressed in any Drinking Water Protection Plan but also in any Water System Emergency Response Plan.**

The water supply also appears to be highly susceptible to most of the remaining potential contaminant sources identified between the 2- and 15-year TOT zones (refer to Table 6.1). As a result of this analysis, we recommend that the water system develop a Drinking Water Protection Plan that addresses all high- and moderate-risk potential contaminant sources within the DWPA, beginning with those sources which represent the greatest susceptibility risk. At a minimum, the water system should work with representatives from those PCSs posing a moderate- to high-susceptibility risk within the DWPA to (1) determine the level of environmental protection employed in the day-to-day operations of the facility and (2) identify any reasonable Best Management Practices that will lead to an overall reduction of contamination risk.

6.2 Water System Susceptibility to Viral Contaminant Sources within the Two-Year Time-of-Travel Zone.

The area within the two-year TOT roughly identifies the next two years of groundwater supply for the water system. The two-year time frame is used as a conservative estimate of the survival time for some viruses. **Based on the assessment results, the drinking water source is considered highly sensitive. Therefore, we consider that the City of Burns's water supply is susceptible to viral contamination** because a viral source (sewer lines) was identified inside the two-year TOT.

7. Conclusions

The City of Burns's water system draws water from a deeper confined aquifer within the lava flows and ash flows of a volcanic rock sequence. Assessment results indicate that the water system would be moderately to highly susceptible to a contamination event inside the identified Drinking Water Protection Area. The presence of approximately 60 high- and moderate-risk potential contaminant sources within the protection area was confirmed through a potential contaminant source inventory. Under a "worst case" scenario, where it is assumed that nothing is being done to protect groundwater quality at the identified potential contaminant sources, the assessment results indicate that the water system would be highly susceptible to nearly all of the identified potential contaminant sources. In addition, the assessment results indicate that, at this time, the water system is considered susceptible to viral contamination.

8. Recommended Use of the Source Water Assessment Report

The costs associated with contaminated drinking water are high. Developing an approach to protect that resource, such as a Drinking Water Protection Plan, can reduce the potential for contamination of the local drinking water supply. This report contains a summary of the local geology and well construction issues as they pertain to the quality of your drinking water source. We have identified the area we believe to be most critical to preserving your water quality (the Drinking Water Protection Area) and have identified potential sources of contamination within that area. In addition, we provide you with recommendations, i.e., Best Management Practices, regarding the proper use and practices associated with some common potential contamination sources (See "BMPs for Activities Commonly Found in Drinking Water Protection Areas" in the Appendix). We believe public awareness is a powerful tool for protecting drinking water and that the information provided in this report will help you increase local awareness regarding the relationship between land use activities and drinking water quality. To that end, the process for developing a Drinking Water Protection Plan can be summarized as follows:

Assessment Phase (Source Water Assessment Provided by DHS and DEQ)

- Delineate the area that serves as the source of the public water supply (Drinking Water Protection Area (DWPA))
- Inventory the potential risks or sources of contamination within the DWPA
- Determine the areas most susceptible to contamination

Protection Phase (performed by the water system or community)

- Assemble a local Drinking Water Protection Team
- Enhance the Source Water Assessment if necessary
- Develop a plan to reduce the risk of contamination (protect the resource)
- Develop a contingency plan to address the potential loss of the drinking water supply
- Certify (optional) and implement the Drinking Water Protection Plan

The assessment phase was funded by the federal Safe Drinking Water Act. Its purpose is to supply the water system with the information necessary to develop a Drinking Water Protection Plan. In Oregon, development of a protection plan is voluntary.

Prior to moving into the protection phase, DEQ recommends the inventory presented in this document be reviewed in detail to clarify the presence, location, operational practices, actual risks, etc., of the identified facilities and land use activities. The Source Water Assessment (SWA) inventory should be regarded as a preliminary review of potential sources of contamination within the drinking water protection area. Resources within the community

should be used to do an "enhanced inventory" to refine this preliminary list of potential contaminant sources.

It is also important to remember that not all of the inventoried activities will need to be addressed if you choose to develop a Drinking Water Protection Plan. When developing a protection plan, potential contaminant sources which pose little or no threat to your drinking water supply can be screened out. For example, if any of the land use activities are conducted in a manner that already significantly reduces the risk of a contamination release, the facility would not need to re-evaluate their practices based on drinking water protection "management". One of the goals for developing a plan based on the inventory results is to address those land use activities that do pose high or moderate risks to your public water supply. The system should target these facilities with greater levels of education and technical assistance to minimize the risk of contamination.

Limited technical assistance is available through the DEQ and Drinking Water Program at DHS for water systems that choose to move beyond the assessments and voluntarily develop a Drinking Water Protection Plan. By using the results of the assessment, the water system/community can form a Drinking Water Protection Team comprised of individuals that have a stake in the plan's implementation.

Forming a local team to help with the development of a protection plan is very important. Oregon's drinking water protection approach relies upon the concept of "community based protection", as are many other water quality programs. This simply refers to the concept of allowing local control and decision-making to implement the water quality protection effort. Community-based protection is successful only with significant local citizen stakeholder involvement. Community-based protection can draw on the knowledge and successful adaptive practices within the area. Landowners generally know best how to achieve water resource restoration and protection as long as a thorough explanation of the problem is provided, the objectives to solve the problem are clearly defined, and technical assistance is available.

In community-based protection, citizens have more control and are therefore more likely to participate in the program and be more willing to assist with the educational and outreach effort which will make the plan successful. We recommend that the protection plan be developed so as to minimize any burdens on individual property owners, but maximize the equity in responsibility for reducing the risks of future contamination.

Protecting the drinking water supply in a community can also be a very effective way to encourage all citizens to participate in issues which directly affect everyone in that community. This often leads to more public involvement in other significant local decisions concerning future livability issues, e.g., land use planning. In communities already developing and implementing Drinking Water Protection Plans, the process has served to bring many diverse interests together on a common goal and strengthen the local rural and urban relationships through communication and increased understanding. The risks and sources of water quality problems are not only from industries, farmers, and managed forest, but every individual living, commuting, and working in that area.

Communities/water systems interested in developing Drinking Water Protection Plans may contact the Department of Environmental Quality (503-229-5413) or the DHS Drinking Water Program (541-726-2587) for further information.

Appendices

References

Figures

Inventory of Potential Contaminant Sources

Well Reports

Parameters Used in Delineation Model

Groundwater Fact Sheet

BMPs for Activities Commonly found in Drinking Water Protection Areas

Drinking Water Protection in Oregon

Source Water Assessment Methodology

Additional copies of the Appendix materials are available upon written request to the following address:

Groundwater Coordinator
Drinking Water Program
Department of Human Services
444 A Street
Springfield, OR 97477

References

Blandford, T. N. and Huyakorn, P. S., 1991. WHPA: A Modular Semi-Analytical Model for the Delineation of Wellhead Protection Areas. U.S. Environmental Protection Agency Contract No. 68-08-0003.

Gonthier, J.B., 1985. A Description of Aquifer Units in Eastern Oregon. U.S. Geological Survey Water-Resources Investigations Report 84-4095.

Stewart, S. and Nelson, D., 1996. Oregon Wellhead Protection Program Guidance Manual. Oregon Department of Environmental Quality (available at http://www.deq.state.or.us/wq/dwp/dwphome.htm).

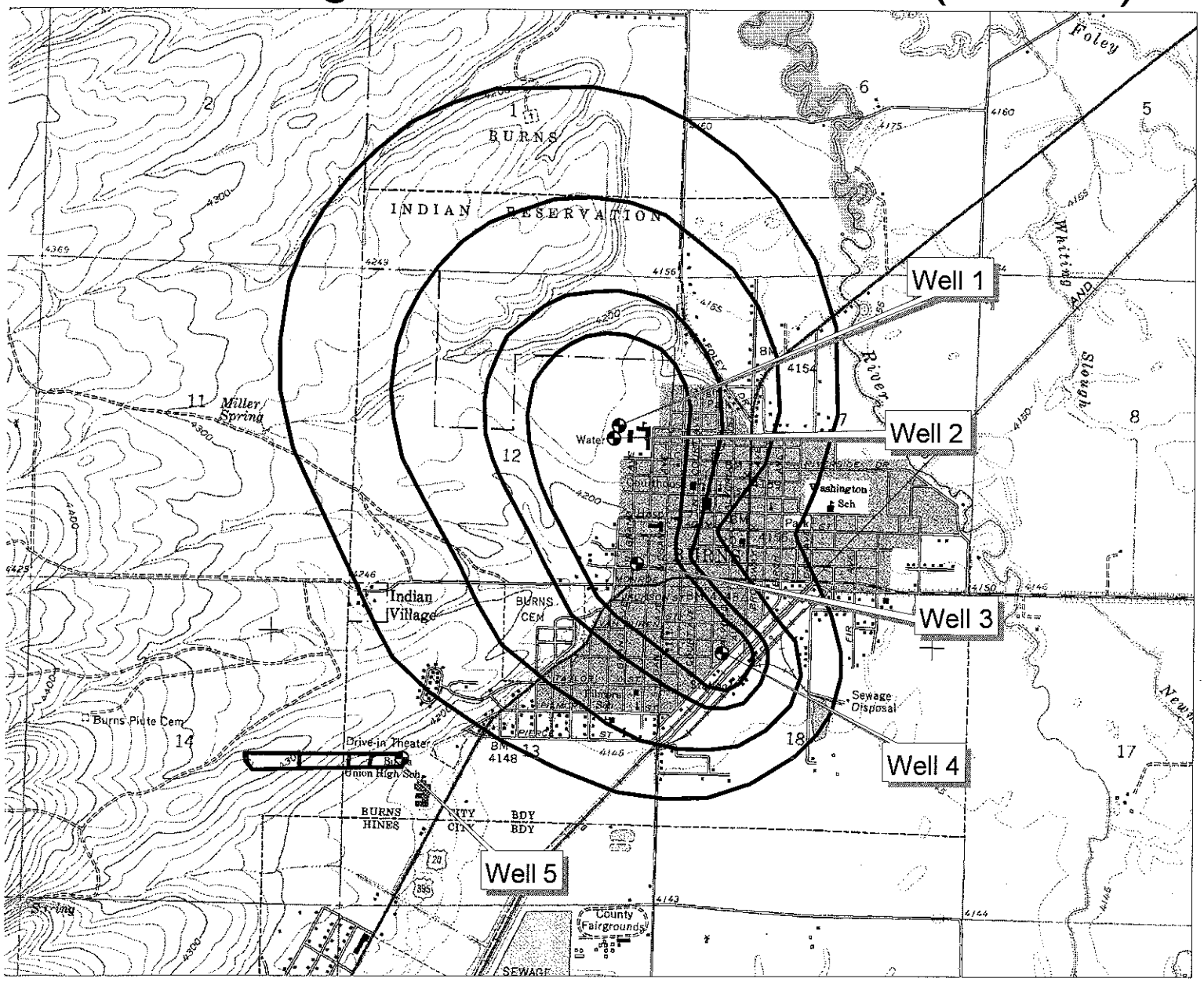
Stewart, S. and Nelson, D., 1999. Oregon Source Water Assessment Plan. Oregon Department of Environmental Quality.

Walker, G.W. and MacLeod, N.S., 1991. Geologic Map of Oregon. U.S. Geological Survey.

Figures

Figure

Burns Water Department
Drinking Water Protection Area (DWPA)



Scale 1: 30,000

Drinking Water Protection Area (DWPA)
1, 2, 5, and 10 year Time-of-Travel (TOT)
for groundwater to move through the aquifer
to the wells shown
Analytical Model

Model Parameters
Aquifer: Confined layered volcanic rocks
Effective Porosity: 0.25
Water Use Gal/day: 1,729,115
Production Interval: 40 ft

Prepared by: Alison Schutt 9/27/99
Reviewed by: Dennis Nelson RG#: 1224
Drinking Water Program
Oregon Department of Human Services
File#: 4100153

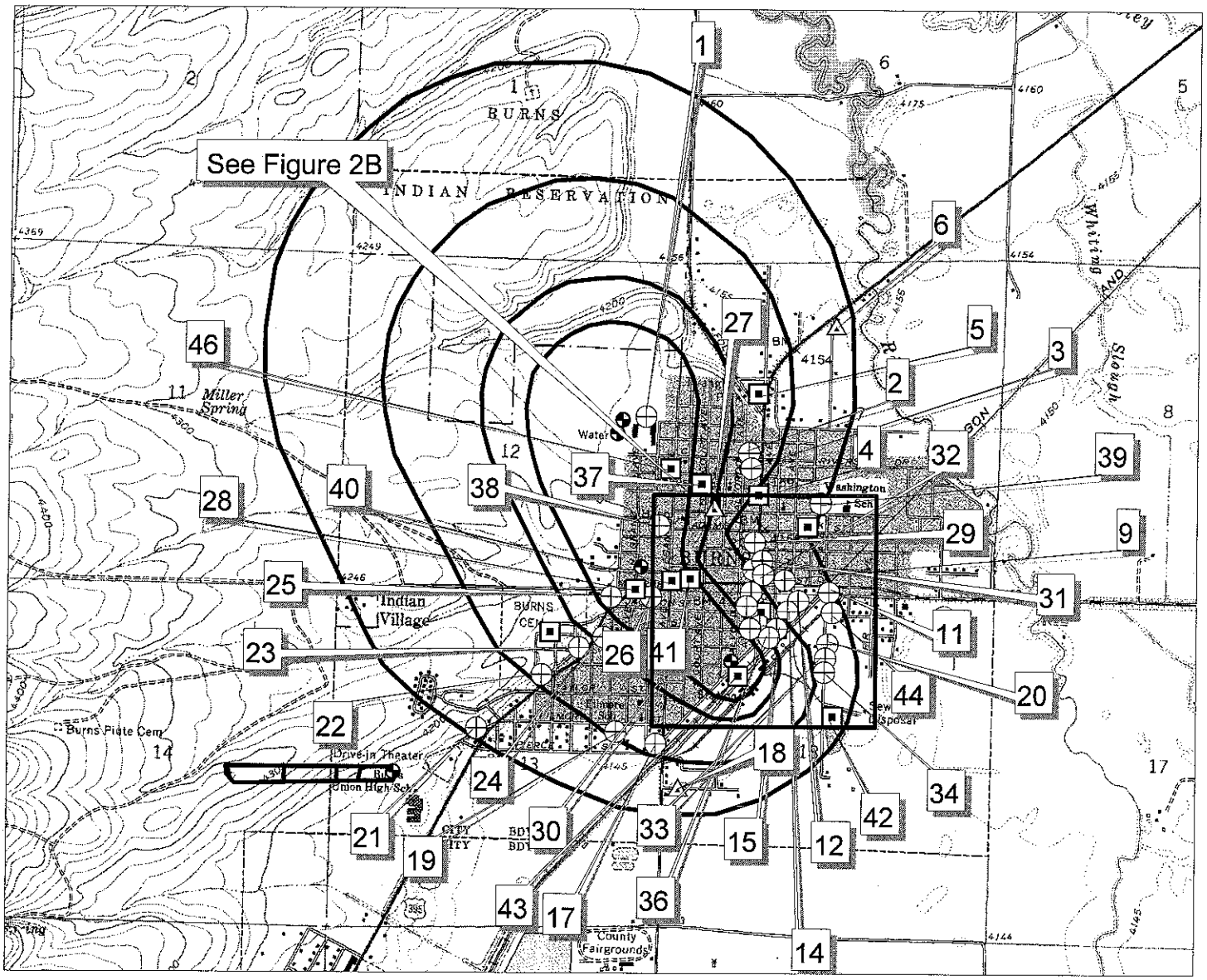
Well Locations (WGS1984 datum)
Well 1 43°35'34.178" N 119°03'46.075" W
Well 2 43°35'32.081" N 119°03'47.129" W
Well 3 43°35'11.740" N 119°03'41.080" W
Well 4 43°34'57.587 N" 119°03'21.223" W
Well 5 43°34'39.165" N 119°04'33.372" W
USGS Burns, OR Quadrangle (part section)

T23S R30E Secs 12 and 13;
T23S R 31E Sec 18

N

Figure 2A

Burns Water Department
Potential Contaminant Sources



3000 0 3000 6000 Feet

Scale 1: 30,000

Drinking Water Protection Area (DWPA)
Delineation Method: 2-Dimensional
Analytical model (RESSQC)

Prepared by: Kylee Godfrey 9/30/04
Project Manager: Dennis Nelson
RG# 1224
File# 4100153

N

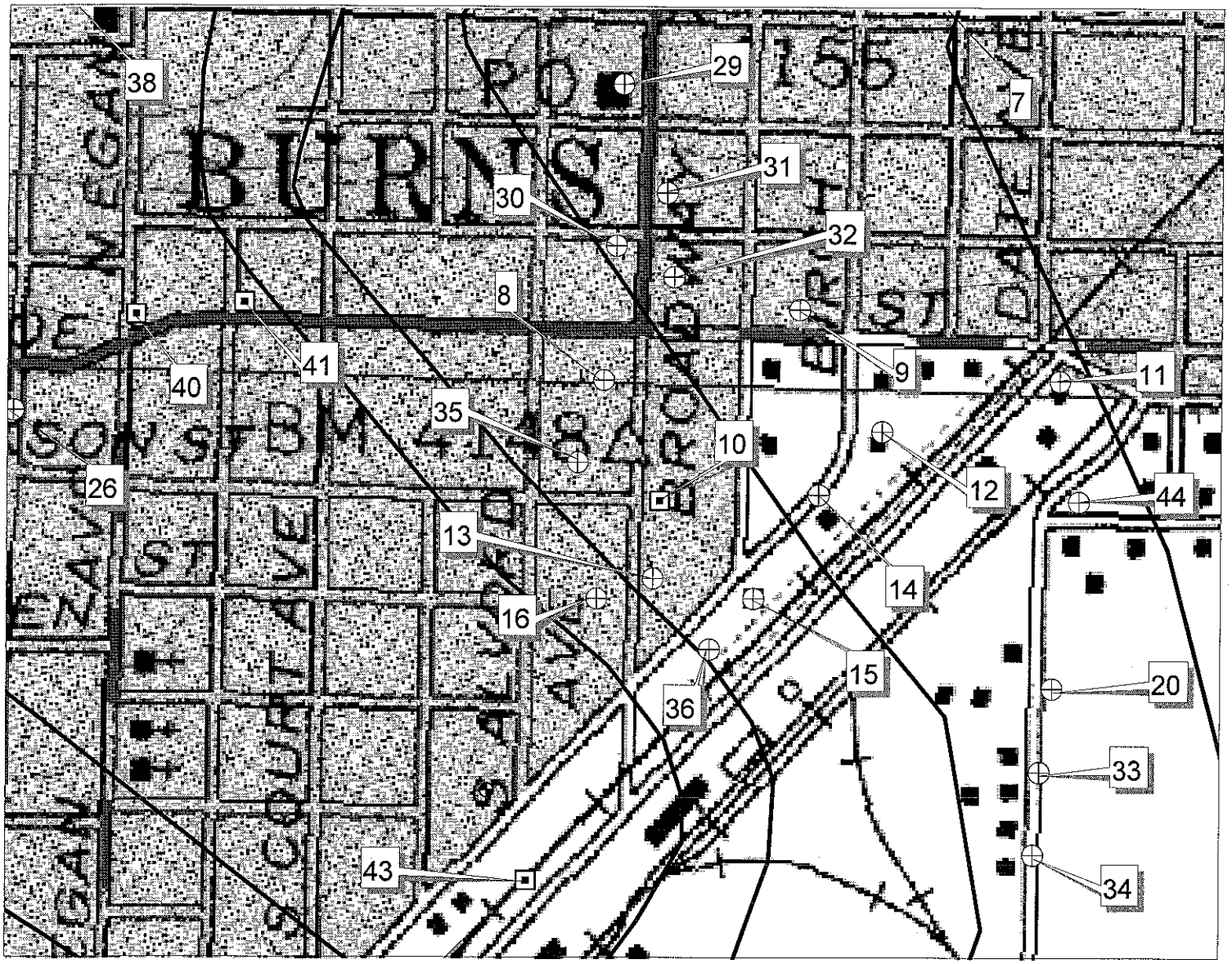
Potential Contaminant Sources
- ⊕ **Higher Relative Risk**
- ▣ **Moderate Relative Risk**
- △ **Low Relative Risk**

Note: Sites and areas noted in this figure are potential sources of contamination to the drinking water identified by Oregon drinking water protection staff. Environmental contamination is not likely to occur when chemicals are used and managed properly.

Numbers indicate potential contaminant sources which are explained in the Appendix.

Figure 2B

Burns Water Department
Potential Contaminant Sources



Drinking Water Protection Area (DWPA)
Delineation Method: 2-Dimensional
Analytical model (RESSQC)

Prepared by: Kylee Godfrey 9/30/04
Project Manager: Dennis Nelson
RG# 1224
File# 4100153

N

Potential Contaminant Sources
- ⊕ **Higher Relative Risk**
- ▣ **Moderate Relative Risk**
- ⚠ **Low Relative Risk**

Note: Sites and areas noted in this figure are potential sources of contamination to the drinking water identified by Oregon drinking water protection staff. Environmental contamination is not likely to occur when chemicals are used and managed properly.

Numbers indicate potential contaminant sources which are explained in the Appendix.

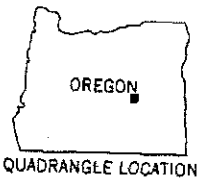
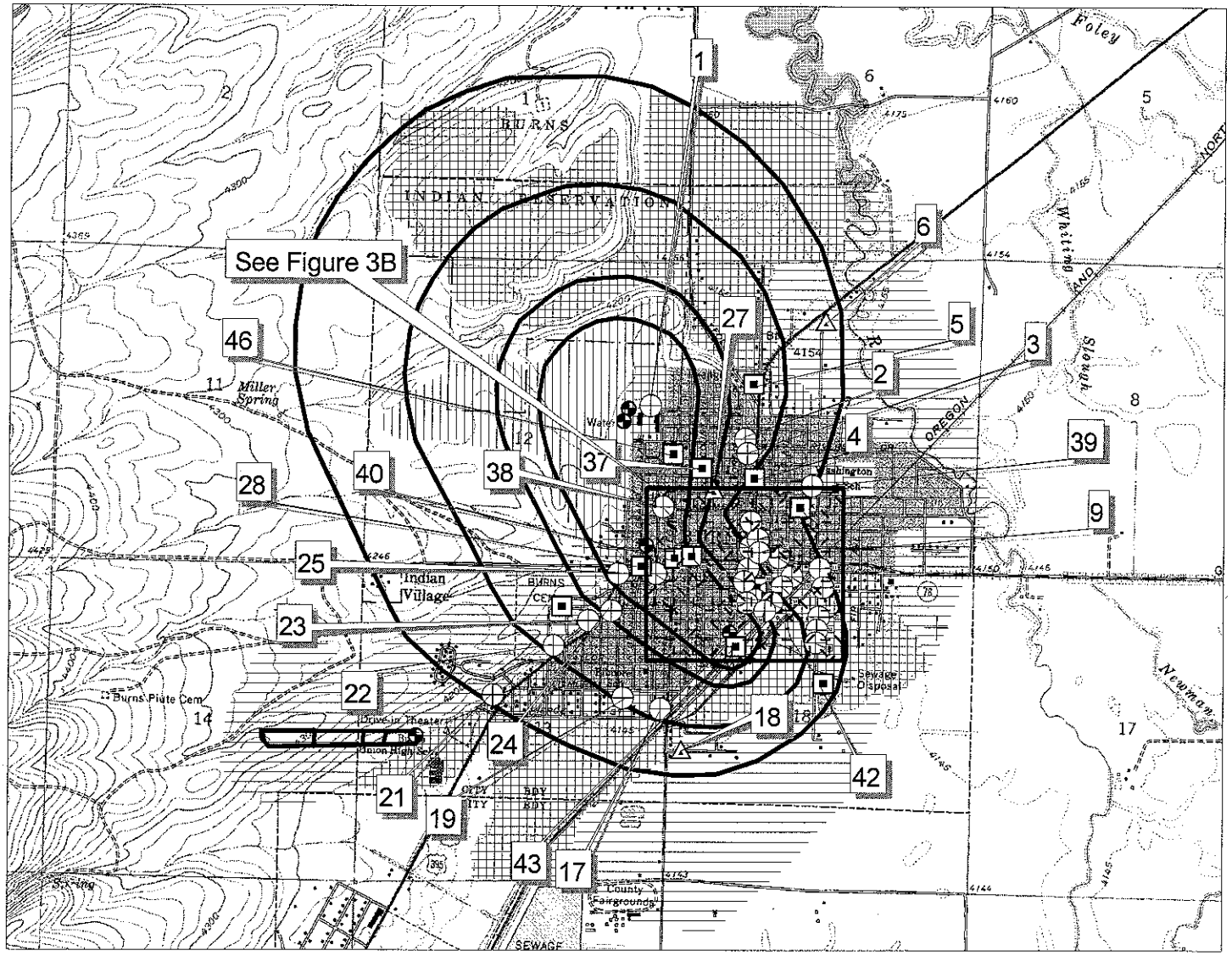


Figure 3A

Burns Water Department
Drinking Water Source Susceptibility



Drinking Water Protection Area (DWPA) 1, 2, 5, and 10 Year Time of Travel (TOT) Analytical Model

Potential Contaminant Sources
- **Higher Relative Risk**
- **Moderate Relative Risk**
- **Low Relative Risk**

Sensitivity Analysis
- **High Soil Sensitivity**
- **Medium Soil Sensitivity**
- **Low Soil Sensitivity**

Note: Sites and areas noted in this figure are potential sources of contamination to the drinking water as identified by Oregon Drinking Water Protection Staff.
Environmental contamination is not likely to occur when chemicals are used and managed properly.

Features or activities that are identified as high or moderate risk that occur within an area designated as high or moderate sensitivity pose a greater risk to drinking water quality than those in areas of low sensitivity.

Numbers indicate potential contaminant sources indexed to the Appendix.

N

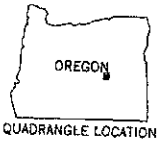
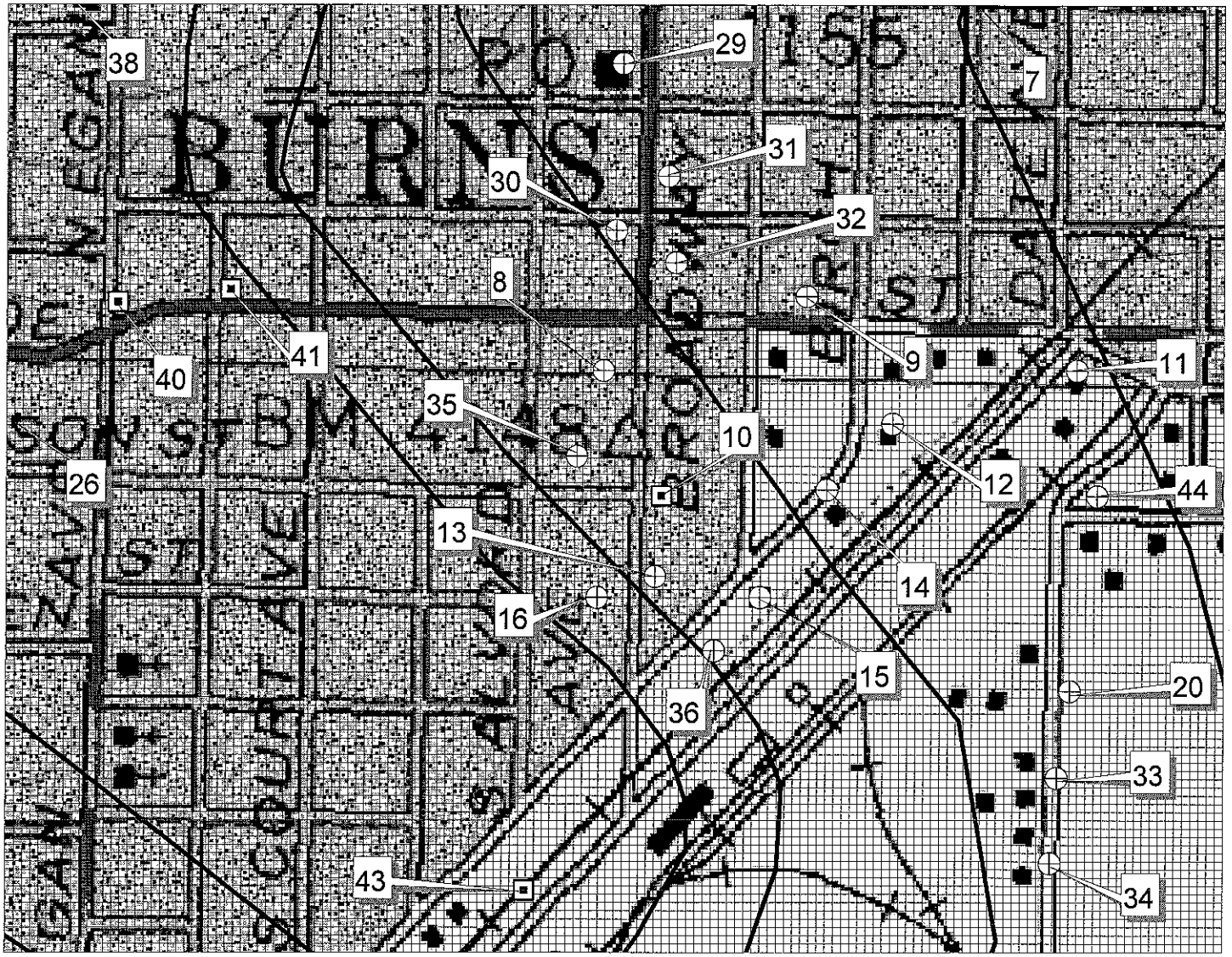


Figure 3B

Burns Water Department
Drinking Water Source Susceptibility



Drinking Water Protection Area (DWPA) 1, 2, 5, and 10 Year Time of Travel (TOT) Analytical Model

Potential Contaminant Sources
- ⊕ **Higher Relative Risk**
- ▣ **Moderate Relative Risk**
- △ **Low Relative Risk**

Sensitivity Analysis
- **High Soil Sensitivity**
- **Medium Soil Sensitivity**
- **Low Soil Sensitivity**

Note: Sites and areas noted in this figure are potential sources of contamination to the drinking water as identified by Oregon Drinking Water Protection Staff.
Environmental contamination is not likely to occur when chemicals are used and managed properly.

Features or activities that are identified as high or moderate risk that occur within an area designated as high or moderate sensitivity pose a greater risk to drinking water quality than those in areas of low sensitivity.

Numbers indicate potential contaminant sources indexed to the Appendix.

N

APPENDIX C - INVENTORY OF POTENTIAL CONTAMINANT SOURCES
BURNS WATER DEPARTMENT - PWS # 4100153
OREGON SOURCE WATER ASSESSMENT

Inventory Results

Table 1. Summary of Potential Contaminant Sources by Land Use

Table 2. Inventory Results - List of Potential Contaminant Sources

Table 3. Results of Regulatory Database Search

Notes for Tables:

Sites and areas identified in these Tables are only potential sources of contamination to the drinking water. Environmental contamination is not likely to occur when contaminants are used and managed properly.

Total number of sources listed in Table 1 in the DWPA may not add up to the total number of potential contaminants sources in Table 2 because more than one type of potential contaminant source may be present at any given facility.

Data collected by Debbie Croom Oregon DEQ on 07/11/2000.

Acronyms:

AST - Aboveground Storage Tank
DC - DEQ's Dry Cleaner database
DEQ - Oregon Department of Environmental Quality
DWPA - Drinking Water Protection Area
ECSI - DEQ's Environmental Cleanup Site Information database
HWIMSY - DEQ's Hazardous Waste Information Management System database
LUST - DEQ's Leaking Underground Storage Tank database
NPDES - National Pollution Discharge Elimination System
PCS - Potential Contaminant Source
PWS - Public Water System
SFM - State Fire Marshall's database of hazardous materials
SIS - DEQ's Source Information System database (includes WPCF & NPDES permits)
SWMS - DEQ's Solid Waste Management System database
UST - DEQ's Underground Storage Tank database or Underground Storage Tank
WPCF - Water Pollution Control Facility
WRD - Oregon Water Resources Division database for water rights information

TABLE 1. SUMMARY OF POTENTIAL CONTAMINANT SOURCES BY LAND USE

PWS # 4100153 BURNS WATER DEPARTMENT

Residential/Municipal Land Uses

Potential Contamination Source	Notes	Relative Risk Level	Total in DWPA
Airport - Maintenance/Fueling Area		Higher	0
Apartments and Condominiums		Lower	0
Campgrounds/RV Parks	(1)	Lower	0
Cemeteries - Pre-1945		Moderate	1
Drinking Water Treatment Plants		Moderate	0
Fire Station		Lower	1
Fire Training Facilities		Moderate	0
Golf Courses		Moderate	0
Housing - High Density (> 1 House/0.5 acres)		Moderate	1
Landfill/Dumps	(1)	Higher	0
Lawn Care - Highly Maintained Areas		Moderate	0
Motor Pools		Moderate	0
Parks		Moderate	2
Railroad Yards/Maintenance/Fueling Areas		Higher	0
Schools		Lower	3
Septic Systems - High Density (> 1 system/acre)	(1)	Higher	0
Sewer Lines - Close Proximity to PWS	(1)	Higher	0
Utility Stations - Maintenance Transformer Storage		Higher	3
Waste Transfer/Recycling Stations	(1)	Moderate	0
Wastewater Treatment Plants/Collection Stations	(1)	Moderate	1
Other			0

NOTES:
Sites and areas identified in this Table are only potential sources of contamination to the drinking water. Environmental contamination is not likely to occur when contaminants are used and managed properly.
(1) - Potential source of microbial contamination
(2) - Drip irrigated crops, such as vineyards and some vegetables, are considered lower risk than spray irrigation
(3) - For groundwater public water systems, septic systems located within the 2-year time-of-travel (TOT) are considered moderate risks.

TABLE 1. SUMMARY OF POTENTIAL CONTAMINANT SOURCES BY LAND USE

PWS # 4100153 BURNS WATER DEPARTMENT

Commercial/Industrial Land Uses

Potential Contamination Source	Notes	Relative Risk Level	Total in DWPA
Automobiles - Body Shops		Higher	0
Automobiles - Car Washes		Moderate	0
Automobiles - Gas Stations		Higher	4
Automobiles - Repair Shops		Higher	8
Boat Services/Repair/Refinishing		Higher	0
Cement/Concrete Plants		Moderate	0
Chemical/Petroleum Processing/Storage		Higher	3
Dry Cleaners		Higher	0
Electrical/Electronic Manufacturing		Higher	0
Fleet/Trucking/Bus Terminals		Higher	3
Food Processing		Moderate	0
Furniture/Lumber/Parts Stores		Moderate	5
Home Manufacturing		Higher	0
Junk/Scrap/Salvage Yards		Higher	0
Machine Shops		Higher	0
Medical/Vet Offices	(1)	Moderate	0
Metal Plating/Finishing/Fabrication		Higher	2
Mines/Gravel Pits		Higher	1
Office Buildings/Complexes		Lower	0
Parking Lots/Malls (> 50 Spaces)		Higher	0
Photo Processing/Printing		Higher	0
Plastics/Synthetics Producer		Higher	0
Research Laboratories		Higher	0
RV/Mini Storage		Lower	2
Wood Preserving/Treating		Higher	0
Wood/Pulp/Paper Processing and Mills		Higher	0
Other			0

NOTES:
Sites and areas identified in this Table are only potential sources of contamination to the drinking water.
Environmental contamination is not likely to occur when contaminants are used and managed properly.
(1) - Potential source of microbial contamination
(2) - Drip irrigated crops, such as vineyards and some vegetables, are considered lower risk than spray irrigation
(3) - For groundwater public water systems, septic systems located within the 2-year time-of-travel (TOT) are considered moderate risks.

TABLE 1. SUMMARY OF POTENTIAL CONTAMINANT SOURCES BY LAND USE

PWS # 4100153 BURNS WATER DEPARTMENT

Agricultural/Forest Land Uses

Potential Contamination Source	Notes	Relative Risk Level	Total in DWPA
Auction Lots	(1)	Higher	0
Boarding Stables	(1)	Moderate	0
Confined Animal Feeding Operations (CAFOs)	(1)	Higher	0
Crops - Irrigated (inc. orchards, vineyards, nurseries, greenhouses)	(2)	Moderate	0
Crops - Nonirrigated (inc. Christmas trees, grains, grass seed, pasture)		Lower	0
Farm Machinery Repair		Higher	0
Grazing Animals (> 5 large animals or equivalent/acre)	(1)	Moderate	0
Lagoons/Liquid Wastes	(1)	Higher	1
Land Application Sites	(1)	Moderate	1
Managed Forest Land - Broadcast Fertilized Areas		Lower	0
Managed Forest Land - Clearcut Harvest (< 35 yrs.)		Moderate	0
Managed Forest Land - Partial Harvest (< 10 yrs.)		Moderate	0
Managed Forest Land - Road Density (> 2 mi./sq. mi.)		Moderate	0
Pesticide/Fertilizer/Petroleum Storage, Handling, Mixing, & Cleaning Ar		Higher	0
Recent Burn Areas (< 10 yrs.)		Lower	0
Managed Forest Lands - Status Unknown		Moderate	0
Other			0

NOTES:
Sites and areas identified in this Table are only potential sources of contamination to the drinking water.
Environmental contamination is not likely to occur when contaminants are used and managed properly.
(1) - Potential source of microbial contamination
(2) - Drip irrigated crops, such as vineyards and some vegetables, are considered lower risk than spray irrigation
(3) - For groundwater public water systems, septic systems located within the 2-year time-of-travel (TOT) are considered moderate risks.

TABLE 1. SUMMARY OF POTENTIAL CONTAMINANT SOURCES BY LAND USE

PWS # 4100153 BURNS WATER DEPARTMENT

Miscellaneous Land Uses

Potential Contamination Source	Notes	Relative Risk Level	Total in DWPA
Above Ground Storage Tanks - Excluding Water		Moderate	1
Channel Alterations - Heavy		Lower	0
Combined Sewer Outfalls	(1)	Lower	0
Stormwater Outfalls	(1)	Lower	0
Composting Facilities	(1)	Moderate	0
Historic Gas Stations		Higher	0
Historic Waste Dumps/Landfills	(1)	Higher	0
Homesteads - Rural - Machine Shops/Equipment Maintenance		Higher	0
Homesteads - Rural - Septic Systems (< 1/acre)	(1)(3)	Lower	0
Injection/Dry Wells, Sumps - Class V UICs	(1)	Higher	0
Kennels (> 20 Pens)	(1)	Lower	0
Military Installations		Higher	0
Random Dump Sites		Moderate	0
River Recreation - Heavy Use (inc. campgrounds)	(1)	Lower	0
Sludge Disposal Areas	(1)	Moderate	0
Stormwater Retention Basins	(1)	Moderate	0
Transmission Lines - Right-of-Ways		Lower	0
Transportation - Freeways/State Highways/Other Heavy Use Roads		Moderate	1
Transportation - Railroads		Moderate	1
Transportation - Right-Of-Ways - Herbicide Use Areas		Moderate	0
Transportation - River Traffic - Heavy		Lower	0
Transportation - Stream Crossing - Perennial		Lower	0
UST - Confirmed Leaking Tanks - DEQ List		Higher	10
UST - Decommissioned/Inactive		Lower	0
UST - Nonregulated Tanks (< 1,100 gals or Large Heating Oil Tanks)		Higher	0
UST - Not Upgraded and/or Registered Tanks		Higher	0
UST - Upgraded/Registered - Active		Lower	0
UST - Status Unknown		Higher	10
Upstream Reservoirs/Dams		Lower	0
Wells/Abandoned Wells		Higher	0
Large Capacity Septic Systems (serves > 20 people) - Class V UICs	(1)	Higher	0
Construction/Demolition Areas		Moderate	0
Other			0

NOTES:
Sites and areas identified in this Table are only potential sources of contamination to the drinking water. Environmental contamination is not likely to occur when contaminants are used and managed properly.
(1) - Potential source of microbial contamination
(2) - Drip irrigated crops, such as vineyards and some vegetables, are considered lower risk than spray irrigation
(3) - For groundwater public water systems, septic systems located within the 2-year time-of-travel (TOT) are considered moderate risks.

TABLE 2. INVENTORY RESULTS - LIST OF POTENTIAL CONTAMINANT SOURCES

PWS# 4100153 BURNS WATER DEPARTMENT

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive	Relative Risk Level (2)	Potential Impacts	Comments
1	Schools	Henry Slater School	Fairview St	Burns	Database (2) Field-Observation Interview	Within the 2-yr TOT.	Lower	Over-application or improper handling of cleaning products, pesticides or fertilizers used on the school grounds may impact drinking water. Vehicle maintenance wastes may contribute contaminants.	
	UST - Status Unknown						Higher	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	
2	Automobiles - Gas Stations	One-Stop Gas Station	C Street and Broadway	Burns	Database (2) Field-Observation Interview	Between 2-yr and 5-yr TOT.	Higher	Spills, leaks, or improper handling of fuels and other materials during transportation, transfer, and storage may impact the drinking water supply.	
	UST - Status Unknown						Higher	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	
3	Automobiles - Gas Stations	Sam's Service	Broadway	Burns	Database (2) Field-Observation Interview	Between 2-yr and 5-yr TOT.	Higher	Spills, leaks, or improper handling of fuels and other materials during transportation, transfer, and storage may impact the drinking water supply.	
	UST - Confirmed Leaking Tanks - DEQ List						Higher	Existing contamination from spills, leaks, or improper handling of stored materials may impact the drinking water supply.	
4	Furniture/Lumber/Parts Stores	Ranch Supply and Hardware	Broadway	Burns	Field-Observation Interview	Between 5-yr and 10-yr TOT	Moderate	Spills, leaks, or improper handling of hazardous chemical products and other materials in inventory during transportation, use, storage and disposal may impact the drinking water supply.	
5	Parks	City Park	Foley Dr.	Burns	Field-Observation	Between 5-yr and 10-yr TOT	Moderate	Over-application or improper handling of pesticides/fertilizers may impact drinking water. Excessive irrigation may cause transport of contaminants through runoff. Heavy use along edge of waterbody may contribute to erosion, causing turbidity.	
6	RV/Mini Storage	Village RV Park	North Date St	Burns	Field-Observation	Between 5-yr and 10-yr TOT	Lower	Spills, leaks, or improper handling of automotive fluids and other materials during transportation, storage and disposal may impact the drinking water supply.	

Note: Sites and areas identified in this Table are only potential sources of contamination to the drinking water. Environmental contamination is not likely to occur when contaminants are used and managed properly.

(1) Where multiple potential contaminant sources exist at a site, the highest level of risk is used.

(2) See Table 3 for database listings (if necessary).

TABLE 2. INVENTORY RESULTS - LIST OF POTENTIAL CONTAMINANT SOURCES

PWS# 4100153 BURNS WATER DEPARTMENT

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive	Relative Risk Level (2)	Potential Impacts	Comments
7	Parks	Washington Park	Washington St	Burns	Field-Observation	Between 5-yr and 10-yr TOT	Moderate	Over-application or improper handling of pesticides/fertilizers may impact drinking water. Excessive irrigation may cause transport of contaminants through runoff. Heavy use along edge of waterbody may contribute to erosion, causing turbidity.	
8	Automobiles - Gas Stations	Swarthout Shell Station	Broadway	Burns	Database (2) Field-Observation Interview	Between 2-yr and 5-yr TOT.	Higher	Spills, leaks, or improper handling of fuels and other materials during transportation, transfer, and storage may impact the drinking water supply.	
	UST - Confirmed Leaking Tanks - DEQ List						Higher	Existing contamination from spills, leaks, or improper handling of stored materials may impact the drinking water supply.	
9	Automobiles - Repair Shops	J&F Auto Repair	Monroe	Burns	Database (2) Field-Observation	Between 5-yr and 10-yr TOT	Higher	Spills, leaks, or improper handling of automotive fluids, solvents, and repair materials during transportation, use, storage and disposal may impact the drinking water supply.	
10	Furniture/Lumber/Parts Stores	Parr Lumber	Broadway	Burns	Database (2) Field-Observation	Between 2-yr and 5-yr TOT.	Moderate	Spills, leaks, or improper handling of hazardous chemical products and other materials in inventory during transportation, use, storage and disposal may impact the drinking water supply.	
11	Chemical/Petroleum Processing/Storage	Weeks Oil Company	Date St	Burns	Database (2) Field-Observation Interview	Between 5-yr and 10-yr TOT	Higher	Spills, leaks, or improper handling of chemicals and other materials during transportation, use, storage and disposal may impact the drinking water supply.	
12	Utility Stations - Maintenance Transformer Storage	Burns Electric	Railroad Ave	Burns	Field-Observation	Between 5-yr and 10-yr TOT	Higher	Spills, leaks, or improper handling of chemicals and other materials including PCBs during transportation, use, storage and disposal may impact the drinking water supply.	
13	Metal Plating/Finishing/Fabrication	Alan's Welding	Broadway	Burns	Database (2) Field-Observation	Between 2-yr and 5-yr TOT.	Higher	Spills, leaks, or improper handling of solvents, metals, and other chemicals during transportation, use, storage and disposal may impact the drinking water supply.	

Note: Sites and areas identified in this Table are only potential sources of contamination to the drinking water. Environmental contamination is not likely to occur when contaminants are used and managed properly.

(1) Where multiple potential contaminant sources exist at a site, the highest level of risk is used.

(2) See Table 3 for database listings (if necessary).

TABLE 2. INVENTORY RESULTS - LIST OF POTENTIAL CONTAMINANT SOURCES

PWS# 4100153 BURNS WATER DEPARTMENT

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive	Relative Risk Level (2)	Potential Impacts	Comments
14	Automobiles - Repair Shops	C&C Truck & Auto Repair	Railroad Ave	Burns	Field-Observation	Between 5-yr and 10-yr TOT	Higher	Spills, leaks, or improper handling of automotive fluids, solvents, and repair materials during transportation, use, storage and disposal may impact the drinking water supply.	
15	Furniture/Lumber/Parts Stores	Harney County Farm Supply	Industrial Ave	Burns	Database (2) Field-Observation	Between 2-yr and 5-yr TOT.	Moderate	Spills, leaks, or improper handling of hazardous chemical products and other materials in inventory during transportation, use, storage and disposal may impact the drinking water supply.	
	UST - Status Unknown						Higher	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	
16	UST - Status Unknown	City Hall and Fire Station	Broadway	Burns	Database (2) Field-Observation	Between 2-yr and 5-yr TOT.	Higher	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	
	Fire Station						Lower	Spills, leaks, or improper handling of chemicals and other materials during transportation, use, storage and disposal may impact the drinking water supply.	
	Fleet/Trucking/Bus Terminals						Higher	Spills, leaks, or improper handling of fuels, grease, solvents, and other materials from vehicle service, fueling, and parking areas may impact the drinking water supply.	
17	Utility Stations - Maintenance Transformer Storage	Oregon Trail Electric	Pierce St	Burns	Database (2) Field-Observation Interview	Between 2-yr and 5-yr TOT.	Higher	Spills, leaks, or improper handling of chemicals and other materials including PCBs during transportation, use, storage and disposal may impact the drinking water supply.	
18	RV/Mini Storage	Mini Storage	Egan St	Burns	Field-Observation	Between 5-yr and 10-yr TOT	Lower	Spills, leaks, or improper handling of automotive fluids and other materials during transportation, storage and disposal may impact the drinking water supply.	

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TABLE 2. INVENTORY RESULTS - LIST OF POTENTIAL CONTAMINANT SOURCES

PWS# 4100153 BURNS WATER DEPARTMENT

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive	Relative Risk Level (2)	Potential Impacts	Comments
19	UST - Status Unknown	Filmore School	Filmore St	Burns	Database (2) Field-Observation Interview	Between 2-yr and 5-yr TOT.	Higher	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	
	Schools						Lower	Over-application or improper handling of cleaning products, pesticides or fertilizers used on the school grounds may impact drinking water. Vehicle maintenance wastes may contribute contaminants.	
20	Mines/Gravel Pits	Harney Rock & Paving	Date St	Burns	Database (2) Field-Observation Interview	Between 5-yr and 10-yr TOT	Higher	Spills, leaks, or improper handling of chemicals and wastes generated in mining operations or from heavy equipment may impact the drinking water supply.	
21	Automobiles - Repair Shops	Bennett Muffler & Repair	Oregon Ave	Burns	Database (2) Field-Observation	Between 5-yr and 10-yr TOT	Higher	Spills, leaks, or improper handling of automotive fluids, solvents, and repair materials during transportation, use, storage and disposal may impact the drinking water supply.	
22	Automobiles - Repair Shops	High Desert Performance Auto Repair	Hwy 20	Burns	Field-Observation	Between 2-yr and 5-yr TOT.	Higher	Spills, leaks, or improper handling of automotive fluids, solvents, and repair materials during transportation, use, storage and disposal may impact the drinking water supply.	
23	Metal Plating/Finishing/Fabrication	Rays Repair and Welding	Hwy 20	Burns	Field-Observation	Between 2-yr and 5-yr TOT.	Higher	Spills, leaks, or improper handling of solvents, metals, and other chemicals during transportation, use, storage and disposal may impact the drinking water supply.	
24	Automobiles - Repair Shops	Les Schwab	Hines Blvd	Burns	Database (2) Field-Observation	Within the 2-yr TOT.	Higher	Spills, leaks, or improper handling of automotive fluids, solvents, and repair materials during transportation, use, storage and disposal may impact the drinking water supply.	
25	Automobiles - Repair Shops	Plymouth Jeep Dealer Repair Shop	Hwy 20	Burns	Field-Observation	Within the 2-yr TOT.	Higher	Spills, leaks, or improper handling of automotive fluids, solvents, and repair materials during transportation, use, storage and disposal may impact the drinking water supply.	

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TABLE 2. INVENTORY RESULTS - LIST OF POTENTIAL CONTAMINANT SOURCES

PWS# 4100153 BURNS WATER DEPARTMENT

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive	Relative Risk Level (2)	Potential Impacts	Comments
26	UST - Confirmed Leaking Tanks - DEQ List	A-1 Machine & Radiator (Formerly Steve's Exxon)	Monroe St	Burns	Database (2) Field-Observation Interview	Within the 2-yr TOT.	Higher	Existing contamination from spills, leaks, or improper handling of stored materials may impact the drinking water supply.	
	Automobiles - Repair Shops						Higher	Spills, leaks, or improper handling of automotive fluids, solvents, and repair materials during transportation, use, storage and disposal may impact the drinking water supply.	
27	Schools	Lincoln Jr. High School	N. Court St	Burns	Database (2) Field-Observation Interview	Between 2-yr and 5-yr TOT.	Lower	Over-application or improper handling of cleaning products, pesticides or fertilizers used on the school grounds may impact drinking water. Vehicle maintenance wastes may contribute contaminants.	
28	Transportation - Freeways/State Highways/Other Heavy Use Roads	Highway 20	runs through DWPA	Burns	Field-Observation	Within the 2-yr TOT.	Moderate	Vehicle use increases the risk for leaks or spills of fuel & other haz. materials. Road building, maintenance & use can increase erosion/slope failure causing turbidity. Over-application or improper handling of pesticides/fertilizers may impact water.	
29	UST - Confirmed Leaking Tanks - DEQ List	Burns Post Office	Broadway	Burns	Database (2) Field-Observation	Between 5-yr and 10-yr TOT	Higher	Existing contamination from spills, leaks, or improper handling of stored materials may impact the drinking water supply.	
30	Automobiles - Repair Shops	Quality Quick Service	Broadway	Burns	Database (2) Field-Observation	Between 5-yr and 10-yr TOT	Higher	Spills, leaks, or improper handling of automotive fluids, solvents, and repair materials during transportation, use, storage and disposal may impact the drinking water supply.	
	UST - Confirmed Leaking Tanks - DEQ List						Higher	Existing contamination from spills, leaks, or improper handling of stored materials may impact the drinking water supply.	
31	Automobiles - Gas Stations	Burns Chevron	Broadway & Madison	Burns	Database (2)	Between 5-yr and 10-yr TOT	Higher	Spills, leaks, or improper handling of fuels and other materials during transportation, transfer, and storage may impact the drinking water supply.	
	UST - Confirmed Leaking Tanks - DEQ List						Higher	Existing contamination from spills, leaks, or improper handling of stored materials may impact the drinking water supply.	

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TABLE 2. INVENTORY RESULTS - LIST OF POTENTIAL CONTAMINANT SOURCES

PWS# 4100153 BURNS WATER DEPARTMENT

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive	Relative Risk Level (2)	Potential Impacts	Comments
32	UST - Confirmed Leaking Tanks - DEQ List	Burns Ford	Broadway	Burns	Database (2) Field-Observation	Between 5-yr and 10-yr TOT	Higher	Existing contamination from spills, leaks, or improper handling of stored materials may impact the drinking water supply.	
	UST - Status Unknown						Higher	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	
33	UST - Confirmed Leaking Tanks - DEQ List	Harney County Shop	S. Date St	Burns	Database (2) Field-Observation	Between 5-yr and 10-yr TOT	Higher	Existing contamination from spills, leaks, or improper handling of stored materials may impact the drinking water supply.	
	Fleet/Trucking/Bus Terminals						Higher	Spills, leaks, or improper handling of fuels, grease, solvents, and other materials from vehicle service, fueling, and parking areas may impact the drinking water supply.	
34	Fleet/Trucking/Bus Terminals	Oregon State Highway Dept	S. Date St	Burns	Database (2) Field-Observation	Between 5-yr and 10-yr TOT	Higher	Spills, leaks, or improper handling of fuels, grease, solvents, and other materials from vehicle service, fueling, and parking areas may impact the drinking water supply.	
35	UST - Status Unknown	US West	Broadway and Jackson	Burns	Database (2) Field-Observation	Between 2-yr and 5-yr TOT.	Higher	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	
	Utility Stations - Maintenance Transformer Storage						Higher	Spills, leaks, or improper handling of chemicals and other materials including PCBs during transportation, use, storage and disposal may impact the drinking water supply.	
36	Chemical/Petroleum Processing/Storage	Unocal Bulk Plant	Industrial Ave	Burns	Database (2) Field-Observation	Between 2-yr and 5-yr TOT.	Higher	Spills, leaks, or improper handling of chemicals and other materials during transportation, use, storage and disposal may impact the drinking water supply.	
	UST - Status Unknown						Higher	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	
	UST - Confirmed Leaking Tanks - DEQ List						Higher	Existing contamination from spills, leaks, or improper handling of stored materials may impact the drinking water supply.	

Note: Sites and areas identified in this Table are only potential sources of contamination to the drinking water. Environmental contamination is not likely to occur when contaminants are used and managed properly.

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TABLE 2. INVENTORY RESULTS - LIST OF POTENTIAL CONTAMINANT SOURCES

PWS# 4100153 BURNS WATER DEPARTMENT

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive	Relative Risk Level (2)	Potential Impacts	Comments
37	Above Ground Storage Tanks - Excluding Water	Harney County Jail	Court Ave	Burns	Database (2) Field-Observation Interview	Within the 2-yr TOT.	Moderate	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	
38	UST - Status Unknown	Harney District Hospital	Washington St	Burns	Database (2) Field-Observation	Within the 2-yr TOT.	Higher	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	
39	UST - Status Unknown	Harney School Dist. #3	Washington St	Burns	Database (2) Field-Observation Interview	Between 5-yr and 10-yr TOT	Higher	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	
40	Furniture/Lumber/Parts Stores	A Parts Store	Monroe St	Burns	Database (2) Field-Observation Interview	Within the 2-yr TOT.	Moderate	Spills, leaks, or improper handling of hazardous chemical products and other materials in inventory during transportation, use, storage and disposal may impact the drinking water supply.	
41	Furniture/Lumber/Parts Stores	Burns Auto & Truck Supply	Monroe St	Burns	Database (2) Field-Observation Interview	Within the 2-yr TOT.	Moderate	Spills, leaks, or improper handling of hazardous chemical products and other materials in inventory during transportation, use, storage and disposal may impact the drinking water supply.	
42	Lagoons/Liquid Wastes	Burns Sewage Treatment Plant	S. Date St	Burns	Database (2) Field-Observation Interview	Between 5-yr and 10-yr TOT	Higher	Improper seepage or overflows of liquid wastes may impact the drinking water supply.	
	Land Application Sites						Moderate	Improper management of sludge and wastewater may impact drinking water supply.	
	Wastewater Treatment Plants/Collection Stations						Moderate	Improper management of wastewater, treatment chemicals, or equipment maintenance materials may impact drinking water supply.	
43	Transportation - Railroads	Railroad	runs through DWPA	Burns	Field-Observation	Within the 2-yr TOT.	Moderate	Rail transport elevates the risk for leaks/spills of fuel & other haz. materials. Installation/maintenance of tracks may increase erosion & slope failure causing turbidity. Over-application/improper handling of pesticides may impact the water supply.	

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TABLE 2. INVENTORY RESULTS - LIST OF POTENTIAL CONTAMINANT SOURCES

PWS# 4100153 BURNS WATER DEPARTMENT

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive	Relative Risk Level (2)	Potential Impacts	Comments
44	UST - Confirmed Leaking Tanks - DEQ List Chemical/Petroleum Processing/Storage	Bennetts Bulk Plant	Off of Monroe	Burns	Database (2) Field-Observation	Between 5-yr and 10-yr TOT	Higher Higher	Existing contamination from spills, leaks, or improper handling of stored materials may impact the drinking water supply. Spills, leaks, or improper handling of chemicals and other materials during transportation, use, storage and disposal may impact the drinking water supply.	
45	Cemeteries - Pre-1945	Burns Cemetery	Hwy 20	Burns	Field-Observation	Between 2-yr and 5-yr TOT.	Moderate	Embalming fluids (for example, arsenic) and decomposition by-products may impact drinking water supply.	
46	Housing - High Density (> 1 House/0.5 acres)	Housing high-density	throughout DWPA	Burns	Field-Observation	Within the 2-yr TOT.	Moderate	Improper use, storage, and disposal of household chemicals may impact the drinking water supply. Stormwater run-off or infiltration may carry contaminants to drinking water supply.	

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TABLE 3. RESULTS OF REGULATORY DATABASE SEARCH

PWS# 4100153 BURNS WATER DEPARTMENT

Reference No. (1)	Name	Database Listings (2)
1	Henry Slater School	SFM - CLEANING SUPPLIES stored in CAN
		SFM - DIESEL FUEL stored in TANK INSIDE BUILDING
		SFM - DUPLICATING FLUID stored in CAN
		SFM - HEATING FUEL #2 stored in UNDERGROUND TANK
		SFM - PAINT stored in CAN
		UST list-PWS needs to verify tank permit status
		SFM - BOWL CLEANER stored in PLASTIC OR NON-METALLIC DRUM
2	One-Stop Gas Station	SFM - MOTOR OIL stored in ABOVEGROUND TANK
		UST list with a status of 3 UST(s) upgraded and 0 not upgraded to DEQ 1998 technical standards.
		SFM - GASOLINE stored in UNDERGROUND TANK
		SFM - DIESEL stored in ABOVEGROUND TANK
		LUST list with unknown status
3	Sam's Service	SFM - UNLEADED GASOLINE stored in ABOVEGROUND TANK
		UST list-PWS needs to verify tank permit status
		LUST cleanup initiated on 03/21/1991. PWS should verify cleanup progress.
8	Swarthout Shell Station	UST list with a status of 3 UST(s) upgraded and 0 not upgraded to DEQ 1998 technical standards.
		LUST cleanup initiated on 10/04/1997. PWS should verify cleanup progress.
		SFM - ANTIFREEZE stored in ABOVEGROUND TANK
		SFM - DIESEL stored in UNDERGROUND TANK

Notes: (1) See Table 2 and Figure. (2) For State Fire Marshals (SFM) list, information on materials in a gaseous-form is not presented since gaseous compounds rarely pose a threat to groundwater or surface water.

TABLE 3. RESULTS OF REGULATORY DATABASE SEARCH

PWS# 4100153 BURNS WATER DEPARTMENT

Reference No. (1)	Name	Database Listings (2)
8	Swarthout Shell Station	SFM - GASOLINE stored in UNDERGROUND TANK
		SFM - KEROSENE stored in STEEL DRUM
		SFM - MOTOR OIL stored in CAN
		SFM - WASTE MOTOR OIL stored in ABOVEGROUND TANK
9	J&F Auto Repair	SFM - PAINTS-SHERMAN WILLIAMS stored in CAN
10	Parr Lumber	SFM - CEMENT PREMIX stored in BAG
		SFM - HYDRATED LIME stored in BAG
		SFM - MORTAR MIX stored in BAG
		SFM - PORTLAND CEMENT stored in BAG
11	Weeks Oil Company	SFM - TRANSMISSION FLUID stored in STEEL DRUM
		SFM - ANTIFREEZE stored in ABOVEGROUND TANK
		SFM - CHEVRON GREASES LUBRICANTS (VARIOUS) stored in CAN
		SFM - DIESEL FUEL stored in ABOVEGROUND TANK
		SFM - GASOLINE stored in ABOVEGROUND TANK
		SFM - MOTOR OIL stored in STEEL DRUM
		SFM - SOLVENT stored in STEEL DRUM
13	Alan's Welding	ECSI site with no further state action required.
15	Harney County Farm Supply	SFM - MONO-AMMONIUM PHOSPHATE stored in OTHER
		SFM - UREA stored in OTHER
		UST list-PWS needs to verify tank permit status
		SFM - AMMONIUM SULFATE stored in OTHER

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TABLE 3. RESULTS OF REGULATORY DATABASE SEARCH

PWS# 4100153 BURNS WATER DEPARTMENT

Reference No. (1)	Name	Database Listings (2)
16	City Hall and Fire Station	UST list-PWS needs to verify tank permit status
17	Oregon Trail Electric	HWIMSY list as a conditionally exempt generator.
		SFM - POLYCHLORINATED BIPHENYLS stored in STEEL DRUM
19	Filmore School	SFM - HEATING OIL stored in UNDERGROUND TANK
20	Harney Rock & Paving	SFM - SOLVENT stored in STEEL DRUM
		SFM - ANTIFREEZE stored in STEEL DRUM
		SFM - ASPHALT BASE stored in ABOVEGROUND TANK
		SFM - DIESEL #2 stored in ABOVEGROUND TANK
		UST list-PWS needs to verify tank permit status
		SFM - GASOLINE stored in ABOVEGROUND TANK
21	Bennett Muffler & Repair	SFM - OIL (MOTOR, LUBE, BRAKE) stored in STEEL DRUM
24	Les Schwab	SFM - CALCIUM CHLORIDE stored in OTHER
		SFM - LEAD WHEEL WEIGHTS stored in BOX
		SFM - WHITE WALL CLEANER stored in STEEL DRUM
26	A-1 Machine & Radiator (Formerly Steve's Exxon)	ECSI site with no further state action required.
		LUST list with unknown status
		UST list-PWS needs to verify tank permit status
27	Lincoln Jr. High School	SFM - CLEANING SUPPLIES stored in CAN
		SFM - DIESEL HEATING FUEL #2 stored in TANK INSIDE BUILDING
29	Burns Post Office	LUST list with unknown status

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TABLE 3. RESULTS OF REGULATORY DATABASE SEARCH

PWS# 4100153 BURNS WATER DEPARTMENT

Reference No. (1)	Name	Database Listings (2)
29	Burns Post Office	LUST cleanup initiated on 05/29/1991. PWS should verify cleanup progress.
30	Quality Quick Service	LUST list with unknown status UST list-PWS needs to verify tank permit status
31	Burns Chevron	LUST cleanup initiated on 08/11/1998. PWS should verify cleanup progress.
32	Burns Ford	LUST list with unknown status SFM - KEROSENE stored in STEEL DRUM SFM - SOLVENT stored in STEEL DRUM UST list-PWS needs to verify tank permit status
33	Harney County Shop	SFM - OIL stored in STEEL DRUM UST list-PWS needs to verify tank permit status LUST list with unknown status SFM - DIESEL FUEL stored in UNDERGROUND TANK
34	Oregon State Highway Dept	LUST cleanup initiated on 06/11/1993. PWS should verify cleanup progress. SFM - ANTIFREEZE stored in STEEL DRUM SFM - GREASE 2 stored in STEEL DRUM SFM - HYDRAULIC OIL stored in STEEL DRUM SFM - MOTOR OIL stored in STEEL DRUM UST list-PWS needs to verify tank permit status
36	Unocal Bulk Plant	ECSI site with a confirmed release. LUST list with unknown status UST list-PWS needs to verify tank permit status

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TABLE 3. RESULTS OF REGULATORY DATABASE SEARCH

PWS# 4100153 BURNS WATER DEPARTMENT

Reference No. (1)	Name	Database Listings (2)
37	Harney County Jail	SFM - DIESEL FUEL stored in ABOVEGROUND TANK
		SFM - HEATING OIL stored in ABOVEGROUND TANK
38	Harney District Hospital	SFM - DIESEL #2 stored in UNDERGROUND TANK
39	Harney School Dist. #3	SFM - DIESEL HEATING FUEL #2 stored in UNDERGROUND TANK
40	A Parts Store	SFM - ANTIFREEZE stored in PLASTIC BOTTLES OR JUGS
		SFM - MOTOR OIL stored in PLASTIC BOTTLES OR JUGS
41	Burns Auto & Truck Supply	SFM - CLEANING SOLVENT stored in STEEL DRUM
		SFM - HEATING OIL stored in ABOVEGROUND TANK
		SFM - PAINT AUTOMOTIVE stored in CAN
		SFM - SOLVENT stored in CAN
		SFM - THINNER stored in CAN
42	Burns Sewage Treatment Plant	SIS list with a individual WPCF permit.
44	Bennetts Bulk Plant	UST list-PWS needs to verify tank permit status
		LUST list with unknown status

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STATE ENGINEER
Salem, Oregon

Well Record

STATE WELL NO. 23/30-12J(
COUNTY Harney
APPLICATION NO. G-1490

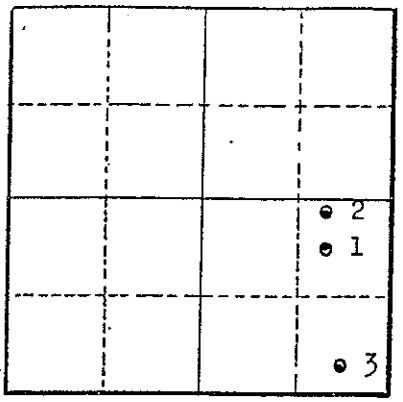
OWNER: City of Burns
MAILING ADDRESS:
CITY AND STATE: Burns, Oregon

LOCATION OF WELL: Owner's No. 1

NE ¼ SE ¼ Sec. 12 T. 23 ~~N.~~ S., R. 30 ~~E.~~ W., W.M.

Bearing and distance from section or subdivision corner 241' S. & 979' West from E¼ cor

Altitude at well



TYPE OF WELL: Drilled Date Constructed

Depth drilled 251 Depth cased 100

Section 12

CASING RECORD:
12-inch

FINISH:

AQUIFERS:

WATER LEVEL:
85

PUMPING EQUIPMENT: Type Turbine H.P. 50
Capacity 800 G.P.M. 1.85 c.f.s.

WELL TESTS:
Drawdown ft. after hours G.P.M.
Drawdown ft. after hours G.P.M.

USE OF WATER Public supply Temp. 57 °F. 19
SOURCE OF INFORMATION G-1490 Well 17 WSP 841
DRILLER or DIGGER
ADDITIONAL DATA:
Log Water Level Measurements Chemical Analysis Aquifer Test

REMARKS:

WELL NO. 2

A#G1490

File Original and First Copy with the STATE ENGINEER, SALEM, OREGON

WATER WELL REPORT
STATE OF OREGON

State Well No. 23/30-12J

State Permit No.

(1) OWNER:
Name: City of Burns
Address: Burns, Ore

(2) LOCATION OF WELL:
County: Harney — Owner's number, if any: #2
NE ¼ SE ¼ Section 12 T. 23 S R. 30 E W.M.
Bearing and distance from section or subdivision corner: S 0° 15' W 9' and W 90° 30' N 910' from the NE Corner of the SE ¼ Section 12

(3) TYPE OF WORK (check): Existing
New Well ☐ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 11.

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

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

(6) CASING INSTALLED: Threaded ☐ Welded ☐
12" Diam. from 0 ft. to 150 ft. Gage
" Diam. from ft. to ft. Gage
" Diam. from ft. to ft. Gage

(7) 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.
perforations from ft. to ft.
perforations from ft. to ft.

(8) SCREENS: Well screen installed ☐ Yes ☐ No
Manufacturer's Name: Fairbanks Morse
Type: 8" Suction — Model No. FM Co
Diam. Slot size Set from ft. to ft.
Diam. Slot size Set from ft. to ft.

(9) CONSTRUCTION:
Was well gravel packed? ☐ Yes ☐ No Size of gravel: Not Known
Gravel placed from ft. to ft.
Was a surface seal provided? ☒ Yes ☐ No To what depth? ? ft.
Material used in seal— Cement
Did any strata contain unusable water? ☒ Yes ☐ No
Type of water? ? Depth of strata ?
Method of sealing strata off: Casing

(10) WATER LEVELS:
Static level 85 ft. below land surface Date 12-10-58
Artesian pressure lbs. per square inch Date

Log Accepted by:
[Signed] City of Burns (Owner) Date 1926, 19

(11) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? ☒ Yes ☐ No If yes, by whom? A. A. Durand & Son
Yield: 800 gal./min. with 27 ft. drawdown after 4 hrs.
" " " "
" " " "
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m. Date
Temperature of water 58°F Was a chemical analysis made? ☒ Yes ☐ No

(12) WELL LOG: Diameter of well inches.
Depth drilled 253 ft. Depth of completed well ft.

Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
Log of well lost unable to secure city from drillers. OLD WELL RECORD NOT AVAILABLE TO DATA ACCORDING TO BEST OF MEMORY G.H.P. 8/1/59		

Work started 19 . Completed 1927 19

(13) PUMP:
Manufacturer's Name: Fairbanks Morse
Type: Deep Well Turbine H.P. 50

Well Driller's Statement:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME A. A. DURAND & SON (Person, firm, or corporation) (Type or print)
Address P.O. Box 437, Walla Walla, Wn
Driller's well number: City Well No. 2
[Signed] [illegible] (Well Driller)
License No. Date 8/1 1959

(USE ADDITIONAL SHEETS IF NECESSARY)

STATE ENGINEER
Salem, Oregon

Well Record

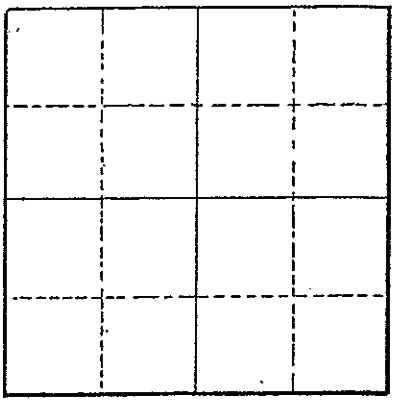
STATE WELL NO. 23/30-12R(1)
COUNTY Harney
APPLICATION NO. G-1490

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

LOCATION OF WELL: Owner's No. 3

SE ¼ SE ¼ Sec. 12 T. 23 S., R. 30 E., W.M.

Bearing and distance from section or subdivision corner 292' N. & 475' W. from SE cor. of Sec.



Altitude at well

TYPE OF WELL: Drilled Date Constructed

Depth drilled 304 Depth cased 85

Section

CASING RECORD:

16-inch

FINISH:

AQUIFERS:

WATER LEVEL:

12 feet below LSD

PUMPING EQUIPMENT: Type Turbine H.P. 100
Capacity G.P.M.

WELL TESTS:
Drawdown ft. after hours G.P.M.
Drawdown ft. after hours G.P.M.

USE OF WATER public supply Temp. °F., 19
SOURCE OF INFORMATION G-1490
DRILLER or DIGGER
ADDITIONAL DATA:
Log Water Level Measurements Chemical Analysis Aquifer Test

REMARKS:

RECEIVED
DEC 7 1959

WELL NO. 3

A#G1490

File Original and First Copy with the STATE ENGINEER, SALEM, OREGON

WATER WELL REPORT

STATE OF OREGON

State Well No. 23/30-12R

State Permit No.

(1) OWNER:
Name City of Burns
Address Burns, Oregon

(2) LOCATION OF WELL:
County Harney Owner's number, if any— #3
SE ¼ SE ¼ Section 12 T. 23 S R. 30 E W.M.
Bearing and distance from section or subdivision corner
N 0° 15' E 292' thence
N 89° 45' W 470' from SE
Corner Sec. 12

(3) TYPE OF WORK (check): Existing
New Well ☐ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 11.

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

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

(6) CASING INSTALLED: Threaded ☒ Welded ☐
16" Diam. from 0 ft. to 143 10 ft. Gage

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

(8) SCREENS: Well screen installed ☒ Yes ☐ No
Manufacturer's Name Byron Jackson
Type 8" Galvanized Cone Model No.
Slot size Set from ft. to ft.

(9) CONSTRUCTION:
Was well gravel packed? ☒ Yes ☐ No Size of gravel Not Stated
Gravel placed from — ft. to — ft.
Was a surface seal provided? ☒ Yes ☐ No To what depth? 20 ft.
Material used in seal— Cement
Did any strata contain unusable water? ☐ Yes ☐ No
Type of water? ? Depth of strata ?
Method of sealing strata off Casing

(10) WATER LEVELS:
Static level 14 ft. below land surface Date 12-10-59
Artesian pressure lbs. per square inch Date

Log Accepted by:
[Signed] City of Burns (Owner) Date 12-10, 19 59

(11) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? ☒ Yes ☐ No If yes, by whom? R.J. Strasser Drilling C
Yield: 1280 gal./min. with 81 ft. drawdown after 2 hrs.
" 1000 " 58 " 2 "
" 300 " 39 " 1/2 "
Bailer test gal./min. with 0 ft. drawdown after 2 hrs.
Artesian flow g.p.m. Date
Temperature of water 54° Was a chemical analysis made? ☒ Yes ☐ No

(12) WELL LOG: Diameter of well 16" inches.
Depth drilled 304 ft. Depth of completed well 304 ft.
Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
Surface Dirt	0	9
Sand	9	18
Soft Rock	18	24
Hard Gray Rock	24	46
Decomposed Rock	46	76
Hard Gray Rock	76	84
Decomposed Rock	84	99
Hard Gray Rock	99	103
Pumice Rock	103	140
Porous Rock	140	164
Red Rock	164	181
Hard Gray Rock	181	199
Hard Rough Gray Rock	199	221
Hard Gray Rock	221	244
Hard Rough Gray Rock	244	267
Broken formation Blk. Rock	267	272
White Pumice	272	280
Soft Rock Mixed	280	293
Hard Grey Rock	293	304

Work started 11-3 19 59 Completed 12-11 19 59

(13) PUMP:
Manufacturer's Name Byron Jackson
Type: Deep Well Turbine H.P. 100

Well Driller's Statement:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
NAME R.J. STRASSER DRILLING CO.
(Person, firm, or corporation) (Type or print)
Address 8110 S.E. SUNSET LANE PORTLAND, ORE.
Driller's well number
[Signed] (Well Driller)
License No. 10 Date July 17, 1959

(USE ADDITIONAL SHEETS IF NECESSARY)

Filed with the
STATE ENGINEER, SALEM, OREGON 97310
within 30 days from the date
of well completion.

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

HARN 4/18

State Well No. .....

State Permit No. .....

(1) OWNER:

Name City of Burns

Address Burn Oregon

(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 ☑

16 " Diam. from +2 ft. to 173 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? Harney Farm Supply

Yield: 1737 gal./min. with 17' 1" ft. drawdown after 5 hrs.

" " " "

" " " "

Bailer test 90 gal./min. with 5 ft. drawdown after 2 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 22 ft.

Diameter of well bore to bottom of seal 20 in.

Diameter of well bore below seal 16 in.

Number of sacks of cement used in well seal 56 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 Surface depth of strata 1287

Method of sealing strata off .....

Was well gravel packed? ☐ Yes ☒ No Size of gravel: .....

Gravel placed from ..... ft. to ..... ft.

(10) LOCATION OF WELL:

County Harney Driller's well number .....

S.W. ¼ N.W. ¼ Section 18 T. 23S R. 31E W.M.

Bearing and distance from section or subdivision corner .....

(11) WATER LEVEL: Completed well.

Depth at which water was first found 240 ft.

Static level 13' 4" ft. below land surface. Date 8-7-74

Artesian pressure ..... lbs. per square inch. Date .....

(12) WELL LOG:

Diameter of well below casing 16"

Depth drilled 290 ft. Depth of completed well 290 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
Clay - Brown	0	12	
Clay & Conq. Brown	12	22	13' 4"
Clay + Conq. Gray	22	26	
Clay & Conq. Brown	26	72	
Clay - Brown	72	91	
Pumice	91	93	
Clay & Conq. Brown	93	125	
Clay - Brown	125	137	
Clay & Conq. Brown	137	160	
Clay - Brown	160	242	
Cinders - Red	242	290	

Work started 7 - 5 1974 Completed 8 - 8 1974

Date well drilling machine moved off of well 8 - 9 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] ..... Davidson Date 8 - 27 1974
(Drilling Machine Operator)

Drilling Machine Operator's License No. 635

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 DAavidson Drilling
(Person, firm or corporation) (Type or print)

Address 626 N W Per Shall - Redmond Or.

[Signed] .....
(Water Well Contractor)

Contractor's License No. ..... Date 1974

(USE ADDITIONAL SHEETS IF NECESSARY)

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.

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

RECEIVED JUL 25 1977 WATER RESOURCES DEPT. SALEM, OREGON

RECEIVED JUL 15 1977 WATER RESOURCES DEPT. SALEM, OREGON

WELL NO. 5 13

State Well No. 23S/30EC

State Permit No. Harney

(1) OWNER:
Name City of Burns
Address Burns Oregon,

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

(3) TYPE OF WELL:
Rotary [ ] Driven [ ]
Cable [X] Jetted [ ]
Dug [ ] Bored [ ]

(4) PROPOSED USE (check):
Domestic [ ] Industrial [ ] Municipal [X]
Irrigation [ ] Test Well [ ] Other [ ]

CASING INSTALLED: Threaded [ ] Welded [X]
6" Diam. from +1½ ft. to 355½ ft. Gage 250
..." Diam. from ... ft. to ... ft. Gage ...
..." Diam. from ... ft. to ... ft. Gage ...

PERFORATIONS: Perforated? [X] Yes [ ] No.
Type of perforator used mill cut
Size of perforations ⅛ in. by 3 in.
3360 perforations from 140 ft. to 355½ ft.
... perforations from ... ft. to ... ft.
... perforations from ... ft. to ... ft.

(7) SCREENS: Well screen installed? [ ] Yes [X] 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? [X] Yes [ ] No If yes, by whom? DRILLER
1500 gal./min. with 32' ft. drawdown after 24 hrs.
2000 " 38 " 2 "
" " " "
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 40 ft.
Diameter of well bore to bottom of seal 24 in.
Diameter of well bore below seal 18 in.
Number of sacks of cement used in well seal 50 sacks
Number of sacks of bentonite used in well seal 0 sacks
Brand name of bentonite ...
Number of pounds of bentonite per 100 gallons of water ... lbs./100 gals.
Was a drive shoe used? [ ] Yes [X] No Plugs ... Size: location ... ft.
Did any strata contain unusable water? [ ] Yes [X] No
Type of water? ... depth of strata ...
Method of sealing strata off ...
Was well gravel packed? [ ] Yes [X] No Size of gravel: ...
Gravel placed from ... ft. to ... ft.

(10) LOCATION OF WELL:
County HARNEY Driller's well number #5
NW ¼ SW ¼ Section 13 T. 23S R. 30E W.M.
Bearing and distance from section or subdivision corner ...

(11) WATER LEVEL: Completed well.
Depth at which water was first found 35 ft.
Static level 30 ft. below land surface. Date April
Artesian pressure ... lbs. per square inch. Date ...

(12) WELL LOG: Diameter of well below casing 18
Depth drilled 355½ ft. Depth of completed well 355½ 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
brown clay	0	10	
brown sandstone	10	128	
purple rock (hard)	128	136	
pink clay	136	168	
pink rock	168	193	
clay light brown pink with gravel mixed in clay	193	250	
black rock	250	288	
red black cinders water gravel	288	290	35
black rock	290	298	
red black cinders water gravel	298	327	35
black rock	327	351	
water gravel	351	353	35
black rock	353	355½	

Work started April 4 19 77 Completed June 16 19 77
Date well drilling machine moved off of well June 26 19 77

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] Earl Skinner (Drilling Machine Operator) Date July 1, 19 77
Drilling Machine Operator's License No. 606

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 WESTERN DRILLING CO. (Person, firm or corporation) (Type or print)
Address BOX 251
[Signed] J. W. McCulloch (Water Well Contractor)
Contractor's License No. 426 Date July 2, 19 77

(USE ADDITIONAL SHEETS IF NECESSARY)

Parameters Used in Delineation Model

Delineation Method: ☒ Analytical ☐ Calculated Fixed Radius ☐ Enhanced CFR
☐ Numerical ☐ Hydrogeologic Mapping ☐ Analytic Element

Pump Rate[1] (Q in gpd): **Well 1=960,000; Well 2=290,000; Well 3=310,000; Well 4=1,600; Well 5=170,000**

Source: ☒ System ☒ Water Resources Dept ☐ Comparable Community
☐ Pump Capacity ☐ Population Estimate ☐ 90% of Safe Yield

Nature of the Aquifer: ☐ Unknown ☐ Unconfined
☐ Semi-confined ☒ Confined

Aquifer name: **Volcanic Rocks (basalt, ash flows and sediment) of the northern Great Basin**

Confining Unit lithology: Unfractured (?) volcanic units
Depth to Confining Unit: Surface to 40 feet
Confining Unit thickness: 200-250 feet
Depth to Aquifer: ~240 feet

Aquifer Characteristics:

Lithology:

☐ Unknown ☐ Sandy Silt ☒ Layered Volcanic Rocks
☐ Sand ☐ Sand & Gravel ☐ Fractured Volcanic Rocks
☐ Gravel ☐ Cobbles/Gravel ☐ Fractured Sedimentary Rocks
☐ Other:_____

Thickness (b): 40 feet

Effective Porosity (n): 0.25

Hydraulic Conductivity (Permeability): 100 ft/day ☐ N/A
☐ Estimated from lithology ☒ Specific Capacity (Well Report)
☐ Published Report ☐ Aquifer Test

Hydraulic Gradient: NA Flow Direction: SE ☐ N/A
☐ Published Report ☐ Graphical Solution ☒ Estimate
☐ Field Measurements ☐ Model Results

Other High Capacity Wells Accounted for: None

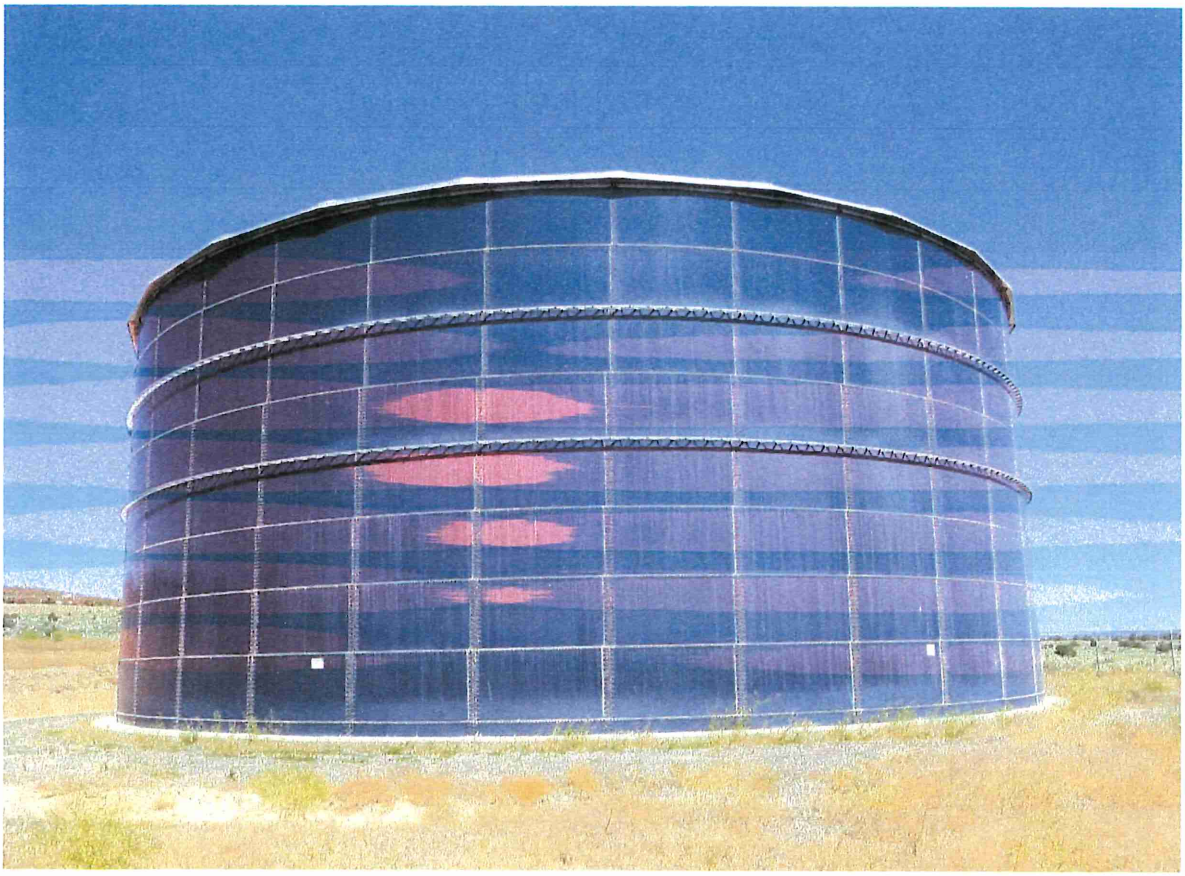
1. Groundwater models used do not allow for variable pump rates, e.g., pumps turning off and on. Therefore, we must calculate an average continuous pump rate over a 24-hour period. Pump rate, therefore, represents average daily use of highest three months divided by 1440 minutes/day to obtain gallons/minute value.

APPENDIX J
Inspection Report for the Glass-Fused-to-Steel Bolted Reservoir

Engineering America

City of Burns, OR 8022007

City of Burns
Burns, OR



Prepared by:
Mike Bray

Engineering America
August 8, 2016

Engineering America

City of Burns, OR 8022007

Introduction

On July, 15th 2016 Engineering America conducted a full visual inspection of the Aquastore potable water tank for the City of Burns, OR. In this report you will find a detailed description of our findings, along with photographs from a digital camera to support any recommended action.

Tank Specifications

INSPECTION NUMBER	750179	**INSPECTION DATE**	7-15-2016
PRODUCT	Aquastore	**INSPECTOR(S)**	Bob Kriha
MODEL	9538 WT	**PROJECT NAME**	City of Burns
CAPACITY	1,997,000 Gallons	**DATE BUILT**	2002
SERIAL NUMBER	8022007	**BUILT BY**	
EXTERIOR COATING	Cobalt - Fused Glass	**INTERIOR COATING**	White - Fused Glass
ROOF TYPE	Aluminum Dome	**ROOF BRAND**	Temcor

Condition grades:

5 = Like New
4 = Good
3 = Fair
2 = Poor
1 = Needs Immediate Attention

Warranty Info

Expired

Engineering America

City of Burns, OR 8022007

Image Name:
Concrete Curb and Foundation

Condition:
4 = Good

Description:
The concrete curb and foundation is in good condition.

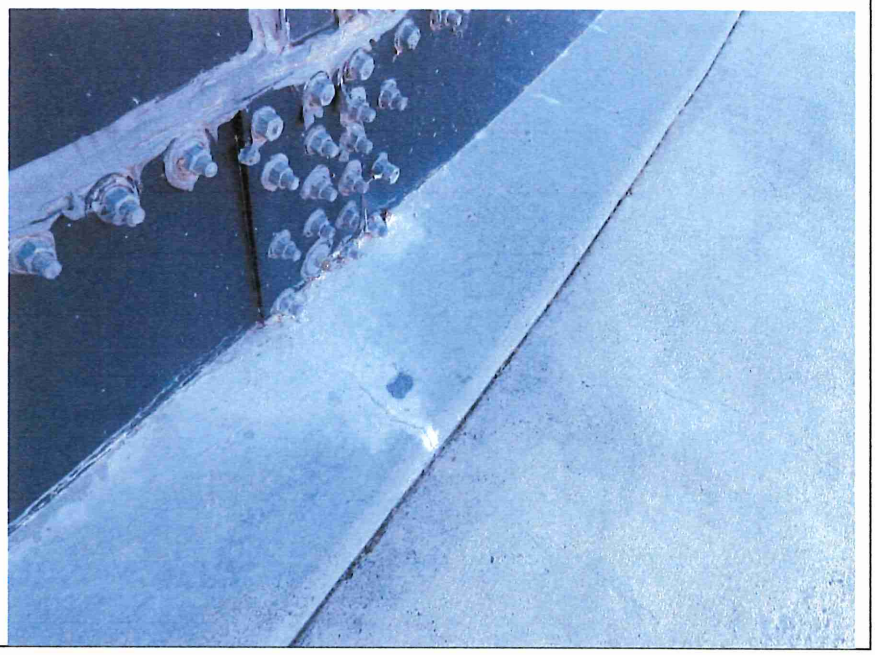


Image Name:
Overflow Discharge

Condition:
4 = Good

Description:
The overflow outlet is in good condition.

Engineering America

City of Burns, OR 8022007

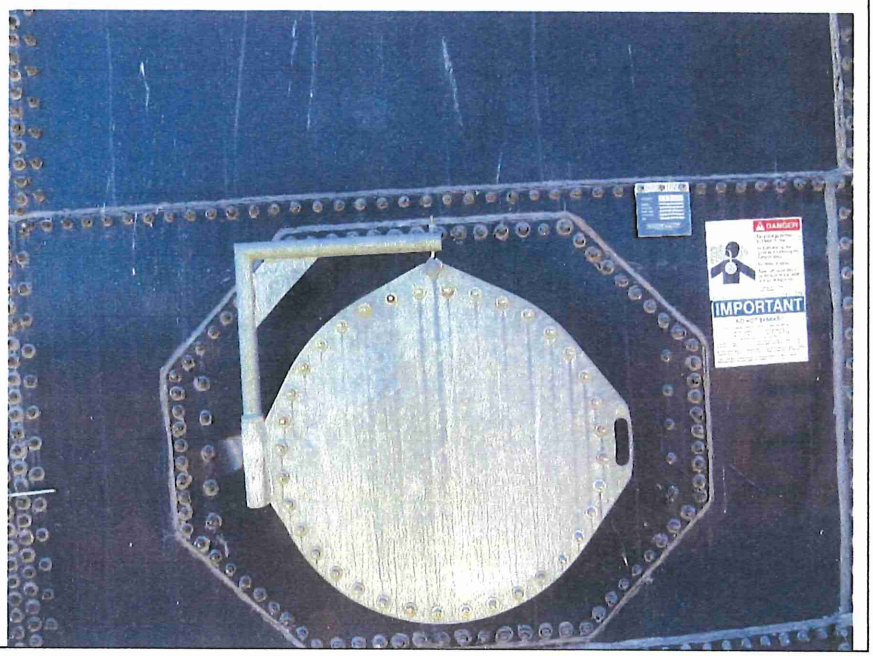
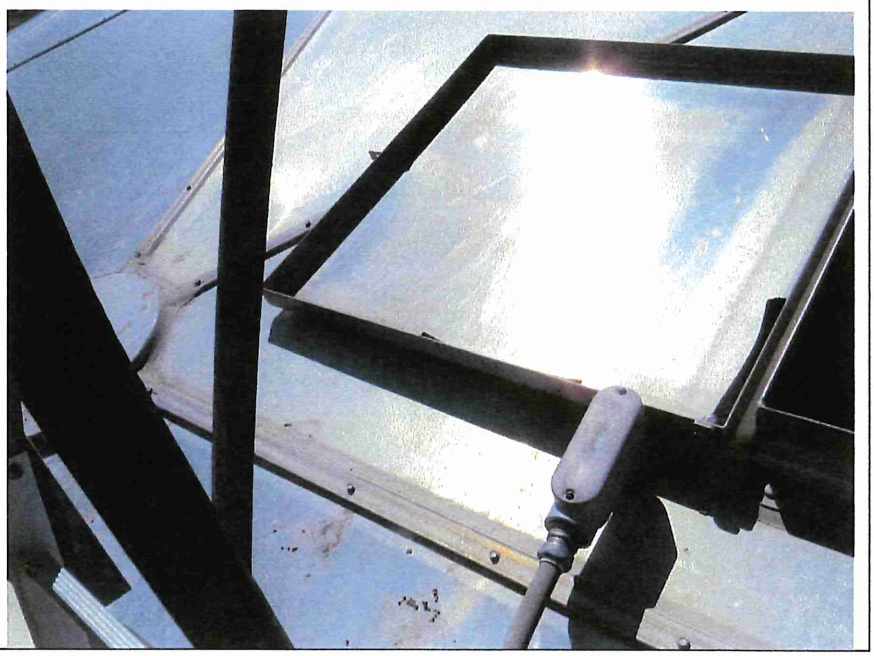
Image Name: Manway Door **Condition:** 4 = Good **Description:** The exterior of the manway door is in good condition.	

Image Name: Exterior Tank Ladder **Condition:** 4 = Good **Description:** The tank ladder and step-off platforms are in good condition.	

Engineering America

City of Burns, OR 8022007

Image Name: Exterior Aluminum Dome Roof **Condition:** 4 = Good **Description:** The exterior of the aluminum dome roof is in good condition.	

Image Name: Roof Hatch **Condition:** 3 = Fair **Description:** The roof access hatch is in fair condition. The door is missing the rubber seal.	

Engineering America

City of Burns, OR 8022007

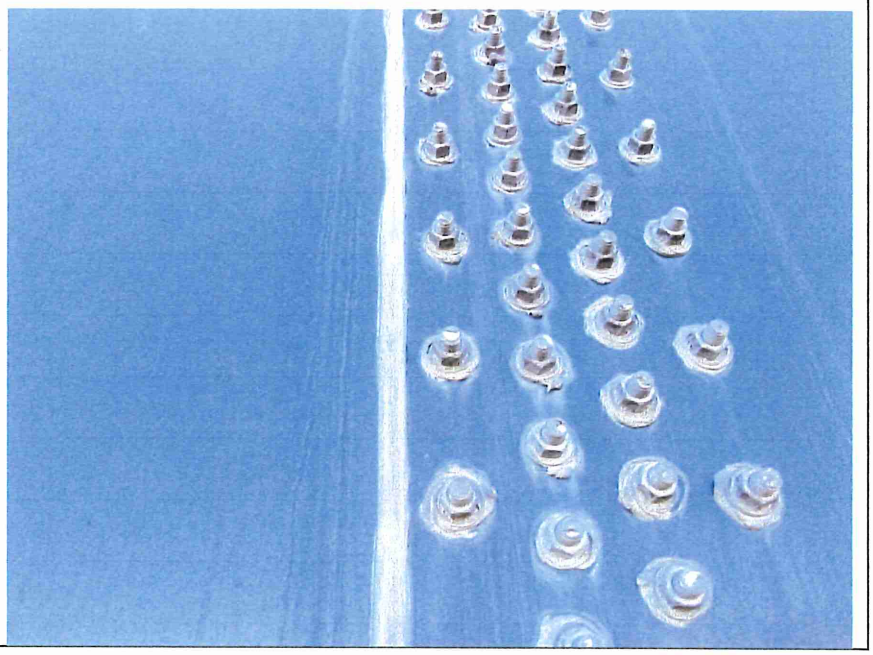
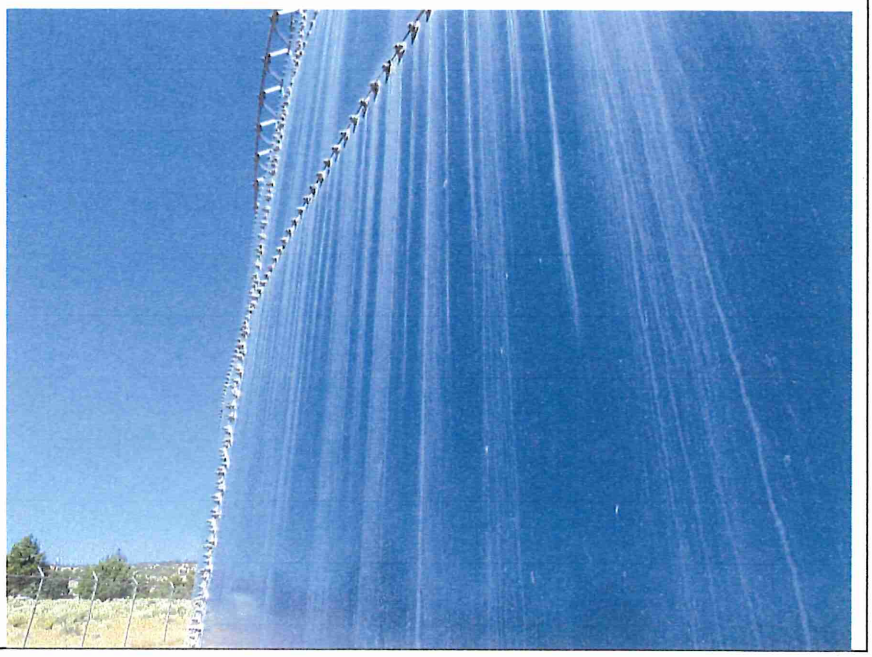
Image Name: Exterior Sealer **Condition:** 3 = Fair **Description:** The sealer on the exterior of the tank is in fair condition. The sheet-edge surfaces are covered.	

Image Name: Exterior Glass Coating **Condition:** 4 = Good **Description:** The glass coating on the exterior of the tank is in good condition. There is some staining that could be cleaned from the sheet surface.	

Engineering America

City of Burns, OR 8022007

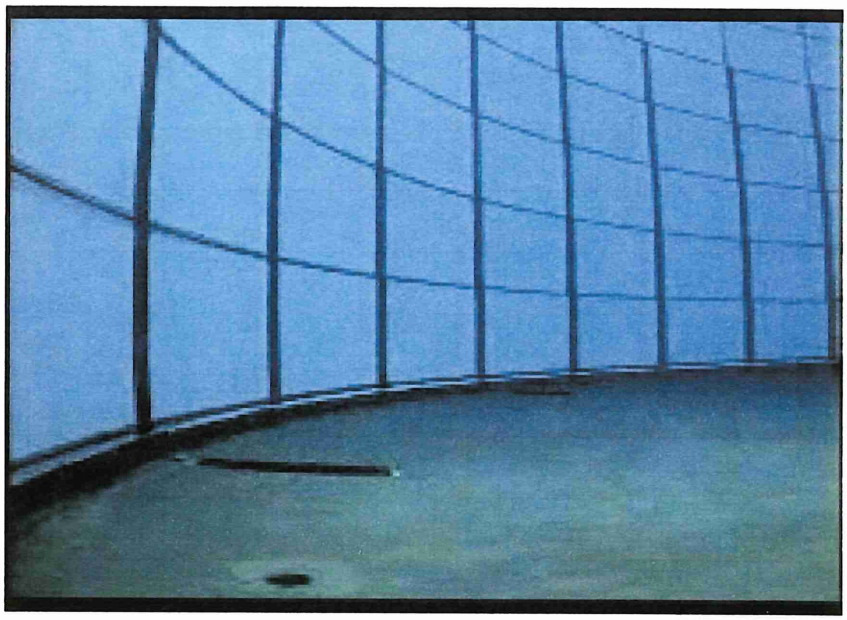
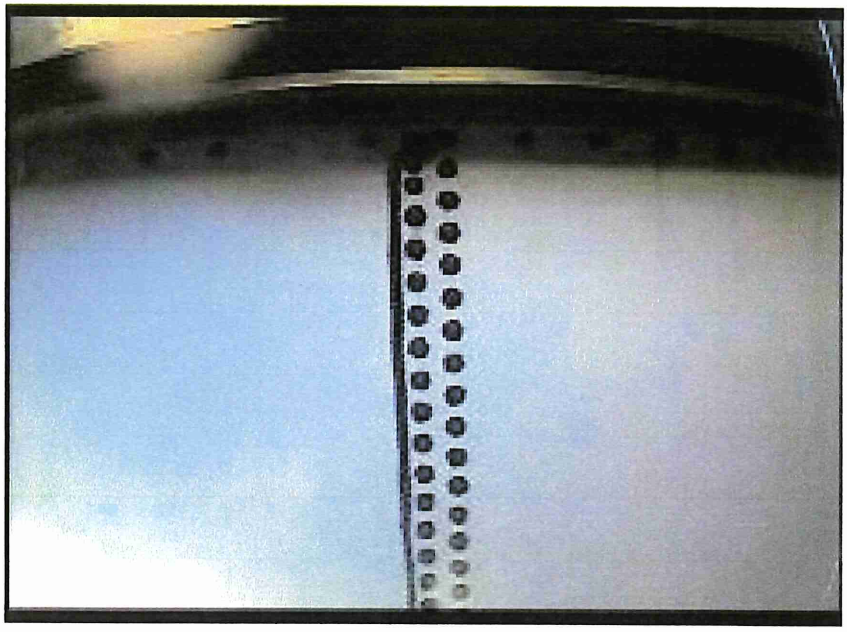
Image Name: Interior Floor **Condition:** 4 = Good **Description:** The floor is in good condition.	

Image Name: Interior Sealer **Condition:** 4 = Good **Description:** The sealer on the interior sheet seams is in good condition.	

Engineering America

City of Burns, OR 8022007

Image Name:
Interior Glass Coating

Condition:
4 = Good

Description:
The glass coating on the interior of the tank is in good condition.

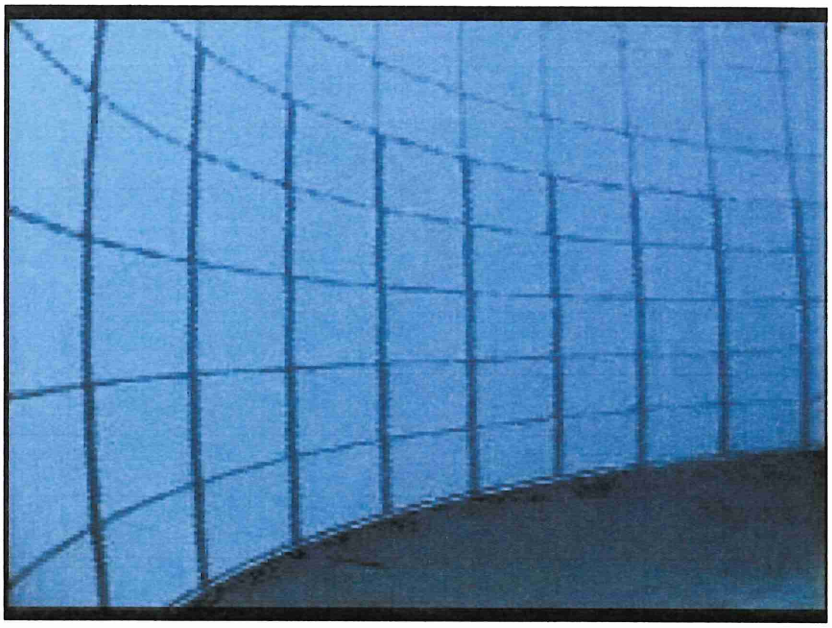
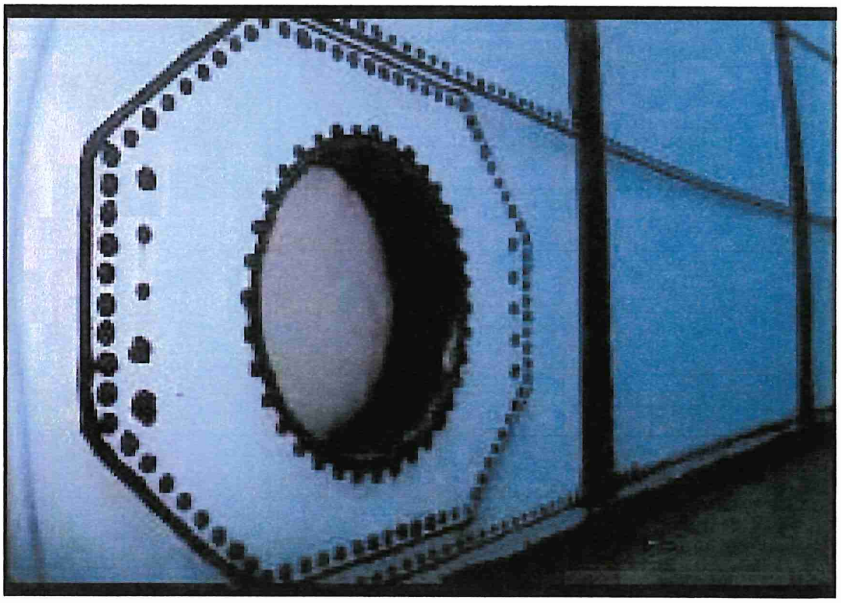


Image Name:
Manway Weldment

Condition:
4 = Good

Description:
The manway weldment is in good condition.



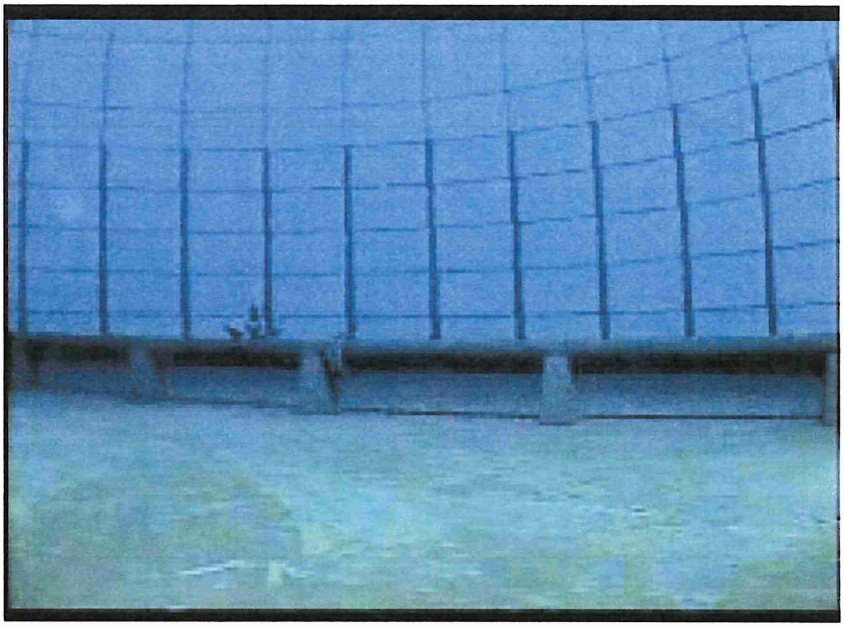
Engineering America

City of Burns, OR 8022007

Image Name:
Interior Piping

Condition:
4 = Good

Description:
The interior pipe is in good condition.



Engineering America

City of Burns, OR 8022007

Recommendations

Engineering America recommends the following repairs and maintenance to be performed:

WITHIN NEXT YEAR

- Replace roof hatch gasket.
- Perform a water analysis to determine proper level of cathodic protection.
- Install a mixer to provide thorough mixing of the tank to reduce water age, stagnation, stratification, short circuiting, and cold-climate ice buildup. Thorough mixing not only improves water quality, it also allows for representative sampling of the tank water, and disinfectant boosting if ever needed.

WITHIN THREE YEARS

- Install the necessary safety accessories to allow for safe access of the roof mounted gravity ventilator.
- Enter a maintenance contract with Engineering America to ensure that proper maintenance, inspections, and cleanings are being performed on the tank.
- Inspect the tank in 2019 per AWWA recommended tank inspection interval.

APPENDIX K
Fire Hydrant Flow Test Data

CITY OF BURNS, OREGON
WATER SYSTEM MASTER PLAN
APPENDIX K - FIRE HYDRANT FLOW TEST

Hydrant Flow Data				
Location of Hydrant Being Flow Tested	**Hydrant Flow (gpm)**	**Location of Hydrant Being Monitored**	**Static Pressure (psi)**	**Residual Pressure (psi)**
W. Monroe Street and road to youth facility	1,275	First hydrant on road to youth facility	70	68
Hillcrest Drive	650	Taylor and Fairview	82	30
W. D Street and N. Fairview Avenue	1,130	W. E Street and N. Fairview Avenue	64	52
S. Egan Avenue near Culp Lane	1,160	S. Egan Avenue and W. Buchanan Street	78	62
S. Date Avenue (south of Harney Rock)	500	S. Date Avenue (north of Harney Rock)	70	34
E. Washington Street and N. Birch Avenue	790	N. Birch Avenue and E. A Street	72	58
E. Washington Street and N. Gordonia Avenue	780	E. Washington Street and N. Fir Avenue	70	56
N. Foley Drive (south) - Fifth hydrant from the north	920	N. Foley Drive (north) - Fourth hydrant from the north	70	40
W. Railroad Avenue and S. Diamond Avenue	1,130	W. Taylor Street and S. Diamond Avenue	75	62

gpm = gallons per minute
psi = pounds per square inch

APPENDIX L
Environmental and Cultural Resource Cursory Review Memo

anderson perry & associates, inc.

1901 N. Fir Street, P.O. Box 1107
La Grande, OR 97850
(541) 963-8309, Fax (541) 963-5456
www.andersonperry.com

engineering ▪ surveying ▪ natural resources

MEMO

To:	Brandon Mahon, P.E., Anderson Perry & Associates, Inc. (AP)
From:	Brad Power, Natural Resources Specialist
Subject:	**City of Burns, Oregon - Water System Master Plan - Cursory Environmental Review**
Date:	April 28, 2021
Job/File No.	308-36-115 (w/encl.)
cc:	Dane Maben, E.I., AP (w/encl.) Dana Kurtz, AP (w/encl.)

Project Description

This memo describes the results of initial environmental review efforts for the Water System Master Plan for the City of Burns, Oregon. Environmental review efforts included an office-based review of available site-specific environmental information.

The City constructed the current water system around 1929 to 1930, and wells were constructed between 1930 and 1977. The City is proposing to upgrade and expand the existing water distribution system to meet the needs of their growing community as well as address aging and undersized infrastructure. Improvements will include installing water lines to eliminate dead ends and increase fire flows, as well as increase undersized main lines. In addition, new valves and fire hydrants will also be installed. The proposed improvements will allow greater system efficiency and reliability than what is currently available. Funding for the proposed improvements is unknown at this time, but state or federal funding is anticipated to be sought.

The following resources were reviewed, and potential impacts to each resource are described along with potential mitigation measures and required permits.

Goal 5 Resources Mapping

Oregon's Statewide Planning Goals and Guidelines lists Goal 5 as Natural Resources, Scenic and Historic Areas, and Open Spaces. Goal 5 resources address a broad statewide planning goal that incorporates important local resources to protect natural resources and conserve scenic areas, historic areas, and open spaces. The six Goal 5 resources categories that rely on state or federal inventories were reviewed for the proposed improvements. National Wild and Scenic Rivers (NWSR), State Scenic Waterways, Oregon scenic or regional trails, wilderness areas, and sage-grouse core habitat are the Goal 5 resources addressed.

- The NWSR System map and Oregon's Scenic Waterways map do not list any rivers designated as a National Wild and Scenic River or a State Scenic Waterway in or near the project area (NWSR, 2021; Oregon Parks and Recreation Department, 2021).

- According to the Oregon Water Resources Department (OWRD), the location of the proposed improvements is located within the Greater Harney Valley classified groundwater restricted area (OWRD, 2021). Because a majority of the proposed work includes replacing existing infrastructure that does not include discharges to groundwater or additional use of groundwater, the project is not anticipated to affect the Greater Harney Valley groundwater restricted area.

- No designated Oregon scenic or regional trails are in the location of the proposed improvements (Oregon State Parks, 2021).

- The nearest wilderness area is the Strawberry Mountain Wilderness, located approximately 55 miles north of the location of the proposed improvements (Wilderness Connect, 2021).

- The Oregon Sage-Grouse Core Areas map developed by the Oregon Department of Fish and Wildlife (ODFW) shows the location of the proposed improvements is not within areas of core habitat (ODFW, 2011). Although current occupied habitat is located near the project area, the proposed improvements are not anticipated to affect sage-grouse populations due to a lack of suitable habitat within city limits.

Due to the distance of NWSR or State Scenic Waterways, Oregon scenic or regional trails, wilderness areas, and sage-grouse core habitat areas from the location of the proposed improvements, potential improvements are not anticipated to impact these Goal 5 resources. Although the project area is located within the Greater Harney Valley groundwater restricted area, no discharges to groundwater or additional use of groundwater are anticipated; therefore, the project is not anticipated to affect the groundwater restricted area. See Attachment A, Goal 5 Resources Maps, for maps reviewed.

Land Use

The City currently owns the properties where a portion of the proposed improvements will be located. The remaining portion of improvements will occur on property where the City has right-of-way (ROW) easements. Improvements will occur throughout the City in locations with varying zoning classifications, none of which are anticipated to conflict with the proposed improvements. Current land use practices are not anticipated to be altered; however, a Conditional Use Permit (CUP) may be required for areas where new piping is to be located. The City Planning Department should be consulted once the design is complete to ensure that all local permitting requirements are met. Additionally, since water line replacement will occur that crosses Highway 20, consultation with Oregon Department of Transportation (ODOT) would be necessary to determine which permits would be required to perform work within ODOT ROW.

Stormwater

The proposed improvements are anticipated to involve more than 1 acre of ground disturbance. As ground disturbance will exceed 1 acre, a 1200-C Construction Stormwater General Permit is anticipated to be required by the Oregon Department of Environmental Quality (DEQ). Proposed improvements will not result in new impervious surfaces; therefore, a Post-construction Stormwater Management Plan is not anticipated to be required. Appropriate erosion control measures and stormwater management will be utilized to ensure proper protection of nearby waterbodies during construction.

Floodplains, Wetlands, and Waterbodies

According to the Federal Emergency Management Agency (FEMA) Map Service Center, FEMA Flood Insurance Rate Map Panel No. 4100840001D, some locations of the proposed improvements are within a 100-year floodplain (Zones A and AE) (FEMA, 2021). Therefore, FEMA development standards may apply, and a Floodplain Development Permit is anticipated to be required. Because all work will occur underground, impacts to floodplains are not anticipated. See Attachment B, FEMA Floodplain Map.

According to the U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory Mapper, no wetlands are mapped within location of the proposed improvements; however, freshwater emergent wetlands and freshwater forested/shrub wetlands are mapped in the vicinity of the proposed improvements (USFWS, 2021a). A wetland determination/delineation is anticipated to be required if work occurs in areas not currently covered in impervious surfaces. If wetlands are identified within the location of the proposed improvements, they will be recorded in a Wetland Delineation Report and avoided to the greatest extent possible. The appropriate permits from the Oregon Department of State Lands (DSL), U.S. Army Corps of Engineers, and DEQ will be obtained for temporary or permanent fill/removal in wetlands. Appropriate mitigation will be provided if impacts are permanent.

The nearest major waterbody to the location of the proposed improvements is the Silvies River, approximately 200 feet east of the nearest proposed improvements. By utilizing best management practices (BMPs), minimal or no impacts to the waterbody are anticipated. Additionally, an unnamed stream exists at the western edge of the project area, approximately 700 feet from the proposed improvements. BMPs will be needed to protect these streams from construction impacts. The proposed improvements are not anticipated to require in-water work.

Protected Species

Listed species within the location of the proposed improvements were obtained from the USFWS and the National Marine Fisheries Service (NMFS) databases. The USFWS list indicates that no endangered species occur within the location of the proposed improvements (USFWS, 2021b). The NMFS list indicates that there are no fish species that utilize streams as critical habitat near Burns (NMFS, 2021). According to StreamNet, redband trout utilize the Silvies River near the City (StreamNet, 2021). Although listed as a species of concern, redband trout are not listed as threatened or endangered under the Endangered Species Act (ESA). Species residing in the Silvies River are unlikely to be affected by the location of the proposed improvements because no in-water work will be required. No ESA-listed species are known to use the Silvies River. See Attachment C, U.S. Fish and Wildlife Service Species List and National Marine Fisheries Service Species Map.

The proposed improvements are not anticipated to require in-water work and, therefore, will not be subject to an in-water work window.

Cultural Resources and Historic Properties

According to the Oregon Historic Sites Database, there are more than 100 historic properties within the project area; approximately half have been determined not eligible, and the remaining half have been determined eligible or have undetermined eligibility for the state register. No historic properties are listed on the National Register of Historic Places.

The Oregon Archaeological Records Remote Access Database lists 24 cultural resource surveys within 1 mile of the project area, nine of which are located within the project area. Twenty-two cultural resources are located within 1 mile of the project area, including five archaeological sites and 11 isolates within the project area. Much of the City has not been surveyed, but the areas that have been surveyed resulted in the identification of a relatively dense concentration of both precontact and historic-period cultural resources.

Potential impacts to archaeological resources as a result of construction include excavation, sediment disturbance, sediment compaction, and other ground-disturbing construction activities. Additional examination of historic maps should occur as specific plans and designs are made to ascertain if such work could potentially impact historical archaeological deposits and mitigate for such impacts. Additionally, efforts may be required to identify previous areas of disturbance within proposed work areas so undisturbed areas may be avoided or investigated for archaeological materials. The Oregon State Historic Preservation Office and Native American tribes with an interest in the area should be consulted prior to finalizing the project design.

Additional requirements may be necessary depending on federal involvement (funding or permits), which may necessitate compliance with Section 106 of the National Historic Preservation Act. If no federal nexus is identified, the project must still comply with Oregon Revised Statutes (ORS) (ORS 97.740, ORS 358.905-358.961, and ORS 390.235) and Oregon Administrative Rules 736-051-0090, which protects Native American cairns, graves, and associated items, items of cultural patrimony, and archaeological sites on non-federal and private lands. Additional archaeological survey, testing, and/or permitting may be required to comply with state laws.

Hazardous Materials

Environmental records were reviewed for identified hazardous and solid waste sites, cleanup sites, underground storage tanks (USTs), and leaking underground storage tanks (LUSTs) using information in the DEQ's Environmental Cleanup Site Information Database and the DEQ's Facility Profiler (DEQ, 2021). Numerous environmental records were found in the vicinity, including 28 environmental cleanup sites, 25 LUSTs, 10 USTs, four hazardous waste sites, four solid waste sites, two water quality site permits, seven active air emission permits, and three water quality underground injection control permits. All records listed are located within 1 mile of the location of the proposed improvements (see Attachment D, Oregon Department of Environmental Quality Profiler Lite Map). The following list details the nearest environmental cleanup sites to the proposed improvements and their approximate distance from proposed improvements:

- Burns Groundwater - No. 134860 - 150 feet
- U.S. Forest Service (USFS) - No. 30200 - 350 feet
- Steve's Exxon - No. 9263 - 370 feet
- Bureau of Land Management (BLM) Wareyard - No. 9262 - 470 feet
- Sharon's Sewing - No. 41184 - 160 feet
- Canyon City Cleaners - No. 41183 - 80 feet
- Knierein's Auto - No. 116547 - 70 feet
- Burns Machine - No. 123219 - 40 feet
- Alder/Monroe Service Station - No. 116548 - 100 feet
- Burns Bulk Plant - No. 41134 - 270 feet
- Unocal Bulk Plant - No. 2418 - 60 feet
- Bennett's Bulk - No. 16911 - 165 feet
- Week's Oil - No. 4904 - 140 feet
- Harney Co Shop - No. 22649 - 175 feet
- Former Auto Wrecking - No. 116599 - 550 feet
- Harney Rock Paving - No. 5657 - 450 feet
- Alan's Repair - No. 40358 - 190 feet
- Bennett's Auto - No. 41228 - 335 feet
- Carter Hot Release - No. 120260 - 1640 feet
- Canyon City Cleaners - No. 43639 - 210 feet
- Broadway and Washington - No. 116613 - 240 feet
- Modern Cleaners - No. 116381 - 420 feet
- Roe Davis Wrecking Yard - No. 116600 - 390 feet

Of the 28 environmental cleanup sites, 17 are recommended for further investigation, 10 are listed as no further action, and one site was listed as contaminated/no cleanup completed. Of the 25 LUST sites, 23 are listed as cleanup completed/no further action, one is listed as cleanup started (in 1998), and one site is listed as contaminated/no cleanup completed. The 10 UST sites are all listed as active storage tanks and do not have records of violations or leaks. The four hazardous waste sites are all listed as status not available. The DEQ database indicates that soil was the contaminated medium at the one LUST site (USFS, facility ID No. 30200) where cleanup has started; therefore, migration of possible contaminants is unlikely due to distance (500 feet) from the proposed improvements. The DEQ database indicates that soil and groundwater are the contaminated mediums at the environmental cleanup site and LUST site listed as currently contaminated/no cleanup completed (Bennett's Bulk Plant, facility ID No. 16911). This site is located 50 feet from the project area where excavation is planned to occur.

Considering the number of environmental cleanup sites within the City, it should be anticipated that soil and groundwater in the vicinity of the proposed improvements may have been impacted by historical releases of contaminants; therefore, the migration of petroleum products and metals is possible and a plan should be in place in case of inadvertent contact with contaminated soil or groundwater. Contaminated soil or soil where contamination is suspected should be disposed of at an appropriate upland disposal site if it is required to be removed from the project area. The remaining water quality and air emission permit sites are primarily for tracking purposes, not for documentation of hazardous materials, and are unlikely to impact the location of the proposed improvements.

Additional review for hazardous materials may be required depending on project funding requirements.

Conclusion

The conclusion of this cursory environmental review is that no impacts to NWSR, State Scenic Waterways, groundwater restricted areas, regional trails, wilderness areas, and sage-grouse habitat are anticipated. No known ESA-listed species are located within the vicinity of the proposed improvements. Impacts to waterbodies or federally listed species are not likely to occur as a result of the proposed improvements.

Several known cultural resource sites and environmental cleanup sites are located within 1 mile of the location of the proposed improvements. A portion of the proposed improvements will occur within the 100-year floodplain. No mapped wetlands occur in the location of the proposed improvements. Based on the cursory environmental review of the location of the proposed improvements, the following items are recommended for the proposed improvements.

Goal 5 Resources Mapping

- The proposed improvements are not anticipated to impact Goal 5 resources. No additional review is anticipated to be required for these resources.

Land Use

- A CUP may be required. In addition, the City Planning Department and ODOT should be consulted to ensure all local and state requirements are met.

Stormwater

- A 1200-C Construction Stormwater General Permit is anticipated to be required if the total disturbed area exceeds 1 acre. The proposed improvements are anticipated to have greater than 1 acre of total disturbance; therefore, a 1200-C Construction Stormwater General Permit is anticipated to be required.

Floodplains, Wetlands, and Waterbodies

- If wetlands are present in the project area, they should be avoided if possible, permitted if fill/removal occurs in them, and mitigated if permanent impacts occur.

- Only the DSL has the authority to make jurisdictional determinations; therefore, it is important to obtain a jurisdictional determination from the DSL prior to starting any work in waterbodies or wetlands.

Protected Species

- Consultation with the USFWS and NMFS is anticipated to be required if federal funding is utilized. Due to a lack of species in the location of the proposed improvements and anticipated lack of impact, informal consultation is anticipated to fulfill this requirement.

Cultural Resources and Historic Properties

- Known cultural sites and significant historic properties should be avoided so as not to disturb sensitive cultural resources.

- Depending on funding requirements, additional cultural review may be required.

- The Oregon State Historic Preservation Office (SHPO) and local tribal historic preservation officers, particularly with the Burns Paiute Tribe of Harney County, should be consulted to identify any potential concerns or important resources.

- A cultural resource survey may be required for any ground disturbance within the location of the proposed improvements on land that has not been previously surveyed or disturbed. An Oregon Archaeological Excavation Permit will need to be obtained prior to this work.

- A Historic Properties Inventory may also be required.

- Recommendations provided by SHPO and local Native American tribes should be followed.

- If cultural resources are discovered during construction, all work should be stopped and SHPO and local Native American tribes should be notified.

Hazardous Materials

- The hazardous materials sites near the location of the proposed improvements are not anticipated to affect the proposed improvements, with the exception of potential encounters with contaminated soil.

- A plan should be in place in case of inadvertent contact with contaminated soil or groundwater.

- Contaminated soil or soils where contamination is suspected should be disposed of at an appropriate upland disposal site if it is required to be removed from the project area.

- Additional review for hazardous materials may be required depending on project funding requirements.

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Attachments

Attachment A - Goal 5 Resources Maps
Attachment B - Federal Emergency Management Agency Floodplain Map
Attachment C - U.S. Fish and Wildlife Service Species List and National Marine Fisheries Service Species Map
Attachment D - Oregon Department of Environmental Quality Profiler Lite Map

BP/jg

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ATTACHMENT A
Goal 5 Resources Maps

NATIONAL WILD AND SCENIC RIVERS SYSTEM

Designations as of November 2016

The National Wild and Scenic Rivers System

Established by Congress under the Wild and Scenic Rivers Act of 1968, the National Wild and Scenic Rivers System was created to preserve the free-flow, water quality, and outstanding natural, cultural, and recreational values of select rivers for the enjoyment of present and future generations. The Act is notable for safeguarding the special character of these rivers, while also recognizing the potential for their appropriate use and development. It encourages river management that crosses political boundaries and promotes public participation in developing goals for river protection.

More information about the National Wild and Scenic Rivers System or specific designated rivers can be found at the Interagency Wild & Scenic Rivers Coordinating Council's website, www.rivers.gov, or by contacting one of the federal river administering agencies:

U.S. Forest Service
www.fs.fed.us

National Park Service
www.nps.gov/wsr

Bureau of Land Management
www.blm.gov

U.S. Fish and Wildlife Service
www.fws.gov

Names of Numbered Wild and Scenic Rivers

1 Sandy
2 Zig Zag
3 Middle Fork Hood
4 East Fork Hood
5 Fifteenmile Creek
6 White
7 Salmon
8 Clackamas
9 Collawash
10 Fish Creek
11 South Fork Clackamas
12 Roaring and South Fork Roaring
13 Eagle Creek
14 Metolius
15 Deschutes
16 North Fork Crooked
17 Whychus Creek
18 North Fork Smith
19 River Styx
20 Big Marsh
21 Crescent Creek
22 Little Deschutes
23 Crooked
24 North Fork Crooked
25 South Fork John Day
26 North Fork John Day
27 North Powder
28 Joseph Creek
29 Lostine
30 Donner und Blitzen
31 Wildhorse Creek and Kiger Creek
32 North Fork Owyhee
33 Red Canyon
34 South Fork Owyhee
35 Battle Creek
36 Deep Creek
37 Dickshooter Creek
38 Little Jacks Creek
39 Big Jacks Creek
40 Duncan Creek and Wickahoney Creek
41 Cottonwood Creek
42 Sheep Creek

Scale 1:5,800,000
Albers Equal Area Conic
0 50 100 200 300 400 Miles
0 80 160 320 480 640 Kilometers

Prepared by the USDA Forest Service
Geospatial Service and Technology Center Salt Lake City, UT 2016.

Oregon Scenic Waterways

1 Chetco River
- Steel Bridge to Alfred A. Loeb State Park (14 mi)

2 Clackamas River
- North Fork (14 mi)
- South Fork (4 mi)
- * Main stem from Ollalie Lake Scenic Area to North Fork Reservoir (49 mi)
- River Mill Dam to Carver Bridge (14 mi)

3 Deschutes River
- * Upper Deschutes: various segments from Little Lava Lake (headwaters) to Lake Billy Chinook (97 mi)
- * Lower Deschutes: Pelton Dam to Columbia River (100 mi)

4 Elk River
- * North Fork (6 mi)
- South Fork (5 mi)
- * Main stem from confluence of North and South Forks to Elk River Fish Hatchery (18 mi)

5 Grand Ronde River
- * Confluence with Wallowa River to Washington border (43 mi)

6 Illinois River
- * Deer Creek to Rogue River (46 mi)

7 John Day River
- * North Fork: North Fork John Day Wilderness boundary to River Mile 20.2 above Monument (57 mi)
- * South Fork: Post-Paulina Road crossing to Murderers' Creek Wildlife Area above Dayville (30 mi)
- Middle Fork: Crawford Creek to confluence with North Fork (73 mi)
- * Main stem: Parrish Creek to Tumwater Falls (158 mi)

8 Klamath River
- * John Boyle Dam powerhouse to California border (11 mi)

9 McKenzie River
- South Fork: Three Sisters Wilderness boundary to main stem, excluding Cougar Reservoir (21 mi)
- * Three segments of the main stem from Clear Lake to Paracise National Forest Service Campground (14 mi)

10 Metolius River
- * Metolius Springs to Candle Creek (12 mi)

11 Minam River
- * Minam Lake to Wallowa River (50 mi)

12 Molalla River
- Confluence of Table Rock Fork to Glen Avon Bridge (13 mi)

13 Nehalem River
- Henry Rierson Spruce Run Campground to confluence with Cook Creek (17.5 mi)

14 Nestucca River
- Main stem: McGuire Dam to Blaine (27 mi)

15 North Fork of Middle Fork of Willamette River
- * Waldo Lake to River Mile 1.5 near Westfir (42 mi)

16 Owyhee River
- * Crooked Creek to Birch Creek
- * South Fork: Idaho Border to Three Forks (26 mi)

17 Rogue River
- * Upper Rogue: Crater Lake National Park to Rogue River National Forest boundary (44 mi)
- * Lower Rogue: Applegate River to Lobster Creek Bridge (83 mi)

18 Sandy River
- * Bull Run River to Dabney State Park (13 mi)

19 North Santiam River
- Little North Fork: Battle Ax Creek to River Mile 16.7 at Willamette National Forest boundary (9 mi)

20 North Umpqua River
- Mt. Thielsen Wilderness boundary to Lemolo Reservoir (7 mi)
- * Soda Springs Dam powerhouse to Rock Creek (34 mi)

21 Walker Creek
- Source to confluence with Nestucca River (3 mi)

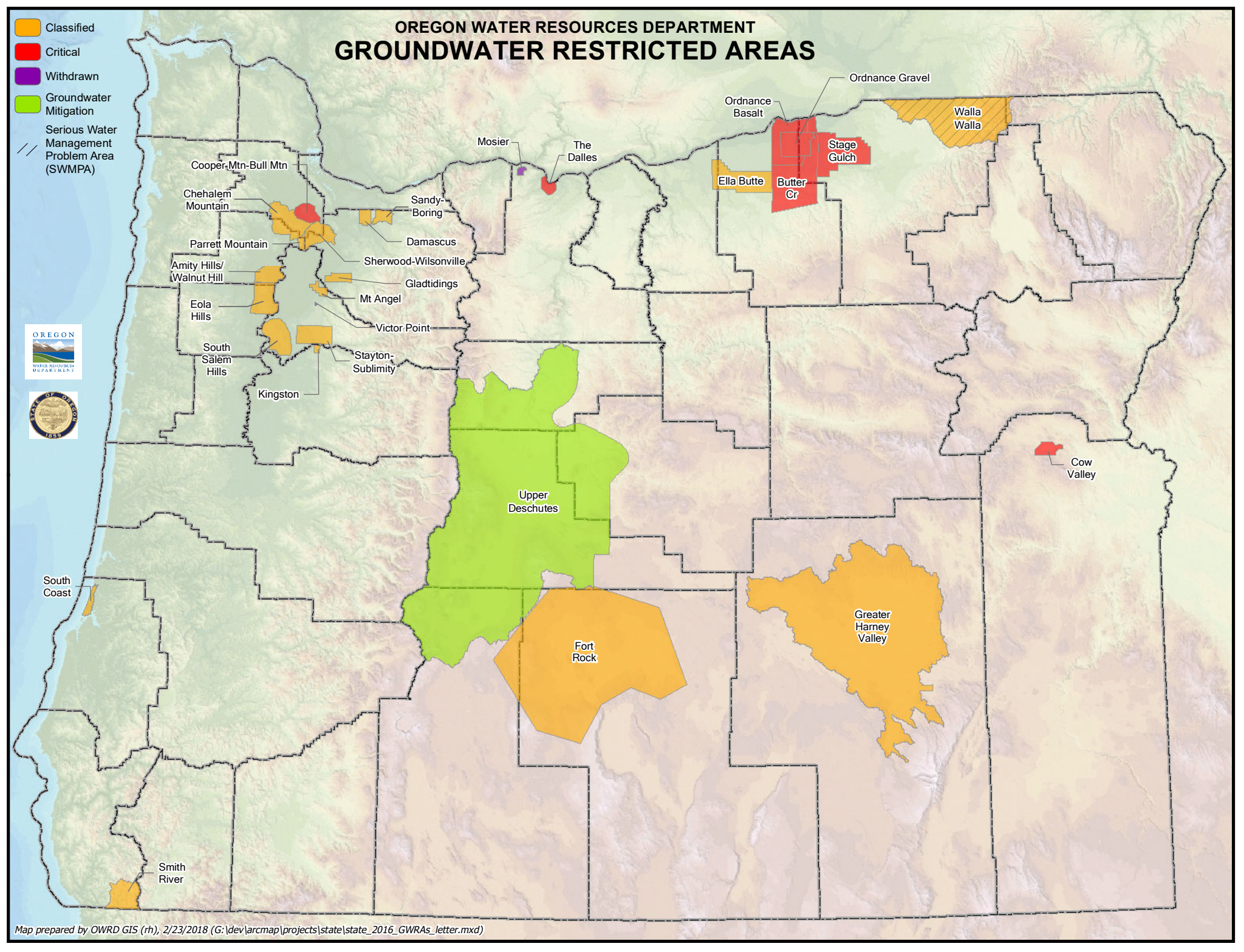
22 Wallowa River
- * Confluence with Minam to confluence with Grande Ronde (10 mi)

23 Waldo Lake
- 6,672 acres, 13 miles north of Oregon Highway 58

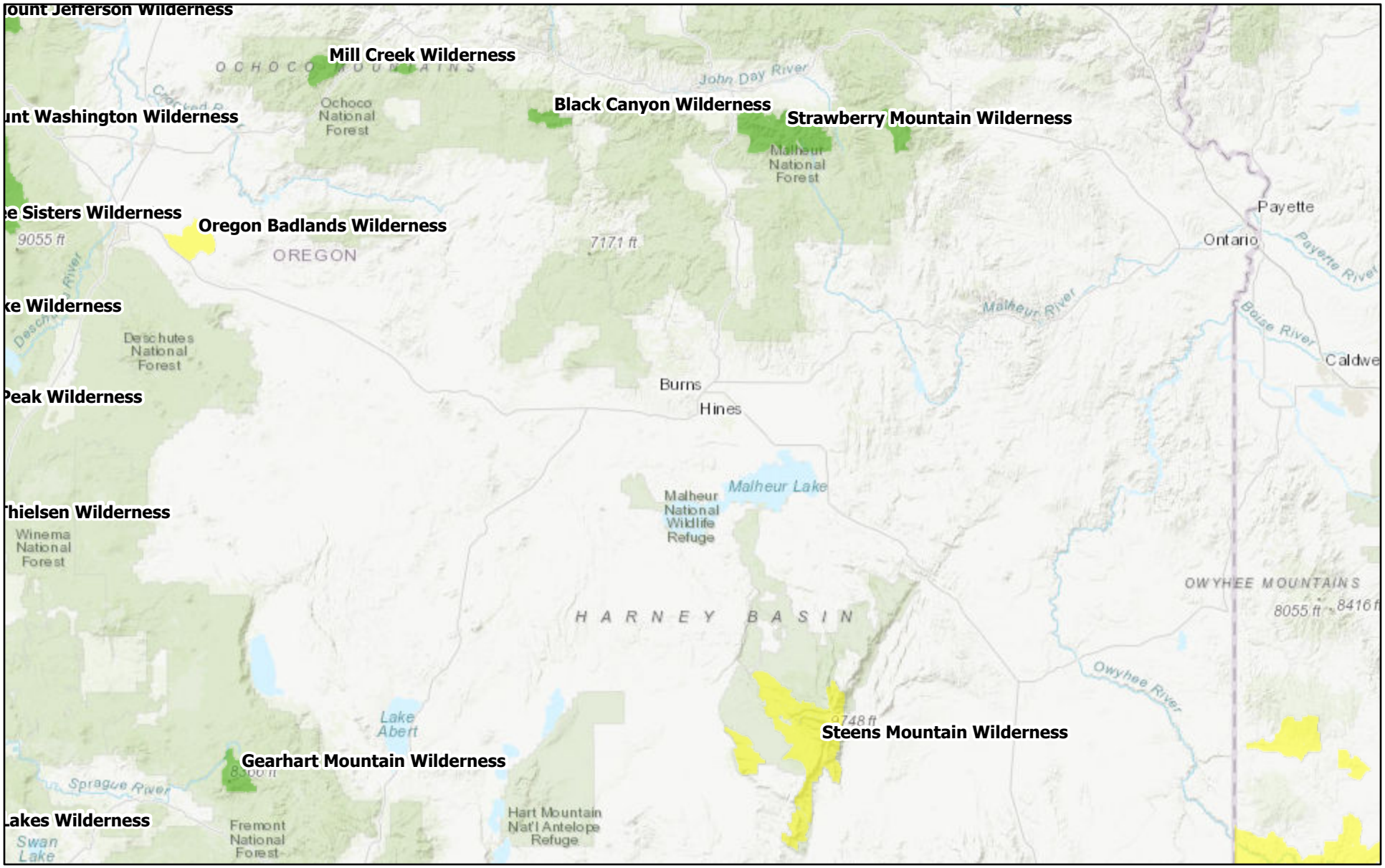
* National Wild and Scenic Rivers

OREGON STATE PARKS

Full descriptions are at
bit.ly/scenicwaterways


Classified
Critical
Withdrawn
Groundwater Mitigation
Serious Water Management Problem Area (SWMPA)
OREGON WATER RESOURCES DEPARTMENT
GROUNDWATER RESTRICTED AREAS
Ordnance Gravel
Ordnance Basalt
Walla Walla
Mosier
The Dalles
Stage Gulch
Ella Butte
Butter Cr
Cooper Mtn-Bull Mtn
Chehalem Mountain
Sandy-Boring
Parrett Mountain
Damascus
Sherwood-Wilsonville
Amity Hills/ Walnut Hill
Gladtidings
Mt Angel
Eola Hills
Victor Point
South Salem Hills
Stayton-Sublimity
Kingston
Upper Deschutes
Cow Valley
South Coast
Fort Rock
Greater Harney Valley
Smith River
Map prepared by OWRD GIS (rh), 2/23/2018 (G:\dev\arcmap\projects\state\state_2016_GWRAs_letter.mxd)

Wilderness Map



4/8/2021, 9:04:44 AM

National Wilderness Preservation System

- Bureau of Land Management
- Fish and Wildlife Service
- Forest Service
- National Park Service

1:2,311,162

0 12.5 25 50 mi

0 20 40 80 km

Esri, HERE, Garmin, FAO, USGS, EPA, NPS

Web AppBuilder for ArcGIS

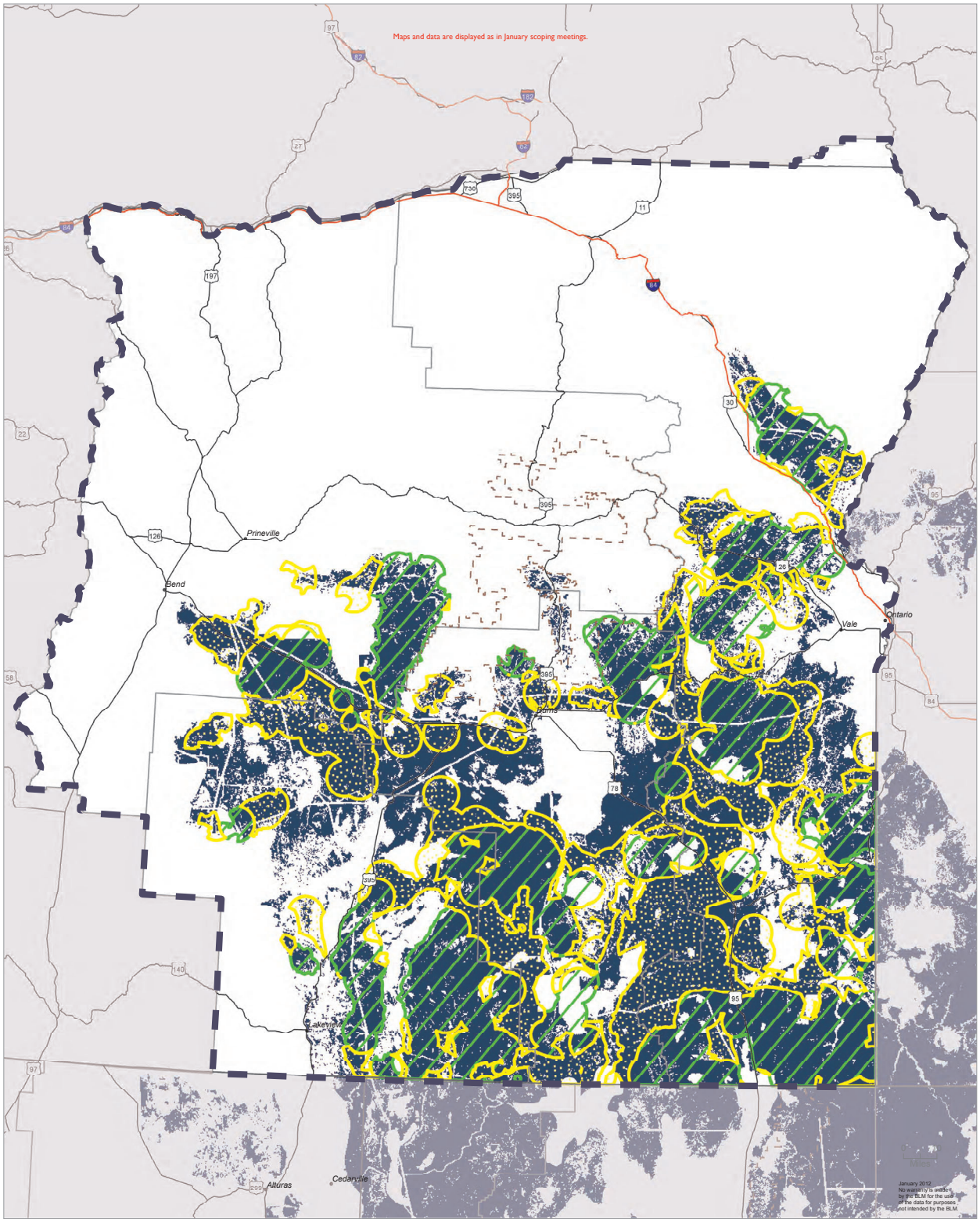
Esri, HERE, Garmin, FAO, USGS, EPA, NPS |

National Greater Sage-Grouse Planning Strategy

Oregon Sage-Grouse Core Areas and Occupied Habitat

The Oregon Sage-Grouse Core Areas Map was developed by ODFW and BLM in close coordination with the Oregon Sage-grouse Conservation Planning Team and Local Implementation Teams. Core Areas are considered Preliminary Priority Habitat (PPH) in Oregon. Core Areas include over 90% of Oregon's breeding sage-grouse populations and 84% of occupied leks.

Low Density Areas reflect lek density strata, connectivity corridors and winter use areas. Low Density Areas combined with the remaining Occupied Habitat outside of Core Areas are considered Preliminary General Habitat (PGH) in Oregon.



Core Area

Low Density

Current occupied habitat

Oregon sub-region

BLM District Office boundary

USFS priority forest or grassland

Source: ODFW 2011; Greater Sage-Grouse Conservation Assessment and Strategy for Oregon- ODFW Sage-Grouse, BLM Durtsche et al. 2010

ATTACHMENT B
Federal Emergency Management Agency
Floodplain Maps

REFERENCE MARK	ELEVATION (FT.NGVD)	DESCRIPTION OF LOCATION
RM 1	4153.509	U.S. Bureau of Public Roads standard disk, stamped "WW 71 1931," set in the top of a concrete post, located 0.6 mile north along U.S. Highway 20 and 395 from the Post Office at Burns, 57 feet north of the south end of a large signboard, 40 feet northwest of the centerline of the highway, 6 feet southwest of a power pole, and 1.6 feet west of a white, wooden witness post.
RM 2	4154.74	A standard disk, stamped "Y 18, 1920" and set vertically, located on the north side of East Adams Street, just east of North Broadway Avenue, in the south brick wall of the Voegtly building, 41.8 feet east of the southwest corner of the building, and approximately 4 feet above the ground. Established by U.S. Army Corps of Engineers.
RM 3*	4152.54	Oregon State Highway Department brass cap, stamped "W652," located on the southwest corner of Silvies River bridge of State Highway 78, east of Burns.
RM 4	4147.94	Set screw and washer, located at intersection of West Jackson Street and South Broadway Avenue. Established by U.S. Army Corps of Engineers.
RM 5	4174.08	Set pipe screw and washer, flush with ground, located at southwest corner of high school baseball field. Established by U.S. Corps of Engineers.
RM 6	4221.95	Set screw and washer, flush with pavement, located at the centerline of the intersection of West Monroe Street and a dirt road going northwest. Established by U.S. Army Corps of Engineers.
RM 7	4158.01	Set screw and washer, flush with pavement, located in centerline of Foley Drive, west of older house, near the southeast corner of Section 1, T 23 S, R 30 E. Established by U.S. Army Corps of Engineers.
RM 8	4157.09	Set screw and washer in centerline of U.S. Highway 20 and 395, approximately 30 feet southwest of bridge over Silvies River, flush with pavement. Established by U.S. Army Corps of Engineers.

*OUTSIDE CORPORATE LIMITS

ZONE V Coastal flood with velocity hazard (wave action); no base flood elevations determined.

ZONE VE Coastal flood with velocity hazard (wave action); base flood elevations determined.

FLOODWAY AREAS IN ZONE AE

OTHER FLOOD AREAS

ZONE X Areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 100-year flood.

OTHER AREAS

ZONE X Areas determined to be outside 500-year floodplain.

ZONE D Areas in which flood hazards are undetermined.

UNDEVELOPED COASTAL BARRIERS†

Identified 1983 — Identified 1990 — Otherwise Protected Areas

†Coastal barrier areas are normally located within or adjacent to special flood hazard areas.

Floodplain Boundary

Floodway Boundary

Zone D Boundary

Boundary Dividing Special Flood Hazard Zones, and Boundary Dividing Areas of Different Coastal Base Flood Elevations Within Special Flood Hazard Zones,

513 — Base Flood Elevation Line; Elevation in Feet*

(D)—(D) Cross Section Line

(EL 987) Base Flood Elevation in Feet Where Uniform Within Zone*

RM 7x Elevation Reference Mark

•M1.5 River Mile

*Referenced to the National Geodetic Vertical Datum of 1929

NOTES

This map is for use in administering the National Flood Insurance Program; it does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size, or all planimetric features outside Special Flood Hazard Areas. The community map repository should be consulted for more detailed data on BFEs, and for any information on floodway delineations, prior to use of this map for property purchase or construction purposes.

Areas of Special Flood Hazard (100-year flood) include Zones A, AE, A1-A30, AH, AO, A99, V, VE and V1-V30.

Certain areas not in Special Flood Hazard Areas may be protected by flood control structures.

Boundaries of the floodways were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the Federal Emergency Management Agency.

Floodway widths in some areas may be too narrow to show to scale. Refer to Floodway Data Table where floodway width is shown at 1/20 inch.

Coastal base flood elevations apply only landward of 0.0 NGVD, and include the effects of wave action; these elevations may also differ significantly from those developed by the National Weather Service for hurricane evacuation planning.

Corporate limits shown are current as of the date of this map. The user should contact appropriate community officials to determine if corporate limits have changed subsequent to the issuance of this map.

MAP REPOSITORY
City of Recorders Office
City Hall
242 South Broadway Avenue
Burns, Oregon 97720
(Maps available for reference only, not for distribution.)

INITIAL IDENTIFICATION:
NOVEMBER 30, 1973

FLOOD HAZARD BOUNDARY MAP REVISION
JANUARY 30, 1976

FLOOD INSURANCE RATE MAP EFFECTIVE:
AUGUST 15, 1984

FLOOD INSURANCE RATE MAP REVISIONS:
NOVEMBER 3, 1989

Map revised December 22, 1998 to change floodway.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at (800) 638-6620.

N

APPROXIMATE SCALE IN FEET

500 0 500

NATIONAL FLOOD INSURANCE PROGRAM

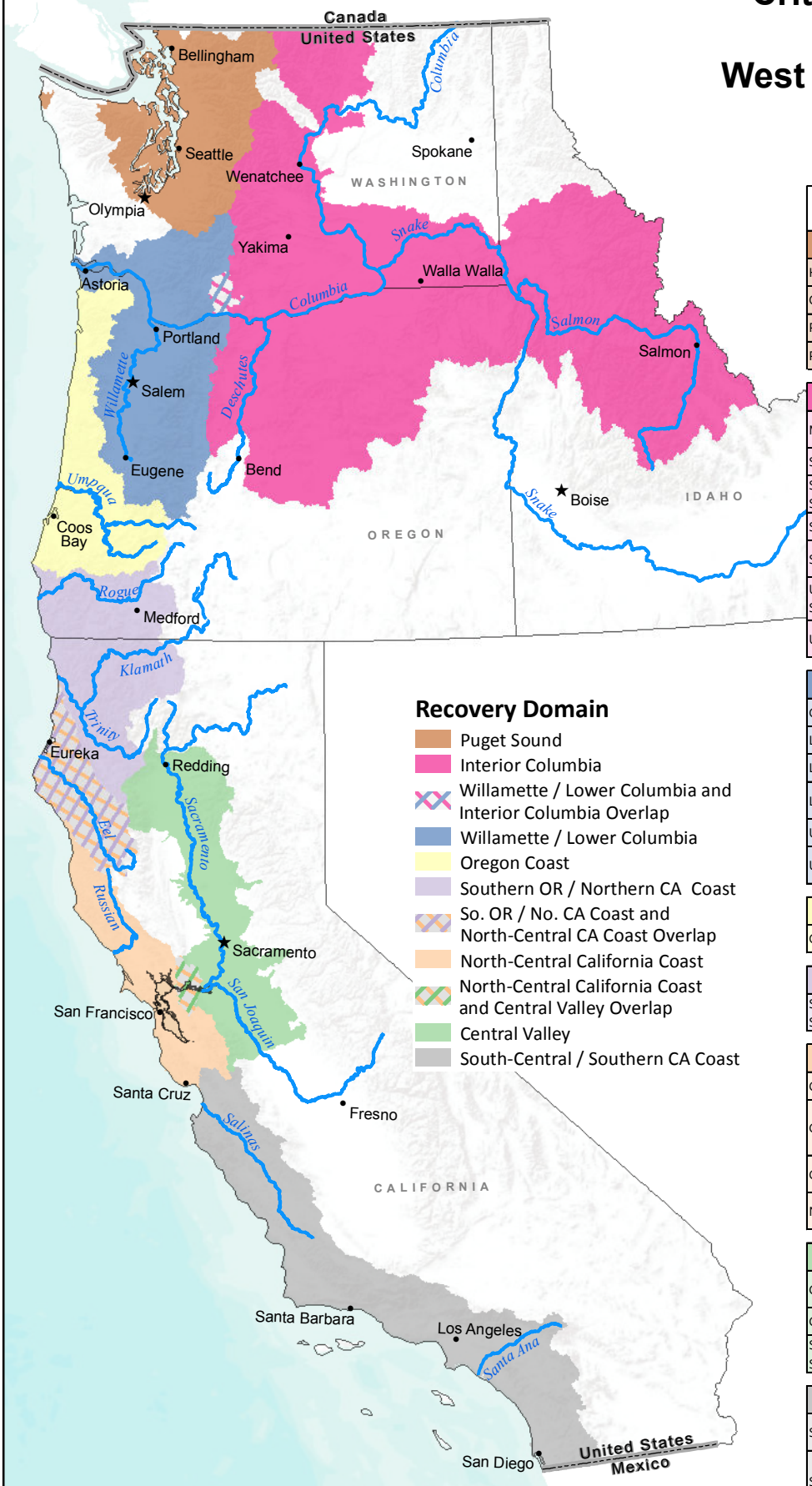
FIRM
FLOOD INSURANCE RATE MAP

CITY OF
BURNS,
OREGON
HARNEY COUNTY

ONLY PANEL PRINTED

ATTACHMENT C
U.S. Fish and Wildlife Service Species List and National Marine Fisheries Service Species Map

Status of ESA Listings & Critical Habitat Designations for West Coast Salmon & Steelhead



Updated July 2016

Evolutionarily Significant Unit / Distinct Population Segment	ESA Status	Date of ESA Listing	Date of CH Designation
Puget Sound Recovery Domain			
Hood Canal Summer-run Chum Salmon	T	3/25/1999	9/2/2005
Ozette Lake Sockeye Salmon	T	3/25/1999	9/2/2005
Puget Sound Chinook Salmon	T	3/24/1999	9/2/2005
Puget Sound Steelhead	T	5/11/2007	2/24/2016
Interior Columbia Recovery Domain			
Middle Columbia River Steelhead	T	3/25/1999 1/5/2006	9/2/2005
Snake River Fall-run Chinook Salmon	T	4/22/1992	12/28/1993
Snake River Spring / Summer-run Chinook Salmon	T	4/22/1992	10/25/1999
Snake River Sockeye Salmon	E	11/20/1991	12/28/1993
Snake River Steelhead	T	8/18/1997 1/5/2006	9/2/2005
Upper Columbia River Spring-run Chinook Salmon	E	3/24/1999	9/2/2005
Upper Columbia River Steelhead	T	8/18/1997 1/5/2006	9/2/2005
Willamette / Lower Columbia Recovery Domain			
Columbia River Chum Salmon	T	3/25/1999	9/2/2005
Lower Columbia River Chinook Salmon	T	3/24/1999	9/2/2005
Lower Columbia River Coho Salmon	T	6/28/2005	2/24/2016
Lower Columbia River Steelhead	T	3/19/1998 1/5/2006	9/2/2005
Upper Willamette River Chinook Salmon	T	3/24/1999	9/2/2005
Upper Willamette River Steelhead	T	3/25/1999 1/5/2006	9/2/2005
Oregon Coast Recovery Domain			
Oregon Coast Coho Salmon	T	2/11/2008	2/11/2008
Southern Oregon / Northern California Coast Recovery Domain			
Southern OR / Northern CA Coasts Coho Salmon	T	5/6/1997	5/5/1999
North-Central California Coast Recovery Domain			
California Coastal Chinook Salmon	T	9/16/1999	9/2/2005
Central California Coast Coho Salmon	E	10/31/1996 (T) 6/28/2005 (E) 4/2/2012 (RE)	5/5/1999
Central California Coast Steelhead	T	8/18/1997 1/5/2006	9/2/2005
Northern California Steelhead	T	6/7/2000 1/5/2006	9/2/2005
Central Valley Recovery Domain			
California Central Valley Steelhead	T	3/19/1998 1/5/2006	9/2/2005
Central Valley Spring-run Chinook Salmon	T	9/16/1999	9/2/2005
Sacramento River Winter-run Chinook Salmon	E	11/5/1990 (T) 1/4/1994 (E)	6/16/1993
South-Central / Southern California Coast Recovery Domain			
South-Central California Coast Steelhead	T	8/18/1997 1/5/2006	9/2/2005
Southern California Steelhead	E	8/18/1997 5/1/2002 (RE) 1/5/2006	9/2/2005

ESA = Endangered Species Act, CH = Critical Habitat, RE = Range Extension
E = Endangered, T = Threatened,

Critical Habitat Rules Cited

- 2/24/2016 (81 FR 9252) Final Critical Habitat Designation for Puget Sound Steelhead and Lower Columbia River Coho Salmon
- 2/11/2008 (73 FR 7816) Final Critical Habitat Designation for Oregon Coast Coho Salmon
- 9/2/2005 (70 FR 52630) Final Critical Habitat Designation for 12 ESU's of Salmon and Steelhead in WA, OR, and ID
- 9/2/2005 (70 FR 52488) Final Critical Habitat Designation for 7 ESU's of Salmon and Steelhead in CA
- 10/25/1999 (64 FR 57399) Revised Critical Habitat Designation for Snake River Spring/Summer-run Chinook Salmon
- 5/5/1999 (64 FR 24049) Final Critical Habitat Designation for Central CA Coast and Southern OR/Northern CA Coast Coho Salmon
- 12/28/1993 (58 FR 68543) Final Critical Habitat Designation for Snake River Chinook and Sockeye Salmon
- 6/16/1993 (58 FR 33212) Final Critical Habitat Designation for Sacramento River Winter-run Chinook Salmon

ESA Listing Rules Cited

- 4/2/2012 (77 FR 19552) Final Range Extension for Endangered Central California Coast Coho Salmon
- 2/11/2008 (73 FR 7816) Final ESA Listing for Oregon Coast Coho Salmon
- 5/11/2007 (72 FR 26722) Final ESA Listing for Puget Sound Steelhead
- 1/5/2006 (71 FR 5248) Final Listing Determinations for 10 Distinct Population Segments of West Coast Steelhead
- 6/28/2005 (70 FR 37160) Final ESA Listing for 16 ESU's of West Coast Salmon
- 5/1/2002 (67 FR 21586) Range Extension for Endangered Steelhead in Southern California
- 6/7/2000 (65 FR 36074) Final ESA Listing for Northern California Steelhead
- 9/16/1999 (64 FR 50394) Final ESA Listing for Two Chinook Salmon ESUs in California
- 3/25/1999 (64 FR 14508) Final ESA Listing for Hood River Canal Summer-run and Columbia River Chum Salmon
- 3/25/1999 (64 FR 14517) Final ESA Listing for Middle Columbia River and Upper Willamette River Steelhead
- 3/25/1999 (64 FR 14528) Final ESA Listing for Ozette Lake Sockeye Salmon
- 3/24/1999 (64 FR 14308) Final ESA Listing for 4 ESU's of Chinook Salmon
- 3/19/1998 (63 FR 13347) Final ESA Listing for Lower Columbia River and Central Valley Steelhead
- 8/18/1997 (62 FR 43937) Final ESA Listing for 5 ESU's of Steelhead
- 5/6/1997 (62 FR 24588) Final ESA Listing for Southern Oregon / Northern California Coast Coho Salmon
- 10/31/1996 (61 FR 56138) Final ESA Listing for Central California Coast Coho Salmon
- 1/4/1994 (59 FR 222) Final ESA Listing for Sacramento River Winter-run Chinook Salmon
- 4/22/1992 (57 FR 14653) Final ESA Listing for Snake River Spring/summer-run and Snake River Fall Chinook Salmon
- 11/20/1991 (56 FR 58619) Final ESA Listing for Snake River Sockeye Salmon
- 11/5/1990 (55 FR 46515) Final ESA Listing for Sacramento River Winter-run Chinook Salmon

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Oregon Fish And Wildlife Office
2600 Southeast 98th Avenue, Suite 100
Portland, OR 97266-1398
Phone: (503) 231-6179 Fax: (503) 231-6195
https://www.fws.gov/oregonfwo/articles.cfm?id=149489416

In Reply Refer To: April 08, 2021
Consultation Code: 01EOFW00-2021-SLI-0291
Event Code: 01EOFW00-2021-E-00600
Project Name: Burns WSMP

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to investigate opportunities for incorporating conservation of threatened and endangered species into project planning processes as a means of complying with the Act. If you have questions regarding your responsibilities under the Act, please contact the Endangered Species Division at the Service's Oregon Fish and Wildlife Office at (503) 231-6179. For information regarding listed marine and anadromous species under the jurisdiction of NOAA Fisheries Service, please see their website (http://www.nwr.noaa.gov/habitat/habitat_conservation_in_the_nw/habitat_conservation_in_the_nw.html).

Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

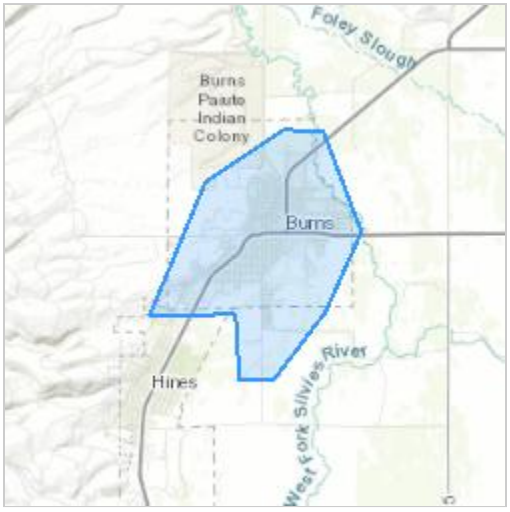
This species list is provided by:

Oregon Fish And Wildlife Office
2600 Southeast 98th Avenue, Suite 100
Portland, OR 97266-1398
(503) 231-6179

Project Summary

Consultation Code: 01EOFW00-2021-SLI-0291
Event Code: 01EOFW00-2021-E-00600
Project Name: Burns WSMP
Project Type: WATER SUPPLY / DELIVERY
Project Description: Burns WSMP - ER Memo
Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@43.5824396,-119.05957825976276,14z



Counties: Harney County, Oregon

Endangered Species Act Species

There is a total of 0 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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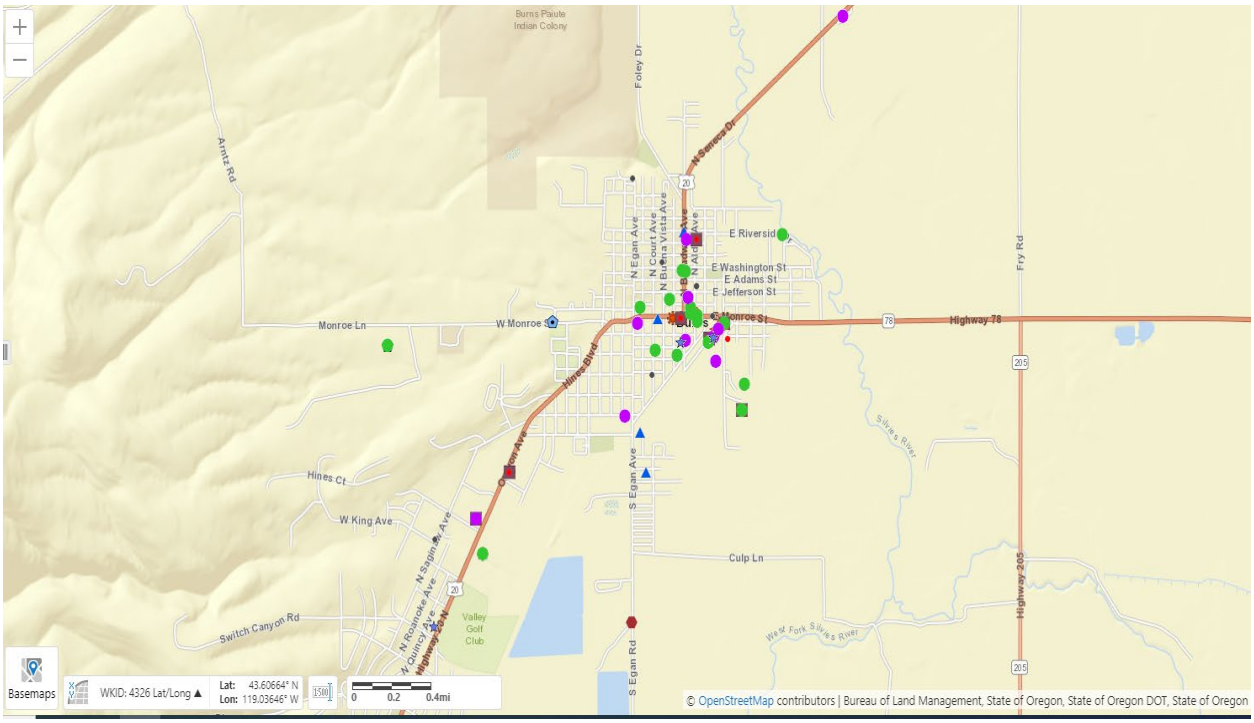
1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

ATTACHMENT D
Oregon Department of Environmental Quality Profiler Lite Map



WQ Underground Injection Control (WQUIC) Sites

Water Quality Underground Injection Control (WQUIC)

Facility Profiler-Lite Sites

Environmental Cleanup Site Information (ECSI)

- Contaminated Site, Listed on CRL or Inventory
- Contaminated Site, No further action required
- Contaminated Site, Suspect site requiring further investigation
- Study Area, Listed on CRL or Inventory
- Study Area, Suspect site requiring further investigation

Hazardous Waste (HAZWASTE)

- Generator
- TSD

Leaking Underground Storage Tanks (LUST)

- Regulated LUST - Cleanup started
- Regulated LUST - Reported
- Regulated LUST - Cleanup completed
- Non-regulated LUST - Cleanup started
- Non-regulated LUST - Reported
- Non-regulated LUST - Cleanup completed

Solid Waste Information Facility Tracking (SWIFT)

- Compost
- Industrial
- Municipal
- SWLA
- Sludge
- Waste Tire

Tracking, Reporting & Admin. of Air Contaminated Sources (TRAACS)

- ACDP, Active
- ACDP, Closed
- ACDP, Temporarily Closed
- ASR, Active
- Title V, Active
- Title V, Temporarily Closed

Underground Storage Tanks (UST)

Water Quality Site Information System (WQSIS)

- Individual NPDES - Domestic wastewater treatment facilities
- Individual NPDES - Industrial storm water Discharges
- Individual NPDES - Industrial wastewater discharges
- Individual WPCF - Domestic on-site sewage system
- Individual WPCF - Domestic wastewater treatment facilities
- Individual WPCF - Industrial storm water Discharges
- Individual WPCF - Industrial wastewater discharges
- NPDES General Permit - Domestic wastewater discharges
- NPDES General Permit - Industrial storm water discharges
- NPDES General Permit - Industrial wastewater discharges
- WPCF General Permit - Domestic on-site sewage system
- WPCF General Permit - Industrial wastewater discharges

APPENDIX M
Water Rate Resolution No. 20-688

CITY OF BURNS

RESOLUTION NO. 20-688

A RESOLUTION OF THE CITY OF BURNS, OREGON, SETTING RATES FOR WATER AND SEWER SERVICES PROVIDED BY THE CITY OF BURNS, PURSUANT TO THE WATER AND SEWER ORDINANCE.

WHEREAS, the water ordinance and the sewer ordinance specifies that water and sewer rates charged to customers will be set by Council resolution;

WHEREAS, the city council has previously studied and received public comments regarding water rates and adopted or approved a table of scheduled rates created to keep the water and sewer fund solvent;

Now, therefore,

BE IT RESOLVED BY THE CITY COUNCIL, OF THE CITY OF BURNS, OREGON, that the following rates are effective immediately for water and sewer services provided to the customers of the City of Burns as follows:

Water

Base rate by meters every two months:	Inside City:	Outside City:
5/8" X ¾" Residential/Commercial	$44.00	$66.00
1"	$61.60	$92.40
1 ½"	$79.10	$118.70
2"	$127.60	$191.40
3"	$484.15	$726.30
4"	$616.25	$924.30

Multifamily units: Base Rate according to meter Size above plus $6.30 per unit per month.

Outside City Limits: Inside City Base Rate according to meter Size above plus 50% per month. See above. (plus $6.30 per unit per Month for multifamily units).

Volume Charge for all accounts (quantity in excess of base) $0.0025 per cu.ft.

Sewer

Base rate by account every two months:

Single Family Residential	$46.80
Two Family Residential-Duplex	$65.50
Three Family Residential-Triplex	$74.85
Apartment/Mobile Homes/Trailer Courts/ RV Parks/Additional Billed Units	$74.85 $13.00 for each unit Over three, per month
Commercial – Business/Industrial/Hotels/ Motels and/or all others	$46.80 + Volume Charge
Water/*Sewer Reserve Charge every two months:*	$12.00
Transportation Fee every two months:	$16.00 per unit
Volume Charge for Commercial Rate	$0.0036per cu.ft.

Other

There shall be a charge to turn water on and off or to go to a residence to check for leaks:
Service/Trip Charge: $35.00 After Hours Service/Trip Charge: $60.00

Passed by the City Council of the City of Burns, Oregon this 24th day of June, 2020

Attest:

Dawn Crafts, City Recorder

City of Burns

Jerry Woodfin, Mayor