City of Prineville, Oregon

Water System Master Plan

2018

GSI Water Solutions, Inc.

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anderson perry & associates, inc.
engineering · surveying · natural resources

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WATER SYSTEM MASTER PLAN
FOR
CITY OF PRINEVILLE, OREGON

2018

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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 Prineville, Oregon. The recommendations outlined hereafter have been developed in cooperation with the Prineville City Council and City staff. The focus of this WSMP is on the City's water system components, including the water supply, storage, and distribution systems. This WSMP includes an analysis of the existing systems and their performance, an evaluation of system needs and improvement alternatives, and development of a financial plan and project implementation plan. Included in this Executive Summary is a brief discussion of the population, design criteria, summary of the evaluation and needs of water system components, categories of improvements and summary of costs, and project financing and implementation. For a more detailed discussion of the information presented in this Executive Summary, refer to the individual chapters of this WSMP.

Population

To estimate future water system demands, population projections must be made. Projections are usually made on the basis of an annual percentage increase estimated from past growth rates combined with future expectations. The City of Prineville's population at the 2010 Census was 9,253. The certified population estimate by the Population Research Center (PRC) at Portland State University for 2017 was 9,646, with an average annual growth rate of 0.7 percent between the years 2016 and 2035 and 0.1 percent between the years 2035 and 2066.

The historical population plus the projected annual growth rate results in a 20-year (year 2037) population estimate of 10,958. This WSMP uses 10,958 as the 20-year design population inside the city limits.

It is important to note that an estimated 1,057 people within city limits do not receive City-supplied water, and an estimated 301 people outside city limits but within the urban growth boundary (UGB) do receive City-supplied water. Therefore, the net 2017 population served by City-supplied water is estimated to be 8,889. A review of historical water data must be completed using the connected population. Improvements to the distribution system are needed to be able to connect the entire population within the city limits. In addition, there are areas of residential development outside the city limits but within the UGB. If 20 percent of these areas are annexed into the City in addition to the 1,057 people not currently connected, the connected population could increase by 1,551 people to 10,440, without any additional people moving into the area.

To obtain a realistic population that could require service by the water system in the next 20 years, a design population of 11,752 in the year 2037 was estimated by utilizing the average annual growth rate values declared by the PRC with the addition of the anticipated future connected population.

Design Criteria

When 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 are set by both the Environmental Protection Agency and Oregon Health Authority - Drinking Water Services. 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 created.

The design criteria in Chapter 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 for each. Application of these criteria is discussed further in the specific chapters that address the water supply, storage, and distribution system facilities. Figure 2-3 in Chapter 2 presents design criteria based on the estimated present service population and present estimated average daily and peak daily demands. Storage volumes are derived from calculations summarized in Chapter 4. The design criteria are used as base information in later chapters for evaluating existing and future system needs and capability.

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

Supply

At this time, due to current limitations with available water rights, the City does not have enough source capacity to meet current and future demands. A detailed discussion of the City's water rights is presented in Chapter 3. It is desirable to design a system with enough source capacity to provide for peak daily demands without requiring the well pumps to operate 24 hours per day. The 2037 peak daily flow requirement is estimated to be 3,977 gallons per minute (gpm). The current capacity from the City's 11 wells is approximately 3,765 gpm. To obtain the needed additional water supply capacity, the City should develop more sources. This could be done by developing the proposed wells in the Deschutes Regional Aquifer or through shallow groundwater sources located near the Crooked River that are hydraulically connected to the river. The most feasible option available to the City appears to be the shallow groundwater sources, but it will not be known for certain until a pending study to evaluate the potential to develop the sources is completed. Once the study is completed, the information needed to compare alternatives will be available, and the City will have the required data and documentation to make the best long-term decision to meet the additional supply capacity needs.

Storage

The City currently has six operating storage reservoirs with a total volume of 4.5 million gallons (MG). With the exception of the Ochoco Heights reservoirs, the existing condition of the reservoirs is generally good to very good. The storage needed for the year 2037 planning period is provided by the existing reservoirs. However, maintenance and rehabilitation improvements are recommended for the Ochoco Heights reservoirs as discussed below.

Anticipated future growth in northeast Prineville will require the addition of two new water system pressure zones. A new 1.0 MG reservoir is recommended to be constructed in connection with the growth in this area to provide adequate system pressures and fire protection. The lower of the two new pressure zones would be served by gravity flows from the new reservoir. A booster pump station would be necessary to provide adequate pressures to the upper pressure zone from the new reservoir.

As discussed in Chapter 4, a new larger reservoir (1.5 MG) is recommended to be constructed at the existing Ochoco Heights reservoirs site. This would enable the existing reservoirs to continue to serve the system as the new reservoir is constructed. Once the new reservoir is constructed and in operation, one of the existing 0.5 MG reservoirs can be taken out of service to complete renovations and repairs. Once the rehabilitation work is complete, the renovated and repaired reservoir would work in conjunction with the new reservoir, providing a total of 2.0 MG storage at the site. The second existing 0.5 MG reservoir would be demolished.

Distribution

As detailed in Chapter 5, the City's distribution system is generally fairly well looped and provides adequate system-wide pressures under normal operating conditions. Fire flow availability is limited in areas of the system due to several undersized main lines and areas of higher elevation. The undersized main lines in the system result in fire flow capacity limitations and water circulation issues. Some of these lines, where improved fire flow capacities are needed, are recommended for upgrading. It is recommended the City complete improvements to the distribution system to eliminate as many deteriorating and undersized main lines as possible and provide improved system fire flow capacities in areas lacking adequate fire flows. Key water distribution system improvements have been identified to meet the following objectives:

- Install a water line and pressure reducing valve from the Airport pressure zone that connects to the Valley pressure zone. This improvement would greatly enhance flows throughout the system. The new water line would provide a second distribution option as a means to deliver Airport Well water to the Valley pressure zone. This improvement will eliminate stress on the existing 8-inch line, provide redundancy, and create more availability from the Barnes Butte supplies to serve future growth.
- Construct a new transmission main, booster pump station, and reservoir to serve the northeast portion of the City of Prineville. In addition to serving growth in northeast Prineville, this improvement will also eliminate some of the low-pressure problems currently experienced in the system at higher elevation areas. This improvement would also offer a source of redundant supply to the Northridge pressure zone.
- Improve water quality and circulation by replacing old, undersized, deteriorating pipe. Increase flow capacity to the existing system to provide adequate fire flows to residential, commercial, and industrial areas.
- Replace existing small diameter or wood stave water pipes. Upsize water pipes in key locations to increase fire flow.
- Connect existing homes in the vicinity of Fairview Street to City water.
- Improve the system to serve future growth.
- Construct future mains and booster pump stations to serve growth within the UGB.

To meet these objectives, address identified deficiencies and support growth and development, the recommended water system improvements have been identified and are shown on Figure ES-1.

Categories of Improvements and Summary of Costs

The City of Prineville's intent is to complete water system improvements utilizing two different funding categories. These categories include:

- **System Development Charge (SDC)** - Improvements identified under the SDC category were developed to address those needs in the system to specifically support growth and associated increased system demands.
- **Capital Improvements Plan (CIP)** - Improvements identified under the CIP category include capital improvements projects that need to be completed to address existing system deficiencies irrespective of growth.

The identified improvements categorized under the SDC funding category are shown on Figure ES-1, and a summary of the improvements and estimated costs are provided on Figure ES-2. It should be noted the reference numbers shown on the figures have been arbitrarily assigned and are not in order of priority. It is not possible to assign priorities to the improvements identified under the SDC funding category as they are development driven and it is unknown which areas of the City will develop first or how quickly development within the City will occur.

The CIP identifies and prioritizes short-, medium-, and long-term capital projects of all types based on the water system master planning process. Capital water system improvements projects will be coordinated with the annual budget process to maintain full utilization of available resources. For each capital improvements project, the CIP provides a variety of information, including a project description and the service need to be addressed, a proposed timetable, and proposed funding levels. Capital water system improvements projects will be prioritized with the most urgent projects first. Ongoing operating costs are not included in the CIP estimated project costs.

Development of a CIP is a collaborative effort between the City manager, engineer, City Council members, department heads, and the City's engineering and financial consultants. City staff participates in CIP development via specific master plans and other planning tools. Major capital improvements projects require City Council interaction during project development and where funding allocations are made.

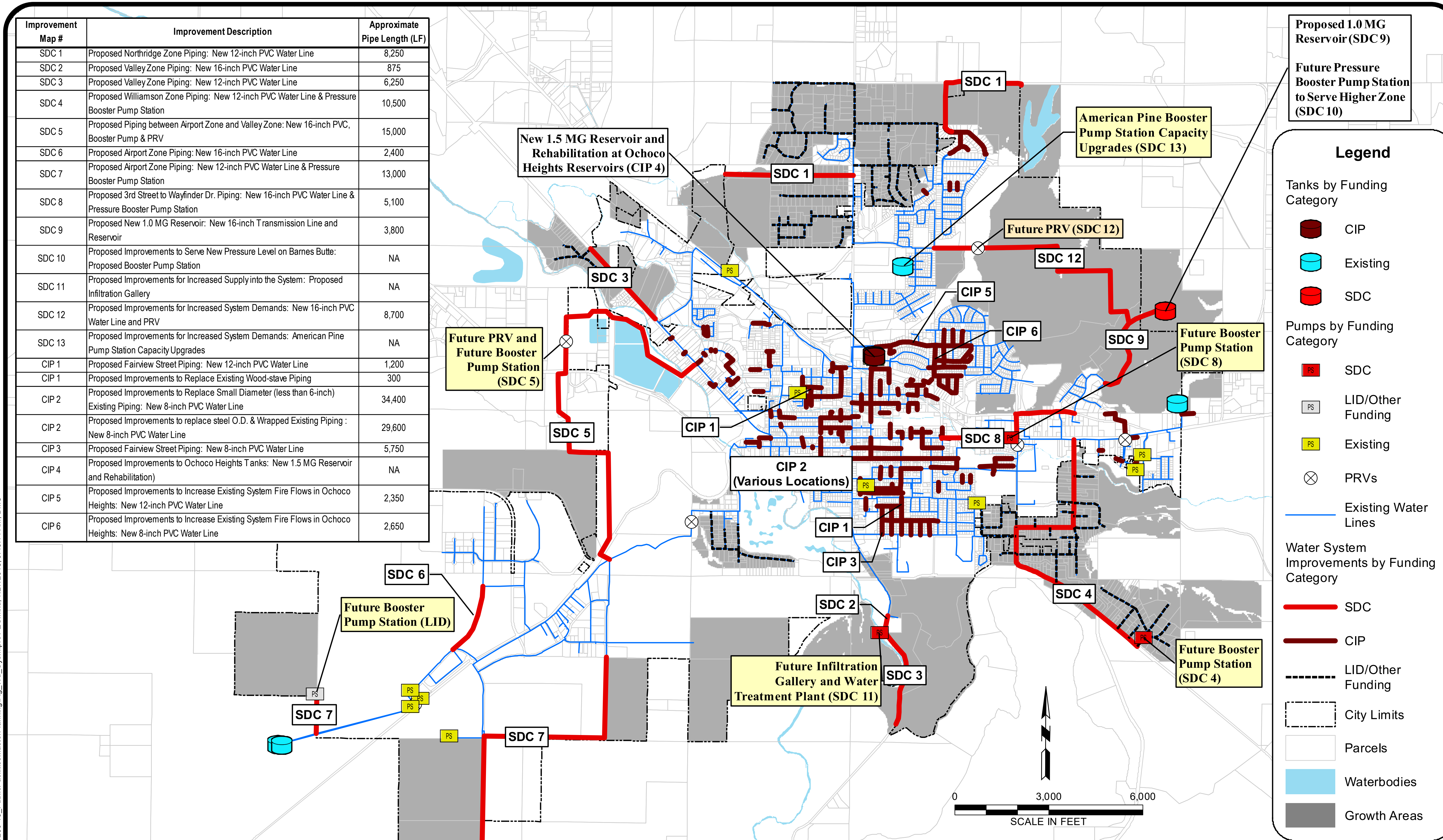
The identified improvements categorized under the CIP funding category are shown on Figure ES-1 and a summary of the improvements and estimated costs are provided on Figure ES-3. It should be noted the reference numbers shown on the figures have been assigned based on City-established priorities (1 being the highest and 6 being the lowest). The priorities are based on the relative urgency of addressing the identified existing deficiencies that are recommended regardless of population growth and associated development.

The estimated costs represent 2017 dollars. As project funding is established, costs should be projected to the year of the anticipated expenditure to account for inflation.

Project Financing and Implementation

Project financing is discussed in Chapter 7 and in the Water Rate and SDC Studies prepared by GEL Oregon, Inc. At the time this WSMP was finalized, the Water Rate and SDC Studies were not complete. Copies of these studies will be available at Prineville City Hall.

Improvement Map #	Improvement Description	Approximate Pipe Length (LF)
SDC 1	Proposed Northridge Zone Piping: New 12-inch PVC Water Line	8,250
SDC 2	Proposed Valley Zone Piping: New 16-inch PVC Water Line	875
SDC 3	Proposed Valley Zone Piping: New 12-inch PVC Water Line	6,250
SDC 4	Proposed Williamson Zone Piping: New 12-inch PVC Water Line & Pressure Booster Pump Station	10,500
SDC 5	Proposed Piping between Airport Zone and Valley Zone: New 16-inch PVC, Booster Pump & PRV	15,000
SDC 6	Proposed Airport Zone Piping: New 16-inch PVC Water Line	2,400
SDC 7	Proposed Airport Zone Piping: New 12-inch PVC Water Line & Pressure Booster Pump Station	13,000
SDC 8	Proposed 3rd Street to Wayfinder Dr. Piping: New 16-inch PVC Water Line & Pressure Booster Pump Station	5,100
SDC 9	Proposed New 1.0 MG Reservoir: New 16-inch Transmission Line and Reservoir	3,800
SDC 10	Proposed Improvements to Serve New Pressure Level on Barnes Butte: Proposed Booster Pump Station	NA
SDC 11	Proposed Improvements for Increased Supply into the System: Proposed Infiltration Gallery	NA
SDC 12	Proposed Improvements for Increased System Demands: New 16-inch PVC Water Line and PRV	8,700
SDC 13	Proposed Improvements for Increased System Demands: American Pine Pump Station Capacity Upgrades	NA
CIP 1	Proposed Fairview Street Piping: New 12-inch PVC Water Line	1,200
CIP 1	Proposed Improvements to Replace Existing Wood-stave Piping	300
CIP 2	Proposed Improvements to Replace Small Diameter (less than 6-inch) Existing Piping: New 8-inch PVC Water Line	34,400
CIP 2	Proposed Improvements to replace steel O.D. & Wrapped Existing Piping : New 8-inch PVC Water Line	29,600
CIP 3	Proposed Fairview Street Piping: New 8-inch PVC Water Line	5,750
CIP 4	Proposed Improvements to Ochoco Heights Tanks: New 1.5 MG Reservoir and Rehabilitation)	NA
CIP 5	Proposed Improvements to Increase Existing System Fire Flows in Ochoco Heights: New 12-inch PVC Water Line	2,350
CIP 6	Proposed Improvements to Increase Existing System Fire Flows in Ochoco Heights: New 8-inch PVC Water Line	2,650



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CITY OF
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WATER SYSTEM MASTER PLAN

PROPOSED WATER SYSTEM IMPROVEMENTS

FIGURE
ES-1

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CITY OF PRINEVILLE, OREGON
SUMMARY OF PROPOSED SDC-FUNDED IMPROVEMENTS AND ESTIMATED PROJECT COSTS
(YEAR 2017 COSTS)

Improvement No.	Improvement Description	Approximate Pipe Length (LF)	Total Estimated Costs
SDC 1	Proposed Northridge Zone Piping (Distribution Mains to Connect Undeveloped Areas to City System)	8,250	$ 2,059,850
SDC 2 and 3	Proposed Valley Zone Piping (Distribution Mains to Connect Undeveloped Areas to City System)	7,125	1,745,425
SDC 4	Proposed Williamson Zone Piping (Distribution Mains to Connect Undeveloped Areas to City System)	10,500	3,764,000
SDC 5	Proposed Piping between Airport Zone and Valley Zone (Inter Connection Distribution Piping)	15,000	4,893,000
SDC 6	Proposed Airport Zone Piping (Distribution Loop Existing City System and increase Circulation and Fire Flows)	2,400	413,000
SDC 7	Proposed Airport Zone Piping (Distribution Mains to Connect Undeveloped Areas to City System)	13,000	2,621,500
SDC 8	Proposed 3rd Street to Wayfinder Drive Piping (New Pressure Zone Feed)	5,100	2,283,400
SDC 9	Proposed New 1.0 Million Gallon Reservoir (to Serve New Pressure Level)	3,800	2,901,500
SDC 10	Proposed Piping Improvements to Serve New Pressure Zone on Barnes Butte	N/A	803,000
SDC 11	Proposed Piping Improvements for Increased Supply to the System	N/A	6,237,500
SDC 12 and 13	Proposed Piping Improvements for Increased System Demands	8,700	1,611,000
	TOTAL ESTIMATED SDC IMPROVEMENT COST (2017 DOLLARS)		**$ 29,333,175**

LF= Lineal Feet

[1] The SDC funded improvements are not listed in any order of priority. Which improvement to be completed first will depend on where growth and development occur.

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CITY OF
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WATER SYSTEM MASTER PLAN
SUMMARY OF PROPOSED SDC-FUNDED IMPROVEMENTS AND ESTIMATED PROJECT COSTS

FIGURE
ES-2

CITY OF PRINEVILLE, OREGON
SUMMARY OF PROPOSED CIP-FUNDED IMPROVEMENTS AND ESTIMATED PROJECT COSTS
(YEAR 2017 COSTS)

Improvement[1] No.	Improvement Description	Approximate Pipe Length (LF)	Total Estimated Costs	Time Frame When Improvements Completed
CIP 1	New 12-inch Water Line in Fairview Street and Replace Existing Wood-stave Piping with New 8-inch Polyvinyl Chloride (PVC) Water Line	1,500	$ 455,350	0 to 10 years
CIP 2	Replace Existing Small-Diameter (Less than 6-inch) Piping, and Replace Existing Wrapped Steel Piping with New 8-inch PVC Water Line	64,000	13,014,250	0 to 10 years
CIP 3	New 8-inch PVC Water Lines in the Vicinity of Fairview Street	5,750	1,595,750	0 to 10 years
CIP 4	New Ochoco Heights Reservoir, Demolition of an Existing Reservoir, and Rehabiliatation of an Existing Reservoir	N/A	3,028,400	0 to 10 years
CIP 5	New 12-inch PVC Water Line to Increase Existing System Fire Flows in Ochoco Heights	2,350	587,900	10 to 20 years
CIP 6	Proposed Improvements to Increase Existing System Fire Flows in Ochoco Heights: New 8-inch PVC Water Line	2,650	593,100	10 to 20 years
	TOTAL ESTIMATED IMPROVEMENT COST (2017 DOLLARS)		**$ 19,274,750**	

LF= Lineal Feet

Notes: [1]Improvements listed in order of City-identified priority, with CIP 1 being the highest priority and CIP 6 being the lowest.

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WATER SYSTEM MASTER PLAN
SUMMARY OF PROPOSED CIP-FUNDED IMPROVEMENTS AND ESTIMATED PROJECT COSTS

FIGURE
ES-3

Chapter 1 - Introduction

Purpose of Study

This Water System Master Plan (WSMP) is intended to provide current information on which future operation the City of Prineville's municipal water system can be based. This WSMP is also intended to satisfy the criteria of the Oregon Health Authority - Drinking Water Services (DWS) and Oregon Administrative Rule 333-061-0060. The City of Prineville's last WSMP was prepared in 2006. This WSMP is intended to fulfill the DWS requirements for a current master plan for the next 20 years. Preparation of this WSMP was authorized by an agreement between the City and Anderson Perry & Associates, Inc., dated September 1, 2016. The primary purposes for developing this WSMP were to establish water system design criteria for a 20-year planning period; evaluate the adequacy of the existing water supply, treatment, storage, and distribution systems; evaluate alternatives and priorities for improving the City's water system; and identify a financial plan for implementing the recommended improvements. This WSMP will also serve as the basis for developing a capital improvements plan based on the identified improvements and priorities.

Organization of Study

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

A. The Executive Summary of the overall WSMP describes water quality and service goals (design criteria), present and future water system deficiencies, the City's selected and prioritized improvements for achieving the goals and correcting the deficiencies, and the recommended implementation schedule and financing program for constructing improvements.

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

C. Chapter 2, "Water System Requirements," develops the data on which recommended improvements to the water system are based. Data relating to elements such as service area, population, land use, water use, fire flows, state and federal regulations, and the design criteria developed for this WSMP 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.

D. Chapter 3, "Water Supply and Treatment," discusses the operation, capacity, and quality of the existing water supply and treatment systems with respect to existing and future system demands and regulations. Information concerning water rights and permits for the appropriation of water from various sources is presented. An evaluation of the existing water treatment system is also included, as well as alternatives to address current treatment system deficiencies. A comparison of alternatives to obtain additional water supply sources is also provided.

E. Chapter 4, "Water Storage," discusses the existing storage reservoirs, presents the four primary components of water storage relative to the City's design criteria, evaluates alternative storage facilities, and provides recommendations for storage improvements.

F. Chapter 5, "Distribution System," presents information related to the existing distribution system facilities, water quality test results, and fire protection information. Existing deficiencies and deficiencies likely to develop during the planning period are identified. Improvements including specific areas of piping, a water meter replacement program, and water conservation efforts are recommended.

G. Chapter 6, "Summary of Proposed Improvements and Capital Improvements Plan," presents information related to water supply, treatment, storage, and distribution system improvements developed through analysis of the system. Cost estimates are provided for each of the recommended water system improvements.

H. Chapter 7, "Project Financing and Implementation," provides a description of alternatives to finance water system improvements including local financing such as user rates, taxes, and financing assistance programs. Operation, maintenance, and replacement costs are projected for both the existing system and future system improvements. The number of residential, commercial, and industrial equivalent dwelling units is provided. Potential water rate needs are developed and rate implementation procedures are identified. A recommended water system improvement implementation process, including an evaluation of financing alternatives and identification of key implementation steps, is also provided.

I. The "Appendices" contain key materials referenced in this WSMP, which are provided for future reference by City staff. This information includes well log and water rights information, testing results, applicable 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, in part, past flow records (supply and usage); financial data (operational cost, revenues, and cost distribution); descriptions of system operation, condition of system components, and identification of problem areas; water quality data; and system layout and sizing. The recommendations and conclusions are, therefore, dependent on the completeness and accuracy of the base information provided.

Review and Updating of Study

This WSMP should be periodically reviewed and updated to stay current with population growth, water system demands, and changing state and federal regulations. This WSMP is recommended to be reviewed at 5-year intervals and be updated at 10-year intervals, or as growth dictates.

Objectives of Study

The primary objectives of this WSMP are to provide the following information:

1. 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.

2. Analyze the individual components of the existing water supply system considering capacity, compliance with current water quality standards, water rights, condition of components, operational dependability, and cost of operation. Develop the water supply needs for the planning period and identify cost-effective alternatives for meeting long-term water supply and treatment needs including alternatives for correcting existing system deficiencies. Outline general operation and maintenance (O&M) requirements for the water supply system.

3. Analyze the existing water storage facilities considering capacity, condition of the reservoirs, and distribution system pressures. Assess the City's storage capacity considering emergency storage, operational storage, equalization storage, and fire flow storage. Identify the storage requirements of the water system for the planning period.

4. Develop a Geographic Information System-based map of the distribution system including line sizes, line types, valve and hydrant locations, etc., when known.

5. Utilizing existing distribution system maps, a computer model, and City records, review the condition and adequacy of the distribution system piping. Identify system deficiencies and alternatives for meeting current and future system needs. Provide estimated costs for implementation of recommended improvements. Outline general O&M requirements of the distribution system as well.

6. Analyze the hydraulic capacity and system pressures in the existing water distribution system under average daily and peak daily demand conditions using an existing computer model. 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, 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 the long-term system needs including general user rate charges and outside financial assistance.

8. Provide information on 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 cost. Make recommendations for meeting the water system needs for the planning period.

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

Regional Setting

The City of Prineville is located in central Oregon along the Crooked River, a major tributary of the Deschutes River that flows north into the Columbia River. The valley through which the river flows is bordered on the north by the slopes of the Ochoco Mountains and on the south by steep escarpments that rise to an extensive lava plateau south of the Prineville area. Location and vicinity maps and aerial photographs for the City are shown on Figures 1-1, 1-2A, and 1-2B. The City of Prineville is the County seat and the only incorporated city in Crook County, with a population of 9,253 at the 2010 Census. The 2015 estimated population for Prineville was 9,385, as estimated by the Population Research Center at Portland State University.

The climate in the summer is typically dry with clear days. Winter brings rain, snow, and frozen soils. Temperatures vary from extremes of -30° Fahrenheit (F) in the winter to 120°F in the summer. These extreme temperatures are usually not prolonged. According to the Western Regional Climate Center, the average annual temperature of the City of Prineville is approximately 47°F and the annual average precipitation is approximately 9.9 inches.

Transportation is provided to the City of Prineville by Highways 26 and 126. The City of Prineville is positioned at the intersection of these two highways. It is located approximately 16 miles west of Highway 97, which is a major north-south highway in Oregon.

Soils

The soils throughout the City of Prineville are generally designated silt loams or sandy loams. The major types are Ochoco-Prineville complex, Powder silt loam, Crooked stearns complex, and Metolius ashy sandy loam. These soils are generally nearly level, well drained to moderately well drained soils with parent materials of volcanic ash over mixed alluvium from volcanic rock.

Location

The City of Prineville is located in central Oregon at the intersection of Highways 26 and 126, adjacent to the Crooked River in Crook County. The general location of the community is shown on Figure 1-1, Location and Vicinity Maps.

The area of analysis provided in this WSMP encompasses the entire area within the city limits and urban growth boundary (UGB), as shown on Figure 1-1.

Water System History

General

The majority of the historical information for the water system was obtained from City records; conversations with Eric Klann, Prineville City Engineer; the City's Water Management and Conservation Plan prepared in 2016 by GSI Water Solutions, Inc.; and the 2006 WSMP completed by Ace Consulting.

The City of Prineville owns and operates a municipal water system that obtains water from several wells distributed over the system. The water is then stored in ground-level storage reservoirs and distributed to residential, commercial, industrial, and public customers within the city limits and approximately 120 residences outside the city limits but within the UGB. An estimated 421 residences exist within the city limits that are currently served by private wells and are not connected to the City's water system.

Historically, the City's water system was privately owned and operated by the Deschutes Power and Light Company until 1928 when it was acquired by Inland Power and Light Company and then resold to Pacific Power and Light in 1930. The City acquired the water system from Pacific Power and Light in January 1985. Approximately 10 percent of the water mains are 4-inch diameter and smaller, and some are galvanized steel pipe. Over the years, the City has replaced some undersized mains and installed new mains, additional wells, and storage tanks.

Previous Study

The primary recommendations in the 2006 WSMP were to increase supply, storage, and distribution. These improvements included replacing existing undersized water mains and wood stave pipes, as well as developing several wells and constructing several tanks and a booster pump station. In response to the 2006 WSMP, the City constructed the 1 million gallon (MG) airport reservoir and three airport wells and removed a significant amount of wood stave and undersized pipes.

Water Supply Sources

Although the City holds surface water rights to the Crooked River, Prineville Reservoir, and Ochoco Creek, surface water is exclusively used for irrigation and livestock purposes. Municipal water for the City of Prineville is sourced from a total of 11 wells. Seven of the wells are located on the Prineville valley floor and appropriate water from an alluvial aquifer with a total reported production capacity of 1,440 gallons per minute (gpm). The other four wells are located west of the City and source water from the Airport Area Aquifer System with a reported production limit of 1,770 gpm. This aquifer is currently being monitored to determine its long-term reliability. All the wells in the system are controlled by telemetry with the exception of the Stearns Well, the 4th Street wells, and the Stadium Well, which are controlled manually. The well locations are shown on Figures 1-2A and 1-2B and a summary of production well data is presented on Table 1-1.

TABLE 1-1
SUMMARY OF PRODUCTION WELL DATA

Well	OWRD Well Log Number	Year Constructed	Depth (feet)	Static Water Level at Construction (feet)	Current (2011 to 2016) Static Water Level (Feet)	Horsepower Pump or Motor	Estimated Capacity (gpm)
Prineville Valley Floor Aquifer Wells							
Barney	CROO 3132	1994	280	35	130.5	60	340
Stearns	CROO 2083	1973	246	0 (Artesian)	164.9	75	210
Stadium	CROO 184	1987	259	31	32.6	40	205
4th Deep	CROO 2133	1960	252	22	9.8	30	175
4th Shallow	CROO 52542 CROO 2130	1950	75	4.5	2.1	--	90
Yancey	CROO 50181	1917	228	16.2	11	30	210
Lamonta	CROO 1540	1957	256	0 (Artesian)	50	60	210
						Subtotal	**1,440**
Airport Area Wells							
Airport Well 1	CROO 1894 CROO 54206	1980/1996	575	435.7	432.5	60	300
Airport Well 2	CROO 53453	2007	546	408	434.8	150	640
Airport Well 3	CROO 53956 CROO 54149	2012	703	480	373.5	100 (de-rated to 90)	285
Airport Well 4	CROO 54191	2014	607	432	436.2	250	1,100
						Subtotal	**2,325**
						Total Production Capacity	**3,765**
Water Source Not Connected to Municipal Water Supply System							
Freight Depot	CROO 35759	2010	280				
10th Street	CROO 1549	1943	223				
Ochoco Heights	CROO 1577	1943	1,002				
Northridge A	CROO 426	1992	940				
Stearns No. 1	--	--	--				
Clear Pine	CROO 1551	1948	400				
Simmons Well	CROO 50124	1996	148				

-- = Data not available

The Stearns Well is located off Highway 26. In January 1973, the well was drilled to a depth of 246 feet and was artesian. A casing with diameters of 24 and 12 inches was installed to a depth of 225 and 226 feet, respectively, with cement grout from 32 to 75 feet. A stainless steel screen was installed from 226 to 246 feet. The materials observed during drilling included silty sand, clays, and gravel. An initial well test at the time of construction showed the well yield was 820 gpm with a 136-foot drawdown for 10 hours.

The 4th Street Deep Well is centrally located in the City approximately 525 feet from the intersection of S.E. Belknap Street and S.E. 4th Street. The well was drilled to a depth of 252 feet with a diameter of 12 inches. The static water level was measured to be 22 feet below ground surface (BGS) when the well was drilled on October 12, 1960. A stainless steel screen was installed from 222 to 242.5 feet. Casing was installed from the surface to 222 feet with diameters of 24 and

12 inches. Casing was also installed with a diameter of 12 inches from 242.5 feet to 252 feet. The materials observed during drilling included silty clay, silts, water-bearing sand, and gravel. An initial well test at the time of construction showed the well yield was 650 gpm with a 74-foot drawdown after 12 hours. The well was rehabilitated in 2005, and the 30 horsepower (Hp) pump has a current capacity of 175 gpm.

The 4th Street Shallow Well is located adjacent to the 4th Street Deep Well. The well was drilled to a depth of 75 feet and cased to a depth of 61 feet. Construction was completed in August 1950. The aquifer was recorded to be gravel from 13 to 28 feet, and the well casing is perforated from 13 to 22 feet. Materials observed included clay, silt, gravel, and sand. The submersible pump has a rated capacity of 90 gpm. The well has not been utilized in recent history and is the City's backup source.

The Lamonta Well is located on Lamonta Road north of the City. Completed on September 4, 1957, the well was drilled to a depth of 256 feet with a diameter of 24 inches. Wire-wound screen was installed from 228 to 253 feet. The static water level is 17 feet BGS. An initial well test at the time of construction showed the well yield was 800 gpm with a 200-foot drawdown after 1 hour. Materials observed in the well included sand, sandstone, surface water, clay, sandy silt, sticky shale, and gravel. The 60 Hp turbine pump currently produces an average of 210 gpm with a rated capacity of 450 gpm.

Only well records exist for the Yancey Well, which is located north of Highway 26 on N.W. Fairmont Street. The well was drilled in 1917 to a depth of 228 feet and was later reconstructed in 1975. The well has an 8-inch casing to a depth of 239 feet. The static water level was recorded to be 16.2 feet BGS on October 26, 1944. The 30 Hp turbine pump has a capacity of 210 gpm. During a well pump test, the drawdown was reported to be 96 feet after 20 hours of pumping at 360 gpm.

The Stadium Well is located on 5th Street adjacent to the high school track and stadium. Construction was completed in February 1987, and the well was drilled to a depth of 259 feet. At the time of drilling, the static water level was found to be 31 feet BGS. The well is cased with a 12- and 10-inch diameter welded steel liner from 3.5 feet to 228 feet and 218 to 259 feet, respectively. Materials observed during drilling include clay, gravel, and sand. The 40 Hp turbine pump has a limited capacity of 205 gpm with significant drawdown. A filter has been installed in the well due to sand and iron problems. This well is utilized manually as a backup for emergencies and only used for short periods of time.

The Barney Well is located close to the Barnes Butte Reservoir Tank and Stearns Well on the east side of the City. Construction was completed in December 1994, and the well was drilled to a depth of 280 feet. The static water level was found to be 35 feet BGS at the time of drilling. During initial well tests, the yield was 700 gpm for 1 hour with a drawdown of 110 feet. Materials observed during drilling include gravel, clay, and coarse sand. The well was rehabilitated in 2002 and currently produces approximately 340 gpm.

The Ochoco Heights Well is located adjacent to the Ochoco Heights Tanks north of the City off Main Street. The well is currently inoperable. Presently, no well pump is installed, but there is a possibility of utilizing this well for monitoring if another well is constructed in the vicinity. The well was drilled to a depth of 1,002 feet and was cased to roughly 300 feet. Construction was completed in 1943 and, at that time, the water level was observed to be 52 feet BGS.

There are four airport wells, each of which is located southwest of the City neighboring the Prineville Airport. These wells appropriate water from a separate aquifer than the wells located in the Prineville valley. The aquifer is still being monitored to determine whether the aquifer is a reliable source of water. The wells were drilled between 1980 and 2014. From information available from the well logs, the static water level appears to be deep at roughly 440 feet BGS.

Water Storage Reservoirs

The City of Prineville has six aboveground covered water storage reservoirs. The total capacity of the reservoirs is 4.5 MG.

The Ochoco Heights reservoirs are identical and are located north of town. Ochoco Heights Reservoir No. 1 was constructed in 1955. The reservoir is an aboveground welded steel tank with a diameter of 41.5 feet and a height of 50 feet. The second reservoir, Ochoco Heights Reservoir No. 2, was built in 1964 directly adjacent to Reservoir No. 1 with the same material and dimensions. The Ochoco reservoirs are filled by the wells located on the valley floor. The reservoirs feed the Ochoco Heights Booster Pump Station, which feeds the Ochoco Heights pressure zone, the Valley pressure zone, and the American Pine Reservoir.

The American Pine Reservoir is located north of the Ochoco Heights reservoirs south of Peters Road. Constructed in 2002, this reservoir is an aboveground welded steel reservoir. The reservoir has a diameter of 73 feet and a height of 33 feet. Because the City was unable to attain the property for a proposed Yellowpine Tank at the north end of Northridge area, the City elected to construct this reservoir with a booster pump station to provide water to the Northridge area. The reservoir is fed by an altitude valve and provides water to the Northridge pressure zone, discussed further in Chapter 5.

The Barnes Butte Reservoir is located near the Barney and Stearns Wells north of Highway 26. The welded steel aboveground reservoir was constructed in 1978. The reservoir is 40 feet tall with a diameter of 47 feet.

The Airport No. 1 Reservoir is an aboveground bolted steel tank with a diameter of 85 feet and a wall height of 24 feet with an operating range of 22.5 to 23.8 feet. The Airport No. 2 Reservoir is an 80-foot diameter welded steel tank adjacent to the Airport No. 1 Reservoir. The operating range is set to match the Airport No. 1 tank.

The City's water sources are the alluvial aquifer beneath the Prineville valley floor and the Airport Area Aquifer System. The water is pumped from 11 groundwater wells into the distribution system to fill six aboveground reservoirs. Table 1-2 provides a summary of these reservoirs.

TABLE 1-2
SUMMARY OF SYSTEM RESERVOIRS

Reservoir	Volume (MG)	Base Elevation (feet)*	Overflow Elevation (feet)*	Height (feet)	Completion Date
Ochoco Heights Reservoir No. 1	0.5	2,937	2,987	50	1955
Ochoco Heights Reservoir No. 2	0.5	2,937	2,987	50	1964
American Pine	1.0	2,951	2,984	33	2002

Reservoir	Volume (MG)	Base Elevation (feet)*	Overflow Elevation (feet)*	Height (feet)	Completion Date
Reservoir					
Barnes Butte Reservoir	0.5	3,064	3,104	40	1978
Airport No. 1 Reservoir	1.0	3,380	3,404	24	1996
Airport No. 2 Reservoir	1.0	3,378	3,404	26	2014
Total	**4.5**				

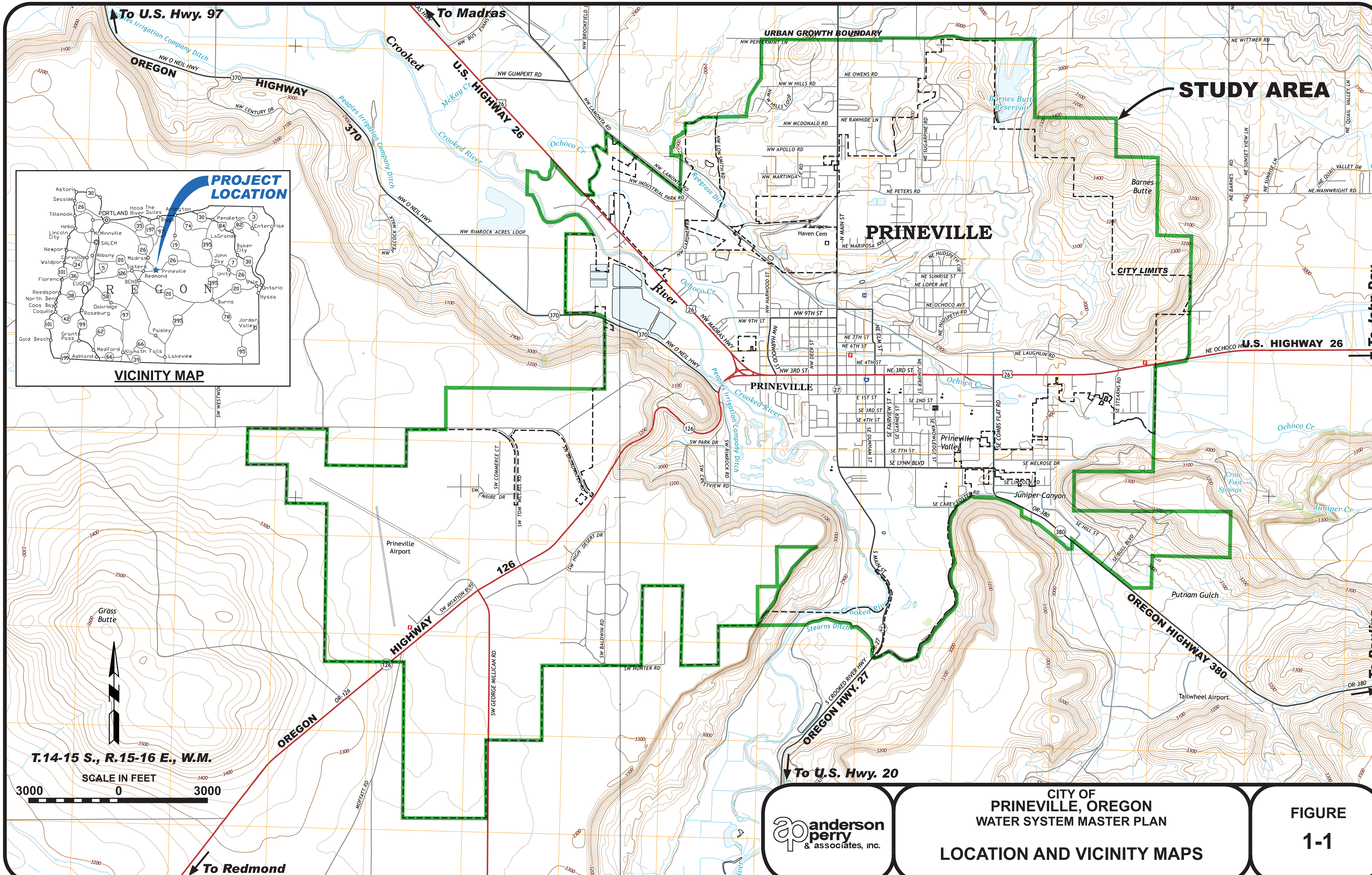
** Elevations are based on the North American Vertical Datum 88 vertical datum.*

Distribution System

The City's water distribution system consists of an assortment of pipe materials including asbestos cement, cast iron, ductile iron, steel, wood stave, and polyvinyl chloride pipe. Pipelines range in size from 1 inch to 18 inches in diameter. Table 1-3 provides a breakdown of the City's pipelines by pipe diameter. The City's distribution system main lines are primarily 6 to 12 inches in diameter, although there are also areas with smaller lines. However, distribution system improvements have been made in recent years to improve flow and pressure in the system. The distribution system is generally laid out with looped piping to assist with water circulation through the system. The City has indicated the water main lines in the distribution system are generally in fair condition. The distribution system is discussed in more detail in Chapter 5.

TABLE 1-3
SUMMARY OF SYSTEM PIPELINES

Pipe Diameter (inches)	Total Length (feet)	Total Length (miles)	Percent of Total System Piping
2 or Less	14,677	2.8	4
3	1,385	0.3	1
4	19,147	3.6	5
6	64,067	12.1	17
8	150,135	28.4	40
10	15,667	3.0	4
12	86,160	16.3	23
16	17,492	3.3	5
18	3,350	0.6	1
Total	**372,080**	**70.4**	**100**



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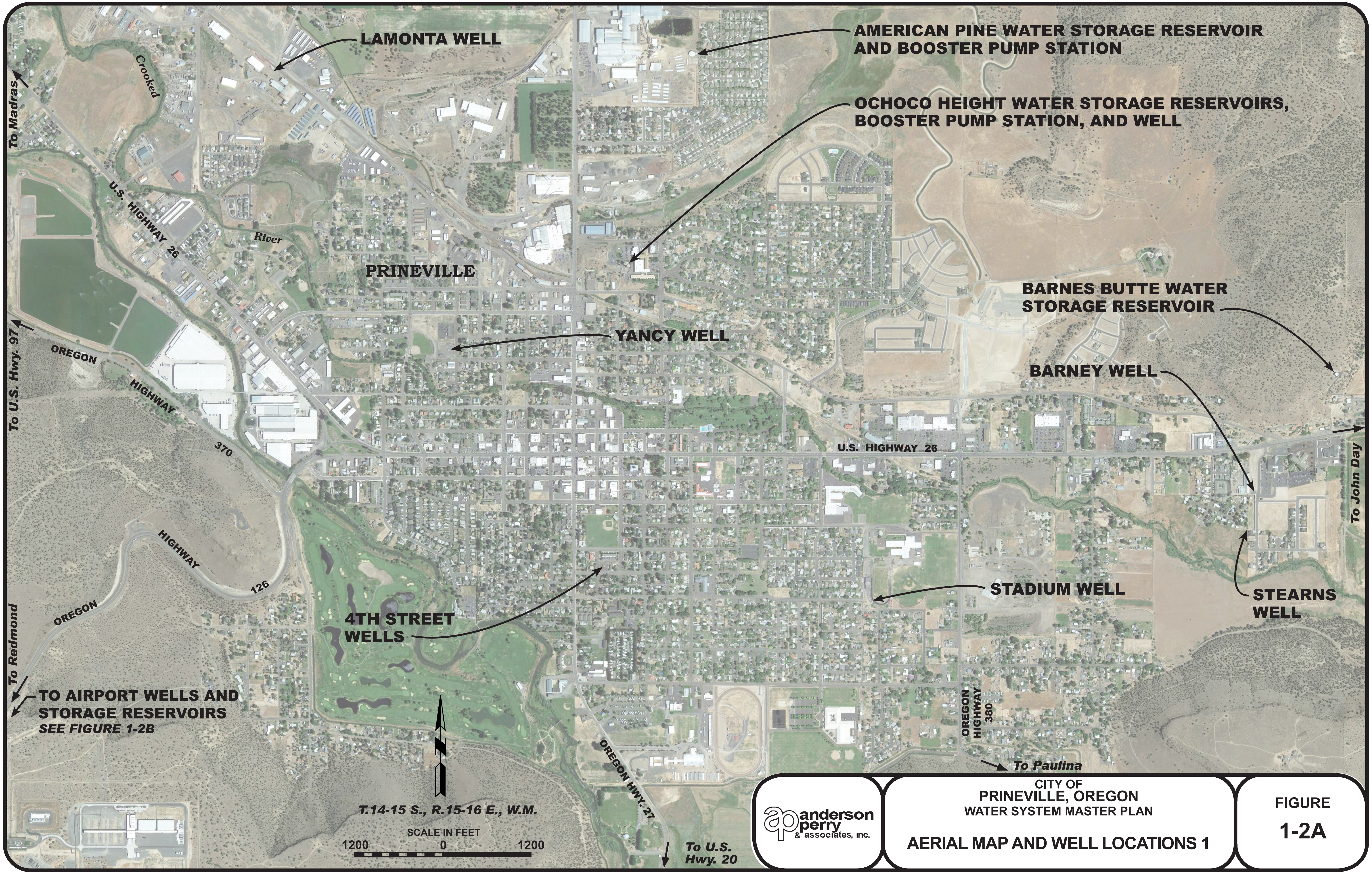
CITY OF
PRINEVILLE, OREGON
WATER SYSTEM MASTER PLAN

LOCATION AND VICINITY MAPS

FIGURE
1-1

Job# 1260-15-020 Nov. 11, 2016 lbauer



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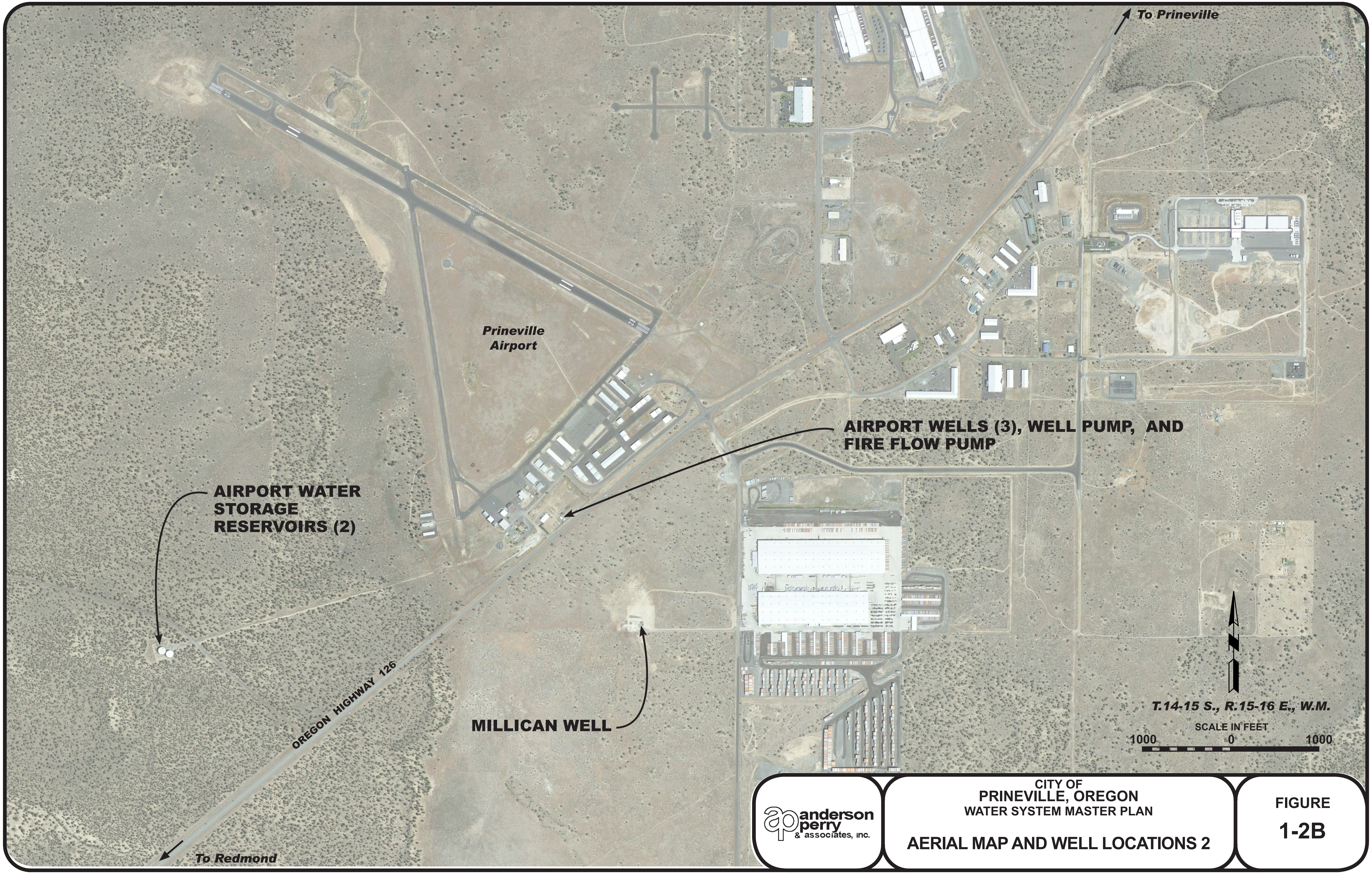
CITY OF
PRINEVILLE, OREGON
WATER SYSTEM MASTER PLAN

AERIAL MAP AND WELL LOCATIONS 1

FIGURE
1-2A

Job# 1260-15-020 May 10, 2018 lbauer



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CITY OF
PRINEVILLE, OREGON
WATER SYSTEM MASTER PLAN

AERIAL MAP AND WELL LOCATIONS 2

FIGURE
1-2B

Job# 1260-15-020 May 10, 2018 lbauer

Chapter 2 - Water System Requirements

Introduction

This chapter presents basic information from which criteria have been developed for evaluating the City of Prineville's 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. Both the present and future service areas are considered in this Water System Master Plan (WSMP). The present service area primarily consists of the developed lands within the boundaries of the city limits; however, there is one small area serviced outside of the city limits. The area is on S.W. Saddle Ridge Loop, which is outside city limits yet inside the urban growth boundary (UGB). For the purposes of this WSMP, the future service area will consist of the present service area plus all areas within the current UGB. The City's zoning map is shown on Figure 2-1.

The service area is located in a valley known as the Crooked River-Ochoco Creek Valley. Dominant geographic features include rimrock formations in the southern part of the service area and Barnes Butte located in the northeastern portion of the area. Surface elevations range from 2,800 to 3,600 above mean sea level. Many areas with large tracts of undeveloped land currently exist within the UGB (see Figure 1-1 in Chapter 1). With a significant area of open, undeveloped land available, the City of Prineville has the potential for residential, commercial, and industrial growth.

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 increase estimated from past growth rates, tempered by future expectations. It is difficult to accurately predict the population of a community over an extended period of time.

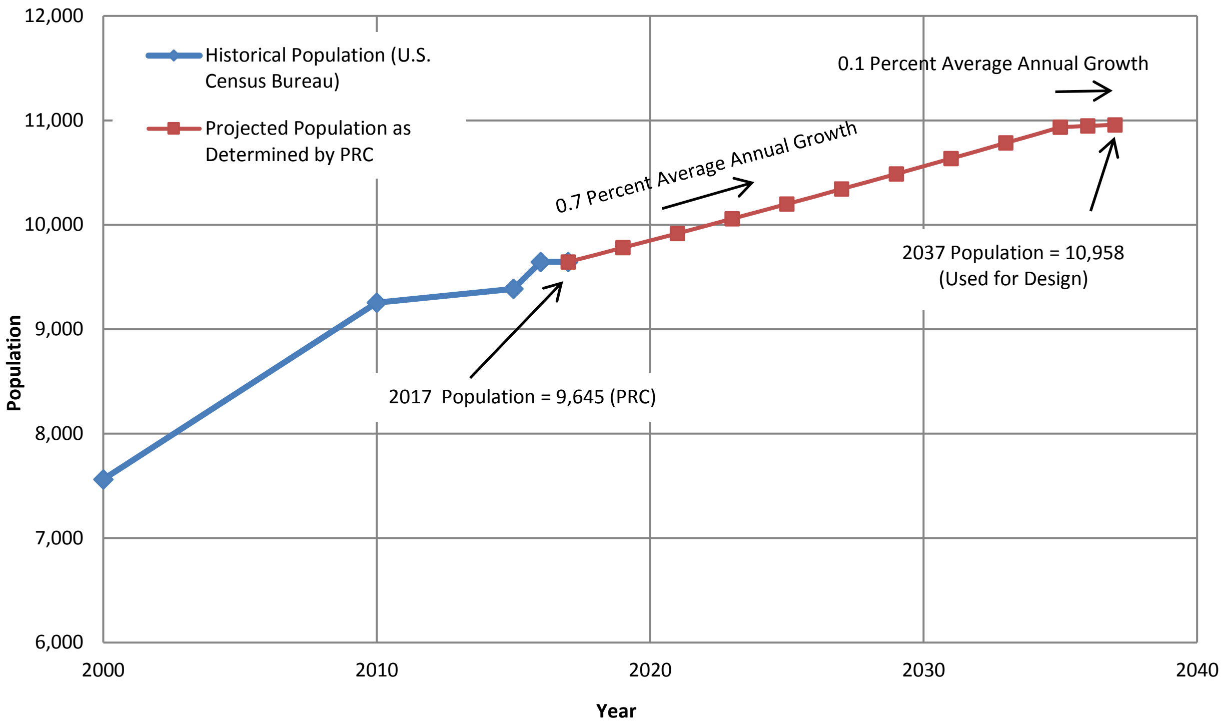
The period of time over which the population is to be projected usually depends on the type of improvements to be considered. Improvements that will require long-term financing should be designed for no less than the term of the financing. Facilities readily expanded or modified are normally designed for a period of 10 to 20 years. Facilities not easily modified or expanded, such as buried pipelines and storage reservoirs, may be designed for their expected life, which is usually 40 to 50 years or more.

The City's water system serves all residential, commercial, industrial, and public customers within the city limits, with the exception of an estimated 421 residences currently served by private wells not connected to the City's water system. In addition to the customers within the city limits, the city currently serves an estimated 120 residences outside the city limits but within the UGB.

The certified 2016 population of the City of Prineville was 9,645, according to Portland State University's (PSU) Population Research Center (PRC). This agency is the official source of population data available in

Oregon between the official Census data generated at the beginning of each decade. The historical population data shown on Chart 2-1 were provided by the PRC.

CHART 2-1
HISTORICAL AND PROJECTED POPULATION



For planning purposes, this certified population was utilized for the 2017 population. Assuming an average number of persons per household of 2.51 per PRC data, an estimated 1,057 people within the city limits do not receive City-supplied water, and an estimated 301 people outside the city limits but within the UGB do receive City-supplied water. Therefore, the net 2017 population served by City-supplied water is estimated to be 8,889.

Projections are usually made on the basis of an annual percentage increase estimated from past growth rates combined with future expectations. The historical population data shown hereafter on Table 2-1 was provided by the PSU Oregon Population Forecast Program. In 2013, the Oregon House of Representatives and Senate approved legislation assigning coordinated population forecasting to the PRC. Utilizing average annual growth rates (AAGR) provided by the PRC, historical population trends for the City are shown on Table 2-1 and Chart 2-1.

TABLE 2-1
HISTORICAL AND FORECASTED POPULATIONS[1]

Historical			Forecast			
2000	2010	AAGR (2000 to 2010)	2017[2]	2037	AAGR (2016 to 2035)	AAGR (2035 to 2066)
7,358	9,253	*0.6 percent*	9,645	10,958	*0.7 percent*	*0.1 percent*

[1]*As provided by the PRC.*
[2]*For planning purposes, the PRC's 2016 certified population was used for 2017.*

The assumed 0.7 percent AAGR between the years 2017 and 2035 and 0.1 percent AAGR between the years 2035 and 2065 results in a 2037 population of 10,958. This value takes into consideration connecting all residences within the city limits and the projected growth in the UGB. However, over the planning period of this WSMP, actual growth could exceed or fall well below the figures presented on Chart 2-1. A more detailed discussion of the design population is presented later in this chapter.

Land Use

The current zoning in the City of Prineville is shown on Figure 2-1. Four Comprehensive Plan land use designations have been identified within the city limits: residential, commercial, industrial, and public. The majority of the City is designated for residential use. Areas along Highway 126 are primarily designated as multipurpose and airport.

Regulatory Requirements

The City of Prineville's water system is 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 of Prineville is currently, and will principally be, working with the DWS as the regulating agency with regard to their water system. The City is required to publish annual Consumer Confidence Reports; a copy of the 2013 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 (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 for monitoring, testing requirements, reporting, recordkeeping, and public notification procedures in the event of non-compliance.

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 included provisions for consumer confidence reporting, stronger protection for microbial contaminants and disinfection byproducts, operator certification, lowering maximum contaminant levels (MCL), and source water assessments.

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. They also work 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 be contacted.

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.

Recent Regulatory History (Last Five Years)

Following is a list of regulations that have been enacted in the past five years:

1. **Reduction of Lead in Drinking Water Act**, which 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)**, which focuses on public health protection by limiting exposure to disinfection byproducts. The D/DBPR specifically targets total trihalomethanes and five haloacetic acids, which 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 but that do not have health-based standards set under the SDWA. Every five years, the EPA develops a new list of UCMR contaminants, 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 representative of water quality throughout the distribution system according to a written sample site identification plan.

Potential Regulatory Changes

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

1. **Radon in Drinking Water Rule**, which 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.

2. **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 contaminates, manganese and nonylphenol, have been added for the final publication.

3. **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 cVOC and up to eight from the Third Contaminant Candidate List.

4. **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.

5. **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. California has already implemented a hexavalent chromium specific MCL.

6. **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.

7. **Cybersecurity.** Executive Order 13636: Improving Critical Infrastructure Cybersecurity, was established in February 2013. The order calls for the 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.

8. **Lead and Copper Rule (LCR) Long-Term Revisions.** The LCR is a treatment technique rule. The rule requires public water systems to take certain actions to minimize lead and copper in drinking water in lieu of setting a MCL. The goals for the revisions are to improve the

effectiveness of the corrosion control treatment and prompt additional actions that may help reduce public exposure to lead and copper.

Regulatory Violations

The City of Prineville has no reported violations in the last 5 years, according to the DWS.

Regulatory Requirements Summary

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

Seismic Risk Assessment and Mitigation Plan

To provide the state with an agenda for earthquake preparedness, the Oregon Resilience Plan (ORP) was developed in 2013 by the Oregon Seismic Safety Policy Advisory Commission. The goals of the ORP are to address critical infrastructure needed to supply water in the event of an emergency and identify projects that need to be completed in the next 50 years to ensure that water can be supplied to a community in the event of a strong earthquake. Scientists have recognized the Cascadia subduction zone as an active fault that poses a major geological hazard to Oregon. The ORP addresses vulnerabilities of the pipelines, treatment plants, water storage reservoirs, supply wells, and pump stations that compose Oregon’s water and wastewater systems and discusses the intervention required to increase the resilience of infrastructure in the event of a Cascadia earthquake.

To assist in the goal of preparing communities, water systems that submit a WSMP to the DWS after January 10, 2018, are required to follow guidelines put forth by the DWS. Community water systems with more than 300 connections must conduct a seismic risk assessment and mitigation plan if any of their existing or proposed facilities are located in areas with moderate to very heavy damage potential as determined by the Oregon Department of Geology and Mineral Industries (DOGAMI). A DOGAMI map (Map of Earthquake and Tsunami Damage Potential for a Simulated Magnitude 9 Cascadia Earthquake), a map of the Prineville area magnified from the DOGAMI map, the ORP executive summary, and frequently asked questions are included in Appendix B.

According to the ORP, central Oregon is located in the eastern zone of the Cascadia Scenario Impact Zones. It is anticipated that the eastern zone will experience light damage and would allow rapid restoration of services and functions. According to the map included in Appendix B, the City of Prineville has one small section of proposed pipeline in an area marked with "moderate" intensity. This proposed pipeline is generally located west and south of the City’s existing wastewater treatment lagoons. The proposed section of pipe is not considered critical as described in the Seismic Risk Assessment and Mitigation Plan guidelines set by the DWS; therefore, a Seismic Risk Assessment and Mitigation Plan was not conducted as part of this WSMP.

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 of Prineville's latest water system sanitary survey was conducted on June 4, 2014. The water system sanitary survey found the following significant deficiencies to be addressed:

- The sanitary seal and casing on some City wells was not watertight. The seal was deficient in the Barney, Stearns, 4th Street Deep, Ochoco Heights, Yancey, and Lamonta Wells.
- The unused well within the 100-foot setback of the Stadium Well is not allowed, because its construction is unknown.
- Remove paint stored in Airport Well No. 2, Lamonta Well, and Ochoco Heights Well buildings.
- Chlorine has not been measured and recorded as required. Although free chlorine residual is measured most days, it must be recorded in a log book.

These deficiencies were corrected by November 18, 2014, or are on an approved corrective action schedule. A copy of the full 2014 Water System Sanitary Survey is included in Appendix C. Included in the survey is a checklist of sanitary survey items during the inspection of the water system. City staff should periodically review the checklist; this will help the City take a proactive approach to these surveys and also help to avoid potential future violations.

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 the evaluation of a water supply 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 for PDD. As a rule, a well would 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 day, peak day, and peak instantaneous water use rates by the number of people served by the water system. These water demand rates would then be expressed as gallons per capita day (gpcd). These values multiplied by a population projected for some future year would then give estimated total demand rates for that year.

The Oregon Water Resources Department maintains a database of water use amounts as reported by the individual water user or entity. Per this database, the total water use reported by the City for the 2016 water year, defined as the period of October 1, 2015, through September 30, 2016, was 569.3 million gallons. The most recent water year data were utilized to most accurately represent current water demands. For planning purposes, the per capita water use was calculated by dividing this 2016 water year use by the net 2017 population served estimate. Therefore, a per capita water use of 176 gpcd was used to project future demand needs.

Historical Average Water Use

To determine current water demands, customer billing and production records for the City's water supply system were reviewed from water years 2005 through 2015. Monthly well production for the City of Prineville for 2005 through 2015 is shown on Charts 2-2 through 2-13. A comparison chart for all 12 wells is shown on Figure 2-2.

CHART 2-2
AIRPORT WELL NO. 1 MONTHLY PRODUCTION

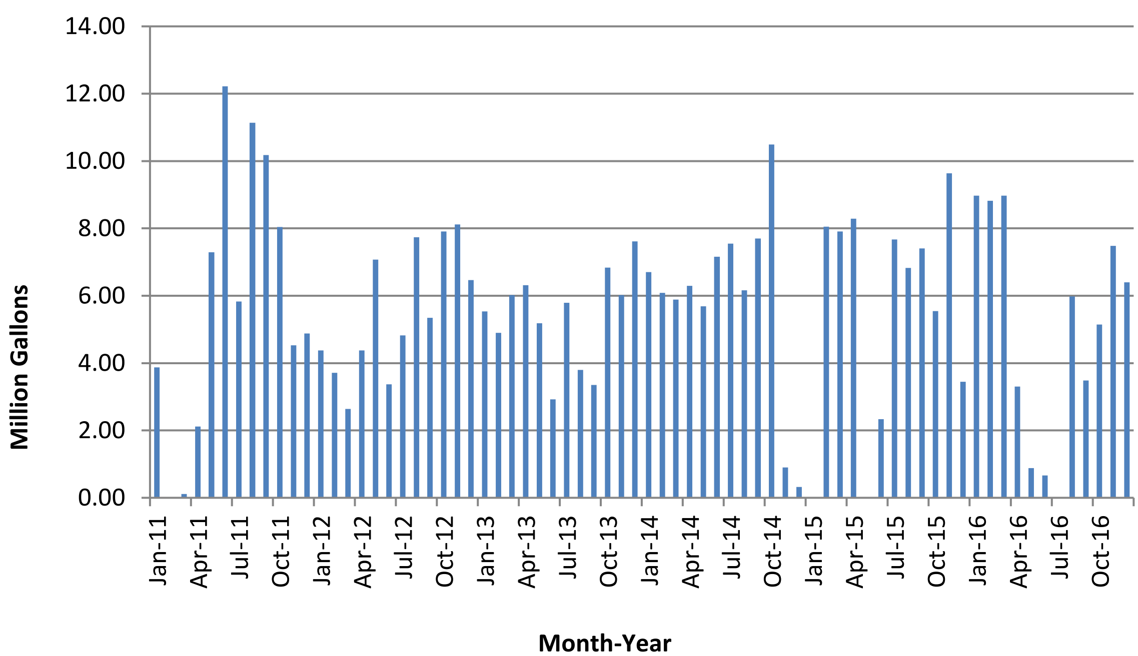


CHART 2-3
AIRPORT WELL NO. 2 MONTHLY PRODUCTION

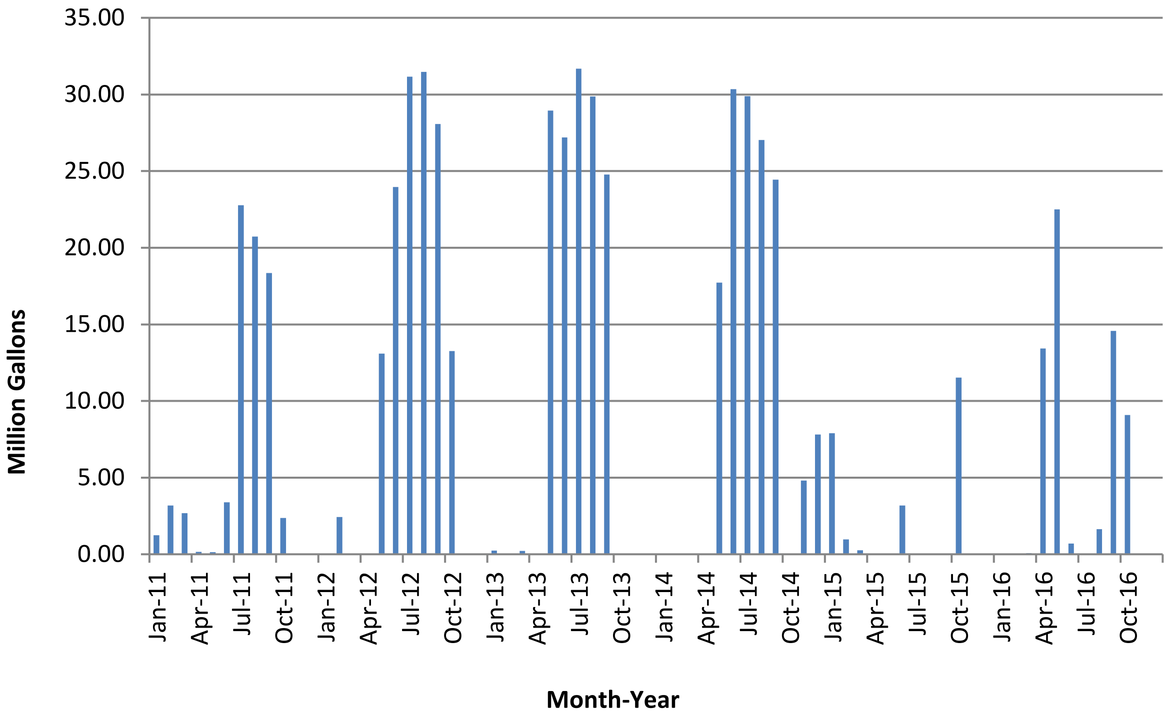


CHART 2-4
AIRPORT WELL NO. 3 MONTHLY PRODUCTION

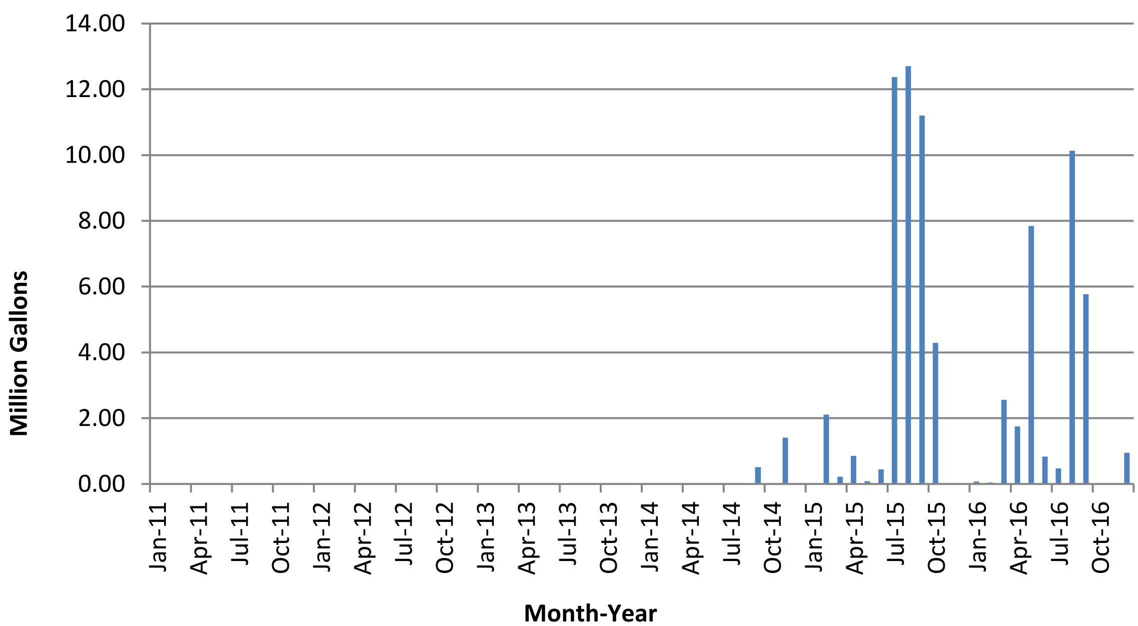


CHART 2-5
AIRPORT WELL NO. 4 MONTHLY PRODUCTION

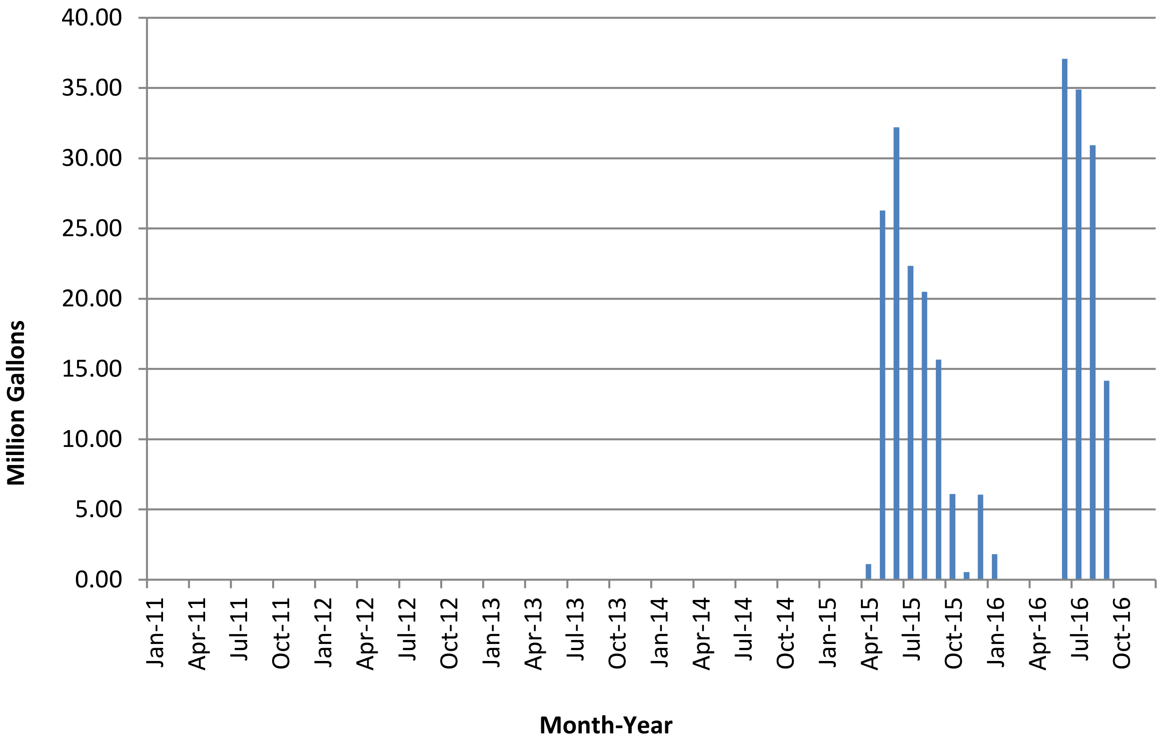


CHART 2-6
4TH STREET DEEP WELL MONTHLY PRODUCTION

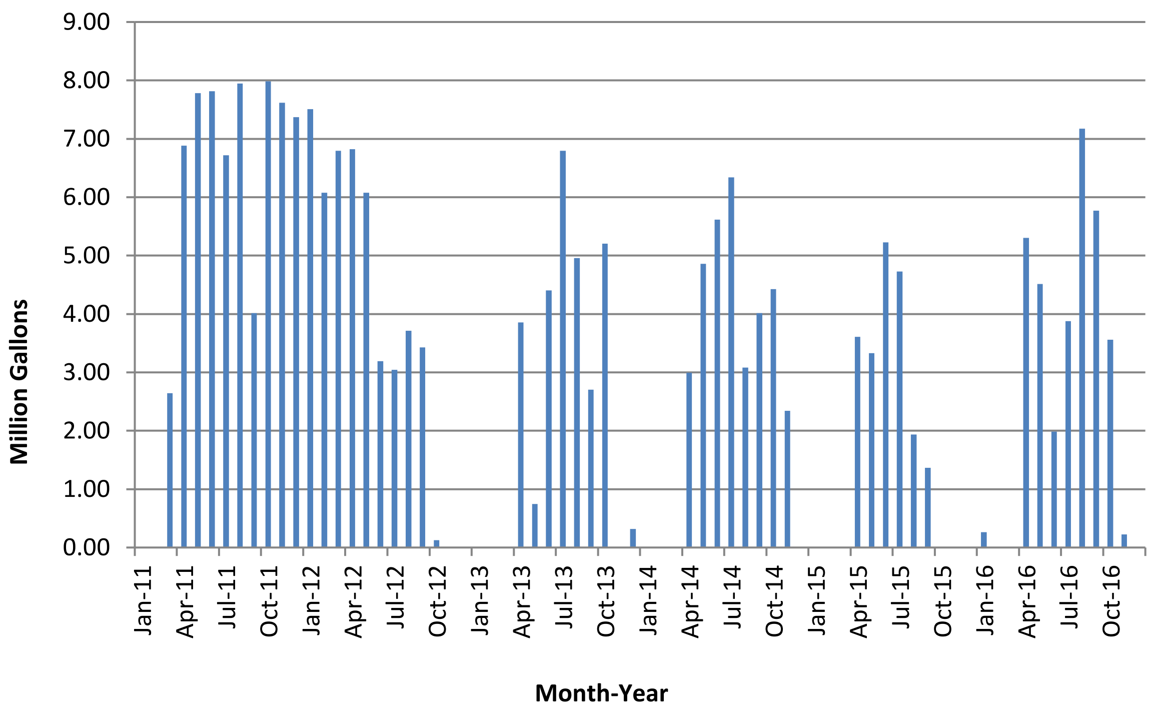


CHART 2-7
4TH STREET SHALLOW WELL MONTHLY PRODUCTION

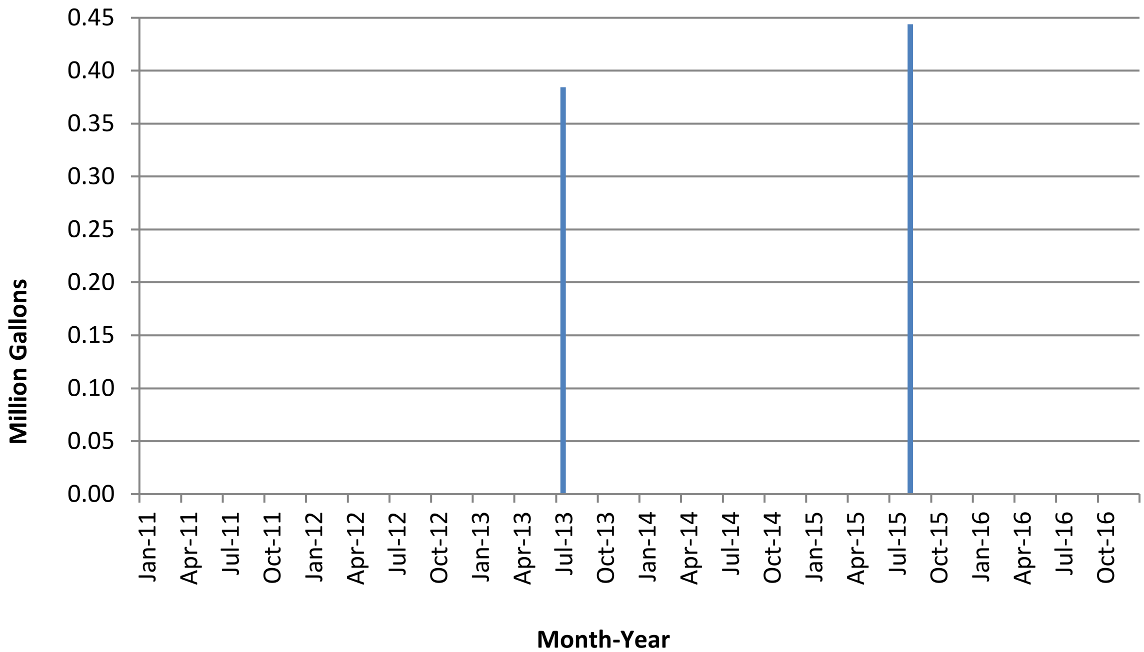


CHART 2-8
LAMONTA WELL MONTHLY PRODUCTION

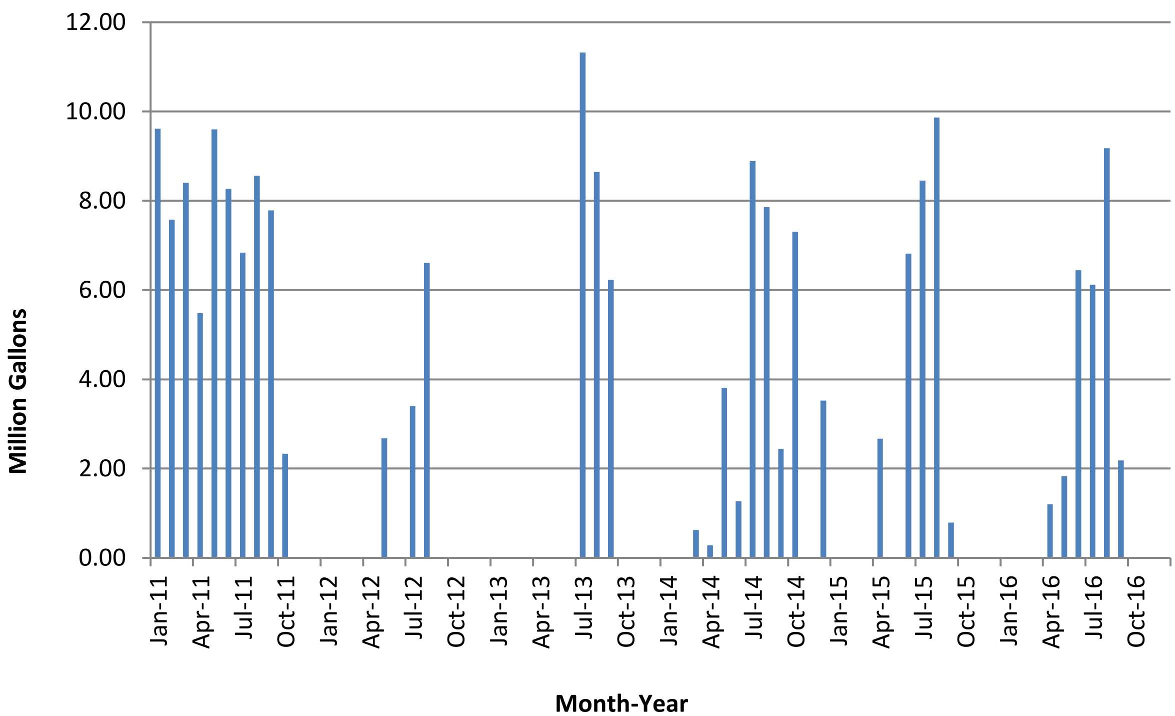


CHART 2-9
OCHOCO WELL MONTHLY PRODUCTION

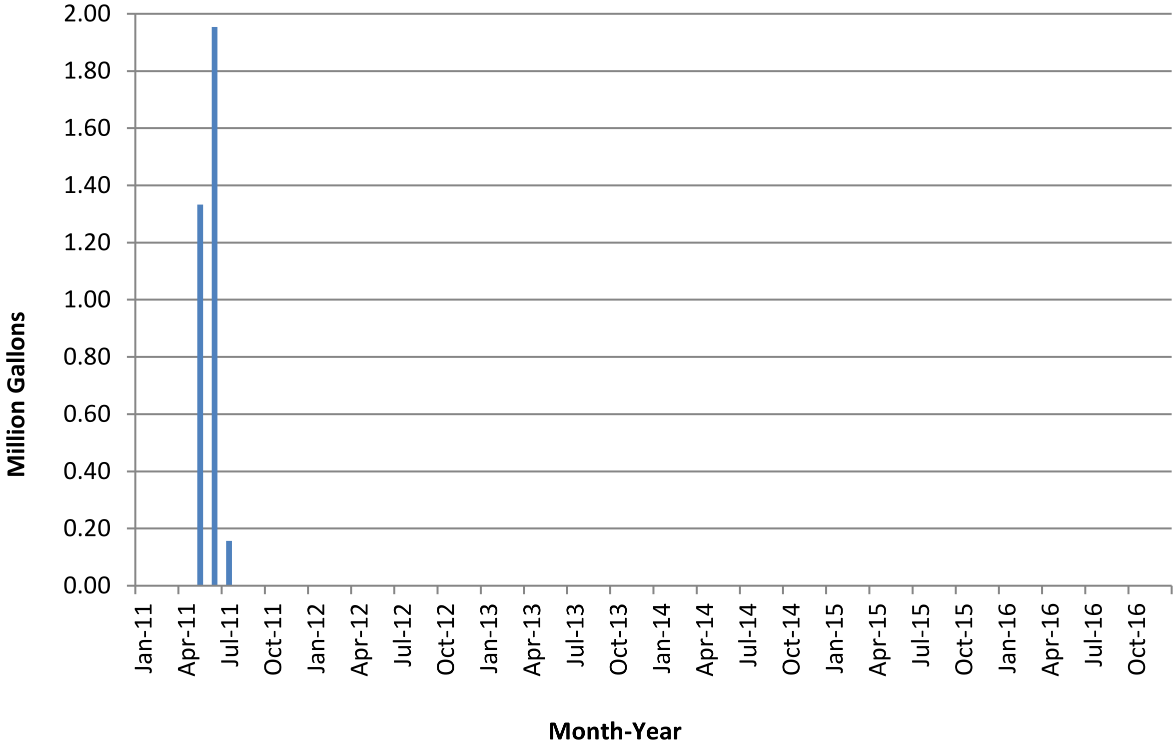


CHART 2-10
STADIUM WELL MONTHLY PRODUCTION

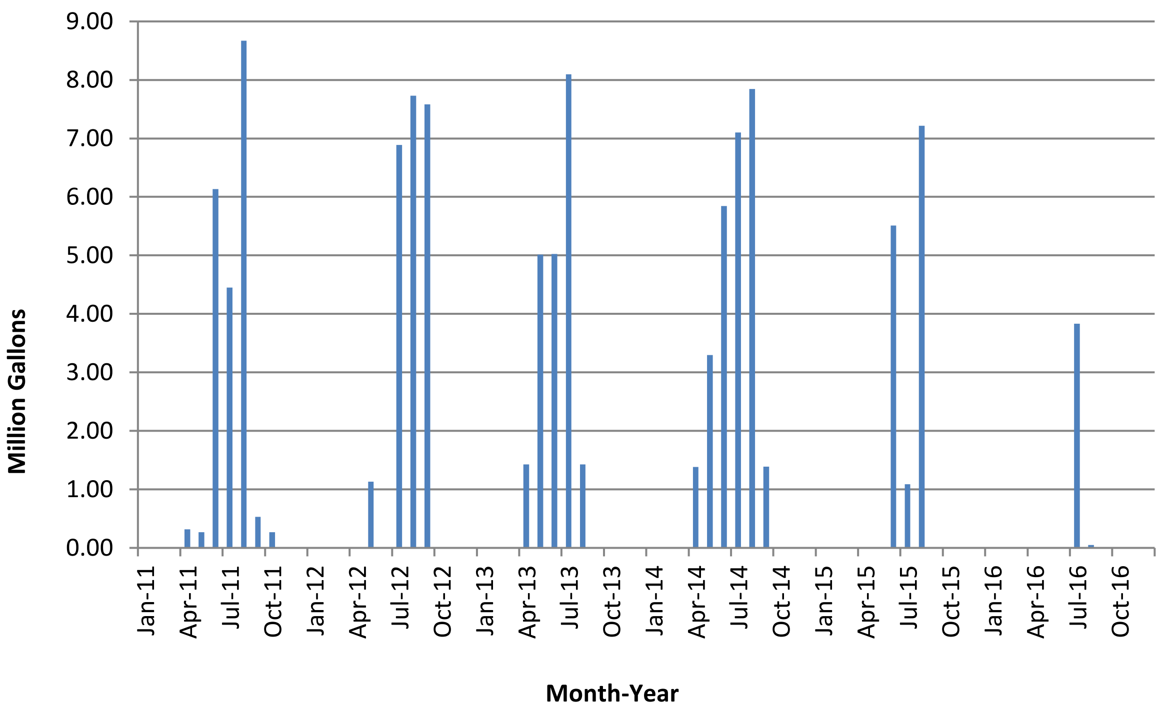


CHART 2-11
STEARNS WELL MONTHLY PRODUCTION

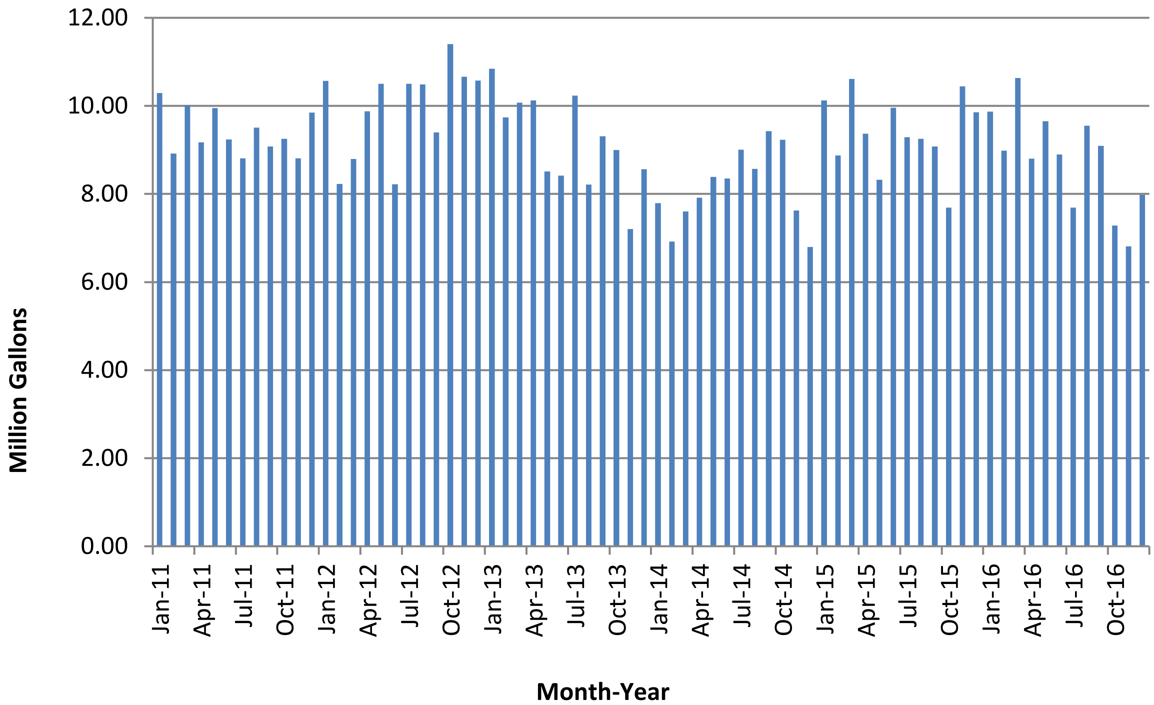


CHART 2-12
BARNEY WELL MONTHLY PRODUCTION

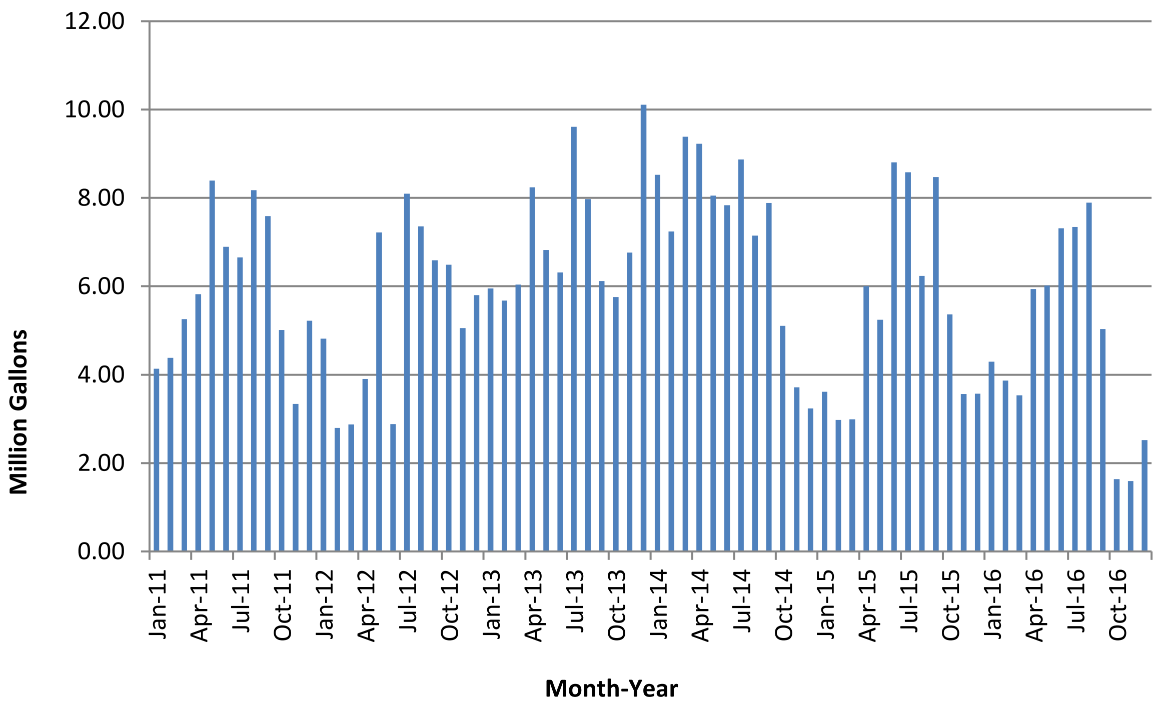
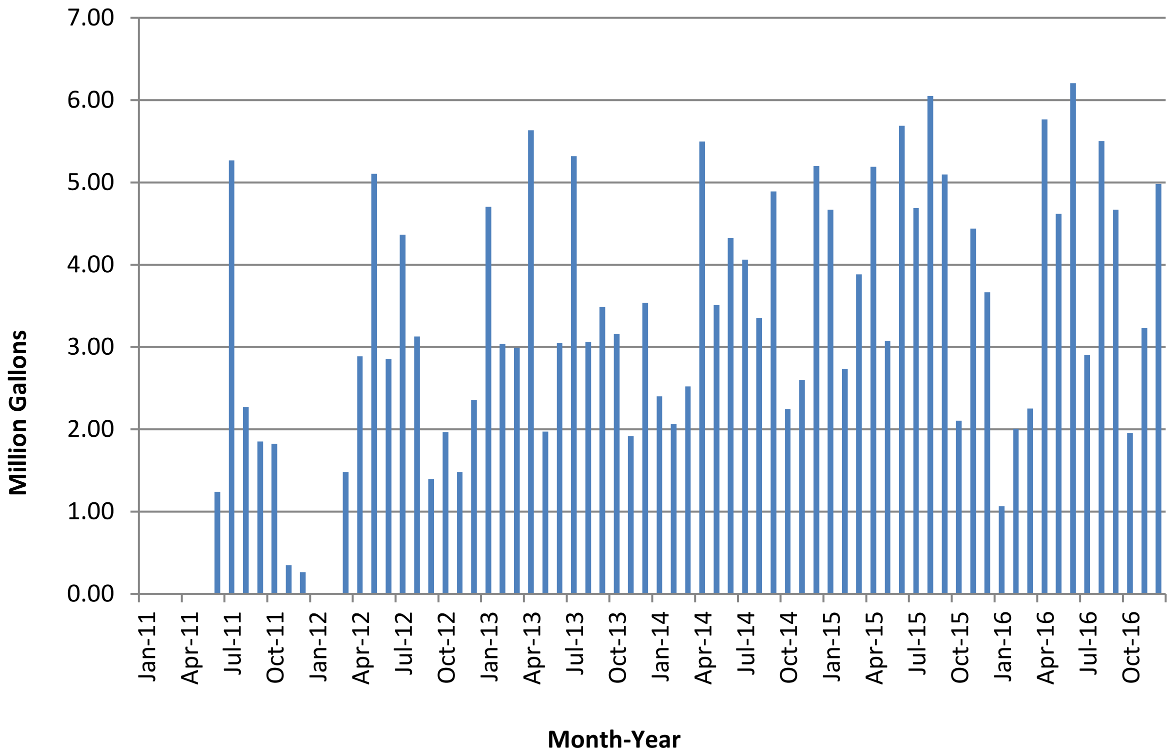


CHART 2-13
YANCEY WELL MONTHLY PRODUCTION



Average Daily Demand

For this WSMP, the per capita water use of 176 gpcd was selected as the ADD to project future demand needs. The City's 176 gpcd average water demand is in the low range of typical demands when compared to other cities with water meters in eastern Oregon, as shown on Table 2-2.

TABLE 2-2
COMPARATIVE WATER USAGE
TYPICAL FOR SMALL CITIES IN EASTERN OREGON METERED SYSTEMS

City	Average Daily Demand (gpcd)	Peak Daily Demand (gpcd)	Peak Factor (peak daily)	Population
Lostine, Oregon	170	545	3.2	250
Prineville, Oregon	**176**	**405**	**2.3**	**8,889**
Adams, Oregon	195	625	3.2	265
Cove, Oregon	215	628	2.9	594
Prairie City, Oregon	234	549	2.3	1,195
Mt. Vernon, Oregon	240	585	2.4	617
Umatilla, Oregon	210	483	2.3	4,686
La Grande, Oregon	230	667	2.9	13,238
Hermiston, Oregon	250	600	2.4	17,730
Athena, Oregon	250	710	2.8	1,142
Vale, Oregon	250	625	2.5	1,890
Island City, Oregon	270	810	3.0	989

City	Average Daily Demand (gpcd)	Peak Daily Demand (gpcd)	Peak Factor (peak daily)	Population
John Day, Oregon	270	865	3.2	2,010
Stanfield, Oregon	240	600	2.5	1,770
Irrigon, Oregon	290	800	2.8	1,790
Echo, Oregon	175	525	3.0	700
Boardman, Oregon	320	960	3.0	3,445
Hines, Oregon	350	1,600	2.5	1,700
Joseph, Oregon	375	1,100	2.9	1,060
Ione, Oregon	461	1,865	4.0	250

Peak Daily Demand

PDD usually occurs during a particular day between June through September, which is when water use is normally at its greatest due to irrigation and other summer uses. PDD can occur in other months, but normally occur during the hottest period of the year. During PDD, the City's wells operate continuously, and equalization storage is required to meet demands. A peaking factor was determined by dividing the maximum daily demand by the ADD for a given water year. For water years 2007 through 2015, the average peaking factor for the City of Prineville was 2.30 (per the August 2016 Water Management and Conservation Plan, prepared by GSI Water Solutions, Inc.). For the purpose of this WSMP, this 2.30 peaking factor was used to estimate the ADD.

The ADD and PDD assumed for planning purposes are summarized on Table 2-3. These demands have also been summarized as a flow rate to provide the basis for comparison to water supply capacity. The assumed service population for determining the actual daily demand rates is 8,889, as discussed earlier in this chapter.

TABLE 2-3
YEAR 2016 TOTAL AVERAGE AND PEAK DAY DEMAND DATA

Parameter	System Demand (gpcd)	Total Demand (gpm)	Percentage of System Capacity (Assumed Total Capacity of 3,210 gpm)	Percentage of System Capacity (18 hours per day operation)
ADD	176	1,083	34	45
PDD	405	2,500	78	103

gpm = gallons per minute

Water supply facilities (well pumps) are normally designed to meet PDD 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 the valley floor and airport area is approximately 1,440 gpm and 1,770 gpm, respectively. The combined capacity is 3,210 gpm. When assuming an 18-hour operation, the total capacity is reduced by 25 percent. This capacity can meet the current ADD but does not meet the PDD assuming an 18-hour maximum operation.

Description of Customers Served

The City of Prineville's water service accounts, as of 2016, are summarized on Table 2-4. The percentage breakdown is also provided on Table 2-4.

TABLE 2-4
WATER ACCOUNT INFORMATION

Account Type	Number of Accounts	Percent of Total Accounts	Percent of Water Use in 2016
Residential	3,003	85	60.1
Commercial	499	14	30.1
Large Commercial	16	<1	9.8
TOTAL	**3,518**	**100**	**100**

The commercial users noted on Table 2-4 consist of schools, churches, City property, and businesses. As shown on Table 2-4, residential water users account for approximately 85 percent of the total water users in the City, while commercial and large commercial users account for approximately 15 percent. However, residential water use only accounts for approximately 60 percent of water use, while commercial and large commercial account for the remaining 40 percent.

Fire Demand

Fire Protection Ratings

Flow rates for fire suppression in residential, commercial, and large commercial 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. The rating for Class 1 through Class 8 represents a fire suppression system that includes a Fire Suppression Rating Schedule, creditable dispatch center, fire department, and water supply. The number assigned to the community will depend on the community’s score on a 100-point scale. The score is based on the ISO's evaluation of the community 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 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. The ISO rating for the City of Prineville, based on the 2013 evaluation, is Class 4/8b. Class 8b is a special classification that recognizes a superior level of fire protection in areas otherwise classified as Class 9. The ISO rating information is presented in Appendix D.

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.

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 International Fire Code (IFC) 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 (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 IFC 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 2004 ISO Hydrant Flow Data Summary recommends needed fire flow protection rates for both residential and commercial districts to receive full credit ratings. ISO does not consider needed fire flows over 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 three-hour duration. This maximum fire flow is typically recommended for school areas and other high-density development.

Available Fire Flow

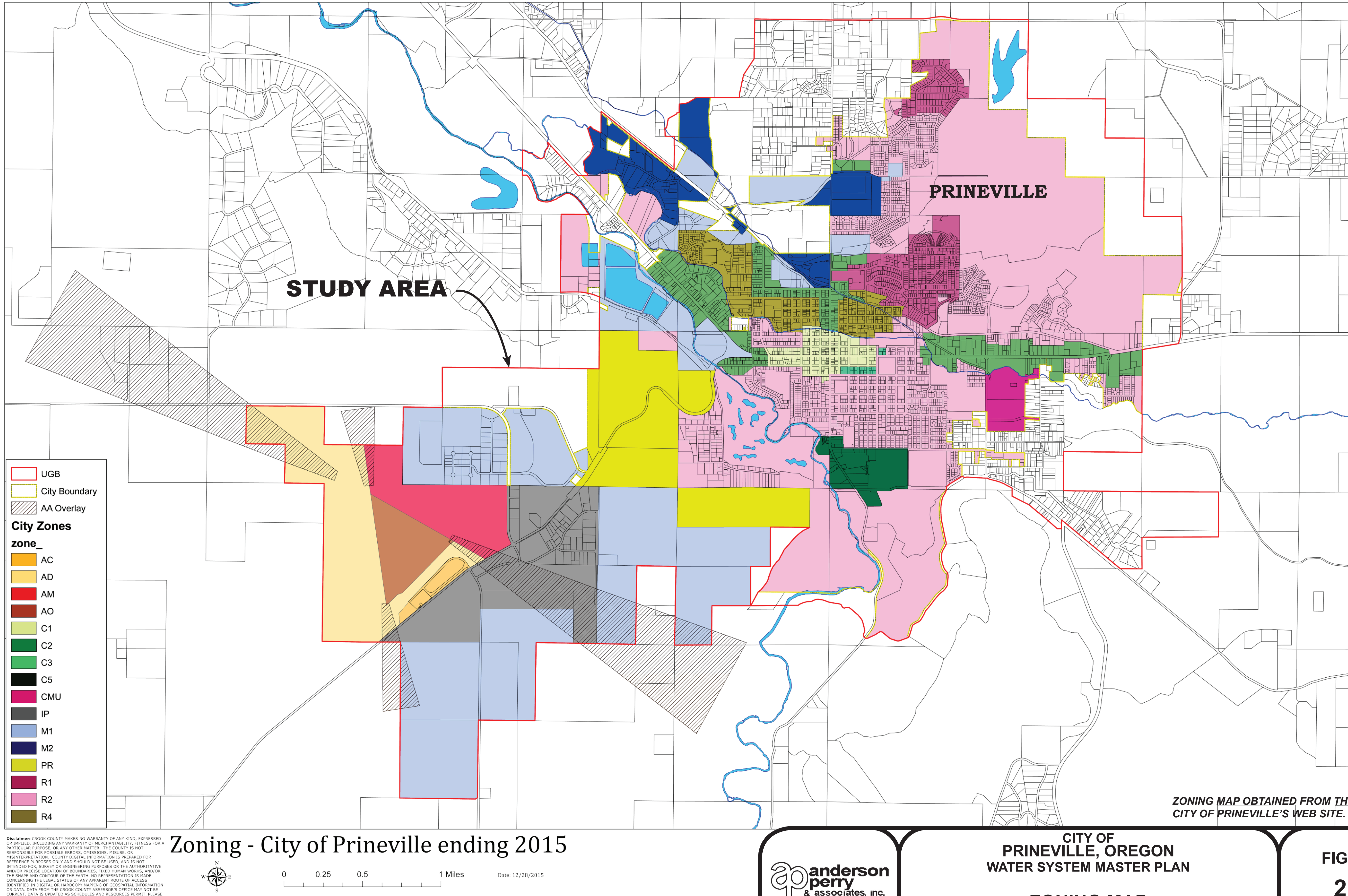
The City routinely tests fire hydrants to help ensure the hydrants remain operable and to estimate available fire flows. Fire hydrant flushing and flow testing data were provided by the City for this WSMP. Based on the test results, the City of Prineville's water system is generally able to deliver water flows ranging from approximately 95 to 3,500 gpm at individual fire hydrants while maintaining working distribution system pressures from 50 to 65 psi. A copy of the fire hydrant flow test results is included in Appendix E. 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 2-3 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 and treatment, storage, and distribution system facilities. Figure 2-3 presents design criteria based on the estimated present service population of 10,958 and present estimated ADD and PDD. Design criteria are shown for the year 2037 based on a 0.7 (2015 through 2035) and 0.1 (2035 through 2065) AAGR in the City. Storage volumes are derived from calculations summarized in Chapter 4. The design criteria presented on Figure 2-3 are used as base information in later chapters for evaluating existing and future system needs and capability.



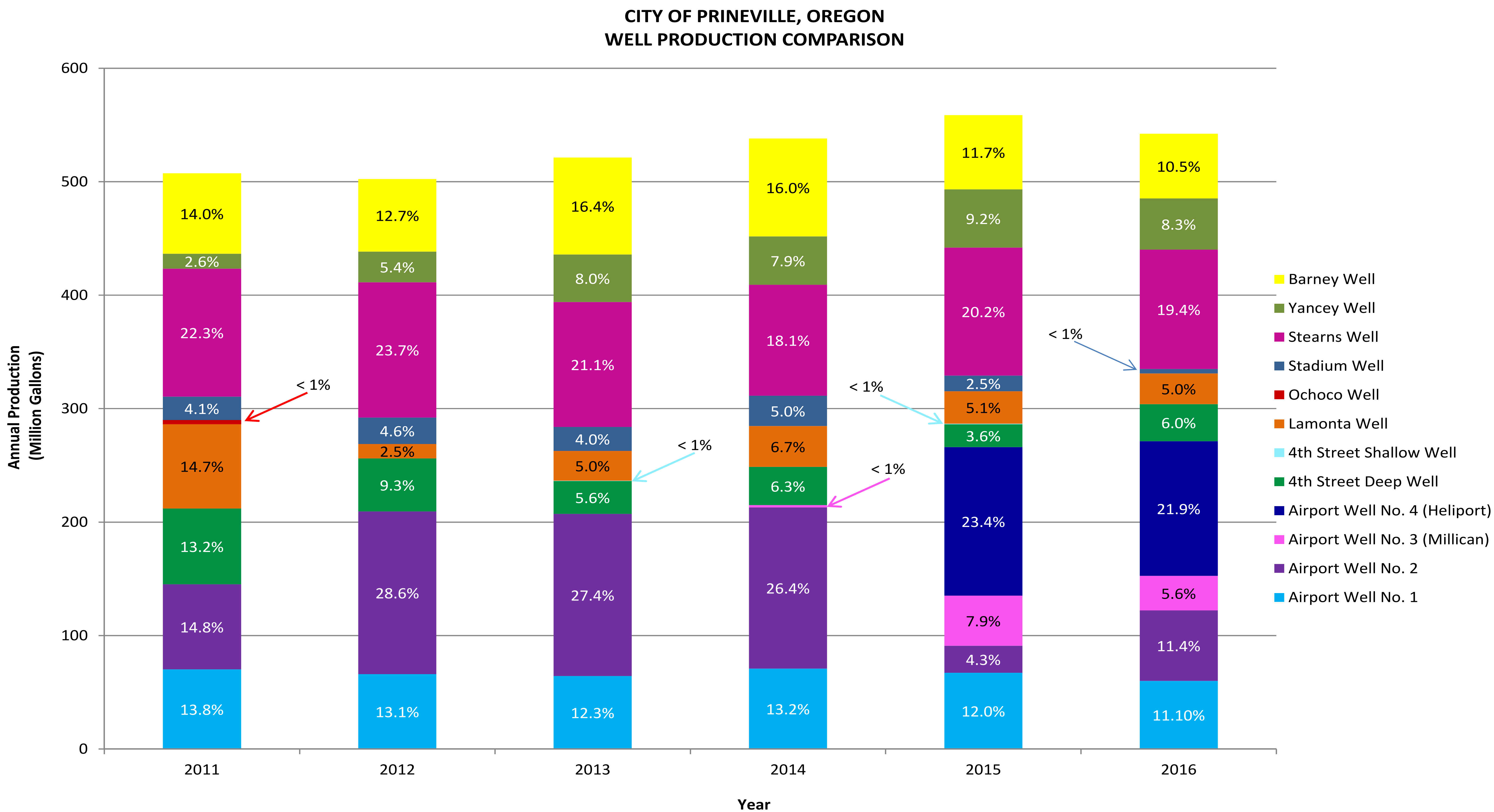
anderson perry & associates, inc.

CITY OF
PRINEVILLE, OREGON
WATER SYSTEM MASTER PLAN

ZONING MAP

FIGURE
2-1

Job# 1260-15-020 Nov. 11, 2016 lbauer



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CITY OF
PRINEVILLE, OREGON
WATER SYSTEM MASTER PLAN

WELL USAGE COMPARISON

FIGURE
2-2

SUMMARY OF DESIGN CRITERIA

	Existing Connected Population 2017[1]	Existing Connected Population with Improvements 2017[2]	Existing Connected Population with Improvements and Anticipated Connections within Urban Growth Boundary 2017[3]	Future Connected Population with Improvements and Anticipated Connections within Urban Growth Boundary 2037[4]
Design Population	8,889	9,946	10,440	11,752
Supply				
Total Water Production 2016 (MG)[5]	569.3	-	-	-
Percent Annual Water Use - Residential[6]	60.1%			
Percent Annual Water Use - Commercial[6]	30.1%			
Percent Annual Water Use - Large Commercial[6]	9.8%			
Average Total Daily Demand (gpcd)	176			
Average Residential Daily Demand (gpcd)	106	106	106	106
Average Residential Daily Flow (gpd)	937,395	1,054,297	1,106,605	1,245,701
Average Commerical Flow (gpd)	469,478	469,478	469,478	767,794
Average Large Commercial Flow (gpd)	152,853	152,853	152,853	475,632
Average Total Daily Flow (gpm)	1,083	1,164	1,201	1,729
Peak Residential Daily Demand[7] (gpcd)	244	244	244	244
Peak Residential Daily Flow (gpd)	2,169,036	2,426,873	2,547,279	2,867,463
Peak Commercial Daily Flow (gpd)	1,079,798	1,079,798	1,079,798	1,765,926
Peak Large Commercial Daily Flow (gpd)	351,562	351,562	351,562	1,093,953
Peak Daily Flow (gpm)	2,500	2,679	2,763	3,977
Peak Hourly Flow[8] (gpm)	4,626	4,957	5,111	7,358
Estimated Supply Flow Available[9] (gpm)	3,765	3,765	3,765	3,765
Estimated Supply Flow Required[10] (gpm)	3,334	3,572	3,684	5,303
Fire Demand				
Residential (gpm)	1,000	1,000	1,000	1,000
Commercial/Public (gpm)	3,500	3,500	3,500	3,500
Duration (hour)	3	3	3	3
Minimum Residual Line Pressure Under Peak Demands Plus Fire Flow (psi)	20	20	20	20

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DOWL

CITY OF
PRINEVILLE, OREGON
WATER SYSTEM MASTER PLAN

SUMMARY OF DESIGN CRITERIA

FIGURE
2-3

Storage				
Equalization Storage[11] (gal)	129,076	178,764	201,967	538,957
Operating Storage[12] (gal)	500,000	500,000	500,000	500,000
Fire Reserve[13] (gal)	630,000	630,000	630,000	630,000
Dead Storage[14] (gal)	225,000	225,000	225,000	225,000
Emergency Reserve[15] (gal)	1,559,726	1,676,628	1,728,935	2,489,127
Total Recommended Storage[16] (gal)	3,043,802	3,210,392	3,285,902	4,383,084
Existing Available Storage (gal)	4,500,000	4,500,000	4,500,000	4,500,000

MG = million gallons
gal = gallons
gpcd = gallons per capita day
gpd = gallons per day
gpm = gallons per minute
psi = pounds per square inch

[1]Existing Connected Population 2017 was found by utilizing City billing reports to find the number of residences within the city limits not connected to water (421) and the number of residences located outside the city limits connected to water (120). According to the Population Research Center (PRC) the average person per household within the City is 2.51. The certified population for 2016 was 9,645. For planning purposes, this population is utilized as the 2017 population.

[2]Existing Connected Population with Improvements 2017 includes all residences within the city limits that could be served plus the number of residences located outside the city limits currently connected to water (120).

[3]Existing Connected Population with Improvements and Anticipated Connections within Urban Growth Boundary 2017 includes all residences within the city limits that could be served, plus the number of residences located outside the city limits currently connected to water (120), plus residences directly outside the city limits that could be served in the future (assumed to be 20 percent of total residences in the urban growth boundary, which equates to 197 residences).

[4]The Future Connected Population with Improvements and Anticipated Connections within Urban Growth Boundary 2037 was found by utilizing the average annual growth rate values declared by the PRC.

[5]Oregon Water Resources Department entity water use report from October 2015 through September 2016.

[6]City of Prineville 2016 water year metered flow records.

[7]August 2016 Water Management and Conservation Plan, prepared for the City of Prineville by GSI Water Solutions, Inc.

[8]1.85 times peak daily flow.

[9]Alluvial aquifer underlying the Prineville valley floor (1,440 gpm) and the Airport Area Aquifer System (2,325 gpm). The City has a total authorized rate of appropriation of approximately 8,671 gpm (19.32 cfs) under their current water rights. The water rights limitations for the airport wells currently cap production capacity at 3,164 gpm (7.05 cfs).

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

[11]Difference between peak hourly flow and available supply for a 2-1/2-hour period.

[12]Breakdown of operating storage per tank per the March 2006 Water System Master Plan Update.

[13]3,500 gpm flow for 3-hour duration, assuming only storage is used.

[14]Assumes 5 percent of overall system storage volume. This volume is not considered usable for consumption.

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

[16]Equalization volume plus operational storage plus emergency reserve plus fire reserve plus dead storage

Chapter 3 - Water Supply and Treatment

Introduction

This chapter includes a description of the City of Prineville's present water supply sources, water rights, treatment systems, and a discussion of the water system's capacity to meet present and future needs. The City's current water supply system consists of production from water wells located in the City. The only treatment currently required for the well water is chlorination for distribution system residual maintenance and disinfection purposes.

Present Water Supply System and Treatment

General

The City of Prineville's water supply currently comes from two groundwater sources supplied by 11 production wells. Seven wells pump water from the alluvial aquifer underlying the Prineville valley floor. Four additional wells pump water from the Airport Area Aquifer System, located on the plateau west of the City adjacent to the Prineville Airport. The locations of the City's production wells are shown on Figures 1-2A and 1-2B in Chapter 1. The City does not have any interconnections with other municipal water supply systems.

Although the City also holds surface water rights for the use of water from the Crooked River, Prineville Reservoir, and Ochoco Creek, surface water is not currently used as a source for its municipal water supply system (surface water rights are primarily used for agricultural purposes).

Prineville Valley Floor Aquifer

The Prineville Valley floor aquifer is located within the alluvial deposits that have filled the Crooked River valley. The alluvial system contains a shallow, unconfined aquifer and a deeper, confined aquifer. The majority of water production in the valley is from the deeper, confined aquifer, including six of the seven City's valley floor municipal production wells and one additional well currently under construction. The City also has one municipal production well (the 4th Street Shallow Well) completed in the shallow aquifer system. The unconfined aquifer system's water levels are influenced by numerous creeks and river systems present in the valley. The confined aquifer system has a seasonal water level fluctuation pattern. Water levels are near ground surface during late winter and spring and then decline during the summer. The valley water levels typically recover fully each year. Although this valley aquifer appears to be able to support the current level of production, the City continues to monitor the long-term resiliency of the alluvial aquifer system.

Airport Area Aquifer System

The Airport Area Aquifer System is a sequence of permeable materials deposited at the base of a narrow ancestral paleochannel that existed beneath the plateau in the vicinity of the Prineville Airport. The deposits within the ancestral canyon are part of the eastern edge of the older Deschutes Formation. The groundwater flow system within the ancestral canyon is present in the more permeable deposits found at the base of the paleochannel. The City's Airport Area production wells are located in two distinct waterbearing units: the fractured basalt flow located at the bottom of the ancestral canyon (lower aquifer) and the coarse sand and gravel deposit that represents the ancestral river's alluvial channel deposits (upper aquifer).

Critical Groundwater Areas

The City's wells are not located in an area designated by the Oregon Water Resources Department (OWRD) as a critical groundwater area or groundwater limited area. However, the wells are located within the Upper Deschutes River Basin, which is regulated under the OWRD's Deschutes Basin Groundwater Mitigation Program.

Deschutes Basin Groundwater Mitigation Program

A joint OWRD and U.S. Geological Survey study of the Upper Deschutes Basin (Deschutes Groundwater Study Area) determined that the high permeability of the Deschutes Formation also results in a hydraulic connection between groundwater and surface water. Specifically, the OWRD concluded that groundwater uses within the groundwater study area have the potential for substantial interference with surface water rights and will reduce scenic waterway flows unless mitigation is provided, as defined in Oregon Administrative Rules (OAR) Chapter 690, Division 505. As a consequence, new groundwater permits are conditioned to require mitigation that meets the OWRD's requirements.

The City of Prineville and surrounding lands are located within the Upper Deschutes Basin Groundwater Study Area. The City provides mitigation in the Crooked River zone of impact for water pumped from its Airport Area Aquifer System wells and will need to provide mitigation for groundwater withdrawals under any new groundwater permit.

Currently, the City is in the process of obtaining a water right for the release of up to 5,100 acre-feet (AF) of stored water from Prineville Reservoir for groundwater pumping (downstream fish and wildlife use) mitigation. The City anticipates the application will result in 5,100 AF of mitigation credits. These mitigation credits are part of the federal Crooked River Collaborative Water Security and Jobs Act of 2014 and required a change in use of the storage right for Prineville Reservoir through a transfer and a new secondary water right to establish mitigation credits. Currently, the secondary water right application (Application S-88402) is pending.

Valley Floor Wells

The City's seven valley floor wells currently provide approximately half of the City's water supply, with each well capable of providing between 90 and 340 gallons per minute (gpm). Only two of the City's valley floor wells were drilled within the last 30 years, as the City has developed new supply from the Airport Area Aquifer System in recent years. The valley floor wells range in depth from 228 to 280 feet, with the exception of the 4th Street Shallow Well, which is used sparingly. Well logs for all of the City's municipal water supply wells are included in Appendix F.

Figure 3-1 shows estimated current production capacity for the wells connected to the municipal water system. The City considers its most reliable valley floor wells to be the Barney, Stearns, Stadium, 4th Street Deep, Yancey, and Lamonta wells. Additionally, the City can utilize the 4th Street Shallow Well if needed, although the city limits the use of the well to peak demand periods. The current combined capacity of the City's valley floor wells is approximately 3.21 cubic feet per second (cfs).

Airport Wells

The City's four Airport Area Aquifer System wells (Airport Wells No. 1 through 4) currently provide the other half of the City's water supply, although the volume supplied by the Airport wells has been increasing over the past 10 years as the City has developed its groundwater rights for the Airport Area Aquifer System. The Airport wells range in depth from 546 to 703 feet deep, and draw water from the upper and lower water-bearing units within the ancestral Crooked River channel, as described previously in this chapter. The well in the fractured basalt flow (Airport Well No. 3) produces 285 gpm, and the wells in the course sand and gravel deposits produce up to 1,100 gpm.

Airport Wells No. 1 through 4 have a combined instantaneous capacity of 5.18 cfs. However, all four wells are not operated simultaneously due to water right constraints. The City's current water rights for its Airport wells limit the production capacity to a maximum withdrawal rate of 3.95 cfs.

Therefore, the City's current municipal water supply wells have a combined production capacity of 8.39 cfs; however, the water rights limitations for the Airport wells currently cap production capacity at 7.05 cfs.

Disinfection and Treatment

Treatment of the well supply sources has been designated as residual maintenance chlorination by the Oregon Health Authority - Drinking Water Services (DWS). This means the source water does not require treatment and, therefore, chlorine contact time is not required. Chlorination is completed at each well source through injection of a sodium hypochlorite solution for the purpose of preventing the potential development of algae and pathogens in the distribution system. Chlorine residuals are measured and recorded regularly to help ensure chlorine levels are maintained appropriately.

Well Maintenance

Well Capacity

Wells require periodic maintenance to keep them functioning properly and working efficiently. Many wells, particularly wells that source their water from an alluvial aquifer, have a tendency to lose efficiency over time. The result of lost efficiency is either decreased yield (gpm) or greater pumping drawdown. This results in higher pumping costs and loss of production.

Specific capacity (production in gpm per foot of drawdown) is a measure of the 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 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 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 reasonable period of time (e.g., one week). The idle time is needed to normalize the well's static water level. Noting a reduction in specific capacity will indicate problems with the well or pumping system and the need to take corrective action before the problem becomes irreversible and also to minimize operating costs.

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 time by performing this specific capacity test provides good information to project forward and budget for a maintenance activity that may be required on the well. If specific capacity has not decreased but pumping rates have, this may indicate a problem with the pump rather than the well.

Static Water Level Trends

Prineville Valley Floor Aquifer

The Prineville Valley floor aquifer has a seasonal water level fluctuation pattern. Water levels are near ground surface during late winter and spring and then decline during the summer. The valley floor aquifer water levels typically recover fully each year. Although this valley floor aquifer appears to be able to support the current level of production, the City needs to continue to monitor the long-term resiliency of the alluvial aquifer system.

Airport Area Aquifer System

Water levels in the Airport Area Aquifer System fluctuate seasonally, with the water tables dropping during the summer period, and then recovering during the winter period. In addition to the seasonal fluctuations, the water levels in both of the Airport Area aquifers have shown a long-term decline over the past three years of monitoring. Water levels have declined at average rates of more than 3.5 feet per year in the upper aquifer and slightly less than 1 foot per year in the lower aquifer during the 3-year groundwater mitigation plan data collection effort. Factors that are likely contributing to the measured declines include climate fluctuations (short- and long-term) and an increase in annual production from these aquifers. The precipitation record from the Prineville valley indicates the Prineville area has been in a drying trend between 1998 and 2016, which may be one reason for the observed long-term water level decline. However, the recent increases in annual production from these aquifers may also be a contributing factor to the observed declining water level trend. A longer term water level dataset that includes a wet climate cycle will assist in further assessment of these relationships. The City needs to continue to monitor water levels in the Airport Area Aquifer System to further understand and evaluate both current and long-term trends.

Water Rights

The City of Prineville holds 30 water rights for the use of both groundwater and surface water for municipal, irrigation, group domestic, and industrial supply. Of these 30 water rights, a majority are for either municipal or irrigation purposes. The City's water rights are summarized on Figures 3-1 and 3-2 and are described in more detail in the following sections. Copies of the water rights certificates are included in Appendix G.

Municipal Water Rights

The City currently holds a total of 12 groundwater rights for municipal use, which include 9 certificates and 3 groundwater permits. The City's municipal water supply currently comes from groundwater supplied by 11 wells, appropriating water under 9 of the City's municipal use water rights with a total authorized rate of appropriation of 19.32 cfs. Although the City has municipal use water rights authorizing 19.32 cfs, current production capacity of the associated wells is approximately 8.39 cfs. However, the water rights limitations for the Airport wells currently cap production capacity at 7.05 cfs.

Prineville Valley Floor Aquifer Groundwater Rights

The City holds six water right certificates and one permit (Permit G-11993) for the use of water for the municipal supply from the Prineville Valley floor alluvial aquifer. These Valley floor aquifer water rights total 5.13 cfs. The current combined production capacity of the City's valley floor wells is 3.21 cfs; therefore, there is 1.92 cfs in excess water rights capacity available for use in the valley's alluvial aquifer. With the exception of Permit G-11993, all of the City's alluvial aquifer water rights are certificated. Permit G-11993 was partially perfected, with Certificate 87714 issued in 2012. An application for extension of time is currently pending for the remaining, unperfected portion of Permit G-11993.

Airport Area Aquifer System Groundwater Rights

The City also holds two groundwater permits in the Airport Area Aquifer System: Permit G-17577 (commonly referred to as Permit A) and Permit G-17236 (commonly referred to as Permit B). Permit G-17577 is for the use of up to 1.715 cfs up to a maximum total annual volume of 1,242 AF from four wells (Airport Wells No. 1 through No. 4) in the Airport Area Aquifer System. Both Permits G-17577 and Permit G-17236 require mitigation under the Deschutes Basin Groundwater Mitigation Program (OARs Chapter 690, Division 505) and, therefore, the permits contain a maximum annual volume limit.

Permit G-17236 is for the use of up to 12.48 cfs for up to 9 wells, with the following limitations: use of a maximum of 5.57 cfs from Airport Wells No. 1 through 4 and proposed Wells No. 5 through 7, a maximum of 2.23 cfs (1,000 gpm) in total from Airport Wells No. 1 through 4, a maximum of 1.11 cfs in total from Wells No. 5 and 6, and a maximum of 2.23 cfs from Well No. 7. There are no well-specific rate limitations on Wells No. 8 and 9. The maximum annual volume under Permit G-17236 is 3,682.7 AF. Currently, only Airport Wells No. 1 through 4 (the same wells authorized under Permit G-17577) are constructed and utilized, with a combined capacity of approximately 5.18 cfs (2,325 gpm). Proposed Wells No. 5 through 9 would appropriate water from the Deschutes Regional Aquifer, located west of the Airport Area Aquifer System. A map showing the current authorized location of Wells No. 1 through 9 is provided on Figure 3-3.

Although the physical pumping capacity of the Airport wells is 2,325 gpm, the City's water rights for the Airport Area Aquifer System are limited by both the maximum rate and volume authorized by water right. Permits G-17236 and G-17577 have a combined rate limitation of 1,770 gpm. The City's

Airport Wells No. 1 through 4 do not pump simultaneously. During periods of peak demand, the City is able to operate Well No. 4 in combination with Well No. 2, or in combination with Wells No. 1 and 3 to maximize the rate of production under Permits G-17236 and G-17577.

Additionally, under the Deschutes Basin Groundwater Mitigation Program, the City must provide mitigation pursuant to the rules in OAR Chapter 690, Division 505. To date, the City has provided 263.6 mitigation credits under Permit G-17577 and 340.3 credits under Permit G-17236. The City must provide mitigation for the OWRD's estimate of consumptive use. The OWRD has generally determined the use of water for year-round municipal supply is 40 percent consumptive, so with the mitigation currently provided the City can appropriate a maximum of 1,509.8 AF from the Airport Area Aquifer wells. In 2015, the City appropriated 816.5 AF from this source.

Municipal Water Rights for Wells Not Connected to the City Municipal Water Supply System

The City also holds four additional municipal use groundwater certificates that are not currently being used to supply water to the City's municipal water system. These rights are used to supply water for industrial use or are not used by the City due to water quality, production, or other issues. One of these rights is a surface water withdrawal from Ochoco Creek. Figure 3-2 provides further details regarding these water rights. Because these water rights are not used to supply water to the City's municipal system, they are not discussed further in this Water System Master Plan (WSMP). Although the wells associated with these groundwater rights are not connected to the City's municipal system, the water rights associated with the wells may be utilized at other points of appropriation in the Prineville Valley floor aquifer through a water right transfer, should the City develop additional wells from that source of supply over the long-term.

Other City Water Rights

The City holds one certificate and two groundwater permits for uses that include group domestic, industrial, fire protection, and sewerage (see Figure 3-2). Because these water rights are not used to supply water to the City's municipal system, they are not discussed further in this WSMP.

Irrigation Water Rights

There are 16 water right certificates for primary irrigation of 864.6 acres and supplemental irrigation of 257.8 acres on City-owned lands. These rights are all surface water rights, with the exception of one supplemental irrigation right associated with a groundwater well. These irrigation water rights are summarized on Figure 3-2. The City uses these rights, in combination with reclaimed water, to irrigate City-owned lands. Both the City golf course and pasture lands near the wastewater treatment plant are irrigated with surface water in this manner. The City leases the majority of acres to which the surface water rights are appurtenant for farming purposes. Because these water rights are not used to supply water to the City's municipal system, they are not discussed further in this WSMP.

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 DWS website. The City's well sources 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, most of the constituents were not detected in samples obtained from the wells. Of those detected, the concentrations were significantly less than their corresponding U.S. Environmental Protection Agency (EPA) primary drinking water maximum contaminant levels (MCL). Based on the latest chemical results, groundwater from the City's supply wells does not contain bacteriological or chemical constituents at concentrations greater than the corresponding EPA primary drinking water MCL. The DWS water quality testing summaries are presented in Appendix H.

Distribution System Water Quality Testing

Although the distribution system is discussed in greater detail in Chapter 5, a brief discussion of water distribution system sample analytical testing is presented herein for completeness. The City routinely obtains samples from the water distribution system for analysis of total coliform and fecal coliforms. In general, coliforms are not present in routine water distribution system samples, although the water has tested positive for total coliforms in the past, but not recently. These past positive test results were reported to the DWS, and the DWS recorded the positive test as an alert, although it was not considered a violation. Total coliform bacteria are commonly found in the environment (e.g., soil or vegetation) and are generally harmless. 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 and, 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 disinfection byproducts (DBP), asbestos, lead, and copper. From 1993 through 2015, all detected concentrations of DBP, asbestos, lead, and copper were less than their 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 Interim Report

The 1996 amendments to the Safe Drinking Water Act required states to provide the information needed by public water systems to develop source water assessments if they chose to do so. The information provided in the source water assessment includes 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. The DWS is the principal agency involved with source water assessments in Oregon. As part of the source water assessment, the DWS developed time of travel delineations for the City of Prineville's water supply wells. In 2014, the DWS certified the City's updated DWPA designated time of travel delineations. The City also completed an Inventory of Potential Contaminant Sources associated with the updated DWPA time of travel delineations in 2014. A copy of the Source Water Assessment Interim Report (Report) is included in Appendix I.

The 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, and the susceptibility of the drinking water sources. Refer to Appendix I for information relative to the City's water supply well source aquifers present beneath the Prineville area. The DWPA delineations are intended to identify the area that supplies the system's drinking water. The DWPA is designated for projected 1-, 2-, 5-, and 10-year time of travel periods for water from the aquifer to enter Prineville's water supply sources. Figures showing the DWPA, the times of travel for groundwater to the wells, and potential contamination sources are included in the Report in Appendix I.

The City utilizes the local groundwater aquifer to supply water to the system. Because groundwater sources can be susceptible and sensitive to contamination, it is important to understand and protect the groundwater systems the local population relies on for their drinking water. Potential contaminant sources for each City well were identified and labeled on figures in the Inventory of Potential Contaminant Sources included in the Report located in Appendix H. Potential contaminant sources identified by the Report include leaking underground storage tank sites, commercial and industrial properties, and agricultural facilities. The full list of potential contaminant sources can be found on tables associated with the Report.

The documents conclude the City of Prineville's water system obtains water from several local aquifers that could be impacted by the release of contaminates on the ground or into the subsurface. Several high to moderate risk potential contaminant sources were identified within the protection area of several of the City's water wells.

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 of Prineville uses shallow wells for their 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. The water levels in the City's wells do have some seasonal fluctuations; however, over time, the static water levels have remained fairly constant (with the exception of the Airport Area Aquifer System). Although the City's water sources have been reliable, certain events could affect the City's water supply. When evaluating the system's performance, potential weaknesses were identified as follows:

1. Transmission line failure
2. Source contamination

3. Equipment failure at the Airport Area Aquifer System wells and/or valley floor wells
4. Booster pump station equipment failure
5. Contamination in reservoirs and distribution system
6. High demand and low storage volume

The supply has been able to meet system demands, but there is no available capacity to accommodate growth and additional demands, as discussed later in this chapter. Currently, the existing water system components provide the City with a good degree of redundancy, but there is limited ability to deliver the water supply from the Airport Area Aquifer System wells to the other zones within the City. In the event of a power outage, the City currently has a backup power system at the Airport Area Aquifer System wells and the valley floor wells.

Reservoir storage is further discussed in Chapter 4, and the distribution system and delivery of water supply from the Airport Area Aquifer System wells to other zones within the City are discussed in detail in Chapter 5.

Water Supply Alternatives

Taking into consideration the water rights limitations, the City does not have enough source capacity to meet current demands at this time. As discussed earlier, it is desirable to design a system with enough source capacity to provide for peak daily demands without requiring the well pumps to operate 24 hours per day. As shown on Figure 2-3 in Chapter 2, the peak daily flow requirements, assuming the wells operate 18 hours per day, is estimated to be approximately 3,330 gpm and 5,300 gpm for current and projected future (2037), respectively. As previously discussed, the current combined instantaneous water right withdrawal allowance from all well sources is 3,210 gpm with an available pumping capacity of 3,765 gpm. Therefore, the City peak day demands currently exceed the available permitted supply capacity and are anticipated to exceed the well pumping capacity in the near future, assuming the recommended daily operating time limit of 18 hours is implemented. It appears the City will need to develop an additional 2,090 gpm of source capacity to meet the 20-year projected demands. The City should immediately begin the process of increasing its supply capacity to meet the current and projected demands. The following alternatives were evaluated to meet this objective:

Develop Additional Well Sources Alternative

An alternative potential available to the City is to develop additional well source(s) to increase capacity. The City has recently drilled exploratory wells in the Prineville Valley floor aquifer to determine the viability of developing additional wells from this source with limited success. The exploratory wells have not yielded adequate water to justify the cost of developing production wells. Due to the relatively small amounts of water produced from the existing wells and the limited success of the exploratory wells drilled, the City has concluded that developing additional wells to utilize water from the Prineville Valley floor aquifer would not likely be cost-effective and probably is not a viable, long-term solution to solve the City's need for more source capacity.

Drilling and developing additional wells to appropriate water from the Deschutes Regional Aquifer is an option the City could consider. As discussed above, Wells No. 1 through 4 have a physical pumping capacity of 2,325 gpm, but are limited by the water right permit to an instantaneous water right withdrawal rate of 1,770 gpm. Water rights from proposed Wells No. 5 through 7 (see

Figure 3-3), allow no more than 500 gpm in total from Wells No. 5 and 6, and no more than 1,000 gpm from Well No. 7, or 1,500 gpm total. There are no well-specific rate limitations on proposed Wells No. 8 and 9. Well No. 7 would be the most feasible well to drill and develop as it has the closest proximity to the City and would require the shortest pipeline to allow it to be connected to the City's water system, and it also has double the available water right when compared to Wells No. 5 and 6. As shown on Figure 3-3, all of the proposed wells would require miles of pipeline to be constructed to connect them to the City's system. These pipelines would have a high capital cost to construct and, unless Well No. 8 or 9 was connected, would not provide the City with the long-term capacity needed to meet the projected demands. For these reasons, the development of these proposed wells does not appear to be the most cost-effective option potentially available to the City.

Shallow Groundwater Source(s) Adjacent to the Crooked River Alternative

As discussed earlier, the City is currently in the process of obtaining a water right for the release of up to 5,100 AF of stored water from Prineville Reservoir for mitigation for groundwater pumping (downstream fish and wildlife use). The City anticipates the application will result in 5,100 AF of mitigation credits.

These anticipated mitigation credits will provide the opportunity for the City to permit and develop additional groundwater source(s). These future groundwater supply source(s) will likely include shallow well(s) (or a similar collection system) in the valley and near the Crooked River.

A study to evaluate the potential to develop shallow groundwater supply source(s) coupled with aquifer storage and recovery (ASR) is being completed outside of this WSMP. That study will provide detailed analysis of the feasibility of developing the shallow groundwater supply source(s), the best method(s) for developing the source(s) [i.e., wells, infiltration gallery, treatment requirements, etc.], the estimated costs of developing the source(s) and whether ASR is a viable solution for providing more available groundwater during peak pumping times.

Until this pending study is completed, it will not be known for certain, but at this point, it appears the most feasible potential additional source(s) of supply available to the City will be from shallow groundwater hydraulically connected to the Crooked River. Because these potential shallow groundwater sources will be hydraulically connected to the Crooked River, as part of the water rights application process, the City will need to provide mitigation credits associated with the Crooked River zone of impact.

Recommendations

To obtain the needed additional water supply capacity, the City should develop more sources. This could be done by developing the proposed wells in the Deschutes Regional Aquifer or through shallow groundwater sources located near the Crooked River that are hydraulically connected to the river. The most feasible option available to the City appears to be from the shallow groundwater sources but will not be known for certain until the pending study evaluating this option is completed. Once the study is completed, the information needed to compare alternatives will be available and the City will have the required data and documentation to make the best long-term decision to solve the additional supply capacity needs.

City-Held Municipal Water Rights

Well	Application	Permit	Certificate, Claim, or Transfer	Entity Name on Water Right	Type of Beneficial Use	Priority Date	Source of Water	Water Right's Authorized Rate gpm	cfs	MGD	Maximum AF per year	Current Capacity gpm	cfs	Status
Water Sources Currently Connected to Municipal Water Supply System														
Barney	G-6313	G-9154	~~T-9762~~	City of Prineville	MU	October 5, 1973	Prineville Valley Aquifer	700	1.56	1.01		340	0.76	
Stearns			83993									210	0.47	
Stadium	G-12344	G-11993	87714 (PP)	City of Prineville	MU	December 14, 1990	Prineville Valley Aquifer	271	0.604	0.39		205	0.46	
	G-12344	G-11993						154	0.343	0.22				Permit completion date October 1, 1998. Extension application pending.
4th Deep	U-402	U-372	86889	City of Prineville	MU	December 8, 1950	Prineville Valley Aquifer	337	0.75	0.48		175	0.39	
4th Shallow	U-396	U-370	88146	City of Prineville	MU	October 11, 1950	Prineville Valley Aquifer	135	0.301	0.19		90	0.20	Currently used only as backup supply due to water quality and/or production issues.
Yancey	U-241	U-215	22839	Pacific Power and Light Company	MU	June 17, 1947	Prineville Valley Aquifer	359	0.8	0.52		210	0.47	
Lamonta	G-605	G-506	86337	City of Prineville	MU	April 5, 1957	Prineville Valley Aquifer	346	0.77	0.5		210	0.47	
Airport No. 1,2, 3, and 4	G-15974	~~G-16146~~ ~~G-17089~~ G-17577	T-10378, T-11647, T-12192	City of Prineville	MU	March 31, 2003	Airport Area Aquifer System	770	1.715	1.11	1,242.00	2325	5.18	Permit completion date October 29, 2026.
Airport No. 1, 2, 3, and 4	G-16900	G-17236	T-11685	City of Prineville	MU	June 27, 2007	Airport Area Aquifer System	1,000	2.23	1.44	3,682.70			Permit completion date November 30, 2031. Only Airport area wells developed to date. Permit condition limits Airport area wells to 2.23 cfs (1,000 gpm).
Wells 5 through 9							Deschutes Regional Aquifer	4,601	10.25	6.62		0	0	Wells not yet developed.
						Valley Floor Aquifer Subtotal:		**2,302**	**5.13**	**3.31**		**1,440**	**3.21**	
						Airport Area Aquifer Subtotal:		**1,770**	**3.95**	**2.55**		**2,325**	**5.18**	
						Municipal Production Wells Total:		**8,673**	**19.32**	**12.49**		**3,765**	**8.39**	
Water Sources Not Connected to Municipal Water Supply System														
Freight Depot	G-605	G-506	~~T-11026~~ 89853	City of Prineville	MU	April 5, 1957	Prineville Valley Aquifer	148	0.33	0.21				Not connected to the City's municipal water supply system. Used at the railroad depot for industrial purposes.
10th Street	U-140	U-133	15539	City of Prineville	MU	May 16, 1941	Prineville Valley Aquifer	45	0.1	0.06				Currently not in use due to water quality and/or production issues.
Ochoco Heights	U-147	U-140	86558	City of Prineville	MU	May 20, 1942	Prineville Valley Aquifer	359	0.8	0.52				Currently not in use due to water quality and/or production issues.
	Crooked River Decree	--	531	City of Prineville	MU, FP, Sewerage	December 31, 1879	Ochoco Creek	Reasonable Amount	Reasonable Amount	Reasonable Amount				Not currently in use.

AF = acre-feet
cfs = cubic feet per second
FP = Fire Protection
gpm = gallons per minute
MGD = million gallons per day
MU = Municipal

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WATER SYSTEM MASTER PLAN

CITY-HELD MUNICIPAL WATER RIGHTS

FIGURE
3-1

City-Held Irrigation and Other Water Rights

Well	Application /Decree	Permit	Certificate, Claim, or Transfer	Entity Name on Water Right	Type of Beneficial Use	Priority Date	Source of Water	Authorized Rate			Primary Acres	Supplemental Acres	Status/Comments
								gpm	cfs	MGD			
Other Water Rights Held by the City													
Northridge	G-13280	G-13280		City of Prineville	GD	February 5, 1993	Prineville Valley Floor Aquifer	67.0	0.15	0.10			Completion date October 1, 2017. Not connected to City's municipal water supply system.
Stearns	G-3139	G-2919	57438	Pacific Power and Light Company	GD	June 17, 1965	Prineville Valley Floor Aquifer	112	0.25	0.16			Currently not in use due to water quality and/or production issues.
Clear Pine	G-13238	G-12541		City of Prineville	Fire Protection, Pollution Abatement, I/M	January 6, 1993	Prineville Valley Floor Aquifer	1,791	3.99	2.58			Completion Date October 1, 2019. Not connected to City's municipal water supply system.
Irrigation Rights on City-Owned Lands													
Surface Water Irrigation Rights													
	S-25184	S-19956	33012	Claude Williams	SUP IR	August 25, 1950	Crooked River	480	1.07	0.69	85.4		
	S-15522	S-11411	75485	Peoples Irrigation Co.	Primary IR	September 11, 1934	Crooked River	449	1	0.65	78.4		
	S-15629	S-11494	75487	Peoples Irrigation Co.	IR	November 21, 1934	Crooked River	72	0.16	0.10	12.4		
	S-4788	S-5426	82246	Ochoco Irrigation District	IR	March 13, 1916 (from McKay) August 10, 1917 (from Other Sources)	Ochoco Creek, McKay Creek, Dry Creek, Lytle Creek, Johnson Creek, Ochoco Reservoir, Waste and Return Water Flowing in All Unnamed Waterways				300		Acquired from Ironhorse Development in 2017. Acreage to be finalized by March 31, 2017.
	S-32641	S-25991	~~68395~~ ~~T-8648~~ 82247	U.S. Bureau of Reclamation (BOR)	SUP IR	April 8, 1914	Crooked River and Prineville Reservoir	13	0.03	0.02	2.5		
			82247	BOR	IR	April 8, 1914	Crooked River and Prineville Reservoir	31	0.07	0.05	2.8	300	Supplemental portion acquired from Ironhorse Development in 2017. Acreage to be finalized by March 31, 2017.
	S-15766	S-11619	87546	Peoples Irrigation Co.	IR	March 23, 1935	Crooked River	85	0.19	0.12	15		
	Crooked River Decree		87547	Peoples Irrigation Co.	IR, LV	1893	Crooked River	304	0.6775	0.44	54.2		
	S-32641	S-25991	87548	BOR and Peoples Irrigation Co.	IR, SUP IR	April 8, 1914	Crooked River and Prineville Reservoir	395 gpm primary; 1,522 gpm supplemental	0.88 cfs primary; 3.39 cfs supplemental		32.5	129.3	
	S-32641	S-25991	~~T-11103~~ 83850	BOR	SUP IR	April 8, 1914	Crooked River and Prineville Reservoir	415	0.925	0.60	37		
			~~T-11134~~ 83850	BOR	IR, SUP IR	April 8, 1914	Crooked River and Prineville Reservoir	471	1.05	0.68	21.8	20	
	S-15766	S-11619	~~T-11134~~ 90380	Peoples Irrigation Co.	IR	March 28, 1935	Crooked River	139	0.31	0.20	25		
	Crooked River Decree		~~T-11134~~ 90381	Peoples Irrigation Co.	IR, LV	December 31, 1893 December 31, 1895	Crooked River	166	0.37	0.24	29.3		
	S-32641	S-25991	~~T-11134~~ 90382	BOR and Peoples Irrigation Co.	IR, SUP IR	April 8, 1914	Crooked River and Prineville Reservoir	705	1.57	1.01	8.3	54.3	
	Crooked River Decree		~~T-11134~~ 90383	Peoples Irrigation Co.	IR, DOM, LV	1895	Crooked River	112	0.25	0.16	20		
	Crooked River Decree		90397	Peoples Irrigation Co.	IR, DOM, LV	1895	Crooked River	224	0.5	0.32	40		
	Crooked River Decree	--	531	City of Prineville	IR	December 31, 1879		2,244	5.00	3.23	400		
Groundwater Irrigation Rights													
Simmons Well	G-13068	G-12511	87724	City of Prineville	SUP IR	August 7, 1992	Prineville Valley Floor Aquifer	301	0.67	0.43		54.2	Not connected to City's municipal water supply system.
										Total:	**1,164.6**	**557.8**	

cfs = cubic feet per second
DOM = domestic
GD = group domestic
gpm = gallons per minute
I/M = irrigation/municipal
IR = irrigation
LV = livestock
MGD = million gallons per day
SUP = supplemental irrigation

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CITY OF
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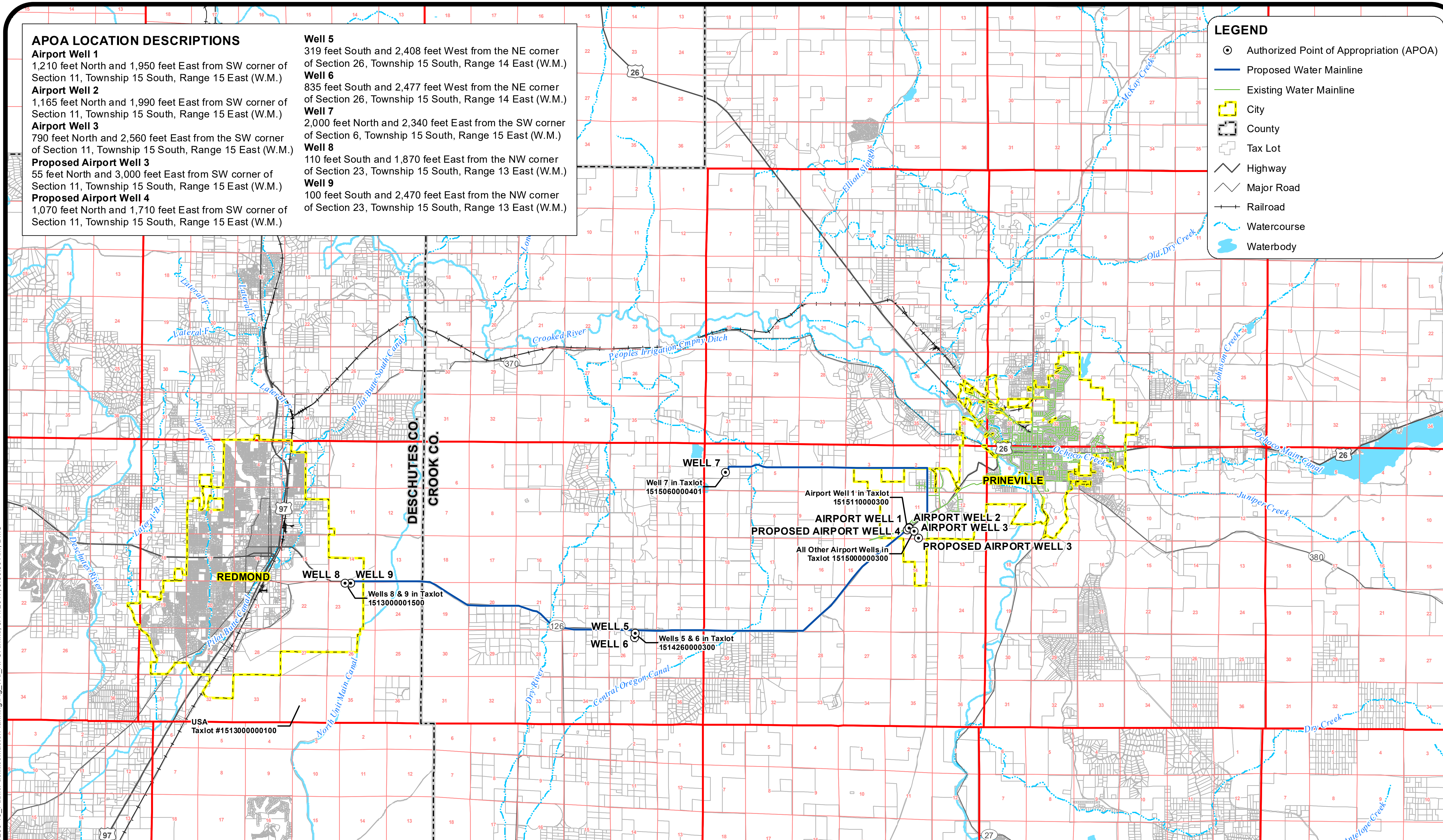
WATER SYSTEM MASTER PLAN
CITY-HELD IRRIGATION AND OTHER WATER RIGHTS

FIGURE
3-2



APOA LOCATION DESCRIPTIONS

Airport Well 1
1,210 feet North and 1,950 feet East from SW corner of Section 11, Township 15 South, Range 15 East (W.M.)

Airport Well 2
1,165 feet North and 1,990 feet East from SW corner of Section 11, Township 15 South, Range 15 East (W.M.)

Airport Well 3
790 feet North and 2,560 feet East from the SW corner of Section 11, Township 15 South, Range 15 East (W.M.)

Proposed Airport Well 3
55 feet North and 3,000 feet East from SW corner of Section 11, Township 15 South, Range 15 East (W.M.)

Proposed Airport Well 4
1,070 feet North and 1,710 feet East from SW corner of Section 11, Township 15 South, Range 15 East (W.M.)

Well 5
319 feet South and 2,408 feet West from the NE corner of Section 26, Township 15 South, Range 14 East (W.M.)

Well 6
835 feet South and 2,477 feet West from the NE corner of Section 26, Township 15 South, Range 14 East (W.M.)

Well 7
2,000 feet North and 2,340 feet East from the SW corner of Section 6, Township 15 South, Range 15 East (W.M.)

Well 8
110 feet South and 1,870 feet East from the NW corner of Section 23, Township 15 South, Range 13 East (W.M.)

Well 9
100 feet South and 2,470 feet East from the NW corner of Section 23, Township 15 South, Range 13 East (W.M.)

DISCLAIMER
This map was prepared for the purpose of identifying the location of a water right only and it is not intended to provide legal dimensions or location of property ownership lines.

0 2 4
SCALE IN MILES

Date: May 11, 2017
Data Sources: OWRD, Crook Co. GIS, OGIC, ESRI

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CITY OF
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WATER SYSTEM MASTER PLAN

AUTHORIZED POINTS OF APPROPRIATION (APOA)

FIGURE
3-3

\\LGSVR6\gisprojects\Prineville\1260-15_PublicFacilitiesMasterPlanning\Fig_Wtr_APOA.mxd, 5/11/2017, 9:30:50 AM, DMC

Chapter 4 - Water Storage

Introduction

This chapter presents information about the City of Prineville's water storage facilities and discusses the purpose for storage in municipal water systems. The condition and needs of the City's existing storage reservoirs are outlined, recommended storage requirements to meet current and 2037 design criteria are presented, and the types of storage facilities generally available are outlined. Cost estimates for storage reservoir improvements are presented at the end of this chapter.

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 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 six water storage reservoirs with a total storage volume of 4.5 million gallons (MG). Refer to Table 1-1 in Chapter 1 for a summary of these reservoirs.

The most recent detailed inspections of five of the six reservoirs were completed in 2011 by Inland Potable Services, Inc., of Centennial, Colorado. Copies of the available Inspection Reports for the reservoirs are included in Appendix J. Additional information was gathered from inspection video from each reservoir. Table 4-1 is a summary of the existing conditions and recommendations.

TABLE 4-1
EXISTING CONDITIONS AND RECOMMENDATIONS

Reservoir	Inspection Date	Inspection Summary	Recommendations
Airport No. 1	October 6, 2011	The exterior and interior of reservoir were generally found to be in good to excellent condition.	Install gasket on access hatch. Clean and inspect every 3 to 5 years.
Airport No. 2	N/A	Airport No. 2 was constructed after the 2011 inspections by Inland Potable Services, Inc.	N/A
Ochoco No. 1	October 6, 2011	The exterior of the reservoir was generally found to be in fair to good condition with surface corrosion ranging from less than 1 percent to 10 percent. Nonfunctioning cathodic protection system noted. The interior of the reservoir was generally found to be in poor condition with pitting, heavy noduling, and up to 95 percent corrosion noted.	Install gasket on access hatch. Replace cathodic protection system. Blast and recoat interior of the reservoir. Repair the epoxy of the exterior of the reservoir. Clean and inspect every 3 to 5 years.
Ochoco No. 2	October 6, 2011	The exterior of the reservoir was generally found to be in good condition with up to 5 percent surface corrosion. The interior of the reservoir was generally found to be in poor condition with pitting, heavy noduling, and up to 90 percent corrosion noted.	Install gasket on access hatch. Blast and recoat interior of the reservoir. Repair the epoxy of the exterior of reservoir. Clean and inspect every 3 to 5 years.
Barnes Butte	October 5, 2011	The reservoir was generally found to be in fair to good condition.	Clean and inspect every 3 to 5 years.
American Pine	October 5, 2011	The reservoir was generally found to be in excellent condition.	Clean and inspect every 3 to 5 years.

Based on a 3- to 5-year time frame, cleaning and inspections are due. Scheduling and completing cleaning and inspections for all the reservoirs is recommended within the next fiscal year.

System Pressures Provided by the Reservoirs

The City of Prineville currently has six pressure zones serving the distribution system. Where practical, the distribution system is gravity-fed from the reservoirs. Chapter 5 provides further detail of the existing pressure zones. Fire flow capacity and the evaluation of the distribution system are discussed in Chapter 5.

Refer to Chapter 5 for a discussion of the water modeling performed as part of this Water System Master Plan, 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's wells with back-up power capacity. All four of the storage components listed below were considered when evaluating the City's potential storage needs. Refer to the design criteria presented on Figure 2-3 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.

Equalization Storage

Equalization storage should be provided to balance the difference between peak hour demand and water supply capacity during a peak day demand (PDD) 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, 2-1/2 hours of peak hourly flow has been assumed. Based on providing the current estimated peak hourly flow of 4,626 gallons per minute (gpm) for 2-1/2 hours and using the current pumping capacity available, equalization storage of 129,000 gallons is currently required. The required equalization storage is anticipated to increase to 538,957 gallons in the 20-year design period to accommodate an anticipated increase in population (if additional water supply sources are not developed).

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 3-hour duration has been set as the design fire flow for the City, as discussed in Chapter 2. A total of 630,000 gallons of fire reserve storage is needed to sustain a fire flow of 3,500 gpm for a 3-hour duration.

Emergency Reserve

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 problems 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. Generally, the City has emergency power supply provisions to operate wells in the event of a power outage and would be less reliant on reserves should a power outage occur. Currently, to serve the City for one day of emergency reserve at the average daily demand, 1,560,000 gallons would be needed. This amount would increase to 2,489,000 gallons in the year 2037.

Dead Storage

Dead storage represents the water stored within the reservoirs that cannot be utilized due to physical constraints such as inlet/outlet piping configuration. This makes a portion of stored water not available to be drawn out of the reservoir.

The City's water storage reservoirs provide the operating storage, equalization storage, fire reserve, dead storage, and emergency reserve for the existing pressure zones. Not all pressure zones are tied to a specific reservoir. For example, the Valley pressure zone can receive water from the Ochoco Heights reservoirs, the Airport reservoirs (through a pressure reducing valve [PRV]), and the Barnes Butte Reservoir (through PRVs).

Evaluation of Reservoir Water Levels

To evaluate overall system performance, an Existing System Peak Day Extended Period Analysis was completed, modeling the existing system at peak day conditions over time. A diurnal demand pattern was applied to the PDD to account for demand fluctuations over a typical day. This analysis shows the water level of the individual reservoirs (by percent full values) over a 2-day period. No issues were observed with the Airport Reservoirs (No. 1 and 2) or the American Pine Reservoir. The Ochoco Heights Reservoirs (No. 1 and 2) drain to roughly 50 to 55 percent full, but recover to over 75 percent full. The supply to the Barnes Butte Reservoir is unable to keep up with an expanded PDD, as little recovery is observed. The Existing System Peak Day Extended Period Analysis is provided in Appendix K.

Storage Components Summary

Considering all five of the storage components discussed previously, it appears the current storage of 4.5 MG is adequate to meet current demands and projected 2037 demands. However, additional storage capacity and upgrades to current storage facilities are recommended to meet future operational needs for the City.

Future Growth

Anticipated future growth in the northeast portion of Prineville (on the southerly flank of Barnes Butte) may occur in areas that cannot be served by the current water system pressure levels. The ground elevation rises above the elevations that can be served by the Williamson and Ochoco Heights pressure zones. Establishing two new pressure zones to provide adequate system pressures for future development on the southerly flank of Barnes Butte is recommended. It is further recommended to construct an additional reservoir to supply the new pressure zones with necessary operation, equalization, fire reserve, and emergency reserve storage.

Operation and Maintenance

As noted previously in this chapter, the City of Prineville has conducted periodic inspections of its reservoirs. These inspections indicate the conditions of the Ochoco Reservoirs No. 1 and 2 are deteriorating and require maintenance. The recommended maintenance requires the draining of a reservoir, sand-blasting, and re-coating of both the interior and exterior surfaces. To achieve the best results, this work should be completed in the summer months. The downside is that the summer months have the greatest water usage. An Existing System Peak Day Extended Period Analysis was modeled to evaluate the draindown and recovery cycle of the current reservoirs. This showed the Ochoco Reservoirs No. 1 and 2 operating as one storage vessel and dipping to just above 55 percent full during the study time.

Due to the modeled conditions, removal of one of the Ochoco Heights reservoirs from the system to complete the recommended maintenance operations is not recommended. A new 1.5 MG reservoir is recommended to be constructed alongside the existing reservoirs. The design criteria on Figure 2-3 shows that the City has adequate storage for the 20-year planning period. However, the life of a properly maintained storage reservoir can reach over 50 years. The relative comparative cost of constructing a 1.5 MG tank to replace the existing 0.5 MG tank is an advantageous investment for the City for long-term planning purposes. Once the new reservoir is constructed and in operation, one of the existing 0.5 MG reservoirs can be taken out of service to complete renovations and repairs. Once the rehabilitation work is complete, the renovated and repaired reservoir would work in conjunction with the new reservoir, providing a total of 2.0 MG storage at the site. The second existing 0.5 MG reservoir would be demolished.

Cost Estimates

The anticipated cost to construct a new 1.5 MG reservoir, rehabilitate one of the existing 0.5 MG reservoirs, and decommission the second existing 0.5 MG reservoir is $3,028,400 (2017 cost). These improvements are anticipated to be included on the City's Capital Improvements Project list. The anticipated cost for a new 1.0 MG reservoir to serve new pressure levels in northeast Prineville is $2,901,500. System development charges (SDCs) are anticipated to help pay for this construction, as it will serve future growth. Further discussion regarding capital improvements projects, SDCs, and detailed breakdowns of estimated costs is provided in Chapter 6.

Summary

The City currently has six operating storage reservoirs with a total volume of 4.5 MG. With the exception of the Ochoco Heights reservoirs, the existing condition of these reservoirs is generally good to very good. The storage needed for the 2037 planning period is provided by the existing reservoirs. However, maintenance and rehabilitation improvements are recommended for the Ochoco Heights reservoirs. Anticipated future growth in northeast Prineville will require the addition of two new water system pressure zones. A new reservoir is recommended to be constructed with the growth in this area to provide adequate system pressures and fire protection. The lower of the two new pressure zones would be served by gravity flows from the new reservoir. A booster pump station would be necessary to provide adequate pressures to the upper pressure level from the new reservoir.

Due to the logistics and coordination to provide needed maintenance of the existing Ochoco Heights reservoirs a new, larger reservoir is recommended to be constructed at the site. This would enable the existing reservoirs to continue to serve the system as the new reservoir is constructed. Once in operation, the new reservoir could then serve the system as one of the existing reservoirs is repaired and the other is demolished. Upon completion, a more reliable and easier to maintain system would be in place.

Chapter 5 - Distribution System

Introduction

This chapter discusses the City of Prineville's existing water distribution system that delivers water to residential and commercial users. Components of the distribution system include pipelines, valves, booster pump stations, water meters, water service lines, and fire hydrants. The distribution system has been evaluated for both present and future City needs. Improvements have been developed to address existing 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.

Existing System

The City's distribution system main lines are composed of several types of pipe including steel, asbestos cement (AC), ductile iron (DI), wood stave, and polyvinyl chloride (PVC).

The existing distribution system layout, including fire hydrant locations and pipe size and locations, is shown on the Existing Water System Map included at the end of this Water System Master Plan (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. If distribution system main lines or other system features are added in the future, the map can easily be updated as the improvements occur so the City always has the most accurate map available for City staff use.

The existing distribution system map developed as part of this WSMP shows that approximately 91 percent of the distribution system piping is composed of 6-inch or larger diameter pipes. The remaining 9 percent are 4-inch or less diameter pipes. The 4-inch diameter or less pipes limit hydraulic capacity and are too small to support fire hydrants.

In general, the distribution system is fairly well looped. There are some dead-end and/or undersized main lines. This can limit capacity and water circulation in the system. These areas are discussed in more detail later in this chapter.

The City has indicated the majority of the water main lines in the distribution system are generally in good condition. However, the existing wood stave lines in the system are recommended to be replaced.

Booster Pump Stations

The City's water system includes two major booster pump stations that boost system pressure to areas that cannot be served adequately by gravity. There are no known deficiencies with these booster pump stations. The booster pump stations appear to be sized appropriately for the current demand. The American Pine booster pump station has a capacity of 2,500 gallons per minute (gpm), which is generally adequate to provide fire flows for the majority of the predominately residential service area. The Ochoco Heights booster pump station has a capacity of 1,500 gpm, which provides adequate fire flow for the majority of the residential service area. There are other limitations due to small diameter mains within the Ochoco Heights pressure zone that limit fire flow for isolated areas of this zone.

The Airport pressure zone includes a separate booster pump station for the purposes of boosting pressure to provide adequate fire flows within this zone, due to pipe size restriction at the Highway 126 crossing. Fire flow tests performed by City staff indicate the booster pump station is not performing as intended.

Pressure reducing valves (PRVs) are currently located on the discharge side of both the American Pine and Ochoco Heights booster pump stations to regulate pressure. Equipping these booster pump stations with variable speed drives would allow the booster pump stations to change speed based on demand conditions to keep the desired downstream pressure constant. This would provide for more efficient operation of the pumps and reduced utility charges to the City.

Table 5-1 summarizes the flow capacities and pump installed at each existing booster pump station.

TABLE 5-1
SUMMARY OF BOOSTER PUMP STATIONS

Booster Pump Station	Flow
Airport Booster Pump Station	One fire flow pump at 4,000 gpm
American Pine Booster Pump Station	Two domestic pumps at 250 gpm each
	Two fire flow pumps at 1,000 gpm each
Ochoco Heights Booster Pump Station	Three domestic pumps at 200, 400, and 900 gpm, respectively

Water Meters

All services within the City's system are metered. The City is currently in the process of replacing all of its residential meters with automatic meter reading (AMR) meters. City staff monitors and tests meters monthly for no or atypical reads and repairs or replaces meters as necessary.

Water Loss

The City is currently implementing several water management and conservation measures, including conducting annual water audits; replacing residential meters with AMR meters, including software to improve leak detection; utilizing a computerized bulk water station to more accurately track bulk water consumption; continuing to replace old, deteriorating distribution piping; encouraging conservation efforts through education programs; and providing free conservation items to water customers.

The City should continue to encourage water conservation through the measures described above along with continued investigation of other reuse, recycling, and non-potable water use opportunities. In addition, the City should continue to encourage other high water use facilities to develop and implement their own internal water conservation plans.

Distribution System Pressure

As discussed in Chapter 4, the City has six pressure zones serving the distribution system, with system pressures are provided by the elevation of the reservoirs and by booster pump stations for areas of the system that cannot be served by gravity. A summary of the pressure zones is included on Table 5-2.

The City also uses three PRVs within the network to regulate system pressures and balance water demands.

TABLE 5-2
SUMMARY OF PRESSURE ZONES

Pressure Zone	Ground Elevation Currently Served (feet)*		Hydraulic Control Element	HGL (ft.) (Tank Full or PRV Setting)	Static Pressure (psi)	
	Highest	Lowest			Low	High
Valley	2,918	2,846	Ochoco Heights Reservoirs	2,987 (Tank Full)	30	61
Barnes Butte	2,981	2,906	Barnes Butte Reservoir	3,104 (Tank Full)	53	86
Williamson	3,029	2,884	Williamson PRV	3,097 (82 psi)	30	92
				3,060 (66 psi)	13	76
Ochoco Heights	2,961	2,885	Ochoco Heights booster pump station with PRV	3,120 (80 psi)	69	102
Northridge	3,056	2,922	American Pine Reservoir booster pump station with PRV	3,136 (80 psi)	35	93
Airport	3,288	3,025	Airport Reservoirs	3,404 (Tank Full)	50	164

**Service elevations do not include locations in the immediate vicinity of reservoirs, PRVs, or booster pump stations.*

HGL = hydraulic grade line

psi = pounds per square inch

The Valley pressure zone is the largest zone and is served by gravity from the Ochoco Heights reservoirs. The zone also includes the Lamonta, Yancey, Ochoco, 4th Street (Deep and Shallow), and Stadium groundwater wells that fill the reservoirs. Flows are supplemented to the Valley pressure zone through two PRVs that allow water from higher pressure zones to enter the lower Valley pressure zone.

The Barnes Butte pressure zone is served by gravity from the Barnes Butte Reservoir. The reservoir is filled by the Barney and Stearns groundwater wells within the zone. Water from Barnes Butte can supplement lower pressure zones of the system through the Williamson and Combs Flat PRVs.

The Williamson pressure zone receives water from the Barnes Butte Reservoir through the Williamson PRV. This PRV is adjusted higher in the summer and lower in the winter.

The Ochoco Heights pressure zone receives its water from the Ochoco Heights reservoirs. The reservoirs supply water to the Ochoco Heights booster pump station to serve the pressure zone. A PRV is located on the downstream side of the booster pump station to regulate pressure.

The Northridge pressure zone receives water from the American Pine Reservoir. The reservoir supplies water to the American Pine booster pump station to serve the pressures zone. A PRV is located on the downstream side of the booster pump station to regulate pressure. The American Pine Reservoir is filled from the Ochoco Heights booster pump station. A pressure sustaining valve exists on the inlet line of the American Pine Reservoir to regulate flow into the reservoir.

The Airport pressure zone is served by gravity from the Airport reservoirs. The zone includes four groundwater wells that fill the Airport reservoirs. Water from the Airport zone can supplement the Valley zone through the Park Drive PRV. The Airport zone also includes a separate booster pump station and PRV to provide fire flows to industrial properties within the zone.

According to the hydraulic model completed as part of this WSMP, the normal operating pressures in the system during 2017 peak daily demand (PDD) range from approximately 11 to 184 psi, as depicted on Figure 5-1. With the exception of a few isolated areas, the City generally has adequate pressure throughout the system. It should be noted portions of the system provide pressures in excess of what is typically recommended for residential fixtures, appliances, etc. The City should maintain an educational program to ensure people are aware that PRVs need to be installed on individual services in high pressure areas. System pressures are discussed in more detail later in this chapter.

Fire Protection

General

The City's existing water supply, storage, and distribution system provides adequate fire protection to the majority of the system, although certain areas of the City do not have adequate fire protection. The DWS regulations and the 2014 OFC require the entire water system remain above 20 psi residual pressure while fire flow demands are placed on the system. The City generally has adequate pressure in the system during fire flow events but has a few isolated areas that are not provided with adequate pressures and/or the recommended fire flows discussed in Chapter 2. A computer model of system fire flows, along with recommended improvements to address the deficiencies in fire flows, 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 to calibrate the water model. The flow and pressure data gathered during the flow tests were used to compare water model pressures to data collected in the field and, if necessary, to adjust the model input data so the model more closely resembled the field results. Based on the hydrants tested as part of the hydrant flushing plan, fire flows ranged from approximately 670 to 920 gpm with residual pressures of 42 to 82 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 was tested at a time and system pressures were allowed to drop further.

Theoretical Fire Flows

In some cases 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 and 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. 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 out 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. The discussion presented herein is intended to provide caution concerning the actual available fire flows from the City's distribution system and fire hydrants. Considering the limitations previously discussed, the City's water system appears limited in its capacity to meet a fire flow of 1,000 to 2,500 gpm in a few areas of the City. System improvements are needed to provide the recommended fire flows of 1,000 gpm for residential areas and 3,500 gpm for commercial areas while maintaining 20 psi in the system.

Fire Hydrant Coverage

The 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 2014 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.

To assist with the fire hydrant spacing analysis, a Fire Hydrant Coverage Map, as depicted on Figure 5-2, showing existing fire hydrants was prepared. In preparing the Fire Hydrant Coverage Map, the Existing Water System Map was utilized by placing 450-foot diameter circles around each existing hydrant. On the map, existing fire hydrant coverage areas are shown in green.

Areas with limited fire hydrant coverage become readily apparent on the map. It is assumed that additional hydrants will be installed along with other required utilities within developed areas not currently served by the City's distribution system and within undeveloped areas when these areas are either connected to the system or developed.

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.

The City's existing water distribution system model contains all existing piping and water system elements. Pipe, node, and feature elements are labeled according to the City's naming convention. As part of this WSMP, the existing hydraulic model was reviewed, updated, and calibrated to match current water system demand and operation. 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 the Natural Resources Conservation Service LiDAR Elevation Dataset Bare Earth Digital Elevation Model.

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

The computer model also utilizes detailed information regarding the distribution system pipes. Each individual pipe was assigned a roughness coefficient based on the type of pipe material, such as PVC, DI, AC, steel, etc. This allowed the water model program to calculate water main line pressure losses under any demand condition desired, including fire flow analyses. Junctions were identified in the water model, which allowed the model to know where and at what elevation pipe intersections occur. Water demands were then placed on the distribution system at each junction (node) to simulate ADD or PDD use demands.

Model Overview

The hydraulic model of the City's water distribution system was developed utilizing the InfoWater modeling system by Innovyze. Demand scenarios for years 2017 and 2037 were derived from the design criteria presented in Chapter 2. Fire flow test data, provided by the City, were used to check the accuracy and calibrate the computer model 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. Discrepancies that may exist between the model and system conditions in the field can be due to incorrect pipe sizes, missing pipe connections, or other unknown field conditions. In general, the model depicts the existing system conditions relatively well based on the majority of the available hydrant test data.

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 2017 water system demands were selected and distributed among the junctions in the distribution system based on water meter usage records. To represent future conditions in year 2037, demands were added for existing properties within the City not currently connected to the City water system. Demands were also added to account for future growth areas within the urban growth boundary (UGB). Growth areas were identified and demands generated for each area based on whether the area is currently developed or undeveloped. Demands were estimated for developed areas based on the existing number of lots within each area. Demands were estimated for undeveloped areas based on anticipated zoning designations and full build-out development densities. Full build-out densities were proportionally reduced to match the 2037 design criteria presented in Chapter 2. The ground elevation of each growth area was also evaluated to determine the pressure zone the area could most reasonably connect to. The demand conditions used in modeling the system are as follows:

- Year 2017 PDD. The current PDD for the City of Prineville is estimated to be 405 gallons per capita per day (gpcd), or 2,500 gpm, at the current connected population of 8,889.
- Year 2037 PDD. The future PDD for the City of Prineville is estimated to be 487 gpcd, or 3,977 gpm, at a future connected population of 11,752.

The existing system pressures under the 2017 PDD demand scenario are presented on Figure 5-1. As shown on the figure, the system has a few areas with pressures below 35 psi. Improvements are required to provide additional pressure to the system. As previously discussed, portions of the system provide pressures in excess of what is typically recommended for residential fixtures, appliances, etc. In areas with higher than average pressures provided by the system, the City should continue to inform citizens of the high pressures and ensure that individual PRVs are installed on service lines.

Figure 5-3 presents the fire flow available in the existing system under the 2017 PDD. As previously discussed, fire flow capacity of 1,000 gpm is required in residential areas and approximately 3,500 gpm is required in commercial and institutional areas, as recommended by Insurance Services Office, Inc., and according to OFC. Figure 5-4 identifies the areas in the system not capable of providing adequate fire flow and areas with low system pressure. The northeast portion and higher elevation areas of the City are largely unable to provide adequate fire flows to the residential and commercial areas. The deficiencies are due in part to small diameter (less than 6-inch) pipelines in the system, higher elevation areas not adequately served by existing pressure zones, and inability of the existing system to distribute the existing supply. The majority of the City's water supply is located in the Airport pressure zone. Water from this zone currently has only one way to feed into the lower Valley zone through an existing 8-inch diameter pipeline and PRV. The amount of water this line can deliver is limited. With flows limited from the Airport zone, the Barnes Butte and Williamson zones must provide the supply. As flows increase from the Barnes Butte zone, the system in unable to maintain adequate pressure and fire flow availability is limited.

Limitations of Water Model Results

Reported fire flows from the water model analysis indicate theoretical distribution system piping capacity. Actual field conditions and head loss 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 2-3 in Chapter 2 to be met. There are approximately 34,400 feet of small diameter (less than 6-inch) pipelines within the City's distribution system.

In addition to these undersized main lines, physical restraints such as higher elevation areas in the City result in a few low system pressure areas within the distribution system.

Recommended Distribution System Improvements

In general, the City's distribution system is fairly well looped and provides adequate system-wide pressures under normal operating conditions. Fire flow availability is limited in areas of the system due to several undersized main lines and areas of higher elevation. The undersized 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 and provide improved system fire flow capacities in areas lacking adequate fire flows. Key water system improvements have been identified to address deficiencies identified in this Study:

1. Improve system distribution.

    a. Install an extension and PRV from the Airport pressure zone that connects into the Valley pressure zone. This improvement would greatly improve flows throughout the system. The new extension will provide a second distribution option as a means to deliver Airport well water into the Valley zone. This improvement will eliminate stress on the existing 8-inch line, provide redundancy, and free up the Barnes Butte supplies to serve future growth.

    b. Construct a new transmission main, booster pump station, and reservoir to serve the northeast portion of the City of Prineville. In addition to serving growth in northeast Prineville, this improvement will also eliminate some of the low pressure problems currently experienced in the system due to high elevations. This improvement would also offer a source of redundant supply to the Northridge pressure zone.

2. Improve water quality and circulation by replacing old, undersized, deteriorating pipe. Increase flow capacity to the existing system to provide adequate fire flows to residential, commercial, and industrial areas.

    a. Replace existing small diameter or wood stave water pipe. Upsize water pipes in key locations to increase fire flow.

    b. Connect existing homes in the vicinity of Fairview Street to City water.

3. Improve the system to serve future growth.

a. Construct future mains and booster pump stations to serve growth within the UGB.

The recommended water system improvements are shown on Figure 5-5. The future conditions water model incorporates the recommended improvements and future growth areas and demands. Figure 5-6 depicts the year 2037 PDD system flows and pressures. System pressures are adequate with the recommended improvements and many of the isolated low pressure areas under existing conditions have been eliminated. Areas of marginal pressure (35 to 45 psi) in the Valley pressure zone are also improved. The majority of reservoirs are filling under peak day conditions, indicating the system has adequate supply. One exception is the American Pine Reservoir, which is draining under peak day conditions. The Ochoco Heights booster pump station may need to be upsized to keep the American Pine Reservoir full under future conditions. Additionally, the American Pine booster pump station is operating at approximately 600 gpm under the future peak day scenario. The existing capacity of the American Pine domestic pumps is 500 gpm. The American Pine booster pump station will need to be upsized to account for future demands.

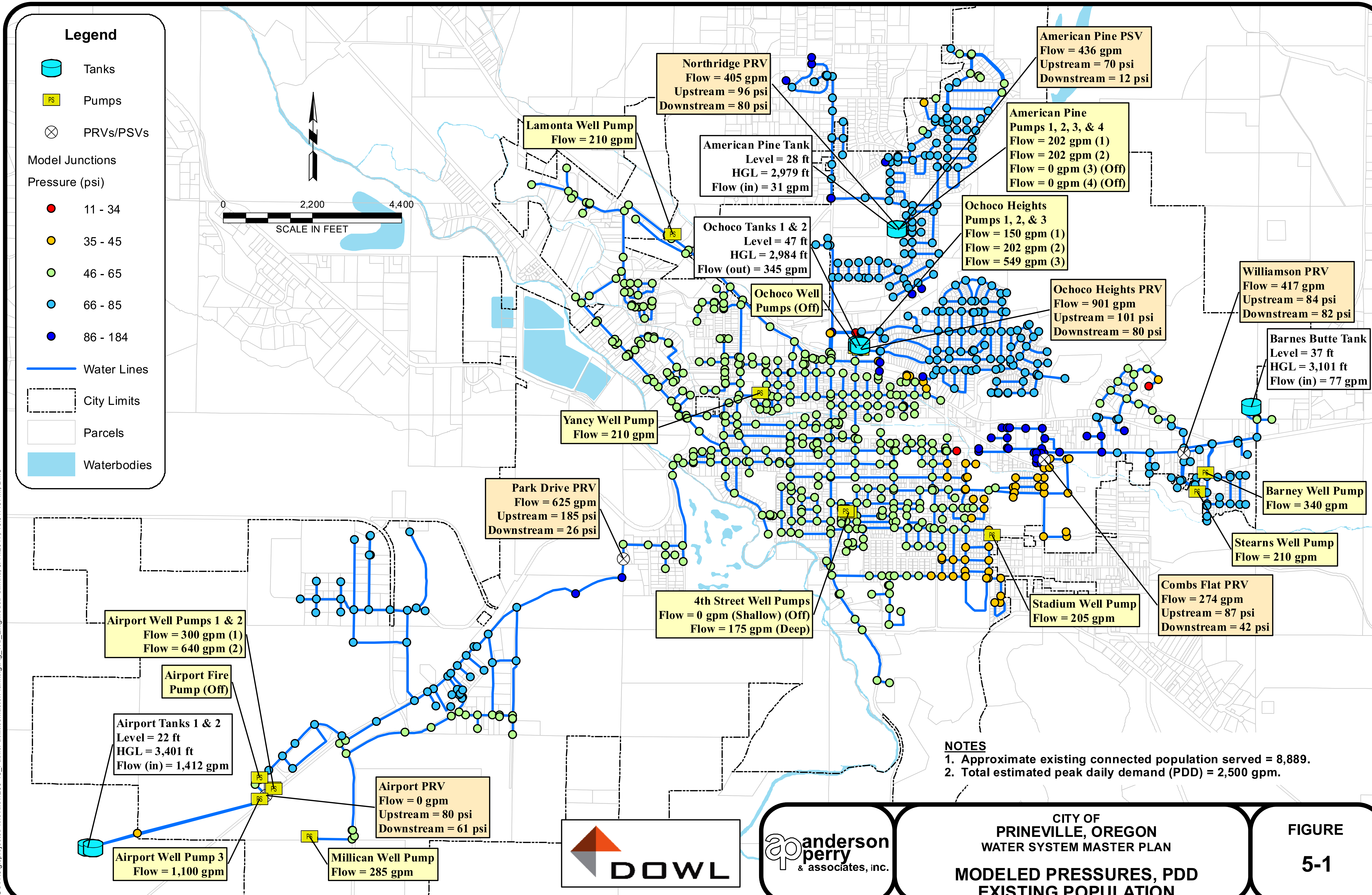
Figure 5-7 depicts the year 2037 available fire flows with the recommended water system improvements. Fire flow availability is generally adequate under future 2037 conditions with the recommended improvements. The recommended improvements are prioritized and further discussed, including detailed breakdowns of estimated costs, as part of the Capital Improvements Plan presented in Chapter 6.

Maintenance Records

One of the important operational functions related to the City's distribution system is maintaining accurate records of various system components. These records become valuable over time in planning future improvements and replacing old or deteriorated components. It is recommended the City continue to track and keep accurate records of all distribution system components. The City should continue monitoring residential meters monthly, test compound meters annually, check hydrants annually for proper operation, and exercise all water valves annually, with records kept on their operating condition, location, etc. The City should also have a program in place to have all backflow prevention devices check annually, either by property owners or the City.

Summary

In general, the City's distribution piping system is in relatively good condition, although a few isolated areas cannot currently provide adequate fire flow and water circulation is limited. Undersized and old distribution system piping within the City lead to low fire flow capacity and issues with water circulation in these areas. Improvements outlined in this chapter include replacing old, undersized, and deteriorating lines; and additional distribution piping to improve system looping, circulation, and fire flow capacities. These improvements were selected to address key areas of concern to improve capacity in the system. These recommended improvements are prioritized and further discussed, including detailed breakdowns of estimated costs, as part of the Capital Improvements Plan presented in Chapter 6.



NOTES
1. Approximate existing connected population served = 8,889.
2. Total estimated peak daily demand (PDD) = 2,500 gpm.

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CITY OF
PRINEVILLE, OREGON
WATER SYSTEM MASTER PLAN

MODELED PRESSURES, PDD
EXISTING POPULATION

FIGURE
5-1

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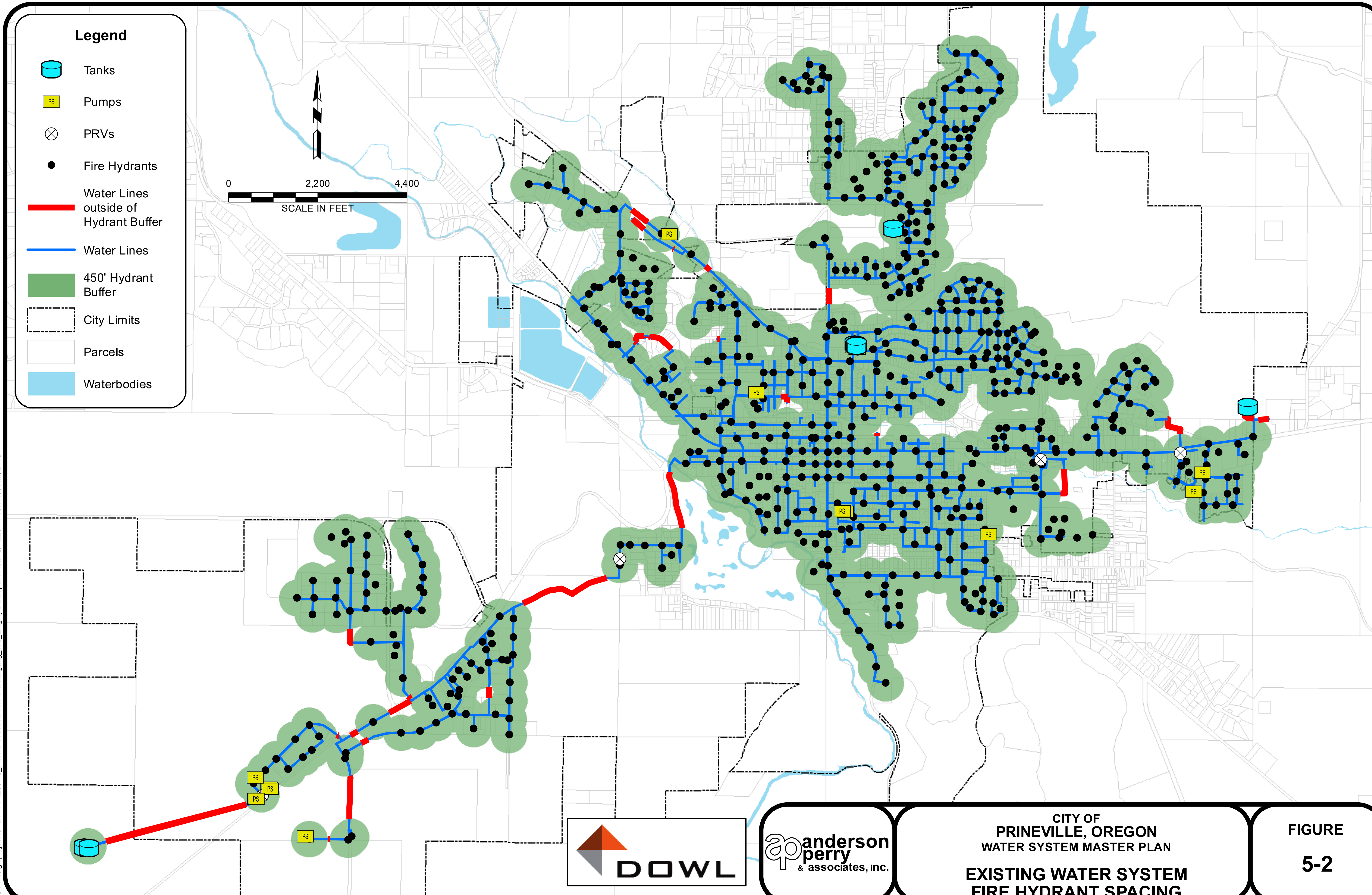
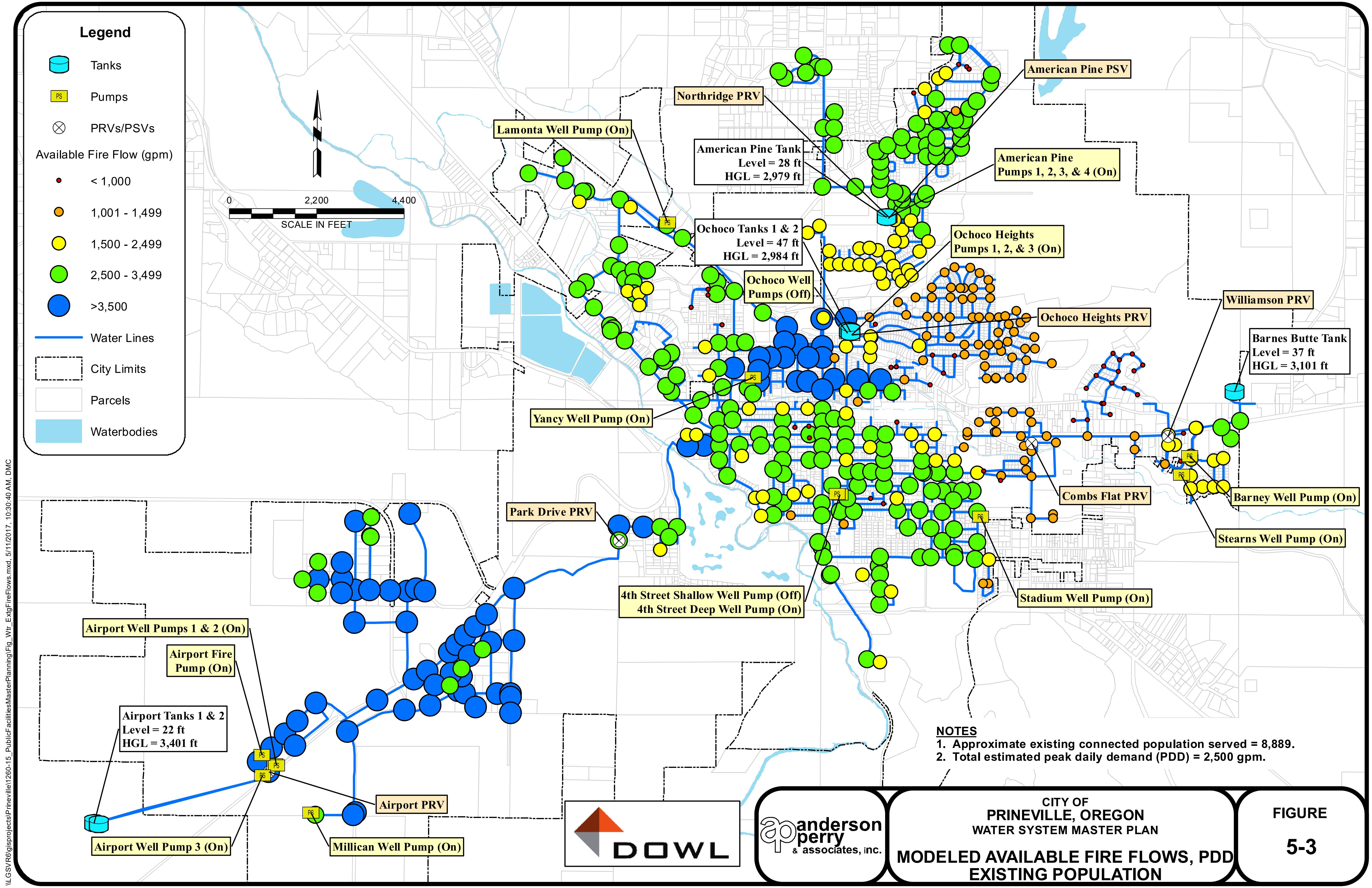


CITY OF
PRINEVILLE, OREGON
WATER SYSTEM MASTER PLAN

EXISTING WATER SYSTEM
FIRE HYDRANT SPACING

FIGURE
5-2

\\LGSVR6\gisprojects\Prineville\1260-15_PublicFacilitiesMasterPlanning\Fig_Wtr_ExtgHydrantSpace.mxd, 5/11/2017, 10:14:50 AM, DMC


Legend
Tanks
Pumps
PRVs/PSVs
Available Fire Flow (gpm)
< 1,000
1,001 - 1,499
1,500 - 2,499
2,500 - 3,499
>3,500
Water Lines
City Limits
Parcels
Waterbodies
0
2,200
4,400
SCALE IN FEET
Lamonta Well Pump (On)
Northridge PRV
American Pine PSV
American Pine Tank
Level = 28 ft
HGL = 2,979 ft
American Pine
Pumps 1, 2, 3, & 4 (On)
Ochoco Tanks 1 & 2
Level = 47 ft
HGL = 2,984 ft
Ochoco Heights
Pumps 1, 2, & 3 (On)
Ochoco Well
Pumps (Off)
Ochoco Heights PRV
Williamson PRV
Barnes Butte Tank
Level = 37 ft
HGL = 3,101 ft
Yancy Well Pump (On)
Combs Flat PRV
Barney Well Pump (On)
Stearns Well Pump (On)
Park Drive PRV
4th Street Shallow Well Pump (Off)
4th Street Deep Well Pump (On)
Stadium Well Pump (On)
Airport Well Pumps 1 & 2 (On)
Airport Fire
Pump (On)
Airport Tanks 1 & 2
Level = 22 ft
HGL = 3,401 ft
Airport PRV
Airport Well Pump 3 (On)
Millican Well Pump (On)
NOTES
1. Approximate existing connected population served = 8,889.
2. Total estimated peak daily demand (PDD) = 2,500 gpm.
DOWL
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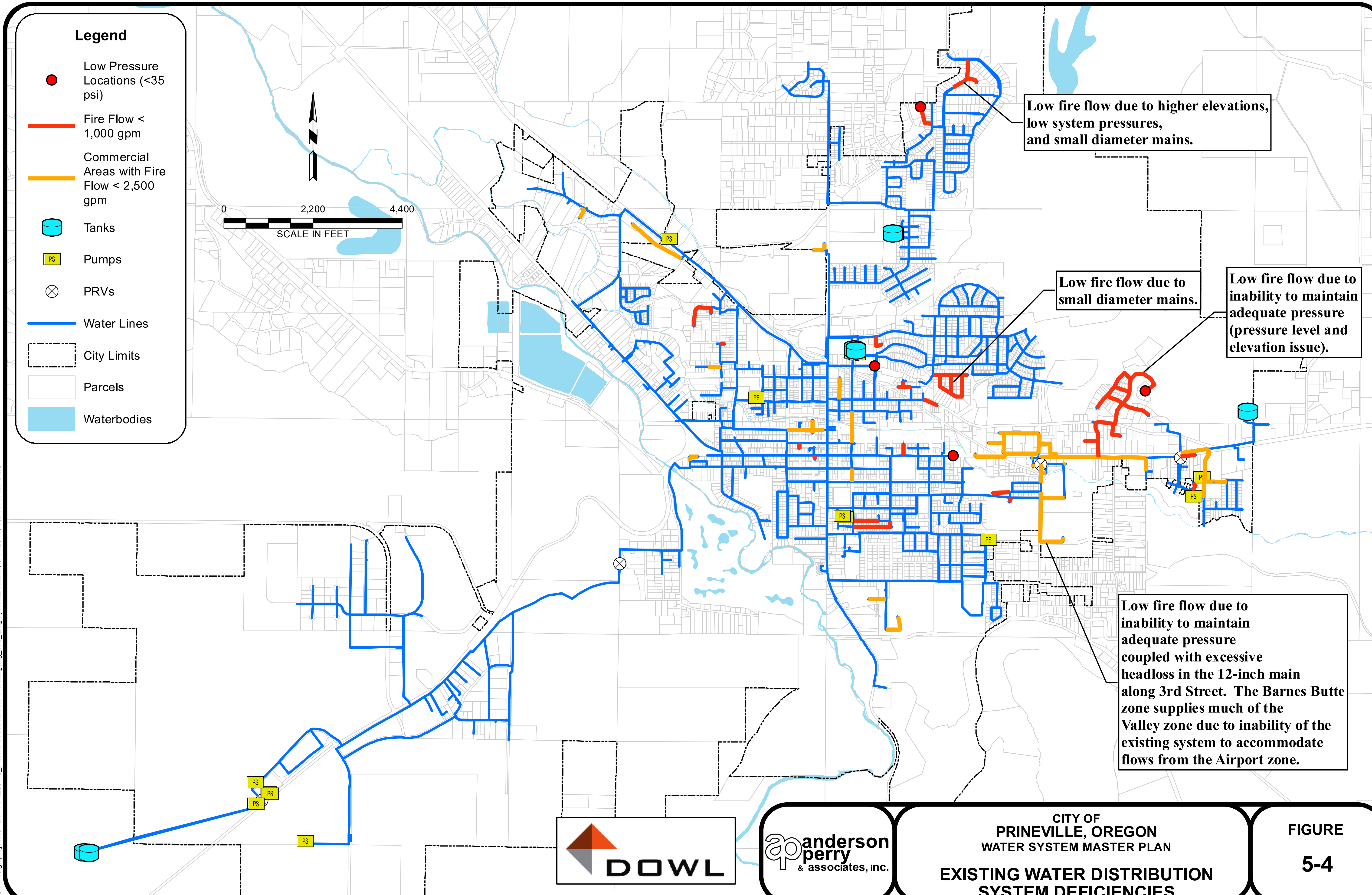
CITY OF
PRINEVILLE, OREGON
WATER SYSTEM MASTER PLAN
MODELED AVAILABLE FIRE FLOWS, PDD
EXISTING POPULATION
FIGURE
5-3
\\LGSVR6\gisprojects\Prineville\1260-15_PublicFacilitiesMasterPlanning\Fig_Wtr_ExtgFireFlows.mxd, 5/11/2017, 10:30:40 AM, DMC

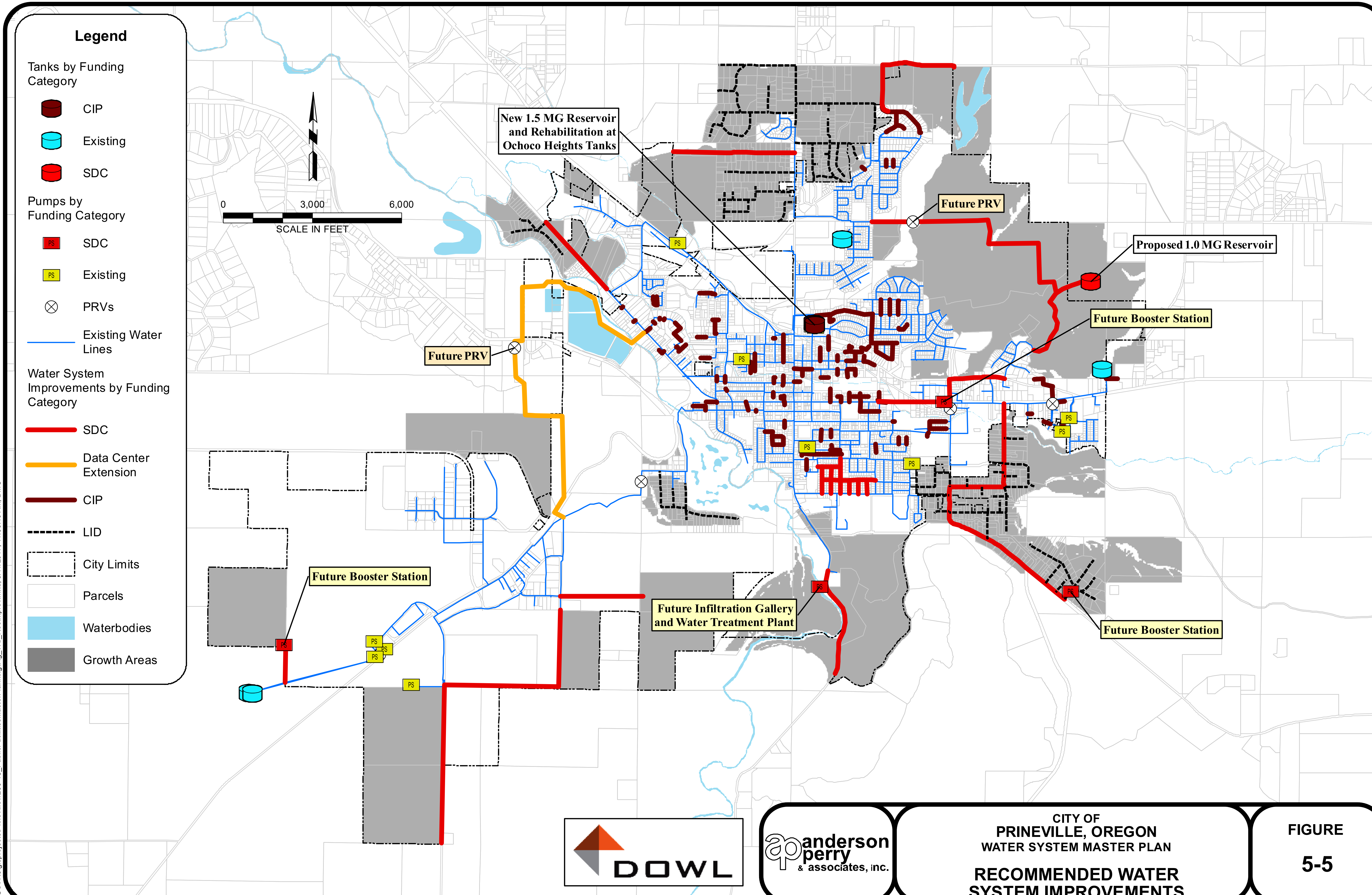


CITY OF PRINEVILLE, OREGON
WATER SYSTEM MASTER PLAN

EXISTING WATER DISTRIBUTION SYSTEM DEFICIENCIES

FIGURE 5-4

\\LGSVR6\gisprojects\Prineville\1260-15_PublicFacilitiesMasterPlanning\Fig_Wtr_ExtgSystemDef.mxd, 5/11/2017, 10:47:14 AM, DMC

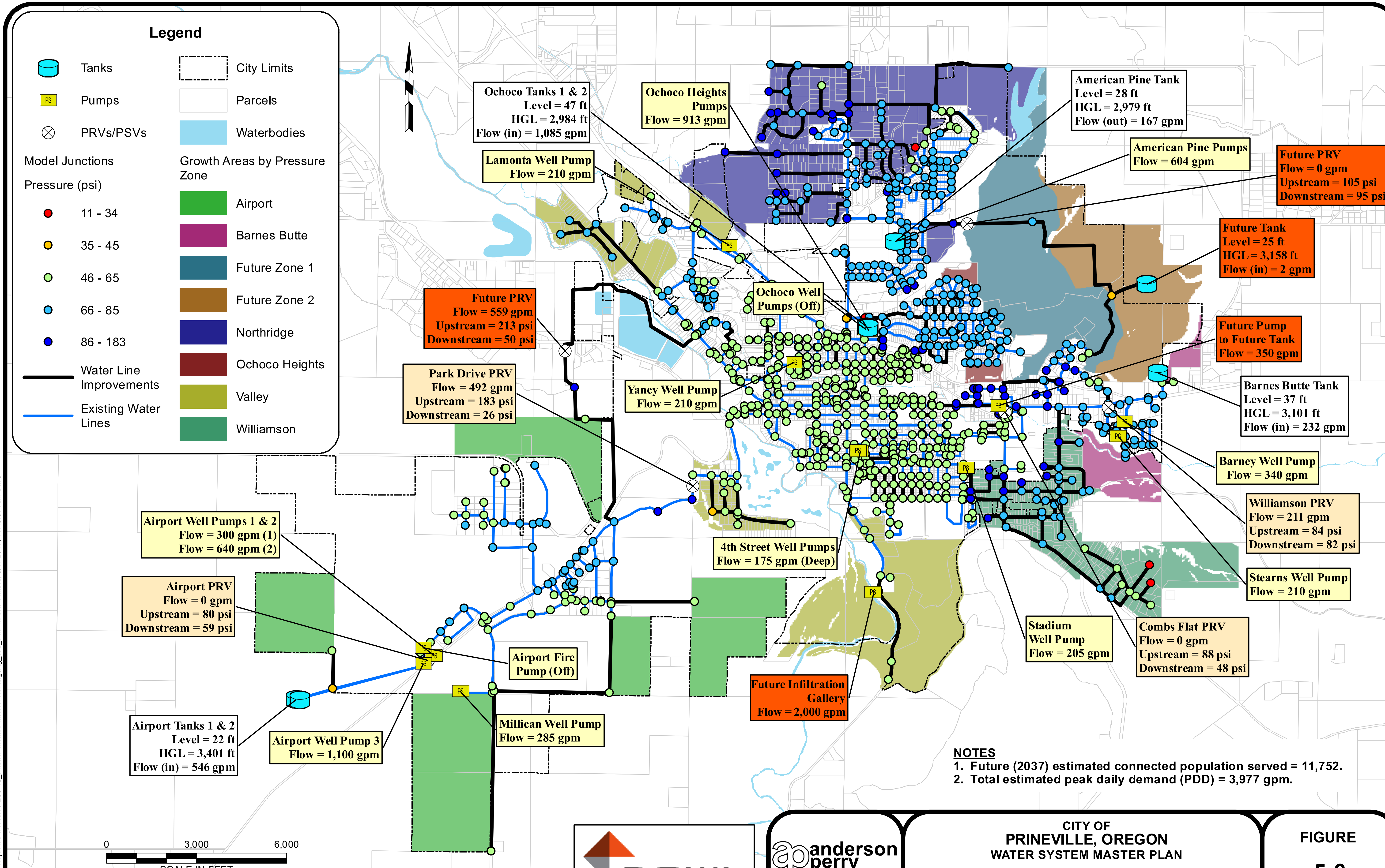


CITY OF
PRINEVILLE, OREGON
WATER SYSTEM MASTER PLAN

RECOMMENDED WATER SYSTEM IMPROVEMENTS

FIGURE
5-5

\\LGSVR6\gisprojects\Prineville\1260-15_PublicFacilitiesMasterPlanning\Fig_Wtr_RecImprov.mxd, 5/11/2017, 11:06:49 AM, DMC



NOTES
1. Future (2037) estimated connected population served = 11,752.
2. Total estimated peak daily demand (PDD) = 3,977 gpm.

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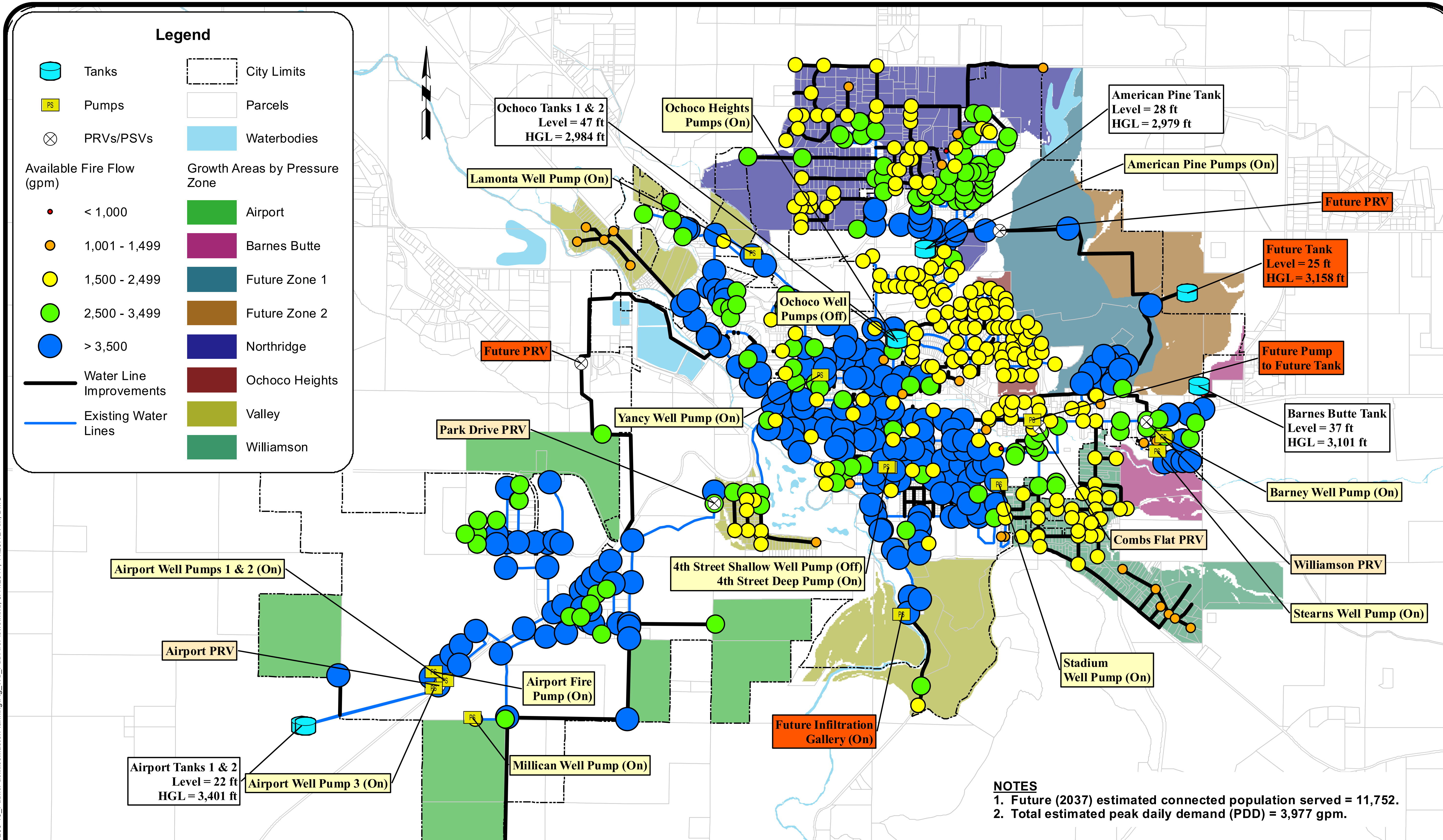
CITY OF
PRINEVILLE, OREGON
WATER SYSTEM MASTER PLAN

MODELED FUTURE PRESSURES, PDD WITH IMPROVEMENTS

FIGURE
5-6



NOTES
1. Future (2037) estimated connected population served = 11,752.
2. Total estimated peak daily demand (PDD) = 3,977 gpm.

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CITY OF
PRINEVILLE, OREGON
WATER SYSTEM MASTER PLAN

MODELED FUTURE AVAILABLE FIRE FLOWS, PDD, WITH IMPROVEMENTS

FIGURE
5-7

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Chapter 6 - Summary of Proposed Improvements and Capital Improvements Plan

Introduction

This chapter summarizes the proposed improvements to the water system identified as part of this Water System Master Plan (WSMP) to address deficiencies and support anticipated growth and increased demands. The System Development Charge (SDC), Capital Improvements Plan (CIP) and Local Improvement District (LID) improvements categories are identified and discussed. Chronologically, priorities for improvements under the SDC and CIP categories are outlined, and estimated costs to complete the improvements are presented.

Categories of Improvements

The City of Prineville, Oregon, is proposing to complete water system improvements utilizing two different funding categories. These categories include:

- **SDC** - Improvements identified under the SDC category have been developed to address those needs in the system to specifically support growth and associated increased system demands.
- **CIP** - Improvements identified under the CIP category include capital improvements projects that need to be completed to address existing system deficiencies irrespective of growth.

A third category to fund improvements is potentially available. This category is the formation of LIDs. Oregon Revised Statutes (ORS), Chapter 223-001 provides the statutory definition of an LID. An LID is an area a city council determines should be benefited by public improvement and the improvement is financed by the City and repaid by owners of benefited properties.

Summary of Improvements

Presented hereafter is a summary of the proposed improvements that have been identified based upon the evaluation and computer water modeling efforts completed as part of this WSMP. Figure 6-1 is a map of the system that shows the proposed improvements and provides a table inset describing the proposed improvements and listing the funding category (SDC or CIP) in which the improvement has been placed. Figure 6-1 also includes those improvements that have been assumed to be completed by formation of LIDs. Estimated costs for assumed LIDs have not been developed as part of this WSMP as that is beyond the scope of work identified. 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

As discussed in Chapter 3, due to current limitations with available water rights the City does not have enough source capacity to meet current demands at this time. The peak daily flow requirements, assuming the wells operate 18 hours per day, is estimated to be approximately

3,330 gallons per minute (gpm) and 5,300 gpm for current and projected future (2037) system demands, respectively. The current combined instantaneous water right withdrawal allowance from all well sources is 3,210 gpm, with an available pumping capacity of 3,765 gpm. Therefore, the City's pumping capacity can exceed the available permitted supply capacity. Therefore, it appears the City will need to develop an additional 2,090 gpm of source capacity and associated water right availability to meet the 20-year projected demands. The City should immediately begin the process of increasing its supply capacity to meet the current and projected demands.

As discussed in Chapter 3, the most feasible option available to the City appears to be from the shallow groundwater source(s) hydraulically connected to the Crooked River but will not be known for certain until a pending study is completed. Once the study is completed, the information needed to compare alternatives will be available and the City will have the required data and documentation to make the best long-term decision to solve the additional supply capacity needs. For the purposes of developing the estimated costs presented in this WSMP, it has been assumed the City will implement the option to utilize shallow groundwater source(s) to increase the available water supply to meet demands, and the source improvements have been included in the SDC category.

Water Storage

The City currently has six operating storage reservoirs with a total volume of 4.5 million gallons (MG). With the exception of the Ochoco Heights reservoirs, the existing condition of the reservoirs is generally good to very good. The storage needed for the year 2037 planning period is provided by the existing reservoirs. However, maintenance and rehabilitation improvements are recommended for the Ochoco Heights reservoirs and have been included in the CIP category.

Anticipated future growth in northeast Prineville will require the addition of two new water system pressure zones. A new 1.0 MG reservoir is recommended to be constructed in connection with the growth in this area to provide adequate system pressures and fire protection. The lower of the two new pressure zones would be served by gravity flows from the new reservoir. A booster pump station would be necessary to provide adequate pressures to the upper pressure zone from the new reservoir. These identified improvements have been included in the SDC category.

As discussed in Chapter 4, a new larger reservoir (1.5 MG) is recommended to be constructed at the existing Ochoco Heights reservoirs site. This would enable the existing reservoirs to continue to serve the system as the new reservoir is constructed. Once the new reservoir is constructed and in operation, one of the existing 0.5 MG reservoirs can be taken out of service to complete renovations and repairs. Once the rehabilitation work is complete, the renovated and repaired reservoir would work in conjunction with the new reservoir, providing a total of 2.0 MG storage at the site. The second existing 0.5 MG reservoir would be demolished. The proposed new reservoir has been included in the CIP category.

Water Distribution

As outlined in detail in Chapter 5, the City's distribution system is generally fairly well looped and provides adequate system-wide pressures under normal operating conditions. Fire flow availability is limited in areas of the system due to several undersized main lines and areas of higher elevation. The undersized main lines in the system result in fire flow capacity limitations and water circulation issues. Some of these lines, where improved fire flow capacities are needed, have been recommended for upgrading. It is recommended the City complete improvements to the distribution system to eliminate as many deteriorating and undersized main lines as possible, and provide improved system fire flow capacities in areas lacking adequate fire flows. Key water distribution system improvements have been identified to meet the following objectives:

- Install an extension and pressure reducing valve from the Airport pressure zone that connects to the Valley pressure zone. This improvement would greatly improve flows throughout the system. The new extension would provide a second distribution option as a means to deliver Airport well water to the Valley pressure zone. This improvement will eliminate stress on the existing 8-inch line, provide redundancy, and free up the Barnes Butte supplies to serve future growth.
- Construct a new transmission main, booster pump station, and reservoir to serve the northeast portion of the City of Prineville. In addition to serving growth in northeast Prineville, this improvement will also eliminate some of the low pressure problems currently being experienced in the system at higher elevation areas. This improvement would also offer a source of redundant supply to the Northridge pressure zone.
- Improve water quality and circulation by replacing old, undersized, deteriorating pipe. Increase flow capacity to the existing system to provide adequate fire flows to residential, commercial, and industrial areas.
- Replace existing small diameter or wood stave water pipes. Upsize water pipes in key locations to increase fire flow.
- Connect existing homes in the vicinity of Fairview Street to City water.
- Improve the system to serve future growth.
- Construct future mains and booster pump stations to serve growth within the urban growth boundary.

To meet these objectives, the recommended distribution system improvements have been identified and are shown on Figure 6-1. Additionally, Figure 6-1 shows the funding category the various distribution system improvements have been included in.

Improvements Included in the System Development Charge (SDC) Funding Category

This section summarizes and describes those identified improvements that have been included in the SDC funding category. The estimated costs of the various improvements are also presented.

System Development Charge Fee Categories

ORS 223.297 to 223.314 require that SDCs be divided into two fee categories, as follows:

- **Reimbursement Fee** - This fee establishes the value of the unused capacity of the existing system infrastructure. The value of the unused capacity can be assessed to future connections until the excess capacity is exhausted. This fee is levied upon new developments to contribute a proportionate share of the cost of constructing existing facilities with the capacity to serve new developments. The Reimbursement Fee is based on original construction costs and the remaining capacity of the system component.

- **Capital Improvement Fee** - This fee establishes the cost of planned capital improvements to be constructed within the planning period. This cost is levied upon new developments to provide funding for planned capital improvements projects, to increase system capacity, and to provide the needed service.

The Reimbursement Fee and the Capital Improvement Fee are combined to result in the total SDC fee.

Establishment of System Development Charges

State of Oregon SDC statutes require the City develop a methodology for establishing an SDC fee schedule. These fees can be assessed to new developments requiring City water services. Additional detailed discussion of the SDC methodologies and comprehensive SDC analysis are presented in an SDC study prepared by GEL Oregon, Inc., as part of the overall water system planning effort.

Identified Improvements and Estimated Costs

As previously mentioned, improvements for the 20-year planning period have been identified that will be necessary assuming water system expansion will be needed to support future development and growth. The identified improvements categorized under the SDC funding category are shown on Figure 6-1, estimated costs are presented on Figure 6-2, and a summary of the improvements and estimated costs are provided on Figure 6-3. It should be noted the reference numbers shown on the figures have been arbitrarily assigned and are not in order of priority. It is not possible to assign priorities to the improvements identified under the SDC funding category as they are development driven and it is unknown which areas of the City will develop first or how quickly development within the City will occur.

Capital Improvements Plan (CIP)

Introduction

A CIP provides a framework to prioritize and implement the City's facility and infrastructure asset improvement process over a specified time period. A CIP is a financing and construction plan for projects that require significant capital investment and are essential to safeguarding the financial health of the City, while providing continued delivery of utility and other services to citizens and businesses.

As part of this WSMP, the City is developing a CIP based upon identified deficiencies and improvements required to address the water system needs of the City for the next 20 years. The CIP will need to be reviewed and updated periodically (at least every five years) to accommodate changing community needs, additional improvements that may be identified through time, and changes in financial resources. The CIP will list the City's capital improvements projects, place the projects in a priority order (subject to periodic review), and schedule the projects for funding and construction.

The CIP is a tool to be used in the development of responsible and progressive financial planning. The program complies with the City's financial policies. City policies and the CIP form the basis for making annual capital budget decisions and support the City's continued commitment to sound, long-term financial planning and direction.

The CIP identifies and prioritizes short-, medium-, and long-term capital projects of all types based on the water system master planning process. Capital water system improvements projects will be coordinated with the annual budget process to maintain full utilization of available resources. For each capital improvements project, the CIP provides a variety of information including a project description and the service need to be addressed, a proposed timetable, and proposed funding levels. Capital water system improvements projects will be prioritized with the most urgent projects first. Ongoing operating costs are not included in the CIP estimated project costs.

Development of a CIP is a collaborative effort between the City manager and engineer, City Council members, department heads, and the City's engineering and financial consultants. The City staff participates in CIP development via specific master plans and other planning tools. Major capital improvements projects require City Council interaction during project development and where funding allocations are made.

Identified Improvements and Estimated Costs

This section summarizes and describes those identified improvements that have been included in the CIP funding category. The chronological listing of priorities is outlined and the estimated costs of the various CIP improvements are presented. The CIP improvements outlined are intended to correct deficiencies identified in the existing system and will provide the means to connect a portion of those residences located in the City not currently connected to the municipal water system.

Proposed Improvements to be Completed within 10 Years

- **CIP 1 - New 12-inch Polyvinyl Chloride (PVC) Water Line in Fairview Street and Replace Existing Wood-stave Piping with New 8-inch PVC Water Line.** CIP 1 has been designated as a top priority to be completed by the City. These improvements would include installing a new 12-inch water line on Fairview Street and replacing the last known remaining wood-stave pipe in the system with new PVC pipe. The improvements would include fire hydrants, new service line connections to the main line, new service lines, and new water meters. These improvements will provide the main water line necessary to allow the residences in the vicinity of Fairview Street to connect to the municipal water system.
- **CIP 2 - Replace Existing Small Diameter (less than 6-inch) Piping and Replace Existing Wrapped Steel Piping with New 8-inch PVC Water Line.** The improvements identified under CIP 2 are intended to improve water quality and circulation by replacing old, undersized, deteriorating pipe and increase flow capacity to the existing system to provide adequate fire flows to residential, commercial, and industrial areas.
- **CIP 3 - New 8-inch PVC Water Lines in the Vicinity of Fairview Street.** These improvements would include installing new 8-inch water lines in the streets in the vicinity of Fairview Street and connecting to the new 12-inch main line completed as part of CIP 1. The improvements would include fire hydrants, new service line

connections to the main lines, new service lines, and new water meters. These improvements will provide the water lines necessary to allow the residences in the vicinity of Fairview Street to connect to the municipal water system.

- **CIP 4 - New Ochoco Heights Reservoir, Demolition of One of the Existing Ochoco Heights Reservoirs, and Rehabilitation of One of the Existing Ochoco Heights Reservoirs.** Improvements identified under CIP 4 are intended to address the deteriorated condition of the existing Ochoco Heights Reservoirs and would include construction of a new 1.5 MG reservoir, demolition of one of the existing reservoirs, and rehabilitation of the other remaining existing reservoir. Upon completion, this would provide an additional 1.0 MG of storage capacity while providing the City with the needed storage redundancy for system operations and maintenance.

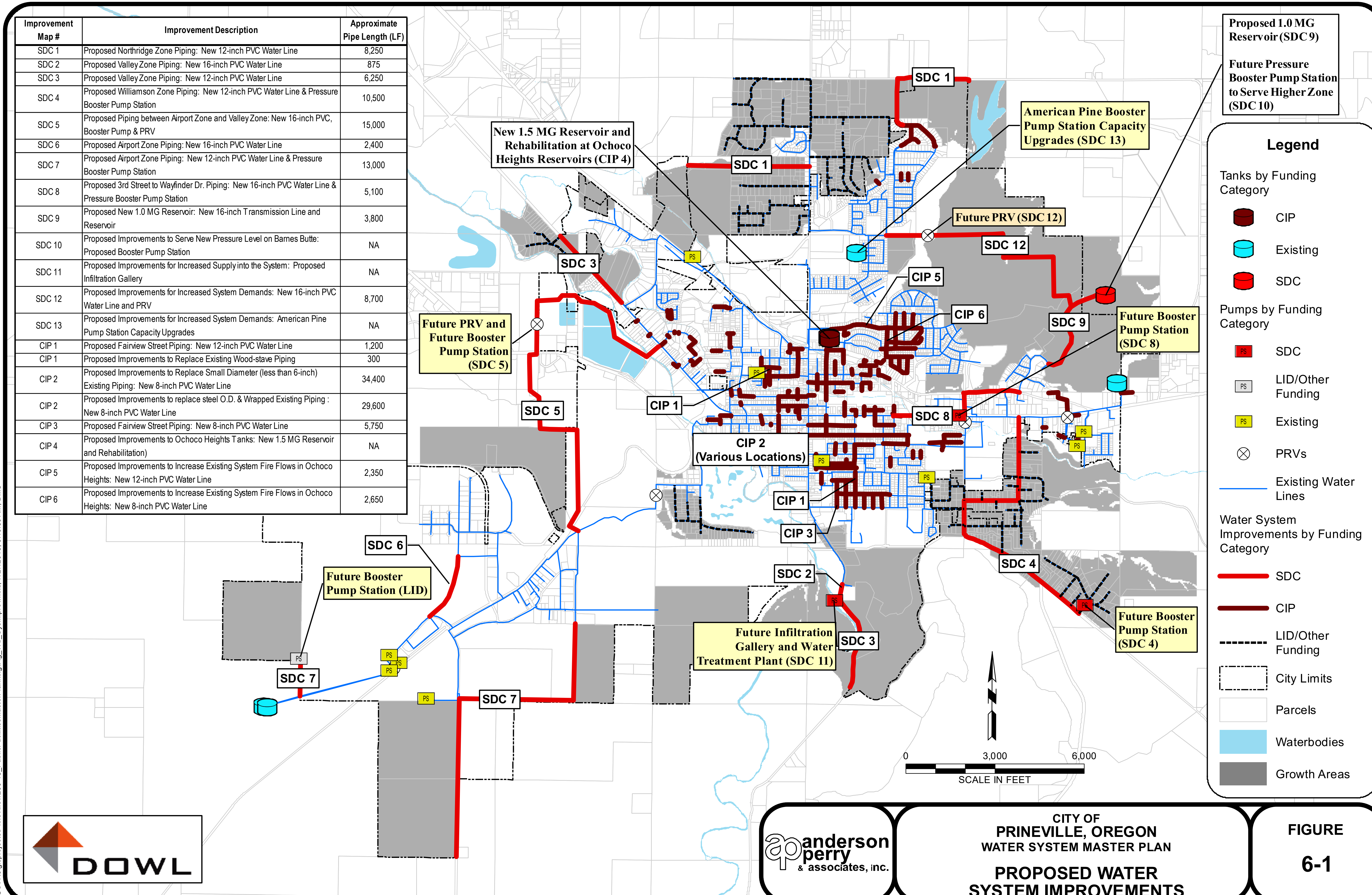
Proposed Improvements to be Completed in 10 to 20 Years

- **CIP 5 - New 12-inch PVC Water Line to Increase Existing System Water, Circulation and Fire Flows in Ochoco Heights.** These improvements would include installation of a new 12-inch PVC water line and associated appurtenances in Ochoco Heights for the purpose of increasing the existing fire flow capacity in this area.
- **CIP 6 - New 8-inch PVC Water Line to Increase Existing System Water, Circulation and Fire Flows in Ochoco Heights.** These improvements would include installation of a new 8-inch PVC water line and associated appurtenances in Ochoco Heights for the purpose of increasing the existing fire flow capacity in this area.

The identified improvements categorized under the CIP funding category are shown on Figure 6-1, estimated costs are presented on Figure 6-4, and a summary of the improvements and estimated costs are provided on Figure 6-5. It should be noted the reference numbers shown on the figures have been assigned based on City-established priorities (1 highest and 6 lowest).

Further detailed evaluation of the proposed CIP improvements impact on water rates is presented in a Water Rate Study prepared GEL Oregon, Inc., as part of the overall planning efforts related to this WSMP. Project financing and implementation is discussed in Chapter 7.

Improvement Map #	Improvement Description	Approximate Pipe Length (LF)
SDC 1	Proposed Northridge Zone Piping: New 12-inch PVC Water Line	8,250
SDC 2	Proposed Valley Zone Piping: New 16-inch PVC Water Line	875
SDC 3	Proposed Valley Zone Piping: New 12-inch PVC Water Line	6,250
SDC 4	Proposed Williamson Zone Piping: New 12-inch PVC Water Line & Pressure Booster Pump Station	10,500
SDC 5	Proposed Piping between Airport Zone and Valley Zone: New 16-inch PVC, Booster Pump & PRV	15,000
SDC 6	Proposed Airport Zone Piping: New 16-inch PVC Water Line	2,400
SDC 7	Proposed Airport Zone Piping: New 12-inch PVC Water Line & Pressure Booster Pump Station	13,000
SDC 8	Proposed 3rd Street to Wayfinder Dr. Piping: New 16-inch PVC Water Line & Pressure Booster Pump Station	5,100
SDC 9	Proposed New 1.0 MG Reservoir: New 16-inch Transmission Line and Reservoir	3,800
SDC 10	Proposed Improvements to Serve New Pressure Level on Barnes Butte: Proposed Booster Pump Station	NA
SDC 11	Proposed Improvements for Increased Supply into the System: Proposed Infiltration Gallery	NA
SDC 12	Proposed Improvements for Increased System Demands: New 16-inch PVC Water Line and PRV	8,700
SDC 13	Proposed Improvements for Increased System Demands: American Pine Pump Station Capacity Upgrades	NA
CIP 1	Proposed Fairview Street Piping: New 12-inch PVC Water Line	1,200
CIP 1	Proposed Improvements to Replace Existing Wood-stave Piping	300
CIP 2	Proposed Improvements to Replace Small Diameter (less than 6-inch) Existing Piping: New 8-inch PVC Water Line	34,400
CIP 2	Proposed Improvements to replace steel O.D. & Wrapped Existing Piping : New 8-inch PVC Water Line	29,600
CIP 3	Proposed Fairview Street Piping: New 8-inch PVC Water Line	5,750
CIP 4	Proposed Improvements to Ochoco Heights Tanks: New 1.5 MG Reservoir and Rehabilitation)	NA
CIP 5	Proposed Improvements to Increase Existing System Fire Flows in Ochoco Heights: New 12-inch PVC Water Line	2,350
CIP 6	Proposed Improvements to Increase Existing System Fire Flows in Ochoco Heights: New 8-inch PVC Water Line	2,650



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CITY OF
PRINEVILLE, OREGON
WATER SYSTEM MASTER PLAN

PROPOSED WATER SYSTEM IMPROVEMENTS

FIGURE
6-1

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CITY OF PRINEVILLE, OREGON
PROPOSED SDC-FUNDED IMPROVEMENTS
ESTIMATED PROJECT COSTS
(YEAR 2017 COSTS)

NO.	DESCRIPTION	UNIT	UNIT PRICE	ESTIMATED QUANTITY	TOTAL PRICE
SDC 1: Proposed Northridge Zone Piping (Distribution Mains to Connect Undeveloped Areas to City System)					
1	Mobilization/Demobilization	LS	$ 66,000	All Req'd	$ 66,000
2	Temporary Protection and Direction of Traffic/Project Safety	LS	20,000	All Req'd	20,000
3	12-inch Polyvinyl Chloride (PVC) Water Line, Including Valves	LF	65	8,250	536,250
4	Fire Hydrant and Auxiliary Valve Assembly	EA	4,000	18	72,000
5	New Water Service (to Existing Lot, Including Service Line and Meter)	EA	2,800	27	75,600
6	Connection to Existing Main Line	EA	5,000	2	10,000
7	Asphalt Surface Restoration	SY	65	9,200	598,000
				Estimated Construction Cost	**$ 1,377,850**
				Construction Contigency Cost (15%)	207,000
				Total Estimated Construction Cost	**$ 1,584,850**
				Preliminary, Design, and Construction Engineering (20%)	317,000
				Environmental Report, Cultural Resource Investigation, Permitting, Plan Reviews (10%)	158,000
				TOTAL ESTIMATED IMPROVEMENT COST (2017 DOLLARS)	**$ 2,059,850**

NO.	DESCRIPTION	UNIT	UNIT PRICE	ESTIMATED QUANTITY	TOTAL PRICE
SDC 2 and 3: Proposed Valley Zone Piping (Distribution Mains to Connect Undeveloped Areas to City System)					
1	Mobilization/Demobilization	LS	$ 56,000	All Req'd	$ 56,000
2	Temporary Protection and Direction of Traffic/Project Safety	LS	20,000	All Req'd	20,000
3	16-inch PVC Water Line, Including Valves	LF	85	875	74,375
4	12-inch PVC Water Line, Including Valves	LF	65	6,250	406,250
5	Fire Hydrant and Auxiliary Valve Assembly	EA	4,000	16	64,000
6	New Water Service (to Existing Lot, Including Service Line and Meter)	EA	2,800	6	16,800
7	Connection to Existing Main Line	EA	5,000	2	10,000
8	Asphalt Surface Restoration	SY	65	8,000	520,000
				Estimated Construction Cost	**$ 1,167,425**
				Construction Contigency Cost (15%)	175,000
				Total Estimated Construction Cost	**$ 1,342,425**
				Preliminary, Design, and Construction Engineering (20%)	269,000
				Environmental Report, Cultural Resource Investigation, Permitting, Plan Reviews (10%)	134,000
				TOTAL ESTIMATED IMPROVEMENT COST (2017 DOLLARS)	**$ 1,745,425**

NO.	DESCRIPTION	UNIT	UNIT PRICE	ESTIMATED QUANTITY	TOTAL PRICE
SDC 4: Proposed Williamson Zone Piping (Distribution Mains to Connect Undeveloped Areas to City System)					
1	Mobilization/Demobilization	LS	$ 122,000	All Req'd	$ 122,000
2	Temporary Protection and Direction of Traffic/Project Safety	LS	50,000	All Req'd	50,000
3	12-inch PVC Water Line, Including Valves	LF	65	10,500	682,500
4	Fire Hydrant and Auxiliary Valve Assembly	EA	4,000	24	96,000
5	Booster Pump Station [1]	LS	500,000	All Req'd	500,000
6	New Water Service (to Existing Lot, Including Service Line and Meter)	EA	2,800	120	326,000
7	Conneciton to Existing Main Line	EA	5,000	2	10,000
8	Asphalt Surface Restoration	SY	65	11,700	760,500
				Estimated Construction Cost	**$ 2,557,000**
				Construction Contigency Cost (15%)	384,000
				Total Estimated Construction Cost	**$ 2,941,000**
				Preliminary, Design, and Construction Engineering (20%)	588,000
				Environmental Report, Cultural Resource Investigation, Permitting, Plan Reviews (8%)	235,000
				TOTAL ESTIMATED IMPROVEMENT COST (2017 DOLLARS)	**$ 3,764,000**

[1] Booster Pump Station includes CMU building, pumps, piping valves, electrical, controls and instrumentation, site work, painting, security fencing, access road, and telemetry and SCADA development.

NO.	DESCRIPTION	UNIT	UNIT PRICE	ESTIMATED QUANTITY	TOTAL PRICE
SDC 5: Proposed Piping between Airport Zone and Valley Zone (Inner Connection Distribution Piping)					
1	Mobilization/Demobilization	LS	$ 160,000	All Req'd	$ 160,000
2	Temporary Protection and Direction of Traffic/Project Safety	LS	60,000	All Req'd	60,000
3	16-inch PVC Water Line, Including Valves	LF	85	15,000	1,275,000
4	Fire Hydrant and Auxiliary Valve Assembly	EA	4,000	20	80,000
5	Airport Zone to Valley Zone Intertie, Reducing Valve Station [1]	LS	60,000	All Req'd	60,000
6	Valley Zone to Airport Zone, Intertie, Booster Pump Station [1]	LS	500,000	All Req'd	500,000
7	Connection to Existing Main Line	EA	5,000	2	10,000
8	Asphalt Surface Restoration	SY	65	16,500	1,072,500
9	Gravel Surface Restoration	SY	10	14,550	145,500
				Estimated Construction Cost	**$ 3,363,000**
				Construction Contigency Cost (15%)	505,000
				Total Estimated Construction Cost	**$ 3,868,000**
				Preliminary, Design, and Construction Engineering (20%)	774,000
				Environmental Report, Cultural Resource Investigation, Permitting, Plan Reviews (6.5%)	251,000
				TOTAL ESTIMATED IMPROVEMENT COST (2017 DOLLARS)	**$ 4,893,000**

[1] Booster Pump Station includes CMU building, pumps, piping valves, electrical, controls and instrumentation, site work, painting, security fencing, access road, and telemetry and SCADA development.

NO.	DESCRIPTION	UNIT	UNIT PRICE	ESTIMATED QUANTITY	TOTAL PRICE
SDC 6: Proposed Airport Zone Piping (Distribution Loop Existing City System and Increase Fire Flows)					
1	Mobilization/Demobilization	LS	$ 14,000	All Req'd	$ 14,000
2	Temporary Protection and Direction of Traffic/Project Safety	LS	10,000	All Req'd	10,000
3	16-inch PVC Water Line, including Valves	LF	85	2,400	204,000
4	Fire Hydrant and Auxiliary Valve Assembly	EA	4,000	3	12,000
5	Connection to Existing Main Line	EA	5,000	2	10,000
6	Gravel Surface Restoration	SY	10	2,600	26,000
				Estimated Construction Cost	**$ 276,000**
				Construction Contigency Cost (15%)	41,500
				Total Estimated Construction Cost	**$ 317,500**
				Preliminary, Design, and Construction Engineering (20%)	63,500
				Environmental Report, Cultural Resource Investigation, Permitting, Plan Reviews (10%)	32,000
				TOTAL ESTIMATED IMPROVEMENT COST (2017 DOLLARS)	**$ 413,000**

NO.	DESCRIPTION	UNIT	UNIT PRICE	ESTIMATED QUANTITY	TOTAL PRICE
SDC 7: Proposed Airport Zone Piping (Distribution Mains to Connect Undeveloped Areas to City System)					
1	Mobilization/Demobilization	LS	$ 84,000	All Req'd	$ 84,000
2	Temporary Protection and Direction of Traffic/Project Safety	LS	25,000	All Req'd	25,000
3	12-inch PVC Water Line, Including Valves	LF	65	13,000	845,000
4	Fire Hydrant and Auxiliary Valve Assembly	EA	4,000	36	144,000
5	Booster Pump Station [1]	LS	500,000	All Req'd	500,000
6	Connection to Existing Main Line	EA	5,000	2	10,000
7	Gravel Surface Restoration	SY	10	14,550	145,500
				Estimated Construction Cost	**$ 1,753,500**
				Construction Contigency Cost (15%)	263,000
				Total Estimated Construction Cost	**$ 2,016,500**
				Preliminary, Design, and Construction Engineering (20%)	403,000
				Environmental Report, Cultural Resource Investigation, Permitting, Plan Reviews (10%)	202,000
				TOTAL ESTIMATED IMPROVEMENT COST (2017 DOLLARS)	**$ 2,621,500**

[1] Booster Pump Station includes CMU building, pumps, piping valves, electrical, controls and instrumentation, site work, painting, security fencing, access road, and telemetry and SCADA development.

NO.	DESCRIPTION	UNIT	UNIT PRICE	ESTIMATED QUANTITY	TOTAL PRICE
SDC 8: Proposed 3rd Street to Wayfinder Drive Piping (New Pressure Zone Feed)					
1	Mobilization/Demobilization	LS	$ 73,000	All Req'd	$ 73,000
2	Temporary Protection and Direction of Traffic/Project Safety	LS	20,000	All Req'd	20,000
3	16-inch PVC Water Line, Including Valves	LF	85	5,100	433,500
4	Fire Hydrant and Auxiliary Valve Assembly	EA	4,000	12	48,000
5	Booster Pump Station [1]	LS	500,000	All Req'd	500,000
6	New Water Service (to Existing Lot, Including Service Line and Meter)	EA	2,800	18	50,400
7	Connection to Existing Main Line	EA	5,000	4	20,000
8	Existing Fire Hydrant Connection to New Main Line	EA	2,000	2	4,000
9	Existing Water Service Connection to New Main Line	EA	400	20	8,000
10	Asphalt Surface Restoration	SY	65	5,700	370,500
				Estimated Construction Cost	**$ 1,527,400**
				Construction Contigency Cost (15%)	229,000
				Total Estimated Construction Cost	**$ 1,756,400**
				Preliminary, Design, and Construction Engineering (20%)	351,000
				Environmental Report, Cultural Resource Investigation, Permitting, Plan Reviews (10%)	176,000
				TOTAL ESTIMATED IMPROVEMENT COST (2017 DOLLARS)	**$ 2,283,400**

[1] Booster Pump Station includes CMU building, pumps, piping valves, electrical, controls and instrumentation, site work, painting, security fencing, access road, and telemetry and SCADA development.

NO.	DESCRIPTION	UNIT	UNIT PRICE	ESTIMATED QUANTITY	TOTAL PRICE
SDC 9: Proposed New 1.0 MG Reservoir (to Serve New Pressure Zone)					
1	Mobilization/Demobilization	LS	$ 93,000	All Req'd	$ 93,000
2	Temporary Protection and Direction of Traffic/Project Safety	LS	10,000	All Req'd	10,000
3	Site Earthwork and Foundation	LS	250,000	All Req'd	250,000
4	New 1.0 Million Gallon (MG) Reservoir	LS	930,000	All Req'd	930,000
5	Painting of Reservoir	LS	165,000	All Req'd	165,000
6	Site Piping, Valves, and Appurtenances	LS	100,000	All Req'd	100,000
7	Security Fencing and Improvements	LS	20,000	All Req'd	20,000
8	16-inch Transmission Line, Including Valves	LF	85	3,800	323,000
9	Telemetry and Supervisory Control and Data Acquisition Development	LS	50,000	All Req'd	50,000
				Estimated Construction Cost	**$ 1,941,000**
				Construction Contigency Cost (15%)	291,000
				Total Estimated Construction Cost	**$ 2,232,000**
				Preliminary, Design, and Construction Engineering (20%)	446,500
				Environmental Report, Cultural Resource Investigation, Permitting, Plan Reviews (10%)	223,000
				TOTAL ESTIMATED IMPROVEMENT COST (2017 DOLLARS)	**$ 2,901,500**

NO.	DESCRIPTION	UNIT	UNIT PRICE	ESTIMATED QUANTITY	TOTAL PRICE
SDC 10: Proposed Improvements to Serve New Pressure Zone on Barnes Butte					
1	Mobilization/Demobilization	LS	$ 26,000	All Req'd	$ 26,000
2	Temporary Protection and Direction of Traffic/Project Safety	LS	10,000	All Req'd	10,000
3	Booster Pump Station [1]	LS	500,000	All Req'd	500,000
				Estimated Construction Cost	**$ 536,000**
				Construction Contigency Cost (15%)	81,000
				Total Estimated Construction Cost	**$ 617,000**
				Preliminary, Design, and Construction Engineering (20%)	124,000
				Environmental Report, Cultural Resource Investigation, Permitting, Plan Reviews (10%)	62,000
				TOTAL ESTIMATED IMPROVEMENT COST (2017 DOLLARS)	**$ 803,000**

[1] Booster Pump Station includes CMU building, pumps, piping valves, electrical, controls and instrumentation, site work, painting, security fencing, access road, and telemetry and SCADA development.

NO.	DESCRIPTION	UNIT	UNIT PRICE	ESTIMATED QUANTITY	TOTAL PRICE
SDC 11: Proposed Improvements for Increased Supply into the System					
1	Mobilization/Demobilization	LS	$ 207,000	All Req'd	$ 207,000
2	Temporary Protection and Direction of Traffic/Project Safety	LS	25,000	All Req'd	25,000
3	Infiltration Gallery	LS	700,000	All Req'd	700,000
4	Booster Pump Station	LS	300,000	All Req'd	300,000
5	Water Treatment/Disinfection Equipment	LS	1,500,000	All Req'd	1,500,000
6	Water Treatment/Disinfection Building, Site Piping, Security Fencing	LS	500,000	All Req'd	500,000
7	Power Supply	LS	50,000	All Req'd	50,000
8	Chlorine Contact Tank	LS	500,000	All Req'd	500,000
9	Telemetry and System Controls	LS	60,000	All Req'd	60,000
10	Electrical Work, Motor Control Center, Standby Generator	LS	400,000	All Req'd	400,000
11	12-inch PVC Water Line, Including Valves	LF	65	600	39,000
12	Fire Hydrant and Auxiliary Valve Assembly	EA	4,000	1	4,000
13	Connectin to Existing Main Line	EA	5,000	2	10,000
14	Asphalt Surface Restoration	SY	65	670	43,550
				Estimated Construction Cost	**$ 4,338,550**
				Construction Contigency Cost (15%)	651,000
				Total Estimated Construction Cost	**$ 4,989,550**
				Preliminary, Design, and Construction Engineering (20%)	998,000
				Environmental Report, Cultural Resource Investigation, Permitting, Plan Reviews (5%)	250,000
				TOTAL ESTIMATED IMPROVEMENT COST (2017 DOLLARS)	**$ 6,237,550**

NO.	DESCRIPTION	UNIT	UNIT PRICE	ESTIMATED QUANTITY	TOTAL PRICE
SDC 12 and 13: Proposed Improvements for Increased System Demands					
1	Mobilization/Demobilization	LS	$ 51,500	All Req'd	$ 51,500
2	Temporary Protection and Direction of Traffic/Project Safety	LS	15,000	All Req'd	15,000
3	New Reservoir to Northridge Pressure Zone Intertie, 16-inch PVC Water Line	LF	85	8,700	739,500
4	New Reservoir to Northridge Pressure Zone Intertie, Pressure Reducing Valve Station	LS	60,000	All Req'd	60,000
5	American Pines Pump Station Capacity Upgrades	LS	100,000	All Req'd	100,000
6	Connection to Existing Main Line	EA	5,000	2	10,000
7	Existing Fire Hydrant Connection to New Main Line	EA	2,000	2	4,000
8	Gravel Surface Restoration	SY	10	9,700	97,000
				Estimated Construction Cost	**$ 1,077,000**
				Construction Contigency Cost (15%)	162,000
				Total Estimated Construction Cost	**$ 1,239,000**
				Preliminary, Design, and Construction Engineering (20%)	248,000
				Environmental Report, Cultural Resource Investigation, Permitting, Plan Reviews (10%)	124,000
				TOTAL ESTIMATED IMPROVEMENT COST (2017 DOLLARS)	**$ 1,611,000**

anderson perry & associates, inc.

DOWL

CITY OF
PRINEVILLE, OREGON
WATER SYSTEM MASTER PLAN
PROPOSED SDC-FUNDED IMPROVEMENTS AND ESTIMATED PROJECT COSTS

FIGURE
6-2
CONT'D.

Chapter 7 - Project Financing and Implementation

Introduction

This chapter briefly outlines alternatives for financing the City of Prineville's 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 proposed improvements, a financing plan acceptable to the City of Prineville must be developed to complete the improvements. Because of the estimated cost of the improvements, it is recommended the City pursue financing resources including a low interest loan coupled with grant funds, if available.

A detailed analysis of the City's current water rate structure was completed as part of the City's overall water and wastewater infrastructure planning process. Some discussion of the existing rate structure and how it affects the City's eligibility for certain funding programs is included. Refer to the Water Rate Study prepared GEL Oregon, Inc., for a comprehensive evaluation of water rate options to fund the identified and recommended 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 the water system. Revenue is obtained from water user customer billings and connection fees.

Water Use Rates

The current base water rate per month for residential services inside the city limits is $18.26 plus $1.90 per unit of consumption. Each unit is 750 gallons or 100 cubic feet. The base water rate per month for commercial services inside city limits is dependent on meter size, starting at $27.81 for a 3/4-inch meter up to $698.84 for a 6-inch meter. The commercial base rate includes a base volume of usage varying by meter size. After the base usage is surpassed, there is a consumption charge of $1.90 per unit. The current commercial monthly water rates are summarized on Table 7-1. Refer to the Water Rate Study for more detailed information pertaining to water rates.

TABLE 7-1
2017 COMMERCIAL WATER RATE INFORMATION

Meter Size	Units Included	Base Rate Per Month	Water Usage Rate (per 750 gallons/ 100 cubic feet)
3/4- inch	14	$27.81	$1.90
1-inch	17	$34.15	$1.90
1-1/2-inch	42	$80.22	$1.90
2-inch	62	$119.14	$1.90
3-inch	116	$373.27	$1.90
4-inch	196	$336.00	$1.90
6-inch	367	$698.84	$1.90

Water System Improvements Funding

To complete the water system improvements discussed in Chapter 6, the City may choose 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 the U.S. Department of Agriculture Rural Development (RD), the U.S. Economic Development Administration (EDA), Business Oregon, and others.

These agencies can provide low interest loan funding and possibly grant funding for assisting rural communities on public works projects. 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. Most of these agencies will require an increase in water rates to support a loan for water system improvements both as a condition of receiving monies and prior to being considered for grant funds. It should be noted the monthly user rates discussed in this section can represent a combination of monthly usage fees and taxes.

Federal Grant and Loan Programs

Rural Development

This agency can provide financial assistance to communities with a population under 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. 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 operation, maintenance, and replacement 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 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 desired. 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 Business Oregon - 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. If the City's water system improvements can be linked directly to industrial expansion or job retention, the City would 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 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 Business Oregon 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 SDWRLF program appears to be a beneficial funding source for the City to pursue.

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 CWA.

While primarily a loan program, grants are available for municipalities that meet 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 borrowers may be funded through the 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 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 (LMIs).

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 LMI category. According to the City and County demographics utilized by Business Oregon, in 2016 the City of Prineville had approximately 44.4 percent of the population within the LMI category. This puts the City below the threshold criteria to qualify for CDBG funds.

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. If the City of Prineville can tie the needed improvements to job creation, the SPWF may be a potential funding source for water system improvements.

For Business Oregon Programs - Contact Regional Development Officer

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

Potential Rate Requirements to Fund System Improvements

To be eligible for RD grant and loan funds, the City must have average water use costs that are comparable to similar systems in the area. Once the City begins to evaluate potential funding sources and attends a "One Stop" meeting (discussed later in this Chapter), RD will provide an estimate of the water rates required for the City of Prineville to be eligible for low interest loans and grants.

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's case, the average five-year MHI is $29,249. This MHI results in a required monthly residential water user cost of $30.47 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, $18.26 is charged as a base rate and $1.90 per 750 gallons of water use is also charged. If a residential water user consumed 7,500 gallons, the associated cost would be $37.26. Therefore, it appears the City has already met the 1.25 percent MHI threshold 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 proposed water system improvements.

Project "One Stop" Meeting

To evaluate all potential project funding options, a "One Stop" meeting is generally requested by a city. "One Stop" meetings are often scheduled in Salem where representatives of 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 can hold these meetings locally. 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 City's taxing authority 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.

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. 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 Oregon, careful consultation with experienced, licensed bonding attorneys should be made if the City begins to obtain bonding authority for the proposed water system improvements.

Project Implementation

For the City of Prineville to successfully implement the water system improvements evaluated in this Water System Master Plan (WSMP) and presented in the City's Capital Improvements Plan, the City will need to coordinate directly with RD, Business Oregon, and other potential funding agencies if they elect to pursue federal, state, and potentially local financing opportunities provided through low interest loans and potential grants.

The City should work closely with its citizens through public meetings to inform them of the system needs and the necessity for potential increased water user costs. To reduce the financial impact to rate payers, the City could seek low interest loans coupled with grant funds. Increasing rates, as required, will adequately fund O&M of the existing and improved water system and keep up with inflation.

Summary

The water system improvements outlined herein are anticipated to provide the City with a higher quality water system with significantly improved reliability. The funding sources outlined in this chapter are potential sources of loans and grants for the City to consider if improvements projects are pursued.

Appendices Table of Contents

APPENDIX A
Consumer Confidence Report

City of Prineville

2016 Water Quality report

Your health and the health of the community is important to us. Your water utility staff is proud of the fact that your water meets stringent federal and state water quality standards 365 days a year. Our staff is made up of highly trained and certified operators that are dedicated to achieving our mission to provide the highest quality water possible. . If after reading this report and you still have questions, please feel free to contact our office 541-447-5627 or attend one of regular scheduled meetings held the 2nd and 4th Tuesday of each month.

An Important Message from the Environmental Protection Agency
Required information by EPA

The sources of (both tap and bottled water) include rivers, lakes, streams , ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals and human activity.

Microbial contaminants, such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.

Inorganic contaminants, such as salts and metals, which can be naturally-occurring or result from urban storm-water runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming.

Pesticides and Herbicides, comes from agricultural, urban storm-water runoff, and residential uses.

Organic Chemical Contaminants, synthetic and volatile organic chemicals are byproducts of industrial processes and petroleum production, and also from gas stations, urban storm-water runoff, and septic systems.

Radioactive Contaminants, Naturally occurring or the result of oil and gas production and mining activities.

Drinking water and bottled water may contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that 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 (800-426-4791).

Lead in Drinking Water....*Are You at Risk?*

Elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. City of Prineville is responsible for providing high quality drinking water to your tap, we cannot control the variety of materials used in plumbing components in your home. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water to drink or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline or at http:/www.epa.gov/safewater/lead, or www.leadline.org, or by contacting Edge Analytical, drinking water testing laboratory 541-639-8425.

Important Information About Water and Your Health

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 advise about drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants. **For more information call the Safe Drinking Water Hot Line 1-800-426-4791. Additional information can be found on the CDC website: www.cdc.gov/healthywater/drinking/public/faq.html.**

2016 Results for Regulated and Unregulated Contaminants for City of Prineville 00682

Detected Regulated and Unregulated contaminants are listed below from the water you used over the last 5 years from our ground water wells. Unregulated Contaminants are those for which EPA has not established drinking water standards. The purpose of unregulated contaminant monitoring is to help EPA determine their occurrence in drinking water and potential need for future regulation.

Primary Standards (directly related to the safety of drinking water)						
Inorganic Contaminants	**Units**	**MCL**	**MCLG**	**Range/Result**	**Violation**	**Likely Source**
2016 - Nitrate	ppm	10	10	0 - 4.36	No	Erosion of natural deposits
2015 – Fluoride	ppm	4	4	0.884	No	Erosion of natural deposits
Unregulated Contaminants	**Units**	**MCL**	**MCLG**	**Range/Result**	**Violation**	**Likely Source**
2015 - Sodium	ppm	N/A	N/A	37.9	No	Erosion of natural deposits
Radiological Contaminants	**Units**	**MCL**	**MCLG**	**Range/Result**	**Violation**	**Likely Source**
2015 - Uranium	ppb	30	0	0 - 1.0	No	Erosion of natural deposits
Lead and Copper	**Units**	**MCLG**	**AL**	**90th %**	**Violation**	**Likely Source**
2015—Copper	ppm	1.3	1.3	0.14	No	Household plumbing
2015 - Lead	ppb	15	0	1.0	No	Household plumbing
Disenfection-Byproducts	**Unit**	**MCL**	**MCLG**	**Range/Result**	**Violation**	**Likely Source**
2016 - Trihalomethane	ppb	80	N/A	1.5 - 3.9	No	By-Product of drinking water disinfection
2016 - Chlorine Residuals	ppm	4	4	0.03 - 0.90	No	By-Product of drinking water disinfection

Key and Definitions

- **AL - Action Level**, the concentration of a contaminant which if exceeded, triggers treatment or other requirements.
- **EPA - Environmental Protection Agency**, sets water quality standards and establishes methods and monitoring requirements for water utilities.
- **MCL - Maximum Contaminant Level**, the highest level of a contaminant that is allowed in drinking water. MCL's are set as close to the MCLG's as feasible using the best available treatment technology.
- **MCLG - Maximum Contaminant Level Goal**, the level of a contaminant in drinking water which there is no known or expected risk to health. MCLG's allow a margin of safety.
- **PPB - Parts Per Billion**. the equivalent of one second in 32 years.
- **PPM - Parts Per Million**, the equivalent of one second in 12 days.
- **pCi/l - Picocuries Per Liter**, a measure of radioactivity.
- **Result/Range -** the column that shows you what level of contaminant was found in the water you drink.

How to access more information on our water system

On the internet type in https://yourwater.oregon.gov/, under the blue box that has Drinking Water Program choose WS ID Look up, in the box type in 00682 and click View Results. You can scroll to the bottom and choose options to browse information for City of Prineville.

City of Prineville District Source Assessment

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 the part of the aquifer that supplies groundwater to our well. (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 information they need to develop a strategy to protect our groundwater resource.

The Drinking Water Programs of The Department of Human Services and Environmental Quality have completed a Source Water Assessment. A copy of the report is available for viewing by contacting the our office @ 541-447-5627.

APPENDIX B
Seismic Risk Assessment and Mitigation Materials

STATE OF OREGON
DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES
www.OregonGeology.org
W. Lawrence Givens, Governing Board Chair
Vicki S. McConnell, Director and State Geologist
Andree V. Pollock, Assistant Director, Geologic Survey and Services
Rachel L. Smith, Project Operations Manager
Ian P. Madin, Chief Scientist

Map of Earthquake and Tsunami Damage Potential for a Simulated Magnitude 9 Cascadia Earthquake

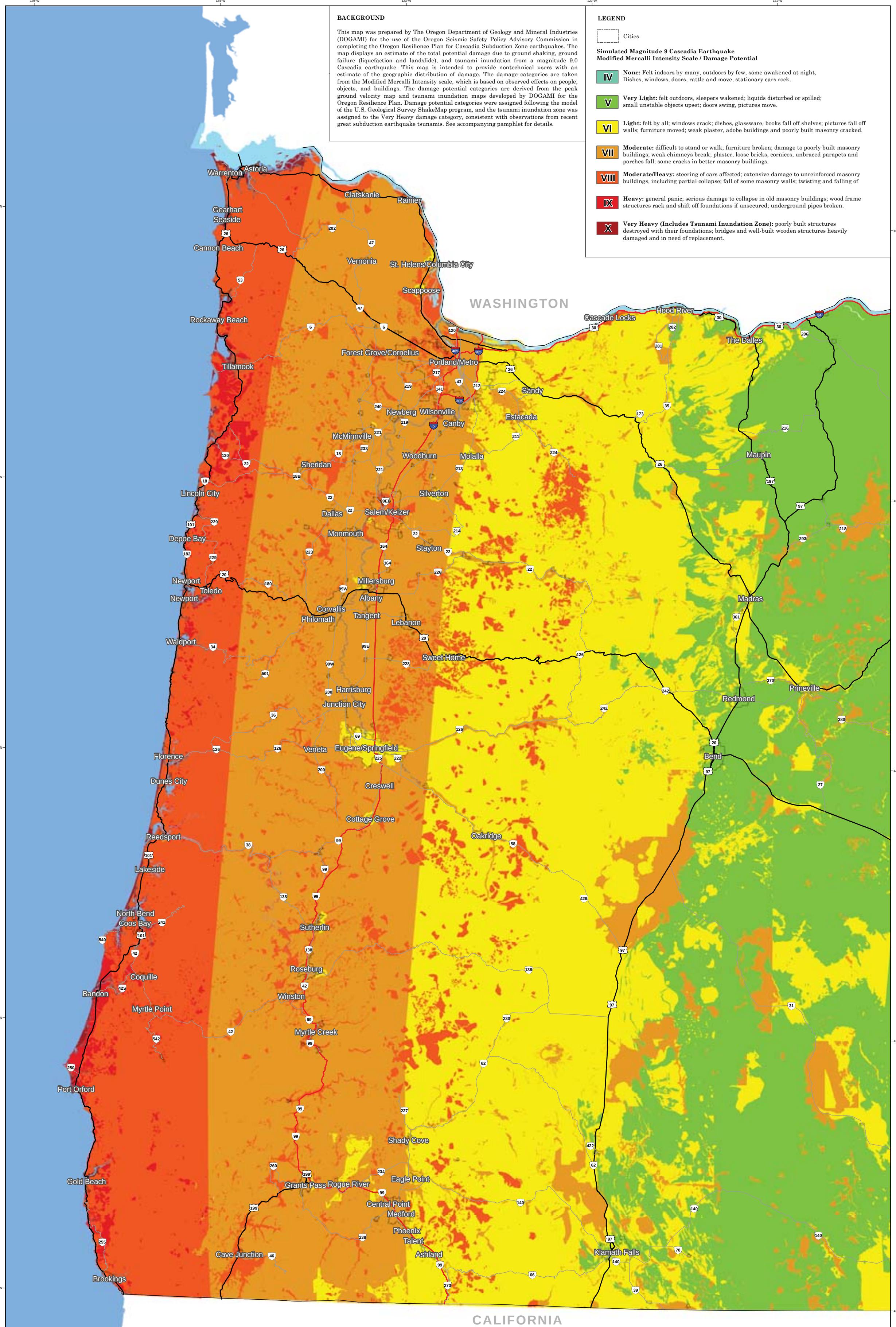
2013

OPEN-FILE REPORT O-13-06

Ground Motion and Ground Deformation Data and Maps for the 2012 Oregon Resilience Plan for Cascadia Subduction Zone Earthquakes

by Ian P. Madin and William J. Burns

PLATE 7



BACKGROUND

This map was prepared by The Oregon Department of Geology and Mineral Industries (DOGAMI) for the use of the Oregon Seismic Safety Policy Advisory Commission in completing the Oregon Resilience Plan for Cascadia Subduction Zone earthquakes. The map displays an estimate of the total potential damage due to ground shaking, ground failure (liquefaction and landslide), and tsunami inundation from a magnitude 9.0 Cascadia earthquake. This map is intended to provide nontechnical users with an estimate of the geographic distribution of damage. The damage categories are taken from the Modified Mercalli Intensity scale, which is based on observed effects on people, objects, and buildings. The damage potential categories are derived from the peak ground velocity map and tsunami inundation maps developed by DOGAMI for the Oregon Resilience Plan. Damage potential categories were assigned following the model of the U.S. Geological Survey ShakeMap program, and the tsunami inundation zone was assigned to the Very Heavy damage category, consistent with observations from recent great subduction earthquake tsunamis. See accompanying pamphlet for details.

LEGEND

Cities

Simulated Magnitude 9 Cascadia Earthquake
Modified Mercalli Intensity Scale / Damage Potential

IV — **None:** Felt indoors by many, outdoors by few, some awakened at night, Dishes, windows, doors, rattle and move, stationary cars rock.

V — **Very Light:** felt outdoors, sleepers wakened; liquids disturbed or spilled; small unstable objects upset; doors swing, pictures move.

VI — **Light:** felt by all; windows crack; dishes, glassware, books fall off shelves; pictures fall off walls; furniture moved; weak plaster, adobe buildings and poorly built masonry cracked.

VII — **Moderate:** difficult to stand or walk; furniture broken; damage to poorly built masonry buildings; weak chimneys break; plaster, loose bricks, cornices, unbraced parapets and porches fall; some cracks in better masonry buildings.

VIII — **Moderate/Heavy:** steering of cars affected; extensive damage to unreinforced masonry buildings, including partial collapse; fall of some masonry walls; twisting and falling of

IX — **Heavy:** general panic; serious damage to collapse in old masonry buildings; wood frame structures rack and shift off foundations if unsecured; underground pipes broken.

X — **Very Heavy (Includes Tsunami Inundation Zone):** poorly built structures destroyed with their foundations; bridges and well-built wooden structures heavily damaged and in need of replacement.

Coordinate System: NAD 1983 CORS96 Oregon Statewide Lambert Ft Intl
Projection: Lambert Conformal Conic
Geographic Coordinate System: NAD 1983 CORS96
Datum: NAD 1983 CORS96

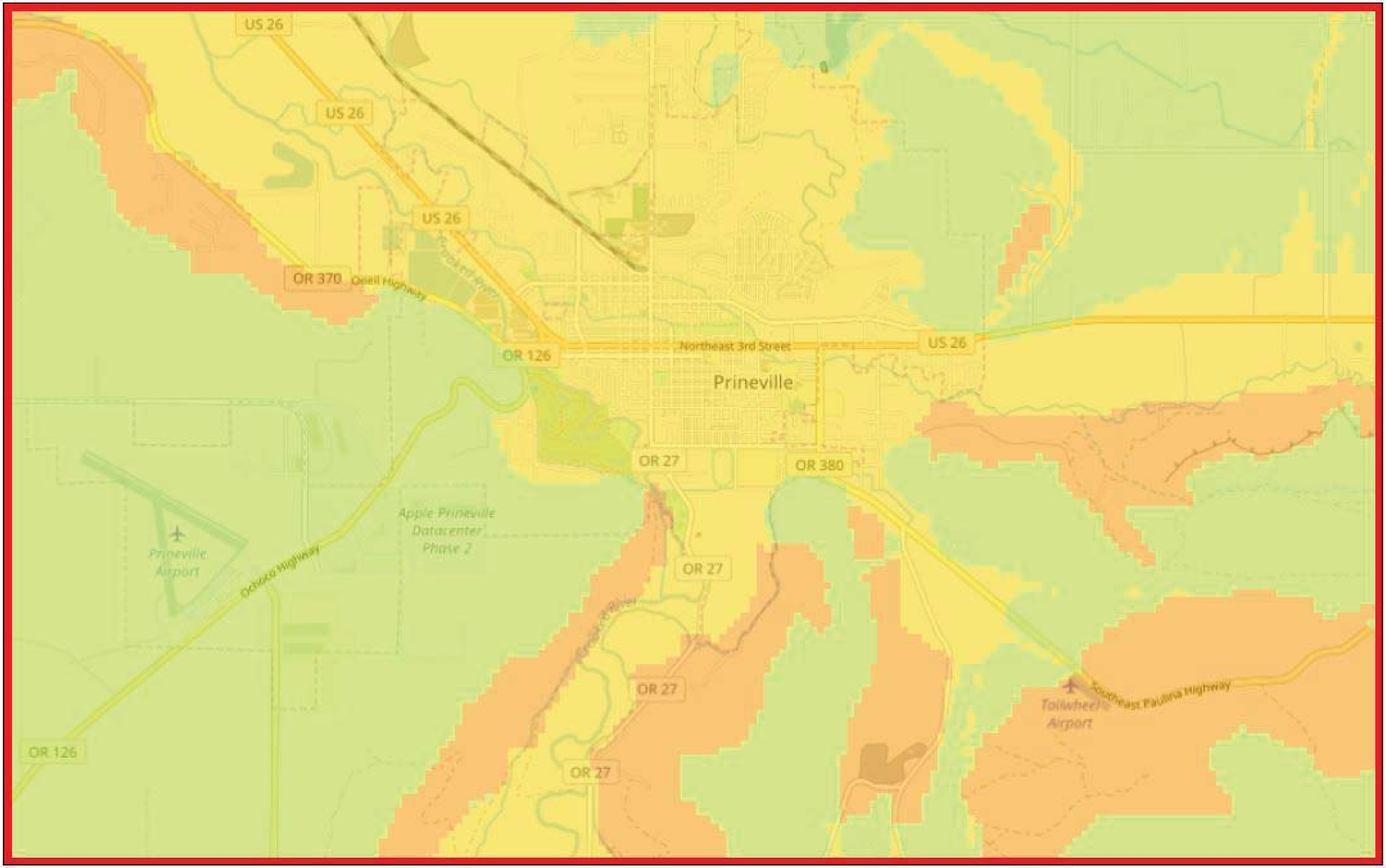
Data layers: Earthquake and tsunami damage: DOGAMI; see Background text on this plate and accompanying pamphlet for details. Roads: Oregon Department of Transportation, 2008. Urban growth boundaries: Oregon Department of Land Conservation and Development (DLCD) (2011).
Cartography by Ian P. Madin.

0 10 20 30 40 50 Miles
0 25 50 Kilometers
TRUE NORTH

NOTICE
This map cannot serve as a substitute for site-specific investigations by qualified practitioners. Site-specific data may give results that differ from those shown on the maps. The views and conclusions contained in this document are those of the authors and should not be interpreted as necessarily representing the official policies, either expressed or implied, of the U.S. government.

For copies of this publication contact:
Nature of the Northwest Information Center
800 NE Oregon Street, #28, Ste. 965
Portland, Oregon 97232
telephone (971) 673-2331

DOGAMI Cascadia Earthquake Hazard Map: Prineville, Oregon

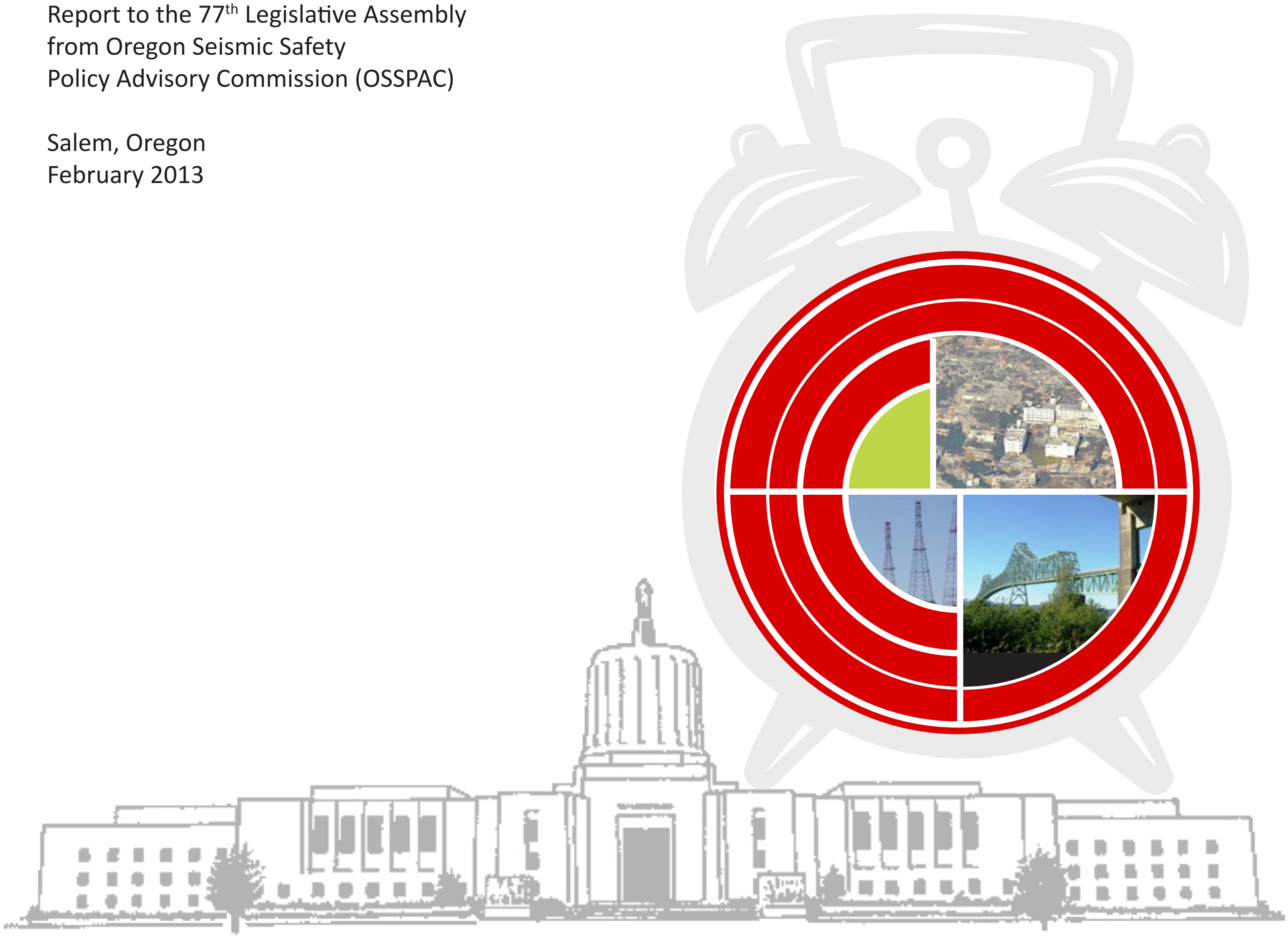


The Oregon Resilience Plan Executive Summary

Reducing Risk and Improving Recovery for the Next Cascadia Earthquake and Tsunami

Report to the 77th Legislative Assembly
from Oregon Seismic Safety
Policy Advisory Commission (OSSPAC)

Salem, Oregon
February 2013



Note: This Executive Summary selects from the large number of detailed recommendations in the chapters of the Oregon Resilience Plan. The full report is available online at the Oregon Office of Emergency Management website: http://www.oregon.gov/OMD/OEM/Pages/index.aspx

Foreword

"If we cannot control the volatile tides of change, we can learn to build better boats."
—Andrew Zolli and Ann Marie Healy, *Resilience: Why Things Bounce Back* (2012)

For more than 300 years, a massive geological fault off America's northwest coast has lain dormant. Well into that interval, Meriwether Lewis and William Clark journeyed to the mouth of the Columbia River and returned to Washington, D.C. to tell the new United States about what came to be known as the Oregon Country. Tens of thousands of settlers crossed the Oregon Trail to establish communities throughout the Willamette Valley, in coastal valleys, and beside natural harbors. With the provisional government established in 1843 followed by statehood in 1859, the modern history of Oregon began. Industries rose and fell, cities and towns grew . . . and still the fault lay silent.

Not until the 1980s did scientists recognize the Cascadia subduction zone as an active fault that poses a major geological hazard to Oregon. A decade later, the state's building codes were updated to address this newly revealed earthquake threat to the built environment.

Since that time, scientists have documented a long history of earthquakes and tsunamis on the Cascadia subduction zone, and state and local officials have urged Oregonians to prepare for the next one. In 1999, the state's Department of Geology and Mineral Industries published a preliminary statewide damage and loss study identifying the dire consequences of a Cascadia earthquake and tsunami for Oregon's infrastructure and for public safety.

One official who took that warning seriously was Senator Peter Courtney, Oregon's unchallenged champion of earthquake safety and advocate for measures to protect students who attend unsafe schools. His legislative efforts over more than a decade launched a statewide assessment of schools and emergency response facilities, and established a state grant program to help fund seismic upgrades to hazardous schools and other critical facilities. Other than California, no state has done as much—yet the hazard surpasses the commitments Oregon has made to date.

In early 2011, we suggested in the pages of *The Oregonian* that Oregon should take new steps to make itself resilient to a big earthquake. Less than two months later, the Tohoku earthquake and tsunami disaster in Japan provided the occasion for Representative Deborah Boone to introduce a House Resolution calling on Oregon to plan for the impacts of a Cascadia earthquake and tsunami here.

House Resolution 3 directed Oregon Seismic Safety Policy Advisory Commission to lead the planning effort. Chairman Kent Yu, Ph.D., has skillfully guided more than 150 volunteer professionals, including noted experts, to develop a landmark report on Oregon's priorities to survive and bounce back from a magnitude 9.0 Cascadia earthquake and tsunami.

The authors of this Oregon Resilience Plan set out to help Oregonians know what to expect from the state's infrastructure should that disaster strike this year, and to propose the level of infrastructure reliability that a resilient state should provide. The plan's recommendations highlight ways to close the gap that separates expected and desired performance.

Business leaders engaged in this resilience planning effort have indicated that in a major disaster, interruptions of infrastructure services lasting longer than two weeks will put their enterprises at risk. Yet, under present conditions, we can expect some interruptions to last much longer, in some cases from 18 to 36 months or more. The state, in tandem with the private sector, has much to do to improve the reliability of basic services. Citizens, too, need to plan to be self-sufficient for far longer than the 72-hour period commonly advised for disaster preparedness.

The most recent Cascadia earthquake struck at around 9:00 p.m. on a late January evening; the next could shake a mid-July morning when hundreds of thousands of Oregonians and visitors are enjoying coastal beaches and towns. No one can predict the next time the Cascadia fault will rupture, and *today* is just as likely as fifty years from now. If we begin now, it is possible to prevent that natural disaster from causing a statewide catastrophe. Now is the time to have a plan. Now is the time to close Oregon's resilience gap.

The Oregon Resilience Plan maps a path of policy and investment priorities for the next fifty years. The recommendations offer Oregon's Legislative Assembly and Governor immediate steps to begin a journey along that path. The plan and its recommendations build on the solid foundation laid over the past quarter century by some of Oregon's top scientists, engineers, and policymakers.

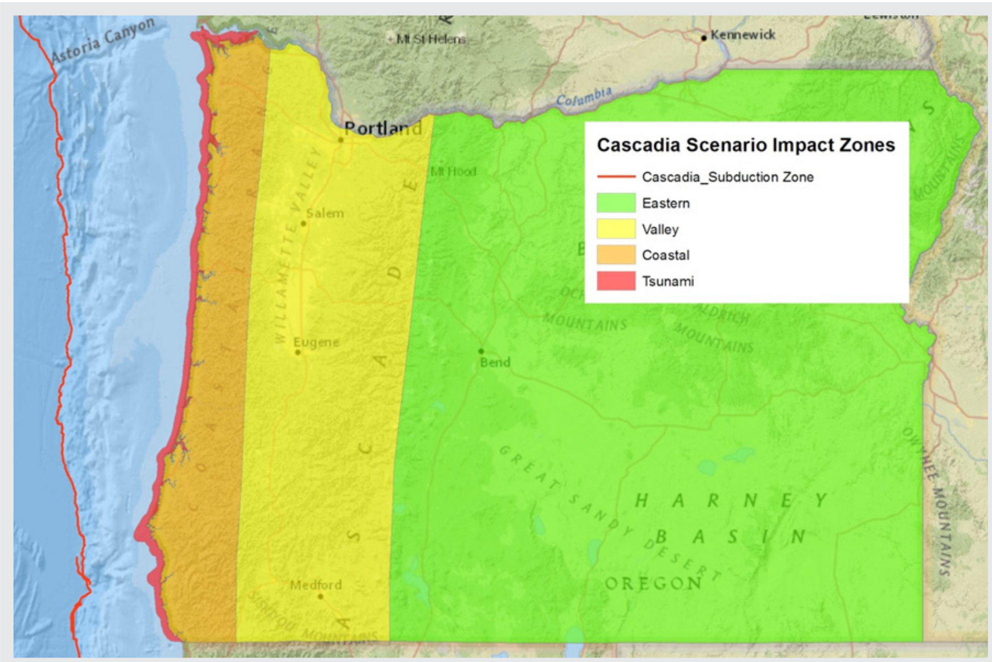
As we wrote two years ago, adopting and implementing such a plan can show "Oregon at its best, tackling a risk with imagination and resourcefulness while sharing the knowledge gained."

Yumei Wang, Jay Raskin, and Edward Wolf
Portland, Oregon, November 2012

Yumei Wang, Jay Raskin, and Edward Wolf are the co-authors of "Oregon should make itself resilient for a big quake," *The Sunday Oregonian*, January 9, 2011.

Executive Summary

Very large earthquakes will occur in Oregon's future, and our state's infrastructure will remain poorly prepared to meet the threat unless we take action now to start building the necessary resilience. This is the central finding of the Oregon Resilience Plan requested by Oregon's 76th Legislative Assembly.



Impact zones for the magnitude 9.0 Cascadia earthquake scenario. Damage will be extreme in the Tsunami zone, heavy in the Coastal Zone, moderate in the Valley zone and light in the Eastern zone.

About the Plan

House Resolution 3, adopted in April 2011, directed the Oregon Seismic Safety Policy Advisory Commission (OSSPAC) "to lead and coordinate preparation of an Oregon Resilience Plan that reviews policy options, summarizes relevant reports and studies by state agencies, and makes recommendations on policy direction to protect lives and keep commerce flowing during and after a Cascadia earthquake and tsunami." OSSPAC assembled eight task groups, comprising volunteer subject-matter experts from government, universities, the private sector, and the general public. An Advisory Group of public- and private-sector leaders oversaw the Task Groups' work, assembled in the portfolio of chapters that make up the plan.

OSSPAC offered the following definition of the seismic resilience goal:

> "Oregon citizens will not only be protected from life-threatening physical harm, but because of risk reduction measures and pre-disaster planning, communities will recover more quickly and with less continuing vulnerability following a Cascadia subduction zone earthquake and tsunami."

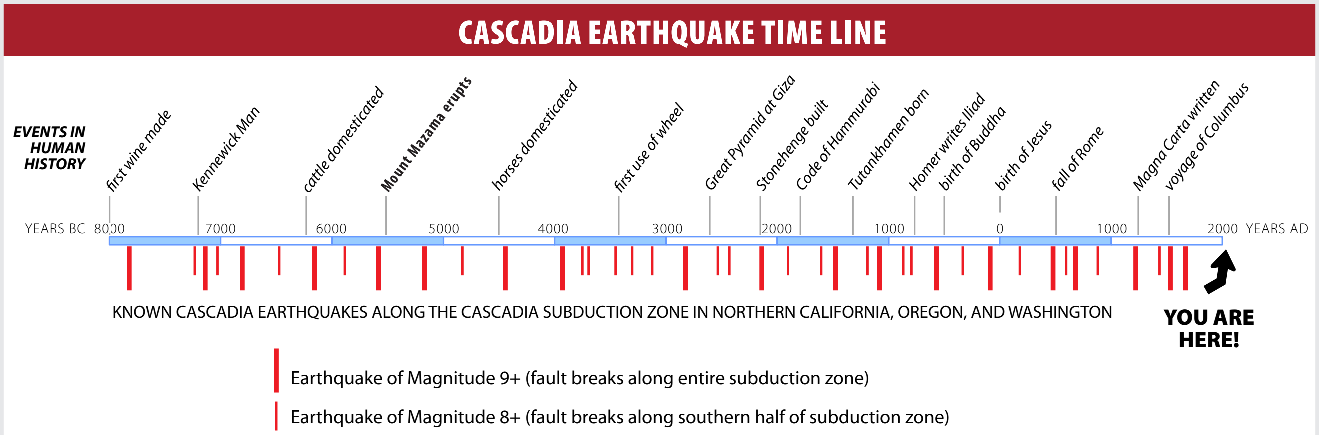
Each group was charged with three tasks for four affected zones (tsunami, coastal/earthquake only, valley, and central/eastern Oregon):

1. Determine the likely impacts of a magnitude 9.0 Cascadia earthquake and tsunami on its assigned sector, and estimate the time required to restore functions in that sector if the earthquake were to strike under present conditions;
2. Define acceptable timeframes to restore functions after a future Cascadia earthquake to fulfill expected resilient performance; and
3. Recommend changes in practice and policies that, if implemented during the next 50 years, will allow Oregon to reach the desired resilience targets.

The purpose of the analysis is to identify steps needed to eliminate the gap separating current performance from resilient performance, and to initiate that work through capital investment, new incentives, and policy changes so that the inevitable natural disaster of a Cascadia earthquake and tsunami will not deliver a catastrophic blow to Oregon's economy and communities.

Overview of the Task Groups

The **Cascadia Earthquake Scenario Task Group** (Chapter One) reviewed current scientific research to develop a detailed description of the likely physical effects of a great (magnitude 9.0) Cascadia subduction zone earthquake and tsunami, providing a scenario that other task groups used to assess impacts on their respective sectors.



Comparison of the history of subduction zone earthquakes along the Cascadia Subduction Zone in northern California, Oregon, and Washington, with events from human history. Ages of earthquakes are derived from study and dating of submarine landslides triggered by the earthquakes. Earthquake data provided by Chris Goldfinger, Oregon State University; time line by Ian P. Madin, DOGAMI.

This timeline compares the 10,000-year-long history of Cascadia earthquakes to events in human history.

The **Business and Workforce Continuity Task Group** (Chapter Two) sought to assess the workplace integrity, workforce mobility, and building systems performance – along with customer viability – needed to allow Oregon's businesses to remain in operation following a Cascadia earthquake and tsunami and to drive a self-sustaining economic recovery.

The **Coastal Communities Task Group** (Chapter Three) addressed the unique risks faced by Oregon's coast, the region of the state that will experience a devastating combination of tsunami inundation and physical damage from extreme ground shaking due to proximity to the subduction zone fault.

Critical Facilities in the Tsunami Zone – Minamisanriku, March 14, 2011. Because their hospital, emergency operation center, and other government and community service facilities were located in the tsunami inundation zone, the surviving community lost nearly all of its capacity to respond and implement recovery efforts. Source: Asia Air Survey Co., Ltd.

Tsunami Vulnerability: City of Seaside with 83% of its population, 89% of its employees and almost 100% of its critical facilities in the tsunami inundation zone. Source: Horning Geosciences

The **Critical and Essential Buildings Task Group** (Chapter Four) examined the main classes of public and private structures considered critical to resilience in the event of a scenario earthquake, and sought to characterize the gap between expected seismic performance (current state) and desired seismic resilience (target state). The group also assessed buildings deemed vital to community resilience, and addressed the special challenges posed by unreinforced masonry (URM) and non-ductile concrete structures.

Many of existing public and private buildings such as the State Capitol Building were built prior to our knowledge of the Cascadia subduction earthquake. They are not seismically safe, and pose significant life-safety threat to the building occupants.

The **Transportation Task Group** (Chapter Five) assessed the seismic integrity of Oregon's multi-modal transportation system, including bridges and highways, rail, airports, water ports, and public transit systems, examined the special considerations pertaining to the Columbia and Willamette River navigation channels, and characterized the work deemed necessary to restore and maintain transportation lifelines after a Cascadia earthquake and tsunami. The group's scope included interdependence of transportation networks with other lifeline systems.

The approach (foreground) to the 1966 Astoria-Megler Bridge that spans the Columbia River has major structural deficiencies that could lead to a collapse following an earthquake. Damaged bridge sections could block waterway access to the Critical Energy Infrastructure Hub. (DOGAMI photo)

The **Energy Task Group** (Chapter Six) investigated the seismic deficiencies of Oregon's energy storage and transmission infrastructure, with a special emphasis on the vulnerability of the state's critical energy infrastructure (CEI) hub, a six-mile stretch of the lower Willamette River where key liquid fuel and natural gas storage and transmission facilities and electricity transmission facilities are concentrated.

Left: Site map of the Critical Energy Infrastructure (CEI) Hub on the western bank of the Lower Willamette River area in NW Portland, Oregon. The CEI Hub, outlined in red, stretches for six miles. (Google Earth) Right: Oil terminals in the CEI Hub. (DOGAMI photo)

The **Information and Communications Task Group** (Chapter Seven) examined the inherent vulnerabilities of Oregon's information and communications systems and the consequences of service disruptions for the resilience of other sectors and systems. The group explored the implications of co-location of communications infrastructure with other vulnerable physical infrastructure (*e.g.,* bridges), and specified the conditions needed to accomplish phased restoration of service following a Cascadia earthquake and tsunami.

The **Water and Wastewater Task Group** (Chapter Eight) reviewed vulnerabilities of the pipelines, treatment plants, and pump stations that make up Oregon's water and wastewater systems, and discussed the interventions needed to increase the resilience of under-engineered and antiquated infrastructure at potential failure points. The group proposed a phased approach to restoration of water services after a Cascadia earthquake and tsunami, beginning with a backbone water and wastewater system capable of supplying critical community needs.

Left: These high voltage electrical transmission towers are built on a river bank in the Critical Energy Infrastructure (CEI) Hub susceptible to lateral spreading. (DOGAMI photo)

Right: Structural damage to a high voltage transmission tower located at a river crossing in 2010 Chile earthquake (ASCE Technical Council on Lifeline Earthquake Engineering – TCLEE)

Key Findings

Oregon is far from resilient to the impacts of a great Cascadia earthquake and tsunami today. Available studies estimate fatalities ranging from 1,250 to more than 10,000 due to the combined effects of earthquake and tsunami, tens of thousands of buildings destroyed or damaged so extensively that they will require months to years of repair, tens of thousands of displaced households, more than $30 billion in direct and indirect economic losses (close to one-fifth of Oregon's gross state product), and more than one million dump truck loads of debris.

A particular vulnerability is Oregon's liquid fuel supply. Oregon depends on liquid fuels transported into the state from Washington State, which is also vulnerable to a Cascadia earthquake and tsunami. Once here, fuels are stored temporarily at Oregon's critical energy infrastructure hub, a six-mile stretch of the lower Willamette River where industrial facilities occupy liquefiable riverside soils. Disrupting the transportation, storage, and distribution of liquid fuels would rapidly disrupt most, if not all, sectors of the economy critical to emergency response and economic recovery.

- After the February 27, 2010 M8.8 Maule Earthquake, Chile was able to restore 90% communication services and 95% power supply within two weeks, and re-start commercial flights after ten days.
- After the March 11, 2011 M9.0 Tohoku Earthquake, Japan was able to restore more than 90% power supply in ten days, 90% telephone lines in two weeks, and 90% cellular base stations in 19 days.

Business continuity planning typically assumes a period of two weeks to be the longest disruption of essential services (*i.e.*, utilities, communications, etc.) that a business can withstand, and service disruptions lasting for one month or longer can be enough to force a business to close, relocate, or leave the state entirely. Analysis in the *Oregon Resilience Plan* reveals the following timeframes for service recovery under present conditions:

Critical Service	Zone	Estimated Time to Restore Service
Electricity	Valley	1 to 3 months
Electricity	Coast	3 to 6 months
Police and fire stations	Valley	2 to 4 months
Drinking water and sewer	Valley	1 month to 1 year
Drinking water and sewer	Coast	1 to 3 years
Top-priority highways (partial restoration)	Valley	6 to 12 months
Healthcare facilities	Valley	18 months
Healthcare facilities	Coast	3 years

Resilience gaps of this magnitude reveal a harsh truth: a policy of business as usual implies a post-earthquake future that could consist of decades of economic and population decline – in effect, a "lost generation" that will devastate our state and ripple beyond Oregon to affect the regional and national economy.

Recommendations

Based on the findings in this *Oregon Resilience Plan*, OSSPAC recommends that Oregon start now on a sustained program to reduce our vulnerability and shorten our recovery time to achieve resilience before the next Cascadia earthquake inevitably strikes our state.

OSSPAC urges systematic efforts to assess the Oregon's buildings, lifelines, and social systems, and to develop a sustained program of replacement, retrofit, and redesign to make Oregon resilient.

Sector-by-sector findings and detailed recommendations are presented in each chapter of the *Oregon Resilience Plan*. Overarching priorities, illustrated with examples selected from the chapters, include new efforts to:

1. Undertake **comprehensive assessments** of the key structures and systems that underpin Oregon's economy, including
   a. Completing a statewide inventory of critical buildings (those needed for emergency response and the provision of basic services to communities) in both public and private sectors (Chapter Four);
   b. Completing an updated inventory of the local agency, transit, port, and rail assets that assure access to school buildings and hospitals and could be used during emergencies (Chapter Five);
   c. Charging the Oregon Public Utility Commission to define criteria for seismic vulnerability assessments that can be applied by operating companies in the energy and information and communications sectors (Chapters Six and Seven); and
   d. Requiring all water and wastewater agencies to complete a seismic risk assessment and mitigation plan as part of periodic updates to facility plans (Chapter Eight).
2. Launch a sustained **program of capital investment** in Oregon's public structures, including
   a. Fully funding Oregon's Seismic Rehabilitation Grants Program for K-12 schools, community colleges, and emergency response facilities (Chapters Two and Four);
   b. Seismically upgrading lifeline transportation routes into and out of major business centers statewide by 2030 (Chapter Five); and
   c. Establishing a State Resilience Office to provide leadership, resources, advocacy, and expertise in implementing statewide resilience plans (Chapter Four).
3. Craft a **package of incentives** to engage Oregon's private sector in efforts to advance seismic resilience, including
   a. Developing a seismic rating system for new buildings to incentivize construction of buildings more resilient than building code compliance requires and to communicate seismic risk to the public (Chapters Two and Four);
   b. Tasking the Oregon Public Utilities Commission to provide oversight for seismic preparedness of the energy providers currently under its jurisdiction (Chapter Six); and
   c. Working with the hospitality industry to develop plans to assist visitors following a major earthquake and tsunami and to plan strategies to rebuild the tourism industry (Chapter Three).
4. **Update Oregon's public policies**, including
   a. Revising individual preparedness communications to specify preparation from the old standard of 72 hours to a minimum of two weeks, and possibly more (Chapters Two and Three);
   b. Developing a policy and standards for installation of temporary bridges following earthquake disruption (Chapter Five); and
   c. Adopting a two-tiered ratings system that indicates the number of hours/days that a citizen in a community can expect to wait before major relief arrives, and the number of days/months that a citizen can expect to wait before the community itself achieves 90 percent restoration of roads and municipal services (Chapter Two).

These and other recommendations may be refined and implemented via a combination of new legislation, regulations, administrative rules, budget priorities, and in consultation with private sector leaders as appropriate.

Looking Ahead

This *Oregon Resilience Plan* emphasizes the resilient physical infrastructure needed to support business and community continuity. The policy recommendations presented here, if implemented over the next 50 years, will enhance our infrastructure resilience, help preserve our communities, and protect our state economy.

This is a timeframe much longer than typical of government planning efforts. To affirm Oregon's commitment, OSSPAC needs to work with the Joint Ways & Means Committee of Oregon's Legislative Assembly to track and report on progress toward seismic resilience at the beginning of each legislative session, to keep the 50-year goal in view.

Local Oregon communities can use the framework and gap-analysis methodology developed by the *Oregon Resilience Plan* to conduct more refined assessments that consider local seismic and tsunami hazards, and develop community-specific recommendations to meet their response and recovery needs.

A Cascadia earthquake and tsunami will affect both Oregon and Washington. Both states share common challenges, among them the interstate bridges and the Columbia River navigation channel as well as the regional power grid and liquid fuel supply. In particular, Oregon gets almost one hundred percent of its liquid fuel from suppliers in Washington, delivered via pipeline and river. We believe that it would be beneficial for both states to work together at a regional level to address the common challenge of resilience to a region-wide seismic event.

OSSPAC recommends expanding future resilience planning efforts to include:

1. Community-level planning
2. Human resilience
3. Civic infrastructure
4. Joint regional planning with Washington State

With resilient physical infrastructure, a healthy population, and functioning government and civic infrastructure to provide services to those in need, Oregon will be ready to withstand a Cascadia earthquake and tsunami, and to expedite response and recovery efforts quickly.

Table of Contents — Full Report

2012-2013 Oregon Seismic Safety Policy Advisory Commission (OSSPAC) Members

CHAIR: Kent Yu - Structural Engineer Stakeholder, Degenkolb Engineers
VICE CHAIR: Jay Wilson - Public Member, Clackamas County Emergency Management
Deborah Boone - Representative, Legislative Assembly
Greg Ek-Collins - Oregon Department of Transportation
Carl Farrington - Multifamily Housing Stakeholder
Fred Girod - Senator, Legislative Assembly
David Holton - American Red Cross*
Francisco Ianni - American Red Cross
Ian Madin - Department of Geology and Mineral Industries

*Retired from the commission in June 2012.

Michael Mumaw - Local Government Stakeholder, Emergency Manager, City of Beaverton
Jay Raskin - Public Member, Ecola Architects
Althea Rizzo - Oregon Emergency Management
Richard Rogers - Building Codes Division
Stephen Lucker - Department of Land Conservation & Development
Susan Steward – Building Owners Stakeholder, BOMA
Mark Tyler - Schools Stakeholder
Bryce Ward – Banking Stakeholder, ECONorthwest
Stan Watters – Utilities Stakeholder, Port of Portland
Gerry Williams - Public Member, Construction & Engineering Management Research, Inc.
Bev Hall - OSSPAC Secretary, Oregon Emergency Management

Project Team and Acknowledgments

On behalf of my fellow OSSPAC Commissioners, I want to thank several individuals whose vision and support have made our resilience planning work possible. First and foremost, we thank our colleague Rep. Deborah Boone, who introduced House Resolution 3 and won the unanimous support of her colleagues on April 18, 2011. We are also grateful to Governor John Kitzhaber, who encouraged OSSPAC's efforts on resilience, and to President Barack Obama's Senior Director for Resilience Richard Reed, who took the time to express his support for the preparation of Oregon's resilience plan.

We are very grateful to members of the project Steering Committee, who have offered their advice, counsel, and support at every stage of our work: **Jay Wilson** (Vice Chair)**, Ian Madin, Dr. Althea Rizzo, and Stan Watters**.

We appreciate the commitment of our Advisory Panel, whose members participated in meetings on January 26th, 2012 and October 5th, 2012 and have made themselves available for informal consultation over the past year: **Prof. Scott Ashford, Sen. Lee Beyer, Sen. Peter Courtney, Ed Dennis, JR Gonzalez, Prof. Chris Goldfinger, Dave Harlan, Onno Husing, Bruce Johnson, Dr. Leon Kempner, Jr., Prof. Andre LeDuc, Dr. Vicki McConnell, Dr. Jean O'Connor, Cameron Smith, Jeffrey Soulages, Yumei Wang, Edward Wolf, and Dr. Nate Wood**. In particular, we want to thank Dr. Vicki McConnell, Yumei Wang and Edward Wolf for their guidance and support.

We owe the creation of the *Oregon Resilience Plan* to diligent efforts by our eight Task Groups and the capable leadership and project management performed by our Task Group leaders, who may not have fully realized the magnitude of the project when they agreed to serve:

Earthquake and Tsunami Scenario Task Group: ***Ian Madin*** (Chair), Bill Burns, Art Frankel, Chris Goldfinger, Matthew Mabey, George Priest, Yumei Wang, and Ivan Wong.

Business and Work Force Task Group: ***Susan Steward*** (Co-Chair), ***Gerry Williams*** (Co-Chair), Lori Chamberlain, Patrick Estenes, Kelley Okolita, Patrick Slabe, Bert Sorio, Jeffrey Soulages, Rick Van Dyke, and Bryce Ward.

Coastal Communities Task Group: ***Jay Wilson*** (Co-Chair), ***Jay Raskin*** (Co-Chair),Jacque Betz, Rep. Deborah Boone, Josh Bruce, Lori Christiansen,Charlie Davis, Sue Graves, Dave Harlan, Jeffrey Hepler, Maggie Kirby, Sen. Jeff Kruse, Margo Lalich, Jack Lenox, Gary Milliman, Sam Steidel, Wayne Stinson, and Laren Woolley.

Critical Buildings Task Group: ***Ed Quesenberry*** (Co-Chair), ***Trent Nagele*** (Co-Chair), Andre Barbosa, David Bugni, Ed Dennis, Kimberly Dills, Shane Downing, Shelly Duquette, Jennifer Eggers, Joe Gehlen, Tonya Halog, Robert Johnson, Kevin Kaplan, Amit Kumar, Dominic Matteri, Anne Monnier, Willy Paul, Josh Richards, Tim Rippey, Richard Rogers, Terry Shugrue, Jason Thompson, Mark Tobin, Jim Weston, Michael Wieber, and Edward Wolf.

Transportation Task Group: ***Bruce Johnson*** (Chair), Martin Callery, Lieutenant Meredith Condon, Chris Corich, Peter Duskica, Greg Ek-Collins, Herb Florer, Doug Grafe, Elsie Hamner, Chuck Hutto, Doug Kirkpatrick, Jeff Langstrom, Lee Lazaro, Mark Libby, Matt Maass, Bob Melbo, Nason McCullough, Curran Mohney, Lucy Moore, Nancy Murphy, Albert Nako, David Neys, David Olongiagh, Jeff Olson, Jon Oshel, Tom Peterson, Craig Shike, Craig Totten, Tom Wharton, John Wilson, and Holly Winston.

Energy Task Group: ***JR Gonzalez*** (Co-Chair), ***Stan Watters*** (Co-Chair), Heide Caswell, Rick Carter, Brian Doherty, Michael Dougherty, Del Draper, Dave Ford, Debbie Guerra, Teresa Hagins, Marion Haynes, Leon Kempner, Jr., Brian Knight, Lori Koho, Christy Munro, Bruce Paskett, Robbie Roberts, Dave Stuckey, Jack Vranish, Yumei Wang, Tashiana Wanger, and Grant M. Yoshihara.

Information and Communications Task Group: ***Mike Mumaw*** (Chair), Rick Carter, Michael Dougherty, Walter Duddington, JR Gonzalez, Alexis Kwasinki, Devon Lumbard, Kelley Stember, Alex Tang, Yumei Wang, Stan Watters, and Geoffery Williams.

Water and Waste Water Task Group: ***Mike Stuhr*** (Co-Chair), ***Mark Knudson*** (Co-Chair), Don Ballantyne, Steve Behrandt, James Bela, Andy Braun, Scott Burns, Mel Damewood, Jim Doane, Michael Doane, Tom Hickman, Gary Irwin, Gwynne Johnson, Jeff Leighton, Arturo Leon, Ian Madin, Jim Male, Jim Newell, Bob Patterson, Sherry Patterson, Todd Perimon, Brad Phelps, Jeff Rubin, Rob Schab, Ken Schlegel, Brian Stahl, and Jeffrey Winchester.

Dr. Kyra L. Nourse compiled and edited the *Oregon Resilience Plan*, with assistance from my OSSPAC colleagues Dr. Althea Rizzo, Jay Wilson, Ian Madin, Bev Hall and from Edward Wolf. We are grateful to FEMA for financial support, through a grant administered by Oregon Emergency Management, for the technical editing of the plan.

The Port of Portland hosted our workshops on January 26, 2012 and October 5, 2012 in its headquarter building. We want to thank Michelle Walker for her planning and coordination to make the workshops successful. Cascadia Region Earthquake Workgroup (CREW) provided their endorsement for our resilience planning efforts, and also helped sponsor our January 26, 2012 workshop. We want to thank Cale Ash (then President of CREW) and John Schelling (Washington State Emergency Management) for their participation and for sharing their resilience planning experience with us.

On a personal note, I wish to thank my colleagues at Degenkolb Engineers, particularly Chris Poland in San Francisco and Stacy Bartoletti in Seattle, for their inspiration on resilience, and colleagues in our Portland office including Liz Francis and Karla Richards who helped me to manage my resilience plan responsibilities without leaving my other professional obligations too far behind.

Finally, I want to acknowledge the leadership of OSSPAC's Vice Chair Jay Wilson, who has in every respect been a full partner in the vision and execution of the *Oregon Resilience Plan*, and who is a great champion for resilience.

Many other individuals have generously shared their expertise and perspective with us during the creation of this plan. OSSPAC bears the sole responsibility for any errors or omissions it contains.

Kent Yu, Ph.D.
Chairman, Oregon Seismic Safety Policy Advisory Commission
Portland, Oregon
January 2013

Note: The ***full Oregon Resilience Plan report*** *is available online at the Oregon Office of Emergency Management website:* http://www.oregon.gov/OMD/OEM/Pages/index.aspx

Seismic Risk Assessment and Mitigation Plan

Frequently Asked Questions

Oregon Health Authority Drinking Water Services

1. Why do community water systems with more than 300 connections need to conduct a seismic risk assessment and mitigation plan?

   The Oregon Resilience Plan was developed in 2013 and provides the state's road map for earthquake preparedness. The goal is to identify critical infrastructure needed to supply water during an emergency, and identify projects to be completed in the next 50 years to ensure that piped water can be provided in the event of a strong earthquake. The plan and related information can be found at www.oregon.gov/gov/policy/orr. Water supply infrastructure is addressed in Section 8 beginning on page 203.

2. Which systems need to submit a seismic risk assessment and mitigation plan?

   Every community water system with more than 300 connections that intends to submit a master plan after January 10, 2018 is required to conduct a seismic risk assessment and mitigation plan if any of their facilities are located in Areas VII through X of Plate 7. Plate 7 is available at http://www.oregon.gov/oha/PH/HEALTHYENVIRONMENTS/DRINKINGWATER/PLANREVIEW/Documents/seismic-map.pdf.

3. What must be included in a seismic risk assessment?

   The seismic risk assessment must identify critical facilities needed to supply key community needs, including at a minimum: fire suppression, essential health care and first aid, emergency response, and drinking water supply points. The result would be a list of infrastructure backbone components including supply, treatment, distribution, and storage elements that are needed in order to continue to supply water for essential community needs immediately after a Cascadia subduction zone earthquake.

   The assessment must also evaluate the likelihood and consequences of seismic failures for each facility identified as critical. General information for assessing various facilities by construction date and material can be found in the Oregon Resiliency Plan, which also references the American Lifelines Alliance (2001) Seismic Fragility Formulations for Water Systems, www.americanlifelinesalliance.org.

4. What must be included in the mitigation plan?

   Based on the critical facilities identified to form the backbone, the mitigation plan consists of projects that will be completed over the next 50-year time period to upgrade, retrofit, or rebuild these facilities so that they will continue to provide water following a Cascadia subduction zone earthquake. The mitigations would include planned capital improvement projects, upgrades to minimize water loss from each critical facility, or recommendations for further study or analysis. The mitigation plan must also include a schedule as to when these mitigation efforts will be completed, within the 50 year planning horizon.

5. Are other formats of Plate 7 available?

   Yes. Labels in pdf files (such as city names) can be turned off on the toolbar on the left hand side of the Adobe Acrobat Reader screen.

   GIS files can be downloaded at http://www.oregongeology.org/pubs/ofr/p-O-13-06.htm. Under Publication Preview, click on "Download zip file (1.85 GB). Refer to "Read me" file for instructions. Open the Appendix folder. Click on the .rar file (a zip utility such as WinZip is needed to open this GIS data file). The GIS layer for Plate 7 is "Oregon_M_9_Scenario_Site_PGV." This file has the raw data and will need to be classified into the Mercalli rankings as shown on Plate 7. Remember that the Area X category includes the tsunami inundation zone.

6. Is any funding available to assist in development of this assessment and plan?

   After July 1, 2018, systems serving 3,300 connections or less will be eligible for up to $20,000 from the Drinking Water State Revolving Fund to complete the seismic risk assessment and mitigation plan. Funds will be awarded on a first-come, first-serve basis with submittal of a Letter of Interest. Funds cannot be used for mitigation activities (design or construction).

7. Are there additional technical resources to help develop the seismic risk assessment and mitigation plan?

   Yes. Technical resources have been compiled in a document located at http://www.oregon.gov/oha/PH/HEALTHYENVIRONMENTS/DRINKINGWATER/PLANREVIEW/Documents/seismic-references.pdf.

For more information, contact Drinking Water Services at 971-673-0405

APPENDIX C
Water System Sanitary Survey

CENTER FOR HEALTH PROTECTION
Drinking Water Services
John A. Kitzhaber, MD, Governor

Oregon Health Authority

800 NE Oregon Street, Suite #640
Portland, OR 97232-2162
(971) 673-0405
(971) 673-0694 – FAX
(971) 673-0372 – TTY

July 22, 2014

RECEIVED
JUL 23 2014
FIELD SERVICES
DRINKING WATER PROGRAM

Patrick Goehring
City of Prineville
387 NE 3rd Street
Prineville, OR 97754

SDWIS
JUL 31 2014

Re: City of Prineville – 2014 Water System Survey (PWS #4100682)

Dear Mr. Goehring:

I would like to thank you and Jan Dobson for assisting with the water system survey on June 4, 2014. The purpose of the survey is to evaluate the entire water system in terms of supplying safe drinking water to the public. A copy of the report is enclosed for your records. Please let me know if corrections need to be made.

While the water system facilities were found to be well operated and maintained, significant deficiencies were identified during the survey. The first page of the report lists the significant deficiencies. Please notify Drinking Water Services (DWS) by August 22, 2014 with a plan of how the deficiencies will be corrected. **Deficiencies must be corrected by November 18, 2014, or be on an approved corrective action schedule.**

If the water system fails to take action within the required time frame, notification must be provided to all persons served by the water system. A repeat public notice will be required every three months until all deficiencies are corrected or the water system is in compliance with an approved corrective action plan.

The significant deficiencies are described below.

1. **Sanitary seal and casing not watertight.**
    a. Seal hole on the sounding tube for Barney Well (survey photo 2).
    b. Seal hole covered with black tape on concrete pad for Stearns Well (survey photo 24).
    c. Seal gap where power cable enters the 4th Street Deep Well and spaces between pump platform and concrete pad (survey photos 8 & 10). Seal around down-hole chlorination tubing into well and improve cover on opening for measuring water level (survey photo 9).
    d. Seal openings into Ochoco Heights Well (survey photo 12).
    e. Seal opening on well with tubing and hole in concrete pad for Yancey Well. Seal hole on pump platform (see survey photos 15 & 16).
    f. Improve seals on old down-hole chlorination openings for Yancey and Lamonta wells (survey photo 17).

2. **Does not meet setbacks from hazards.**
   a. The unused well within the 100-foot setback of the Stadium Well is not allowed because its construction is unknown (see survey photo 6). The city will need to provide documentation that the well meets construction standards.
   b. Remove paint stored in Airport Well 2, Lamonta Well and Ochoco Heights Well buildings (survey photo 20).
3. **Chlorine not measured and recorded as required.** Although free chlorine residual is measured most days, it must be recorded in a log book.

Please see the following comments:

1. During the survey we discussed the city's plans to discontinue practice of down-hole well chlorination. This is a good modification to allow raw water sample collection without turning off chlorination equipment and purging water from the well.

2. If the city discontinues use of the Ochoco Heights Well, it should be physically disconnected from the water system to reduce the risk of potential contamination.

3. The South 4th Street Shallow well has not been used since 2010. This well constructed in 1950 is not adequately sealed to protect from surface contamination. Since the well is within the setback for the South 4th Street Deep Well the potential for contamination increases. I recommend evaluating abandoning this well as a source water protection measure. For information on well abandonment contact the Water Resources Department.

4. At the time of the survey, I was unable to inspect the hatches and vents for the Barnes Butte and Ochoco Heights Reservoirs. At your earliest convenience, provide pictures showing the condition of the vents and hatches and to confirm the hatches are locked.

5. The vegetation around the overflow pipe/flap valve for the Ochoco Heights Reservoirs should be removed to improve access during visual inspections (survey Photo 14).

6. Occasionally, low or no chlorine residual occurs in the downtown area near city hall possibly due to flow conditions or older piping. This issue needs to be evaluated to ensure chlorine residual is detected in all areas of the distribution system.

7. A summary of the chemical monitoring requirements can be found on pages 13-14 of the survey report. The monitoring frequency for arsenic at the Stearns, Lamonta, Yancey, and Airport entry points have been reduced to once every nine years. Please review all chemical schedules available at the following link: https://yourwater.oregon.gov/schedule_status.php?pwsno=00682.

8. The DWS 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 three years to every five years. Even though the water system did not meet the established criteria, please review the enclosed handout to see what steps you can take in the future towards receiving this designation.

Thank you again for your assistance. If you have questions, comments or need this information in an alternate format, please contact me at (971) 673-0425.

Sincerely,

Michelle Byrd

Michelle Byrd, REHS
Drinking Water Specialist

Encl: Survey report and handout

cc: OHA-DWS – Pendleton Office
Max Hamblin – Crook County Environment Health *(electronic copy)*

Deficiency Summary

Surveyor: Michelle Byrd

Date Corrective Action Plan is due: ______________ **County:** Crook

Yes	No	Significant Deficiencies and Rule Violations:	Date to be corrected	Date corrected
☒	☐	**Source:**		
		Well construction:		
		Seal openings on sounding tube for Barnes Well.		
		Seal opening on concrete pad for Stearns Well.		
		Seal old chlorine injection point for 4th Street Deep Well, and seal gap between pump platform & concrete pad.		
		Seal openings into Ochoco Heights Well.		
		Seal holes on well & concrete pad for Yancey Well.		
		Unused old well of unknown construction within 100 foot setback of Stadium well.		
		Remove paint stored in Lamonta, Ochoco Heights and Airport well buildings.		
		Improve seals on old down-hole chlorination openings for Yancey and Lamonta wells		
☐	☒	**Treatment:**		
		Surface water treatment:		
		N/A		
		Disinfection:		
☐	☒	**Finished Water Storage:**		
☒	☐	**Distribution:**		
		Chlorine not recorded when measured at least twice per week		
☐	☒	**Monitoring:**		
☐	☒	**Management & Operations:**		
☐	☒	**Operator Certification:**		
☐	☒	**Other Rule Violations:**		

Comments:

☒ **Source Deficiencies**:

Well Construction Deficiencies (OAR 333-061-0076):

- ☒⊕ 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 (OAR 333-061-0076):

- ☐⊕ 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)
- ☐⊕ Incorrect location for compliance 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: No pressure gauges before and after cartridge filter
- ☐⊕ For diatomaceous earth filtration: Body feed not added with influent flow
- ☐+ For membrane filtration: Turbidimeter not present on each unit-0050(4)(c)(G)
- ☐+ For membrane filtration: Direct integrity testing not done at least daily-0036(5)(b)(F)

Disinfection Deficiencies/Violations:

- ☐+ DPD or EPA approved method not used-0036(9).
- ☐+ Free chlorine residual not maintained-0032(3/5)
- ☒+ Chlorine not measured & recorded as required-0036(9)
- ☐+ Minimum CT requirement 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
- ☐+ Annual raw water sampling past due-0036(6)(w)

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
- ☐+ Annual raw water sampling past due-0036(6)(w)

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)
- ☐+ MCL violations-0030
- ☐+ No Coliform Sampling Plan-0036(6)(b)(G)

☐ **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 submitted (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(5).

☐ **Other Rule Violations:** ______

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

Inventory and Narrative

☐ **Outstanding Performer** **County:** Crook

Type	Status	Size	Season
☒ Community (C)	Population:	9,245	☒ All year ☐ Seasonal
☐ Non Transient Non-Community (NTNC)	Connections:	3,283	Begins: (mm/dd) /
	Service Chars:	MU	Ends: (mm/dd) /
☐ Transient Non-Community (TNC)	Ownership:	4	**Coliform Sampling**
☐ State Reg/Non EPA (NP)	**License**		**Period:** ☒ Monthly ☐ Quarterly
	☒ Not Lic ☐ HD ☐ Ag		Samples Required: 10

Operator Certification Required			Responsible Agency
WD 2	WT	FE ☐ Small WS ☐	☒ State ☐ County ☐ Dept of Agriculture

Primary Administrative Contact (Mailing Address):

Contact Name: Patrick Goehring Phone: (541) 447-5627 (City Hall)
Title: Public Works Superintendent Cell: (541) 408-2437
Street Address: 387 NE 3rd Street Emergency #: ( )
City/State/Zip: Prineville, OR 97754 Email: pgoehring@cityofprineville.com

Legal/Owner Address:

Contact Name: Jan Dobson Phone: ( )
Title: Administration Technician Cell: (541) 233-6199
Street Address: 1233 NW Lamonta Rd (Public Works) Emergency #: ( )
City/State/Zip: Prineville, OR 97754 Email: jdobson@cityofprineville.com

System Physical Address:

Contact Name: Phone: ( )
Title: Cell: ( )
Street Address: Emergency #: ( )
City/State/Zip: Email:

Emergency Systems Available:

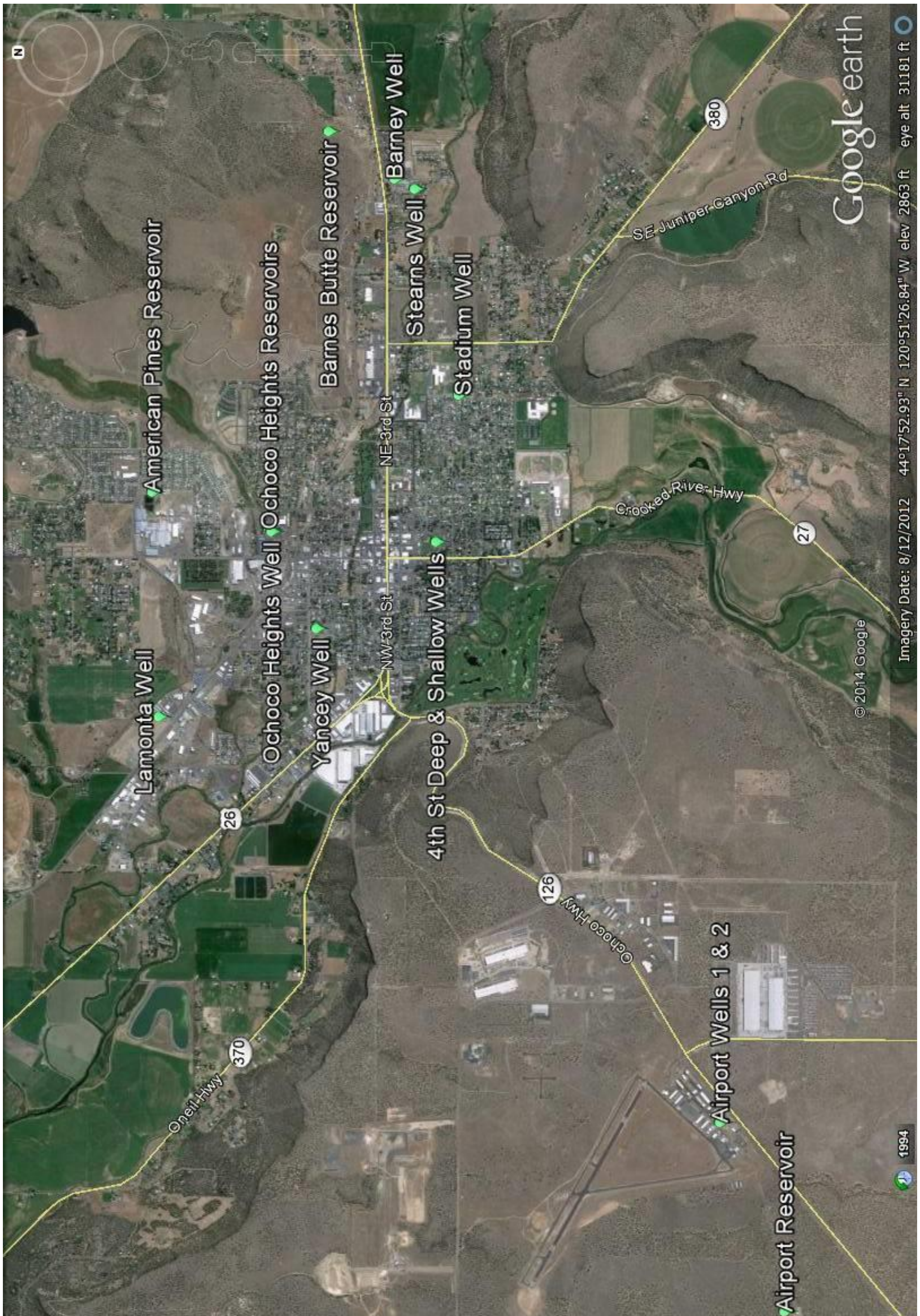
Name: None **PWS ID#:** 41

Narrative:

The city has ten wells located within the service area and at the airport. Two wells (i.e., 4th Street Shallow, Ochoco Heights are available for emergency. Two new wells located at the airport are under construction. Well water is disinfected to maintain free chlorine residual in the distribution system. There are five finished water reservoirs with a storage capacity of about 3.5 million gallons. An additional 1 million gallon storage reservoir is under construction next to the existing airport reservoir. There are over 40 miles of distribution piping with six pressure zones. Estimated daily water use is about 830,000 gallons during winter months and up to about 2.8 million gallons during the peak summer demand.

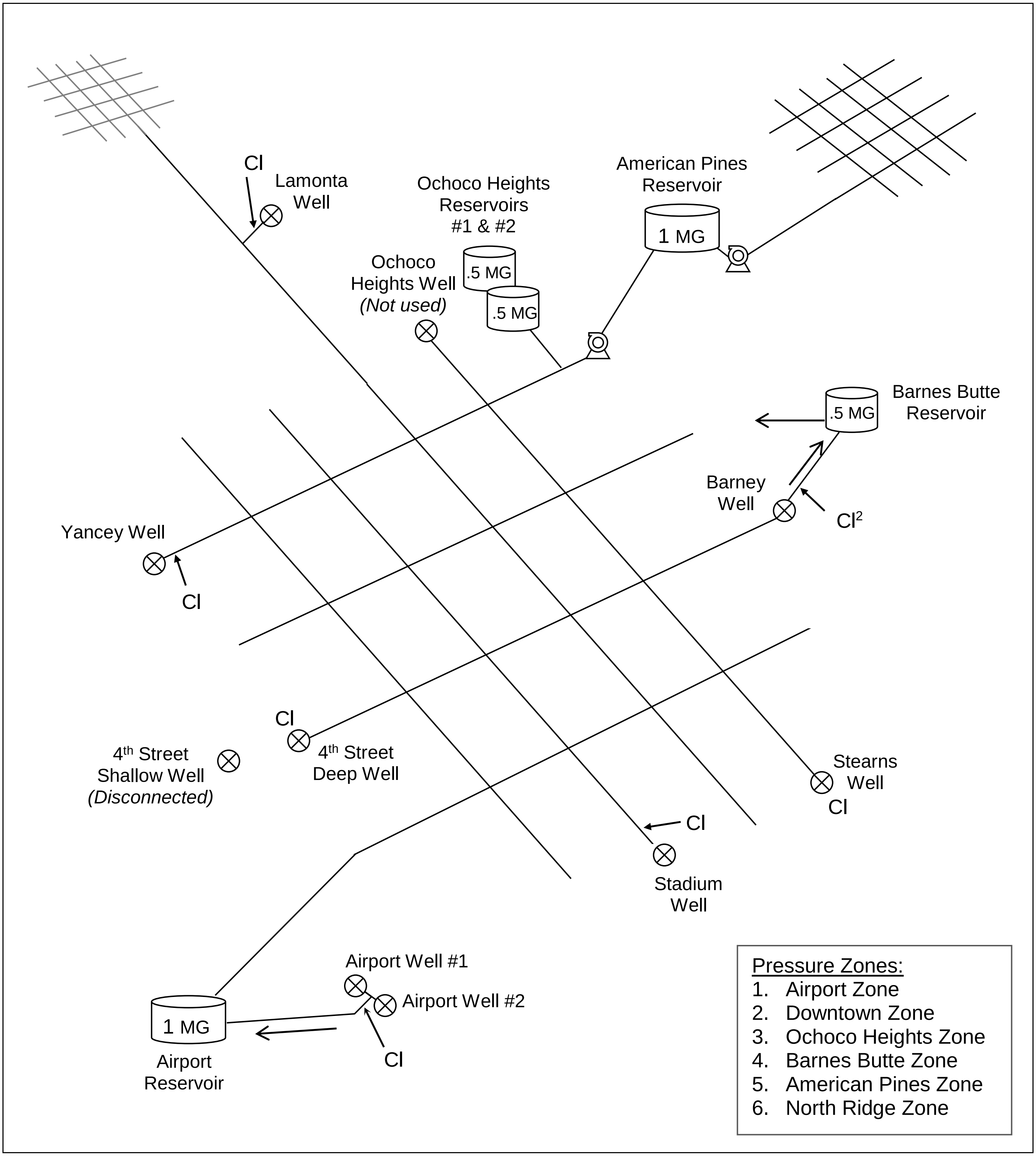
Patrick Goehring and Jan Dobson provided assistance during the survey.

Water System Map



Map Source: Google earth

Water System Schematic



Source Information

ID	Entry Points	Source Type					Availability				Treatment		
ID	(Location where water enters distribution and is sampled) Name	Ground	FORMCHEC KBOX	GWUDI	Pur. ground	Pur. surface	Permanent	Seasonal	Begins	Ends	FORMCHEC KBOX	FORMCHEC KBOX	Treatment Codes**
A	EP for Stearns Well	☒	☐	☐	☐	☐	☒	☐			☐	☐	X421
B	EP for S 4th St Deep Well	☒	☐	☐	☐	☐	☐	☒			☐	☐	X421
C	EP for Lamonta Well	☒	☐	☐	☐	☐	☐	☒			☐	☐	X421
D	EP for Yancey Well	☒	☐	☐	☐	☐	☐	☒			☐	☐	X421
E	EP for S 4th St Shallow Well	☒	☐	☐	☐	☐	☐	☐			☒	☒	-
F	EP for Stadium Well	☒	☐	☐	☐	☐	☐	☒			☐	☐	X421
G	EP for Airport Wells	☒	☐	☐	☐	☐	☒	☐			☐	☐	X401
H	EP for Barney Well	☒	☐	☐	☐	☐	☒	☐			☐	☐	X421
I	EP for Ochoco Heights Well	☒	☐	☐	☐	☐	☐	☐			☒	☒	-

ID	Individual Sources			Source Type					Availability						Treatment
ID	(Contributing to Entry Point) Name	FORMCHEC KBOX *Land Use	Capacity (GPM)	Ground	Surface	GWUDI	Pur. ground	Pur. surface	Permanent	Seasonal	Emergency	Abandoned	Disconnected	None	Treatment Codes**
AA	Stearns Well	G	300	☒	☐	☐	☐	☐	☒	☐	☐	☐	☐	☐	
BA	South 4th St Deep Well	G	220	☒	☐	☐	☐	☐	☐	☒	☐	☐	☐	☐	
CA	Lamonta Well	G, E	215	☒	☐	☐	☐	☐	☐	☒	☐	☐	☐	☐	
DA	Yancey Well	G, E	200	☒	☐	☐	☐	☐	☐	☒	☐	☐	☐	☐	
EA	South 4th St Shallow Well	G	130	☒	☐	☐	☐	☐	☐	☐	☒	☐	☐	☐	
FA	Stadium Well	G	210	☒	☐	☐	☐	☐	☐	☒	☐	☐	☐	☐	
GA	Airport Well #1	G, E	265	☒	☐	☐	☐	☐	☒	☐	☐	☐	☐	☐	
GB	Airport Well #2	G, E	750	☒	☐	☐	☐	☐	☒	☐	☐	☐	☐	☐	
HA	Barney Well	G, J	350	☒	☐	☐	☐	☐	☒	☐	☐	☐	☐	☐	
IA	Ochoco Heights Well	G	315	☒	☐	☐	☐	☐	☐	☐	☒	☐	☐	☐	

*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**
**See "Treatment" page for treatment code descriptions.

List current operational patterns for all sources (e.g., Well 1 used continuously @ 100 gpm. Be as specific as possible)

The Stearns (EP-A) and Barney (EP-H) are active in use 100 percent of the time. The South 4th St Deep Well is ran approximately 50-60 percent of the time, with remaining wells operating on a rotation schedule depending on system demand or maintenance requirements.

Source Information

Yes No

- ☒ ☐ Does the water system have water rights for all sources? ☐ Not Required G15974, G605, G12541, G13280, G11993, G16879, 86889, 86558, 87714, 87724
- ☐ ☒ For GW systems, have there been any modifications to the existing well(s) or spring(s) (e.g. deepened, change in screened interval, springbox reconstruction, etc.)? Describe below:
- ☒ ☐ Has a Source Water Assessment been completed by ☒ DWP or ☐ DEQ? If yes, attach delineation map and review boundaries with operator.
- ☒ ☐ Has system implemented source water protection strategies? If yes, describe below:
  Working with GSI on draft protection plan (Bruce Brody)
- ☐ ☐ Is the water system interested in source water protection? If yes, contact regional geologist at 541-726-2587.

Comments:

- Lamonta doing quarterly monitoring due to elevated nitrate.
- Ochoco Heights Well (SRC-IA) cannot be used due to cavitation. City is planning to remove booster station, old well and construct a storage reservoir at the Ochoco Heights site.

Well Information

		AA		BA		CA		DA		EA		FA	
	Source ID#:	AA		BA		CA		DA		EA		FA	
	Source Name:	Stearns		4th St Deep		Lamonta		Yancey		4th St Shallow		Stadium	
	Well Tag ID (e.g. L12345): L	-		-		-		-		-		-	
	(if no well tag ID, enter WRD Well Log ID below)	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
	Well Log on File:	☒	☐	☒	☐	☒	☐	☒	☐	☒	☐	☒	☐
	WRD Well Log ID (e.g. COLU123):	CROO2083		CROO2121		CROO1540		CROO50181		CROO2130		CROO184	
Wellhead Construction	Well still active	☒	☐	☒	☐	☒	☐	☒	☐	☐	☒	☒	☐
	Depth of well (ft.)	246		252		256		228		75		263	
	Depth of grout seal (ft.)	75		40		15		unk		unk		225	
	Year of installation (yr.)	1973		1960		1957		1917		1950		1987	
	Casing diameter (in.)	24/12		24/12		24/12		8		10		16/12/8	
	• Sanitary seal & casing watertight	☐	☒[1]	☐	☒[2]	☒	☐	☐	☒[5]	☐	☐	☒	☐
	• If vented, properly screened	~~☐~~	~~☐~~	~~☐~~	~~☐~~	☒	☐	☐	☒	Physically Disconnected		☒	☐
	• Wellhead protected from flooding	☒	☐	☒	☐	☒	☐	☒	☐			☒	☐
	• Well meets setbacks from hazards	☒	☐	☐	☒[3]	☐	☒[4]	☒	☐			☐	☒[6]
	Nearest hazard (ft)			70 ft								35 ft	
	Water level device	☒	☐	☒	☐	☒	☐	☒	☐			☒	☐
	Concrete slab around casing	☒	☐	☒	☐	☒	☐	☒	☐			☐	☒
	Casing height ≥ 12-in. above slab/grade	☒	☐	☒	☐	☒	☐	☒	☐			☒	☐
	Pitless adapter	☐	☒	☐	☒	☐	☒	☐	☒			☒	☐
	Constructed properly per SWA report	☐	☒	☐	☒	☐	☒	☐	☒			☒	☐
Control Building	Protective housing	☒	☐	☒	☐	☒	☐	☒	☐			☒	☐
	Flowmeter	☒	☐	☒	☐	☒	☐	☒	☐			☒	☐
	Pressure gauge	☒	☐	☒	☐	☒	☐	☒	☐			☒	☐
	Pump to waste piping	☒	☐	☒	☐	☒	☐	☒	☐			☒	☐
	• Raw sample tap	☒	☐	☒	☐	☒	☐	☒	☐			☒	☐
	• Treated sample tap ☐ N/A	☒	☐	☒	☐	☒	☐	☒	☐			☒	☐
	Heated	☒	☐	☒	☐	☒	☐	☒	☐			☒	☐
	Lighted	☒	☐	☒	☐	☒	☐	☒	☐	☐	☐	☒	☐
	Floor drain	☐	☒	☒	☐	☐	☒	☒	☐	☐	☐	☒	☐
	Well pump removal provision	☒	☐	☒	☐	☒	☐	☒	☐	☐	☐	☒	☐
Pump	Pump type*	VT/75		SU/50		VT/50		VT/40		SU/20		SU/40	
	Bearing lubrication (FG oil/water)	W		W		W		W		W		W	
	Pumping capacity (gpm)	250		220		215		200		130		210	
	Amount of water pumped per year (gallons)	187,954,120		23,584,350		26,202,100		39,056,100		-		20,990,700	
	Percent of total well supply provided (%) **	36%		4.6%		5.1%		7.6%		-		4.1%	
	Static water level (ft below ground surface)	164.85		24.04		49.28		11.00		-		32.62	
	Static water level date	3/28/11		3/28/11		3/28/11		3/28/11		-		3/28/11	

*** Pump Types:** (VT) Vertical Turbine (SU) Submersible (CE) Centrifugal (SJ) Shallow Jet (DJ) Deep Jet (OT) Other

** The sum of the % for all the wells should equal 100% (e.g. for 2 wells, if well #1 provides 80%, then well #2 must provide 20%).

Comments: [1] Seal opening covered with duct tape on concrete pad for Stearns Well. [2] Seal old chlorine injection hole into wellhead and seal gap between pump platform and concrete pad. [3] 4th Street Shallow Well within setback for 4th Street Deep Well. [4] Remove paint stored in Lamonta Well building. [5] Seal holes on well & concrete pad, and seal/screen tubing. [6] Unused well with unknown construction (L82809) within setback for Stadium Well.

2013 water use data obtained from Oregon Water Resources Department website.

Well Information

Source ID#:	GA		GB		HA		IA					
Source Name:	Airport 1		Airport 2		Barney		Ochoco					
Well Tag ID (e.g. L12345): **L**	105198		89932		-		-					
(if no well tag ID, enter WRD Well Log ID below)	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**
Well Log on File:	X		X		X		X					
WRD Well Log ID (e.g. COLU123):	CROO1894		CROO53453		CROO3132		CROO1577					
Wellhead Construction												
Well still active	X		X		X			X [3]				
Depth of well (ft.)	575		546		280		1002					
Depth of grout seal (ft.)	25		112		207		unk					
Year of installation (yr.)	1980/2011		2007		1994		1943					
Casing diameter (in.)	8		16		10		12					
• Sanitary seal & casing watertight	X		X [4]			X [2]		X				
• If vented, properly screened	X		X		~~ ~~	~~ ~~	~~ ~~	~~ ~~				
• Wellhead protected from flooding	X		X		X		X					
• Well meets setbacks from hazards	X			X [1]	X			X [1]				
Nearest hazard (ft)												
Water level device	X		X		X		X					
Concrete slab around casing		X	X		X		X					
Casing height ≥ 12-in. above slab/grade	X		X		X		X					
Pitless adapter	X			X		X	unk	X				
Constructed properly per SWA report	X		X			X		X				
Control Building												
Protective housing		X	X		X		X					
Flowmeter	X		X		X		X					
Pressure gauge	X		X		X		X					
Pump to waste piping	X		X		X		X					
• Raw sample tap	X		X		X		X					
• Treated sample tap ☐N/A	X		X		X		X					
Heated	X		X		X		X					
Lighted	X		X		X		X					
Floor drain		X		X		X	X					
Well pump removal provision	X		X		X		X					
Pump												
Pump type*	SU/60		VT/150		SU/50		SU/40					
Bearing lubrication (FG oil/water)	W		FG Oil		W		W					
Pumping capacity (gpm)	270		685		440		300					
Amount of water pumped per year	222,466,504				***		-					
Percent of total well supply provided (%)	43%						-					
Static water level (ft below ground	424.36		429.00		130.55		66.98					
Static water level date	3/28/11		3/28/11		3/28/11		3/28/11					

*** Pump Types:** (VT) Vertical Turbine (SU) Submersible (CE) Centrifugal (SJ) Shallow Jet (DJ) Deep Jet (OT) Other
** The sum of the % for all the wells should equal 100% (e.g. for 2 wells, if well #1 provides 80%, then well #2 must provide 20%).

Comments: [1]Remove paint stored in Ochoco Heights and Airport well buildings. [2]Seal hole on sounding tube for Barney Well. [3] Ochoco Heights Well inoperable & connected to water system. [4] Recommend sealing around pump platform and concrete pad on Airport 2 well.

*** 2013 water use data combined with Stearns Well (http://apps.wrd.state.or.us/apps/wr/wateruse_report/)

Disinfection

No #	Disinfection Method*	Location	Disinfection Source Water	Residual Maintenance	Other Purpose	Proportional to Flow	Dosage Recorded
	Calcium Hypochlorite	Stearns, So. 4th St Deep wells (down hole)	☐	☒		☐	☐
	Calcium Hypochlorite	Lamonta, Yancey, Stadium, Barney wells	☐	☒		☒	☐
	Chlorine gas	Airport wells 1 & 2	☐	☒		☒	☐

*Chlorine Gas, Sodium Hypochlorite, On-site Generated Sodium Hypochlorite, Calcium Hypochlorite, Chloramines, Ozone, UV, Mixed-Oxidants, Other

Yes	No		Yes	No	
☒	☐	• Is a DPD or other EPA approved method used?	☒	☐	• NSF 60/61 certified (or equivalent)?
☐	☒	• Are residuals recorded as required?			

Distribution: ☒ ≥ 2x weekly # samples: _______ ☒ w/Coliform Other: __________

EP (SWTR & GWR Comp. Mon.): ☐ ≥ 1x Daily # samples: _______ ☐ Continuous if > 3300 pop ☐ N/A

Range of chlorine residuals at first user: mg/l = ______

☒ Yes ☐ No • Are raw water samples taken as required (GWR assessment monitoring, etc.)? ☐ N/A
How often? _______

Yes	No	**Chlorine gas** ☐ N/A	Yes	No	
☒	☐	Separate room for gas storage and feeder	☒	☐	Gas cylinders properly secured
☒	☐	Fan with on/off switch outside	☒	☐	Door that opens out
☒	☐	Vent located next to the floor	☒	☐	Self-contained breathing apparatus
☐	☒	Door with a window (Wall with window)	~~☐~~	~~☐~~	Air scrubber system

CT evaluation for disinfection ☒ N/A

Disinfection Requirement:
☐ (sw) 0.5 log inactivation Giardia ☐ (sw) 1.0 log inactivation Giardia
☐ (gw) 4.0 log inactivation viruses ☐ (sw) log inactivation Crypto: ______
☐ (gw) Minimum chlorine residual: ______ mg/l

Yes	No	
☐	☐	• Does the contact chamber have effluent flow meter or adequate alternative?
		If no, how is peak flow determined for CT calculations? ______
☐	☐	• Has a tracer study been conducted or adequate alternative? Tracer Study Date: ______
		Demand flow (gpm): ______ Baffling factor (%): ______
		Volume used (gal): ______ Results (min): ______
☐	☐	Adequate alternate method for contact time? Describe: ______

Peak hour demand flow over the past 12 months: gpm = ______
Lowest operating volume over the past 12 months: gallons = ______

Yes	No	
☐	☐	Are on-line chlorine analyzers verified weekly with DPD type or EPA approved test kit?
☐	☐	• (SW only) Are pH, temp, and chlorine residual measured daily before or at the first user?
☐	☐	• Are CT values being calculated correctly?
☐	☐	• Are CT values met at all times?

Comments: Accu-Tab dispensers (Models 3012, 2075P, 2000P) with calcium hypochlorite tablets. Continuous chlorination applied when well pumps are on. The Ochoco Heights Well inoperable-chlorine equipment not used. So. 4th St. Shallow and Deep wells on same discharge line. Chlorinated water from Deep Well blended with Shallow Well.
Downtown area near city hall occasionally experiences low or no chlorine residual due to flow conditions and old piping. Residual levels checked most days. **Measure at least twice per week** to verify chlorine residual throughout distribution system. **Maintain logbook** of chlorine residual measurements.

Storage and Pressure Tanks

Number	Name	Tank Type*	Tank Material	Year Built	Volume (gal.)
1	American Pines Reservoir	G	Welded Steel	2002	1,000,000
2	Ochoco Heights Reservoir 1	G	Welded Steel	1955	500,000
3	Ochoco Heights Reservoir 2	G	Welded Steel	1964	500,000
4	Barnes Butte Reservoir	G	Welded Steel	1978	500,000
5	Airport Reservoir	G	Welded Steel	1996	1,000,000
				Total Volume:	3,500,000

*** (G) Ground (E) Elevated (P) Pressure**

Reservoir Features	Reservoir Number:	1 Yes	1 No	2 Yes	2 No	3 Yes	3 No	4 Yes	4 No	5 Yes	5 No
Hatch	● Secured (e.g. locked, bolted, etc)	☒	☐	☒	☐	☒	☐	☒	☐	☒	☐
	● Watertight	☒	☐	☒	☐	☒	☐	☒	☐	☒	☐
	Curbed lid (shoe box style)	☒	☐	☒	☐	☒	☐	☒	☐	☒	☐
Features	Drain to daylight	☒	☐	☒	☐	☒	☐	☒	☐	☒	☐
	Overflow	☒	☐	☒	☐	☒	☐	☒	☐	☒	☐
	● Overflow/drain protected (screen/flap/valve)	☒	☐	☒	☐	☒	☐	☒	☐	☒	☐
	● Screened vent	☒	☐	☒	☐	☒	☐	☒	☐	☒	☐
	Water level gauge	☒	☐	☒	☐	☒	☐	☒	☐	☒	☐
	Bypass piping	☒	☐	☒	☐	☒	☐	☒	☐	☐	☐
	Fence/gate	☒	☐	☒	☐	☒	☐	☒	☐	☒	☐
	Cathodic plates watertight ☒ N/A	~~☐~~	~~☐~~	~~☐~~	~~☐~~	~~☐~~	~~☐~~	~~☐~~	~~☐~~	~~☐~~	~~☐~~
	Alarm for high or low levels	☒	☐	☒	☐	☒	☐	☒	☐	☒	☐
Maintenance	Exterior in good condition	☒	☐	☒	☐	☒	☐	☒	☐	☒	☐
	Interior in good condition	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Approved interior coating	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Inspection schedule	☒	☐	☒	☐	☒	☐	☒	☐	☒	☐
	Cleaning schedule	☒	☐	☒	☐	☒	☐	☒	☐	☒	☐
	Continuously disinfected (● post '81 redwood)	☒	☐	☒	☐	☒	☐	☒	☐	☒	☐
Plumbing Config.	Separate inlet/outlet	☒	☐	☒	☐	☒	☐	☒	☐	☒	☐
	Baffling	☐	☒	☐	☒	☐	☒	☐	☒	☐	☒
	Used for contact time	☐	☒	☐	☒	☐	☒	☐	☒	☐	☒

Pressure Tanks	Number:	N/A Yes	N/A No	Yes	No
Pressure Tanks	Used for contact time	☐	☐	☐	☐
	Accessible for maintenance	☐	☐	☐	☐
	Separate inlet/outlet	☐	☐	☐	☐
	Bypass piping	☐	☐	☐	☐
	Access port ☐ N/A	☐	☐	☐	☐
	Drain	☐	☐	☐	☐
	Pressure relief device	☐	☐	☐	☐
	Air bladder/diaphragm	☐	☐	☐	☐
	Valve for adding air	☐	☐	☐	☐
	Water level sight glass ☐ N/A	☐	☐	☐	☐

Comments

Reservoirs visited regularly, inspected yearly & cleaned every 5 years. Barnes Butte reservoir overflow is to canal. <u>No inspection of hatch, vent for Barnes Butte or Ochoco Heights reservoirs</u>. Remove vegetation away from overflow flap valve on Ochoco Heights Reservoir. Airport Reservoir leaking at base.

Distribution System Information

Service Area and Facility Map <u>Paper copies and electronic maps available.</u>

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

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

Distribution Data

Yes	No		Comments
☒	☐	● System pressure >20 psi	40-75 PSI
☒	☐	Are service connections metered? (What %)	100 percent (AMR auto read & manual)
☒	☐	Water system leakage <10%	Water budget for wells, meters, leaks, etc.
☒	☐	Waterline depth >30"	3-5 feet, minimum cover is 30 inches
☐	☒	Piping looped	2-3 dead-end lines: Saddle Ridge, So. Main to
☒	☐	Hydrants or blow offs on all dead ends	
☒	☐	Routine flushing (How often)	Fire dept. assists. Entire system flushed in 2013.
☒	☐	Adequate valving	Adding new valves with project and maintenance
☒	☐	Routine valve turning (How often)	As needed. Done in conjunction with flushing.
☐	☒	Asbestos cement (AC) pipe absent from system	

Comments:
Distribution piping consists of AC, ductile iron, galvanized steel, wrapped steel, wood stave pipe and PVC. Waterline sizes range from 2- to 16-inch in diameter.

Cross Connection Control (CWS, NTNC, and TNC)

Yes	No	N/A		Comments
☒	☐	☐	● Ordinance or enabling authority (CWS)	No revisions to existing ordinance.
☒	☐	☐	List of installed devices (CWS, NTNC, TNC)	DCVA, RP, air gap
☒	☐	☐	● Devices tested annually (CWS, NTNC, TNC)	Homeowner's test devices
☒	☐	☐	● Annual Summary Report submitted (CWS)	90 percent (issue with vacant homes, no water)
☒	☐	☐	● Certified Cross Connection Control Specialist (CWS $\geq$ 300 connections)	Jan Dobson, Eric Sather are certified

Comments:
Accounts/billing added backflow testing to inform customers. Three strikes to test devices and water turned off.

Booster Pumps

Number	Name (location)	Deficiencies or Comments	HP	GPM	Aux. Power Yes	Aux. Power No
1	American Pine PS	4 pumps	2-75/2-20	2,000	☒	☐
2	Ochoco Heights PS	Near hospital-3 pumps	30/25/50	1,800	☒	☐
3	Airport PS	Emergency pump station only for fire	75	4,000	☒	☐

Comments:
Mobile backup generator available. Generator is tested monthly.

Water Quality Monitoring *(EP-A through EP-G[1, 2])*

Entry Point Sampling:		***EP-A*** *(Stearns Well)*		***EP-B*** *(4th St Deep Well)*	
Contaminant	**N/A**	*Frequency*	*Next Test Due*	*Frequency*	*Next Test Due*
Nitrate…………………………………………………	☐	Yearly	2014	Yearly	2014
Arsenic…………………………………………………	☐	1 every 9 years[3]	2020	-	-
Inorganic Chemicals (Including Nitrite)……….......	☐	1 every 9 years	2020	-	-
SOCs……………………………………………………	☐	2 Consec. Qtrs. every 3 years	2015	-	-
VOCs ……………………………………………………	☐	1 every 3 years	2014	-	-
Radionuclides (Community Water Systems Only):					
Gross Alpha…………………………………	☐	1 every 9 years	2021	-	-
Radium 226/228………………………………	☐	1 every 9 years	2021	-	-
Uranium………………………………………	☐	1 every 6 years	2015	-	-

Entry Point Sampling:		***EP-C*** *(Lamonta Well)*		***EP-D*** *(Yancey Well)*	
Contaminant	**N/A**	*Frequency*	*Next Test Due*	*Frequency*	*Next Test Due*
Nitrate…………………………………………………	☐	Quarterly	2nd Qtr 2014	Yearly	2014
Arsenic…………………………………………………	☐	1 every 9 years[3]	2020	1 every 9 years[3]	2020
Inorganic Chemicals (Including Nitrite)……….......	☐	1 every 9 years	2020	1 every 9 years	2020
SOCs……………………………………………………	☐	2 Consec. Qtrs. every 3 years	2015	2 Consec. Qtrs. every 3 years	2015
VOCs ……………………………………………………	☐	1 every 3 years	2014	1 every 3 years	2014
Radionuclides (Community Water Systems Only):					
Gross Alpha…………………………………	☐	1 every 9 years	2019	1 every 9 years	2021
Radium 226/228………………………………	☐	1 every 9 years	2021	1 every 9 years	2021
Uranium………………………………………	☐	1 every 6 years	2015	1 every 6 years	2015

Entry Point Sampling:		***EP-F*** *(Stadium Well)*		***EP-G*** *(Airport Wells)*	
Contaminant	**N/A**	*Frequency*	*Next Test Due*	*Frequency*	*Next Test Due*
Nitrate…………………………………………………	☐	Yearly	2014	Yearly	2014
Arsenic…………………………………………………	☐	-	-	1 every 9 years[3]	2020
Inorganic Chemicals (Including Nitrite)……….......	☐	-	-	1 every 9 years	2020
SOCs……………………………………………………	☐	-	-	2 Consec. Qtrs. every 3 years	2015
VOCs ……………………………………………………	☐	-	-	1 every 3 years	2014
Radionuclides (Community Water Systems Only):					
Gross Alpha…………………………………	☐	-	-	1 every 9 years	2021
Radium 226/228………………………………	☐	-	-	1 every 9 years	2021
Uranium………………………………………	☐	-	-	1 every 9 years	2018

See comments on next page

Water Quality Monitoring *(EP-H[1])*

Entry Point Sampling:		***EP-H** (Barney Well)*	
Contaminant	**N/A**	*Frequency*	*Next Test Due*
Nitrate…………………………………………………	☐	Yearly	2014
Arsenic…………………………………………………	☐	-	
Inorganic Chemicals (Including Nitrite)…….........	☐	-	
SOCs…………………………………………………	☐	-	
VOCs …………………………………………………	☐	-	
Radionuclides (Community Water Systems Only):			
Gross Alpha………………………………	☐	-	
Radium 226/228…………………………	☐	-	
Uranium…………………………………	☐	-	

Comments:

Monitoring is based upon 2005 well field designation:
Sub-well field #1 includes Stearns, Barney, and Stadium entry points, with Stearns selected for chemical monitoring.
Sub-well field #2 includes South 4th Street Deep, Yancey, and Lamonta entry points. Both Yancey and Lamonta entry points have been selected for chemical monitoring.
South 4th St. Shallow, Ochoco Heights, and Airport entry points sampled independently.

[1] Next test due is based on previous sample date. See chemical samples schedule page https://yourwater.oregon.gov/schedule_status.php?pwsno=00682 for details.
[2] Water system serves more than 3,300 in population.
[3] Frequency in monitoring has changed.

Water Quality Monitoring *(Distribution System)*

Distribution System Sampling:	**N/A**	*Frequency*	*Next Test Due*
Coliform Bacteria………………………………	☐	10 sites per month	monthly
Asbestos (for AC pipe/asbestos geologic areas)	☐	Once every 9 years	2018
DBPs - TTHMs and HAA5s………………………...	☐	Yearly	2014 (Sept)
Lead and Copper, # sites: 20	☐	Once every 3 years	2015 (June-Sept)
Other Sampling:			
TOC…………………………………………………..	☒	-	-
Turbidity……………………………………………	☒	-	-
Source Water Coliform…………………………..	☒	Each well yearly	2014
Other (specify)	☒	-	-

Yes **No**

☒ ☐ ● Is all required monitoring current?

Comments:

Yes **No**

☒ ☐ Has the system experienced chemical (last 5 years) or bacteriological (last 2 years) detections?

If yes, what contaminant and when? Arsenic (2011, 2010), Barium (2011, 2010), Combined Uranium (2009), Fluoride (2011, 2010), Gross Alpha (2009), Nitrate (2014, 2013, 2012, 2011, 2010, 2009) Sodium (2011, 2010), Toxaphene (2012).

☐ ☐ ● Have all MCL violations been addressed? ☒ N/A

☒ ☐ Does the system have any monitoring reductions granted? Explain: Arsenic, IOC +nitrite

☒ ☐ ● Does the system have a written coliform sampling plan? Plan updated in 2014.

Does the plan include:

Yes	No		Yes	No	
☒	☐	Brief narrative	☒	☐	Rotation schedule
☒	☐	Distribution map	☒	☐	Repeat locations
☒	☐	Sample locations	☒	☐	Includes source

☒ ☐ Are TTHM and HAA5 samples taken at location of maximum residence time?

Where in the system are the monitoring sites for TTHM and HAA5? (☐ Not required)

1555 NW Saddlehorn (2DBP-01), 1280 S Main (2DBP-02)

Comments:

Stage 2 DBPR: Historic DBP levels were low and city received a 40/30 waiver. Number of samples based on population & groundwater source type requiring 2 sites (highest TTHM/HAA5). Each site requires collection of a dual sample.

Management & Operations

O&M Manual and Emergency Response Plan

Yes	No	
☒	☐	● Does system have an operation and maintenance manual? Updated manual in 2013/2014.
☒	☐	● Does system have an emergency response plan? Began process of updating ERP in 2013.

Operator Certification

Requirements for system: WD: 2 WT: - ☐ FE required Small System: ☐

Name	Certification Number	WT Level	WD Level	FE	Small System
DRC:*Eric R. Sather	3253	-	2	☐	☐
Patrick A. Goehring	9043	-	1	☐	☐
Joshua M. Perry	8496	-	1	☐	☐
Jason L. Wood	8497	-	2	☐	☐

*DRC= direct responsible charge. Attach additional sheets if necessary to list all certified personnel.

Yes	No	
☒	☐	Is DRC identified?
☒	☐	● Is DRC certified at appropriate level?
☒	☐	● Does system have written operating protocols for other operators? ☐ N/A

If DRC is a Contract Operator:

Yes	No	
☐	☐	Does DWP have contract on file? ☒ N/A
		How does contract operator work with system? ☒ N/A

Plan Review/Master Plan

Yes	No	
☒	☐	● Have all major modifications (since 8/21/81) been approved by DWP?
☒	☐	Does system have a current plan review exemption for water main extensions?
☒	☐	● Does the system have a current (<20 yr. old) master plan? (☐ Not required if < 300 connections)
		What year was the plan completed? 2008
☒	☐	Does the master plan include a water conservation plan?

Compliance Status

Yes	No	
☒	☐	● Is water system in compliance (all orders resolved and not a significant non-complier)?
		How many violations has the system had in the past two years? 1
☐	☐	● Does the system issue Public Notice for Violations as required? ☒ No violations requiring public notice

Other

Yes	No	
☐	☒	Has a capacity assessment been completed by DWP? If yes, list deficiencies noted:
☒	☐	● Are consumer confidence reports sent to users each year and certified?

Comments: Plan review projects: Airport Well #3 storage reservoir (PR #115-2013) and Airport Well #4 (PR #49-2013). Crystal Springs Phase 4 (PR #85-2006) & Willow Creek (PR #103-2007) waterline projects abandoned as of July 1, 2014 per correspondence with Eric Klann, City Engineer.

Photo Log


Photo 1 – Barney Well and piping.


Photo 2 – Small opening into Barney Well.


Photo 3 – New chlorination equipment for Barney Well.


Photo 4 – Barnes Butte Reservoir.


Photo 5 – Barnes Butte Reservoir screened overflow piping to canal.

Photo Log


Photo 6 – Unused well next to Stadium Well control building.


Photo 7 – Stadium Well on other side of control building.


Photo 8 – Seal around power cable going into 4th Street Deep Well.

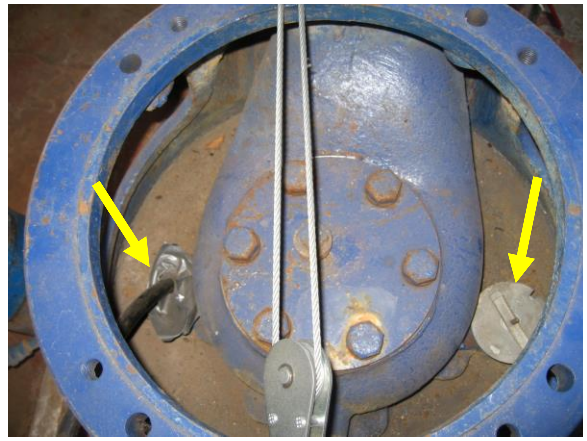


Photo 9 – Seal down-hole chlorine opening into 4th Street Deep Well (under duct tape). Improve cover to hole for measuring water level.


Photo 10 – Seal gap between pump platform and concrete pad on 4th Street Deep Well.


Photo 11 – South 4th St Shallow Well (not used).

Photo Log

Photo 12 – Ochoco Heights Well is not used. Seal openings on wellhead. Source should be disconnected from distribution as a protective measure.

Photo 14 – Remove vegetation away from overflow pipe/valve for Ochoco Heights Reservoirs.

Photo 13 – Ochoco Heights Reservoirs near hospital.

Photo 15 – Seal opening on well with tubing and hole in concrete pad for Yancey Well.

Photo Log


Photo 16 – Seal hole on pump platform into Yancey Well.


Photo 18 – Airport Well 1.


Photo 17 – Improve seal old down-hole chlorination openings for Yancey and Lamonta wells.


Photo 19 – Airport Well 2.

Photo Log

Photo 20 – Remove paint stored in Airport Well 2, Lamonta Well and Ochoco Heights Well buildings.

Photo 21 – Airport Reservoir.

Photo 22 – Airport Reservoir protected overflow pipe (arrow), locked curbed hatch and screened vent.

Photo Log

Photo 23 – American Pines Reservoir protected overflow pipe, locked curbed hatches and screened vent.

Photo 24 – Seal opening into concrete pad for Stearns Well (covered with black tape).

Photo Log

Photo 25 – New reservoir under construction next to Airport Reservoir.

Photo 27 – New Airport Well 3 being constructed.

Photo 26 – New Airport Well 4.

APPENDIX D
Insurance Services Office, Inc., Rating

Public Protection Classification Summary Report

Crook CO Fire and Rescue FD

Oregon

Prepared by

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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™) number is assigned to the community. The surveys are conducted whenever it appears that there is a possibility of a classification change. As such, the PPC program provides important, up-to-date information about fire protection services throughout the country.

The Fire Suppression Rating Schedule (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 Public Protection Classification, 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 classification.

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 is substantially lower than in a community with a poor PPC, 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 Public Protection Classification – 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 depends on:

- **Needed Fire Flows**, which are representative building locations used to determine the theoretical amount of water necessary for fire suppression purposes.
- **Receiving and Handling Fire Alarms**, including telephone systems, telephone lines, staffing, and dispatching systems.
- **Fire Department**, including equipment, staffing, training, and geographic distribution of fire companies.
- **Water Supply**, including condition and maintenance 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 Fire Suppression Rating Schedule (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 number. In order for a community to obtain a classification better then a Class 9, three elements of fire suppression features are reviewed. These three elements are Receiving and Handling Fire Alarms, Fire Department and Water Supply.

A review of the **Receiving and Handling Fire Alarms** fire alarm and communication system accounts for 10% of the total classification. The review focuses on the community's facilities and support for handling and dispatching fire alarms. This section is weighted at **10 points,** as follows:

- Telephone Service 2 points
- Number of Needed Operators 3 points
- Dispatch Circuits 5 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. In this section, ISO reviews such items as engine companies, ladder or service companies, distribution of fire stations and fire companies, equipment carried on apparatus, pumping capacity, reserve apparatus, department personnel, and training. The fire department section is weighted at **50 points,** as follows:

- Engine Companies 10 points
- Reserve Pumpers 1 point
- Pumper Capacity 5 points
- Ladder/Service Companies 5 points
- Reserve Ladder/Service Trucks 1 point
- Distribution of Companies 4 points
- Company Personnel 15 points
- Training 9 points

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. Hydrant size, type, and installation is also considered, as well as the inspection frequency and condition of fire hydrants. The water supply system is weighted at **40 points,** as follows:

- Credit for Supply System 35 points
- Hydrant Size, Type & Installation 2 points
- Inspection/Condition of Hydrants 3 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.

Public Protection Classification Number

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

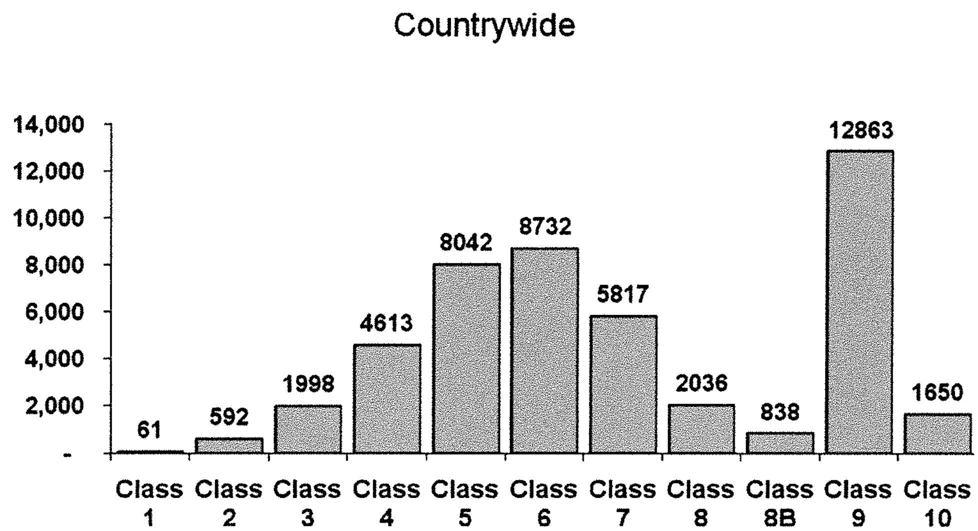
PPC	Points
1	90.00 or more
2	80.00 to 89.99
3	70.00 to 79.99
4	60.00 to 69.99
5	50.00 to 59.99
6	40.00 to 49.99
7	30.00 to 39.99
8	20.00 to 29.99
9	10.00 to 19.99
10	0.00 to 9.99

The classification numbers are interpreted as follows:

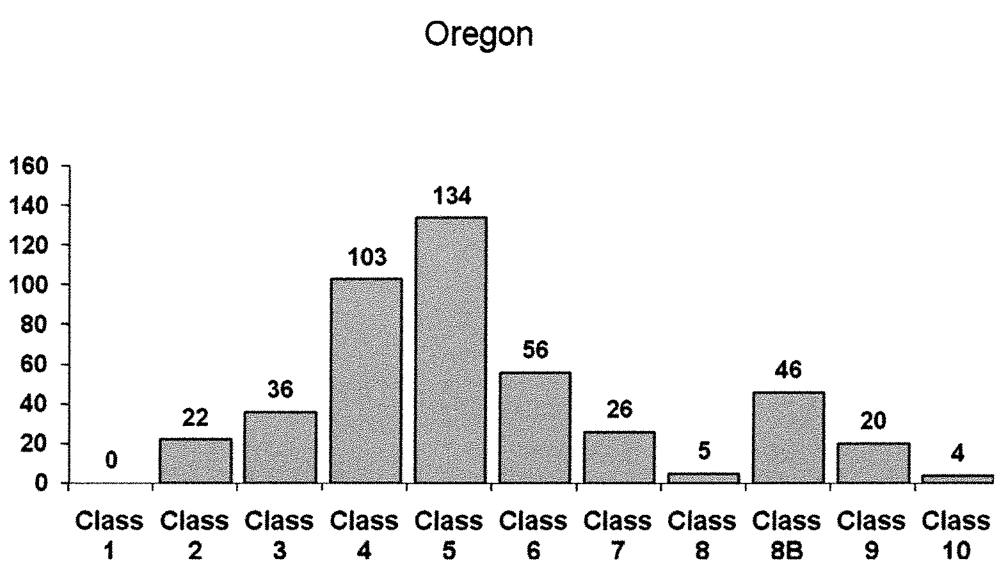
- Class 1 through (and including) Class 8 represents a fire suppression system that includes an FSRS creditable dispatch center, fire department, and water supply.
- Class 8B is a special classification that recognizes a superior level of fire protection in otherwise Class 9 areas. It is designed to 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.

Distribution of Public Protection Classification Numbers

The 2011 published countrywide distribution of communities by the Public Protection Classification number is as follows:



The 2011 published statewide distribution of communities by the Public Protection Classification number 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.

ISO Public Protection 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 PPC questions. 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 ISO's Public Protection Classification 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 ISO Public Protection Classification, 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 Fire Suppression Rating Schedule 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.

Classification Details

Public Protection Classification

ISO concluded its review of the fire suppression features being provided for/by Crook CO Fire and Rescue FD. The resulting community classification is **Class 4/8B**.

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., 6/9), the following applies:

- The first class (e.g., "6" in a 6/9) 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.
- Class 8B or class 9 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.
- Specific properties with a Needed Fire Flow in excess of 3,500 gpm are evaluated separately and assigned an individual classification.

Summary Evaluation Analysis

The following points represent the analysis of the application of the criteria outlined in the FSRS of four topics– Receiving and Handling Fire Alarms, Fire Department, Water Supply, and the Divergence factor for Crook CO Fire and Rescue FD:

FSRS Feature	Earned Credit	Credit Available
Receiving and Handling Fire Alarms		
414. Credit for Telephone Service	**1.80**	2
422. Credit for Operators	**1.86**	3
432. Credit for Dispatch Circuits	**5.00**	5
440. Credit for Receiving and Handling Fire Alarms	**8.66**	**10**
Fire Department		
513. Credit for Engine Companies	**9.84**	10
523. Credit for Reserve Pumpers	**0.79**	1
532. Credit for Pumper Capacity	**5.00**	5
549. Credit for Ladder Service	**0.59**	5
553. Credit for Reserve Ladder and Service Trucks	**0.00**	1
561. Credit for Distribution	**2.17**	4
571. Credit for Company Personnel	**4.90**	15
580. Credit for Training	**3.46**	9
590. Credit for Fire Department	**26.75**	**50**
Water Supply		
616. Credit for Supply System	**26.07**	35
621. Credit for Hydrants	**1.98**	2
631. Credit for Inspection and Condition	**0.89**	3
640. Credit for Water Supply	**28.94**	**40**
Divergence	**-3.77**	--
Total Credit	**60.58**	**100**

General Information

To determine the Total Credit, the points for Receiving and Handling Fire Alarms, Fire Department and Water Supply are added together and the Divergence factor is applied. To establish the points for each category, FSRS items labeled as "Credit for..." are totaled. These particular items are intermediate values. Usually these intermediate values are based upon a 100-point scale, but they can be different. The ratios between the actual points scored in each of these sub-items and the points available for full credit are then multiplied by the points available for the sub-item.

For instance, Item 414 "Credit for Telephone Service (CTS)" is valued at 2 points. To determine the credit earned, the totals for Item 411 "Review of Telephone Lines (TL)", Item 412 "Review of Telephone Directory (TD)", and Item 413 "Review of Recording Device (RD)" are summed. In Item 411, up to 60 points can accrue; Item 412 has a combined value of 20 points; and 20 points are available for Item 413. The sum of these three Items is divided by 100 and then multiplied by the 2 point weight in Item 414 to determine the final score for "Credit for Telephone Service (CTS)".

The formula for Item 414 "Credit for Telephone Service (CTS)" looks like this:

$$\mathbf{CTS} = \frac{\mathbf{TS}}{\mathbf{100}} \times 2$$

Where TS = TL + TD + RD

Detailed Evaluation Analysis

On the following pages are the details of the evaluation of each category for Crook CO Fire and Rescue FD. These details relate only to the fire insurance classification for this jurisdiction. They are not for property loss prevention or life safety purposes and no life safety or property loss recommendations are made.

At the end of the detailed analysis the relative class is indicated. The relative class represents the classification each category would have achieved if the individual score was translated into a 100-point scale instead of the points available for that category.

Receiving and Handling Fire Alarms

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:

- the telephone service, including the number of telephone lines coming into the center
- the listing of the emergency number and business number in the telephone directory
- the automatic recording of emergency calls
- the communications center, including the number of operators on-duty and awake at the center
- the dispatch circuits and how the center notifies firefighters about the location of the emergency

Item 414 - Credit for Telephone Service (2 points)

The first item reviewed is Item 414 "Credit for Telephone Service (CTS)". This item reviews the facilities provided for the public to report fires including the telephone line used to report an emergency, business and private alarm lines including progression of emergency calls to business lines. Also analyzed is the listing of fire and business numbers in the telephone directory and the automatic recording of emergency calls. 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.

To determine the score for Item 414, three sub-items (Item 411, Item 412, and Item 413) were evaluated. The details are as follows:

Item 411 - "Review of Telephone Lines (TL)"	Earned Credit	Credit Available
A. Number of needed fire lines* For maximum credit, there should be 2 incoming telephone lines reserved for receiving notification of fires. The Communication Center serving Crook CO Fire and Rescue FD has 11 lines reserved. The telephone directory listed both a business and an emergency number.	25.00	25
B. Number of needed fire, business, and private alarm lines* For maximum credit, there should be 2 incoming lines reserved for notification of fires (and other emergency calls) plus 1 additional line for conducting other fire department business and, if applicable, for private alarms. The Communication Center serving Crook CO Fire and Rescue FD has 6 lines in addition to the 11 lines reserved for receiving notification of fires (and other emergency calls). The telephone directory listed both a business and an emergency number.	25.00	25
C. Progression of emergency calls to business lines For maximum credit, unanswered emergency calls should progress to the business number.	10.00	10
D. If detailed information of a fire is received and transmitted through more than one communication center, DEDUCT For no deduction of points, fire calls should be immediately transferred from the answering point to the dispatcher who will then obtain the needed information from the caller for dispatching.	0.00	-20
Review of Telephone Lines (TL) total:	**60.00**	**60**

***Note:** When only one telephone number is listed in the telephone directory the telephone lines provided cannot be reserved for emergency calls because the general public is not given a choice of telephone lines to use. Therefore, the operator/telecommunicator must accept both emergency and business calls over the same lines. The number of needed fire, business, and alarm lines will show a reduction in credit.

Item 412 - "Review of Telephone Directory (TD)"	Earned Credit	Credit Available
A. Emergency number on the inside front cover or the front page For credit, the fire emergency telephone number should be printed on the inside front cover or front page of the white pages in the telephone directory.	10	10
B. Emergency number and business number listed under "Fire Department" For credit, both the number to report a fire and the fire department business number should be listed under "FIRE DEPARTMENT" in the white pages (or government section) of the telephone directory. The fire number is not listed and the business number is not listed.	0	5
C. Emergency number and business number listed under the name of the city For credit, both the number to report a fire and the fire department business number should be listed under the community or fire district in the white pages (or government section) of the telephone directory. The fire number is not listed and the business number is not listed.	0	5
D. If the numbers for individual fire stations are listed, DEDUCT For no deduction of points, the individual fire stations should not be listed in the telephone directory.	0	-10
Review of Directory Listing (TD) total:	10	20

Item 413 - "Review of Recording Device (RD)"	Earned Credit	Credit Available
A. Review of the recording device (RD): For credit, a voice recorder should automatically record all emergency calls and the operator should be able to immediately play back any emergency call to review the conversation.	20	20
Review of Recording Device (RD) total:	20	20

The Items "TL", "TD", and "RD" are then added together and divided by the total possible points (100 points) to determine the factor that is applied to the 2 points available for Item 414 "Credit for Telephone Service (CTS)".

414 "Credit for Telephone Service (CTS)" = 1.80 points

Item 422 - Credit for Operators (3 points)

The second item reviewed is Item 422 "Credit for Operators (CTO)". This item reviews the number of operators on duty and awake 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). If the necessary data is not available, the number of needed operators will be determined by specification criteria using a "Call Volume Matrix Table" (see the following page).

CALL VOLUME MATRIX TABLE #1
For Public Safety Answering Points that Perform Call Taking and Dispatching

Alarms per Year	Number of Needed Telecommunicators
Less than 731	1*
731 to 10,000	2
10,001 to 25,000	4**
25,001 to 50,000	5**
50,001 to 100,000	6**
100,001 to 150,000	7**
150,001 to 200,000	8**
200,001 to 250,000	9**
250,001 to 300,000	10**
Over 300,000***	11**

CALL VOLUME MATRIX TABLE #2
For Public Safety Answering Points that Perform Call Taking Without Dispatching

Alarms per Year	Number of Needed Telecommunicators
Less than 10,001	1
10,001 to 50,000	2
50,001 to 100,000	4**
100,001 to 150,000	5**
150,001 to 200,000	6**
200,001 to 250,000	7**
250,001 to 300,000	8**
Over 300,000***	9**

* *Communication centers that provide emergency medical dispatching (EMD) protocols need two telecommunicators on duty at all times.*

** *Includes a supervisor in the communication center.*

*** *For every 10 additional calls (alarms) that are averaged per hour (87,600 calls per year), one additional telecommunicator is added.*

To determine the score for Item 422, two sub-Items (421.A and 421.B) are summed. The details are as follows:

Item 421 - "Review of Operators (PO)"	Earned Credit	Credit Available
A. Number of operators on-duty (OD): For maximum credit, there should be 2 operators on duty at all times. There are an average of 1.24 operators on duty at the communication center.	**49.60**	**80**
B. Number of operators awake at all times (OA): For maximum credit, all operators should be awake at all times. There is an average of 1.24 operators awake at all times.	**12.40**	**20**
Review of Operators (PO) total:	**62.00**	**100**

After the items "OD" and "OA" are summed up to determine the points received for the "Review of Operators", the sum is divided by the total possible points (100 points) to determine the factor that is applied to the 3 points available for Item 422 "Credit for Operators (CTO)".

Item 422 "Credit for Operators (CTO)" = 1.86 points

Item 432 - Credit for Dispatch Circuits (5 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 1.5 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.

Additional points are available for dispatch recording facilities at the Communication Center. All alarms that are transmitted over the required dispatch circuits need to be automatically recorded (including the dates and times of transmission) to earn the maximum points in this item.

ISO's evaluation includes a review of the communication system's emergency power supplies. To receive maximum credit, two sources of power need to be provided for the operation of the communications network including dispatch circuits and its related support systems and equipment. A common arrangement is to have the primary power come from a utility distribution system and a secondary power source from an automatic starting emergency engine-generator and/or an Uninterruptible Power Supply (UPS) and Battery System – (SEPSS-Stored Emergency Power Supply Systems).

To determine the score for Item 432, four sub-items (Item 431.A, Item 431.B, Item 431.C and Item 431.D) needed to be evaluated.

The score that Crook CO Fire and Rescue FD received for Item 432 was calculated as follows:

Item 432 - "Credit for Dispatch Circuits (CDC)"	Earned Credit	Credit Available
Item 431A - "Dispatch Circuits Provided" The points are determined by prorating the value of the type of dispatch circuit using the percentage of members dependent upon each circuit.	40.00	40
Item 431B - "Monitoring for Integrity of Circuit" For maximum credit, the dispatch circuit should have an automatic system that will detect faults and failures and send visual and audible indications to appropriate personnel. These systems are subject to field verification and demonstration.	30.00	30
Item 431C - "Dispatch Recording Facilities at Communication Center" For maximum credit, all alarms that are transmitted over the required dispatch circuits need to be automatically recorded.	10.00	10
Item 431D - "Emergency Power Supply" For maximum credit, emergency power supplies need to be provided and regularly tested (one hour weekly, under load, with test documentation).	20.00	20
Item 431E - "When no circuit is needed" If all responding firefighters are in the same building as the communication center and are alerted, no dispatch circuit is needed and the maximum points are credited. However, the community does not operate in this fashion.	0.00	100
Dispatch Circuits (DC) total:	**100.00**	**100**

After the Items in 431 are summed up to determine the points received for the "Credit for Dispatch Circuits (CDC)", the sum is divided by the total possible points (100 points) to determine the factor that is applied to the 5 points available for Item 432 "Credit for Dispatch Circuits (CDC)".

Item 432 "Credit for Dispatch Circuits (CDC)" = 5.00 points

The final step in determining the credit for "Receiving and Handling Fire Alarms" is to add Item 414, Item 422, and Item 432:

Item	Earned Credit	Credit Available
414. Credit for Telephone Service (CTS)	**1.80**	2
422. Credit for Operators (CTO)	**1.86**	3
432. Credit for Dispatch Circuits (CDC)	**5.00**	5
Item 440. Credit for Receiving and Handling Fire Alarms:	**8.66**	**10**

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
- Distribution of fire companies
- Available and/or responding firefighters
- Automatic Aid with neighboring fire departments
- Training

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 following building addresses were used to determine the Basic Fire Flow:

- 5500 gpm 1400 South East 2nd Street, Prineville
- 4500 gpm 365 North West 2nd Street, Prineville
- 4500 gpm Lamonta Road, Prineville
- 4500 gpm 110 South East Lynn Boulevard, Prineville
- 4500 gpm 701 North East Peters Road, Prineville

The fifth largest Needed Fire Flow is determined to be the Basic Fire Flow. Since the FSRS develops a PPC for properties with a Needed Fire Flow of 3,500 gpm or less, the maximum that the Basic Fire Flow can be is 3,500 gpm. The Basic Fire Flow for Crook CO Fire and Rescue FD has been determined to be 3500 gpm.

Item 513 - Credit for Engine Companies (10 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.

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

Item 510.A. Number of Needed Engine Companies (NE):

BASIC FIRE FLOW, GPM	ENGINE COMPANIES
500 - 1,000	1
1,250 - 2,500	2
3,000 - 3,500	3

The FSRS indicates that a minimum of 4 engine companies are needed in the fire district to suppress fires in structures with a Needed Fire Flow of 3,500 gpm or less. This number is calculated as follows:

The greater of:

a) 3 engine companies to support a Basic Fire Flow of 3500 gpm.

b) 3 engine companies to provide fire suppression services to areas with a reasonable number of properties without a responding fire station within 1½ miles.

c) 4 engine companies based upon the fire department's method of operation to provide a minimum two engine response to all first alarm structure fires.

There are 0 additional engine companies needed for response outside the city.

The FSRS recognizes that there are 4 engine companies in service.

For maximum credit, at least two engine companies should respond to all reported first alarms for fires in buildings (except when only one engine company is needed). The credit for engine companies has been reduced by 0.0 percent because the FSRS review deemed there is an adequate response to all reported fires in the district.

For each in-service engine, ISO reviews the pump capacity (as indicated by a pumper test), the hose (including hose testing) and the equipment carried.

For maximum credit, pumper service tests must be done annually and documented. ISO evaluates the pumper service tests using NFPA 1911, *Standard for the Inspection, Maintenance, Testing and Retirement of In-service Automotive Fire Apparatus.* This Standard indicates that the service tests should be conducted for:

- 20 minutes @ 100% capacity at 150 psi
- 10 minutes @ 70% capacity at 200 psi
- 10 minutes @ 50% capacity at 250 psi

Other factors such as the "overload test" are not evaluated in the FSRS and are not required for FSRS credit.

For maximum credit, hose tests must be performed annually and documented. ISO evaluates a hose testing program using NFPA 1962, *Standard for the Inspection, Care, and Use of Fire Hose, Couplings and Nozzles and the Service Testing of Fire Hose.*

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 reported structure fires on the initial alarm.
- The aid must be provided 24 hours a day, 365 days a year.
- The aid must offset a need in the community ISO is surveying. For example, if a community needs a ladder company and the fire department does not have one, but a neighboring community's ladder company responds by Automatic Aid agreement, credit may be available.
- The aiding ladder company must cover at least 50% of the needed ladder company Standard Response District by hydrant count in the community being graded.

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 0.90 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) and a factor for an overweight apparatus all contribute to the calculation for the percent of credit the FSRS provides to that engine company.

After the Items in 512 are summed to determine the points received for the "In Service Total (EC)", the sum is divided by the total possible points and then multiplied by the Needed Engine Companies (NE). Next, this is multiplied by the appropriate factor representing the percent of built-upon area of the city with first alarm response of one or two engine companies. Finally, this product is multiplied by the 10 points available for Item 513 "Credit for Engine Companies (CEC)" to determine the final score for this item.

Item 513 "Credit for Engine Companies (CEC)" = 9.84 points

Item 523 - Credit for Reserve Pumpers (1 point)

The second pumper item reviewed is Item 523 "Credit for Reserve Pumpers (CRP)". This item reviews the number and adequacy of the pumpers and their equipment with one (or more in larger communities) pumper out of service. The number of needed reserve pumpers is 1 for each 8 needed engine companies determined in Item 513, or any fraction thereof. The number of reserve pumpers credited in this item will not exceed the number of needed reserve pumpers. If only one reserve pumper is needed, and more than one reserve pumper is provided in the city, only the best equipped reserve pumper will be credited. Reserve pumpers are reviewed for pump capacity, hose carried, and equipment in the same manner as described in Item 512 except that Automatic Aid reserve pumpers are not considered.

The value of the Reserve Pumper Credit (RPC) is determined by multiplying the credited Pump Capacity (PC) times the credit for the Hose Carried (HC) times the credit for the Equipment Carried (EC) times the factor for an overweight apparatus.

After the items in 521 are factored to determine the points received for each reserve pumper, the reserve pumper with the largest points is selected for the Reserve Pumper Credit (RPC). The value for RPC is added to the value in Item 512 determined above. Next, the best equipped in-service pumper is subtracted from the in-service and reserve total. The difference is then divided by the total the possible points times the Needed Engine Companies (NE). Finally, this quotient is multiplied by the 1 point available for Item 523 "Credit for Reserve Pumpers (CRP)".

Item 523 "Credit for Reserve Pumpers (CRP)" = 0.79 points

Item 532 – Credit for Pumper Capacity (5 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 3500 gpm in Crook CO Fire and Rescue FD. The maximum needed pump capacity credited is the Basic Fire Flow of the community. The pump capacity is obtained by test at the rated pump pressure. Credit is limited to 80 percent of rated capacity if no test data is available within two years of the survey date. Less than 80 percent may be credited if other mechanical features of the apparatus indicate a generally poor mechanical condition.

The existing pump capacity (EP) represents the capacity of in-service pumpers, pumper-ladder, and pumper-service trucks that were credited in Item 513.

The reserve pump capacity (RP) is that capacity of reserve pumpers, reserve pumper-ladder, and pumper-service trucks that were credited in Item 523. One-half the capacity of permanently-mounted pumps capable of delivering at least 50 gpm at 150 psi on other apparatus, reserve pumpers and reserve pumper-ladder and reserve pumper-service trucks not credited in Items 513 or 523 is credited in this item. This capacity is expressed as "OP".

Automatic Aid pumper capacity is that capacity of pumpers credited as Automatic Aid in Item 513. The capacity credited does not exceed the percent determined by the value of the Automatic Aid plan determined in Item 512.D multiplies by the creditable pump capacity for each Automatic Aid pumper. This capacity is expressed as AAP.

The sum of the capacities determined for EP, RP, OP, and AAP is 6450 gpm. The FSRS limits the total capacity to the Basic Fire Flow of 3500 gpm. Next, this capacity is divided by the Basic Fire Flow. Finally, this factor is multiplied by the 5 points available for Item 532 "Credit for Pumper Capacity (CPC)".

Item 532 "Credit for Pumper Capacity (CPC)" = 5.00 points

Item 549 – Credit for Ladder Service (5 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. When no individual response area alone needs a ladder company, at least one ladder company is needed if buildings in the city meet the above criteria. The number and type of apparatus is dependent upon the height of buildings, Needed Fire Flow and response distance.

Response areas not needing a ladder company should have a service company. A service company is an apparatus with some or all of the equipment identified in Table 544.A (see the following pages).

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 (Table 544 A, B, and C). 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, the response distance to built-upon areas, the method of operation and the response outside the city.

The FSRS indicates that a minimum of 1 ladder company is needed. This is calculated as follows:

> 1 ladder company due to the number of buildings with a Needed Fire Flow over 3,500 gpm or 3 stories or more in height, the response distance to built-upon areas or the method of operation.
>
> There are 0 additional ladder companies needed because 10% or less of the responses outside of the district result in a reduction of the ladder companies left in the district to 50% or less of the normal strength level.

The FSRS recognizes that there are 0.5 ladder companies in service.

For maximum credit, a ladder or service company should respond on first alarms to all reported fires in buildings. It was determined the ladder or service company response is to 100% of first alarm fires in buildings.

The FSRS indicates that a minimum of 0 service companies are needed. This need is calculated as follows:

0 service companies due to the number of buildings with a Needed Fire Flow over 3,500 gpm or 3 stories or more in height, the response distance to built-upon areas or the method of operation.

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

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.

If a ladder company is needed, the available equipment items in Table 544.A are summed to determine the points received for a Service Company, and available equipment items in Table 544.B are summed to determine the additional equipment points available for a Ladder Company. Table 544.A and 544.B points are added together to determine the total possible points available out of a possible 784 points.

Tests and sample forms for recording tests for aerial ladder and elevating platforms are described in NFPA 1911, *Standard for the Inspection, Maintenance, Testing and Retirement of In-service Automotive Fire Apparatus.*

If a service company is needed, the available equipment items are summed in Table 544.A. If additional ground ladders are needed for the service company, the assigned points for each available ground ladder up to 4 (from Table 544.B) are added to the points determined in Table 544.A.

All ladder company equipment, available service company equipment, available engine-ladder company equipment and available engine-service company equipment are summed. This sum is then divided by the sum of 784 points multiplied by the Needed Ladder (NL) plus 334 points multiplied by the Needed Service (NS) companies plus any points assigned for any additional ladders from Table 544.B.

Next, this factor is multiplied by the appropriate factor (A) representing the percent of built-upon area of the city with first alarm response of a ladder, service, engine-ladder or engine-service company to fires in buildings. Finally, this product is multiplied by the 5 points available for Item 549 "Credit for Ladder Service (CLS)".

Item 549 "Credit for Ladder Service (CLS)" = 0.59 points

Item 553 – Credit for Reserve Ladder and Service Trucks (1 point)

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. When 8 or less ladder and service companies are needed, and 1 or more ladder companies are needed, the reserve truck should be a ladder truck. When the number of needed reserve ladder and service trucks exceeds the number of needed reserve ladder trucks, the difference is considered as needed reserve service trucks.

The number of in-service ladder and service trucks considered out of service is determined by the number of needed reserve ladder and service trucks. The in-service ladder and service trucks credited in Item 549 having the largest number of points is what is considered as out of service. The equipment on credited reserve ladder and service trucks shall be reviewed by application of Tables 544.A, 544.B and 544.C.

The number of reserve ladder trucks credited in this item shall not exceed the number of needed reserve ladder and service trucks. If only one reserve ladder is needed, and if more than one reserve ladder or service truck is provided in the city, only the best equipped reserve ladder or service truck will be credited.

All ladder company equipment, available service company equipment, available engine-ladder company equipment and available engine-service company equipment are summed.

After the points for all reserve ladder and service equipment is determined, the reserve ladder service truck with the largest points is selected. This value is added to the value of all in-service ladder and service company equipment determined in Item 549. Next, the best equipped in-service ladder or service truck is subtracted from the in-service and reserve total. The difference is then divided by the total possible points for a ladder truck times the Needed Ladder (NL) plus the total possible points times the Needed Service (NS) plus any assigned points for any additional ladders needed from Table 544.B. Finally, this quotient is multiplied by the 1 point available for Item 553 "Credit for Reserve Ladder and Service Trucks (CRLS)".

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

Item 561 – Credit for Distribution (4 points)

Next, Item 561 "Credit for Distribution (CD)" is reviewed. This Item examines the number and adequacy of existing engine and ladder-service companies to cover built-upon areas of the city. The built-upon area of the city should have a fully equipped first-due engine company within 1½ miles and a fully equipped ladder-service company within 2½ miles.

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, 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 for Distribution (CD)" = 2.17 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.

Call and volunteer members (VM) 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 call and volunteer 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.

Call and volunteer firefighters and company officers assigned for on-duty shifts at fire stations on a pre-arranged schedule are considered as on duty for the proportional time that they are at the fire station.

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 volunteer 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 call/volunteer 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 8.66 on-duty personnel and an average of 3.44 volunteers/off-shift personnel responding on first alarm structure fires.

Item 571 "Credit for Company Personnel (CCP)" = 4.90 points

Item 581 – Credit for Training (9 points)

The final item reviewed in the Fire Department section is Item 580 "Credit for Training (CT)". This item evaluates training facilities and aids and the use made of them by the fire suppression force; company training at fire stations; classes for officers; driver and operator training; new driver and operator training; hazardous materials training; recruit training; the pre-fire planning inspection program; and the training and inspection records.

A maximum of 35% of the training evaluation is attributed to facilities, aids and use, and 65% is attributed to specialized training including the pre-fire planning inspection program.

Item 580.A.1 "Facilities and Aids "	Earned Credit	Credit Available
Drill Tower For maximum credit, a 4 story drill tower should be used. 0 points were credited as there is no drill tower available and used by the fire department.	0.00	8
Fire Building (including smoke room) For maximum credit, there should be a fire resistive smoke room that is separated from the drill tower so that training may be conducted in the tower and in the smoke room. A fire building is not available or used for training.	0.00	8
Combustible Liquids Pit For maximum credit, a 1,500 square foot combustible liquid pit or equivalent video instructing effective fire suppression of Class B fires should be used. Credit for a 1500 square foot combustible liquids pit was provided representing the actual size of the pit or that there is a video instructing effective fire suppression of Class B fires available for use to train the fire department personnel.	5.00	5
Library and Training Manuals For maximum credit, a complete library of training manuals should be available in the department for the membership. The library and manuals may include: NFPA "Fire Protection Handbook", "The Fire Chief's Handbook" published by Fire Engineering, "Managing Fire and Rescue Services" published by ICMA, Training manuals published by IFSTA or equivalent, and the following NFPA Standards, 472, 1001, 1002, 1021, 1201, 1401, 1403, 1410, 1451, and 1620. Credit was given for complete training materials.	2.00	2
Multi-Media Training Aids including Pump and Hydrant Cutaways A slide/overhead projector and compatible multi-media aids are available. A movie/VCR type projector and compatible multi-media aids are available. A pump cutaway is available in the department for the membership. A hydrant cutaway is available in the department for the membership.	2.00	2

Item 580.A.1 "Facilities and Aids " (continued)	Earned Credit	Credit Available
Training Area For maximum credit, a fire department training area of at least 2.0 acres in size should be available for single and multi-company drills. A training area of 0 acres is provided. Training is conducted on streets or other areas.	10.00	10
Review of Facilities and Aids (FA) total:	14.00	35
Item 580.A.2 "Use "		
a. Half-day (3 hours) drills, 8 per year (0.05 each) For maximum credit, all members should participate in 8 half-day, single company drills. There were an average of 8.00 single company half-day drills.	0.40	0.40
b. Half-day (3 hours) multiple-company drills, 4 per year (0.10 each): For maximum credit, all members should participate in 4 half-day multiple company drills. There were an average of 4.00 multiple company drills.	0.40	0.40
c. Night drills (3 hours), 2 per year (0.10 each): For maximum credit, all members should participate in two 3-hour night drills per year. There were an average of 2.00 night drills.	0.20	0.20
Factor for "Use" subtotal -	1.00	
Average percentage participating in drills -	100%	
Factor for Use (FU):	1.00	1.0
Review of Facilities and Aids (FA) total:	14.00	35
"Facilities, Aids and Use" subtotal:	14.00	
Deduction for incomplete or missing records -	-0.00	

Note 1: A single company drill may receive credit under a and c; a multiple-company drill may receive credit under a, b, and c.

Note 2: If the Drill Tower, Fire Building, Combustible Liquids Pit or Training Area do not achieve at least 10 points, credit will be given for the use of buildings, streets and open areas (other than formal training grounds), but not both.

After the items under Item "Facilities and Aids" are summed and the factor for "Use" is established, the credit for "Facilities, Aids and Use" is determined by multiplying the total possible points (35 points) by the factor for "Use" (up to 1.0) and subtracting any deductions for record keeping.

Facilities, Aids and Use subtotal = 14.00 points

Specialized Training	Earned Credit	Credit Available
B. Company Training For maximum credit, each firefighter should receive 20 hours per month in structure fire related subjects as outlined in NFPA 1001. There was an average of 2.24 hours per month of company training received by company members and participation was 100% of those eligible to participate. 0.00 points will be deducted for missing or incomplete records.	2.80	25
C. Classes for Officers For maximum credit, each officer should receive 2 days of leadership, management, supervisory, and incident management system training per year as outlined in NFPA 1021. There was an average of 2.00 days devoted to officer classes and participation is 100% of those eligible to participate. 0.00 points will be deducted for missing or incomplete records.	15.00	15
D. Driver and Operator Training For maximum credit, each driver and operator should receive 4 half-day sessions of driver/operator training per year in accordance with NFPA 1002 and NFPA 1451. There were 4.00 half-day sessions received per year by drivers and operators and participation was 100% of those eligible to participate. 0.00 points will be deducted for missing or incomplete records.	2.00	2
E. New Driver and Operator Training For maximum credit, each new driver and operator should receive 40 hours of driver/operator training per year in accordance with NFPA 1002 and NFPA 1451. There were 30.00 hours received per year by new drivers and operators and participation was 100% of those eligible to participate. 0.00 points will be deducted for missing or incomplete records.	1.50	2
F. Training on Hazardous Materials For maximum credit, each firefighter should receive ½ day of training for incidents involving hazardous materials in accordance with NFPA 472. There was 1.00 day of training received per year and participation was 100% of those eligible to participate. 0.00 points will be deducted for missing or incomplete records.	1.00	1

Specialized Training (continued)	Earned Credit	Credit Available
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. There were 100.00 hours received per year and participation was 100% of those eligible to participate. 0.00 points will be deducted for missing or incomplete records.	2.08	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 twice per year by company members. Records of inspections should include up-to date notes and sketches. There are 0.00% of the buildings inspected at a yearly frequency of 0.00. Participation is 0.00%. 0.00 points will be deducted for missing or incomplete records.	0.00	15

To determine the Credit for Training, the points credited in Item 580.A though 580.H are summed.

For maximum credit, records should be kept of all training. NFPA 1401 outlines the appropriate manner in which to accomplish this. A deduction of up to 20 points (20% for each Item) is made for a lack of records. A deduction of 10% is made for incomplete records and 20% for no records for each sub-item.

A total of **0.00** points is deducted to reflect a deficiency of record keeping for Crook CO Fire and Rescue FD.

Finally, this sum is divided by 100 and then multiplied by the 9 points available for Item 580 “Credit for Training (CT)”.

Item 580 “Credit for Training (CT)” = 3.46 points

The final step in determining the Credit for Fire Department is to add the following eight components:

Item	Earned Credit	Credit Available
513. Credit for Engine Companies (CEC)	**9.84**	10
523. Credit for Reserve Pumpers (CRP)	**0.79**	1
532. Credit for Pumper Capacity (CPC)	**5.00**	5
549. Credit for Ladder Service (CLS)	**0.59**	5
553. Credit for Reserve Ladder and Service Trucks (CRLS)	**0.00**	1
561. Credit for Distribution (CD)	**2.17**	4
571. Credit for Company Personnel (CCP)	**4.90**	15
581. Credit for Training (CT)	**3.46**	9
Item 590. Credit for Fire Department:	**26.75**	**50**

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 condition of fire hydrants.

Item 616 – Credit for Supply System (35 points)

The first item reviewed was 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.

To determine the score for Item 616 "Credit for Supply System (CSS)", three sub-items are evaluated (Item 612 "Supply Works Capacity", Item 613 "Main Capacity" and Item 614 "Hydrant Distribution").

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. Credit is allowed up to 1,000 gpm for each hydrant within 300 feet of the location, 670 gpm for hydrants within 301 to 600 feet of the location and 250 gpm for hydrants within 601 to 1,000 feet of the location. Credit may be reduced when hydrants do not have a pumper outlet and/or two or more hose outlets. If a hose diameter greater than 2½ inch is carried by all in-service pumpers, the hydrant distribution credit may be greater due to the reduced friction loss in the larger diameter hose.

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)" = 26.07

Item 621 – Credit for Hydrants (2 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.

For maximum credit, all hydrants should have a pumper outlet, 6 inch or larger branch connection, uniform size operating nut and should operate in a uniform direction in accordance with AWWA C-502 *Standard for Dry-Barrel Fire Hydrants* or AWWA C-503 *Standard for Wet-Barrel Fire Hydrants.*

For maximum credit, all suction supply points should be equipped with a dry hydrant with a 6 inch or larger pipe and fittings, a minimum number of 90 degree elbows (preferably no more than two), and suction screen placement so that the dry hydrant will deliver the design capacity (usually 1,000 gpm) as specified in NFPA 1142, *Standard on Water Supplies for Suburban and Rural Fire Fighting.*

There are a total of 735 hydrants in the city.

620. Hydrants, - Size, Type and Installation	Earned Credit	Credit Available
A. With a 6 -inch or larger branch and a pumper outlet with or without 2½ -inch outlets There are 730 hydrants that have a 6 -inch or larger branch and a pumper outlet.	99.32	100
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 There are 0 hydrants that have a 6 -inch or larger branch but no pumper outlet, or have a small foot valve or with a small barrel.	0.00	75
C. With only a 2½ -inch outlet There are 0 hydrants with only a 2½ -inch outlet.	0.00	25
D. With less than a 6 -inch branch There are 5 hydrants with less than a 6 -inch branch connection.	0.17	25
E. Flush Type There are 0 hydrants that are of the flush type.	0.00	25
F. Cistern or suction point There are 0 locations that are considered a cistern and/or a suction point.	0.00	25
Total	99.49	100

Note 1: 2 points are deducted for each 10 percent of the hydrants that are not operating in a uniform direction of the majority, or with an operating nut different from the majority.

Of the 735 hydrants that were reviewed, 0% did not operate in the direction of the majority and 0% had a different size operating nut.

Note 2: 10 points are deducted if more than one type hose thread is used for pumper or hose outlets. Of the 735 hydrants that were reviewed, none had a different hose thread than the majority. There were no points deducted for this item.

To determine the "Credit for Hydrants (CH)", the points credited in Item 620.A though 620.F are summed, including any deductions. The sum is divided by 100 and then multiplied by the 2 points available for Item 621 "Credit for Hydrants (CH)".

Item 621 "Credit for Hydrants (CH)" = 1.98

Item 630 – Credit for Inspection and Condition (3 points)

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

A. Inspection (HI):

The frequency of inspection is the average time interval between the 3 most recent inspections.

Frequency of Inspections	Points
½ year	100
1 year	80
2 years	65
3 years	55
4 years	45
5 years or more	40

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, 40 points are deducted.

B. Condition (HF):

A factor (HF) is determined from the following list of conditions according to the actual condition of hydrants examined compared with the total number examined during the survey:

Condition	Factor
Standard (no leaks, opens easily, conspicuous, well located for use by pumper)	1.0
Usable (with some defects and/or impediments to use)	0.5
Not Usable	0.0

For maximum credit, all hydrants should be inspected twice a year. The inspection should include operation of the fire hydrant, a test for leaks (using domestic pressure), and a flushing of the hydrant. Records should be kept of inspections.

Water System: Prineville

Item 630.A "Inspection (HI):"		Time Interval
Most recent inspection was Jun 01, 2011		
1st prior inspection was Jun 01, 2007		4 years
2nd prior inspection was Jun 01, 2003		4 years
Review of Inspection (HI):	**Earned Credit**	**Credit Available**
	32	100

Note: The inspection dates shown are for the water system which includes the largest concentration of hydrants in the graded area; however, the earned credit reflects the frequency of inspection for all applicable water systems.

For maximum credit, all hydrants should be conspicuous, well located for use by a pumper and in good condition. There were 28 hydrants examined in this FSRS item.

Item 630.B "Condition (HF):"		Maximum Factor
Standard: There were 24 hydrants considered in standard condition.		1.0
Usable: There were 4 hydrants considered in usable condition.		0.5
Not Usable: There were 0 hydrants considered not usable.		0.0
Review of Condition (HF):	**Condition Factor (HF)**	**Maximum Factor**
	0.93	1.0

To determine the "Credit for Inspection and Condition (CIC)", the points credited in Item 630.A are multiplied by the Condition Factor from Item 630.B. The product is divided by 100 and then multiplied by the 3 points available for Item 631 "Credit for Inspection and Condition (CIC)".

Item 631 "Credit for Inspection and Condition (CIC)" = 0.89

The final step in determining the credit for Water Supply is to add Item 616, Item 621, and Item 631:

Item	Earned Credit	Credit Available
616. Credit for Supply System (CSS)	**26.07**	35
621. Credit for Hydrants (CH)	**1.98**	2
631. Credit for Inspection and Condition (CIC)	**0.89**	3
Item 640. Credit for Water Supply:	**28.94**	**40**

Divergence = -3.77

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.

Summary of Public Protection Classification Review

Completed by ISO

for

Crook CO Fire and Rescue FD

FSRS Item	Earned Credit	Credit Available
Receiving and Handling Fire Alarms		
414. Credit for Telephone Service	**1.80**	2
422. Credit for Operators	**1.86**	3
432. Credit for Dispatch Circuits	**5.00**	5
440. Credit for Receiving and Handling Fire Alarms	**8.66**	**10**
Fire Department		
513. Credit for Engine Companies	**9.84**	10
523. Credit for Reserve Pumpers	**0.79**	1
532. Credit for Pumper Capacity	**5.00**	5
549. Credit for Ladder Service	**0.59**	5
553. Credit for Reserve Ladder and Service Trucks	**0.00**	1
561. Credit for Distribution	**2.17**	4
571. Credit for Company Personnel	**4.90**	15
580. Credit for Training	**3.46**	9
590. Credit for Fire Department	**26.75**	**50**
Water Supply		
616. Credit for Supply System	**26.07**	35
621. Credit for Hydrants	**1.98**	2
631. Credit for Inspection and Condition	**0.89**	3
640. Credit for Water Supply	**28.94**	**40**
Divergence	**-3.77**	--
Total Credit	**60.58**	**100**

Community Classification = 4/8B

If the individual scores Crook CO Fire and Rescue FD achieved for Receiving and Handling Fire Alarms; Fire Department; and Water Supply were translated into a 100 point scale instead of the (10, 50 and 40) points actually used, the relative Fire Suppression Rating Schedule classification for each of these sections would be:

Receiving and Handling Fire Alarms: a (relative) **Class 2**

Fire Department: a (relative) **Class 5**

Water Supply: a (relative) **Class 3**

INSURANCE SERVICES OFFICE, INC.

HYDRANT FLOW DATA SUMMARY

City Crook Co Fire And Rescue FD

County Crook State Oregon Witnessed by: Insurance Services Office, Inc. Date: May 16, 2012

TEST NO.	TYPE DIST.*	TEST LOCATION	SERVICE	FLOW - GPM $Q=(29.83(C(d^2)p^{0.5}))$ INDIVIDUAL HYDRANTS			TOTAL	PRESSURE PSI STATIC	RESID.	FLOW - AT 20 PSI NEEDED **	AVAIL.	REMARKS***
1	Comm	Lamonta Rd & Deer St	Prineville, Main Zone	1280	0	0	1280	42	28	4500	1600	
1A	Comm	Lamonta Rd & Deer St	Prineville, Main Zone	1280	0	0	1280	42	28	4000	1600	
1B	Comm	Lamonta Rd & Deer St	Prineville, Main Zone	1280	0	0	1280	42	28	2000	1600	
2	Comm	2nd & Knowledge	Prineville, Main Zone	730	0	0	730	40	36	5500	1700	
2R	Res	2nd & Knowledge	Prineville, Main Zone	730	0	0	730	40	36	1000	1700	
3	Comm	N Deer St & 3rd St	Prineville, Main Zone	690	690	0	1380	46	42	3500	3800	
4	Comm	Gardner & Murphy Ct	Prineville, Main Zone	1430	0	0	1430	52	30	4500	1800	
4A	Comm	Gardner & Murphy Ct	Prineville, Main Zone	1430	0	0	1430	52	30	3500	1800	
5	Comm	1100 Lynn - front	Prineville, Main Zone	670	0	0	670	40	26	4500	800	
5A	Comm	1100 Lynn - front hyd	Prineville, Main Zone	670	0	0	670	40	26	750	800	
6	Res	14152 SW Lupien Dr	Avion, PBVE	670	0	0	670	70	65	500	2300	
7	Res	7208 Joshua	Avion, Red Cloud	1400	0	0	1400	112	58	500	1900	
8	Res	Range Land & Mecate Dr	Avion, Brasada	1350	0	0	1350	80	64	500	2800	
9	Res	6322 SE Nighthawk	Highlands Subdivision WD, Main	790	0	0	790	88	26	500	850	
10	Res	17007 SE Zaltana	Indian Rock Estates, Main	270	0	0	270	100	80	500	550	(B)-(399 gpm)
11	Comm	Buena Villa & 3rd St	Prineville, Barnes Butte	920	0	0	920	74	52	3500	1500	(C)-(2540 gpm)

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.**

INSURANCE SERVICES OFFICE, INC.

HYDRANT FLOW DATA SUMMARY

City Crook Co Fire And Rescue FD

County Crook State Oregon Witnessed by: Insurance Services Office, Inc. Date: May 16, 2012

TEST NO.	TYPE DIST.*	TEST LOCATION	SERVICE	FLOW - GPM $Q=(29.83(C(d^2)p^{0.5}))$ INDIVIDUAL HYDRANTS			TOTAL	PRESSURE PSI STATIC	RESID.	FLOW - AT 20 PSI NEEDED **	AVAIL.	REMARKS***
12	Res	2710 SW Century	Westridge, Main	750	0	0	750	46	20	500	750	(B)-(382 gpm)
13	Comm	2734 High Desert - front	Prineville, Airport	1910	0	0	1910	68	42	3000	2700	
14	Comm	South of Lynn and Main	Prineville, Main Zone	670	670	0	1340	46	36	3000	2200	
15	Comm	1210 N Main St - front	Prineville, Hospital Red Zone	1560	0	0	1560	94	48	3500	2000	(C)-(1715 gpm)
16	Comm	Mariposa and Stone Ridge	Prineville, American Pine Green Zone	1690	0	0	1690	88	40	4500	2000	(D)-(1514 gpm)
16A	Comm	Mariposa & Stone Ridge	Prineville, American Pine Green Zone	1690	0	0	1690	88	40	1500	2000	

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 E
Fire Hydrant Flow Testing Results

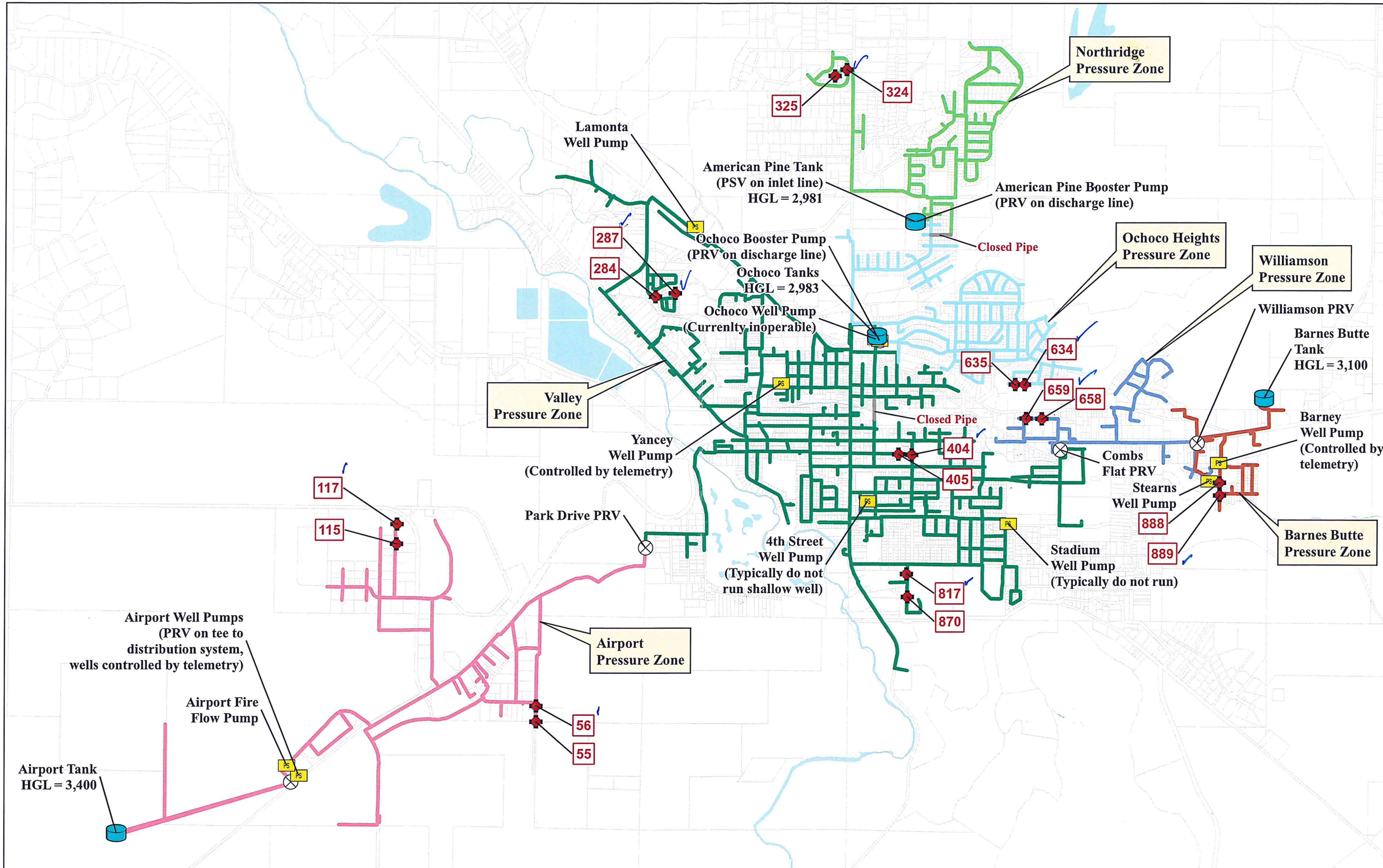
Prineville Hydrant Flushing Plan

Date: Oct 28-31 2016

	Pressure Zone	Residual Hydrant				Hydrant Flowing						Time of Day	Comments
		#	Location	Static Pressure (psi)	Residual Pressure (psi)	#	Location	Inside Diameter of Outlet Nozzle, D (inches)	Outlet Nozzle Coefficient, C_d (1)	Pitot Pressure, P (psi)	Flow (gpm) (2)		
oct 28 2016	Airport	56	Cessna Drive and Baldwin Road	64	54	55	South end of Baldwin Road	2"		40	752		
		115	Commerce Court	74	62	117	North end of Commerce Court	2"		48	824		Pitot (50) #115 @841 GPM
oct 31	Barnes Butte	888	Stearns Road	84	82	889	Stearns Road and Triangle Outfit Drive	2"		60	920		
oct 31	Northridge	324	Saddlehorn Court and Saddleridge Loop	84	60	325	End of Saddlehorn Court	2"		38	733		
oct 31	Ochoco Heights	634	Boxcar Drive	74	53	635	Boxcar Drive and Union Loop	2"		40	752		
oct 28 2016	Valley	817	Fairgrounds Hydrant South of Lynn Boulevard	48	44	870	Fairgrounds Hydrant	2"		36	713		
oct 31		284	Western Sky Road	68	56	287	End of Bucko Court	2"		36	713		
		405	2nd Street and Elm Street	50	42	404	2nd Street and Fairview Street	2"		32	673		
oct 31	Williamson	658	Hydrant behind commercial development	92	66	659	Ochoco Plaza Drive	2"		48	824		

(1) Outlet nozzle coefficient is determined by feeling the inside of the hydrant nozzle; rounded (C=0.9), square and sharp (C=0.8), projecting (C=0.7)

(2) Flow = $C_f C_d D^2 P^{1/2}$ where C_f = 29.8 (unit conversion factor, English), C_d = discharge coefficient, D = outlet diameter (inches), and P = pressure reading from Pitot gage (psi).



Northridge Pressure Zone
325
324
Lamonta Well Pump
American Pine Tank (PSV on inlet line) HGL = 2,981
American Pine Booster Pump (PRV on discharge line)
Closed Pipe
287
284
Ochoco Booster Pump (PRV on discharge line)
Ochoco Tanks HGL = 2,983
Ochoco Heights Pressure Zone
Williamson Pressure Zone
Williamson PRV
Ochoco Well Pump (Currenlty inoperable)
Barnes Butte Tank HGL = 3,100
635
634
659
658
Valley Pressure Zone
Closed Pipe
Barney Well Pump (Controlled by telemetry)
Yancey Well Pump (Controlled by telemetry)
404
Combs Flat PRV
405
Stearns Well Pump
117
888
Park Drive PRV
115
889
Barnes Butte Pressure Zone
4th Street Well Pump (Typically do not run shallow well)
Stadium Well Pump (Typically do not run)
817
870
Airport Well Pumps (PRV on tee to distribution system, wells controlled by telemetry)
Airport Pressure Zone
Airport Fire Flow Pump
56
55
Airport Tank HGL = 3,400

APPENDIX F
Well Logs

CROO 2121

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

WATER WELL REPORT
STATE OF OREGON

CROO 2121

State Well No. 15/16 - 5 E (4)

State Permit No.

(1) OWNER:
Name Pacific Power and Light Co.
Address Prineville, Oregon

(2) LOCATION OF WELL:
County Crook Owner's number, if any—
SW ¼ NW ¼ Section 5 T. 15S R. 16W W.M.
Bearing and distance from section or subdivision corner (approx.)
375 feet North and 370 feet East of quarter section corner to Section 5 & 6, T15S, R16E, WM

(3) TYPE OF WORK (check):
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 ☒
24" Diam. from Surf. ft. to 222 ft. Gage 3/8" wal
12" Diam. from Surf ft. to 222 ft. Gage 43.45 #
12" Diam. from 242.5 ft. to 252 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 Johnson
Type Stainless Steel Model No.
Diam. 12 Slot size 100 Set from 222 ft. to 242.5 ft.
Diam. Slot size Set from ft. to ft.

(9) CONSTRUCTION:
Was well gravel packed? ☒ Yes ☐ No Size of gravel: ¼" to #10
Gravel placed from 202 ft. to 252 ft.
Was a surface seal provided? ☒ Yes ☐ No To what depth? 40 ft.
Material used in seal— neat cement grout
Did any strata contain unusable water? ☐ Yes ☐ No
Type of water? Depth of strata
Method of sealing strata off

(10) WATER LEVELS:
Static level 35 ft. below land surface Date Oct. 6,60
Artesian pressure lbs. per square inch Date

Log Accepted by:
[Signed] Date , 19
(Owner)

(11) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? ☒ Yes ☐ No If yes, by whom? -
Yield: 400 gal./min. with 74 ft. drawdown after 12 hrs.
" 500 600 " 93 115 " 12 12 "
" 650 " 130 " 12 "
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? ☐ Yes ☐ No

(12) WELL LOG: Diameter of well 12 inches.
Depth drilled 252 ft. Depth of completed well 252 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
Black silty clay	0	6
Cemented gravel	6	9
sand, silt, and gravel	9	27
Sand and gravel - water	27	38
Packed sand	38	43
Sandy silt	43	68
Blue silt	68	81
Sandy silt	81	103
Black silt	103	149
Silt and broken rock	149	155
Sandy silt	155	161
Black silt	161	173
Grey silt	173	206
Sticky green clay	206	221
Water bearing sand and gravel	221	242
Sandy silt	242	252

Work started July 22 1960 Completed Oct. 12 1960

(13) PUMP:
Manufacturer's Name
Type: H.P.

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 SE Sunset Lane, Portland 6, Oregon
Driller's well number 4103
[Signed] Robert L. Strasser partner (Well Driller)
License No. 10 Date Oct. 17, 1960

CC (USE ADDITIONAL SHEETS IF NECESSARY)

OBSERVATION WELL

CROO 2130

STATE ENGINEER
Salem, Oregon

Well Record

CRUO 2130

STATE WELL NO. 15/16-5E(3)
COUNTY Crook
APPLICATION NO. U-396
Permit U-370

OWNER: Pacific Power & Light Co.
MAILING ADDRESS:

LOCATION OF WELL: Owner's No. 5
CITY AND STATE: Prineville, Oregon

SW ¼ NW ¼ Sec. 5 T. 15 ~~N.~~ S., R. 16 E. ~~W.~~, W.M.

Bearing and distance from section or subdivision corner Lot 9, Block 8, Oregon & Western Add.
Well approx. 20' N. of well 5E(1)

Altitude at well

E(3)

Section 5

TYPE OF WELL: Drilled Date Constructed Aug. 50

Depth drilled 75 Depth cased 61

CASING RECORD:

10-inch casing to 61 feet, backfilled with gravel to 51 feet

FINISH:

Perforations from 13 to 22 feet

AQUIFERS:

Gravel from 13 to 28 feet

WATER LEVEL:

4.5 feet below land surface, August 8, 1950

PUMPING EQUIPMENT: Type Centrifugal H.P. 25
Capacity 450 G.P.M.

WELL TESTS:
Drawdown ft. after hours G.P.M.
Drawdown ft. after hours G.P.M.

USE OF WATER Municipal Temp. °F. , 19
SOURCE OF INFORMATION U-396
DRILLER or DIGGER
ADDITIONAL DATA:
Log x Water Level Measurements Chemical Analysis Aquifer Test

REMARKS:

CROO 2130

STATE ENGINEER
Salem, Oregon

State Well No. 15/16-5E(3)
County Crook
Application No. U-396

Well Log

Owner: Pacific Power & Light Co. Owner's No. 5

Driller: Date Drilled August 1950

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Clay and silt	0	6	6
Gravel, coarse	6	11	5
Gravel, cemented	11	13	2
Gravel	13	28	15
Sand, brown	28	38	10
Sand, black	38	65	27
Clay	65	75	10

Crook 15/16-5E(3)

CROO 2130

Oregon State Board of Health

SANITARY ENGINEERING LABORATORY

REPORT OF MINERAL ANALYSIS OF WATER

Location of source Prineville Description of source Well #

Analysis by MBP Date 12/17/54 Collected by Date 8/23/54

RESULTS

	Parts per million
Turbidity	7
Color: Apparent / True	3
Odor: Hot / Cold	
Total Solids	304
Loss on Ignition	110
Silicon (SiO_2)	25
Chloride (Cl)	7.8
Sulfate (SO_4)	15
Calcium (Ca)	45
Magnesium (Mg)	14
Aluminum (Al)	0
Orthophosphates (PO_4)	.2
Metaphosphates $(PO_3)_6$	
Alkalinity (as $CaCO_3$): Carbonate	26
Bicarbonate	210
Hardness (as $CaCO_3$)	175
Sodium ~~and Potassium~~ (as Na)	44
Iron (Fe)	0
Manganese (Mn)	0
Fluoride (F)	.2
Carbon Dioxide (CO_2)	2.2

pH 8.3

Remarks

PHE-10

NOTICE TO WATER WELL CONTRACTOR
The original and first copy of this report are to be filed with the

WATER RESOURCES DEPARTMENT, SALEM, OREGON 97310 within 30 days from the date of well completion.

CROO 1894

WATER WELL REPORT

JAN 13 1981

STATE OF OREGON

WATER RESOURCES DEPT SALEM, OREGON

(Please type or print)

(Do not write above this line)

dh

State Well No. 15S-15E-11dc

State Permit No.

(1) OWNER:

Name JERE Gruniger

Address P.O Box 182 Redmond, Oregon 97756

(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 ☒

8" Diam. from +2 ft. to 25 ft. Gage .250

" Diam. from ft. to ft. Gage

" Diam. from ft. to ft. Gage

(6) PERFORATIONS:

Perforated? ☐ Yes ☒ No.

Type of perforator used

Size of perforations in. by in.

perforations from ft. to ft.

perforations from ft. to ft.

perforations from ft. to ft.

(7) SCREENS:

Well screen installed? ☐ Yes ☒ No

Manufacturer's Name

Type Model No.

Diam. Slot size Set from ft. to ft.

Diam. Slot size Set from ft. to ft.

(8) WELL TESTS:

Drawdown is amount water level is lowered below static level

Was a pump test made? ☐ Yes ☒ No If yes, by whom?

Yield: gal./min. with ft. drawdown after hrs.

Blow Tested @ 135 G.P.M 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 25 ft.

Diameter of well bore to bottom of seal 12 in.

Diameter of well bore below seal 8 in.

Number of sacks of cement used in well seal 17 sacks

How was cement grout placed? Pressure grouted with 1" pipe from 25 ft. to surface

Was a drive shoe used? ☐ Yes ☒ No Plugs Size: location ft.

Did any strata contain unusable water? ☐ Yes ☒ No

Type of water? - depth of strata -

Method of sealing strata off -

Was well gravel packed? ☐ Yes ☒ No Size of gravel:

Gravel placed from ft. to ft.

(10) LOCATION OF WELL:

County Crook Driller's well number

N.W ¼ S.E ¼ Section 11 T. 15S R. 15E W.M.

Bearing and distance from section or subdivision corner

Prineville Airport

(11) WATER LEVEL: Completed well.

Depth at which water was first found 448 ft.

Static level 414 ft. below land surface. Date 12-11-80

Artesian pressure - lbs. per square inch. Date -

(12) WELL LOG:

Diameter of well below casing 8"

Depth drilled 492 ft. Depth of completed well 475 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
Overburden	0	1	
BASALT	1	195	
SANdSTONE & Cong. Br.	195	448	414
WATerbearing BASALT	448	475	

RECEIVED
DEC 15 1980
WATER RESOURCES DEPT
SALEM, OREGON

Work started 11-12 19 Completed 12-11 1980

Date well drilling machine moved off of well 12-12 1980

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] M. Gordon Davidson (Drilling Machine Operator) Date 11-12 1980

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 P.O Box 315 Redmond, Ore.

[Signed] M. Gordon Davidson (Water Well Contractor)

Contractor's License No. 548 Date 11-12, 1980

(USE ADDITIONAL SHEETS IF NECESSARY)

SP*45656-119

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.765)
Instructions for completing this report are on the last page of this form

CROO 53453

WELL ID # L 89932

(START CARD) # 190442

(1) OWNER:
Well Number: Airport#2

Name: City of Prineville
Address: 387 NE Third Street
City: Prineville State: OR Zip: 97754

(2) TYPE OF WORK:
[X] New Well [ ] Deepening [ ] Alteration (repair/recondition) [ ] Abandonment

(3) DRILL METHOD:
[X] Rotary Air [ ] Rotary Mud [X] Cable [ ] Auger
[ ] Other

(4) PROPOSED USE:
[ ] Domestic [X] Community [ ] Industrial [ ] Irrigation
[ ] Thermal [ ] Injection [ ] Livestock [ ] Other

(5) BORE HOLE CONSTRUCTION:
Special Construction approval [ ] Yes [X] No Depth of Completed Well 546 ft.
Explosives used [ ] Yes [X] No Type Amount

HOLE Diameter	From	To	SEAL Material	From	To	Amount sacks or pounds
22in	0	30	Cement Slurry	0	112	154 sacks
20in	30	335	Cement Slurry	403	452	66 sacks
18in	335	454				
15in	454	546				

How was seal placed: Method [ ] A [ ] B [X] C [ ] D [ ] E
[ ] Other
Backfill placed from 112 ft. to 403 ft. Material Bentonite Chips
Gravel placed from 442 ft. to 546 ft. Size of gravel 8x12

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	16	+2	452	.375	[X]	[ ]	[X]	[ ]
					[ ]	[ ]	[ ]	[ ]
					[ ]	[ ]	[ ]	[ ]
					[ ]	[ ]	[ ]	[ ]
Liner:	12in	442	447	.250	[X]	[ ]	[X]	[ ]
	12	452	474	.250	[X]	[ ]	[X]	[ ]

Final location of shoe(s)

(7) PERFORATIONS/SCREENS:
[ ] Perforations Method: Factory - Roscoe Moss
[X] Screens Type: Wire Wrap Material: Stainless

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
447	452	.055		12	pipe	[ ]	[X]
474	539	.055		12	pipe	[ ]	[X]
						[ ]	[ ]
						[ ]	[ ]
						[ ]	[ ]

(8) WELL TESTS: Minimum testing time is 1 hour
[X] Pump [ ] Bailer [ ] Air [ ] Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
700	11.5	475	24 hr.

Temperature of Water 54 Depth Artesian Flow found
Was a water analysis done? [ ] Yes By whom
Did any strata contain water not suitable for intended use? [ ] Too little
[ ] Salty [ ] Muddy [ ] Odor [ ] Colored [ ] Other
Depth of strata:

(9) LOCATION OF WELL by legal description:
County: Crook Latitude Longitude
Township: 15S N or S. Range: 15E E or W. of WM.
Section: 11 NW 1/4 SE 1/4
Tax lot: 303 Lot Block Subdivision
Street Address of Well (or nearest address): 4585 Airport, Prineville, OR 97754

(10) STATIC WATER LEVEL:
408 ft. below land surface. Date 7/11/2007
Artesian pressure lb. per square inch. Date

(11) WATER BEARING ZONES:
Depth at which water was first found 420

From	To	Estimated Flow Rate	SWL
420	546	1000+	407

(12) WELL LOG:
Ground elevation

Material	From	To	SWL
Brown Clay & Rock	0	2	
Hard Gray Basalt	2	48	
Fractured Basalt Gray with Brown	48		
Seams		72	
Hard Gray Basalt with Green Seams	72	152	
Hard Gray with Brown Seams	152	197	
Soft Brown Sandstone Cong.	197	232	
Soft Sand Semi-Consolidated	232	270	
Loose Brown Sand	270	295	
Sand & Gravel	295	372	
Brown Conglomerate	372	420	
Brown Sandstone WB	420	442	408
Hard Gray Basalt	442	452	408
Semi Consolidated River Gravel WB	454	546	408

WESTERN WATER DEVELOPMENT
P.O. Box 1670
Redmond, OR 97756

RECEIVED
JUL 23 2007
WATER RESOURCES DEPT
SALEM, OREGO

Date started 4/13/2007 Completed 7/11/2007

(unbonded) Water Well Constructor Certification:
I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to my best knowledge and belief.

WWC Number
Signed Date

(bonded) Water Well Constructor Certification:
I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.

WWC Number 1385
Signed Robert Buckner Date 7/17/2007
Robert Buckner

ORIGINAL - WATER RESOURCES DEPARTMENT FIRST COPY - CONSTRUCTOR SECOND COPY - CUSTOMER

Amended 8/11/14
CROO 54149

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.765 & OAR 690-205-0210)

CROO 54149
7/12/2014

WELL I.D. LABEL# L 108444
START CARD # 1021358
ORIGINAL LOG #

(1) LAND OWNER Owner Well I.D.
First Name Last Name
Company CITY OF PRINEVILLE
Address 387 N.E. THIRD STREET
City PRINEVILLE State OR Zip 97754

(2) TYPE OF WORK [ ] New Well [ ] Deepening [ ] Conversion
[X] Alteration (complete 2a & 10) [ ] Abandonment(complete 5a)

(2a) PRE-ALTERATION
Casing: Dia + From To Gauge Stl Plstc Wld Thrd
Seal: Material From To Amt sacks/lbs

(3) DRILL METHOD
[X] Rotary Air [ ] Rotary Mud [ ] Cable [ ] Auger [ ] Cable Mud
[ ] Reverse Rotary [ ] Other

(4) PROPOSED USE [ ] Domestic [ ] Irrigation [X] Community
[ ] Industrial/ Commercial [ ] Livestock [ ] Dewatering
[ ] Thermal [ ] Injection [ ] Other

(5) BORE HOLE CONSTRUCTION Special Standard [ ] (Attach copy)
Depth of Completed Well 703.00 ft.

BORE HOLE

Dia	From	To
12	0	703

SEAL

Material	From	To	Amt	sacks/lbs
Cement	0	545	352	S

How was seal placed: Method [ ] A [ ] B [X] C [ ] D [ ] E
[ ] Other
Backfill placed from 545 ft. to 703 ft. Material WELL PACK SAND
Filter pack from ft. to ft. Material Size
Explosives used: [ ] Yes Type Amount

(5a) ABANDONMENT USING UNHYDRATED BENTONITE
Proposed Amount Actual Amount

(6) CASING/LINER

Casing	Liner	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd
(●)		8	[X]	1	703	.250	(●)		[X]	

Shoe [ ] Inside [ ] Outside [ ] Other Location of shoe(s)
Temp casing [ ] Yes Dia From To

(7) PERFORATIONS/SCREENS
Perforations Method Factory Saw
Screens Type Material

Perf/Screen	Casing/Liner	Dia	From	To	Scrn/slot width	Slot length	# of slots	Tele/pipe size
Perf	Casing	8	565	665	.125	3	1520	
Perf.	CAsing	8	535	565	.375	1"	900	

(8) WELL TESTS: Minimum testing time is 1 hour
(●) Pump ( ) Bailer ( ) Air ( ) Flowing Artesian

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration (hr)
265	145	588	4
300	175.2	588	4

Temperature 61 °F Lab analysis [X] Yes By Umpqua Labs
Water quality concerns? [ ] Yes (describe below) TDS amount

From	To	Description	Amount	Units

(9) LOCATION OF WELL (legal description)
County CROOK Twp 15.00 S N/S Range 15.00 E E/W WM
Sec 11 NE 1/4 of the SW 1/4 Tax Lot 300
Tax Map Number Lot
Lat ° ' " or DMS or DD
Long ° ' " or DMS or DD
(●) Street address of well ( ) Nearest address
2975 GEORGE MILLICAN ROAD
PRINEVILLE, OREGON 97754

(10) STATIC WATER LEVEL

	Date	SWL(psi)	+	SWL(ft)
Existing Well / Pre-Alteration	10/11/2013			370
Completed Well	6/6/2014			370

Flowing Artesian? [ ] Dry Hole? [ ]

WATER BEARING ZONES Depth water was first found

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)

(11) WELL LOG Ground Elevation

Material	From	To

RECEIVED BY OWRD
AUG 12 2014
SALEM, OR

Date Started 10/14/2013 Complete 7/7/2014

(unbonded) Water Well Constructor Certification
I certify that the work I performed on the construction, deepening, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.
License Number Date
Signed

(bonded) Water Well Constructor Certification
I accept responsibility for the construction, deepening, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.
License Number 1385 Date 7/12/2014
Signed ROBERT BUCKNER (E-filed)
Contact Info (optional)

CROO 54149

CROO 54149

WATER SUPPLY WELL REPORT - continuation page

7/12/2014

WELL I.D. LABEL# L 108444

START CARD # 1021358

ORIGINAL LOG #

(2a) PRE-ALTERATION

Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd

Material	From	To	Amt	sacks/lbs

Water Quality Concerns

From	To	Description	Amount	Units

(5) BORE HOLE CONSTRUCTION

BORE HOLE / SEAL

Dia	From	To	Material	From	To	Amt	sacks/lbs

FILTER PACK

From	To	Material	Size

(10) STATIC WATER LEVEL

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)

(6) CASING/LINER

Casing	Liner	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd

(11) WELL LOG

Material	From	To

RECEIVED BY OWRD

AUG 12 2014

SALEM, OR

Western Water Development
P.O. Box 1670
Redmond, OR 97756

(7) PERFORATIONS/SCREENS

Perf/Screen	Casing/Liner	Screen Dia	From	To	Scrn/slot width	Slot length	# of slots	Tele/pipe size

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

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration (hr)

Comments/Remarks

Removed existing 8" casing, reamed hole to 12", re-installed 8" casing, pressure grouted annulus through cementing packer assembly as per drinking water requirements.

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.765 & OAR 690-205-0210)

CROO 54191
12/29/2014

WELL I.D. LABEL# L 114180
START CARD # 1021882
ORIGINAL LOG #

(1) LAND OWNER

Owner Well I.D.
First Name — Last Name
Company: CITY OF PRINEVILLE
Address: 387 N.E. THIRD STREET
City: PRINEVILLE State: OR Zip: 97754

(2) TYPE OF WORK

☒ New Well ☐ Deepening ☐ Conversion
☐ Alteration (complete 2a & 10) ☐ Abandonment(complete 5a)

(2a) PRE-ALTERATION

	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd
Casing:									

	Material	From	To	Amt	sacks/lbs
Seal:					

(3) DRILL METHOD

☒ Rotary Air ☒ Rotary Mud ☐ Cable ☐ Auger ☐ Cable Mud
☐ Reverse Rotary ☐ Other

(4) PROPOSED USE

☐ Domestic ☐ Irrigation ☒ Community
☐ Industrial/ Commericial ☐ Livestock ☐ Dewatering
☐ Thermal ☐ Injection ☐ Other

(5) BORE HOLE CONSTRUCTION

Special Standard ☐ (Attach copy)
Depth of Completed Well 607.00 ft.

BORE HOLE

Dia	From	To
22	0	482
17.25	482	607

SEAL

Material	From	To	Amt	sacks/lbs
Cement w/2% Bentonite	0	482	462	S

How was seal placed: Method ☒ A ☐ B ☐ C ☐ D ☐ E
☐ Other
Backfill placed from ft. to ft. Material
Filter pack from ft. to ft. Material Size
Explosives used: ☐ Yes Type Amount

(5a) ABANDONMENT USING UNHYDRATED BENTONITE

Proposed Amount Actual Amount

(6) CASING/LINER

Casing	Liner	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd
◉	○	18	☒	2	482	.375	◉	○	☒	☐
○	◉	16	☐	452	472	.375	◉	○	☒	☐
○	◉	16	☐	572	597	.375	◉	○	☒	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐

Shoe ☐ Inside ☐ Outside ☐ Other Location of shoe(s)
Temp casing ☐ Yes Dia From To

(7) PERFORATIONS/SCREENS

Perforations Method
Screens Type: Wire wrap Material: SS 304L

Perf/ Screen	Casing/ Liner	Screen Dia	From	To	Scrn/slot width	Slot length	# of slots	Tele/ pipe size
Screen	Liner	16	472	572	.09			16
Screen	Liner	14	597	607	.09			14

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

◉ Pump ○ Bailer ○ Air ○ Flowing Artesian

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration (hr)
780	26	575	120

Temperature 56 °F Lab analysis ☒ Yes By Umpqua Labs
Water quality concerns? ☐ Yes (describe below) TDS amount

From	To	Description	Amount	Units

(9) LOCATION OF WELL (legal description)

County: CROOK Twp: 15.00 S N/S Range: 15.00 E E/W WM
Sec: 11 1/4 of the 1/4 Tax Lot: 300
Tax Map Number Lot
Lat ° ' " or 44.27911111 DMS or DD
Long ° ' " or -120.90075000 DMS or DD
○ Street address of well ◉ Nearest address

AIRPORT ROAD, PRINEVILLE, OREGON

(10) STATIC WATER LEVEL

	Date	SWL(psi)	+	SWL(ft)
Existing Well / Pre-Alteration			☐	
Completed Well	11/28/2014		☐	435

Flowing Artesian? ☐ Dry Hole? ☐

WATER BEARING ZONES Depth water was first found 340.00

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)
1/20/2014	340	365	200		☐	340
3/3/2014	470	607	1200		☐	435
					☐	
					☐	
					☐	

(11) WELL LOG

Ground Elevation 3248.00

Material	From	To
Road Fill	0	3
Brown Caliche	3	14
Hard Gray Basalt	14	32
Broken Brown and Gray Basalt & Lost Circ	32	209
Sand & Gravels some brown clay	209	245
Brown Sandstone	245	340
Sandstone with Gravel Layer WB	340	365
Brown Sandstone	365	465
Broken Basalt, Gravel & Cinders	465	515
Gray Basalt with Gravel interbeds	515	545
Brown Sandstone Tuff	545	565
Hard Gray Basalt	565	607

Date Started 12/23/2013 Completed 5/30/2014

(unbonded) Water Well Constructor Certification

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

License Number Date

Signed

(bonded) Water Well Constructor Certification

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

License Number 1385 Date 12/29/2014

Signed ROBERT BUCKNER (E-filed)

Contact Info (optional)

RECEIVED

FEB - 2 1995

WATER RESOURCES DEPT.
SALEM, OREGON

11

CROO
3132

155/16E/4ac

STATE OF OREGON
WATER WELL REPORT
(as required by ORS 537.765)

(START CARD) # 69126

(1) OWNER: Well Number #1, Barney Well
Name City of Prineville
Address 400 E. Third St.
City Prineville State Or. Zip 97754

(2) TYPE OF WORK:
[X] New Well [ ] Deepen [ ] Recondition [ ] Abandon

(3) DRILL METHOD:
[ ] Rotary Air [X] Rotary Mud [ ] Cable
[ ] Other

(4) PROPOSED USE:
[ ] Domestic [X] Community [ ] Industrial [ ] Irrigation
[ ] Thermal [ ] Injection [ ] Other

(5) BORE HOLE CONSTRUCTION:
Special Construction approval [ ] Yes [X] No Depth of Completed Well 280' ft.
Explosives used [ ] Yes [X] No Type Amount

HOLE Diameter	From	To	SEAL Material	From	To	Amount sacks or pounds
22"	0	280	cement	0	207	135 sacks

How was seal placed: Method [ ] A [ ] B [ ] C [ ] D [ ] E
[ ] Other pumped via tremie pipe
Backfill placed from 207 ft. to 214 ft. Material .30 sand
Gravel placed from 214 ft. to 279 ft. Size of gravel 3/8 washed

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	10"	+2	280	388	[X]	[ ]	[X]	[ ]
					[ ]	[ ]	[ ]	[ ]
					[ ]	[ ]	[ ]	[ ]
~~Liner~~					[ ]	[ ]	[ ]	[ ]
~~XXX~~					[ ]	[ ]	[ ]	[ ]
tremie	4"	+1.5	215	250	[X]	[ ]	[ ]	[X]

Final location of shoe(s)

(7) PERFORATIONS/SCREENS:
[X] Perforations Method factory
[ ] Screens Type Material

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
219	279	1/8	3000	10"		[X]	[ ]
						[ ]	[ ]
						[ ]	[ ]
						[ ]	[ ]
						[ ]	[ ]

(8) WELL TESTS: Minimum testing time is 1 hour
[ ] Pump [ ] Bailer [X] Air [ ] Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
700 +	110'	250	1 hr.

Temperature of Water 65 Depth Artesian Flow Found 217
Was a water analysis done? [X] Yes By whom City of Prineville
Did any strata contain water not suitable for intended use? [ ] Too little
[ ] Salty [ ] Muddy [ ] Odor [ ] Colored [X] Other Artesian sealing
Depth of strata: 22-35

(9) LOCATION OF WELL by legal description:
County Crook Latitude Longitude
Township 15 S N or S. Range 16 E E or W. WM.
Section 4 SW ¼ NE ¼
Tax Lot 2500 Lot Block Subdivision
Street Address of Well (or nearest address) Barney Well Site

(10) STATIC WATER LEVEL:
35' ft. below land surface. Date 12-14-94
Artesian pressure -0- lb. per square inch. Date

(11) WATER BEARING ZONES:
Depth at which water was first found 22' & 217'

From	To	Estimated Flow Rate	SWL
22	35	100 gpm	9'
217'	265'	700 +	35'

(12) WELL LOG:
Ground elevation

Material	From	To	SWL
top soil	0	12	
gravel & brown clay	12	22	
w/b gravel	22	35	
soft black clay	35	120	
sticky black clay	120	217	35
coarse sand, med. gravel	217	238	"
coarse gravels	238	265	"
hard blue claystone	265	280	"

All construction and test pumping information of this well can be attained from David Evans and Assoc. Bend, Or. .

All construction standards were varified by David Evans & Assoc. , under contract to the City of Prineville.

Date started 11-10-94 Completed 12-14-94

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

WWC Number
Signed Date

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

WWC Number 741
Signed [signature] Date 12-29-94

ORIGINAL
File Original and Duplicate with the STATE ENGINEER, SALEM, OREGON

CROO 1540

WATER WELL REPORT
STATE OF OREGON

CROO 1540

Well No. 14/16-31bda

State Permit No. G-506

(1) OWNER:
Name Pacific Power & Light Company
Address 920 S. W. 6th Avenue
Portland 4, Oregon 97204

(2) LOCATION OF WELL:
County Crook County Owner's number, if any— Well #7
NW ¼ NW ¼ Section 31 T. 14S R. 16 E W.M.
Bearing and distance from section or subdivision corner
S 58° 13' 20" East 1447 feet from N.W. corner of Section 31, T 14 S, R 16 E, WM.

(3) TYPE OF WORK (check):
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 ☒
24" O." Diam. from 0 ft. to 230 ft. Gage 5/16" wall
12" I." Diam. from 0 ft. to 228 ft. Gage 5/16" wall
12" I." Diam. from 253 ft. to 256 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 A D Cook & Son
Type Wire Wound Model No. 75WS
Diam. 12" I.D. Slot size 25 Set from 228 ft. to 253 ft.
Diam. Slot size Set from ft. to ft.

(9) CONSTRUCTION:
Was well gravel packed? ☒ Yes ☐ No Size of gravel:
Gravel placed from 253 ft. to 205 ft.
Was a surface seal provided? ☒ Yes ☐ No To what depth? 15 ft.
Material used in seal— Concrete
Did any strata contain unusable water? ☒ Yes ☐ No
Type of water? Surface Water Depth of strata 0 to 12 ft.
Method of sealing strata off Cased off and concrete seal.

(10) WATER LEVELS:
Static level 17 ft. below land surface Date Sept. 4, '57
Artesian pressure Slight lbs. per square inch Date Sept. 27 '57

Log Accepted by: PACIFIC POWER & LIGHT COMPANY
[Signed] George T. Bragg (Owner) Date January 28, 1958
Vice President

(11) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? ☒ Yes ☐ No If yes, by whom?
Yield: 550 gal./min. with 84 ft. drawdown after 8 hrs.
" 800 " 200 " 1 "
" " " "
Bailer test No gal./min. with ft. drawdown after hrs.
Artesian flow Slight g.p.m. Date Sept. 27, 1957
Temperature of water - Was a chemical analysis made? ☒ Yes ☐ No Attached.

(12) WELL LOG: Diameter of well 24 inches.
Depth drilled 256 ft. Depth of completed well 256 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
Soft sand	0	2
Sand Stone & Surface Water	2	12
Clay	12	19
Gravel with Clay Binder	19	31
Sandy Silt	31	52
Sandy Silt & Some Gravel	52	57
Sandy Silt	57	101
Sandy Silt & Some Gravel	101	122
Silt	122	194
Sticky Shale	194	223
Yellow Silt	223	228
Cemented Gravel	228	231
Sand & Gravel, Water Bearing	231	252
Yellow Clay	252	256

Work started May 20 1957. Completed Sept. 4 1957

(13) PUMP:
Manufacturer's Name Fairbanks Morse Co. Pamona Pump Di
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 R. J. Strasser Drilling Co
(Person, firm, or corporation) (Type or print)
Address 8110 SE Sunset Lane -Portland 6, Orego
Driller's well number 3092
[Signed] Robert L. Strasser - Partner
(Well Driller)
License No. 10 Date Jan. 23, 1958

(USE ADDITIONAL SHEETS IF NECESSARY)

PRospect 1-2355

CROO 1540

14/16-31D (1)
App G605
Per G506
Crook Co

R. J. Strasser Drilling Co.

8110 S. E. Sunset Lane
Portland 6, Oregon

Sept. 17, 1957

Log of 12" well drilled for Pacific Power & Light Company.
Legal Description of well location: S 58degrees 13 min. 20 sec.east for 1447 ft. from N.W. Corner of Sec. 31, Township 14 S. R 16E Willamette Meridian, Crook County, Ore.

0 - 2	Soft sand
2 - 12	Sandstone, with surface water
12 - 19	Clay
19 - 31	Gravel with clay binder.
31 - 52	Sandy silt
52 - 57	Sandy silt with some gravel
57 -101	Sandy silt
101 -122	Sandy silt with some gravel
122 -194	Silt
194 -223	Sticky shale
223 -228	Yellow silt
228 -231	Cemented gravel
231 -252	Sand and gravel, water-bearing
252 -256	Yellow clay

Casing:
0 - 230 ft.---24" O.D. 5/16 wall pipe.
0- 230 ft.---12" I.D. 5/16 wall pipe.
230 - 253 ft.---12" I.D. Cook Well Screen
253 - 256 ft.---12" I.D. 5/16 wall pipe. Steel plate welded on bottom of pipe.
Opening between 12" pipe and inside of 24" pipe filled with gravel-pack material to 205 ft. Opening between 15 ft. and 205 ft. filled with clay. Cement seal from 5 ft. to 15 ft.

Static water level---17 ft.
Pumping level, at 550 g.p.m.--101 ft.

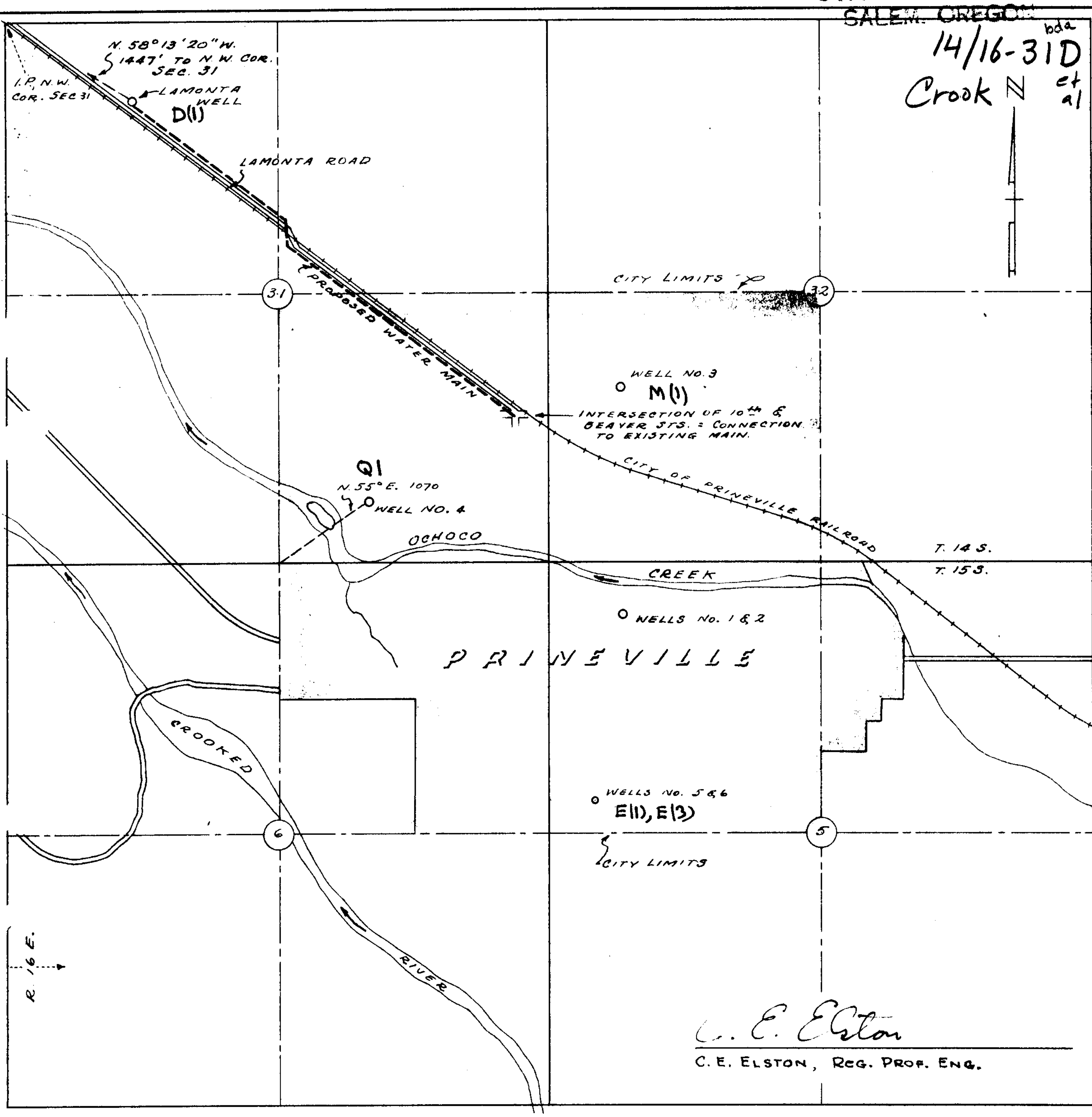
R J Strasser

Application No. G-605
Permit No. G-506

CROO 1540

RECEIVED
APR 5 1957
STATE ENGINEER
SALEM, OREGON

bda
14/16-31D
Crook et al



C. E. Elston

C. E. ELSTON, REG. PROF. ENG.

CERTIFICATE:

I, C. E. ELSTON OF PORTLAND, OREGON DO HEREBY CERTIFY THAT THIS MAP WAS MADE FROM NOTES TAKEN DURING AN ACTUAL SURVEY MADE UNDER MY IMMEDIATE SUPERVISION ON MARCH 15, 1957, THAT THE WELL SHOWN HEREON CONSISTING OF A 24" STEEL CASING IS S. 58°13'20" E., 1447' FROM THE N.W. COR. OF SEC. 31, T. 14 S., R. 16 E.W.M., CROOK COUNTY, OREGON.

Chester E. Elston

PACIFIC POWER & LIGHT COMPANY
proposed
NEW WELL (LAMONTA WELL)
for
PRINEVILLE MUNICIPAL WATER SYSTEM
In Sec. 31, T. 14 S., R. 16 E.W.M.
Prineville, Crook County, Oregon

SCALE: 4" = 1 Mile March, 1957

CROO 1540

bdq
14/16-31D(1)
CROOK CO.

TO: [illegible]

DATE: [illegible] 1957

SUBJECT: [illegible] Water Deep well
[illegible] Well #4

DATE RECEIVED: 11-25-57

pH Value 7.24

	parts per million
Total Solids (Residue on Evaporation)	271
Volatile Solids (Loss on Ignition)	21
Alkalinity (as $CaCO_3$)	
Carbonate	0
Bicarbonate	142
Hardness (as $CaCO_3$)	148
Silica (SiO_2)	43.5
Iron (Fe)	0.04
Aluminum (Al)	0.63
Calcium (Ca)	33.0
Magnesium (Mg)	15.9
Sodium (Na)	24.0
Potassium (K)	3.5
Manganese (Mn)	0.0
Chloride (Cl)	19.8
Sulfate (SO_4)	21.6
Fluoride (F)	0.0
Nitrate (NO_3)	5.0
Free Carbon Dioxide (CO_2)	15

This water is classed as a hard bicarbonate type. Because of its hardness it will be scale-forming and will require treatment for use in steam boiler operation. It is low in iron and non-corrosive, so should not cause iron staining of laundry or fixtures.

Except for the nuisance due to hardness the water should be satisfactory for general domestic use and irrigation.

CHARLTON LABORATORIES, INC.

[illegible]

By [illegible]

OBSERVATION WELL

STATE ENGINEER
Salem, Oregon

CROO 1577

Well Record

STATE WELL NO. 14/16-32M(1)
COUNTY Crook
APPLICATION NO. U-147
PERMIT U-140

OWNER: Pacific Power & Light Co. MAILING ADDRESS:

LOCATION OF WELL: Owner's No. 3-Ochoco Heights CITY AND STATE: Prineville

NW ¼ SW ¼ Sec. 32 T. 14 S., R. 16 E., W.M.

Bearing and distance from section or subdivision corner

Altitude at well 2933'

M(1)

TYPE OF WELL: Drilled Date Constructed July 42-Feb. 43

Depth drilled 1002 Depth cased 300' ±

Section 32

CASING RECORD:

12-inch set to 300 ± feet

FINISH:

AQUIFERS:

Gravel at 238 feet

WATER LEVEL:

52 feet below land surface in March 1943

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

WELL TESTS:
Drawdown 27 ft. after 2 hours pumping 130 G.P.M.
Drawdown ft. after hours G.P.M.

USE OF WATER Municipal Temp. 59 °F. , 19
SOURCE OF INFORMATION U-147, U.S.G.S. Report
DRILLER or DIGGER George E. Scott
ADDITIONAL DATA:
Log x Water Level Measurements Chemical Analysis Aquifer Test

REMARKS:

Draws down 27 feet after 2 hours pumping 130 gpm.

STATE ENGINEER
Salem, Oregon

State Well No. 14/16-32M(1)
County Crook
Application No. U - 147

Well Log

Owner: Pacific Power and Light Co. Owner's No. 3 - Ochoco Hgts.

Driller: George E. Scott Date Drilled 1943

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Plaistocene(?) lacoustrine & alluvial deposits			
Gravel	0	18	18
Sand, yellow	18	39	21
Silt & sand w/streaks of clay	39	88	49
Sand, dark, dirty, water bearing	88	94	6
Clay, drak, silty	94	219	125
Clay, blue	219	237	18
Gravel, dirty, water bearing	237	239	2
Clay, sticky	239	241	2
Gravel, dirty, water bearing	241	254	13
Clarno (?) formation			
Clay, greenish	254	262	8
Clay, muddy, yellow	262	272	10
Clay, gray	272	307	35
Gravel (?)	307	307½	½
Clay, gray, w/slight variations	307½	1002	694½

Crook

14/16-32M(1)

Oregon State Board of Health

SANITARY ENGINEERING LABORATORY

REPORT OF MINERAL ANALYSIS OF WATER

Location of source Prineville

Description of source Ochoco Heights Pump #1, Well #7

Analysis by [illegible] Date ______ Collected by Agee Date 11/10/[illegible]

RESULTS

	Parts per million
Turbidity	
Color: ~~Apparent~~ ~~True~~	2
Odor: Hot	
Cold	
Total Solids	390
Loss on Ignition	64
Silicon (SiO_2)	27
Chloride (Cl)	35.5
Sulfate (SO_4)	37.7
Calcium (Ca)	26.9
Magnesium (Mg)	6.5
Aluminum (Al)	0
Orthophosphates (PO_4)	
Metaphosphates $(PO_3)_6$	
Alkalinity (as $CaCO_3$): Carbonate	0
Bicarbonate	16.1
Hardness (as $CaCO_3$)	137
Sodium and Potassium (as Na)	63
Iron (Fe)	.1
Manganese (Mn)	0.2
Fluoride (F)	0.2
Carbon Dioxide (CO_2)	6

pH 7.7

Remarks

PHE-10

STATE ENGINEER
Salem, Oregon

State Well No. 11/16-32M (1)
County Crook
Application No. ....

Chemical Analysis

OWNER Pacific Power & Light Co. OWNER'S NO. ....
ANALYST Charlton Laboratories Address Portland, Ore.
Date of Collection May 5, 1949
Point of Collection ....

	P.P.M.	E.P.M.
Silica (SiO_2)		
Iron (Fe) Total		
Manganese (Mn)		
Calcium (Ca)		
Magnesium (Mg)		
Sodium (Na)		
Potassium (K)		
Bicarbonate (HCO_3)		
Carbonate (CO_3)		
Sulfate (SO_4)	15	
Chloride (Cl)	7.4	
Fluoride (F)		
Nitrate (NO_3)		
Boron (B)		
Dissolved Solids	287	
Hardness as $CaCO_3$	64	
Specific Conductance (Micromhos at 25°C)		
pH		
Percent Sodium		
Sodium Absorption Ratio (S.A.R.)		
CLASS		

STATE ENGINEER
Salem, Oregon

State Well No. [illegible] (1)
County Crook
Application No.

Chemical Analysis

OWNER Pacific Power & Light Co. OWNER'S NO.
ANALYST U.S.G.S. Address
Date of Collection Nov. 1[illegible] 1946
Point of Collection

	P.P.M.	E.P.M.
Silica (SiO_2)		
Iron (Fe) Total	.02	
Manganese (Mn)		
Calcium (Ca)	27	
Magnesium (Mg)	13	
Sodium (Na) }	54	
Potassium (K) }		
Bicarbonate (HCO_3)	215	
Carbonate (CO_3)		
Sulfate (SO_4)	35	
Chloride (Cl)	17	
Fluoride (F)	.3	
Nitrate (NO_3)	1.5	
Boron (B)		
Dissolved Solids	254	
Hardness as $CaCO_3$	121	
Specific Conductance (Micromhos at 25°C)		
pH		
Percent Sodium		
Sodium Absorption Ratio (S.A.R.)		
CLASS		

STATE OF OREGON
WATER WELL REPORT
(as required by ORS 537.765)

RECEIVED FEB 18 1987 WATER RESOURCES DEPT SALEM, OREGON

CR00 184

15S/16E-5da

(1) OWNER:
Well Number:
Name City of Prineville
Address 400 East Third Street
City Prineville State Oregon Zip 97754

(2) TYPE OF WORK:
☒ New Well ☐ Deepen ☐ Recondition ☐ Abandon

(3) DRILL METHOD
☒ Rotary Air ☐ Rotary Mud ☒ Cable
☐ Other

(4) PROPOSED USE:
☐ Domestic ☒ Community ☐ Industrial ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other

(5) BORE HOLE CONSTRUCTION:
Special Construction approval Yes ☒ No ☐ Depth of Completed Well 259 ft.
Explosives used Yes ☐ No ☒ Type Amount

HOLE Diameter	From	To	SEAL Material	From	To	Amount sacks or pounds
16	0	225	Concrete	0	10	7 cu. yds
12	225	260	Cement	10	225	272 sacks
8	260	263				

How was seal placed: Method ☐ A ☐ B ☒ C ☐ D ☐ E
☒ Other 0'-9' tremied & probed
Backfill placed from 259 ft. to 263 ft. Material sand
Gravel placed from ft. to ft. Size of gravel

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	12	+3.5	228	.250	☒	☐	☒	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
Liner:	10	218	228	.250	☒	☐	☒	☐
	10	249	259	.250	☒	☐	☒	☐

Final location of shoe(s)

(7) PERFORATIONS/SCREENS:
☐ Perforations Method
☒ Screens Type wire wrap Material S.S.

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
228	232	.050		12	TS	☐	☐
232	249	.090		12	TS	☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐

(8) WELL TESTS: Minimum testing time is 1 hour
☒ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
400	175		1 hr.
400	188.5		4 hrs
300	142		16 hrs

Temperature of water 57°F Depth Artesian Flow Found 225
Was a water analysis done? ☒ Yes By whom WF & R Lab
Did any strata contain water not suitable for intended use? ☐ Too little
☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other
Depth of strata:

(9) LOCATION OF WELL by legal description:
County Crook Latitude Longitude
Township 15S N or S, Range 16E E or W, WM.
Section 5 NE ¼ of SE ¼
Tax Lot Lot Block Subdivision
Street Address of Well (or nearest address)

(10) STATIC WATER LEVEL:
31 ft. below land surface. Date 1/21/87
Artesian pressure lb. per square inch. Date

(11) WATER BEARING ZONES:
Depth at which water was first found 8

From	To	Estimated Flow Rate	SWL
225	249	See well test	
8	199	>100 gpm	8

(12) WELL LOG:
Ground elevation Approx. 2880

Material	From	To	SWL
Clay, brown	0	8	
Grvl, lg & sand, crse, brown	8	26	8
Sand, brown w/gravel	26	30	
Sand, brown, med.	30	41	
Sand, black, med-fine	41	72	
Sand, grey, fine-silt w/wood	72	184	
Sand, grey, fine-silt w/clay lenses	184	199	
Clay, grey, sticky	199	225	
Sand, black, coarse-fine	225	228	
Gravel & sand, blk, coarse	228	231	
Gravel, lg & sand, some cement	231	238	
Gravel, med-small & sand, med-coarse	238	249	
Clay, grey, firm	249	267	
Clay, grey, soft	261	263	

Date started 8/26/86 Completed 2/4/87

(unbonded) Water Well Constructor Certification:
I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to my best knowledge and belief.
WWC Number 1394
Signed Eugene Clark Date 2/13/87

(bonded) Water Well Constructor Certification:
I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. all work performed during this time is in compliance with Oregon well construction standards. This report is true to the best of my knowledge and belief.
WWC Number 649
Signed Stephen Schneider Date 2/13/87

WHITE COPIES - WATER RESOURCES DEPARTMENT YELLOW COPY - CONSTRUCTOR PINK COPY - CUSTOMER 9809C 10/86

SEI #8703

WELL DRILLING
IRRIGATION
CONTROL SYSTEMS

SCHNEIDER
EQUIPMENT, INC.

PUMPS
ENGINEERED WATER SYSTEMS
SALES AND SERVICE

21881 River Road N.E. St. Paul, Oregon 97137 (503) 633-2666

February 13, 1987

Water Resources Department
3850 Portland Road, NE
Salem, OR 97310

Attention: Tom Paul

Re: City of Prineville Municipal Well
NE 1/4 of SE 1/4 Sec. 5 T 15S R 16E Crook County

Dear Tom,

Per our phone conversations, enclosed is the log of the City of Prineville well which we recently completed. As previously discussed, our efforts to seal the well with neat cement grout appeared futile as the grout disappeared into the extremely porous upper gravel formation. After discussing the situation with yourself we tried filling the annular space with a sand concrete mix. Four cubic yards of the sand concrete only raised the seal approximately 6 inches so we finally completed filling the annular space with approximately 3 cubic yards of a regular gravel concrete mix.

We trust this special construction meets with your approval. If you have any questions, please do not hesitate to call.

Sincerely,

Stephen J. Schneider

Stephen J. Schneider
General Manager

L0263.WRD

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.

CROO 2083

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

RECEIVED FEB 6 1973 STATE ENGINEER SALEM OREGON

State Well No. 15S/16E-4 ad
State Permit No. G-6313

(1) OWNER:
Name PACIFIC POWER AND LIGHT
Address PUBLIC SERVICE BLDG. PORTLAND, ORE. 97204

(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 ☒
24" Diam. from +1 ft. to 225 ft. Gage .375
12" Diam. from +2 ft. to 226 ft. Gage .330
" 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 U.O.P. JOHNSON
Type STAINLESS STEEL Model No.
Diam. 12 Slot size 130 Set from 226 ft. to 246 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? STRASSER
Yield: 820 gal./min. with 136 ft. drawdown after 10 hrs.
550 " 73 " 12 "
" " " "
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow 100 g.p.m.
Temperature of water 56° Depth artesian flow encountered 223 ft.

(9) CONSTRUCTION: CEMENT GROUT FROM 32 FT. TO 75 FT.
Well seal—Material used READY MIX 0-32 FT
Well sealed from land surface to 75 ft.
Diameter of well bore to bottom of seal 30 in.
Diameter of well bore below seal 24 in.
Number of sacks of cement used in well seal 38 sacks
Number of sacks of bentonite used in well seal sacks
Brand name of bentonite
Number of pounds of bentonite per 100 gallons of water lbs./100 gals.
Was a drive shoe used? ☒ Yes ☐ No Plugs Size: location ft.
Did any strata contain unusable water? ☐ Yes ☒ No
Type of water? depth of strata
Method of sealing strata off
Was well gravel packed? ☒ Yes ☐ No Size of gravel: 3/8-1/8
Gravel placed from 226 ft. to 246 ft.

(10) LOCATION OF WELL:
County CROOK Driller's well number 5430
SE ¼ NE ¼ Section 4 T. 15S R. 16E W.M.
Bearing and distance from section or subdivision corner

(11) WATER LEVEL: Completed well.
Depth at which water was first found 223 ft.
Static level ft. below land surface. Date
Artesian pressure 3.5 lbs. per square inch. Date 1/22/73

(12) WELL LOG: Diameter of well below casing —
Depth drilled 246 ft. Depth of completed well 246 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
SILTY SAND	0	13	
GRAVEL	13	24	
BLUE SILTY CLAY	24	220	
BROWN CLAY AND GRAVEL	220	223	
WATER BEARING GRAVEL	223	245	
CLAY AND GRAVEL	245	246	

Work started NOV 6 1972 Completed JAN 22 1973
Date well drilling machine moved off of well JAN 23 1973

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] Don V. Rohman (Drilling Machine Operator) Date 1/30, 1973
Drilling Machine Operator's License No. 57

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 R.J. STRASSER DRILLING CO (Person, firm or corporation) (Type or print)
Address 8110 SE SUNSET LANE PORTLAND ORE
[Signed] Robert L. Strasser (Water Well Contractor)
Contractor's License No. 10 Date JAN 30, 1973

(USE ADDITIONAL SHEETS IF NECESSARY)

SP*45656-119

OBSERVATION WELL

Well Record

#89

STATE ENGINEER
Salem, Oregon

CROO
50181

STATE WELL NO. 14/16-31Q(1)
COUNTY Crook
APPLICATION NO. U-241
PERMIT U-215
C 22839

OWNER: Pacific Power & Light Co.

MAILING ADDRESS:

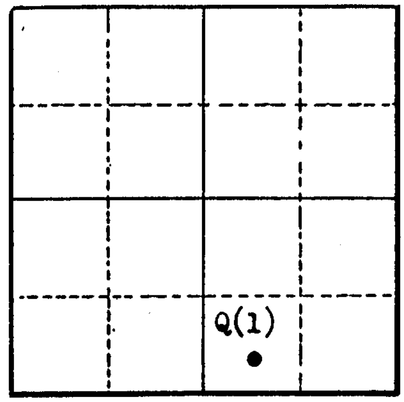
CITY AND STATE: Prineville, Oregon

LOCATION OF WELL: Owner's No. 4-Yancey

SW ¼ SE ¼ Sec. 31 T. 14 ~~N.~~ S., R. 16 E ~~W.~~, W.M.

Bearing and distance from section or subdivision corner N 55° 00' E 1070' of S¼ Cor. Sec. 31

Altitude at well 2858



Section 31

TYPE OF WELL: Drilled Date Constructed 1917

Depth drilled 228 Depth cased

CASING RECORD:

8-inch

FINISH:

AQUIFERS:

WATER LEVEL:

16.2 feet above land surface, October 26, 1944

PUMPING EQUIPMENT: Type Turbine H.P.

Capacity 360 G.P.M.

WELL TESTS:

Drawdown 96 ft. after 20 hours pumping 360 G.P.M.

Drawdown ft. after hours G.P.M.

USE OF WATER Municipal Temp. 56 °F. , 19

SOURCE OF INFORMATION U-241 U.S.G.S. report

DRILLER or DIGGER

ADDITIONAL DATA:

Log Water Level Measurements Chemical Analysis Aquifer Test

REMARKS:

APPENDIX G
Water Rights Certificates

STATE OF OREGON

WATER DIVISION NO. 2 COUNTY OF CROOK

CERTIFICATE OF WATER RIGHT

(For Rights which have been confirmed by the Courts)

This is to Certify, *That* CITY OF PRINEVILLE *of* Prineville *State of* Oregon *has a right to the use of the waters of* Ochoco Creek, a tributary of Crooked River

for the purpose of the irrigation of 400 acres of land, fire, sewerage and municipal use,

and that said right has been confirmed by decree of the Circuit Court of the State of Oregon for Crook *County, and the said decree entered of record at Salem, in the Order Record of the* STATE WATER BOARD [redacted] *of the State of Oregon, in Volume 1, at page* 449 *; that the priority of the right hereby confirmed dates from* the year 1879,

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 a reasonable amount for general municipal purposes, and five cubic feet per second for irrigation, the total quantity being limited to four acre feet per acre during each year. The use hereunder shall conform to any reasonable rotation system ordered by the proper state officer.

A description of the lands irrigated under such right, and to which the water hereby confirmed is appurtenant, or, if for other purposes, the place where such water is put to beneficial use, is as follows:

40 acres in the $SW\frac{1}{4}$ of $SE\frac{1}{4}$; 40 acres in the $SE\frac{1}{4}$ of $SE\frac{1}{4}$; Section Thirty-one, (31): 40 acres in the $SE\frac{1}{4}$ of $SW\frac{1}{4}$; Section Thirty-two (32), Township Fourteen (14) South Range Sixteen (16) East of Willamette Meridian: 40 acres in the $NE\frac{1}{4}$ of $NE\frac{1}{4}$; 40 acres in the $NW\frac{1}{4}$ of $NE\frac{1}{4}$; 40 acres in the $SE\frac{1}{4}$ of $NE\frac{1}{4}$; Section Six (6): 40 acres in the $NE\frac{1}{4}$ of $NW\frac{1}{4}$; 40 acres in the $NW\frac{1}{4}$ of $NW\frac{1}{4}$; 40 acres in the $SW\frac{1}{4}$ of $NW\frac{1}{4}$; 40 acres in the $SE\frac{1}{4}$ of $NW\frac{1}{4}$; Section Five (5) Township Fifteen (15) South Range Sixteen (16) East of Willamette Meridian, in Crook County, Oregon.

The right to the use of the water aforesaid hereby confirmed is restricted to the lands or place of use herein described.

WITNESS the seal and signature of the State [redacted] *Water Board* [redacted], *affixed this* 21st *day*

of September, *19*14.

STATE WATER BOARD

[redacted]

(SEAL OF STATE WATER BOARD)

By JOHN H. LEWIS

State Engineer, President

Attest: M. F. MERS

Secretary

Recorded in State Record of Water Right Certificates, Volume 1, page 531.

STATE OF OREGON

COUNTY OF CROOK

CERTIFICATE OF WATER RIGHT

This Is to Certify, *That* CITY OF PRINEVILLE

of Prineville *, 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* a well *a tributary of* *for the purpose of* Use of City owned Railway and Municipal use, including swimming pool, fire protection, and street sprinkling *under Permit No.* U-133 *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* May 16, 1941 ;

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 0.1 cubic foot per second

or its equivalent in case of rotation, measured at the point of diversion from the stream. The point of diversion is located in the NE¼ SE¼, Section 31, Township 14 South, Range 16 East, W. M.

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,*

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:

SE¼,
Section 31,
NE¼ SW¼,
SW¼ SW¼,
SE¼ SW¼,
Section 32,
T. 14 S., R. 16 E., W. M.

NW¼,
Section 5,
NE¼ NE¼,
NW¼ NE¼,
SE¼ NE¼,
Section 6,
T. 15 S., R. 16 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 1st *day of* March *, 194*9 .

CHAS. E. STRICKLIN
State Engineer

Recorded in State Record of Water Right Certificates, Volume 13 *, page* 15539

STATE OF OREGON

COUNTY OF CROOK

CERTIFICATE OF WATER RIGHT

This Is to Certify, That PACIFIC POWER & LIGHT CO.

of Public Service Bldg., Portland 4, 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 a well a tributary of for the purpose of municipal supply under Permit No. U-215 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 17, 1947;

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 0.8 cubic foot per second.

or its equivalent in case of rotation, measured at the point of diversion from the stream. The point of diversion is located in the SW¼SE¼, Section 31, Township 14 South, Range 16 East, W. M.

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,

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:

SW¼SE¼
NW¼SE¼
NE¼SE¼
SE¼SE¼
Section 31
SW¼SW¼
NW¼SW¼
NE¼SW¼
SE¼SW¼
Section 32
Township 14 South, Range 16 East, W. M.

SW¼NW¼
NW¼NW¼
NE¼NW¼
SE¼NW¼
SW¼NE¼
NW¼NE¼
Section 5
NW¼NE¼
NE¼NE¼
SE¼NE¼
Section 6
Township 15 South, Range 16 East, 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 12th day of July, 57.

LEWIS A. STANLEY
State Engineer

Recorded in State Record of Water Right Certificates, Volume 16, page 22839.

STATE OF OREGON

COUNTY OF CROOK

CERTIFICATE OF WATER RIGHT

THIS CERTIFICATE ISSUED TO

CITY OF PRINEVILLE
387 NE 3RD STREET
PRINEVILLE, OREGON, 97754

confirms the right to use of the waters of STEARNS WELL #2 and BARNEY WELL in the OCHOCO CREEK BASIN for MUNICIPAL USE.

The right has been perfected under Permit G-9154. The date of priority is OCTOBER 5, 1973. The right is limited to 1.56 CUBIC FEET PER SECOND (CFS), IN ANY COMBINATION FROM THE TWO WELLS, AND IS FURTHER LIMITED TO A MAXIMUM OF 1.02 CFS FROM STEARNS WELL #2 OR 1.02 CFS FROM BARNEY WELL, or its equivalent in case of rotation, measured at the well(s).

The wells are located as follows:

ORIGINAL WELL

STEARNS WELL #2: SW ¼ NE ¼, SECTION 4, T15S, R16E, W.M.; 1810.2 FEET SOUTH & 1151.5 FEET EAST FROM N 1/4 CORNER OF SECTION 4.

ADDITIONAL WELL

BARNEY WELL: NE ¼ NE ¼, SECTION 4, T15S, R16E, W.M.; 1315 FEET SOUTH & 1370 FEET EAST FROM N 1/4 CORNER OF SECTION 4.

The right shall conform to such reasonable rotation system as may be ordered by the proper state officer.

This is a final order in other than a contested case. This order is subject to judicial review under ORS 183.484. Any petition for judicial review must be filed within the 60 day time period specified by ORS 183.484(2). Pursuant to ORS 536.075 and OAR 137-004-0080 you may either petition for judicial review or petition the Director for reconsideration of this order. A petition for reconsideration may be granted or denied by the Director, and if no action is taken within 60 days following the date the petition was filed, the petition shall be deemed denied.

T-9762.RA

Certificate Number 83993

A description of the place of use under the right, and to which such right is appurtenant, is as follows:

1/4 1/4		SECTION	TOWNSHIP	RANGE, W.M.
SW	NE	31	14 S	16 E
NE	NW	31	14 S	16 E
NW	NW	31	14 S	16 E
SE	NW	31	14 S	16 E
SE	SW	31	14 S	16 E
NE	SE	31	14 S	16 E
NW	SE	31	14 S	16 E
SW	SE	31	14 S	16 E
SE	SE	31	14 S	16 E
SW	NW	32	14 S	16 E
NE	SW	32	14 S	16 E
NW	SW	32	14 S	16 E
SW	SW	32	14 S	16 E
SE	SW	32	14 S	16 E
NW	SE	32	14 S	16 E
SW	SE	32	14 S	16 E
NW	NW	3	15 S	16 E
NW	NE	4	15 S	16 E
SW	NE	4	15 S	16 E
NE	NW	4	15 S	16 E
NW	NW	4	15 S	16 E
SW	NW	4	15 S	16 E
NE	NE	5	15 S	16 E
NW	NE	5	15 S	16 E
SW	NE	5	15 S	16 E
SE	NE	5	15 S	16 E
NE	NW	5	15 S	16 E
NW	NW	5	15 S	16 E
SW	NW	5	15 S	16 E
SE	NW	5	15 S	16 E
NE	SW	5	15 S	16 E
NW	SW	5	15 S	16 E
NW	SE	5	15 S	16 E
NE	NE	6	15 S	16 E
NW	NE	6	15 S	16 E
SE	NE	6	15 S	16 E
NE	NW	6	15 S	16 E
SE	NW	6	15 S	16 E
NE	SE	6	15 S	16 E

The water user shall maintain the meter or measuring device in good working order.

This certificate is issued to confirm an ADDITIONAL POINT OF APPROPRIATION approved by an order of the Water Resources Director entered NOVEMBER 22, 2004, and supersedes Certificate 57443, State Record of Water Right Certificates.

The quantity of water diverted at the additional point of appropriation, together with that diverted at the original point of appropriation, shall not exceed the quantity of water lawfully available at the original point of appropriation.

Water shall be acquired from the same aquifer (water source) as the original point of appropriation.

Water may be applied to lands which are not specifically described above, provided the holder of this right complies with ORS 540.510(3).

Issued MAR 21 2008

Dwight French for
Phillip C. Ward, Director
Water Resources Department

Recorded in State Record of Water Right Certificates numbered 83993.

T-9762.RA

STATE OF OREGON

COUNTY OF CROOK

CERTIFICATE OF WATER RIGHT

THIS CERTIFICATE ISSUED TO

CITY OF PRINEVILLE
387 NE THIRD STREET
PRINEVILLE, OR 97754

confirms the right to use the waters of LaMONTA WELL in the OCHOCO CREEK BASIN for MUNICIPAL USES.

This right was perfected under Permit G-506. The date of priority is APRIL 5, 1957. The amount of water to which this right is entitled is limited to an amount actually used beneficially, and shall not exceed 0.77 CUBIC FOOT PER SECOND or its equivalent in case of rotation, measured at the well.

The well is located as follows:

Twp	Rng	Mer	Sec	Q-Q	Measured Distances
14 S	16 E	WM	31	NW NW	SOUTH 58 DEGREES 13 MINUTES EAST, 1447 FEET FROM NW CORNER OF SECTION 31

The use shall conform to such reasonable rotation system as may be ordered by the proper state officer.

A description of the place of use to which this right is appurtenant is as follows:

MUNICIPAL USES					
Twp	Rng	Mer	Sec	Q-Q	GLot
14 S	16 E	WM	31	NE SE	
14 S	16 E	WM	31	NW SE	
14 S	16 E	WM	31	SW SE	
14 S	16 E	WM	31	SE SE	
14 S	16 E	WM	32	NE SW	
14 S	16 E	WM	32	NW SW	
14 S	16 E	WM	32	SW SW	
14 S	16 E	WM	32	SE SW	
15 S	16 E	WM	5	NW NE	2
15 S	16 E	WM	5	SW NE	
15 S	16 E	WM	5	NE NW	3
15 S	16 E	WM	5	NW NW	4
15 S	16 E	WM	6	NE NE	1
15 S	16 E	WM	6	NW NE	2
15 S	16 E	WM	6	SE NE	

This certificate describes that portion of the water right confirmed by Certificate 29097, State Record of Water Right Certificates, NOT modified by the provisions of an order of the Water Resources Director entered JUN 0 7 2010, approving Transfer Application T-11026.

The issuance of this superseding certificate does not confirm the status of the water right in regard to the provisions of ORS 540.610 pertaining to forfeiture or abandonment.

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 June 7, 2010.

Phillip C. Ward, Director

STATE OF OREGON

COUNTY OF CROOK

CERTIFICATE OF WATER RIGHT

THIS CERTIFICATE ISSUED TO

CITY OF PRINEVILLE
387 NE THIRD STREET
PRINEVILLE, OREGON 97754

confirms the right to use the waters of a WELL (OCHOCO HEIGHTS WELL NO.1), for MUNICIPAL USE.

This right was perfected under Permit U-140. The date of priority is MAY 20, 1942. The amount of water to which this right is entitled is limited to an amount actually used beneficially, and shall not exceed 0.8 CUBIC FOOT PER SECOND, or its equivalent in case of rotation, measured at the point of diversion.

The point of appropriation is located as follows:

TWP	RNG	MER	SEC	Q - Q
14 S	16 E	WM	32	NW SW

A description of the place of use to which this right is appurtenant is as follows:

TWP	RNG	MER	SEC	Q - Q
14 S	16 E	WM	31	SE
14 S	16 E	WM	32	SW
15 S	16 E	WM	5	NW
15 S	16 E	WM	5	NE SW
15 S	16 E	WM	5	NW SW
15 S	16 E	WM	6	NE NE
15 S	16 E	WM	6	NW NE
15 S	16 E	WM	6	SE NE

This certificate describes that portion of the water right confirmed by Certificate 75223, State Record of Water Right Certificates, NOT modified by the provisions of an order of the Water Resources Director entered SEP 14 2010, and recorded at Special Order Volume 81, pages 796 to 798, canceling a portion of the water right. This certificate supersedes Certificate 75223.

The issuance of this superseding certificate does not confirm the status of the water right in regard to the provisions of ORS 540.610 pertaining to forfeiture or abandonment.

WITNESS the signature of the Water Resources Director, affixed Sept. 14, 2010.

Dwight French for

Phillip C. Ward, Director

Recorded in State Record of Water Right Certificates numbered 86558.

c75223-part cancel-rr.GLN

STATE OF OREGON

COUNTY OF CROOK

CERTIFICATE OF WATER RIGHT

THIS CERTIFICATE ISSUED TO

CITY OF PRINEVILLE
387 NE THIRD STREET
PRINEVILLE, OREGON 97754

confirms the right to use the waters of a WELL, for MUNICIPAL USE.

This right was perfected under Permit U-372. The date of priority is DECEMBER 8, 1950. The amount of water to which this right is entitled is limited to an amount actually used beneficially, and shall not exceed 0.75 CUBIC FOOT PER SECOND, or its equivalent in case of rotation, measured at the point of diversion.

The point of appropriation is located as follows:

TWP	RNG	MER	SEC	Q - Q	MEASURED DISTAMCES
15 S	16 E	WM	5	SW NW	375 FEET NORTH AND 370 FEET EAST FROM W ¼ CORNER OF SECTION 5

A description of the place of use to which this right is appurtenant is as follows:

TWP	RNG	MER	SEC	Q - Q
14 S	16 E	WM	31	NE SE
14 S	16 E	WM	31	NW SE
14 S	16 E	WM	31	SW SE
14 S	16 E	WM	31	SE SE
14 S	16 E	WM	32	NE SW
14 S	16 E	WM	32	NW SW
14 S	16 E	WM	32	SW SW
14 S	16 E	WM	32	SE SW
14 S	16 E	WM	32	NW SE
14 S	16 E	WM	32	SW SE
15 S	16 E	WM	5	NW NE
15 S	16 E	WM	5	SW NE
15 S	16 E	WM	5	NE NW
15 S	16 E	WM	5	NW NW
15 S	16 E	WM	5	SW NW
15 S	16 E	WM	5	SE NW
15 S	16 E	WM	6	NE NE
15 S	16 E	WM	6	NW NE
15 S	16 E	WM	6	SE NE

This certificate describes that portion of the water right confirmed by Certificate 22868, State Record of Water Right Certificates, NOT modified by the provisions of an order of the Water Resources Director entered March 11, 2011, and recorded at Special Order Volume 81, pages 757 to 759, canceling a portion of the water right. This certificate supersedes Certificate 22868.

The issuance of this superseding certificate does not confirm the status of the water right in regard to the provisions of ORS 540.610 pertaining to forfeiture or abandonment.

WITNESS the signature of the Water Resources Director, affixed MAR 1 1 2011.

Dwight French for
PHILLIP C. WARD, DIRECTOR

STATE OF OREGON

COUNTY OF CROOK

CERTIFICATE OF WATER RIGHT

THIS CERTIFICATE ISSUED TO

CITY OF PRINEVILLE
387 NE THIRD ST
PRINEVILLE, OR 97754

confirms the right to use the waters of STADIUM WELL in the Ochoco Creek Basin for MUNICIPAL USE.

This right was perfected under Permit G-11993. The date of priority is DECEMBER 14, 1990. The amount of water to which this right is entitled is limited to an amount actually used beneficially, and shall not exceed 0.604 CUBIC FOOT PER SECOND or its equivalent in case of rotation, measured at the well.

The well is located as follows:

Twp	Rng	Mer	Sec	Q-Q	Measured Distances
15 S	16 E	WM	5	NE SE	2122 FEET NORTH & 461 FEET WEST FROM SE CORNER, SECTION 5

The period of allowed use is year round.

A description of the place of use is as follows:

Twp	Rng	Mer	Sec	Q-Q
14 S	16 E	WM	31	NE NE
14 S	16 E	WM	31	NW NE
14 S	16 E	WM	31	SW NE
14 S	16 E	WM	31	SE NE
14 S	16 E	WM	31	NE NW
14 S	16 E	WM	31	NW NW
14 S	16 E	WM	31	SW NW
14 S	16 E	WM	31	SE NW
14 S	16 E	WM	31	NE SW
14 S	16 E	WM	31	NW SW
14 S	16 E	WM	31	SW SW
14 S	16 E	WM	31	SE SW
14 S	16 E	WM	31	NE SE
14 S	16 E	WM	31	NW SE

NOTICE OF RIGHT TO PETITION FOR RECONSIDERATION OR JUDICIAL REVIEW

This is an order in other than a contested case. This order is subject to judicial review under ORS 183.484 and ORS 536.075. Any petition for judicial review must be filed within the 60 day time period specified by ORS 183.484(2). Pursuant to ORS 183.484, ORS 536.075 and OAR 137-004-0080, you may petition for judicial review and petition the Director for reconsideration of this order. A petition for reconsideration may be granted or denied by the Director, and if no action is taken within 60 days following the date the petition was filed, the petition shall be deemed denied. In addition, under ORS 537.260 any person with an application, permit or water right certificate subsequent in priority may jointly or severally contest the issuance of the certificate within three months after issuance of the certificate.

Twp	Rng	Mer	Sec	Q-Q
14 S	16 E	WM	31	SW SE
14 S	16 E	WM	31	SE SE
14 S	16 E	WM	32	NE NE
14 S	16 E	WM	32	NW NE
14 S	16 E	WM	32	SW NE
14 S	16 E	WM	32	SE NE
14 S	16 E	WM	32	NE NW
14 S	16 E	WM	32	NW NW
14 S	16 E	WM	32	SW NW
14 S	16 E	WM	32	SE NW
14 S	16 E	WM	32	NE SW
14 S	16 E	WM	32	NW SW
14 S	16 E	WM	32	SW SW
14 S	16 E	WM	32	SE SW
14 S	16 E	WM	32	NE SE
14 S	16 E	WM	32	NW SE
14 S	16 E	WM	32	SW SE
14 S	16 E	WM	32	SE SE
14 S	16 E	WM	33	NE NE
14 S	16 E	WM	33	NW NE
14 S	16 E	WM	33	SW NE
14 S	16 E	WM	33	SE NE
14 S	16 E	WM	33	NE NW
14 S	16 E	WM	33	NW NW
14 S	16 E	WM	33	SW NW
14 S	16 E	WM	33	SE NW
14 S	16 E	WM	33	NE SW
14 S	16 E	WM	33	NW SW
14 S	16 E	WM	33	SW SW
14 S	16 E	WM	33	SE SW
14 S	16 E	WM	33	NE SE
14 S	16 E	WM	33	NW SE
14 S	16 E	WM	33	SW SE
14 S	16 E	WM	33	SE SE
15 S	16 E	WM	4	NE NE
15 S	16 E	WM	4	NW NE
15 S	16 E	WM	4	SW NE
15 S	16 E	WM	4	SE NE
15 S	16 E	WM	4	NE NW
15 S	16 E	WM	4	NW NW
15 S	16 E	WM	4	SW NW
15 S	16 E	WM	4	SE NW
15 S	16 E	WM	4	NE SW
15 S	16 E	WM	4	NW SW
15 S	16 E	WM	4	SW SW
15 S	16 E	WM	4	SE SW
15 S	16 E	WM	4	NE SE
15 S	16 E	WM	4	NW SE
15 S	16 E	WM	4	SW SE
15 S	16 E	WM	4	SE SE
15 S	16 E	WM	5	NE NE

Twp	Rng	Mer	Sec	Q-Q
15 S	16 E	WM	5	NW NE
15 S	16 E	WM	5	SW NE
15 S	16 E	WM	5	SE NE
15 S	16 E	WM	5	NE NW
15 S	16 E	WM	5	NW NW
15 S	16 E	WM	5	SW NW
15 S	16 E	WM	5	SE NW
15 S	16 E	WM	5	NE SW
15 S	16 E	WM	5	NW SW
15 S	16 E	WM	5	SW SW
15 S	16 E	WM	5	SE SW
15 S	16 E	WM	5	NE SE
15 S	16 E	WM	5	NW SE
15 S	16 E	WM	5	SW SE
15 S	16 E	WM	5	SE SE
15 S	16 E	WM	6	NE NE
15 S	16 E	WM	6	NW NE
15 S	16 E	WM	6	SW NE
15 S	16 E	WM	6	SE NE
15 S	16 E	WM	6	NE NW
15 S	16 E	WM	6	NW NW
15 S	16 E	WM	6	SW NW
15 S	16 E	WM	6	SE NW
15 S	16 E	WM	6	NE SW
15 S	16 E	WM	6	NW SW
15 S	16 E	WM	6	SW SW
15 S	16 E	WM	6	SE SW
15 S	16 E	WM	6	NE SE
15 S	16 E	WM	6	NW SE
15 S	16 E	WM	6	SW SE
15 S	16 E	WM	6	SE SE

The well shall be maintained in accordance with the General Standards for the Construction and Maintenance of Water Wells in Oregon. The works shall be equipped with a usable access port, and may also include an air line and pressure gauge adequate to determine water level elevation at all times.

The Director may require water level or pump test results every ten years.

If substantial interference with a senior water right occurs due to withdrawal of water from any well listed on this right, then use of water from the well(s) shall be discontinued or reduced and/or the schedule of withdrawal shall be regulated until or unless the Department approves or implements an alternative administrative action to mitigate the interference. The Department encourages junior and senior appropriators to jointly develop plans to mitigate interferences.

Failure to comply with any of the provisions of this right may result in action including, but not limited to, restrictions on the use, civil penalties, or cancellation of the right.

This right is for the beneficial use of water without waste. The water user is advised that new regulations may require the use of best practical technologies or conservation practices to achieve this end.

By law, the land use associated with this water use must be in compliance with statewide land-use goals and any local acknowledged land-use plan.

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; however, water may be applied to lands which are not specifically described above, provided the holder of this right complies with ORS 540.510(3).

This certificate is issued for a partial perfection of Permit G-11993 as described in OAR 690-320-0040 and by an order of the Water Resources Director entered AUG 03 2012, at Volume 88, Page 247.

The use of water shall be limited when it interferes with any prior surface or ground water rights.

Issued AUG 03 2012.

Dwight W. French
Water Right Services Administrator, for
Phillip C. Ward, Director
Water Resources Department

STATE OF OREGON

COUNTY OF CROOK

CERTIFICATE OF WATER RIGHT

THIS CERTIFICATE ISSUED TO

CITY OF PRINEVILLE
387 NE THIRD ST
PRINEVILLE OR 97754

confirms the right to use the waters of A WELL in the CROOKED RIVER BASIN for SUPPLEMENTAL IRRIGATION of 54.2 ACRES.

This right was perfected under Permit G-12511. The date of priority is AUGUST 7, 1992. The amount of water to which this right is entitled is limited to an amount actually used beneficially, and shall not exceed 0.67 CUBIC FOOT PER SECOND or its equivalent in case of rótation, measured at the well.

The period of allowed use is February 1 through December 1.

The well is located as follows:

Twp	Rng	Mer	Sec	Q-Q	Measured Distances
14 S	15 E	WM	36	NE SW	1670 FEET NORTH & 820 FEET WEST FROM S1/4 CORNER, SECTION 36

The amount of water used for irrigation, together with the amount secured under any other right existing for the same lands, is limited to a diversion of ONE-EIGHTIETH of one cubic foot per second (or its equivalent) and shall be further limited to a diversion of not to exceed 3.0 acre-feet per acre for each acre irrigated during the irrigation season of each year.

A description of the place of use is as follows:

Twp	Rng	Mer	Sec	Q-Q	Acres
14 S	15 E	WM	36	SE NW	28.8
14 S	15 E	WM	36	NE SW	25.4

Measurement, recording and reporting conditions:

A. The water user shall maintain the meter or other suitable measuring device in good working order.

NOTICE OF RIGHT TO PETITION FOR RECONSIDERATION OR JUDICIAL REVIEW

This is an order in other than a contested case. This order is subject to judicial review under ORS 183.484 and ORS 536.075. Any petition for judicial review must be filed within the 60 day time period specified by ORS 183.484(2). Pursuant to ORS 183.484, ORS 536.075 and OAR 137-004-0080, you may petition for judicial review and petition the Director for reconsideration of this order. A petition for reconsideration may be granted or denied by the Director, and if no action is taken within 60 days following the date the petition was filed, the petition shall be deemed denied. In addition, under ORS 537.260 any person with an application, permit or water right certificate subsequent in priority may jointly or severally contest the issuance of the certificate within three months after issuance of the certificate.

B. The water user shall allow the watermaster access to the meter or measuring device; provided however, where the meter or measuring device is located within a private structure, the watermaster shall request access upon reasonable notice.

C. The Director may require the water user to keep and maintain a record of the amount (volume) of water used and may require the water user to report water use on a periodic schedule as established by the Director. In addition, the Director may require the water user to report general water use information, the periods of water use and the place and nature of use of water under the right. The Director may provide an opportunity for the water user to submit alternative reporting procedures for review and approval.

Use of water under authority of this right may be regulated if analysis of data available after the right is issued discloses that the appropriation will measurably reduce the surface water flows necessary to maintain the free-flowing character of a scenic waterway in quantities necessary for recreation, fish and wildlife in effect as of the priority date of the right or as those quantities may be subsequently reduced.

If substantial interference with a senior water right occurs due to withdrawal of water from any well listed on this right, then use of water from the well(s) shall be discontinued or reduced and/or the schedule of withdrawal shall be regulated until or unless the Department approves or implements an alternative administrative action to mitigate the interference. The Department encourages junior and senior appropriators to jointly develop plans to mitigate interference.

This right is limited to any deficiency in the available supply of any prior right existing for the same land.

Ground water for use under this right shall be produced from a depth greater than 50 feet below land surface.

The well shall be maintained in accordance with the General Standards for the Construction and Maintenance of Water Wells in Oregon. The works shall be equipped with a usable access port, and may also include an air line and pressure gauge to determine the water level elevation in the well at all times.

The Director may require water level or pump test results every ten years.

Failure to comply with any of the provisions of this right may result in action including, but not limited to, restrictions on the use, civil penalties, or cancellation of the right.

This right is for the beneficial use of water without waste. The water user is advised that new regulations may require the use of best practical technologies or conservation practices to achieve this end.

By law, the land use associated with this water use must be in compliance with statewide land-use goals and any local acknowledged land-use plan.

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.

The use of water shall be limited when it interferes with any prior surface or ground water rights.

Issued AUG 10 2012

Dwight W. French
Water Right Services Administrator, for
Phillip C. Ward, Director
Water Resources Department

STATE OF OREGON

COUNTY OF CROOK

CERTIFICATE OF WATER RIGHT

THIS CERTIFICATE ISSUED TO

CITY OF PRINEVILLE
387 NE THIRD STREET
PRINEVILLE, OREGON 97754

confirms the right to use the waters of a WELL, for MUNICIPAL USE.

This right was perfected under Permit U-370. The date of priority is OCTOBER 11, 1950. The amount of water to which this right is entitled is limited to an amount actually used beneficially, and shall not exceed 0.301 CUBIC FOOT PER SECOND, or its equivalent in case of rotation, measured at the point of diversion.

The point of appropriation is located as follows:

TWP	RNG	MER	SEC	Q - Q
15 S	16 E	WM	5	SW NW

A description of the place of use to which this right is appurtenant is as follows:

TWP	RNG	MER	SEC	Q - Q
14 S	16 E	WM	31	NE SE
14 S	16 E	WM	31	NW SE
14 S	16 E	WM	31	SW SE
14 S	16 E	WM	31	SE SE
14 S	16 E	WM	32	NE SW
14 S	16 E	WM	32	NW SW
14 S	16 E	WM	32	SW SW
14 S	16 E	WM	32	SE SW
14 S	16 E	WM	32	NW SE
14 S	16 E	WM	32	SW SE
15 S	16 E	WM	5	NW NE
15 S	16 E	WM	5	SW NE
15 S	16 E	WM	5	NE NW
15 S	16 E	WM	5	NW NW
15 S	16 E	WM	5	SW NW
15 S	16 E	WM	5	SE NW
15 S	16 E	WM	6	NE NE
15 S	16 E	WM	6	NW NE
15 S	16 E	WM	6	SE NE

This certificate describes that portion of the water right confirmed by Certificate 87526, State Record of Water Right Certificates, NOT modified by the provisions of an order of the Water Resources Director entered April 12th 2013, and recorded at Special Order Volume 89, pages 375 to 377, canceling a portion of the water right. This certificate supersedes Certificate 87526.

The issuance of this superseding certificate does not confirm the status of the water right in regard to the provisions of ORS 540.610 pertaining to forfeiture or abandonment.

WITNESS the signature of the Water Resources Director, affixed April 12, 2013.

Dwight French, Water Right Services Division Administrator for
PHILLIP C. WARD, DIRECTOR

c87526-part cancel-rr.GLN

Recorded in State Record of Water Right Certificates numbered 88146.

STATE OF OREGON

COUNTY OF CROOK

CERTIFICATE OF WATER RIGHT

THIS CERTIFICATE ISSUED TO

CITY OF PRINEVILLE
387 NE 3RD ST
PRINEVILLE OR 97754

confirms the right to use the waters of FREIGHT DEPOT WELL (CROO 53759), tributary of OCHOCO CREEK-CROOKED RIVER for the purpose of MUNICIPAL USES.

The right was perfected under Permit G-506. The date of priority is APRIL 5, 1957. 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 0.133 CUBIC FOOT PER SECOND or its equivalent in case of rotation, measured at the point of diversion.

The point of diversion is located as follows:

Twp	Rng	Mer	Sec	Q-Q	Measured Distances
14 S	15 E	WM	23	SE SE	FREIGHT DEPOT WELL (CROO 53759) - 780 FEET NORTH AND 685 FEET WEST FROM SE CORNER, SECTION 23

The use 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:

MUNICIPAL USES					
Twp	**Rng**	**Mer**	**Sec**	**Q-Q**	**Tax Lot**
14 S	15 E	WM	23	SE SE	602
14 S	15 E	WM	23	SW SE	607

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

Twp	Rng	Mer	Sec	Q-Q	Measured Distances
14 S	16 E	WM	31	NW NW	LaMONTA WELL - 58 DEGREES, 13 MINUTES EAST, 1,447 FEET FROM NW CORNER, SECTION 31

NOTICE OF RIGHT TO PETITION FOR RECONSIDERATION OR JUDICIAL REVIEW

This is an order in other than a contested case. This order is subject to judicial review under ORS 183.482. Any petition for judicial review must be filed within the 60-day time period specified by ORS 183.482. Pursuant to ORS 183.482, ORS 536.075 and OAR 137-003-0675, you may petition for judicial review and petition the Director for reconsideration of this order. A petition for reconsideration may be granted or denied by the Director, and if no action is taken within 60 days following the date the petition was filed, the petition shall be deemed denied.

Measurement, recording and reporting conditions:

A. The water user shall maintain the meter or other suitable measuring device in good working order.

B. The water user shall allow the Watermaster access to the meter or measuring device; provided however, where the meter or measuring device is located within a private structure, the Watermaster shall request access upon reasonable notice.

Water shall be acquired from the same aquifer (water source) as the original point of appropriation.

The right to the use of the water for the above purpose is restricted to beneficial use on place of use described, and is subject to all other conditions and limitations contained in said decree.

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; however, water may be applied to lands which are not specifically described above, provided the holder of this right complies with ORS 540.510(3).

This certificate is issued to confirm a change in POINT OF APPROPRIATION AND PLACE OF USE approved by an order of the Water Resources Director entered June 7, 2010, at Special Order Volume 81, Page 34, approving Transfer Application T-11026, and together with Certificate 86337, supersedes Certificate 29097, State Record of Water Right Certificates.

Issued JAN 26 2015

Dwight W. French
Water Right Services Division Administrator, for
Thomas M. Byler, Director
Oregon Water Resources Department

STATE OF OREGON

COUNTY OF CROOK

PERMIT TO APPROPRIATE THE PUBLIC WATERS

THIS PERMIT IS HEREBY ISSUED TO

CITY OF PRINEVILLE
400 EAST THIRD ST 503-447-5627
PRINEVILLE, OREGON 97754

to use the waters of A WELL in the OCHOCO CREEK BASIN for MUNICIPAL USE.

This permit is issued approving Application G-12344. The date of priority is DECEMBER 14, 1990. The use is limited to not more than 0.947 cubic foot per second, or its equivalent in case of rotation, measured at the well.

The well is located as follows:

NE 1/4 SE 1/4 SECTION 5, T 15 S, R 16 E, W.M.; 2122 FEET NORTH AND 461 FEET WEST FROM THE SE CORNER OF SECTION 5..

The use shall conform to such reasonable rotation system as may be ordered by the proper state officer.

The period of allowed use is year round.

A description of the proposed place of use under this permit is within the service area of the City of Prineville, more explicitly described, but not limited to:

Sections 31, 32 and 33
Township 14 South, Range 16 East, WM

Sections 4, 5 and 6
Township 15 South, Range 16 East, WM

The well shall be constructed in accordance with the General Standards for the Construction and Maintenance of Water Wells in Oregon. The works shall be equipped with a usable access port, and may also include an air line and pressure gauge adequate to determine water level elevation in the well at all times.

Within one year of permit issuance, the City shall submit a conservation management plan consistent with Oregon Administrative Rule 690-86.

Prior to receiving a certificate of water right, the permit holder shall submit the results of a pump test meeting the department's standards, to the Water Resources Department. The Director may require water level or pump test results every ten years thereafter.

If substantial interference with a senior water right occurs due to withdrawal of water from any well listed on this permit, then use of water from the well(s) shall be discontinued or reduced and/or the schedule of withdrawal shall be regulated until or unless the Department approves or implements an alternative administrative action to mitigate the interference. The Department encourages junior and senior appropriators to jointly develop plans to mitigate interferences.

Actual construction work shall begin on or before April 24, 1996, and shall be completed on or before October 1, 1997. Complete application of the water shall be made on or before October 1, 1998.

Failure to comply with any of the provisions of this permit may result in action including, but not limited to, restrictions on the use, civil penalties, or cancellation of the permit.

This permit is for beneficial use of water without waste. The water user is advised that new regulations may require use of best practical technologies or conservation practices to achieve this end.

By law, the land use associated with this water use must be in compliance with statewide land-use goals and any local acknowledged land-use plan.

The use of water shall be limited when it interferes with any prior surface or ground water rights.

The Director finds that the proposed use(s) of water described by this permit, as conditioned, would not impair or be detrimental to the public interest.

Issued this date April 24, 1995.

/s/ MARTHA O. PAGEL

Water Resources Department
Martha O. Pagel
Director

STATE OF OREGON

COUNTY OF CROOK

PERMIT TO APPROPRIATE THE PUBLIC WATERS

THIS PERMIT IS HEREBY ISSUED TO

CLEAR PINE MOULDINGS, INC.
PO BOX 309 (541) 447-4195
PRINEVILLE, OREGON 97754

The specific limits for the use are listed below along with conditions of use.

APPLICATION FILE NUMBER: G-13238

SOURCE OF WATER: THREE WELLS IN OCHOCO CREEK BASIN

PURPOSE OR USE: INDUSTRIAL USE INCLUDING FIRE PROTECTION AND DUST CONTROL

VOLUME OF USE: 3.99 CUBIC FEET PER SECOND (CFS), BEING 1.33 CFS FROM WELL #1, 1.33 CFS FROM WELL #2, AND 1.33 CFS FROM WELL #3

PERIOD OF ALLOWED USE: YEAR ROUND

DATE OF PRIORITY: JANUARY 6, 1993

POINT OF DIVERSION LOCATION: NE 1/4 NE 1/4, SW 1/4 NE 1/4, NE 1/4 NW 1/4, SECTION 31, T14S, R16E, W.M.; WELL #1 - 878 FEET SOUTH AND 1009 FEET WEST; WELL #2 - 1678 FEET SOUTH AND 2033 FEET WEST; WELL #3 - 1002 FEET SOUTH AND 3087 FEET WEST, ALL FROM THE NE CORNER OF SECTION 31

THE PLACE OF USE IS LOCATED AS FOLLOWS:

NE 1/4 NE 1/4
NW 1/4 NE 1/4
SW 1/4 NE 1/4
SE 1/4 NE 1/4
NE 1/4 NW 1/4
SECTION 31
TOWNSHIP 14 SOUTH, RANGE 16 EAST, W.M.

Measurement, recording and reporting conditions:

A. Before water use may begin under this permit, the permittee shall install a meter or other suitable measuring device as approved by the Director. The permittee shall maintain the meter or measuring device in good working order, shall keep a complete record of the amount of water used each month and shall submit a report which includes the recorded water use measurements to the Department annually or more frequently as

"CERTIFICATE NO. [illegible]

may be required by the Director. Further, the Director may require the permittee to report general water use information, including the place and nature of use of water under the permit.

B. The permittee shall allow the watermaster access to the meter or measuring device; provided however, where the meter or measuring device is located within a private structure, the watermaster shall request access upon reasonable notice.

The water user shall install and maintain adequate treatment facilities meeting current DEQ requirements to remove sediment before returning the water to the stream.

If substantial interference with a senior water right occurs due to withdrawal of water from any well listed on this permit, then use of water from the well(s) shall be discontinued or reduced and/or the schedule of withdrawal shall be regulated until or unless the Department approves or implements an alternative administrative action to mitigate the interference. The Department encourages junior and senior appropriators to jointly develop plans to mitigate interferences.

Use of water under authority of this permit may be regulated if analysis of data available after the permit is issued discloses that the appropriation will measurably reduce the surface water flows necessary to maintain the free-flowing character of a scenic waterway in quantities necessary for recreation, fish and wildlife in effect as of the priority date of the right or as those quantities may be subsequently reduced.

Limited Water Level Decline/Interference Condition

To monitor the effect of water use from the well(s) authorized under this permit, the Department requires the water user to make and report annual static water level measurements. The static water level shall be measured in the month of March. Reports shall be submitted to the Department within 30 days of measurement.

Measurements must be made according to the following schedule:

Before Use of Water Takes Place
Initial and Annual Measurements
The Department requires the permittee to submit an initial water level measurement in the month specified above once well construction is complete and annually thereafter until use of water begins; and

After Use of Water has Begun
Seven Consecutive Annual Measurements
Following the first year of water use, the user shall submit seven consecutive annual reports of static water level measurements. The first of these seven annual measurements will establish the reference level against which future annual measurements will be compared. Based

on an analysis of the data collected, the Director may require that the user obtain and report additional annual static water level measurements beyond the seven year minimum reporting period. The additional measurements may be required in a different month. If the measurement requirement is stopped, the Director may restart it at any time.

All measurements shall be made by a certified water rights examiner, registered professional geologist, registered professional engineer, licensed well constructor or pump installer licensed by the Construction Contractors Board and be submitted to the Department on forms provided by the Department. The Department requires the individual performing the measurement to:

(A) Identify each well with its associated measurement; and
(B) Measure and report water levels to the nearest tenth of a foot as depth-to-water below ground surface; and
(C) Specify the method used to obtain each well measurement; and
(D) Certify the accuracy of all measurements and calculations submitted to the Department.

The water user shall discontinue use of, or reduce the rate or volume of withdrawal from, the well(s) if annual water level measurements reveal any of the following events:

(A) An average water level decline of 3 or more feet per year for five consecutive years; or
(B) A water level decline of 15 or more feet in fewer than five consecutive years; or
(C) A water level decline of 25 or more feet; or
(D) Hydraulic interference leading to a decline of 25 or more feet in any neighboring well with senior priority.

The period of non or restricted use shall continue until the annual water level rises above the decline level which triggered the action or until the Department determines, based on the permittee's and/or the Department's data and analysis, that no action is necessary because the aquifer in question can sustain the observed declines without adversely impacting the resource or senior water rights. The water user shall in no instance allow excessive decline, as defined in Commission rules, to occur within the aquifer as a result of use under this permit. If more than one well is involved, the water user may submit an alternative measurement and reporting plan for review and approval by the Department.

SEE NEXT PAGE

STANDARD CONDITIONS

The wells shall be constructed in accordance with the General Standards for the Construction and Maintenance of Water Wells in Oregon. The works shall be equipped with a usable access port, and may also include an air line and pressure gauge adequate to determine water level elevation in the well at all times.

The use shall conform to such reasonable rotation system as may be ordered by the proper state officer.

Prior to receiving a certificate of water right, the permit holder shall submit the results of a pump test meeting the department's standards, to the Water Resources Department. The Director may require water level or pump test results every ten years thereafter.

Failure to comply with any of the provisions of this permit may result in action including, but not limited to, restrictions on the use, civil penalties, or cancellation of the permit.

This permit is for the beneficial use of water without waste. The water user is advised that new regulations may require the use of best practical technologies or conservation practices to achieve this end.

By law, the land use associated with this water use must be in compliance with statewide land-use goals and any local acknowledged land-use plan.

The use of water shall be limited when it interferes with any prior surface or ground water rights.
Application G-13238 Water Resources Department PERMIT G-12541
The Director finds that the proposed use(s) of water described by this permit, as conditioned, will not impair or be detrimental to the public interest.

Actual construction of the wells shall begin within one year from permit issuance and shall be completed on or before October 1, 1998. Complete application of the water to the use shall be made on or before October 1, 1999.

Issued June 19, 1996

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for Martha O. Pagel, Director
Water Resources Department

STATE OF OREGON

COUNTIES OF CROOK AND DESCHUTES

PERMIT TO APPROPRIATE PUBLIC WATERS

THIS PERMIT IS HEREBY ISSUED TO:

CITY OF PRINEVILLE
387 NE THIRD ST
PRINEVILLE OR 97754

This superseding permit is issued to describe an amendment for an additional point of appropriation and a change in point of appropriation proposed under Permit Amendment Application T-11685 and approved by Special Order Vol. 93 **, Page** 60 **, entered** Aug 5 2014 **. This permit supersedes Permit G-16879.**

The specific limits and conditions of the use are listed below.

APPLICATION FILE NUMBER: G-16900

SOURCE OF WATER: WELL 1 (CROO 1894/CROO 50095), WELL 2 (CROO 53453), WELL 3 (CROO 53956), WELL 4, WELL 5, WELL 6, WELL 7, WELL 8 AND WELL 9 IN CROOKED RIVER BASIN

RATE: 12.48 CUBIC FEET PER SECOND (CFS), FURTHER LIMITED TO 5.57 CFS FROM WELLS 1-7, BEING NO MORE THAN 2.23 CFS IN TOTAL FROM WELL 1 (CROO 1894/CROO 50095), WELL 2 (CROO 53453), WELL 3 (CROO 53956); NO MORE THAN 1.11 CFS IN TOTAL FROM WELL 5 AND WELL 6; AND NO MORE THAN 2.23 CFS FROM WELL 7

MAXIMUM ANNUAL VOLUME: 3682.7 ACRE FEET

DATE OF PRIORITY: JUNE 27, 2007

USE: MUNICIPAL

PERIOD: YEAR-ROUND

Authorized Points of Appropriation:

Well	Twp	Rng	Mer	Sec	Q-Q	Measured Distances
City Airport Well 1 (CROO 1894/CROO 50095)	15 S	15 E	WM	11	SE SW	1210 FEET NORTH AND 1950 FEET EAST FROM THE SW CORNER OF SECTION 11
City Airport Well 2 (CROO 53453)	15 S	15 E	WM	11	SE SW	1165 FEET NORTH AND 1990 FEET EAST FROM THE SW CORNER OF SECTION 11
City Airport Well 3 (CROO 53956)	15 S	15 E	WM	11	SW SE	55 FEET NORTH AND 3000 FEET EAST FROM THE SW CORNER OF SECTION 11
City Airport Well 4	15 S	15 E	WM	11	SE SW	1070 FEET NORTH AND 1710 FEET EAST FROM THE SW CORNER OF SECTION 11
Well 5	15 S	14 E	WM	26	NW NE	319 FEET SOUTH AND 2408 FEET WEST FROM THE NE CORNER OF SECTION 26

Well	Twp	Rng	Mer	Sec	Q-Q	Measured Distances
Well 6	15 S	14 E	WM	26	NW NE	835 FEET SOUTH AND 2477 FEET WEST FROM THE NE CORNER OF SECTION 26
Well 7	15 S	15 E	WM	6	NE SW	2000 FEET NORTH AND 2340 FEET EAST FROM THE SW CORNER OF SECTION 6
Well 8	15 S	13 E	WM	23	NE NW	110 FEET SOUTH AND 1870 FEET EAST FROM THE NW CORNER OF SECTION 23
Well 9	15 S	13 E	WM	23	NE NW	100 FEET SOUTH AND 2470 FEET EAST FROM THE NW CORNER OF SECTION 23

Authorized Place of Use: WITHIN CITY OF PRINEVILLE SERVICE BOUNDARY

Permit Amendment T-11685 Conditions:

The quantity of water diverted at the new point of appropriation, (Well 3), shall not exceed the quantity of water lawfully available at the original point of appropriation.

The combined quantity of water diverted at the proposed additional point of appropriation, (Well 4), together with that diverted at the old points of appropriation (Wells 1, 2, and 3), shall not exceed the quantity of water lawfully available at the original points of appropriation (2.23 cfs).

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

Measurement, Recording and Reporting Conditions:

A. Before water use may begin under this permit, the permittee shall install a totalizing flow meter at each point of appropriation. The permittee shall maintain the meter in good working order.

B. The permittee shall keep a complete record of the amount of water used each month, and shall submit a report which includes the recorded water use measurements to the Department annually or more frequently as may be required by the Director. Further, the Director may require the permittee to report general water-use information, including the place and nature of use of water under the permit.

C. The permittee shall allow the watermaster access to the meters; provided however, where any meter is located within a private structure, the watermaster shall request access upon reasonable notice.

D. The Director may provide an opportunity for the permittee to submit alternative measuring and reporting procedures for review and approval.

The Department requires the water user to obtain, from a qualified individual (see below), and report annual static water levels for each well on the permit. The static water level shall be measured in the month of March. Reports shall be submitted to the Department within 30 days of measurement.

The permittee shall report an initial March static water-level measurement once well construction is complete and annual measurements thereafter. Annual measurements are required whether or not the well is used. The first annual measurement will establish a reference level against which future measurements will be compared. However, the Director may establish the reference level based on an analysis of other water-level data. The Director may require the user to obtain and report additional water levels each year if more data are needed to evaluate the aquifer system.

All measurements shall be made by a certified water rights examiner, registered professional geologist, registered professional engineer, licensed well constructor or pump installer licensed by the Construction Contractors Board. Measurements shall be submitted on forms provided by, or specified by, the Department. Measurements shall be made with equipment that is accurate to at least the standards specified in OAR 690-217-0045. The Department requires the individual performing the measurement to:

A. Associate each measurement with an owner's well name or number and a Department well log ID; and

B. Report water levels to at least the nearest tenth of a foot as depth-to-water below ground surface; and

C. Specify the method of measurement; and

D. Certify the accuracy of all measurements and calculations reported to the Department.

The water user shall discontinue use of, or reduce the rate or volume of withdrawal from, the wells if any of the following events occur:

A. Annual water-level measurements reveal an average water-level decline of three or more feet per year for five consecutive years; or

B. Annual water-level measurements reveal a water-level decline of 15 or more feet in fewer than five consecutive years; or

C. Annual water-level measurements reveal a water-level decline of 25 or more feet; or

D. Hydraulic interference leads to a decline of 25 or more feet in any neighboring well with senior priority.

The period of restricted use shall continue until the water level rises above the decline level which triggered the action or the Department determines, based on the permittee's and/or the Department's data and analysis, that no action is necessary because the aquifer in question can sustain the observed declines without adversely impacting the resource or causing substantial interference with senior water rights. The water user shall not allow excessive decline, as defined in Commission rules, to occur within the aquifer as a result of use under this permit. If more than one well is involved, the water user may submit an alternative measurement and reporting plan for review and approval by the Department.

Ground Water Mitigation Conditions:

1. Mitigation Obligation: a total of 1473.1 acre-feet of mitigation water in the General Zone of Impact and/or the Crooked River Zone of Impact, as applicable.

Well	Zone of Impact
Well 1 (CROO 1894/CROO 50095)	Crooked River Zone of Impact
Well 2 (CROO 53453)	Crooked River Zone of Impact
Well 3 (CROO 53956)	Crooked River Zone of Impact
Well 4	Crooked River Zone of Impact
Well 5	Crooked River Zone of Impact
Well 6	Crooked River Zone of Impact
Well 7	Crooked River Zone of Impact
Well 8	General Zone of Impact
Well 9	General Zone of Impact

Mitigation must be provided in the General Zone of Impact for use of water from any well with a mitigation obligation in the General Zone of Impact. Mitigation must be provided in the Crooked River Zone of Impact for use of water from any well with a mitigation obligation in the Crooked River Zone of Impact. The amount of mitigation provided in each zone of impact shall be consistent with the incremental development plan on file with the Department, and shall be of sufficient quantity to mitigate for the annual volume of water used in each zone of impact.

Mitigation Source: mitigation projects, mitigation credits, or offsets

2. First increment of mitigation:
   a. Mitigation obligation: 91.5 acre feet of mitigation water in the either the General Zone of Impact or Crooked River Zone of Impact
   b. Mitigation source: 36.6 mitigation credits originating from Mitigation Project MP-140, established by instream water right certificates 87249 and 87250, and which may be used in either the General Zone of Impact or Crooked River Zone of Impact, in accordance with the incremental development plan on file with the Department, meeting requirements of OAR chapter 690, Division 505 (Deschutes Groundwater Mitigation Rules).
3. The permittee shall provide mitigation during each stage of development under the permit, as described in the incremental development mitigation plan on file with the Department, and in accordance with the standards of the Deschutes Ground Water Mitigation Rules, OAR Chapter 690, Division 505 and 522.
4. The permittee shall not increase the rate or amount of water diverted, as described in the incremental development mitigation plan, prior to increasing the corresponding mitigation.
5. The permittee shall seek and receive Departmental approval prior to changing the incremental mitigation development plan and related mitigation obligation for each stage of permit development.
6. The permittee shall report to the Department the progress made in implementing the incremental mitigation development plan and related mitigation no later than April 1 of each year. The annual report shall include the annual volume of water used, the source and

amount of mitigation, and any offset used for that period. This information shall be broken down by Zone of Impact, and shall include identification of the authorized wells utilized. This annual notification is not necessary if the permittee has completed development and submitted a Claim of Beneficial Use to the Department.

7. Mitigation water must be legally protected instream in the General Zone of Impact and the Crooked River Zone of Impact, as applicable, for the life of the permit and subsequent certificate(s). Regulation of the use and/or cancellation of the permit, or subsequent certificate(s) will occur if the required mitigation is not maintained.
8. The permittee shall provide additional mitigation if the Department determines that average annual consumptive use of the subject appropriation has increased beyond the originally mitigated amount.
9. If mitigation is from a secondary right for stored water from a storage project not owned or operated by the permittee, the use of water under this right is subject to the maintenance and terms and conditions of a valid contract or satisfactory replacement, with the owner/operator of the storage project, a copy of which must be on file in the records of the Water Resources Department.
10. Failure to comply with these mitigation conditions shall result in the Department regulating the ground water permit, or subsequent certificate(s), proposing to deny any permit extension application for the ground water permit, and proposing to cancel the ground water permit, or subsequent certificate(s).

Scenic Waterway Condition:

Use of water under authority of this permit may be regulated if analysis of data available after the permit is issued discloses that the appropriation will measurably reduce the surface water flows necessary to maintain the free-flowing character of a scenic waterway in quantities necessary for recreation, fish and wildlife in effect as of the priority date of the right, or as those quantities may be reduced subsequently.

However, the use of ground water allowed under the terms of this permit will not be subject to regulation for Scenic Waterway flows, provided the required mitigation is maintained.

Water Management and Conservation Plan Condition

The permittee shall submit a Water Management and Conservation Plan, addressing use under this permit, consistent with OAR 690-086 by November 30, 2016, or before use of the second increment of water development occurs, whichever is sooner. The Director may approve an extension of this time line to complete the required Water Management and Conservation Plan. No water may be diverted if a Water Management and Conservation Plan is not submitted according to the time lines described in this condition, unless such an extension has been approved. The time line for submittal of a plan under this permit does not alter the time lines for submittal of such a plan under any other order of the Department.

STANDARD CONDITIONS

1. Failure to comply with any of the provisions of this permit may result in action including, but not limited to, restrictions on the use, civil penalties, or cancellation of the permit.

2. If the number, location, source, or construction of any well deviates from that proposed in the permit application or required by permit conditions, this permit may be subject to cancellation, unless the Department authorizes the change in writing.

3. If substantial interference with a senior water right occurs due to withdrawal of water from any well listed on this permit, then use of water from the well(s) shall be discontinued or reduced and/or the schedule of withdrawal shall be regulated until or unless the Department approves or implements an alternative administrative action to mitigate the interference. The Department encourages junior and senior appropriators to jointly develop plans to mitigate interferences.

4. The wells shall be constructed in accordance with the General Standards for the Construction and Maintenance of Water Wells in Oregon. The works shall be equipped with a usable access port, and may also include an air line and pressure gauge adequate to determine water level elevation in the well at all times.

5. Where two or more water users agree among themselves as to the manner of rotation in the use of water and such agreement is placed in writing and filed by such water users with the watermaster, and such rotation system does not infringe upon such prior rights of any water user not a party to such rotation plan, the watermaster shall distribute the water according to such agreement.

6. Prior to receiving a certificate of water right, the permit holder shall submit the results of a pump test meeting the department's standards, to the Water Resources Department. The Director may require water level or pump test results every ten years thereafter.

7. This permit is for the beneficial use of water without waste. The water user is advised that new regulations may require the use of best-practice technologies or conservation practices to achieve this end.

8. By law, the land use associated with this water use must be in compliance with statewide land-use goals and any local acknowledged comprehensive land-use plan.

9. Completion of construction and complete application of the water to the use shall be made within twenty years of the date of permit G-16879 issuance, being November 30, 2031. If the water is not completely applied before this date, and the permittee wishes to continue development under the permit, the permittee must submit an application for extension of time, which may be approved based upon the merit of the application.

10. Within one year after complete application of water to the proposed use, the permittee shall submit a claim of beneficial use, which includes a map and report, prepared by a Certified Water Rights Examiner.

Issued August 5, 2014

Dwight French, Water Right Services Division Administrator, for
Director, Oregon Water Resources Department

STATE OF OREGON

COUNTY OF CROOK

PERMIT TO APPROPRIATE THE PUBLIC WATERS

THIS PERMIT IS HEREBY ISSUED TO

CITY OF PRINEVILLE
387 NE THIRD STREET
PRINEVILLE, OR 97754

This superseding permit is issued to describe an amendment for an additional point of appropriation proposed under Permit Amendment Application T-12192 and approved by Special Order Vol. 101, Page 88-90, entered June 1, 2016. This permit supersedes Permit G-17089.

The specific limits and conditions of the use are listed below.

APPLICATION FILE NUMBER: G-15974

SOURCE OF WATER: FOUR WELLS IN OCHOCO CREEK BASIN WITHIN THE DESCHUTES RIVER BASIN

PURPOSE OR USE: MUNICIPAL USE

MAXIMUM RATE/VOLUME: 1.715 CUBIC FEET PER SECOND (CFS), LIMITED TO A MAXIMUM ANNUAL VOLUME OF 1242.0 ACRE FEET (AF), FURTHER LIMITED BY THE CORRESPONDING MITIGATION PROVIDED UNDER THE INCREMENTAL MITIGATION DEVELOPMENT PLAN

PERIOD OF USE: YEAR ROUND

DATE OF PRIORITY: MARCH 31, 2003

WELL LOCATIONS:

Twp	Rng	Mer	Sec	Q-Q	Measured Distances
15 S	15 E	WM	11	SE SW	CITY AIRPORT WELL 1 (CROO 1894) - 1210 FEET NORTH AND 1950 FEET EAST FROM THE SW CORNER OF SECTION 11
15 S	15 E	WM	11	SE SW	CITY AIRPORT WELL 2 (CROO 53453) - 1165 FEET NORTH AND 1990 FEET EAST FROM THE SW CORNER OF SECTION 11
15 S	15 E	WM	11	SW SE	CITY AIRPORT WELL 3 (CROO 53956) - 55 FEET NORTH AND 3000 FEET EAST FROM THE SW CORNER OF SECTION 11.
15 S	15 E	WM	11	SE SW	CITY AIRPORT WELL 4 (CROO 54191) – 1070 FEET NORTH AND 1710 FEET EAST FROM THE SW CORNER OF SECTION 11.

THE PLACE OF USE IS LOCATED AS FOLLOWS:

MUNICIPAL USES WITHIN THE MUNICIPAL SERVICE BOUNDARY OF THE CITY OF PRINEVILLE				
Twp	Rng	Mer	Sec	Q-Q
14 S	15 E	WM	25	NE NE
14 S	15 E	WM	25	NW NE
14 S	15 E	WM	25	SW NE
14 S	15 E	WM	25	SE NE
14 S	15 E	WM	25	NE NW
14 S	15 E	WM	25	NW NW
14 S	15 E	WM	25	SW NW
14 S	15 E	WM	25	SE NW
14 S	15 E	WM	25	NE SW
14 S	15 E	WM	25	NW SW
14 S	15 E	WM	25	SW SW
14 S	15 E	WM	25	SE SW
14 S	15 E	WM	25	NE SE
14 S	15 E	WM	25	NW SE
14 S	15 E	WM	25	SW SE
14 S	15 E	WM	25	SE SE
14 S	15 E	WM	36	NE NE
14 S	15 E	WM	36	NW NE
14 S	15 E	WM	36	SW NE
14 S	15 E	WM	36	SE NE
14 S	15 E	WM	36	NE NW
14 S	15 E	WM	36	NW NW
14 S	15 E	WM	36	SW NW
14 S	15 E	WM	36	SE NW
14 S	15 E	WM	36	NE SW
14 S	15 E	WM	36	NW SW
14 S	15 E	WM	36	SW SW
14 S	15 E	WM	36	SE SW
14 S	15 E	WM	36	NE SE
14 S	15 E	WM	36	NW SE
14 S	15 E	WM	36	SW SE
14 S	15 E	WM	36	SE SE
14 S	16 E	WM	28	NE NE
14 S	16 E	WM	28	NW NE
14 S	16 E	WM	28	SW NE
14 S	16 E	WM	28	SE NE
14 S	16 E	WM	28	NE NW
14 S	16 E	WM	28	NW NW
14 S	16 E	WM	28	SW NW
14 S	16 E	WM	28	SE NW
14 S	16 E	WM	28	NE SW
14 S	16 E	WM	28	NW SW
14 S	16 E	WM	28	SW SW
14 S	16 E	WM	28	SE SW
14 S	16 E	WM	28	NE SE

MUNICIPAL USES WITHIN THE MUNICIPAL SERVICE BOUNDARY OF THE CITY OF PRINEVILLE				
Twp	Rng	Mer	Sec	Q-Q
14 S	16 E	WM	28	NW SE
14 S	16 E	WM	28	SW SE
14 S	16 E	WM	28	SE SE
14 S	16 E	WM	29	NE NE
14 S	16 E	WM	29	NW NE
14 S	16 E	WM	29	SW NE
14 S	16 E	WM	29	SE NE
14 S	16 E	WM	29	NE NW
14 S	16 E	WM	29	NW NW
14 S	16 E	WM	29	SW NW
14 S	16 E	WM	29	SE NW
14 S	16 E	WM	29	NE SW
14 S	16 E	WM	29	NW SW
14 S	16 E	WM	29	SW SW
14 S	16 E	WM	29	SE SW
14 S	16 E	WM	29	NE SE
14 S	16 E	WM	29	NW SE
14 S	16 E	WM	29	SW SE
14 S	16 E	WM	29	SE SE
14 S	16 E	WM	30	NE NE
14 S	16 E	WM	30	NW NE
14 S	16 E	WM	30	SW NE
14 S	16 E	WM	30	SE NE
14 S	16 E	WM	30	NE NW
14 S	16 E	WM	30	NW NW
14 S	16 E	WM	30	SW NW
14 S	16 E	WM	30	SE NW
14 S	16 E	WM	30	NE SW
14 S	16 E	WM	30	NW SW
14 S	16 E	WM	30	SW SW
14 S	16 E	WM	30	SE SW
14 S	16 E	WM	30	NE SE
14 S	16 E	WM	30	NW SE
14 S	16 E	WM	30	SW SE
14 S	16 E	WM	30	SE SE
14 S	16 E	WM	31	NE NE
14 S	16 E	WM	31	NW NE
14 S	16 E	WM	31	SW NE
14 S	16 E	WM	31	SE NE
14 S	16 E	WM	31	NE NW
14 S	16 E	WM	31	NW NW
14 S	16 E	WM	31	SW NW
14 S	16 E	WM	31	SE NW
14 S	16 E	WM	31	NE SW
14 S	16 E	WM	31	NW SW
14 S	16 E	WM	31	SW SW
14 S	16 E	WM	31	SE SW

MUNICIPAL USES WITHIN THE MUNICIPAL SERVICE BOUNDARY OF THE CITY OF PRINEVILLE				
Twp	Rng	Mer	Sec	Q-Q
14 S	16 E	WM	31	NE SE
14 S	16 E	WM	31	NW SE
14 S	16 E	WM	31	SW SE
14 S	16 E	WM	31	SE SE
14 S	16 E	WM	32	NE NE
14 S	16 E	WM	32	NW NE
14 S	16 E	WM	32	SW NE
14 S	16 E	WM	32	SE NE
14 S	16 E	WM	32	NE NW
14 S	16 E	WM	32	NW NW
14 S	16 E	WM	32	SW NW
14 S	16 E	WM	32	SE NW
14 S	16 E	WM	32	NE SW
14 S	16 E	WM	32	NW SW
14 S	16 E	WM	32	SW SW
14 S	16 E	WM	32	SE SW
14 S	16 E	WM	32	NE SE
14 S	16 E	WM	32	NW SE
14 S	16 E	WM	32	SW SE
14 S	16 E	WM	32	SE SE
14 S	16 E	WM	33	NE NE
14 S	16 E	WM	33	NW NE
14 S	16 E	WM	33	SW NE
14 S	16 E	WM	33	SE NE
14 S	16 E	WM	33	NE NW
14 S	16 E	WM	33	NW NW
14 S	16 E	WM	33	SW NW
14 S	16 E	WM	33	SE NW
14 S	16 E	WM	33	NE SW
14 S	16 E	WM	33	NW SW
14 S	16 E	WM	33	SW SW
14 S	16 E	WM	33	SE SW
14 S	16 E	WM	33	NE SE
14 S	16 E	WM	33	NW SE
14 S	16 E	WM	33	SW SE
14 S	16 E	WM	33	SE SE
14 S	16 E	WM	34	NE NE
14 S	16 E	WM	34	NW NE
14 S	16 E	WM	34	SW NE
14 S	16 E	WM	34	SE NE
14 S	16 E	WM	34	NE NW
14 S	16 E	WM	34	NW NW
14 S	16 E	WM	34	SW NW
14 S	16 E	WM	34	SE NW
14 S	16 E	WM	34	NE SW
14 S	16 E	WM	34	NW SW
14 S	16 E	WM	34	SW SW

MUNICIPAL USES WITHIN THE MUNICIPAL SERVICE BOUNDARY OF THE CITY OF PRINEVILLE				
Twp	Rng	Mer	Sec	Q-Q
14 S	16 E	WM	34	SE SW
14 S	16 E	WM	34	NE SE
14 S	16 E	WM	34	NW SE
14 S	16 E	WM	34	SW SE
14 S	16 E	WM	34	SE SE
15 S	15 E	WM	1	NE NE
15 S	15 E	WM	1	NW NE
15 S	15 E	WM	1	SW NE
15 S	15 E	WM	1	SE NE
15 S	15 E	WM	1	NE NW
15 S	15 E	WM	1	NW NW
15 S	15 E	WM	1	SW NW
15 S	15 E	WM	1	SE NW
15 S	15 E	WM	1	NE SW
15 S	15 E	WM	1	NW SW
15 S	15 E	WM	1	SW SW
15 S	15 E	WM	1	SE SW
15 S	15 E	WM	1	NE SE
15 S	15 E	WM	1	NW SE
15 S	15 E	WM	1	SW SE
15 S	15 E	WM	1	SE SE
15 S	15 E	WM	2	NE NE
15 S	15 E	WM	2	NW NE
15 S	15 E	WM	2	SW NE
15 S	15 E	WM	2	SE NE
15 S	15 E	WM	2	NE NW
15 S	15 E	WM	2	NW NW
15 S	15 E	WM	2	SW NW
15 S	15 E	WM	2	SE NW
15 S	15 E	WM	2	NE SW
15 S	15 E	WM	2	NW SW
15 S	15 E	WM	2	SW SW
15 S	15 E	WM	2	SE SW
15 S	15 E	WM	2	NE SE
15 S	15 E	WM	2	NW SE
15 S	15 E	WM	2	SW SE
15 S	15 E	WM	2	SE SE
15 S	15 E	WM	3	NE NE
15 S	15 E	WM	3	NW NE
15 S	15 E	WM	3	SW NE
15 S	15 E	WM	3	SE NE
15 S	15 E	WM	3	NE NW
15 S	15 E	WM	3	NW NW
15 S	15 E	WM	3	SW NW
15 S	15 E	WM	3	SE NW
15 S	15 E	WM	3	NE SW
15 S	15 E	WM	3	NW SW

MUNICIPAL USES WITHIN THE MUNICIPAL SERVICE BOUNDARY OF THE CITY OF PRINEVILLE				
Twp	Rng	Mer	Sec	Q-Q
15 S	15 E	WM	3	SW SW
15 S	15 E	WM	3	SE SW
15 S	15 E	WM	3	NE SE
15 S	15 E	WM	3	NW SE
15 S	15 E	WM	3	SW SE
15 S	15 E	WM	3	SE SE
15 S	15 E	WM	10	NE NE
15 S	15 E	WM	10	NW NE
15 S	15 E	WM	10	SW NE
15 S	15 E	WM	10	SE NE
15 S	15 E	WM	10	NE NW
15 S	15 E	WM	10	NW NW
15 S	15 E	WM	10	SW NW
15 S	15 E	WM	10	SE NW
15 S	15 E	WM	10	NE SW
15 S	15 E	WM	10	NW SW
15 S	15 E	WM	10	SW SW
15 S	15 E	WM	10	SE SW
15 S	15 E	WM	10	NE SE
15 S	15 E	WM	10	NW SE
15 S	15 E	WM	10	SW SE
15 S	15 E	WM	10	SE SE
15 S	15 E	WM	11	NE NE
15 S	15 E	WM	11	NW NE
15 S	15 E	WM	11	SW NE
15 S	15 E	WM	11	SE NE
15 S	15 E	WM	11	NE NW
15 S	15 E	WM	11	NW NW
15 S	15 E	WM	11	SW NW
15 S	15 E	WM	11	SE NW
15 S	15 E	WM	11	NE SW
15 S	15 E	WM	11	NW SW
15 S	15 E	WM	11	SW SW
15 S	15 E	WM	11	SE SW
15 S	15 E	WM	11	NE SE
15 S	15 E	WM	11	NW SE
15 S	15 E	WM	11	SW SE
15 S	15 E	WM	11	SE SE
15 S	15 E	WM	12	NE NE
15 S	15 E	WM	12	NW NE
15 S	15 E	WM	12	SW NE
15 S	15 E	WM	12	SE NE
15 S	15 E	WM	12	NE NW
15 S	15 E	WM	12	NW NW
15 S	15 E	WM	12	SW NW
15 S	15 E	WM	12	SE NW
15 S	15 E	WM	12	NE SW

MUNICIPAL USES WITHIN THE MUNICIPAL SERVICE BOUNDARY OF THE CITY OF PRINEVILLE				
Twp	Rng	Mer	Sec	Q-Q
15 S	15 E	WM	12	NW SW
15 S	15 E	WM	12	SW SW
15 S	15 E	WM	12	SE SW
15 S	15 E	WM	12	NE SE
15 S	15 E	WM	12	NW SE
15 S	15 E	WM	12	SW SE
15 S	15 E	WM	12	SE SE
15 S	15 E	WM	13	NE NE
15 S	15 E	WM	13	NW NE
15 S	15 E	WM	13	SW NE
15 S	15 E	WM	13	SE NE
15 S	15 E	WM	13	NE NW
15 S	15 E	WM	13	NW NW
15 S	15 E	WM	13	SW NW
15 S	15 E	WM	13	SE NW
15 S	15 E	WM	13	NE SW
15 S	15 E	WM	13	NW SW
15 S	15 E	WM	13	SW SW
15 S	15 E	WM	13	SE SW
15 S	15 E	WM	13	NE SE
15 S	15 E	WM	13	NW SE
15 S	15 E	WM	13	SW SE
15 S	15 E	WM	13	SE SE
15 S	15 E	WM	14	NE NE
15 S	15 E	WM	14	NW NE
15 S	15 E	WM	14	SW NE
15 S	15 E	WM	14	SE NE
15 S	15 E	WM	14	NE NW
15 S	15 E	WM	14	NW NW
15 S	15 E	WM	14	SW NW
15 S	15 E	WM	14	SE NW
15 S	15 E	WM	14	NE SW
15 S	15 E	WM	14	NW SW
15 S	15 E	WM	14	SW SW
15 S	15 E	WM	14	SE SW
15 S	15 E	WM	14	NE SE
15 S	15 E	WM	14	NW SE
15 S	15 E	WM	14	SW SE
15 S	15 E	WM	14	SE SE
15 S	16 E	WM	3	NE NE
15 S	16 E	WM	3	NW NE
15 S	16 E	WM	3	SW NE
15 S	16 E	WM	3	SE NE
15 S	16 E	WM	3	NE NW
15 S	16 E	WM	3	NW NW
15 S	16 E	WM	3	SW NW

MUNICIPAL USES WITHIN THE MUNICIPAL SERVICE BOUNDARY OF THE CITY OF PRINEVILLE				
Twp	Rng	Mer	Sec	Q-Q
15 S	16 E	WM	3	SE NW
15 S	16 E	WM	3	NE SW
15 S	16 E	WM	3	NW SW
15 S	16 E	WM	3	SW SW
15 S	16 E	WM	3	SE SW
15 S	16 E	WM	3	NE SE
15 S	16 E	WM	3	NW SE
15 S	16 E	WM	3	SW SE
15 S	16 E	WM	3	SE SE
15 S	16 E	WM	4	NE NE
15 S	16 E	WM	4	NW NE
15 S	16 E	WM	4	SW NE
15 S	16 E	WM	4	SE NE
15 S	16 E	WM	4	NE NW
15 S	16 E	WM	4	NW NW
15 S	16 E	WM	4	SW NW
15 S	16 E	WM	4	SE NW
15 S	16 E	WM	4	NE SW
15 S	16 E	WM	4	NW SW
15 S	16 E	WM	4	SW SW
15 S	16 E	WM	4	SE SW
15 S	16 E	WM	4	NE SE
15 S	16 E	WM	4	NW SE
15 S	16 E	WM	4	SW SE
15 S	16 E	WM	4	SE SE
15 S	16 E	WM	5	NE NE
15 S	16 E	WM	5	NW NE
15 S	16 E	WM	5	SW NE
15 S	16 E	WM	5	SE NE
15 S	16 E	WM	5	NE NW
15 S	16 E	WM	5	NW NW
15 S	16 E	WM	5	SW NW
15 S	16 E	WM	5	SE NW
15 S	16 E	WM	5	NE SW
15 S	16 E	WM	5	NW SW
15 S	16 E	WM	5	SW SW
15 S	16 E	WM	5	SE SW
15 S	16 E	WM	5	NE SE
15 S	16 E	WM	5	NW SE
15 S	16 E	WM	5	SW SE
15 S	16 E	WM	5	SE SE
15 S	16 E	WM	6	NE NE
15 S	16 E	WM	6	NW NE
15 S	16 E	WM	6	SW NE
15 S	16 E	WM	6	SE NE
15 S	16 E	WM	6	NE NW
15 S	16 E	WM	6	NW NW
15 S	16 E	WM	6	SW NW
15 S	16 E	WM	6	SE NW
15 S	16 E	WM	6	NE SW

MUNICIPAL USES WITHIN THE MUNICIPAL SERVICE BOUNDARY OF THE CITY OF PRINEVILLE				
Twp	Rng	Mer	Sec	Q-Q
15 S	16 E	WM	6	NW SW
15 S	16 E	WM	6	SW SW
15 S	16 E	WM	6	SE SW
15 S	16 E	WM	6	NE SE
15 S	16 E	WM	6	NW SE
15 S	16 E	WM	6	SW SE
15 S	16 E	WM	6	SE SE
15 S	16 E	WM	7	NE NE
15 S	16 E	WM	7	NW NE
15 S	16 E	WM	7	SW NE
15 S	16 E	WM	7	SE NE
15 S	16 E	WM	7	NE NW
15 S	16 E	WM	7	NW NW
15 S	16 E	WM	7	SW NW
15 S	16 E	WM	7	SE NW
15 S	16 E	WM	7	NE SW
15 S	16 E	WM	7	NW SW
15 S	16 E	WM	7	SW SW
15 S	16 E	WM	7	SE SW
15 S	16 E	WM	7	NE SE
15 S	16 E	WM	7	NW SE
15 S	16 E	WM	7	SW SE
15 S	16 E	WM	7	SE SE
15 S	16 E	WM	8	NE NE
15 S	16 E	WM	8	NW NE
15 S	16 E	WM	8	SW NE
15 S	16 E	WM	8	SE NE
15 S	16 E	WM	8	NE NW
15 S	16 E	WM	8	NW NW
15 S	16 E	WM	8	SW NW
15 S	16 E	WM	8	SE NW
15 S	16 E	WM	8	NE SW
15 S	16 E	WM	8	NW SW
15 S	16 E	WM	8	SW SW
15 S	16 E	WM	8	SE SW
15 S	16 E	WM	8	NE SE
15 S	16 E	WM	8	NW SE
15 S	16 E	WM	8	SW SE
15 S	16 E	WM	8	SE SE
15 S	16 E	WM	9	NE NE
15 S	16 E	WM	9	NW NE
15 S	16 E	WM	9	SW NE
15 S	16 E	WM	9	SE NE
15 S	16 E	WM	9	NE NW
15 S	16 E	WM	9	NW NW
15 S	16 E	WM	9	SW NW
15 S	16 E	WM	9	SE NW
15 S	16 E	WM	9	NE SW
15 S	16 E	WM	9	NW SW
15 S	16 E	WM	9	SW SW

MUNICIPAL USES WITHIN THE MUNICIPAL SERVICE BOUNDARY OF THE CITY OF PRINEVILLE				
Twp	Rng	Mer	Sec	Q-Q
15 S	16 E	WM	9	SE SW
15 S	16 E	WM	9	NE SE
15 S	16 E	WM	9	NW SE
15 S	16 E	WM	9	SW SE
15 S	16 E	WM	9	SE SE

Permit Amendment T-12192 Conditions

The combined quantity of water diverted at the new point of appropriation, City Airport Well 4, together with that diverted at the old points of appropriation, City Airport Wells 1, 2 and 3, shall not exceed the quantity of water lawfully available at the original points of appropriation, City Airport Wells 1 and 2.

Water shall be acquired by City Airport Well 4 from the same aquifer as the original points of appropriation, City Airport Wells 1 and 2.

Water use measurement conditions:

a. Before water use may begin under this order, the water user shall install a totalizing flow meter, or, with prior approval of the Director, another suitable measuring device at each new point of appropriation.

b. The water user shall maintain the meter or measuring device in good working order.

c. The water user shall allow the Watermaster access to the meter or measuring device; provided however, where the meter or measuring device is located within a private structure, the Watermaster shall request access upon reasonable notice.

The permittee shall an updated Water Management and Conservation Plan pursuant to OAR Chapter 690, Division 86 no later than November 19, 2019.

Permit Amendment T-11647 Conditions

The combined quantity of water diverted at the new points of appropriation, City Airport Well 3, together with that diverted at the old points of appropriation, City Airport Wells 1 and 2, shall not exceed the quantity of water lawfully available at the original points of appropriation, City Airport Wells 1 and 2.

Water shall be acquired by City Airport Well 3 from the same aquifer as the original points of appropriation, City Airport Wells 1 and 2.

Permit Amendment T-10378 Conditions

The combined quantity of water diverted at the new points of appropriation (wells), together with that diverted at the old points of appropriation, shall not exceed the maximum rate and duty allowed under Permit G-16146.

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

Measurement, recording and reporting conditions:

A. Before water use may begin under this permit, the permittee shall install a totalizing flow meter on each well. The totalizing flow meter must be installed and maintained in good working order consistent with those standards identified in OAR 690-507-645(1) through 3. The permittee shall keep a complete record of the amount of water used each month and shall submit a report which includes the recorded water use measurements to the Department annually or more frequently as may be required by the Director. Further, the Director may require the permittee to report general water use information, including the place and nature of use of water under the permit.

B. The permittee shall allow the watermaster access to the meters; provided however, where the meter is located within a private structure, the watermaster shall request access upon reasonable notice.

Use of water under authority of this permit may be regulated if analysis of data available after the permit is issued discloses that the appropriation will measurably reduce the surface water flows necessary to maintain the free-flowing character of a scenic waterway in quantities necessary for recreation, fish and wildlife in effect as of the priority date of the right or as those quantities may be subsequently reduced. However, the use of ground water allowed under the terms of this permit will not be subject to regulation for Scenic Waterway flows so long as mitigation is maintained.

To monitor the effect of water use from the well(s) authorized under this permit, the Department requires the water user to make and report annual static water level measurements. The static water level shall be measured in the month of March. Reports shall be submitted to the Department within 30 days of measurement.

Measurements must be made according to the following schedule:

Before Use of Water Takes Place
Initial and Annual Measurements
The Department requires the permittee to submit an initial water level measurement in the month specified above once well construction is complete and annually thereafter until use of water begins; and

After Use of Water has Begun
Seven Consecutive Annual Measurements
Following the first year of water use, the user shall submit seven consecutive annual reports of static water level measurements. The first of these seven annual measurements will establish the reference level against which future annual measurements will be compared. Based on an analysis of the data collected, the Director may require that the user obtain and report additional annual static water level measurements beyond the seven year minimum reporting period. The additional measurements may be required in a different month. If the measurement requirement is stopped, the Director may restart it at any time.

All measurements shall be made by a certified water rights examiner, registered professional geologist, registered professional engineer, licensed well constructor or pump installer licensed by the Construction Contractors Board and be submitted to the Department on forms provided by the Department. The Department requires the individual performing the measurement to:

A. Identify each well with its associated measurement; and
B. Measure and report water levels to the nearest tenth of a foot as depth-to-water below ground surface; and
C. Specify the method used to obtain each well measurement; and
D. Certify the accuracy of all measurements and calculations submitted to the Department.

The water user shall discontinue use of, or reduce the rate or volume of withdrawal from, the well(s) if any of the following events occur:

A. Annual water level measurements reveal an average water level decline of three or more feet per year for five consecutive years; or
B. Annual water level measurements reveal a water level decline of 15 or more feet in fewer than five consecutive years; or
C. Annual water level measurements reveal a water level decline of 25 or more feet; or
D. Hydraulic interference leads to a decline of 25 or more feet in any neighboring well with senior priority.

The period of non or restricted use shall continue until the water level rises above the decline level which triggered the action or until the Department determines, based on the permittee's and/or the Department's data and analysis, that no action is necessary because the aquifer in question can sustain the observed declines without adversely impacting the resource or senior water rights. The water user shall in no instance allow excessive decline, as defined in Commission rules, to occur within the aquifer as a result of use under this permit. If more than one well is involved, the water user may submit an alternative measurement and reporting plan for review and approval by the Department.

GROUND WATER MITIGATION CONDITIONS

Mitigation Obligation: 496.8 acre-feet of mitigation water in the Crooked River Zone of Impact (anywhere in the Crooked River Basin above River Mile 13.8)

Mitigation Source: Mitigation Credits or a Mitigation Project, in accordance with the incremental development plan on file with the Department, meeting the requirements of OAR Chapter 690, Division 505 (Deschutes Ground Water Mitigation Rules).

The first stage of incremental development was met with 104.4 AF of mitigation, being mitigation water resulting from Mitigation Project MP-25, a permanent instream transfer that meets the requirements of OAR 690-505-0610(2)-(5), within the Crooked River Zone of Impact.

Mitigation water must be legally protected instream for instream use within the Crooked River Zone of Impact and committed for life of the permit and subsequent certificate(s). Regulation of the use and/or cancellation of the permit, or subsequent certificate(s) will occur if the required mitigation is not maintained.

If mitigation is from a secondary right for stored water from a storage project not owned or operated by the permittee, the use of water under this right is subject to the terms and conditions of a valid contract, or a satisfactory replacement, with the owner/operator of the storage project, a copy of which must be on file in the records of the Water Resources Department prior to use of water.

The permittee shall provide additional mitigation if the Department determines that average annual consumptive use of the subject appropriation has increased beyond the originally mitigated amount.

The permittee shall provide mitigation prior to each stage of development under the permit, as described in the incremental development mitigation plan on file with the Department, and in accordance with the standards of the Deschutes Ground Water Mitigation Rules, OAR Chapter 690, Division 505.

The permittee shall not increase the rate or amount of water diverted, as described in the incremental development mitigation plan, prior to increasing the corresponding mitigation.

The permittee shall seek and receive Department approval prior to changing the incremental mitigation development plan and related mitigation obligation for each stage of permit development.

The permittee shall report to the Department the progress of implementing the incremental mitigation development plan and related mitigation no later than April 1 of each year. This annual notification is not necessary if the permittee has completed development and submitted a Claim of Beneficial Use to the Department.

The permittee shall submit a new or updated Water Management and Conservation Plan pursuant to OAR Chapter 690, Division 86 by December 29, 2008.

Failure to comply with these mitigation conditions shall result in the Department regulating the ground water permit, or subsequent certificate(s), proposing to deny any permit extension application for the ground water permit, and proposing to cancel the ground water permit, or subsequent certificate(s).

STANDARD CONDITIONS

If substantial interference with a senior water right occurs due to withdrawal of water from any well listed on this permit, then use of water from the well(s) shall be discontinued or reduced and/or the schedule of withdrawal shall be regulated until or unless the Department approves or implements an alternative administrative action to mitigate the interference. The Department encourages junior and senior appropriators to jointly develop plans to mitigate interferences.

The wells shall be constructed in accordance with the General Standards for the Construction and Maintenance of Water Wells in Oregon. The works shall be equipped with a usable access port, and may also include an airline and pressure gauge adequate to determine water level elevation in the well at all times.

The use shall conform to such reasonable rotation system as may be ordered by the proper state officer.

Prior to receiving a certificate of water right, the permit holder shall submit the results of a pump test meeting the department's standards, to the Water Resources Department. The Director may require water level or pump test results every ten years thereafter.

Failure to comply with any of the provisions of this permit may result in action including, but not limited to, restrictions on the use, civil penalties, or cancellation of the permit.

This permit is for the beneficial use of water without waste. The water user is advised that new regulations may require the use of best practical technologies or conservation practices to achieve this end.

By law, the land use associated with this water use must be in compliance with statewide land-use goals and any local acknowledged land-use plan.

The use of water shall be limited when it interferes with any prior surface or ground water rights.

The permit holder shall commence and complete the construction of any proposed works prior to October 29, 2026. The Department may order and allow an extension of time to complete construction or to perfect a water right beyond October 29, 2026.

Within one year after complete application of water to the proposed use, the permittee shall submit a claim of beneficial use, which includes a map and report, prepared by a Certified Water Rights Examiner (CWRE).

Issued June 1, 2016

Dwight French

Dwight French, Water Right Services Administrator, for
Thomas M. Byler, Director
Water Resources Department

RECEIVED
SEP 5 1958
STATE ENGINEER
SALEM, OREGON

Permit No. 25991

*APPLICATION FOR PERMIT

To Appropriate the Public Waters of the State of Oregon

I, The United States of America, acting through the Bureau of Reclamation, Department of the Interior (Name of applicant)

of P.O. Box 937, Boise, Idaho (Mailing address)

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

If the applicant is a corporation, give date and place of incorporation Not a corporation

1. The source of the proposed appropriation is Crooked River et al, see remarks (Name of stream), a tributary of Deschutes River

2. The amount of water which the applicant intends to apply to beneficial use is cubic feet per second. see remarks (If water is to be used from more than one source, give quantity from each)

**3. The use to which the water is to be applied is irrigation and supplemental irrigation (Irrigation, power, mining, manufacturing, domestic supplies, etc.)

4. The primary point of diversion is located 420 ft. S. (N. or S.) and 300 ft. E. (E. or W.) from the 1/4 corner of the north line of section 1. (The outlet of Prineville Reservoir is located (Section or subdivision) 3,360 feet N. and 320 feet E. from the SW corner of section 11, T. 17 S., R. 16 E., W.M. being within the SW¼NW¼ of section 11, T. 17 S., R. 16 E., W.M. Other points of diversion are listed on separate sheet.) (If preferable, give distance and bearing to section corner)

(If there is more than one point of diversion, each must be described. Use separate sheet if necessary)

being within the NW¼ NE¼ (Give smallest legal subdivision) of Sec. 1, Tp. 16 S. (N. or S.) R. 15 E. (E. or W.), W. M., in the county of Crook

5. The Delivery and Distribution Canal (Main ditch, canal or pipe line) to be 24.2 miles (Miles or feet) in length, terminating in the NW¼ NE¼ (Smallest legal subdivision) of Sec. 9, Tp. 14 S. (N. or S.) R. 15 E., W. M., the proposed location being shown throughout on the accompanying map. No. 113-119-223

DESCRIPTION OF WORKS

Diversion Works— see separate sheets

6. (a) Height of dam 22 feet, length on top 270 feet, length at bottom 140 feet; material to be used and character of construction earth fill with 2 22'x12.5' radial gates, sluiceways, float controlled, electrically operated. (Loose rock, concrete, masonry, rock and brush, timber crib, etc., wasteway over or around dam)

(b) Description of headgate 60" x 60" metal turnout gate on right abutment plus 48" x 48" metal gate on left abutment. Fish screens both turnouts. (Timber, concrete, etc., number and size of openings)

(c) If water is to be pumped give general description see separate sheets (Size and type of pump)

(Size and type of engine or motor to be used, total head water is to be lifted, etc.)

*A different form of application is provided where storage works are contemplated.

**Application for permits to appropriate water for the generation of electricity, with the exception of municipalities, must be made to the Hydroelectric Commission. Either of the above forms may be secured, without cost, together with instructions by addressing the State Engineer, Salem, Oregon.

25991

Canal System or Pipe Line—

7. *(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)* 26.3 *feet; width on bottom* 14.0 *feet; depth of water* 4.1 *feet; grade* 0.3 *feet fall per one thousand feet.*

(b) At 8 *miles from headgate: width on top (at water line)* 22.5 *feet; width on bottom* 12.0 *feet; depth of water* 3.5 *feet; grade* 0.35 *feet fall per one thousand feet,* continued on separate sheets

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

8. *Location of area to be irrigated, or place of use* see separate sheets

Township North or South	Range E. or W. of Willamette Meridian	Section	Forty-acre Tract	Number Acres To Be Irrigated
New lands				7,766.8
Supplemental				27,010.2
Total				34,777.0

Remarks: This application is made for the Crooked River Project, authorized by the act of August 6, 1956 (70 Stat. 1058), under plan of construction and operation set out in House Document No. 387, 84th Congress, 2d session, the project water supply being that withdrawn under a priority date of April 8, 1914. The application covers a natural flow right for the project lands of the Ochoco Irrigation District, and is a secondary application for diversion of water to be stored in Prineville Reservoir under a companion reservoir filing. The storage of water in Prineville Reservoir is to be secondary, but of the same priority date, as the natural flow under this application for the project lands within the Ochoco Irrigation District.

(If more space required, attach separate sheet)

(a) Character of soil alluvial and lacustrine of varying texture

(b) Kind of crops raised General forage, truck and small grains

Power or Mining Purposes— No power or mining

9. *(a) Total amount of power to be developed* .... *theoretical horsepower.*

(b) Quantity of water to be used for power .... *sec. ft.*

(c) Total fall to be utilized .... (Head) *feet.*

(d) The nature of the works by means of which the power is to be developed ....

(e) Such works to be located in .... (Legal subdivision) *of Sec.* .... *Tp.* .... (No. N. or S.), *R.* .... (No. E. or W.), *W. M.*

(f) Is water to be returned to any stream? .... (Yes or No)

(g) If so, name stream and locate point of return ...., *Sec.* ...., *Tp.* .... (No. N. or S.), *R.* .... (No. E. or W.) *W. M.*

(h) The use to which power is to be applied is ....

(i) The nature of the mines to be served ....

25091

Continuation of Item 4 - Points of Diversion

(A) Works to be constructed.

McKay Creek Diversion, located 40 feet south and 2,440 feet east from the west ¼ corner of sec. 18, being within the NE¼ of SW¼ of sec. 18, T. 14 S., R. 16 E., W.M.

Lytle Creek Diversion, located 1,060 feet south and 110 feet east from the north ¼ corner of sec. 9, being within the NW¼ of NE¼ of sec. 9, T. 14 S., R. 15 E., W.M.

(B) Existing Works

1.	Hoffman Dam	SE¼NE¼	sec. 20,	T 16 S.,	R 16 E.,	W.M.
2.	Peoples Dam	NW SW¼	sec. 8,	T 15 S.,	R 16 E.,	W.M.
3.	Low Line Diversion	NW NE	sec. 27,	T 14 S.,	R 15 E.,	W.M.
4.	Low Line Diversion	NW SE	sec. 21,	T. 14 S.,	R 15 E.,	W.M.
5.	Ochoco Dam	SW NW	sec. 5,	T 15 S.,	R 17 E.,	W.M.
6.	Lanius Ditch	NW NW	sec. 6,	T 15 S.,	R 17 E.,	W.M.
7.	O.I.D. Canal	NW SW	sec. 2,	T 15 S.,	R 16 E.,	W.M.
8.	O.I.D. Canal	NW SE	sec. 3,	T 15 S.,	R 16 E.,	W.M.
9.	Rye Grass Intake	NW NE	sec. 5,	T 15 S.,	R 16 E.,	W.M.
10.	McKay Creek	SW SW	sec. 4,	T 14 S.,	R 16 E.,	W.M.
11.	McKay Creek	SW SW	sec. 24,	T 14 S.,	R 15 E.,	W.M.
12.	Lytle Creek	SE SW	sec. 34,	T 13 S.,	R 15 E.,	W.M.

(C) Individual Diversions on north side of Crooked River by pumping, located in:

SE¼SW¼ and S½SE¼, sec. 20, T. 14 S., R. 14 E.
NE¼SW¼, SE¼SW¼, N½SE¼ and SW¼SE¼, sec. 21, T. 14 S., R. 14 E.
S½NE¼ N½SW¼, and N½SE¼, sec. 22, T. 14 S., R. 14 E.
S½NE¼, NW¼, NW¼SW¼ and N½SE¼, sec. 23, T. 14 S., R. 14 E.
S½NE¼, SW¼, N½SE¼ and SW¼SE¼, sec. 24, T. 14 S., R. 14 E.
NE¼NW¼, sec. 29, T. 14 S., R. 14 E.
N½NE¼, SW¼NE¼ and S½NW¼, sec. 19, T. 14 S., R. 15 E.

Individual Diversions on north side of Crooked River by pumping, located in:

SW¼SW¼, sec. 25, T. 14 S., R. 15 E.
SE¼SE¼, sec. 26, T. 14 S., R. 15 E.
SE¼NE¼, N½NW¼, SE¼NW¼ and NE¼SE¼, sec. 36, T. 14 S., R. 15 E.
SW¼SW¼, sec. 31, T. 14 S., R. 16 E.

25991

Individual Diversions on south side of Ochoco Creek by pumping, located in:

S½NE¼ and S½NW¼, sec. 1, T. 15 S., R. 16 E.
S½NE¼ and SE¼NW¼, sec. 2, T. 15 S., R. 16 E.
W½NE¼, SE¼NE¼, N½NW¼ and SW¼NW¼, sec. 6, T. 15 S., R. 17 E.

Continuation of Item 6 - Diversion Works (as listed under 4A)

McKay Creek Diversion to Distribution Canal. Works will be the existing check structure in McKay Creek built by Ochoco Irrigation District during 1950. The canal will be controlled by a 3-foot by 3-foot metal gate inlet structure. Maximum capacity, 36.2 cubic feet per second.

Lytle Creek Diversion to Distribution Canal. Works will be a flashboard check structure. Canal control by a 16-inch by 16-inch metal slide gate. Maximum capacity 6 cubic feet per second.

Barnes Butte Pumping Plant

Location: 2,640 feet east and 310 feet south of NW corner, sec. 4, T. 15 S., R. 16 E.

Pumps from Diversion Canal to Distribution Canal

Pumps: Type - Centrifugal (3 units)

Motors: Type - Electric
Size - 3 motors of 275 HP each

Head: With 1 unit running = 65.3 feet
with 2 units running = 66.1 feet
with 3 units running = 67.4 feet

Capacity: 3 units of 26 cfs each = 78 cfs total

<u>Ochoco Relift Pumping Plant</u>

Location: 1,360 feet north and 2,570 feet east of SW corner,
sec. 20, T. 14 S., R.16E.

Pumps from Distribution Canal to Ochoco Main Canal

Pump: Type-Centrifugal

Motor: Type - Electric
Size - 500 HP

Head: 95 feet

Capacity: 34 cubic feet per second

<u>Continuation of Item 7 - Canal System</u>

(c) At 14.2 miles from headgate: width on top 12.6 feet; width on bottom 6 feet; depth of water 2.2 feet; grade 0.35 feet of fall per 1,000 feet.

(d) At 23.2 miles from headgate: width on top 5.7 feet; width on bottom 3 feet; depth of water 0.9 feet; grade 1.2 feet of fall per 1,000 feet.

In addition to the canal to be constructed, existing works of Ochoco Irrigation District and ditch companies diverting from the left bank of Crooked River will be utilized.

3. Location 25991 irrigated, or place of use (continued)

Sheet 1 - 20

Crooked River Project, Oregon

Township North or South	Range E. or W. of Willamette Meridian	Section	Forty-acre Tract		Number Acres to Be Irrigated: New	Supplemental	Total
12S	16E	31	NE ¼	NE ¼		3.0	3
			NW	✓	14		14
			SW	✓	35		35
			SE	✓	27		27
			NE	SE	38.9		38.9
			NW	✓	23		23
			SW	✓	25		25
			SE	✓	10.3		10.3
		32	SW	NE	4		4
			SE	✓	10		10
			NE	SW	16		16
			NW	✓	20		20
			SW	✓	10.3		10.3
			SE	✓	40.1		40.1
			NE	SE	40.5		40.5
			NW	✓	26		26
			SW	✓	39.2		39.2
			SE	✓	40.5		40.5
		33	SW	NE	10		10
			SE	✓	21		21
			SE	NW	1		1
			NE	SW	14		14
			NW	✓	31		31
			SW	✓	38.2	1.8	40.0
			SE	✓	3.0	5.0	8
			NE	SE	37.2		37.2
			NW	✓	39.6		39.6
			SW	✓	17.5	22.4	39.9
			SE	✓	21.7	18.2	39.9
		34	SW	NE	10.0	27.0	37
			NW	✓	2.0		2.0
			SE	✓	2.8	5.2	8
			SW	NW	31		31
			SE	✓	30		30
			NE	SW	40.5		40.5
			NW	✓	40.1		40.1
			SW	✓	12.3	27.2	39.5
			SE	✓	15.4	24.6	40.0
			NE	SE	~~30~~ 6.4	~~32.0~~ 25.6	32
			NW	✓	~~39.6~~ 20.8	18.8	39.6
			SW	✓	~~39.5~~ 14.2	25.3	39.5
			SE	✓	[illegible]	30.9	39.7
			Page Total		1,046.9	184.4	1,181.3

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8. Location of area to be irrigated, or place of use (continued)

25991 Sheet 2 of 28

Township North or South	Range E or W of Willamette Meridian	Section	Forty-acre Tract ¼	¼	New	Supp'l	Total
18S	16E	35	NW	NE	2		2
			SW	✓	22		22
			SE	✓	1		1
			NE	NW	2		2
			SE	✓	10		10
			NW	SW		4.0	4
			SW	✓		17.0	17
			NE	SE	21		21
			NW	✓	8		8
			SE	✓	22		22
		36	SW	NW	0.8	4.2	5
			SE	✓	2		2
			NE	SW	10		10
			NW	✓	7.6	14.4	22
			SW	✓	4		4
			SE	✓	10		10
14S	14E	11	SE	SW	2		2
			SW	SE	5		5
			SE	✓	15		15
		12	SW	SW	2		2
		13	NW	NW	1		1
		14	NE	NE	32		32
			NW	✓	40		40
			SW	✓	40		40
			SE	✓	5		5
			NE	NW	30		30
			NW	✓	1		1
			SW	✓	33		33
			SE	✓	40		40
			NE	SW	40		40
			NW	✓	40		40
			SW	✓	40.0		40.0
			SE	✓	40.0		40.0
			NE	SE	12		12
			NW	✓	40		40
			SW	✓	40		40
			SE	✓	27		27
		15	SE	NE	15		15
			NE	SW	2.0	~~2.0~~	2
			SW	✓	2.8	5.2 ~~8.0~~	8
			SE	✓	4.4	19.6 ~~24.0~~	24
			Page Total		662.4	73.6	736.0

25991

6. Location of area to be irrigated, or place of use (continued)

Township North or South	Range E or W of [illegible] Meridian	Section	Forty acre Tract ¼	¼	[illegible]	[illegible]	[illegible]
14S	14E	18	NE	SE	29.8	~~[illegible]~~ 2.2	32
			NW	"	9.2	~~[illegible]~~ 8	10
						10.0	10
						10.0	10
		19	SE	SE		13.0	13
		20	NE	SW	18		18
			NW			20.0	20
			SW		19.1	21.0	40.1
			SE		40.3		40.3
			NE	SE	10		10
			SW		23.0	7.0	30
			SE		16.0	23.0	39.0
		21	NE	NE	6.0	~~6.0~~	6
			SW			40.0	40.0
			SE		~~40.6~~	40.6	40.6
			SW	NW	2		2
			SE		5		5
				SW		40.3	40.3
					10.0	30.0	40.0
						40.0	40.0
						40.0	40.0
				SE	10.0	30.0	40.0
						40.0	40.0
						40.0	40.0
						40.0	40.0
		22		NE	0.9	38.0	38.9
						39.5	39.5
						40.0	40.0
					19.5	20.0	39.5
				NW		40.0	40
					7.5	29.5	37.0
					19.3	20.0	39.3
					19.2	20.0	39.2
				SW	19.4	20.0	39.4
					9.4	30.0	39.4
					24.9	15.0	39.9
					39.7		39.7
				SE	7.5	32.0	39.5
					34.7	5.0	39.7
					6.3	33.0	39.3
						39.4	39.4
			Page Total		402.3	973.7	1,376.0

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6. Location of area to be irrigated, or place of use (continued)

Township (North or South)	Range (E. or W. of Willamette Meridian)	Section	Forty-acre Tract		Number Acres to be Irrigated: New	Supplemental	Total
14S	14E	22	¼	NE ¼	39		39
					40.1		40.1
						40.0	40.0
						40.0	40.0
				NW	39.9		39.9
					40.3		40.3
						40.0	40.0
						40.0	40.0
				SW	10.1	30.0	40.1
					10.2	30.0	40.2
					0.4	40.0	40.4
						40.0	40.0
				SE	10.4	30.0	40.4
					10.2	30.0	40.2
						40.0	40
						40.1	40.1
		24	SW	NE	10		10
			SE		15.0	5.0	20
			SW	NW	6		6
			SE		10		10
				SW	4.4	35.0	39.4
					31.7	8.0	39.7
					2.7	37.0	39.7
					24.6	15.0	39.6
				SE	19.6	20.0	39.6
					10.1	30.0	40.1
					13.8	20.2	34.0
					5.0	1.0	6
		25	NE	NW		6.0	6
			NW		3.0	6.0	9
		26	NE	NE	4.0	1.0	5
			NW		4.0	15.0	19.0
			NE	NW	2.0	30.0	32.0
			NW		6.0	30.0	36.0
			SW		1		1
		27		NE		40.0	40
						40.1	40.1
						20.0	20
					4.0	16.0	20
				Page Total	377.5	815.4	1,192.9

8. Location of area to be irrigated, or place of use (continued) 25991

[illegible] 5 28

Township	Range	Section	Forty-acre Tract ¼	¼	Number of acres		
19S	14E	27		NW		40.0	40
						40.0	40.0
					2.0	10.0	12
					10.0	27.0	37
			NE	SW	4.0	6.0	10
			NW	SE	1.0	1.0	2
		28	NE	NE	4.5	3.5	8
			NW		14.0	25.0	39
			SW		5		5
				NW	6.1	35.0	41.1
						40.0	40.0
					34.7	5.0	39.7
					34		34
		29		NE		40.0	40
					7.8	30.0	37.8
					10		10
					30		30
				NW	34.2	5.0	39.2
						40.0	40
						16.0	16
					14.0	8.0	22
		30	NE	NE		20.0	20
			SE			2.0	2
	15E	1	NW	NE	9		9
			SW		1		1
			NE	NW	10		10
			NW		5		5
			SE		16		16
				SW	23.8	16.5	40.3
					13.9	17.1	31
					0.8	40.0	40.8
					4.7	36.3	41.0
				SE	26		26
					36		36
					36.4	4.6	41.0
					40.3		40.3
		2		NE	25.6		25.6
					5		5
					32.6	7.2	39.8
					26		26
				Page Total	515.2	523.4	1,038.6

6. Location of area to be irrigated, or place of use (continued)

25991 Sheet 6 of 28

Township	Range	Section	Forty-acre Tract	New	Suppl	Total
14S	16E	2	¼ NW ¼	2.3	2.7	5
				2.1	13.9	16
					40.0	40
					39.1	39.1
			SW		40.0	40
					40.0	40
					40.0	40
					40.0	40
			SE	10.1	29.6	39.7
					40.0	40
					40.0	40
					40.1	40.1
		3	NE		22.4	22.4
					22.6	22.6
				1.1	40.0	41.1
					40.5	40.5
			NW		21.3	21.3
					21.7	21.7
				2.3	38.2	40.5
					39.9	39.9
			SW		40.2	40.2
					40.2	40.2
					40.1	40.1
					40.1	40.1
			SE		40.4	40.4
				1.0	40.0	41.0
					40.0	40.0
					40.2	40.2
		4	NE		21.5	21.5
					20.8	20.8
				1.6	40.0	40.6
				0.7	40.0	40.7
			NW	8.6	10.6	19.2
				0.6	18.2	18.8
				1.7	40.0	41.7
				1.7	39.6	41.3
			SW		40.0	40
					40.0	40
					40.3	40.3
					40.3	40.3
			Page Total	32.8	1,364.5	1,397.3

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6. Location of area to be irrigated, or place of use (continued)

Sheet 7 of 20

Township North or South	Range East or West	Section	Forty-acre Tract ¼	¼	New	Suppl.	Total
14S	15E	4		SE	2.5	38.1	40.6
						40.0	40
						40.4	40.4
					1.4	39.1	40.5
		5		NE	1.8	13.2	15.0
					1.2	15.9	17.1
						40.4	40.4
						40.6	40.6
				NW	12.6	7.5	20.1
					16.5	3.6	20.1
					1.4	33.7	35.1
						37.0	37
				SW		40.0	40
					2.8	17.9	20.7
					1.8	0.2	2
					1.9	33.6	35.5
				SE		40.0	40
						40.0	40
						40.0	40
						40.0	40
		6	NE	NE	12		12
			NW		8		8
			SE		1		1
			NE	SE	19		19
		8		NE		40.3	40.3
					3.1	36.9	40.0
						22.2	22.2
						40.4	40.4
			NE	NW		5.4	5.4
				SE		40.5	40.5
						17.5	17.5
					1.5	17.8	19.3
					1.1	39.3	40.4
		9		NE		40.0	40
					1.3	38.4	39.7
						40.0	40.0
						40.0	40
				NW		39.9	39.9
						40.0	40
						40.0	40
					1.8	37.8	39.6
				Page Total	92.7	1177.6	1270.3

6. Location of area to be irrigated, or place of use (continued)

25991 Sheet 8 - 20

Township	Range E. or W. of Willamette Meridian	Section	Forty-acre Tract			Number Acres To Be Irrigated New	Supp'l	Total
14S	14E	9	¼	SW	¼	0.7	38.5	39.2
							40.0	40
							40.0	40
							39.9	39.9
				SE		1.7	37.7	39.4
							39.7	39.7
						0.7	39.0	39.7
							40.1	40.1
		10		NE			40.1	40.1
							40.1	40.1
							40.1	40.1
							40.1	40.1
				NW			40.4	40.4
						0.6	40.0	40.6
						3.7	36.9	40.6
						0.6	40.0	40.6
				SW		1.1	40.0	41.1
						2.2	38.1	40.3
							40.0	40
						1.8	40.0	41.8
				SE			40.0	40
							40.0	40
							40.0	40
							40.0	40
		11		NE			40.0	40
							40.0	40
							40.0	40
							40.0	40
				NW			40.0	40
							40.0	40
							40.0	40
							40.0	40
				SW			40.0	40
							40.0	40
							40.0	40
							40.0	40
				SE			40.0	40
							40.0	40
							40.0	40
							40.0	40
				Page Total		13.1	1,595.7	1,608.8

8. Location of area to be irrigated, or place of use (continued) 25891

Sheet 9 of 28

Township North or South	Range E or W of Willamette Meridian	Section	Forty-acre Tract	Number Acres to be Irrigated: New	Supp	Total
14S	16E	12	¼ NE ¼	40.0	[illegible]	10
				7.6	[illegible]	10
				16.0	24.0	10
				20.5 ~~18.5~~	10.0 ~~40.0~~	41.6
			NW	1.0	40.0	41.0
				0.6	40.0	40.6
					40.2	40.2
				0.7	40.0	40.7
			SW	0.7	40.0	40.7
					40.4	40.4
					40.4	40.4
					40.4	40.4
			SE	7.2	33.9 ~~40.0~~	41.1
					40.0	40
					40.0	40
				8.6	40.0	40.0
		13	NE		~~40.3~~	40.3
					40.0	40.0
					40.0	40
					40.0	40.0
			NW	0.8	40.0	40.8
				~~10.0~~	42.0	42.0 ~~41.2~~
					40.4	40.4
				0.6	40.0	40.6
			SW		40.0	40.0
				0.9	40.0	40.9
				0.7	40.0	40.7
					40.2	40.2
			SE		40.3	40.3
					40.3	40.3
					40.0	40.0
				20.5 ~~40.1~~	19.6	40.1
		14	NE		40.0	40
					40.4	40.4
				0.6	40.0	40.6
					40.0	40
			NW		40.0	40.0
					40.0	40
				1.3	40.0	41.3
				0.6	40.0	40.6
			Page Total	91.4	1523.3	1614.7

8. Location of area to be irrigated, or place of use (continued) 25991 Sheet 10 of 28

Township	Range	Section	Forty-acre Tract			Number Acres To Be Irrigated		
						New	Supp'l	Total
14S	15E	14	¼	SW	¼		40.1	40.1
						0.8	40.0	40.8
						1.0	39.4	40.4
						0.7	39.8	40.5
				SE			40	40
						1.0	38.9	39.9
						4.2	36.3	40.5
							40.0	40.0
		15		NE			40	40
							40	40
							40	40
							40	40
				NW			40.0	40.0
							40.2	40.2
							40.3	40.3
							40	40
				SW		0.6	40.0	40.6
							40.4	40.4
						1.5	38.6	40.1
						1.1	39.3	40.4
				SE			40	40
							40	40
						3.9	36.2	40.1
						5.4	35.2	40.6
		16		NE			40	40
							40	40
						7.8	30.0	37.8
							40.3	40.3
				NW			40	40
						~~2.8~~	~~28.0~~ 30.5	30.5
						5.1	~~40~~ 34.9	40
							32.6	32.6
			NE	SW			32.1	32.1
			SW				28.4	28.4
			SE				40	40
				SE			40	40
							40	40
						0.9	40.0	40.9
						0.7	40.0	40.7
				Page Total		32.6	1,495.6	1,528.2

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4. Location of area to be irrigated, or place of use (continued) — 11 — 20

Township	Range	Section	Forty-acre Tract		Number Acres to be Irrigated: New	Supplemental	Total
14S	16E	17	NE ¼	NE ¼		1.1	1.1
			NW			20.8	20.8
			SW			4.5	4.5
			NE	NW		3.1	3.1
			SW		9.4	~~14.7~~ 5.3	14.7
			SE		~~14.7~~	~~6.0~~ 20.0	20
				SW		21.8	21.8
						14.7	14.7
						24.7	24.7
						27.6	27.6
		18	SE	SE		6.0	6
		19		NE	5.0	35.0	40
						20.0	20
						40.0	40
						40.2	40.2
				NW	3.0	7.0	10
						2.0	2
						40.0	40
						40.2	40.2
			NE	SW		20.0	20
			NW		5.0	25.0	30
			NE	SE	12.0	15.0	27
			NW			15.0	15
		20		NE	8.0	7.0	15
						15.1	15.1
					11.0	29.0	40
					4.0	36.8	40.8
				NW		40.0	40
						40.1	40.1
					34.0	6.3	40.3
					0.9	40.0	40.9
				SW	3.3	37.0	40.3
					4.7	35.0	39.7
					5.0	25.0	30
					0.6	40.0	40.6
				SE	0.6	40.0	40.6
						40.0	40
					9.8	30.0	39.8
					28.7	12.0	40.7
				Page Total	150.3	917.3	1,067.6

6. Location of area to be irrigated, or place of use (continued) **25991** Sheet 12 of 28

Township	Range	Section	Forty-acre Tract ¼	¼	New	Suppl.	Total
16S	16E	21		NE		10.0	10
						10.0	10
						10.0	10.0
						10.1	10.1
				NW		10.0	10
						10.0	10.0
					~~19.5~~	40.4	10.4
					~~[illegible]~~	40.3	10.3
			NE	SW	32.7	7.3	10.0
			NW		19.5	10.5	30
			SE		30		30
				SE	1.1	38.2	39.3
					0.9	38.3	39.2
					~~29.6~~	37.3	39.3
					0.3	39.1	39.4
		22		NE		10.1	40.1
						39.6	39.6
						10.0	40
						10.0	40
				NW		10.0	40
						10.0	40
						10.0	40
						10.0	40
				SW	7.4	32.4	39.8
						40.0	40
					21.5	17.4	38.9
					31.5	7.6	39.1
				SE		40.0	40
						40.0	40
					23.2	15.8	39.0
						39.2	39.2
		23		NE	6.1	34.2	40.3
						40.0	40
					3.2	36.2	39.4
					6.2	33.4	39.6
				NW		39.9	39.9
					4.7	35.0	39.7
						40.0	40
					2.2	37.3	39.5
				Page Total	346.4	1,185.7	1,532.1

Sheet 18 of 28

8. Location of area to be irrigated, or place of use (continued)

[illegible]	[illegible]	Section	Forty-acre Tract		Number Acres To Be Irrigated: New	Suppl.	Total
14S	15E	23	¼	SW ¼		40	40
						40	40
						38.8	38.8
						40	40
				SE	0.6	39.5	40.1
					4.6	35.2	39.8
					7.3	32.0	39.3
					4.3	35.4	39.7
		24		NE	11.9	28.3	40.2
					4.5	35.2	39.7
					3.7	35.7	39.4
						40	40
				NW	0.8	40.0	40.8
						40.0	40.0
						40.0	40.0
					2.9	36.6	39.5
				SW		40	40
					0.5	40.0	40.5
						40	40
					7.6	32.0	39.6
				SE		39.9	39.9
					10.5	29.2	39.7
						39.1	39.1
						40	40
		25		NE		40	40
						40	40
						40	40
						40.3	40.3
				NW		40	40
					2.0	36.7	38.7
						40	40
					1.2	38.2	39.4
				SW	3.5	36.0	39.5
					1.9	37.6	39.5
					4.0	35.5	39.5
					1.0	38.3	39.3
				SE		40	40
						40.0	40.0
						40	40
						40	40
				Page Total	72.8	1,519.5	1,592.3

8. Location of area to be irrigated, or place of use (continued) 25991 Sheet M 28

Township	Range	Section	Forty-acre Tract ¼	¼	New	[illegible]	Total
10S	15E	26		NE		10.0	10
						10.0	10
						10.2	10.2
						10.0	10
				NW	1.0	38.3	39.3
					17.1	22.8	39.9
					4.7	35.0	39.7
					15.6	23.9	39.5
				SW	17.1	22.2	39.3
						10.0	10
					19.5	20.0	39.5
					19.2	20.0	39.2
				SE		10.0	10
					0.6	10.0	10.6
					13.5	26.1	39.6
					9.1	30.8	39.9
		27		NE	35.5	5.0	40.5
					40.3		40.3
					5.0	10.0	15
					6.0	30.0	36
			NE	NW	40.3		40.3
			NW		33.0	5.0	38
			SE		3		3
			NE	SE	8		8
		28	NE	NE	16.0	20.0	36
			NW		15.0 ~~17.0~~	12.0 ~~10.0~~	27
			NE	NW	5		5
		35		NE	22.1	17.0	39.1
					14.5	25.0	39.5
					23.0	7.0	30
					39.1		39.1
			NE	NW	19.0	15.0	34
			NW		7		7
			SE		2		2
			NE	SE	23		23
			NW		1		1
		36		NE	1.0	39.0	40.0
					0.7	39.1	39.8
						40.0	10
						40.0	40
				Page Total	468.9	831.4	1300.3

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8. Location of area to be irrigated, or place of use (continued) 16 - 28

Township North or South	Range E. or W. of Willamette Meridian	Section	Forty-acre Tract		Number Acres To Be Irrigated		
					[illegible]	[illegible]	[illegible]
14S	15E	36		NW	9.3	30.7	40.0
					7.0	32.8	39.8
						40.0	40.0
					2.2	37.0	39.2
				SW		40.0	40.0
						40.0	40.0
					6.0	3.0	9
					6.0	10.0	16
				SE	11.0	28.8	39.8
						40.0	40.0
					6.0	20.0	26
					6.9	32.5	39.4
	16E	4	NW	SW	30.0	8.0	38
			SW		26.9	2.6	29.5
		5	NE	SE	6.0	5.0	11
			SW		11.0	1.0	12
			SE		8.0	24.0	32
		6	~~NW~~	~~NE~~	~~22~~		~~22~~
			~~SW~~		~~12~~		~~12~~
			~~NE~~	~~NW~~	~~14~~		~~14~~
			~~SW~~		~~4~~		~~4~~
			~~SE~~		~~30~~		~~30~~
			~~NE~~	~~SW~~	~~27~~		~~27~~
			~~NW~~		~~35~~		~~35~~
			SW	SW	22		22
			~~NW~~	~~SE~~	~~5~~		~~5~~
		7	SE	NE	8.7	11.3	20
			NE	NW	10		10
			NW		40		40
			SW		16.3	15.7	32
			NW	SW		10.2	10.2
			SW		2.5	13.5	16
			NE	SE	0.7	20.3	21
			SW		3.9	18.1	22
			SE		4.9	35.2	40.1
		8		NE	5.3	33.0	38.3
					12.2	28.4	40.6
					3.4	38.0	41.4
					21.6	18.2	39.8
				Page Total	433.8	637.3	1,071.1

8. Location of area to be irrigated, or place of use (continued)

25991 [illegible] 16 - 28

[illegible]	[illegible]	Section	Forty-acre Tract		New	[illegible]	[illegible]
14S	16E	8	¼	NW ¼		18.0	18
			Check		3.0	18.0	21
					8.0	32.0	40
						40.0	40
				SW	3.7	36.8	40.5
					4.1	35.3	39.4
						40.4	40.4
					1.6	39.1	40.7
				SE	22.6	2.4	25
					1.5	38.4	39.9
					14.4	25.6	40.0
					16.0	24.0	40
		9	NW	NW	5.3	6.7	12
			SW	SW	25 ~~20~~		25 ~~20~~
			SE		11		11
			SW	SE	1		1
		16		NE	~~25~~		~~26~~
					22.0	13.0	35
					9		9
					5		5
				NW	25.0	7.0	32
					35		35
					9		9
					10		10
		17		NE	0.7	39.6	40.3
					4.2	35.6	39.8
					1.5	37.7	39.2
						40.0	40
				NW		40.2	40.2
						40.0	40.0
						40.2	40.2
						40.1	40.1
				SW		40.0	40.0
					0.5	40.0	40.5
					0.6	39.4	40.0
					1.2	38.4	39.6
			NW	SE	3.6	16.4	20
			SW		1.9	8.1	10
			Page Total		267.4	872.4	1139.8

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8. Location of area to be irrigated, or place of use (continued)

Sheet 17 of 28

Township	Range	Section	Forty-acre Tract	[illegible]	[illegible]	[illegible]
14S	16E	18	¼ NE ¼		40.0	40
				10.6	28.3	38.9
				0.8	38.4	39.2
					40.0	40
			NW		12.1	12.1
					40.0	40
					40.0	40
					40.0	40
			SW	4.1	34.0	38.1
					40.0	40
				2.4	35.0	37.4
					39.5	39.5
			SE	0.8	39.0	39.8
					40.3	40.3
					40.0	40
					40.0	40
		19	NE		40.0	40.0
					40.1	40.1
					40.0	40
				0.6	40.0	40.6
			NW		40.0	40
					40.0	40
				1.8	36.2	38.0
					40.0	40
			SW		40.0	40
				2.1	36.2	38.3
				2.2	36.2	38.4
				2.3	36.0	38.3
			SE	0.7	40.0	40.7
					40.0	40
				6.5	34.0	40.5
				19.0	20.7	39.7
		20	NE	30 [illegible]		30 [illegible]
				4.9	11.1	16
				13.6	26.4	40.0
			NW		9.7	9.7
					35.0	35
				4.5	30.5	35
				14.2	23.7	37.9
			Page Total	123.1	1,322.4	1,445.5

Location of area to be irrigated, or place of use (continued) 25991 Sheet 10 of 28

[illegible]	[illegible]	Section	Forty-acre Tract ¼	¼	Number Acres To Be Irrigated: New	Suppl.	Total
14S	16E	20		SW		39.0	39.0
					0.6	10.0	10.6
						10.0	10
						10.0	10
				SE		10.3	10.3
					0.8	10.0	10.8
					6.1	35.1	41.8
					8.3	32.2	40.5
		21		NE	39.5		39.5
					12		12
					28		28
					39.6		39.6
				NW	39.3		39.3
					39.2		39.2
					18.5	21.2	39.7
					35.1	2.9	38
				SW	6.8	30.7	37.5
						40.0	40
						40.0	40
						40.0	40
				SE	36.2	3.5	39.7
					40		40
					13.4	26.3	39.7
					8.6	31.2	39.8
		22		NE	5		5
					5		5
					20		20
					19		19
			NW	NW	5		5
			SW		8		8
			SE		9		9
				SW	4.2	25.8	30
					1.5	24.5	26
					1.5	40.0	41.5
					3.0	39.1	42.1
			NE	SE	9		9
			NW		26.5	3.5	30
			SW			20.4	20.4
				Page Total	489.0	696.0	1185.0

8. Location of area to be irrigated, or place of use (continued) 25991

Sheet 19 of 28

Township North or South	Range E. or W. of Willamette Meridian	Section	Forty-acre Tract		Number Acres To Be Irrigated New	Supp'l	Total
14S	16E	24	¼	SW ¼		35.0	35
						17.1	17.1
						35.0	35
						17.9	17.9
		25		NE		9.4	9.4
						40.0	40
					7.7	34.6	42.3
					3.8	6.2	10
				NW		40.0	40
						40.3	40.3
					9.2	32.9	42.1
					4.1	38.2	42.3
				SW	0.5	40.0	40.5
						40.0	40.0
					1.5	39.1	40.6
					0.6	40.0	40.6
				SE		14.0	14
					0.7	40.0	40.7
					1.5	40.0	41.5
					18.2	23.5	41.7
		26		NE	2.3	25.7	28
					3.2	8.8	12
						40.1	40.1
					0.8	40.0	40.8
			NE	NW		9.9	9.9
			SW			16.0 ~~12.5~~	16.0 ~~12.3~~
			SE		0.8	40.0	40.8
				SW	0.7	39.3	40.0
						38.9	38.9
					0.6	40.0	40.6
						40.1	40.1
				SE	0.8	39.5	40.3
					39.0		39.0
					2.9	38.4	41.3
						40.0	40.0
		27	SW	NE		20.0	20
			SE			10.0	10
				NW		40.4	40.4
					1.9	39.2	41.1
					3.9	36.6	40.5
					3.0	37.3	40.3
				Page Total	107.7	1259.7	1367.4

6. Location of area to be irrigated, or place of use (continued) 25991 Sheet 20 - 28

Township	Range	Section	Forty-acre Tract		New	Supp'l	Total
14S	16E	27	NE ¼	SW ¼		10.0	10.0
			NW		28.5	2.5	31
			SE			38.6	38.6
			✓	SE		39.6	39.6
					1.9	37.8	39.7
						10.0	10.0
						10.0	10.0
		28	✓	NE	31.6	8.0	39.6
			✓		0.7	39.0	39.7
					25.2	14.3	39.5
					7.6	31.8	39.4
			✓	NW		10.1	10.1
			✓		0.6	39.0	39.6
					6.5	33.2	39.7
						13.9	13.9
			NW	SW		28.8	28.8
			SW		3.5	36.2	39.7
			SE		0.9	2.1	3
			NE	SE	9		9
			NW		1		1
		29		NE	13.3	6.7	20
					3.3	21.7	25
					9.4	27.6	37
					2.8	3.2	6
			✓	NW		10.2	10.2
			✓			39.6	39.6
			✓			10.2	10.2
					0.7	34.3	35
				SW	0.7	24.3	25
					0.5	10.0	10.5
					0.9	10.0	10.9
						10.0	10
				SE		10.0	10
			✓			10.1	10.1
						10.0	10
						10.0	10
		30		NE	11.5	9.5	21
					6.5	21.5	28
					1.4	39.0	40.4
						10.0	10
				Page Total	168.0	1,147.8	1,315.8

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B. Location of area to be irrigated, or place of use (continued) 21 20

Township North or South	Range E. or W. of Willamette Meridian	Section	Forty-acre Tract ¼	¼	Number Acres to be Irrigated [illegible]	[illegible]	[illegible]
14S	16E	30		NW	22.0	16.8	38.8
					2.5	36.0	38.5
					1.5	35.6	37.1
					3.0	34.6	37.6
				SW		40.0	40
					2.3	35.2	37.5
					18.3	18.1	36.4
			✓		0.4	37.6	38.0
				SE		40.0	40
					1.7	40.0	41.7
						40.0	40.0
					2.1	40.0	42.1
		31	NE	NE		40.0	40
			NW			40.0	40
				NW		40.0	40
						40.0	40
						40.0	40
						40.0	40
				SW	5		5
					6.2	31.1	37.3
					11.8	29.0	40.8
					20		20
		32		NE		40.0	40
						40.0	40
						40.0	40
						40.3	40.3
			SE	NW		37.7	37.7
			NE	SW		6.0	6
			NW		5		5
				SE		40.0	40
						5.8	5.8
						39.3	39.3
					1.1	40.0	41.1
		33	NE	NW		3.8	3.8
			NW			40.1	40.1
			SW			38.3	38.3
				SW	5.8	26.2	32
					1.2	38.7	39.9
						40.3	40.3
					5.8	33.4	39.2
				Page Total	115.7	1263.9	1379.6

7. Location of area to be irrigated, or place of use (continued)

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Township	Range	Section	Forty-acre Tract	¼		¼	[illegible]	[illegible]	[illegible]
[illegible]	16E	33	NW	¼	SE	¼	12.4	12.6	25
			SW				2.9	4.1	7
		34			NE		0.6	40.0	40.6
							0.5	40.0	40.5
								40.0	40
								40.0	40
			NE		NW			11.0	11
			SE					17.9	17.9
					SW			35.4	35.4
							2		2
								32.1	32.1
							1.0	40.0	41.0
					SE			40.0	40
								40.0	40
								40.0	40
								40.0	40
		35			NE		0.6	40.0	40.6
					✓			40.4	40.4
					✓			40.3	40.3
								40.0	40
					NW		1.0	40.0	41.0
							1.1	40.0	41.1
					✓			40.3	40.3
					✓			40.1	40.1
					SW		0.6	40.0	40.6
							1.2	40.0	41.2
								40.0	40
							0.5	40.0	40.5
					SE			40.1	40.1
							1.3	40.0	41.3
								40.0	40
								40.1	40.1
		36	NE		NE		5.0	15.0	20
			✓ NW					40.3	40.3
			SW				2.1	9.9	12
			✓		NW			40.7	40.7
			✓					40.6	40.6
							0.6	40.0	40.6
			✓					40.0	40
					Page Total		33.4	1340.9	1374.3

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Sheet 23 of 28

8. Location of area to be irrigated, or place of use (continued)

Township North or South	Range E. or W. of Willamette Meridian	Section	Forty-acre Tract ¼	¼	Number Acres To Be Irrigated New	Suppl.	Total
14S	16E	36		SW		40.0	40
					0.7	40.0	40.7
					2.2	40.0	42.2
					1.1	40.0	41.1
				SE		3.3	3.3
						26.6	26.6
				✓		40.4	40.4
				✓	2.0	~~[illegible]~~ 33.8	35.8
15S	15E	13	SE	SE	18		18
		24		NE	27.2	13.6	40.8
					8		8
					18		18
					16.2	24.2	40.4
				SE	1.0	40.0	41.0
					18		18
					17		17
				✓		40.4	40.4
		25		✓ NE		40.4	40.4
						16.7	16.7
						40.0	40
						40.0	40.0
				SE		40.0	40.0
						29.0	29
					1.0	12.0	13
					1.0	38.0	39.0
		36	NE	NE	1.0	32.0	33
			SW		2		2
			SE		1.0	35.0	36
				SE	17.6	22.0	39.6
					1.0	28.0	29
					3.0	20.0	23
					12.0	3.0	15
	16E	1		NE		40.0	40
						40.0	40.0
						17.9	17.9
						33.8	33.8
				NW		40.4	40.4
						40.1	40.1
					27.9	~~[illegible]~~ 11.1	39.0
					13.8	~~[illegible]~~ 21.2	35
				Page Total	198.7	1,084.9	1,283.6

8. Location of area to be irrigated, or place of use (continued)

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Township North or South	Range E. or W. of Willamette Meridian	Section	Forty-acre Tract		Number Acres to be Irrigated New	Supp.	Total
15S	16E	2	¼	NE ¼		10.0	10
						10.0	10
			✓			10.3	10.3
			✓			26.0	26
				NW		10.0	10.0
			✓		3.3	10.0	13.3
					3.6	10.0	13.6
					0.6	10.0	10.6
			NE	SW	0.8	1.2	2.0
			NW		2		2
			NW	SE	0.5	1.5	2
		3		NE		10.0	10.0
						10.0	10
						38.9	38.9
			✓		0.6	38.8	39.4
			✓	NW		10.3	10.3
			✓			10.1	10.1
			✓			10.0	10
						10.2	10.2
			NE	SW	7.0	11.0	18
			NW			17.0	17
			NE	SE	20.2	3.8	24
			NW		23.9	6.1	30
		4		NE		10.3	10.3
					0.7	10.0	10.7
					0.6	10.0	10.6
			✓			10.0	10
				NW		39.7	39.7
						10.0	10.0
						10.3	10.3
					5.0	35.0	40.0
				SW		10.0	10
						10.0	10
						34.8	34.8
						10.0	10
			NE	SE		12.5	12.5
			NW			22.5	22.5
		5	NE	NE		36.8	36.8
			SW			39.3	39.3
			SE			39.2	39.2
			SE	NW		10.0	10
			Page	Total	68.8	1265.6	1334.4

25991

P. Location of area to be irrigated, or place of use (continued)

Sheet 25 of 28

Township	Range	Section	Forty-acre Tract		Number Acres To Be Irrigated: New	[illegible]	[illegible]
16S	16E	5	NE ¼	SW ¼		7.0	7
				SE		29.0	29
						37.0	37
						40.0	40
						40.0	40.0
		6	SW	NE	14.2	25.0	39.2
			SE			16.0	16
			SE	NW	11.2	28.8	40
			NE	SW	2.0	35.0	37
			SE			17.0	17.0
				SE		15.0	15
					12.0	24.0	36
						40.0	40
					13.0	13.0	26
		7	NE	SE		9.6	9.6
			SW		2.0	14.0	16
			SE			40.0	40.0
		8	NW	NE	~~[illegible]~~	~~[illegible]~~ 37.0	37.0
			SW		2.6	37.0	39.6
				NW		40.3	40.3
						40.2	40.2
						40.0	40.
						40.0	40
				SW		40.1	40.1
						40.0	40
						40.0	40
						40.0	40
			NW	SE	7.3	32.6	39.9
			SW			15.6	15.6
		9	SW	NE		37.1	37.1
			SE			37.9	37.9
			SE	NW	17.5	~~[illegible]~~ 9.2	26.7
			NE	SW	7.9	4.1	12
			SE		7.9	~~[illegible]~~ 1.3	9.2
				SE	~~[illegible]~~ 1.5	~~14.5~~ 38.5	40.0
					~~39.7~~ 0.5	39.2	39.7
					20		20
					~~[illegible]~~ 3.4	~~[illegible]~~ 36.3	39.7
		10	SW	NW		23.5	23.5
				Page Total	199.0	1,019.3	1,218.3

25991 Sheet 26 of 28

I. Location of lands to be irrigated, or place of use (continued)

Township	Range	Section	Forty-acre Tract		Number Acres To Be Irrigated: New	[illegible]	Total
			¼	¼			
[illegible]	[illegible]	10		SW	16.7	13.3	30
						39.4	39.4
					6.2	35.3	41.5
					37.5	4.0	41.5
				SE	30		30
					25		25
					25		25
					1		1
		11	NW	SW	4		4
		15		NE	1		1
					12		12
					2		2
					4		4
			NE	NW	29		29
			NW		14.1	25.9	40.0
			SW		15.5	0.5	16
			NW	SW	10		10
		16	✓	NE	30		30
					4		4
					6		6
					38.6		38.6
			NE	SE	38.9		38.9
			NW		8		8
			SE		10		10
		17	✓ NE	NW	1		1
			✓ NW		~~28~~	28 0	28
		18	✓	NE	~~[illegible]~~ 1.7	37.6	39.3
			✓		~~[illegible]~~ 11.2	~~[illegible]~~ 28.8	40.0
			✓		~~40.3~~	40.3	40.3
			✓		15		15
			✓ NE	NW	5.5	4.5	10
			✓ SE		~~[illegible]~~	39.0	39
			✓	SW	~~[illegible]~~	40.0	40.0
			✓		10		10
			✓		~~[illegible]~~	39.9	39.9
			✓		~~[illegible]~~ 8.6	31.4	40.0
			NW	SE	10		10
			✓ SW		~~[illegible]~~ 13.3	18 7	32
				Page Total	745.7	125.7	871.4

25991

8. Location of area to be irrigated, or place of use (continued)

27 28

Township North or South	Range E. or W. Willamette Meridian	Section	Forty-acre Tract		Number Acres to be Irrigated: New	Supplemental	Total
15S	16E	19	✓ ¼	NE ¼	6.2	31.4	37.6
			✓		[illegible]	[illegible]	40.1
			✓			40.8	40.3
			✓		[illegible]	40.0	40.0
			✓	NW	[illegible]	39.3	39.3
			✓		0.9	39.5	40.4
			✓		[illegible]	40.0	40.0
						40.0	40
			✓	SW		40.0	40
			✓		[illegible]	40.0	40.0
					0.7	40.0	40.7
			✓		9.2	31.2	40.4
			✓	SE	12.5	7.5	20
			✓		[illegible]	40.4	40.4
			✓		16.2	18.8	35
			✓		10		10
		30	NW	NE	3		3
			✓	NW	30		30
					8.0	31.6	39.6
			✓		14.0	26.1	40.1
					3.5	0.5	4
			NW	SW	19.1	21.1	40.2
			SW		32.3	8.0	40.3
		31	NW	NW	0.9	39.0	39.9
			SW		3.0	19.0	22
			NW	SW	1		1
	17E	6	NW	NE		20.2	20.2
			SW			28.0	28
			SE		15.0	10.0	25
				NW		23.0	23
					7.0	23.0	30
			✓		5.1	8.9	14
						12.0	12
16S	15E	12	SW	SE	1		1
			SE		1		1
		13	NE	NE	3.0	26.0	29
			NW		4		4
			SE			15.0	15
				Page Total	402.3	644.2	1046.5

2. Location of area to be irrigated, or place of use (continued)   25991 Sheet 20 20

[illegible]	[illegible]	Section	Forty-acre Tract		Number Acres To Be Irrigated		
					New	Supp.	Total
[illegible]	[illegible]	17	NW ¼	SW ¼	8.0	20.0	28
			SW		2.0	36.0	38
		18	SW	NE	4.3	36.0	40.3
			SW	NW	4.1	36.0	40.1
			SE		1.8	38.0	39.8
			NE	SW	1		1
			NE	SE	7.7	32.0	39.7
			NW		8.0	10.0	18
		20	SW	NE	35		35
			NE	NW	2.0	24.0	26
			NW		2.0	23.0	25
			SE		30		30
			NW	SE	7		7
				Page Total	108.9	254.0	362.9

TOTAL 27,010.2

7,766.8   34,777.0

25991

8. Location of area to be irrigated, or place of use (continued)

Township North or South	Range E or W of WM	Section	Forty-acre Tract		Number Acres to be Irrigated New	Supp'l	Total
Crooked	River Project.	Oregon					
14S	16E	4	NW ¼	NW ¼	12.0		12.0
			SW		14.0	21.0	35.0
			SE		5.0		5.0
		5	SE	NE	5.0		5.0
			SW	SW	1.0		1.0
		7	NE	NE	15.0		15.0
			NW		5.0		5.0
			SE	NW	2.0		2.0
		16	SW	SW	12.0		12.0
		17	NE	SE	1.0		1.0
			SE		2.0		2.0
		27	NE	NE	13.0		13.0
			NW			20.0	20.0
15S	16E	9	NW	NE		12.0	12.0
			NE	NW		12.0	12.0

Municipal or Domestic Supply—

25991

10. (a) To supply the city of no municipal

(Name of) County, having a present population of

and an estimated population of in 19

(b) If for domestic use state number of families to be supplied no domestic

(Answer questions 11, 12, 13, and 14 in all cases)

11. Estimated cost of proposed works, $4,000,000

12. Construction work will begin on or before October 1, 1958

13. Construction work will be completed on or before March 1, 1961

14. The water will be completely applied to the proposed use on or before October 15, 1964

H. T. Nelson
(Signature of applicant)
H. T. Nelson, Regional Director
~~Region 1, Bureau of Reclamation~~
P. O. Box 937, Boise, Idaho

Remarks: Item 1., Source of appropriation - - Crooked River, Releases from Prineville Reservoir, [redacted] Return flows originating within project lands.

Item 2., Amount of water from each source (1) 250 cubic feet per second from Crooked River and storage in Prineville Reservoir [redacted].

(2) Return flows from lands of Crooked River Project as described in item 8 amounting to 150 cubic feet per second.

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

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

WITNESS my hand this day of , 19

STATE ENGINEER

By ASSISTANT

PERMIT

STATE OF OREGON, } ss.
County of Marion,

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 400 *cubic feet per second measured at the point of diversion from the stream, or its equivalent in case of rotation with other water users, from* Crooked River and Prineville Reservoir to be constructed under application No. R-32640, permit No. R-2223,

The use to which this water is to be applied is irrigation and supplemental irrigation.

If for irrigation, this appropriation shall be limited to 1/40th *of one cubic foot per second or its equivalent for each acre irrigated* from direct flow and shall be further limited to a diversion of not to exceed 4 acre feet per acre for each acre irrigated during the irrigation season of each year from direct flow and storage from reservoir to be constructed under permit No. R- 2223 , and is for the use of waters withdrawn by application No. 3589; provided further that the amount of water allowed herein, together with the amount secured under any other right existing for the same lands shall not exceed the limitation allowed herein,

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

The priority date of this permit is April 8, 1914

Actual construction work shall begin on or before April 15, 1960 *and shall thereafter be prosecuted with reasonable diligence and be completed on or before October 1, 19*60.

*Complete application of the water to the proposed use shall be made on or before October 1, 19*61

WITNESS my hand this 15th *day of* April, 19 59

STATE ENGINEER

Application No. 32641

Permit No. 25991

PERMIT
TO APPROPRIATE THE PUBLIC WATERS OF THE STATE OF OREGON

This instrument was first received in the office of the State Engineer at Salem, Oregon, on the 5th *day of* September 1958, *at* 8:00 *o'clock* A *M.*

Returned to applicant:

Approved:
April 15, 1959

Recorded in book No. 70 *of Permits on page* 25991

LEWIS A. STANLEY
STATE ENGINEER

Drainage Basin No. 5 *page* 25 14C 108

Fees 40821

State Printing

APPENDIX H
Oregon Health Authority - Drinking Water Services Water Quality Summaries

Coliform, Lead, and Copper

Oregon Public Health
Drinking Water Data Online

Oregon Health Authority

Coliform fact sheet

PWS ID: 00682 ---- PRINEVILLE, CITY OF

Current Coliform Summary History

Samples Required	Sample Type	Sampling Period Type
10	RT	MONTH

Spreadsheet

Number of Samples Reported

Period End Date	Routines Reported	Routine TC+	Routine FC+	Repeats Reported	Repeat TC+	Repeat FC+	Period Type
Mar 31, 2017	10	0	0	0	0	0	MN
Feb 28, 2017	10	0	0	0	0	0	MN
Jan 31, 2017	10	0	0	0	0	0	MN
Dec 31, 2016	10	0	0	0	0	0	MN
Dec 31, 2016	0	0	0	0	0	0	YR
Nov 30, 2016	10	0	0	0	0	0	MN
Oct 31, 2016	10	0	0	0	0	0	MN
Sep 30, 2016	10	0	0	0	0	0	MN
Aug 31, 2016	10	0	0	0	0	0	MN
Jul 31, 2016	10	0	0	0	0	0	MN
Jun 30, 2016	10	0	0	0	0	0	MN
May 31, 2016	10	0	0	0	0	0	MN
Apr 30, 2016	10	0	0	0	0	0	MN
Mar 31, 2016	10	0	0	0	0	0	MN
Feb 29, 2016	10	0	0	0	0	0	MN
Jan 31, 2016	10	0	0	0	0	0	MN
Dec 31, 2015	0	0	0	0	0	0	3Y
Dec 31, 2015	10	0	0	0	0	0	MN
Dec 31, 2015	0	0	0	0	0	0	YR
Nov 30, 2015	10	0	0	0	0	0	MN
Oct 31, 2015	10	0	0	0	0	0	MN
Sep 30, 2015	10	0	0	0	0	0	MN
Aug 31, 2015	11	0	0	0	0	0	MN
Jul 31, 2015	10	0	0	0	0	0	MN
Jun 30, 2015	10	0	0	0	0	0	MN
May 31, 2015	10	0	0	0	0	0	MN
Apr 30, 2015	10	0	0	0	0	0	MN
Mar 31, 2015	10	0	0	0	0	0	MN
Feb 28, 2015	10	0	0	0	0	0	MN
Jan 31, 2015	10	0	0	0	0	0	MN
Dec 31, 2014	10	0	0	0	0	0	MN
Dec 31, 2014	0	0	0	0	0	0	YR
Nov 30, 2014	11	0	0	0	0	0	MN
Oct 31, 2014	10	0	0	0	0	0	MN
Sep 30, 2014	10	0	0	0	0	0	MN
Aug 31, 2014	10	0	0	0	0	0	MN
Jul 31, 2014	10	0	0	0	0	0	MN
Jun 30, 2014	10	0	0	0	0	0	MN
May 31, 2014	10	0	0	0	0	0	MN
Apr 30, 2014	10	0	0	0	0	0	MN
Mar 31, 2014	10	0	0	0	0	0	MN
Feb 28, 2014	10	0	0	0	0	0	MN
Jan 31, 2014	10	0	0	0	0	0	MN
Dec 31, 2013	10	0	0	0	0	0	MN
Dec 31, 2013	0	0	0	0	0	0	YR
Nov 30, 2013	10	0	0	0	0	0	MN
Oct 31, 2013	10	0	0	0	0	0	MN
Sep 30, 2013	10	0	0	0	0	0	MN
Aug 31, 2013	10	0	0	0	0	0	MN
Jul 31, 2013	10	0	0	0	0	0	MN
Jun 30, 2013	10	0	0	0	0	0	MN
May 31, 2013	10	0	0	0	0	0	MN

Apr 30, 2013	10	0	0	0	0	0	MN
Mar 31, 2013	10	0	0	0	0	0	MN
Feb 28, 2013	10	0	0	0	0	0	MN
Jan 31, 2013	10	0	0	0	0	0	MN
Dec 31, 2012	0	0	0	0	0	0	3Y
Dec 31, 2012	10	0	0	0	0	0	MN
Dec 31, 2012	0	0	0	0	0	0	YR
Nov 30, 2012	10	0	0	0	0	0	MN
Oct 31, 2012	10	0	0	0	0	0	MN
Sep 30, 2012	10	0	0	0	0	0	MN
Aug 31, 2012	10	0	0	0	0	0	MN
Jul 31, 2012	10	0	0	0	0	0	MN
Jun 30, 2012	10	0	0	0	0	0	MN
May 31, 2012	10	0	0	0	0	0	MN
Apr 30, 2012	10	0	0	0	0	0	MN
Mar 31, 2012	10	0	0	0	0	0	MN
Feb 29, 2012	10	0	0	0	0	0	MN
Jan 31, 2012	10	0	0	0	0	0	MN
Dec 31, 2011	10	0	0	0	0	0	MN
Dec 31, 2011	0	0	0	0	0	0	YR
Nov 30, 2011	10	0	0	0	0	0	MN
Oct 31, 2011	10	0	0	0	0	0	MN
Sep 30, 2011	10	0	0	0	0	0	MN
Aug 31, 2011	10	0	0	0	0	0	MN
Jul 31, 2011	10	0	0	0	0	0	MN
Jun 30, 2011	10	0	0	0	0	0	MN
May 31, 2011	10	0	0	0	0	0	MN
Apr 30, 2011	10	0	0	0	0	0	MN
Mar 31, 2011	10	0	0	0	0	0	MN
Feb 28, 2011	10	0	0	0	0	0	MN
Jan 31, 2011	10	0	0	0	0	0	MN
Dec 31, 2010	0	0	0	0	0	0	9Y
Dec 31, 2010	10	0	0	0	0	0	MN
Dec 31, 2010	0	0	0	0	0	0	YR
Nov 30, 2010	10	0	0	0	0	0	MN
Oct 31, 2010	10	0	0	0	0	0	MN
Sep 30, 2010	10	0	0	0	0	0	MN
Aug 31, 2010	10	0	0	0	0	0	MN
Jul 31, 2010	10	0	0	0	0	0	MN
Jun 30, 2010	10	0	0	0	0	0	MN
May 31, 2010	10	0	0	0	0	0	MN
Apr 30, 2010	10	0	0	0	0	0	MN
Mar 31, 2010	10	0	0	0	0	0	MN
Feb 28, 2010	10	0	0	0	0	0	MN
Jan 31, 2010	10	0	0	0	0	0	MN
Dec 31, 2009	10	0	0	0	0	0	MN
Dec 31, 2009	0	0	0	0	0	0	YR
Nov 30, 2009	10	0	0	0	0	0	MN
Oct 31, 2009	10	1	0	3	0	0	MN
Sep 30, 2009	10	0	0	0	0	0	MN
Aug 31, 2009	10	0	0	0	0	0	MN
Jul 31, 2009	10	0	0	0	0	0	MN
Jun 30, 2009	10	0	0	0	0	0	MN
May 31, 2009	10	0	0	0	0	0	MN
Apr 30, 2009	10	0	0	0	0	0	MN
Mar 31, 2009	10	0	0	0	0	0	MN
Feb 28, 2009	10	0	0	0	0	0	MN
Jan 31, 2009	10	0	0	0	0	0	MN
Dec 31, 2008	10	0	0	0	0	0	MN
Dec 31, 2008	0	0	0	0	0	0	YR
Nov 30, 2008	10	0	0	0	0	0	MN
Oct 31, 2008	10	0	0	0	0	0	MN
Sep 30, 2008	10	0	0	0	0	0	MN
Aug 31, 2008	10	0	0	0	0	0	MN
Jul 31, 2008	10	0	0	0	0	0	MN
Jun 30, 2008	10	0	0	0	0	0	MN
May 31, 2008	10	0	0	0	0	0	MN
Apr 30, 2008	10	0	0	0	0	0	MN

Mar 31, 2008	10	0	0	0	0	0	MN
Feb 29, 2008	10	0	0	0	0	0	MN
Jan 31, 2008	10	0	0	0	0	0	MN
Dec 31, 2007	10	0	0	0	0	0	MN
Dec 31, 2007	0	0	0	0	0	0	YR
Nov 30, 2007	10	0	0	0	0	0	MN
Oct 31, 2007	10	0	0	0	0	0	MN
Sep 30, 2007	10	0	0	0	0	0	MN
Aug 31, 2007	10	0	0	0	0	0	MN
Jul 31, 2007	10	0	0	0	0	0	MN
Jun 30, 2007	11	0	0	0	0	0	MN
May 31, 2007	10	0	0	0	0	0	MN
Apr 30, 2007	10	0	0	0	0	0	MN
Mar 31, 2007	10	0	0	0	0	0	MN
Feb 28, 2007	10	0	0	0	0	0	MN
Jan 31, 2007	10	0	0	0	0	0	MN
Dec 31, 2006	10	0	0	0	0	0	MN
Nov 30, 2006	10	0	0	0	0	0	MN
Oct 31, 2006	10	0	0	0	0	0	MN
Sep 30, 2006	10	0	0	0	0	0	MN
Aug 31, 2006	11	1	0	3	0	0	MN
Jul 31, 2006	11	1	0	3	0	0	MN
Jun 30, 2006	11	0	0	0	0	0	MN
May 31, 2006	14	2	0	6	6	0	MN
Apr 30, 2006	10	0	0	0	0	0	MN
Mar 31, 2006	11	0	0	0	0	0	MN
Feb 28, 2006	11	0	0	0	0	0	MN
Jan 31, 2006	11	0	0	0	0	0	MN
Dec 31, 2005	11	0	0	0	0	0	MN
Nov 30, 2005	14	0	0	0	0	0	MN
Oct 31, 2005	13	0	0	0	0	0	MN
Sep 30, 2005	12	0	0	0	0	0	MN
Aug 31, 2005	13	0	0	0	0	0	MN
Jul 31, 2005	12	0	0	0	0	0	MN
Jun 30, 2005	14	0	0	0	0	0	MN
May 31, 2005	14	0	0	0	0	0	MN
Apr 30, 2005	13	0	0	0	0	0	MN
Mar 31, 2005	13	0	0	0	0	0	MN
Feb 28, 2005	13	0	0	0	0	0	MN
Jan 31, 2005	13	0	0	0	0	0	MN
Dec 31, 2004	14	0	0	0	0	0	MN
Nov 30, 2004	16	0	0	0	0	0	MN
Oct 31, 2004	13	0	0	0	0	0	MN
Sep 30, 2004	11	0	0	0	0	0	MN
Aug 31, 2004	12	0	0	0	0	0	MN
Jul 31, 2004	10	0	0	0	0	0	MN
Jun 30, 2004	13	0	0	0	0	0	MN
May 31, 2004	13	0	0	0	0	0	MN
Apr 30, 2004	13	0	0	0	0	0	MN
Mar 31, 2004	17	0	0	0	0	0	MN
Feb 29, 2004	12	0	0	0	0	0	MN
Jan 31, 2004	13	0	0	0	0	0	MN
Dec 31, 2003	13	0	0	0	0	0	MN
Nov 30, 2003	11	0	0	0	0	0	MN
Oct 31, 2003	8	1	0	0	0	0	MN
Sep 30, 2003	11	0	0	0	0	0	MN
Aug 31, 2003	9	0	0	0	0	0	MN
Jul 31, 2003	11	0	0	0	0	0	MN
Jun 30, 2003	9	0	0	0	0	0	MN
May 31, 2003	9	0	0	0	0	0	MN
Apr 30, 2003	11	0	0	0	0	0	MN
Mar 31, 2003	9	0	0	0	0	0	MN
Feb 28, 2003	9	0	0	0	0	0	MN
Jan 31, 2003	9	0	0	0	0	0	MN
Dec 31, 2002	12	1	0	0	0	0	MN
Nov 30, 2002	9	0	0	0	0	0	MN
Oct 31, 2002	11	0	0	0	0	0	MN
Sep 30, 2002	9	0	0	0	0	0	MN

Aug 31, 2002	9	0	0	0	0	0	MN
Jul 31, 2002	11	0	0	0	0	0	MN
Jun 30, 2002	7	0	0	0	0	0	MN
May 31, 2002	9	0	0	0	0	0	MN
Apr 30, 2002	9	0	0	0	0	0	MN
Mar 31, 2002	9	0	0	0	0	0	MN
Feb 28, 2002	9	0	0	0	0	0	MN
Jan 31, 2002	9	0	0	0	0	0	MN

Show results prior to 01/01/2002

Oregon Public Health
Drinking Water Data Online

Oregon Health Authority

PWS ID: 00682 ---- PRINEVILLE, CITY OF

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*
Sep 21, 2015 - Sep 24, 2015	Oct 28, 2015	20	3Y	0.0010	0.1400	
Sep 13, 2012 - Sep 13, 2012	Oct 05, 2012	20	3Y	0.0000	0.0900	
Sep 02, 2009 - Sep 02, 2009	Oct 07, 2009	20	3Y	0.0040	0.2140	
Aug 15, 2006 - Aug 15, 2006	Sep 19, 2006	20	3Y	0.0020	0.2270	
Dec 23, 2003 - Dec 23, 2003	Feb 01, 2006	21	3Y	0.0010	0.1300	
Dec 19, 2000 - Dec 21, 2000	Apr 28, 2003	20	YR	0.0030	0.2400	
Jan 01, 1995 - Jul 27, 1995	Oct 06, 1995	20	YR	0.0026	0.2720	
Jan 01, 1994 - Jun 13, 1994	Jun 15, 1995	20	YR	0.0018	0.2690	
Jul 01, 1993 - Sep 20, 1993	Oct 20, 1993	40	6M	0.0054	0.4600	
Jan 01, 1993 - Mar 08, 1993	Apr 08, 1993	40	6M	0.0059	0.2860	

*Consumer notice date is the date water customers were notified of their tap results. Consumer notice records are not available prior to 2016.

Water Quality Alerts and Violations

Oregon Public Health
Drinking Water Data Online

PWS ID: 00682 — PRINEVILLE, CITY OF

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 the 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.

Current Alerts (SDWIS database)

Alert ID	Date Generated	Sample Source	Alert Type	Contaminant	Group	Result	Alert Level	MCL
CHEM6645	03/03/2015	EP-G EP FOR AIRPORT WELLS	CHEM	SODIUM	IOC	37.9000	20.0000	
CHEM6448	10/01/2014	SRC-GC AIRPORT WELL #4	CHEM	SODIUM	IOC	40.2000	20.0000	
CHEM6394	08/08/2014	EP-C EP FOR LAMONTA WELL	CHEM	NITRATE (AS N)	IOC	5.7400	5.0000	10.0000
COLI13106	08/06/2014	SRC-FA stadium well	COLI	COLIFORM, TOTAL (TCR)	MOR	Present	Present	Present
COLI13106	08/06/2014	SRC-GB airport well #2	COLI	COLIFORM, TOTAL (TCR)	MOR	Present	Present	Present
CHEM6020	10/22/2013	EP-C EP FOR LAMONTA WELL	CHEM	NITRATE (AS N)	IOC	5.5100	5.0000	10.0000
CHEM5072	10/03/2011	EP-C EP FOR LAMONTA WELL	CHEM	SODIUM	IOC	28.2000	20.0000	
CHEM5072	10/03/2011	EP-D EP FOR YANCEY WELL	CHEM	SODIUM	IOC	27.4000	20.0000	
CHEM5072	10/03/2011	EP-A EP FOR STEARNS WELL	CHEM	SODIUM	IOC	30.4000	20.0000	
CHEM5072	10/03/2011	EP-G EP FOR AIRPORT WELLS	CHEM	SODIUM	IOC	37.6000	20.0000	
CHEM5072	10/03/2011	EP-I EP FOR OCHOCO HEIGHTS WELL	CHEM	SODIUM	IOC	59.4000	20.0000	
COLI9180	05/23/2011	SRC-IA ochoco hgts well	COLI	COLIFORM, TOTAL (TCR)	MOR	Present	Present	Present
CHEM4614	12/17/2010	EP-I EP FOR OCHOCO HEIGHTS WELL (CROO1577)	CHEM	SODIUM	IOC	66.5000	20.0000	
COLI6904	10/08/2009	DIST-A Distribution System	COLI	COLIFORM, TOTAL (TCR)	MOR	Present	Present	Present
CHEM3340	01/27/2009	EP-I EP FOR OCHOCO HEIGHTS WELL (CROO1577)	CHEM	GROSS ALPHA, EXCLUDING RA & U	RA	6.2000	15.0000	15.0000
COLI3330	08/04/2006	DIST-A Distribution System	COLI	COLIFORM, TOTAL (TCR)	MOR	Present	Present	Present
COLI3238	07/14/2006	DIST-A Distribution System	COLI	COLIFORM, TOTAL (TCR)	MOR	Present	Present	Present
COLI3000	05/05/2006	DIST-A Distribution System	COLI	COLIFORM, TOTAL (TCR)	MOR	Present	Present	Present
COLI3000	05/05/2006	DIST-A Distribution System	COLI	COLIFORM, TOTAL (TCR)	MOR	Present	Present	Present
COLI3000	05/05/2006	DIST-A Distribution System	COLI	COLIFORM, TOTAL (TCR)	MOR	Present	Present	Present
COLI3000	05/05/2006	DIST-A Distribution System	COLI	COLIFORM, TOTAL (TCR)	MOR	Present	Present	Present
COLI3000	05/05/2006	DIST-A Distribution System	COLI	COLIFORM, TOTAL (TCR)	MOR	Present	Present	Present
COLI3000	05/05/2006	DIST-A Distribution System	COLI	COLIFORM, TOTAL (TCR)	MOR	Present	Present	Present
COLI3000	05/05/2006	DIST-A Distribution System	COLI	COLIFORM, TOTAL (TCR)	MOR	Present	Present	Present
COLI3000	05/05/2006	DIST-A Distribution System	COLI	COLIFORM, TOTAL (TCR)	MOR	Present	Present	Present
CHEM1972	04/27/2006	EP-I EP FOR OCHOCO HEIGHTS WELL (CROO1577)	CHEM	SODIUM	IOC	70.0000	20.0000	
CHEM1905	01/23/2006	EP-I EP FOR OCHOCO HEIGHTS WELL (CROO1577)	CHEM	SODIUM	IOC	66.0000	20.0000	
COLI778	11/12/2003	DIST-A Distribution System	COLI	COLIFORM, TOTAL (TCR)	MOR	Present	Present	Present
CHEM475	08/14/2003	EP-H EP FOR BARNEY WELL	CHEM	SODIUM	IOC	29.0000	20.0000	
CHEM378	05/05/2003	EP-D EP FOR YANCY WELL	CHEM	SODIUM	IOC	27.0000	20.0000	
CHEM378	05/05/2003	EP-A EP FOR STEARNS WELL	CHEM	SODIUM	IOC	28.0000	20.0000	
CHEM378	05/05/2003	EP-F EP FOR STADIUM WELL	CHEM	SODIUM	IOC	27.0000	20.0000	
CHEM378	05/05/2003	EP-C EP FOR LAMONTA WELL	CHEM	SODIUM	IOC	31.0000	20.0000	
CHEM378	05/05/2003	EP-G AIRPORT WELL	CHEM	SODIUM	IOC	36.0000	20.0000	
CHEM378	05/05/2003	EP-B EP FOR S. 4TH ST. DEEP WELL	CHEM	SODIUM	IOC	32.0000	20.0000	
CHEM378	05/05/2003	EP-E EP FOR S. 4TH ST. SHALLOW WELL	CHEM	SODIUM	IOC	32.0000	20.0000	

Archived Alerts (SWS database)

Date	Source	Chemical	Results mg/l	MCL mg/l
12/17/2002		Coliform		
03/25/1993	BA--PRINEVILLE DEEP WELLS (5) - SOUTH 4th ST	Nickel	0.051	0.1

03/25/1993	EA--PRINEVILLE SHALLOW WELL - SOUTH 4th STRE	Nickel	0.075	0.1
11/10/1999	A--EP FOR STEARNS WELL	Sodium	29	
11/10/1999	B--EP FOR S. 4TH ST. DEEP WELL	Sodium	29	
11/10/1999	C--EP FOR LAMONTA WELL	Sodium	29	
11/10/1999	D--EP FOR YANCY WELL	Sodium	25	
11/10/1999	E--EP FOR S. 4TH ST. SHALLOW WELL	Sodium	47	
11/10/1999	F--EP FOR STADIUM WELL	Sodium	26	
11/10/1999	G--AIRPORT WELL	Sodium	33	
09/09/1996	A--EP FOR STEARNS WELL	Sodium	33.1	
09/09/1996	B--EP FOR S. 4TH ST. DEEP WELL	Sodium	33.3	
09/09/1996	C--EP FOR LAMONTA WELL	Sodium	29.8	
09/09/1996	D--EP FOR YANCY WELL	Sodium	27.9	
08/27/1996	E--EP FOR S. 4TH ST. SHALLOW WELL	Sodium	54	
08/27/1996	F--EP FOR STADIUM WELL	Sodium	30.4	
08/27/1996	G--AIRPORT WELL	Sodium	39.3	
06/23/1993	AA--PRINEVILLE DEEP WELLS (5) - STEARNS WELL	Sodium	23	
06/23/1993	BA--PRINEVILLE DEEP WELLS (5) - SOUTH 4th ST	Sodium	23.7	
06/23/1993	CA--PRINEVILLE DEEP WELLS (5) - LAMONTA WELL	Sodium	20.8	
06/23/1993	EA--PRINEVILLE SHALLOW WELL - SOUTH 4th STRE	Sodium	38.4	
06/23/1993	FA--PRINEVILLE DEEP WELLS (5) - STADIUM WELL	Sodium	20.4	
03/25/1993	FA--PRINEVILLE DEEP WELLS (5) - STADIUM WELL	Thallium Total	0.002	0.002

Oregon Public Health
Drinking Water Data Online

Oregon Health Authority

Introduction :: Data Search Options :: WS Name Look Up :: WS ID Look Up :: DWS Home :: Quick Data Links

PWS ID: 00682 ---- PRINEVILLE, CITY OF

For questions regarding these violations contact: REGION 1 — Michelle Byrd — (971) 673-0425

Violations are displayed for the last 5 years only.
Group Abbreviations: NO3 = Nitrate
Gray shading indicates return to compliance.

Hide Auto-RTC | *Show Determination Dates*

Click here to see public notices.

Violation History

Violation Number	Auto-RTC?	Monitoring Period Begin	End	Facility ID	Analyte Group	Violation Type - Analyte Count *Show analytes for all violations*	Enforcement Action - Date *Show history*	Points
900716921	*Y*	*Apr 01, 2014*	*Jun 30, 2014*	*EP-C*	*NO3*	*Chemical Late/Nonreporting - 1*	*Returned To Compliance - Aug 07, 2014*	*5*
900716919	*Y*	*Oct 01, 2013*	*Dec 31, 2013*	*EP-C*	*NO3*	*Chemical Late/Nonreporting - 1*	*Returned To Compliance - Apr 09, 2014*	*5*

SYSTEM SCORE SUMMARY

Unaddressed Points:	0
Number of years the oldest violation has been unaddressed (*n*):	0
System Score:	**0**
Points under formal enforcement:	0
Points RTC'd:	10

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 04/03/2017, 9 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 :: Site Visits :: Public Notice :: Plan Review
Coliform Summary :: Coliform Results :: Sampling Schedule for Coliform :: Groundwater/GWUDI Source Details
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
DBPs :: TOC & Alkalinity :: DBP Sample Sites :: FANLs :: MRDL :: Turbidity :: SWTR :: RAA :: LRAA

APPENDIX I
Source Water Assessment

SOURCE WATER ASSESSMENT
INTERIM REPORT

CITY OF PRINEVILLE
PWS ID #4100682
PRINEVILLE, OREGON
CROOK COUNTY

June 2005

Prepared for
City of Prineville

by

Department of Human Services
Health Services
Drinking Water Program

DHS
oregon department
of human services

DEQ
State of Oregon
Department of
Environmental
Quality

Available in Alternate Formats by contacting the DHS DWP at (541) 726-2587

Source Water Assessment Interim Report

City of Prineville

1. Introduction

Traditionally, water systems have relied on proper water system management, water quality monitoring and, if necessary, water treatment to ensure that the water they serve meets drinking water standards. In spite of the best of these efforts, however, contamination of drinking water can still occur. The costs, both tangible and intangible, to a water system contending with a contaminated water supply are significant. At minimum, there is the cost of increased monitoring that will be required to make certain that the water does not pose a significant health risk. At contaminant concentrations exceeding a drinking water standard, the system may be dealing with the cost of installing and maintaining treatment, the loss of the drinking water source, i.e., a well, and most assuredly, a concerned and often frightened public.

Beginning with the 1986 Amendments to the Safe Drinking Water Act, an additional "barrier to contamination" was recognized at the federal level. A shift from the "reactive" approach of water treatment to a "proactive" approach of prevention began to take place. Although water treatment may be necessary in some cases, it is much more cost effective to prevent the contamination from happening in the first place. A recent estimate by the Oregon Department of Environmental Quality (DEQ) and the Department of Human Services Drinking Water Program (DHS) compared the estimated cost of prevention (less than $15 per resident) to the actual cost of investigation and treatment (more than $1500 per resident) in a small Oregon community impacted by a volatile organic contaminant that exceeded the drinking water standard.

Oregon has a Drinking Water Protection Program in place for groundwater systems, i.e., wells and springs. In order to protect a drinking water resource, a water system must know where the drinking water comes from, what potential sources of pollution exist and what level of threat each presents to the system's drinking water. Up until recently, the costs associated with acquiring this information were the responsibility of the water system, a financial burden that even the most proactive water systems found hard to meet. The 1996 Amendments to the Safe Drinking Water Act lifted that burden from water systems by requiring that the states conduct Source Water Assessments for the water systems within their respective boundaries. <u>The purpose of the Assessment is to provide both groundwater and surface water systems with the information that they need to develop a strategy to protect their source of drinking water if they choose.</u>

As mandated by the 1996 Amendments, a Source Water Assessment for groundwater systems consists of the following: (1) the identification of the area that directly overlies that part of the aquifer supplying drinking water to the well or spring, (2) an inventory of potential sources of contamination within that area, and (3) the evaluation of the susceptibility of the water system to contamination from those sources. Funding for assessments was provided to the states through the Act as part of the state's Drinking Water Revolving Loan Fund.

In this interim report, we focus on the first two elements of the Source Water Assessment, identifying the critical area of protection and inventorying potential sources of contaminants within that area. This information provides you with a map of where your drinking water comes from and identifies the potential threats to its quality. The third element, our assessment of the susceptibility of your drinking water to those potential contaminant sources, will be provided to you by the end of 2005, or sooner, if you wish to move forward with developing a drinking water protection plan.

The DEQ and DHS worked with a citizen's advisory committee and with DHS' Drinking Water Advisory Committee to design a program that would meet the needs of Oregon's public water systems. The Environmental Protection Agency (EPA) has certified that Oregon's plan meets the requirements of the Safe Drinking Water Act. Within the program, DHS has the responsibility of working with groundwater systems in general, as well as with transient noncommunity water systems.

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. Although developing a Drinking Water Protection Plan is voluntary in Oregon, it is hoped that the information provided in the Source Water Assessment Report will be used as a basis for reducing the risk of contamination to your source.

1.1 Groundwater Basics

In order to protect a groundwater source of drinking water, it is important to understand how the groundwater system works, e.g., where groundwater comes from, how it occurs in the subsurface, how it moves, and how it becomes contaminated. Included in the appendix of this report is a Fact Sheet about groundwater that you can use to help increase the awareness of others regarding groundwater and its susceptibility to contamination.

Groundwater is part of the hydrologic cycle which controls the distribution of water on the earth's surface. Groundwater is therefore linked to other water sources, notably surface water such as streams, rivers, and lakes. Virtually without exception, groundwater originates as precipitation at the earth's surface which sinks through the soil and percolates down to the water-table. The fact that groundwater originates at the surface is what makes it vulnerable to contamination. As recharging groundwater moves downward through the soil and vadose zone, it comes in contact not only with the geologic materials present, but also with any contaminants contained within the soil and/or vadose zone. Therefore, recharging groundwater can carry contaminants downward to the aquifer. Likewise liquid chemicals, if present in large enough quantities, can enter the aquifer by following the same path as recharging groundwater.

The direction and speed with which groundwater moves is controlled by the slope of the water-table and aquifer permeability. The slope of the water-table often mimics, in a subdued sense, the earth's surface with groundwater moving from high areas to low areas. Aquifer permeability is a measure of how easy it is for groundwater to move through the geologic material that makes up the aquifer. Geologic materials with greater permeability allow groundwater to move with less restriction. In general, groundwater movement is measured in terms of a few inches to a few feet per day. A pumping well can significantly influence the speed and direction of groundwater movement by drawing the water-table down in its vicinity, creating a depression in the water-table. As the well continues to pump, the depression in the water-table spreads out through the aquifer and leads to the formation of a "capture zone". Groundwater inside the capture zone is eventually pumped to the earth's surface by the well.

When wells are used as a water source, we identify the drinking water protection area for the water system by delineating those portions of the capture zone around the well(s) where, on average, it will take 10 or 15 years (depending on the delineation technique used) for water moving through the aquifer to arrive at the well. We have also identified the 5-, 2-, and 1- year capture zones around the well(s) to enhance the overall usefulness of the drinking water protection area.

When springs are used as a water source, we have attempted to identify the recharge area uphill from the springs based on hydrogeologic mapping. In these cases we have attempted to identify the short-, intermediate-, and long-term groundwater flow regimes that provide water to the springs. Typically, we have labeled these areas as Zone 1 (short-term), Zone 2 (intermediate-term), and Zone 3 (long-term). When appropriate, we will also identify a Zone 4 which represents the watershed above the estimated recharge area which could quickly transport spilled contaminants into the DWPA via surface water runoff.

1.2 Well Construction

When a well is drilled, the drilling equipment first passes through the vadose zone until it encounters the water-table. Within the vadose zone, the open pore spaces between soil and sediment particles and/or the open fractures within the bedrock material are only partially filled with water. Most of the open pore/fracture space is filled with air, therefore, little if any water can be obtained from the vadose zone. The water-table marks the top of the saturated zone, where the open pore/fracture spaces are, for the most part, completely saturated (full) with groundwater. It should be understood that within the saturated zone, groundwater does not occur as underground rivers, lakes, or veins. An aquifer is any geologic material located below the water-table (and is therefore water saturated) that can yield an adequate water supply to a well. Geologic materials that tend to yield large quantities of water to wells include sand and gravel deposits, porous lava flows, and fractured bedrock.

2. Water System Background

The City of Prineville water system is located in Crook County and serves approximately 8,501 people through 3,300 connections. Drinking water is supplied by eight wells, commonly referred to as the Stearns Well, the South 4th St. Deep Well, the Lamonta Well, the Yancey Well, the South 4th St. Shallow Well, the Stadium Well, the Airport Well, and the Barney Well. According to DHS Drinking Water Program records, the Stearns Well, the Yancey Well, the Airport Well, and the Barney Well serve as permanent water sources and the others serve as seasonal water sources.

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
Stearns Well - Source AA	44° 18' 00.577" N	120° 48' 45.272" W
S. 4th St. Deep Well - Source BA	44° 17' 55.546" N	120° 50' 44.103" W
Lamonta Well - Source CA	44° 19' 02.739" N	120° 51' 43.172" W
Yancy Well - Source DA	44° 18' 24.506" N	120° 51' 13.350" W
S. 4th St. Shallow Well - Source EA	44° 17' 55.498" N	120° 50' 43.139" W
Stadium Well - Source FA	44° 17' 50.043" N	120° 49' 54.493" W
Airport Well - Source GA	44° 16' 47.817" N	120° 53' 58.303" W
Barney Well - Source HA	44° 18' 05.442" N	120° 48' 41.986" W

2.2 Source Construction

The Stearns Well was constructed from November 1972 to January 1973. A 30-inch diameter hole was drilled to 75 feet and a 24-inch diameter hole was continued to 246 feet. Twenty-four-inch diameter casing was installed from one foot above the surface to a depth of 225 feet and 12-inch diameter casing was installed from two feet above the surface to a depth of 226 feet. Screens were installed from 226 to 246 feet. Cement was placed between the casing and the outer wall of the hole from the surface to a depth of 75 feet to serve as a casing seal. This casing seal is considered inadequate because not enough cement was used to seal from the surface to a depth of 75 feet. A copy of the well report for this well is included in the appendix materials.

The South 4th St. Deep Well was constructed from July to October 1960. A hole at least 24 inches in diameter was drilled to 222 feet, and a 12-inch diameter hole was continued to 252 feet. Twenty-four-inch diameter casing was installed from the surface to a depth of 222 feet and 12-inch diameter casing was also installed from the surface to a depth of 222 feet, and from 242.5 to 252 feet. Screens were installed from 222 to 242.5 feet, and gravel was placed from 202 to 252 feet. Cement was placed between the casing and the outer wall of the hole from the surface to a depth of 40 feet to serve as a casing seal. This casing seal is considered inadequate because, according to current Oregon Water Resources Department standards, the casing seal should extend at least five feet into the confining unit (48 feet). A copy of the well report for this well is included in the appendix materials.

The Lamonta Well was constructed from May to September 1957. A hole of unknown diameter was drilled to 15 feet, a 24-inch diameter hole was continued to 256 feet. Twenty-four-inch diameter casing was installed from the surface to a depth of 230 feet and 12-inch diameter casing was installed from the surface to a depth of 228 feet, and from 253 to 256 feet. Screens were installed from 228 to 253 feet, and gravel was placed from 205 to 253 feet. Concrete was placed between the casing and the outer wall of the hole from the surface to a depth of 15 feet to serve as a casing seal. This casing seal is considered inadequate because, according to current Oregon Water Resources Department standards, the casing seal should extend at least 18 feet below the surface. In addition, there appears to be no casing seal outside the 24-inch diameter casing, which can allow potentially contaminated surface water to travel down the outside of the casing and into the well. A copy of the well report for this well is included in the appendix materials.

The Yancey Well was constructed in 1917. A hole of unknown diameter was drilled to 228 feet. According to a video log of the well, eight-inch diameter casing was installed to a depth of 218 feet and the well is an open hole from 218 to 228 feet. The well record contains no information about a casing seal. This provides us with little option when determining how to respond in the event of future contamination at the wellhead. Under these circumstances, the water system will likely be required to evaluate the construction of the current well and bring it up to current standards or formally abandon the well in favor of a new well that would be protective of the aquifer. A copy of the well record for this well is included in the appendix materials.

The South 4th St. Shallow Well was constructed in 1950. A hole of unknown diameter was drilled to 75 feet. Ten-inch diameter casing was installed to a depth of 61 feet and was backfilled with gravel to 51 feet. Perforations, to allow water into the well, were installed from 13 to 22 feet and gravel was also placed from 13 to 28 feet. The well is considered to be an open hole from 61 to 75 feet below the surface. The well record contains no information about a casing seal. This provides us with little option when determining how to respond in the event of future contamination at the wellhead. Under these circumstances, the water system will likely be required to evaluate the construction of the current well and bring it up to current standards or formally abandon the well in favor of a new well that would be protective of the aquifer. A copy of the well record for this well is included in the appendix materials.

The Stadium Well was constructed from August 1986 to February 1987. A 16-inch diameter hole was drilled to 225 feet, a 12-inch diameter hole was continued to 260 feet, and an eight-inch diameter hole completed the 263 feet. Twelve-inch diameter casing was installed from 3.5 feet above the surface to a depth of 228 feet, and 10-inch diameter liner was installed from 218 to 228 feet and from 249 to 259 feet. The well was sand-packed from 259 to 263 feet. Screens were installed from 228 to 249 feet. Concrete was placed between the casing and the outer wall of the hole from the surface to a depth of 10 feet, and cement was placed from 10 to 225 feet, both to serve as a casing seal. This casing seal received special construction approval and is therefore considered adequate. A copy of the well report for this well is included in the appendix materials.

The Airport Well was originally constructed in November and December 1980 and altered in May 1996. A 12-inch diameter hole was drilled to 25 feet, and an eight-inch diameter hole was continued to 475 feet in 1980. Eight-inch diameter casing was installed from two feet above the surface to a depth of 25 feet, and seven-inch diameter liner was reportedly installed from seven to 487 feet below the surface in 1996. Perforations were installed in the liner from 447 to 467 feet; however, because of the differences in diameter between the casing and liner, the well is considered an open hole from a depth of 25 feet to the bottom of the hole. Cement was placed between the casing and the outer wall of the hole from the surface to a depth of 25 feet to serve as a casing seal. This casing seal is considered adequate. A copy of the well report for this well is included in the appendix materials.

The Barney Well was constructed in November and December 1994. A 22-inch diameter hole was drilled to 280 feet. Ten-inch diameter casing was installed from two feet above the surface to a depth of 280 feet and four-inch diameter liner was installed from 1.5 feet above the surface to a depth of 215 feet. Perforations, to allow water into the well, were installed in the casing from 219 to 279 feet. The well was sand-packed from 207 to 214 feet and gravel-packed from 214 to 279 feet. Cement was placed between the casing and the outer wall of the hole from the surface to a depth of 207 feet to serve as a casing seal. This casing seal is considered inadequate because not enough cement was used to seal from the surface to a depth of 207 feet. In a Sanitary Survey conducted on 4/23/03, Drinking Water Program staff determined that the sanitary seal and casing are not watertight. A copy of the well report for this well is included in the appendix materials.

2.3 Nature and Characteristics of the Aquifer

Based on the well logs for the City of Prineville's Stearns Well, South 4th St. Deep Well, Lamonta Well, Yancey Well, Stadium Well, and Barney Well, the aquifer supplying water to these wells has been identified as confined fluviolacustrine sand and/or gravel deposits.

The City of Prineville's Stearns, South 4th St., Lamonta, Yancey, Stadium, and Barney wells indicate that the depth to the first water-bearing zone within the confined fluviolacustrine sand and/or gravel varies from approximately 217 to 228 feet. The water-bearing sand and/or gravel deposits are directly overlain by approximately 217 to 228 feet of topsoil, silt, silt packed gravel, sand, and clay. The static water-levels (water-level in the well when it is at rest, i.e. not being pumped) in the wells were reported to range from a minimum of 16.2 feet above ground in the Yancey Well to a maximum of 35 feet below ground in the South 4th St. Deep and Barney wells. When determining the aquifer condition (i.e., unconfined, semi-confined, or confined) at each well location, we evaluate the condition of the first water-bearing zone below the casing seal. Therefore, we consider the fluviolacustrine aquifer in the Prineville area to be confined. Thickness of the water-bearing zone exploited in the aquifer is estimated to be 265 feet.

Based on the well logs for the South 4th St. Shallow Well and other area wells, the aquifer supplying water to this well has been identified as unconfined alluvial silt, sand, and/or gravel.

The City of Prineville's South 4th St. Shallow Well indicates that the depth to the first water-bearing zone within the gravel is likely as shallow as six feet. Based on the well log, the water-bearing gravel is directly overlain by approximately six feet of silt. The static water-level (water-level in the well when it is at rest, i.e. not being pumped) in the well was reported to occur at a depth of 4.5 feet. When determining the aquifer condition (i.e., unconfined, semi-confined, or confined) at each well location, we evaluate the condition of the first water-bearing zone below the casing seal. Therefore, we consider the alluvial aquifer in the Prineville area to be semi-confined to unconfined. Thickness of the water-bearing zone exploited in the aquifer is estimated to be 29 feet.

Based on the well log for the Airport Well, the aquifer supplying water to the well has been identified as layered basalts associated with the Clarno Formation. Robinson and Price describe theses materials as primarily consisting of welded tuffs and andesitic lava. They

characterized these lavas as being generally poor to moderately permeable, yielding small quantities of water to local wells.

The City of Prineville's Airport Well indicates that the first water-bearing zone is encountered at a depth of 448 feet. The aquifer is directly overlain by 448 feet of basalt and tuff. The static water-level (water-level in the well when it is at rest, i.e. not being pumped) in the well is reported to occur at a depth of 414 feet. Comparing the depth to the first water-bearing zone to the static water-level in the well indicates that the aquifer is confined. Therefore, we consider the aquifer penetrated by the City of Prineville's Airport Well to be a deep, confined, layered volcanic aquifer with a minimum depth of 448 feet. Thickness of the water-bearing zone exploited in the aquifer is estimated to be 27 feet.

3. Delineation Results

The purpose of the Drinking Water Protection Area (DWPA) delineations is to identify the areas at the surface which overly the critical portion of the aquifers that are supplying groundwater to the water system's wells. Therefore, DHS Drinking Water Program staff have collected and reviewed data for the purpose of delineating the DWPAs for your water system. The areas included in the DWPAs are designed to approximate the next 10 to 15 years of groundwater supply for the water system, depending on the delineation method, and are shown in Figures 1-A through 1-G (see appendix materials). We have enhanced the usefulness of the DWPA maps by identifying additional five-year, two-year, and one-year "Time-Of-Travel Zones" inside the DWPAs.

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 lack of hydrogeologic information available for the vicinity of the Airport Well, the Calculated Fixed Radius (volumetric) Method was used to delineate the DWPA for the Airport Well (see the appendix materials for an explanation of the delineation process). Based on the service population and the complex aquifer boundary conditions associated with the surrounding area, the Analytic Element Model Method was used to delineate the DWPAs for all wells except the Airport Well. **The delineation of the DWPAs for all wells, excluding the Airport Well, was accomplished using the groundwater modeling software WhAEM2000 (Kraemer et al., 2003).** The resulting DWPAs for the City of Prineville wells are shown in Figures 1-A through 1-G of the appendix materials.

WhAEM2000 is a public domain 2-dimentional groundwater flow model that allows for the modeling of capture zones for steady state pumping wells. WhAEM2000 allows for the inclusion of hydrological boundaries, such as rivers, recharge boundaries, no-flow boundaries, and inhomogeneity zones which may have an influence on capture zone size and shape. Model results can be "calibrated" by comparing actual water-levels observed in area wells and then adjusting the model parameters within reasonable limits until the modeled and observed head values agree to within acceptable limits. This "calibration" step allows the modeler to better represent the actual groundwater system. Once calibrated, the model can be used to estimate the impact of changing conditions, i.e., the effect of pumping. WhAEM2000 was specifically developed to facilitate capture zone delineation and protection area mapping in support of the Source Water Assessment Planning process for public water well supplies in the United States (Kraemer et al., 2003).

4. 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.

4.1 Potential Contaminant Sources within the Two-Year Time-of-Travel Zone for the Wells

The delineated two-year time of travel zones are primarily dominated by commercial and residential land uses although the Stearns and Barney well two-year TOT also includes some agricultural land uses. A combined total of 59 potential contaminant sources (Reference Numbers 1-6, 8-16, 34, 37-40, 56-60, 65-81, 104-112 and 121-128 on Figure 2 and Table 2 in the Appendix Materials) were identified in the combined two-year time-of-travel zones for the wells. A general listing of potential sources of contamination (PCSs) identified within the 2-year time of travel for each of the wells is detailed below:

Well Number	PCSs within the 2-year Time-of- Travel Zone
S. 4th Street Deep Well	High density housing areas, apartments, sewer lines, a gas station with a confirmed leaking underground storage tank, the two schools and school bus garage, a storm water injection/dry well, the Highway 26/3rd Street transportation corridor, a state cleanup site (ECSI), and two parks.
S. 4th Street Shallow Well	High density housing areas, apartments, and sewer lines
Stadium Well	High density housing areas, sewer lines, a fleet/trucking terminal, a lumber yard, a home machine/equipment maintenance shop, a State cleanup site (ECSI), a school with ball field and underground storage tank, and the Highway 26/3rd Street transportation corridor.

Stearns and Barney Wells	Rural homes with septic systems and private wells, the Highway 26/3rd Street transportation corridor, an unused well, two unknown operations, a potential Confined Animal Feeding Area and boarding stable with aboveground storage tanks, and irrigated crop areas.
Yancey Well	High density housing areas, sewer lines, a car wash, two gas stations, two auto repair shops, four businesses with chemical/petroleum processing/storage operations, two fleet terminals, a lumber yard, a salvage yard, a wood processing facility, several sites with above and underground storage tanks, the Lamonta Road and railroad transportation corridors, a State cleanup site (ECSI), a park and a substation.
Lamonta Well	Sewer lines, a gas station, two auto repair businesses, the school bus yard, a lumber yard, two mini-storages, a wood preserving treating plant, the Lamonta Road and railroad transportation corridor, several facilities with above ground storage tanks, a state cleanup site (ECSI), and an irrigation canal.
Airport Well	Several airport maintenance/fueling areas, a fleet terminal, several businesses with above and underground storage tanks, the Highway 126 transportation corridor, and a state cleanup site (ECSI).

The potential contaminant sources within the two-year time-of-travel zones all have relatively higher to moderate risk to the drinking water supply with the exception of the apartments, rural homes (low density areas), mini-storage facilities, schools, and underground storage tanks that are listed as decommissioned/inactive or upgraded to current standards.

Several of the potential contaminant source within the 2-year time of travel zones have a high risk of transmitting micro-organisms to the groundwater including the sewer lines, septic systems, grazing animal areas, boarding stables, potential Confined Animal Feeding Area operations, and the irrigation canal.

4.2 Potential Contaminant Sources within the Five-Year and Ten-Year Time-of-Travel Zones for the Wells

The drinking water protection area within the five and ten-year time-of-travel zones is primarily occupied by multiple land uses including residential, commercial and agricultural land uses. An additional 73 potential contaminant sources were identified within the five and ten/fifteen-year time-of-travel zones as summarized below. Area-wide potential sources such as the residential areas, sewered areas, and transportation corridors extend from the two-year time-of-travel zone into the five and ten/fifteen-year time-of-travel zones. These land uses occur throughout the drinking water protection area and are shown on Figure 2 in the location nearest to the well and are not included in the following table.

Well Number	PCSs within the 5-year and 10/15-year Time-of- Travel Zone
S. 4^{th} Street Deep Well	Several auto body/repair shops, two gas stations, two businesses with minor chemical storage/use, two dry cleaners, several fleet/trucking/bus terminals, two salvage yards, a veterinary clinic, several large parking lots, two mini-storages, a lumber yard, a home machine/equipment shop, a injection/dry wells, the railroad transportation corridor, an unused well, several sites with above and underground storage tanks, several State cleanup sites (ECSI), two RV parks/campgrounds, a park, three schools, a substation, a boarding stable, irrigated and non-irrigated crop areas, and grazing animal areas.
S. 4^{th} Street Shallow Well	Several auto body/repair shops, two gas stations, a business with minor chemical storage/use, two dry cleaners, several fleet/trucking/bus terminals, a salvage yard, a veterinary clinic, several large parking lots, two mini-storages, a lumber yard, two home machine/equipment maintenance shops, a storm water injection/dry well, the Highway 26/3rd Street and railroad transportation corridors, several sites with above and underground storage tanks, an unused well, two state cleanup sites (ECSI), two RV parks/campgrounds, three schools, and a substation.
Stadium Well	High density housing areas, sewer lines, several auto body/repair shops, several fleet/trucking/bus terminals, a salvage yard, a large parking lot, a mini-storage, a building with injection/dry wells, several sites with above and underground storage tanks, an unused well, two unknown operations, three potential Confined Animal Feeding Areas with aboveground storage tanks, irrigated crop areas, and grazing animal areas.
Stearns and Barney Wells	High density housing areas with septic systems, an auto repair shop, two fleet/trucking terminals, a salvage yard, a large parking lot, a building with injection/dry wells, several sites with above and underground storage tanks, two potential Confined Animal Feeding Areas with aboveground storage tanks, irrigated crop areas, and grazing animal areas.

Yancey Well	Several auto body/repair shops, two gas stations, several businesses with chemical storage/use, a cement/concrete plant, two dry cleaners, three fleet terminals, several medical/veterinary facilities, a printing operation, several large parking lots, two mini-storages, the Highway 26/3rd Street transportation corridor, several sites with above and underground storage tanks, two State cleanup sites (ECSI), a RV parks/campground, two parks, two schools, a substation, and irrigated and non-irrigated crop areas.
Lamonta Well	High density housing areas, a mini-storage, a wood processing business, a home machine shop, several sites with aboveground storage tanks, several unknown operations, a cemetery, and a waste transfer/recycling station.
Airport Well	A gas station, an auto repair shop, a fleet maintenance terminal with a storm water injection/dry well, an RV storage site, an unknown operation, and two businesses with aboveground storage tanks.

The potential contaminant sources within the five-year and ten -year time-of-travel all pose a relatively higher to moderate risk to the drinking water supply with the exception of businesses that store/use minor amounts of chemicals, RV/mini-storages, RV Parks/campgrounds, schools, decommissioned or upgraded underground storage tanks and non-irrigated crops which present a lower risk.

5. Conclusions

The aquifer supplying the City of Prineville's Stearns, South 4^{th} St. Deep, Lamonta, Yancey, Stadium, and Barney wells is deep, confined, and consists of fluviolacustrine sand and/or gravel. The aquifer supplying the South 4^{th} St. Shallow Well is shallow, semi-confined to unconfined, and consists of alluvial gravel. The aquifer supplying the Airport Well is deep, confined, and consists of layered volcanics of the Clarno Formation. The presence of several high- and moderate-risk potential contaminant sources within the protection areas was confirmed through a potential contaminant source inventory.

6. 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. 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 upon system's request

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.

Appendix

Figure 1. Map of the Drinking water protection area

Figure 2. Map of Potential Contaminant Sources within the Drinking water protection area

Inventory of Potential Contaminant Sources

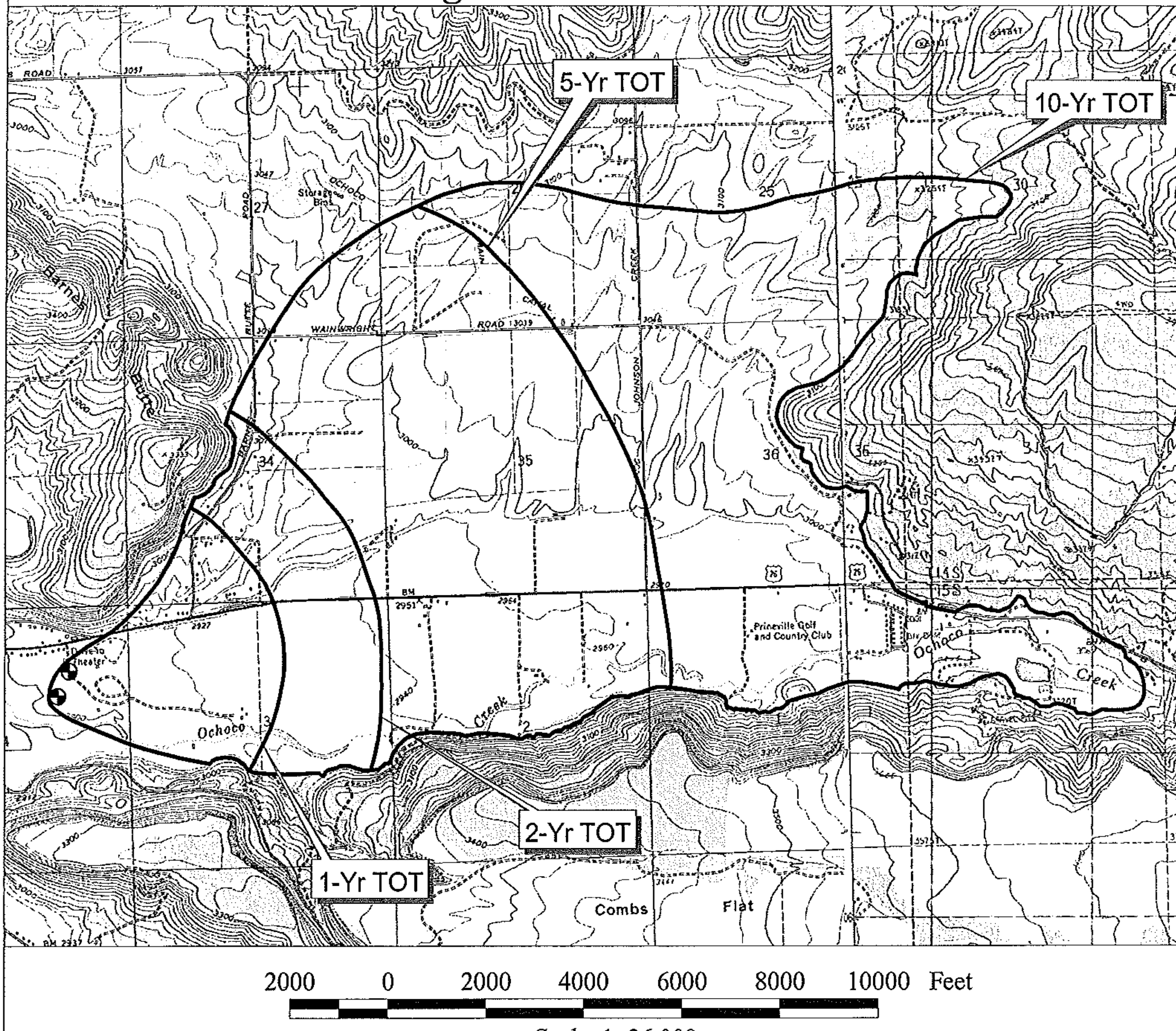
Well Report(s)

Groundwater Information Sheets

Drinking Water Protection In Oregon

NOTE: **Additional copies of the appendix materials are available upon request by calling (541) 726-2587**

Figure 1-A. City of Prineville Stearns & Barney Wells Drinking Water Protection Area

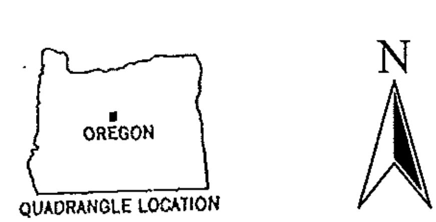


Drinking Water Protection Area (DWPA)
1, 2, 5, and 10 Year Time of Travel (TOT)
Analytic Element Method

Model Parameters
Production Interval (ft): 265
Effective Porosity: 0.09
Hydraulic Conductivity (ft/day): 90
Usage (gal/day): Stearns = 793,224
Barney = 151,021

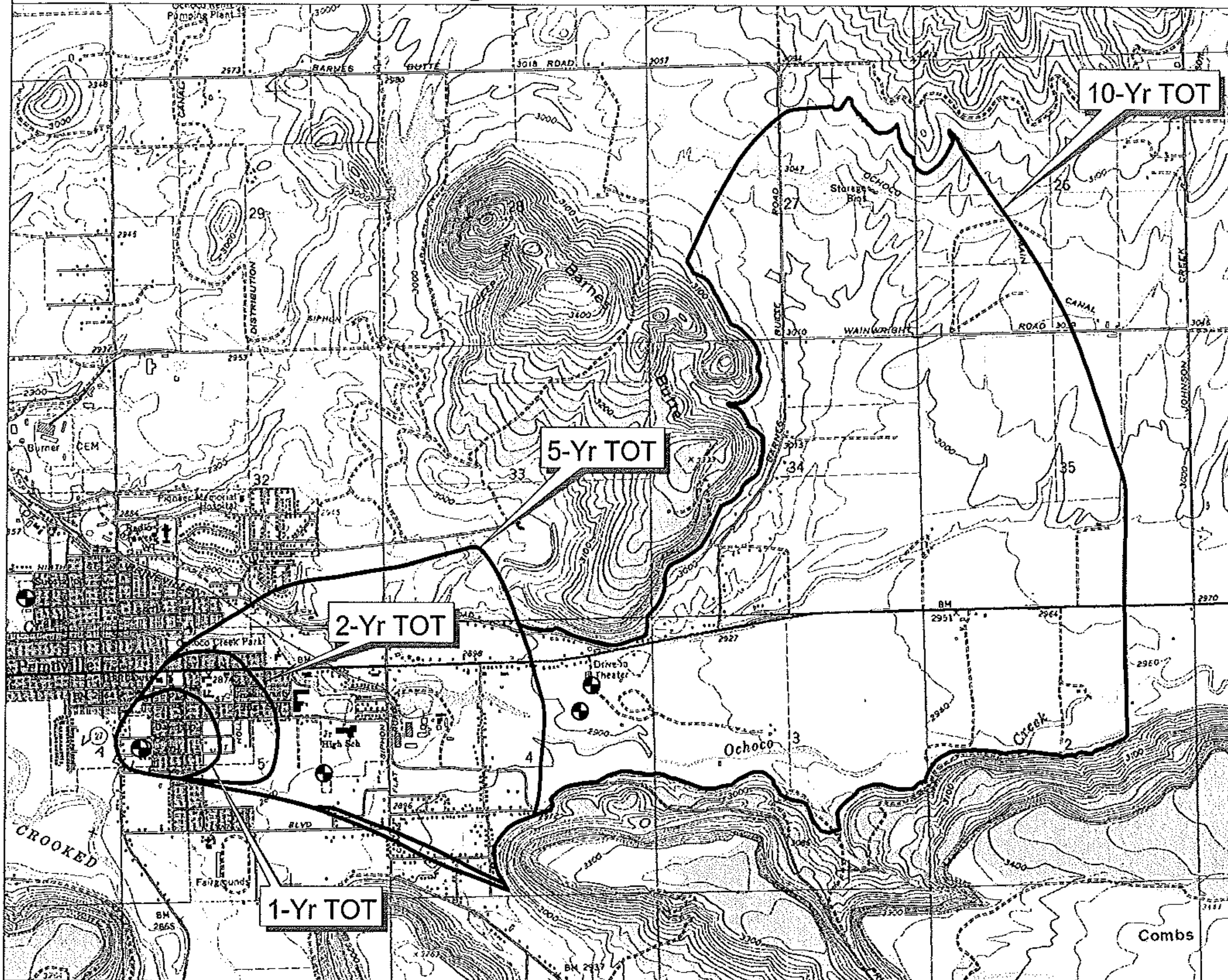
Prepared by: TP
Project Manager: TP RG# G-1874
PWS#: 4100682 File#: PRI100

Well Location (WGS84 Datum): Crook County
T. 15 S., R. 16 E., Sec. 4
Stearns: Lat. 44° 18' 00.5772"N, Long. 120° 48' 45.2717"W
Barney: Lat. 44° 18' 05.4417"N, Long. 120° 48' 41.9861"W



USGS Prineville & Ochoco Reservoir, OR Quadrangles (part sections) 7.5' Series (Topographic)

Figure 1-B. City of Prineville
4th St. Deep Well
Drinking Water Protection Area



2000 0 2000 4000 6000 8000 10000 Feet

Scale 1: 36,000

Drinking Water Protection Area (DWPA)
1, 2, 5, and 10 Year Time of Travel (TOT)
Analytic Element Method

Well Location (WGS84 Datum): Crook County
T. 15 S., R. 16 E., Sec. 5
Lat. 44° 17' 55.5456"N,
Long. 120° 50' 44.1032"W

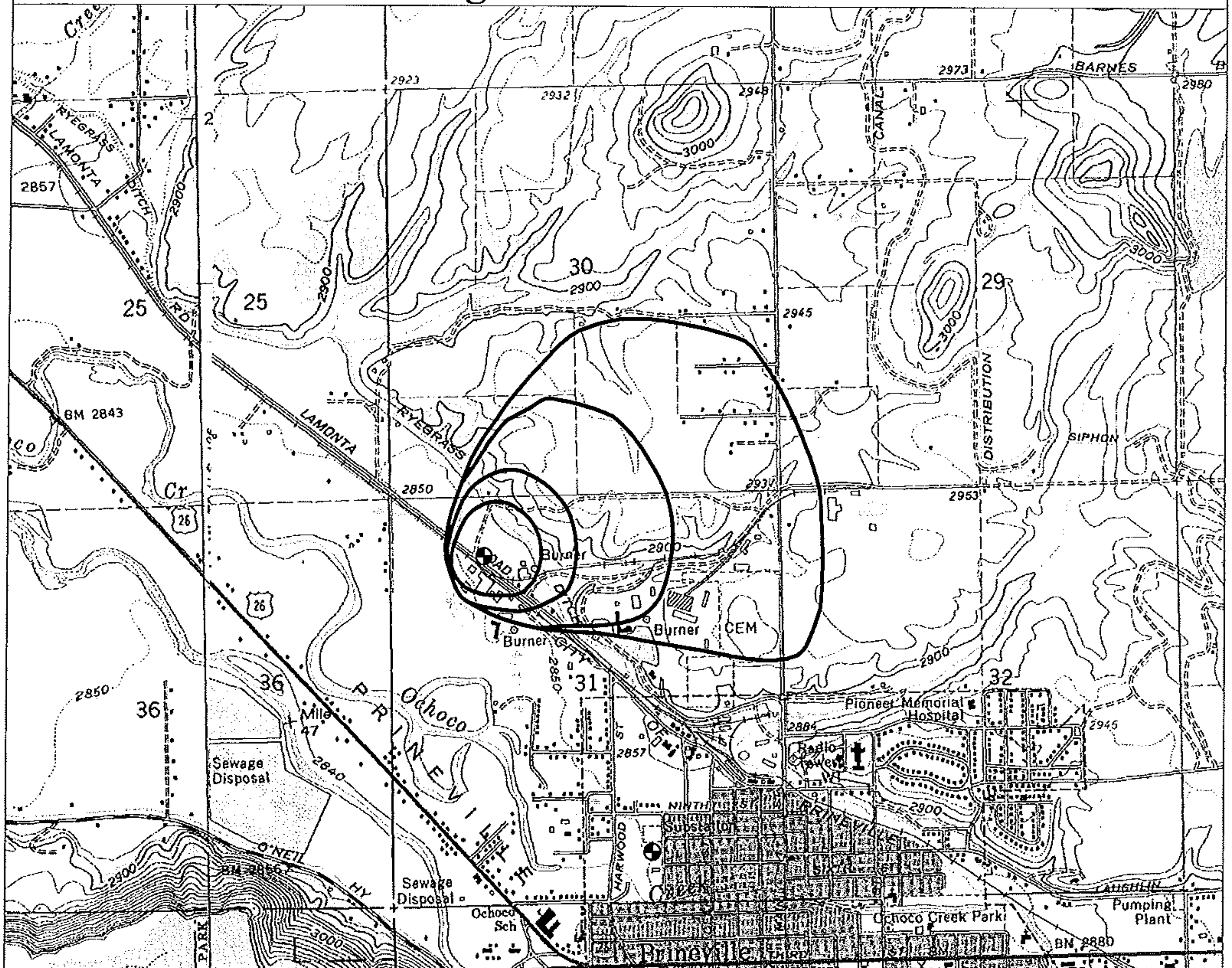
Model Parameters
Production Interval (ft): 265
Effective Porosity: 0.09
Hydraulic Conductivity (ft/day): 90
Usage (gal/day): 360,371

N

Prepared by: TP
Project Manager: TP RG# G-1874
PWS#: 4100682 File#: PRI100

USGS Prineville, OR Quadrangle (part section) 7.5' Series (Topographic)

Figure 1-C. City of Prineville
Lamonta Well
Drinking Water Protection Area



2000 0 2000 4000 6000 Feet

Scale 1: 24,000

Drinking Water Protection Area (DWPA)
1, 2, 5, and 10 Year Time of Travel (TOT)
Analytic Element Method

Well Location (WGS84 Datum): Crook County
T. 14 S., R. 16 E., Sec. 31
Lat. 44° 19' 02.7392"N,
Long. 120° 51' 43.1735"W

Model Parameters
Production Interval (ft): 265
Effective Porosity: 0.09
Hydraulic Conductivity (ft/day): 90
Usage (gal/day): 221,303

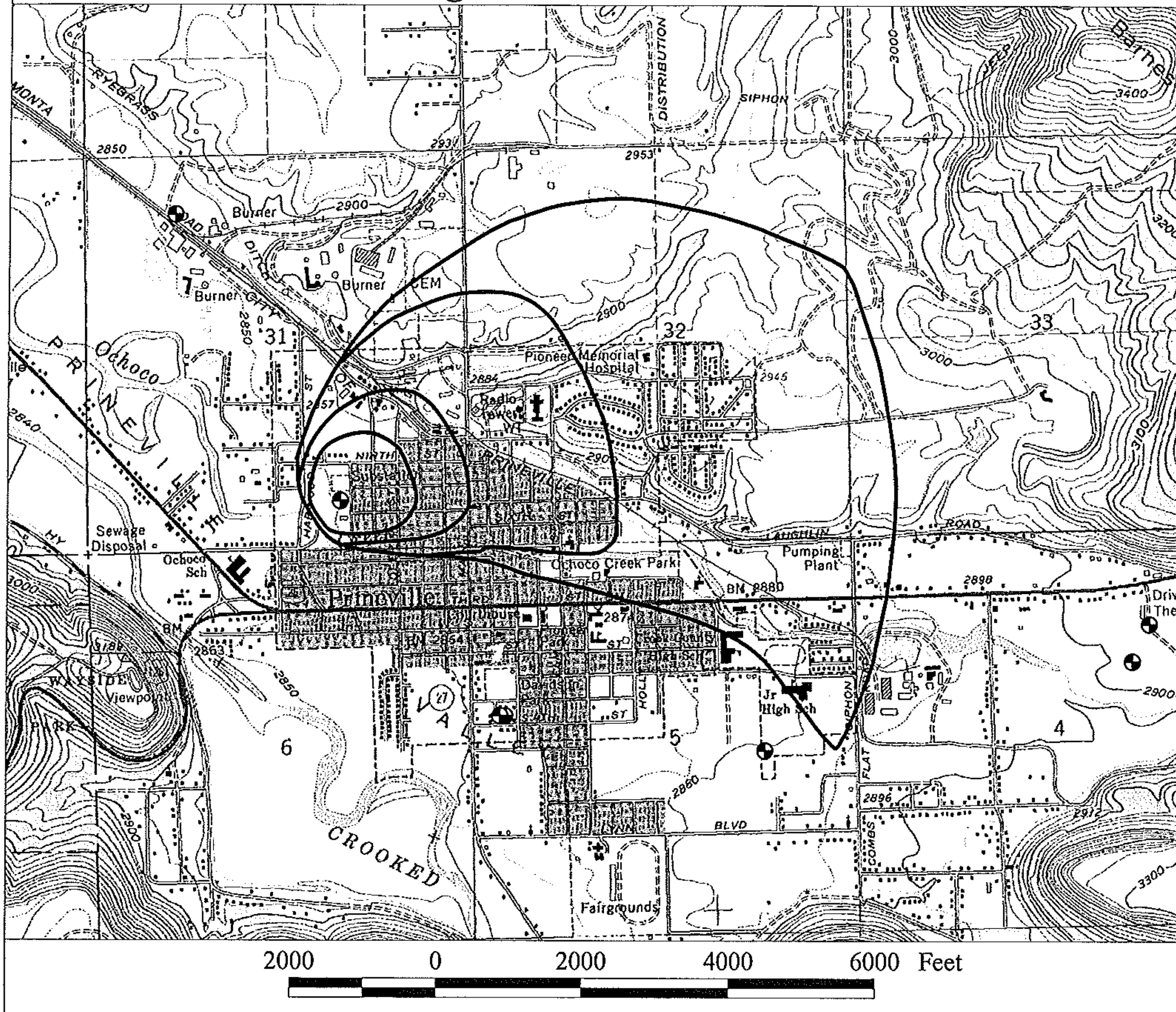
QUADRANGLE LOCATION

N

Prepared by: TP
Project Manager: TP RG# G-1874
PWS#: 4100682 File#: PRI100

USGS Prineville, OR Quadrangle (part section) 7.5' Series (Topographic)

Figure 1-D. City of Prineville
Yancey Well
Drinking Water Protection Area



Scale 1: 24,000

Drinking Water Protection Area (DWPA)
1, 2, 5, and 10 Year Time of Travel (TOT)
Analytic Element Method

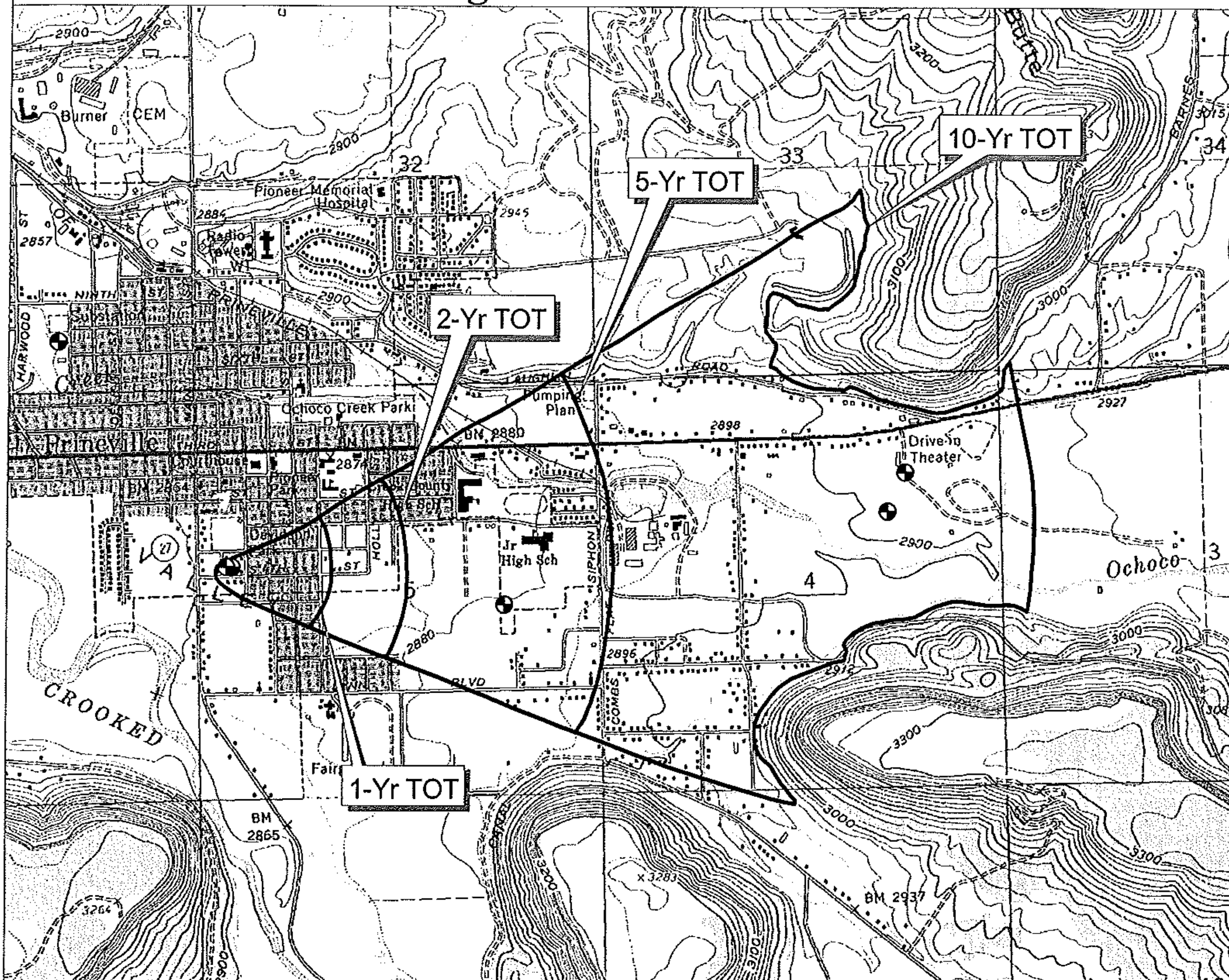
Well Location (WGS84 Datum): Crook County
T. 14 S., R. 16 E., Sec. 31
Lat. 44° 18' 24.5060"N,
Long. 120° 51' 13.3495"W

Model Parameters
Production Interval (ft): 265
Effective Porosity: 0.09
Hydraulic Conductivity (ft/day): 90
Usage (gal/day): 313,098

Prepared by: TP
Project Manager: TP RG# G-1874
PWS#: 4100682 File#: PRI100

USGS Prineville, OR Quadrangle (part section) 7.5' Series (Topographic)

Figure 1-E. City of Prineville
4th St. Shallow Well
Drinking Water Protection Area



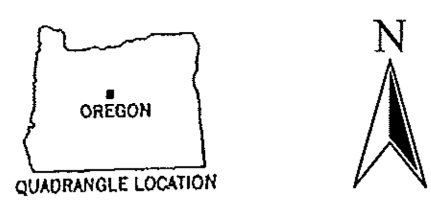
Scale 1: 24,000

Drinking Water Protection Area (DWPA)
1, 2, 5, and 10 Year Time of Travel (TOT)
Analyitic Element Method

Well Location (WGS84 Datum): Crook County
T. 15 S., R. 16 E., Sec. 5
Lat. 44° 17' 55.4982"N,
Long. 120° 50' 43.1391"W

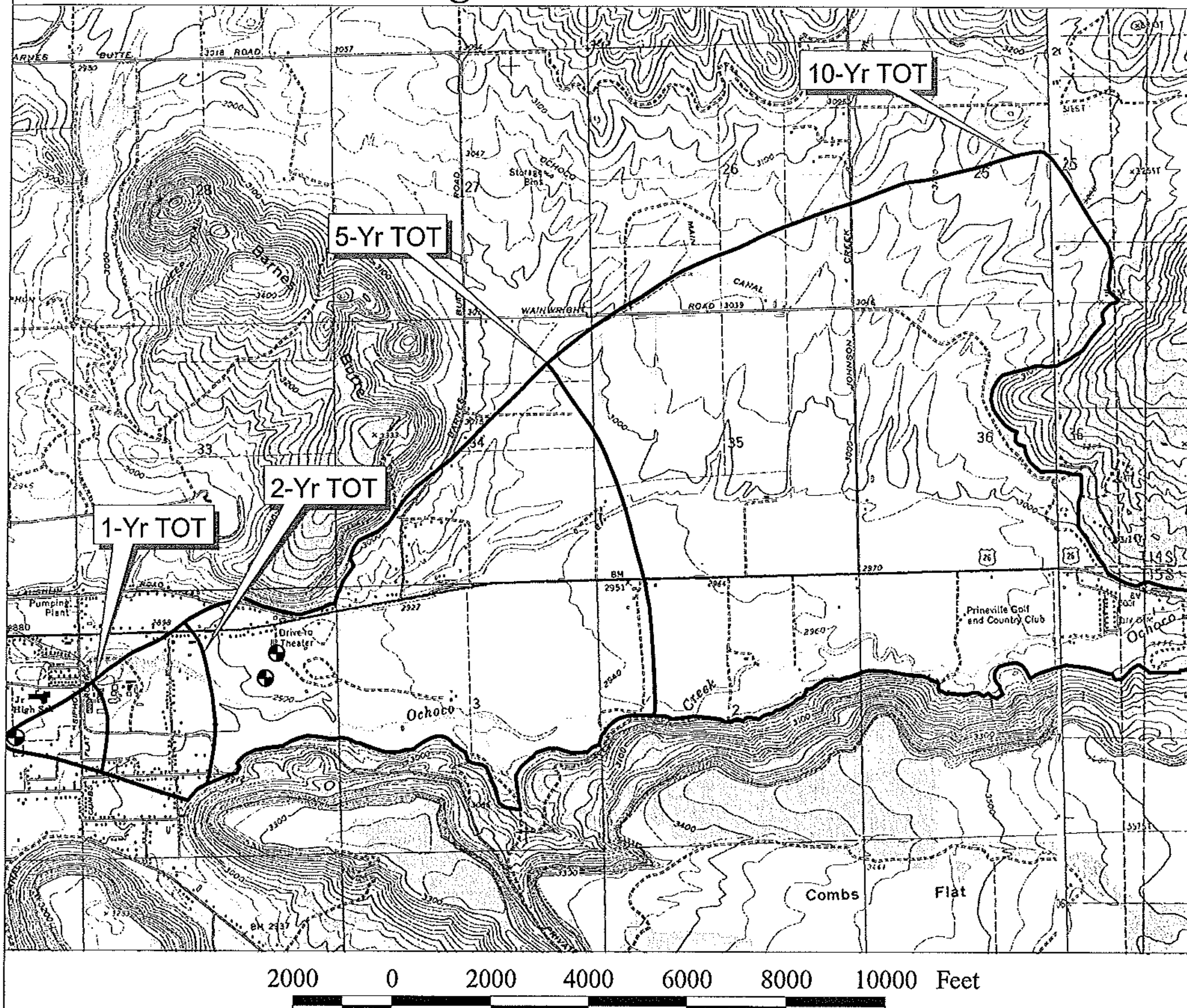
Model Parameters
Production Interval (ft): 29
Effective Porosity: 0.12
Hydraulic Conductivity (ft/day): 72
Usage (gal/day): 23,547

Prepared by: TP
Project Manager: TP RG# G-1874
PWS#: 4100682 File#: PRI100



USGS Prineville, OR Quadrangle (part section) 7.5' Series (Topographic)

Figure 1-F. City of Prineville
Stadium Well
Drinking Water Protection Area

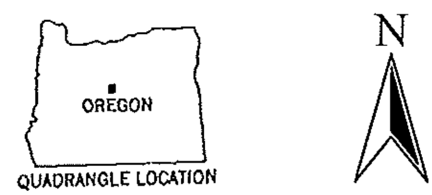


Scale 1: 36,000

Drinking Water Protection Area (DWPA)
1, 2, 5, and 10 Year Time of Travel (TOT)
Analytical Element Method

Well Location (WGS84 Datum): Crook County
T. 15 S., R. 16 E., Sec. 5
Lat. 44° 17' 50.0428"N,
Long. 120° 49' 54.4931"W

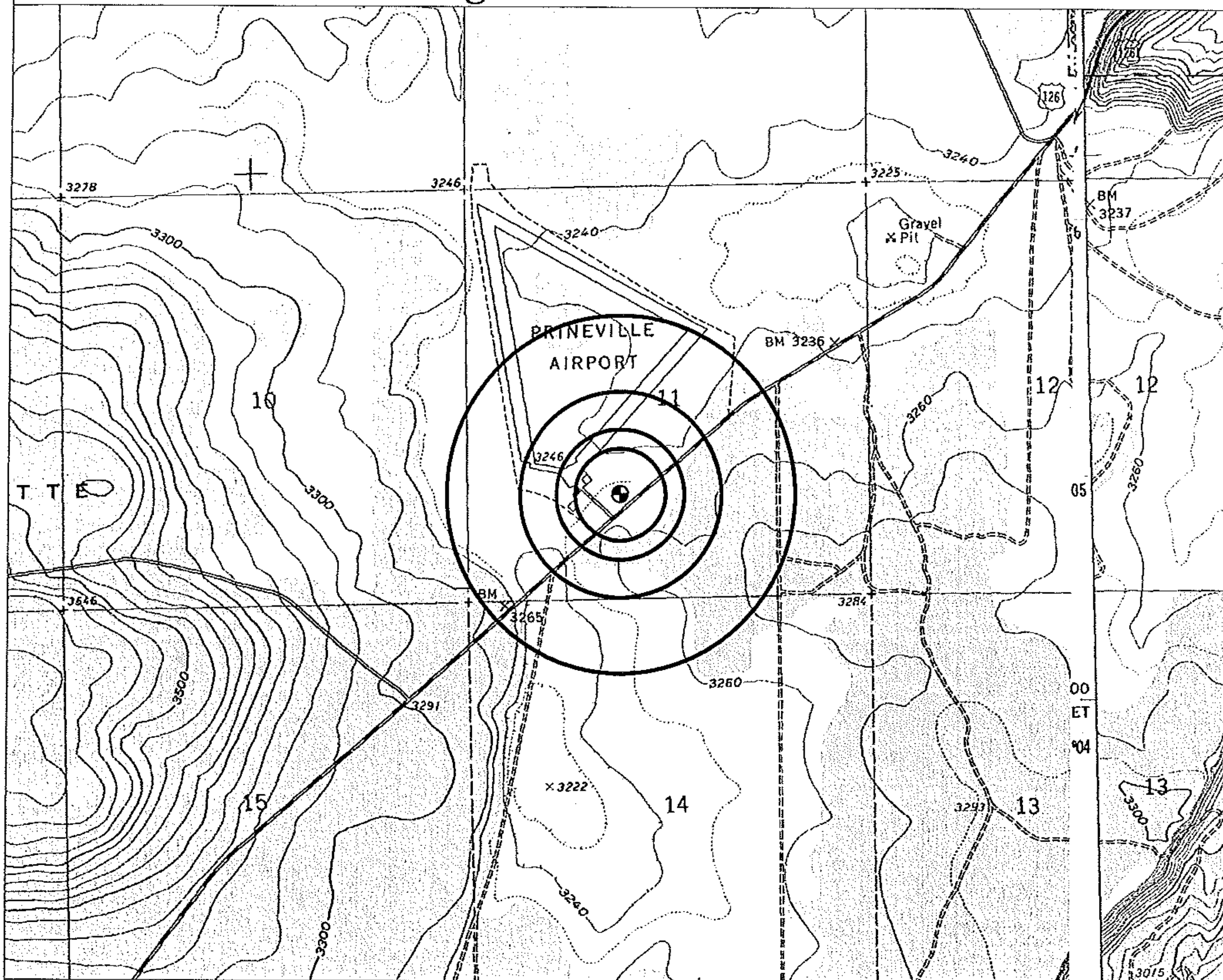
Model Parameters
Production Interval (ft): 265
Effective Porosity: 0.09
Hydraulic Conductivity (ft/day): 90
Usage (gal/day): 48,014



Prepared by: TP
Project Manager: TP RG# G-1874
PWS#: 4100682 File#: PRI100

USGS Prineville & Ochoco Reservoir, OR Quadrangles (part sections) 7.5' Series (Topographic)

Figure 1-G. City of Prineville Airport Well Drinking Water Protection Area



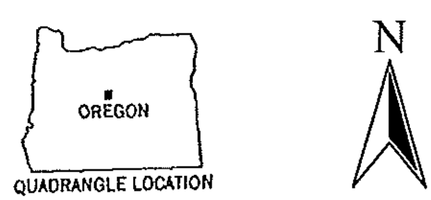
2000 0 2000 4000 6000 Feet

Scale 1: 24,000

Drinking Water Protection Area (DWPA)
1, 2, 5, and 15 Year Time of Travel (TOT)
CFR Method

Well Location (WGS84 Datum): Crook County
T. 15 S., R. 15 E., Sec. 11
Lat. 44° 16' 47.8172"N,
Long. 120° 53' 58.3027"W

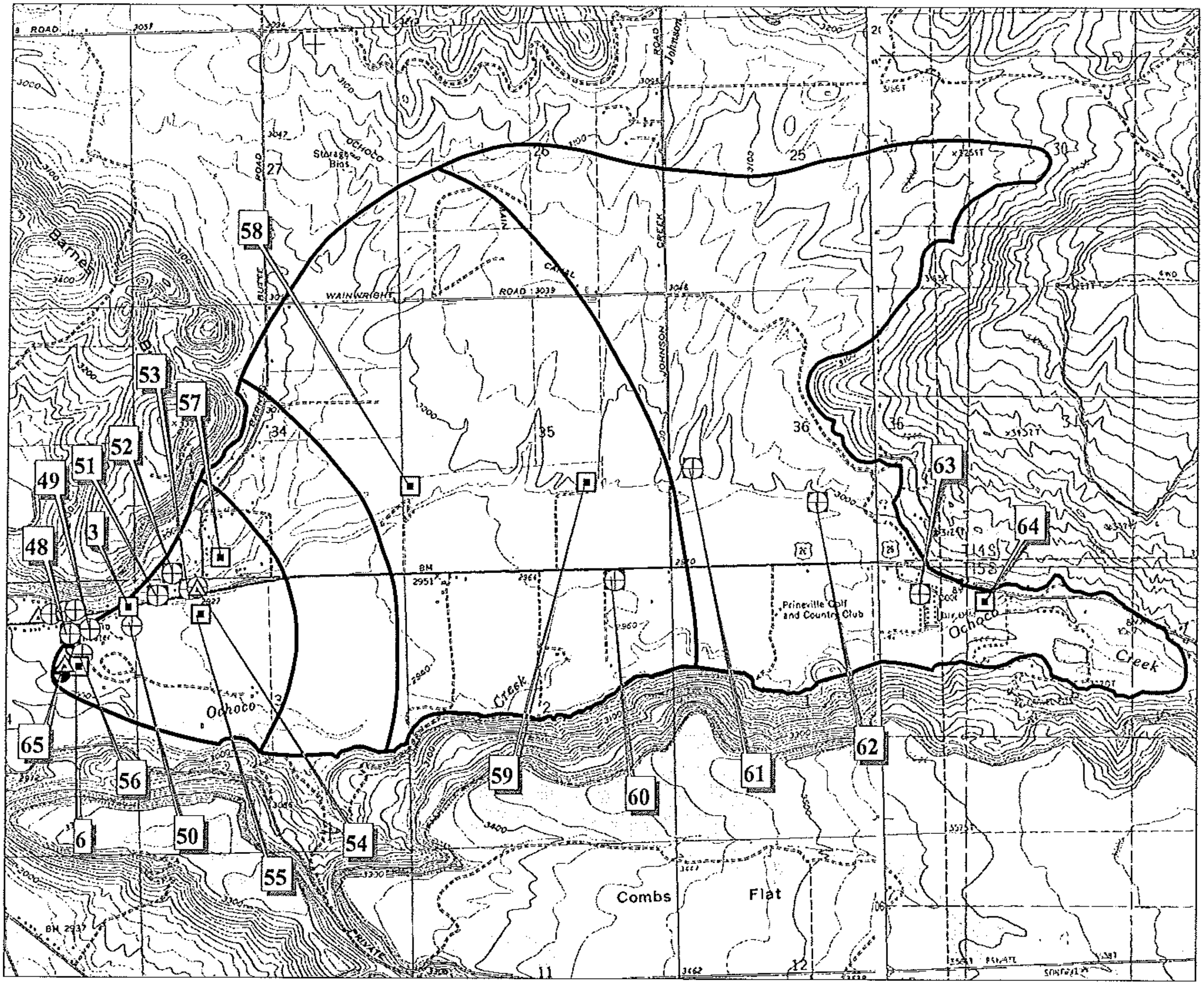
Model Parameters
Production Interval (ft): 27
Effective Porosity: 0.25
Usage (gal/day): 151,021



Prepared by: TP
Project Manager: TP RG# G-1874
PWS#: 4100682 File#: PRI100

USGS Houston Lake & Prineville, OR Quadrangles (part sections) 7.5' Series (Topographic)

Figure 2-A. City of Prineville
Stearns & Barney Wells
Potential Contaminant Sources



2000 0 2000 4000 6000 8000 10000 Feet

Scale 1: 36,000

USGS Prineville & Ochoco Reservoir, OR Quadrangles (part sections) 7.5' Series (Topographic)

Drinking Water Protection Area (DWPA)
1, 2, 5, and 10 Year Time of Travel (TOT)
Analytic Element Method
Potential Contaminant Sources

⊕ **Higher Relative Risk**

▣ **Moderate Relative Risk**

△ **Low Relative Risk**

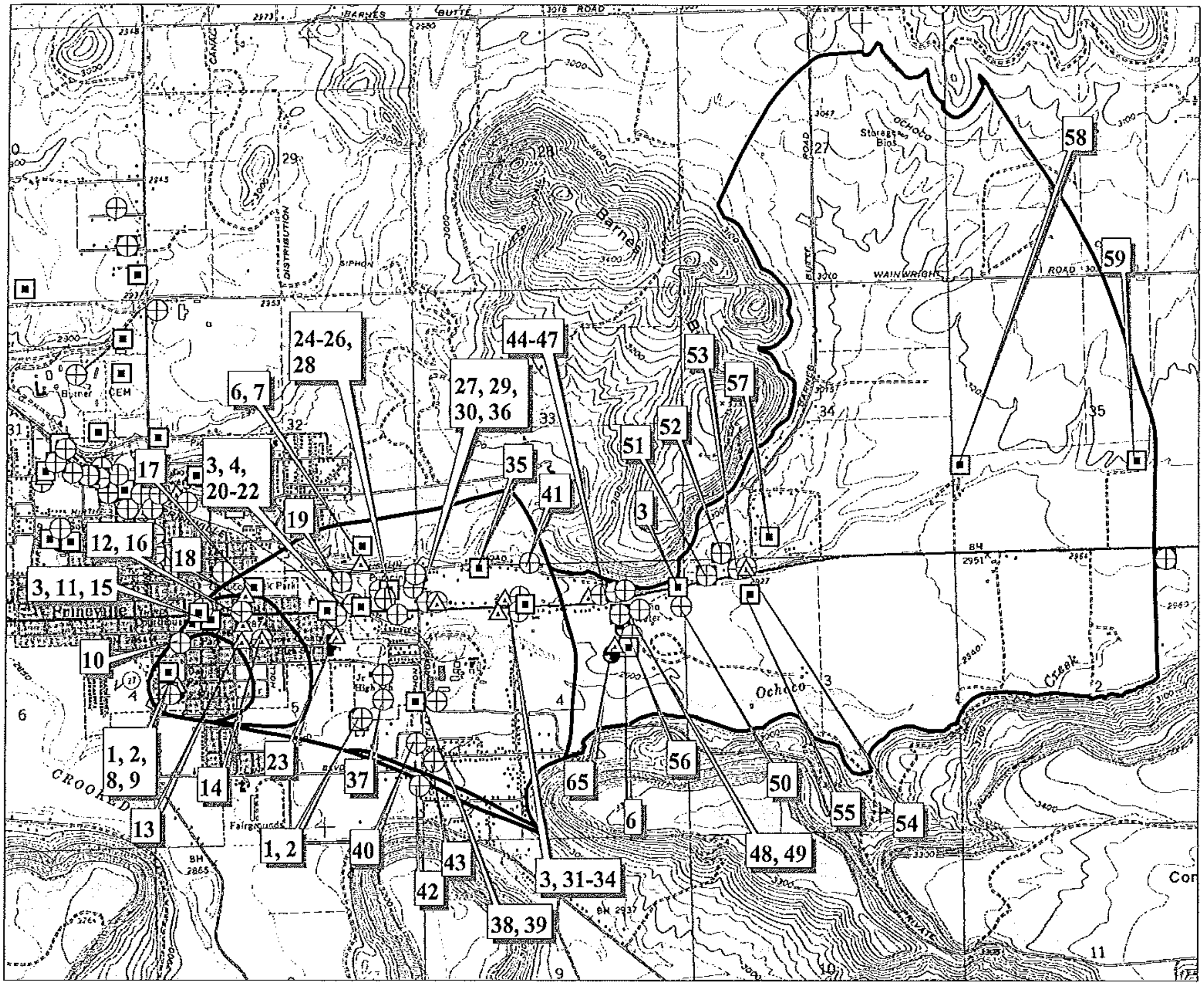
Well Location (WGS84 Datum): Crook County
T. 15 S., R. 16 E., Sec. 4
Stearns: Lat. 44° 18' 00.5772"N, Long. 120° 48' 45.2717"W
Barney: Lat. 44° 18' 05.4417"N, Long. 120° 48' 41.9861"W

N

Prepared by: KK 06/27/2005
Project Manager: TP RG# G-1874
PWS#: 4100682

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 managed properly. Numbers indicate potential contaminant sources outlined in Table 2 in the Appendix.

Figure 2-B. City of Prineville
4th St. Deep Well
Potential Contaminant Sources



2000 0 2000 4000 6000 8000 10000 Feet

Scale 1: 36,000

USGS Prineville & Ochoco Reservoir, OR
Quadrangles (part sections)
7.5' Series (Topographic)

N

Drinking Water Protection Area (DWPA)
1, 2, 5, and 10 Year Time of Travel (TOT)
Analytic Element Method

Potential Contaminant Sources

⊕ **Higher Relative Risk**

▣ **Moderate Relative Risk**

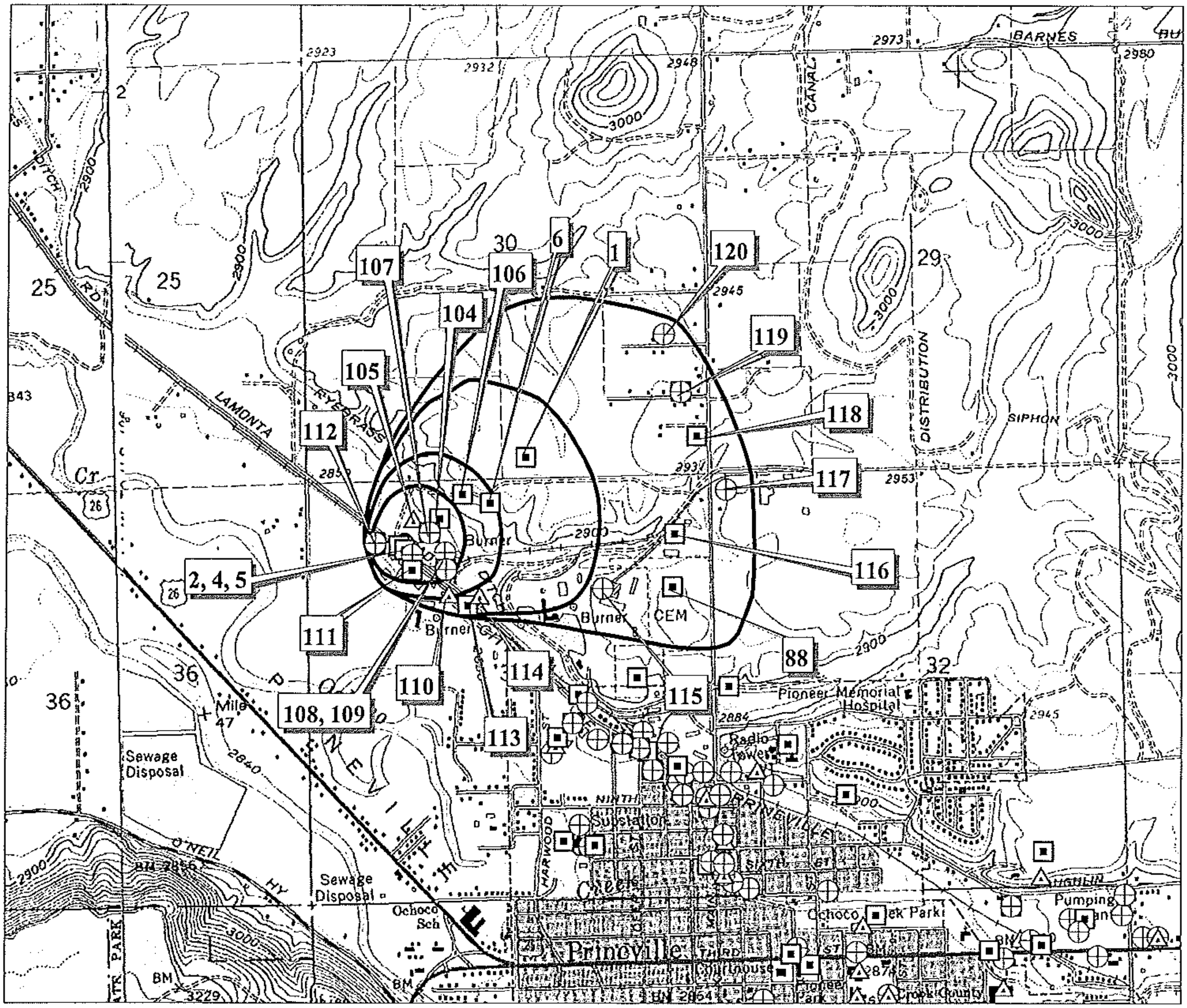
△ **Low Relative Risk**

Well Location (WGS84 Datum): Crook County
T. 15 S., R. 16 E., Sec. 5
Lat. 44° 17' 55.5456"N,
Long. 120° 50' 44.1032"W

Prepared by: KK 06/27/2005
Project Manager: TP RG# G-1874
PWS#: 4100682

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 managed properly. Numbers indicate potential contaminant sources outlined in Table 2 in the Appendix.

Figure 2-C. City of Prineville
Lamonta Well
Potential Contaminant Sources



2000 0 2000 4000 6000 Feet

Scale 1: 24,000

USGS Prineville, OR Quadrangle
(part section) 7.5' Series (Topographic)

N

Drinking Water Protection Area (DWPA)
1, 2, 5, and 10 Year Time of Travel (TOT)
Analytic Element Method

Potential Contaminant Sources

⊕ **Higher Relative Risk**

▣ **Moderate Relative Risk**

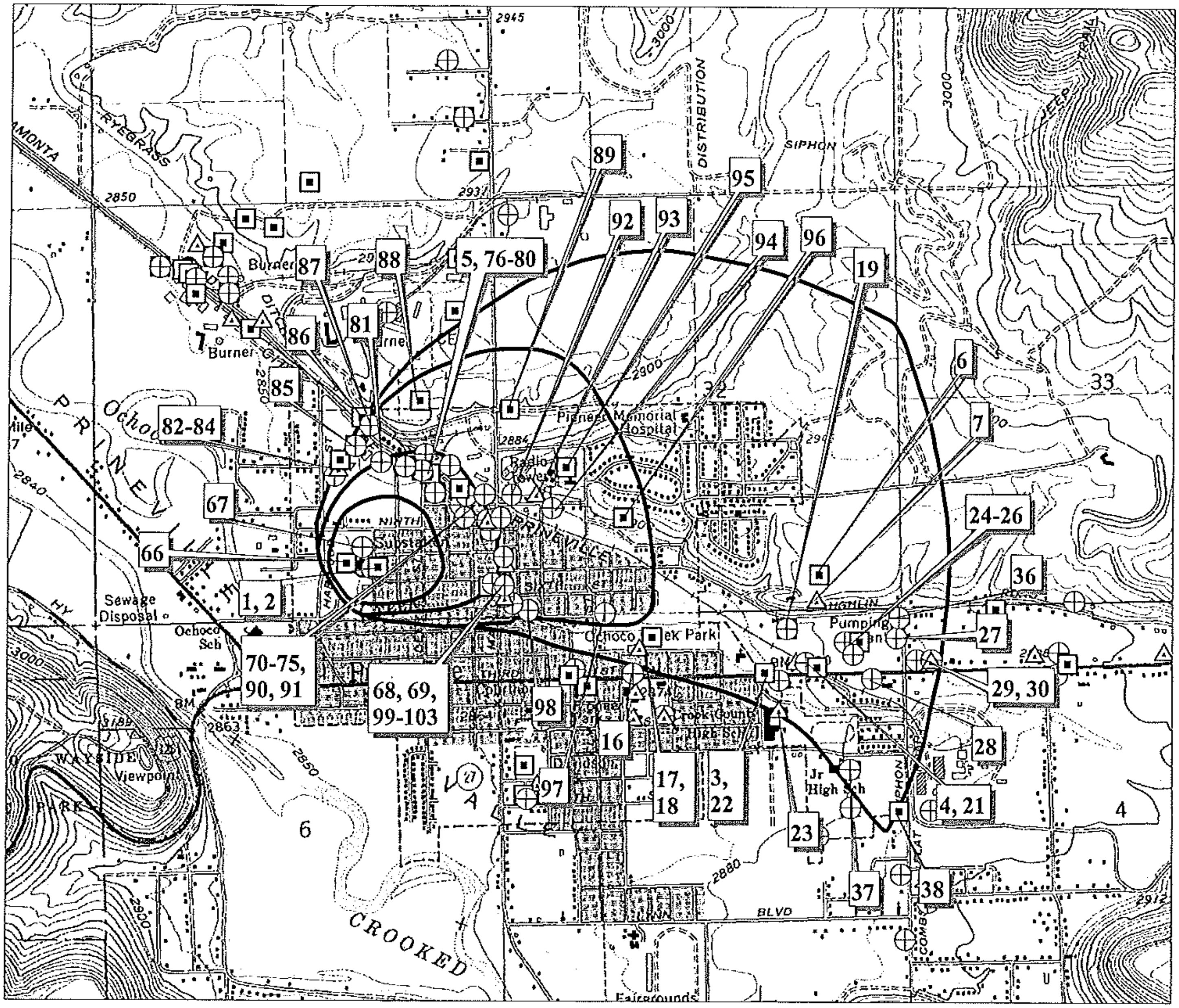
△ **Low Relative Risk**

Well Location (WGS84 Datum): Crook County
T. 14 S., R. 16 E., Sec. 31
Lat. 44° 19' 02.7392"N,
Long. 120° 51' 43.1735"W

Prepared by: KK 06/27/2005
Project Manager: TP RG# G-1874
PWS#: 4100682

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 managed properly. Numbers indicate potential contaminant sources outlined in Table 2 in the Appendix.

Figure 2-D. City of Prineville
Yancey Well
Potential Contaminant Sources



2000 0 2000 4000 6000 Feet

Scale 1: 24,000

USGS Prineville, OR Quadrangle
(part section) 7.5' Series (Topographic)

N

Drinking Water Protection Area (DWPA)
1, 2, 5, and 10 Year Time of Travel (TOT)
Analytic Element Method

Potential Contaminant Sources

⊕ **Higher Relative Risk**

▣ **Moderate Relative Risk**

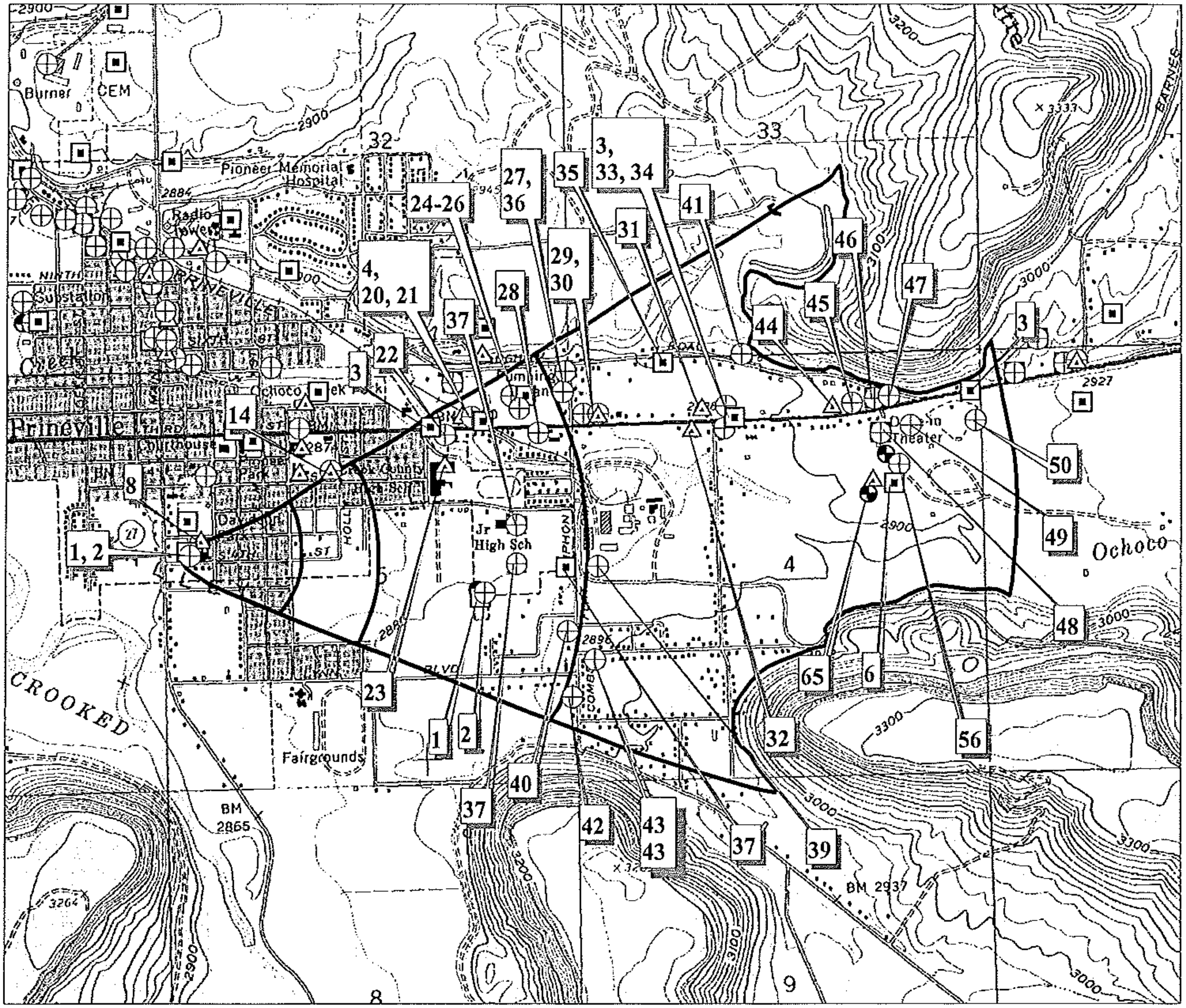
△ **Low Relative Risk**

Well Location (WGS84 Datum): Crook County
T. 14 S., R. 16 E., Sec. 31
Lat. 44° 18' 24.5060"N,
Long. 120° 51' 13.3495"W

Prepared by: KK 06/27/2005
Project Manager: TP RG# G-1874
PWS#: 4100682

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 managed properly. Numbers indicate potential contaminant sources outlined in Table 2 in the Appendix.

Figure 2-E. City of Prineville
4th St. Shallow Well
Potential Contaminant Sources



2000 0 2000 4000 6000 Feet

Scale 1: 24,000

USGS Prineville, OR Quadrangle
(part section) 7.5' Series (Topographic)

Drinking Water Protection Area (DWPA)
1, 2, 5, and 10 Year Time of Travel (TOT)
Analyitic Element Method

Potential Contaminant Sources

- ⊕ **Higher Relative Risk**
- ▣ **Moderate Relative Risk**
- △ **Low Relative Risk**

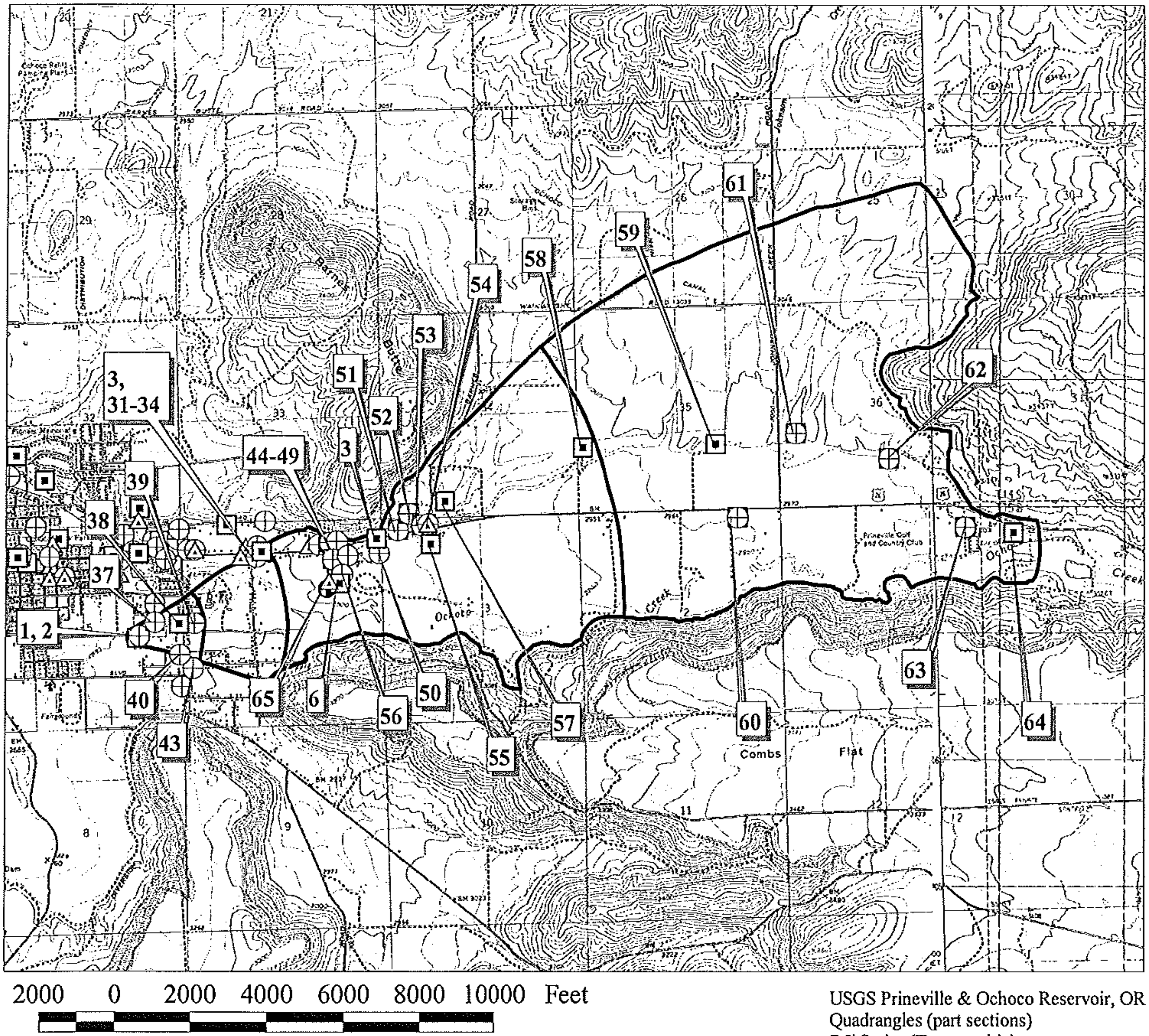
Well Location (WGS84 Datum): Crook County
T. 15 S., R. 16 E., Sec. 5
Lat. 44° 17' 55.4982"N,
Long. 120° 50' 43.1391"W

N

Prepared by: KK 06/27/2005
Project Manager: TP RG# G-1874
PWS#: 4100682

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 managed properly. Numbers indicate potential contaminant sources outlined in Table 2 in the Appendix.

Figure 2-F. City of Prineville
Stadium Well
Potential Contaminant Sources



USGS Prineville & Ochoco Reservoir, OR
Quadrangles (part sections)
7.5' Series (Topographic)

N

Drinking Water Protection Area (DWPA)
1, 2, 5, and 10 Year Time of Travel (TOT)
Analytical Element Method

Potential Contaminant Sources

⊕ **Higher Relative Risk**

▣ **Moderate Relative Risk**

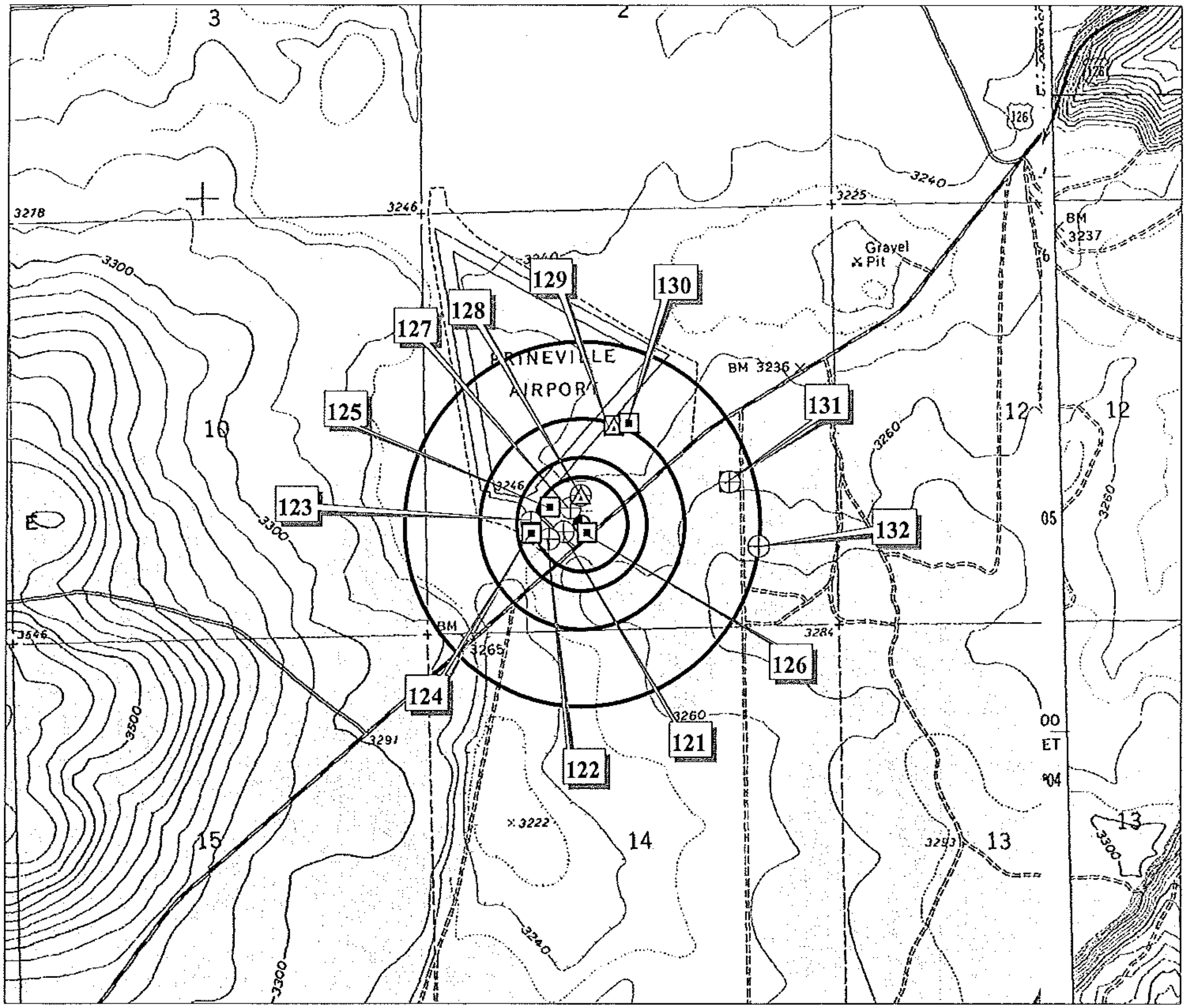
△ **Low Relative Risk**

Well Location (WGS84 Datum): Crook County
T. 15 S., R. 16 E., Sec. 5
Lat. 44° 17' 50.0428"N,
Long. 120° 49' 54.4931"W

Prepared by: KK 06/27/2005
Project Manager: TP RG# G-1874
PWS#: 4100682

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 managed properly. Numbers indicate potential contaminant sources outlined in Table 2 in the Appendix.

Figure 2-G. City of Prineville
Airport Well
Potential Contaminant Sources



2000 0 2000 4000 6000 Feet

Scale 1: 24,000

USGS Houston Lake & Prineville, OR
Quadrangles (part sections)
7.5' Series (Topographic)

N

Drinking Water Protection Area (DWPA)
1, 2, 5, and 15 Year Time of Travel (TOT)
CFR Method
Potential Contaminant Sources

Well Location (WGS84 Datum): Crook County
T. 15 S., R. 15 E., Sec. 11
Lat. 44° 16' 47.8172"N,
Long. 120° 53' 58.3027"W

⊕ **Higher Relative Risk**

▣ **Moderate Relative Risk**

△ **Low Relative Risk**

Prepared by: KK 06/27/2005
Project Manager: TP RG# G-1874
PWS#: 4100682

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 managed properly. Numbers indicate potential contaminant sources outlined in Table 2 in the Appendix.

APPENDIX - INVENTORY OF POTENTIAL CONTAMINANT SOURCES
PRINEVILLE, CITY OF - PWS # 4100682
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 Sue Gries Oregon DEQ on 5/10/2005.

Information from applicable state and federal regulatory databases is current as of 9/27/2004.

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 # 4100682 PRINEVILLE, CITY OF

Residential/Municipal Land Uses

Potential Contamination Source	Notes	Relative Risk Level	Total in DWPA
Airport - Maintenance/Fueling Area		Higher	3
Apartments and Condominiums		Lower	1
Campgrounds/RV Parks	(1)	Lower	2
Cemeteries - Pre-1945		Moderate	2
Drinking Water Treatment Plants		Moderate	0
Fire Station		Lower	0
Fire Training Facilities		Moderate	0
Golf Courses		Moderate	0
Housing - High Density (> 1 House/0.5 acres)		Moderate	5
Landfill/Dumps	(1)	Higher	0
Lawn Care - Highly Maintained Areas		Moderate	0
Motor Pools		Moderate	0
Parks		Moderate	5
Railroad Yards/Maintenance/Fueling Areas		Higher	0
Schools		Lower	6
Septic Systems - High Density (> 1 system/acre)	(1)	Higher	1
Sewer Lines - Close Proximity to PWS	(1)	Higher	4
Utility Stations - Maintenance Transformer Storage		Higher	2
Waste Transfer/Recycling Stations	(1)	Moderate	1
Wastewater Treatment Plants/Collection Stations	(1)	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 # 4100682 PRINEVILLE, CITY OF

Commercial/Industrial Land Uses

Potential Contamination Source	Notes	Relative Risk Level	Total in DWPA
Automobiles - Body Shops		Higher	4
Automobiles - Car Washes		Moderate	1
Automobiles - Gas Stations		Higher	7
Automobiles - Repair Shops		Higher	15
Boat Services/Repair/Refinishing		Higher	0
Cement/Concrete Plants		Moderate	1
Chemical/Petroleum Processing/Storage		Higher	8
Dry Cleaners		Higher	2
Electrical/Electronic Manufacturing		Higher	0
Fleet/Trucking/Bus Terminals		Higher	15
Food Processing		Moderate	0
Furniture/Lumber/Parts Stores		Moderate	2
Home Manufacturing		Higher	0
Junk/Scrap/Salvage Yards		Higher	3
Machine Shops		Higher	0
Medical/Vet Offices	(1)	Moderate	4
Metal Plating/Finishing/Fabrication		Higher	0
Mines/Gravel Pits		Higher	0
Office Buildings/Complexes		Lower	0
Parking Lots/Malls (> 50 Spaces)		Higher	3
Photo Processing/Printing		Higher	1
Plastics/Synthetics Producer		Higher	0
Research Laboratories		Higher	0
RV/Mini Storage		Lower	8
Wood Preserving/Treating		Higher	1
Wood/Pulp/Paper Processing and Mills		Higher	3
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 # 4100682 PRINEVILLE, CITY OF

Agricultural/Forest Land Uses

Potential Contamination Source	Notes	Relative Risk Level	Total in DWPA
Auction Lots	(1)	Higher	0
Boarding Stables	(1)	Moderate	1
Confined Animal Feeding Operations (CAFOs)	(1)	Higher	3
Crops - Irrigated (inc. orchards, vineyards, nurseries, greenhouses)	(2)	Moderate	4
Crops - Nonirrigated (inc. Christmas trees, grains, grass seed, pasture)		Lower	1
Farm Machinery Repair		Higher	0
Grazing Animals (> 5 large animals or equivalent/acre)	(1)	Moderate	1
Lagoons/Liquid Wastes	(1)	Higher	0
Land Application Sites	(1)	Moderate	0
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: - Irrigation canal/ditch		Moderate	1

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 # 4100682 PRINEVILLE, CITY OF

Miscellaneous Land Uses

Potential Contamination Source	Notes	Relative Risk Level	Total in DWPA
Above Ground Storage Tanks - Excluding Water		Moderate	24
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	4
Homesteads - Rural - Septic Systems (< 1/acre)	(1)(3)	Lower	1
Injection/Dry Wells, Sumps - Class V UICs	(1)	Higher	3
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	7
Transportation - Railroads		Moderate	3
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	3
UST - Decommissioned/Inactive		Lower	4
UST - Nonregulated Tanks (< 1,100 gals or Large Heating Oil Tanks)		Higher	0
UST - Not Upgraded and/or Registered Tanks		Higher	1
UST - Upgraded/Registered - Active		Lower	2
UST - Status Unknown		Higher	6
Upstream Reservoirs/Dams		Lower	0
Wells/Abandoned Wells		Higher	1
Large Capacity Septic Systems (serves > 20 people) - Class V UICs	(1)	Higher	0
Construction/Demolition Areas		Moderate	0
Other: - Industrial Facility		Higher	1
Other: - State cleanup site (ECSI)		Higher	7

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 # 4100682 PRINEVILLE, CITY OF

Other: - Unknown operation	Moderate	5
Other: - Warehouse	Moderate	1

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# 4100682 PRINEVILLE, CITY OF

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
1	Housing - High Density (> 1 House/0.5 acres)	High-density housing area(s)	Throughout DWPA	Prineville	Field-Observation	Within the 2-yr TOT for S. 4th St. Deep Well	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.	
	Housing - High Density (> 1 House/0.5 acres)					Within the 2-yr TOT for S. 4th St. Shallow Well	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.	
	Housing - High Density (> 1 House/0.5 acres)					Between 2-yr and 5-yr TOT for Lamonta Well	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.	
	Housing - High Density (> 1 House/0.5 acres)					Within the 2-yr TOT for Stadium Well	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.	
	Housing - High Density (> 1 House/0.5 acres)					Within the 2-yr TOT for Yancy Well	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.	

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# 4100682 PRINEVILLE, CITY OF

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
2	Sewer Lines - Close Proximity to PWS	Sewer lines	Throughout DWPA	Prineville	Interview	Within the 2-yr TOT for S. 4th St. Deep Well	Higher	If not properly designed, installed, and maintained, sewer lines can impact drinking water, especially adjacent to a waterbody or within the 2-year time-of-travel zone for drinking water wells.	One area in east part of town is unsewered. PWS contact indicates Prineville is working on getting this area sewered.
	Sewer Lines - Close Proximity to PWS					Within the 2-yr TOT for Stadium Well	Higher	If not properly designed, installed, and maintained, sewer lines can impact drinking water, especially adjacent to a waterbody or within the 2-year time-of-travel zone for drinking water wells.	
	Sewer Lines - Close Proximity to PWS					Within the 2-yr TOT for Yancy Well	Higher	If not properly designed, installed, and maintained, sewer lines can impact drinking water, especially adjacent to a waterbody or within the 2-year time-of-travel zone for drinking water wells.	
	Sewer Lines - Close Proximity to PWS					Within the 2-yr TOT for S. 4th St. Shallow Well	Higher	If not properly designed, installed, and maintained, sewer lines can impact drinking water, especially adjacent to a waterbody or within the 2-year time-of-travel zone for drinking water wells.	One area in east part of town is unsewered. PWS contact indicates Prineville is working on getting this area sewered.
	Sewer Lines - Close Proximity to PWS					Within the 2-yr TOT for Lamonta Well	Higher	If not properly designed, installed, and maintained, sewer lines can impact drinking water, especially adjacent to a waterbody or within the 2-year time-of-travel zone for drinking water wells.	

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# 4100682 PRINEVILLE, CITY OF

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
3	Transportation - Freeways/State Highways/Other Heavy Use Roads	3rd Street/Ochoco Highway/Highway 26	Runs through DWPA	Prineville	Field-Observation	Within the 2-yr TOT for Barney Well	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.	
	Transportation - Freeways/State Highways/Other Heavy Use Roads					Within the 2-yr TOT for Stadium Well	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.	
	Transportation - Freeways/State Highways/Other Heavy Use Roads					Within the 2-yr TOT for Stearns Well	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.	
	Transportation - Freeways/State Highways/Other Heavy Use Roads					Between 5-yr and 10-yr TOT for Yancy Well	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.	
	Transportation - Freeways/State Highways/Other Heavy Use Roads					Between 2-yr and 5-yr TOT for S. 4th St. Shallow Well	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.	
	Transportation - Freeways/State Highways/Other Heavy Use Roads					Within the 2-yr TOT for S. 4th St. Deep Well	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.	

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# 4100682 PRINEVILLE, CITY OF

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
4	Transportation - Railroads	Railroad	Runs through DWPA	Prineville	Field-Observation	Between 2-yr and 5-yr TOT for S. 4th St. Shallow Well	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.	
	Transportation - Railroads					Between 2-yr and 5-yr TOT for S. 4th St. Deep Well	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.	
	Transportation - Railroads					Within the 2-yr TOT for Lamonta Well	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.	
5	Transportation - Freeways/State Highways/Other Heavy Use Roads	Lamonta Road	Runs through DWPA	Prineville	Field-Observation	Within the 2-yr TOT for Yancy Well	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.	
	Transportation - Freeways/State Highways/Other Heavy Use Roads					Within the 2-yr TOT for Lamonta Well	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.	

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# 4100682 PRINEVILLE, CITY OF

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
6	Crops - Irrigated (inc. orchards, vineyards, nurseries, greenhouses)	Irrigated crop area(s)	Throughout DWPA	Prineville	Field-Observation	Between 2-yr and 5-yr TOT for S. 4th St. Deep Well	Moderate	Over-application or improper handling of pesticides/fertilizers may impact drinking water. Excessive irrigation may transport contaminants or sediments to groundwater/surface water through runoff. Drip-irrigated crops are considered to be a low risk.	Location and type of use based on WRD database - needs verification.
	Crops - Irrigated (inc. orchards, vineyards, nurseries, greenhouses)					Within the 2-yr TOT for Lamonta Well	Moderate	Over-application or improper handling of pesticides/fertilizers may impact drinking water. Excessive irrigation may transport contaminants or sediments to groundwater/surface water through runoff. Drip-irrigated crops are considered to be a low risk.	Location and type of use based on WRD database - needs verification.
	Crops - Irrigated (inc. orchards, vineyards, nurseries, greenhouses)					Within the 2-yr TOT for Stearns Well	Moderate	Over-application or improper handling of pesticides/fertilizers may impact drinking water. Excessive irrigation may transport contaminants or sediments to groundwater/surface water through runoff. Drip-irrigated crops are considered to be a low risk.	Location and type of use based on WRD database - needs verification.
	Crops - Irrigated (inc. orchards, vineyards, nurseries, greenhouses)					Within the 2-yr TOT for Barney Well	Moderate	Over-application or improper handling of pesticides/fertilizers may impact drinking water. Excessive irrigation may transport contaminants or sediments to groundwater/surface water through runoff. Drip-irrigated crops are considered to be a low risk.	Location and type of use based on WRD database - needs verification.
	Crops - Irrigated (inc. orchards, vineyards, nurseries, greenhouses)					Between 5-yr and 10-yr TOT for Yancy Well	Moderate	Over-application or improper handling of pesticides/fertilizers may impact drinking water. Excessive irrigation may transport contaminants or sediments to groundwater/surface water through runoff. Drip-irrigated crops are considered to be a low risk.	Location and type of use based on WRD database - needs verification.

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# 4100682 PRINEVILLE, CITY OF

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
7	Crops - Nonirrigated (inc. Christmas trees, grains, grass seed, pasture)	Non-irrigated crop area(s)	Throughout DWPA	Prineville	Field-Observation	Between 5-yr and 10-yr TOT for Yancy Well	Lower	Over-application or improper handling of pesticides/fertilizers may impact drinking water. Some agricultural practices may result in excess sediments discharging to surface waters, but non-irrigated crops are generally considered to be a low risk.	
	Crops - Nonirrigated (inc. Christmas trees, grains, grass seed, pasture)					Between 2-yr and 5-yr TOT for S. 4th St. Deep Well	Lower	Over-application or improper handling of pesticides/fertilizers may impact drinking water. Some agricultural practices may result in excess sediments discharging to surface waters, but non-irrigated crops are generally considered to be a low risk.	
8	Apartments and Condominiums	Apartments	3rd Street	Prineville	Field-Observation	Within the 2-yr TOT for S. 4th St. Deep Well	Lower	Improper use, storage, and disposal of household and facility maintenance chemicals may impact the drinking water supply. Stormwater run-off or infiltration may carry contaminants to water supply.	
	Apartments and Condominiums					Within the 2-yr TOT for S. 4th St. Shallow Well	Lower	Improper use, storage, and disposal of household and facility maintenance chemicals may impact the drinking water supply. Stormwater run-off or infiltration may carry contaminants to water supply.	
9	Parks	Davidson Field	Court Street	Prineville	Field-Observation	Within the 2-yr TOT for S. 4th St. Deep Well	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.	
10	Injection/Dry Wells, Sumps - Class V UICs	US Postal Service	N. Court Street	Prineville	Database (2) Field-Observation	Within the 2-yr TOT for S. 4th St. Deep Well	Higher	Shallow injection wells may transport untreated wastewater (process or storm water) directly into groundwater and impact drinking water.	

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TABLE 2. INVENTORY RESULTS - LIST OF POTENTIAL CONTAMINANT SOURCES

PWS# 4100682 PRINEVILLE, CITY OF

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
11	Parks	Pioneer Park	3rd Street	Prineville	Field-Observation	Within the 2-yr TOT for S. 4th St. Deep Well	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.	
12	Schools	Crook Co. High School	3rd Street	Prineville	Field-Observation	Within the 2-yr TOT for S. 4th St. Deep Well	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.	
13	Schools	Crook County Unit School	E. 1st Street	Prineville	Database (2) Field-Observation	Within the 2-yr TOT for S. 4th St. Deep Well	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.	
14	Schools	Crook County Unit School Bus Garage	E. 1st Street	Prineville	Database (2) Field-Observation	Within the 2-yr TOT for S. 4th St. Deep Well	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.	
	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.	

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PWS# 4100682 PRINEVILLE, CITY OF

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
15	Automobiles - Gas Stations	Texaco Service Station	3rd Street	Prineville	Database (2) Field-Observation	Within the 2-yr TOT for S. 4th St. Deep Well	Higher	Spills, leaks, or improper handling of fuels and other materials during transportation, transfer, and storage may impact the drinking water supply.	Also listed as Bryan Gold's Texaco.
	UST - Confirmed Leaking Tanks - DEQ List						Higher	Existing contamination from spills, leaks, or improper handling of stored materials may impact the drinking water supply.	Also listed as Bryan Gold's Texaco.
16	Other - State cleanup site (ECSI)	Downtown Prineville Groundwater Contamination	3rd Street	Prineville	Database (2)	Within the 2-yr TOT for S. 4th St. Deep Well	Higher	The impacts of this potential contaminant source will be addressed during the enhanced inventory.	PCS location based on regulatory database search - needs verification.
17	Parks	Ochoco Creek Park	4th Street	Prineville	Field-Observation	Between 5-yr and 10-yr TOT for Yancy Well	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.	
	Parks					Between 2-yr and 5-yr TOT for S. 4th St. Deep Well	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.	

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PWS# 4100682 PRINEVILLE, CITY OF

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
18	Chemical/Petroleum Processing/Storage	Crook County Parks and Recreation	NE Garner Street	Prineville	Database (2)	Between 5-yr and 10-yr TOT for Yancy Well	Lower	Spills, leaks, or improper handling of chemicals and other materials during transportation, use, storage and disposal may impact the drinking water supply.	PCS location based on regulatory database search - needs verification. Risk reduced to Lower because only store/use chlorine products.
	Chemical/Petroleum Processing/Storage					Between 2-yr and 5-yr TOT for S. 4th St. Deep Well	Lower	Spills, leaks, or improper handling of chemicals and other materials during transportation, use, storage and disposal may impact the drinking water supply.	PCS location based on regulatory database search - needs verification. Risk reduced to Lower because only store/use chlorine products.
19	Other - State cleanup site (ECSI)	B&S Logging	NE Laughlin Road	Prineville	Database (2) Field-Observation	Between 5-yr and 10-yr TOT for Yancy Well	Higher	The impacts of this potential contaminant source will be addressed during the enhanced inventory.	Also listed as Stafford SBS BS Logging.
	Other - State cleanup site (ECSI)					Between 2-yr and 5-yr TOT for S. 4th St. Deep Well	Higher	The impacts of this potential contaminant source will be addressed during the enhanced inventory.	Also listed as Stafford SBS BS Logging.
	Above Ground Storage Tanks - Excluding Water					Between 5-yr and 10-yr TOT for Yancy Well	Moderate	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	Also listed as Stafford SBS BS Logging.
	Above Ground Storage Tanks - Excluding Water					Between 2-yr and 5-yr TOT for S. 4th St. Deep Well	Moderate	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	Also listed as Stafford SBS BS Logging.

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PWS# 4100682 PRINEVILLE, CITY OF

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
20	Campgrounds/RV Parks	Prineville RV/Eagle Cap Intermountain RV	Ochoco Highway	Prineville	Field-Observation	Between 5-yr and 10-yr TOT for Yancy Well	Lower	Leaks or spills of automotive fluids or improperly managed septic systems and wastewater disposal may impact drinking water supply. Heavy usage along edge of waterbody may contribute to erosion, causing turbidity.	
	Campgrounds/RV Parks					Between 2-yr and 5-yr TOT for S. 4th St. Shallow Well	Lower	Leaks or spills of automotive fluids or improperly managed septic systems and wastewater disposal may impact drinking water supply. Heavy usage along edge of waterbody may contribute to erosion, causing turbidity.	
	Campgrounds/RV Parks					Between 2-yr and 5-yr TOT for S. 4th St. Deep Well	Lower	Leaks or spills of automotive fluids or improperly managed septic systems and wastewater disposal may impact drinking water supply. Heavy usage along edge of waterbody may contribute to erosion, causing turbidity.	
21	Automobiles - Repair Shops	Prineville Automotive	Ochoco Highway	Prineville	Field-Observation	Between 5-yr and 10-yr TOT for Yancy Well	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.	
	Automobiles - Repair Shops					Between 2-yr and 5-yr TOT for S. 4th St. Shallow Well	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.	
	Automobiles - Repair Shops					Between 2-yr and 5-yr TOT for S. 4th St. Deep Well	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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PWS# 4100682 PRINEVILLE, CITY OF

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
22	Automobiles - Repair Shops	Les Schwab	E. 3rd Street	Prineville	Database (2) Field-Observation	Between 2-yr and 5-yr TOT for S. 4th St. Shallow Well	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.	
	Automobiles - Repair Shops					Between 5-yr and 10-yr TOT for Yancy Well	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.	
	Automobiles - Repair Shops					Between 2-yr and 5-yr TOT for S. 4th St. Deep Well	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	Schools	Crook County Unit School District	NE Knowledge Street	Prineville	Database (2) Field-Observation	Between 2-yr and 5-yr TOT for S. 4th St. Deep Well	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.	
	Schools					Between 5-yr and 10-yr TOT for Yancy Well	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.	
	Schools					Between 2-yr and 5-yr TOT for S. 4th St. Shallow Well	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.	

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TABLE 2. INVENTORY RESULTS - LIST OF POTENTIAL CONTAMINANT SOURCES

PWS# 4100682 PRINEVILLE, CITY OF

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
24	Dry Cleaners	Ochoco Plaza Cleaners	E. 3rd Street	Prineville	Database (2) Field-Observation	Between 5-yr and 10-yr TOT for Yancy Well	Higher	Spills, leaks, or improper handling of dry cleaning solvents and other chemicals during transportation, use, storage and disposal may impact the drinking water supply.	
	Dry Cleaners					Between 2-yr and 5-yr TOT for S. 4th St. Shallow Well	Higher	Spills, leaks, or improper handling of dry cleaning solvents and other chemicals during transportation, use, storage and disposal may impact the drinking water supply.	
	Dry Cleaners					Between 2-yr and 5-yr TOT for S. 4th St. Deep Well	Higher	Spills, leaks, or improper handling of dry cleaning solvents and other chemicals during transportation, use, storage and disposal may impact the drinking water supply.	
25	Chemical/Petroleum Processing/Storage	Rite Aid	E. 3rd Street	Prineville	Database (2) Field-Observation	Between 5-yr and 10-yr TOT for Yancy Well	Moderate	Spills, leaks, or improper handling of chemicals and other materials during transportation, use, storage and disposal may impact the drinking water supply.	Risk reduced to Moderate because only store/use floor cleaners.
	Chemical/Petroleum Processing/Storage					Between 2-yr and 5-yr TOT for S. 4th St. Shallow Well	Moderate	Spills, leaks, or improper handling of chemicals and other materials during transportation, use, storage and disposal may impact the drinking water supply.	Risk reduced to Moderate because only store/use floor cleaners.
	Chemical/Petroleum Processing/Storage					Between 2-yr and 5-yr TOT for S. 4th St. Deep Well	Moderate	Spills, leaks, or improper handling of chemicals and other materials during transportation, use, storage and disposal may impact the drinking water supply.	Risk reduced to Moderate because only store/use floor cleaners.

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Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
26	Parking Lots/Malls (> 50 Spaces)	Parking lot	Ochoco Highway	Prineville	Field-Observation	Between 2-yr and 5-yr TOT for S. 4th St. Shallow Well	Higher	Spills and leaks of automotive fluids in parking lots may impact the drinking water supply.	
	Parking Lots/Malls (> 50 Spaces)					Between 2-yr and 5-yr TOT for S. 4th St. Deep Well	Higher	Spills and leaks of automotive fluids in parking lots may impact the drinking water supply.	
	Parking Lots/Malls (> 50 Spaces)					Between 5-yr and 10-yr TOT for Yancy Well	Higher	Spills and leaks of automotive fluids in parking lots may impact the drinking water supply.	
27	Dry Cleaners	Coin Laundry	Ochoco Highway	Prineville	Field-Observation	Between 5-yr and 10-yr TOT for Yancy Well	Higher	Spills, leaks, or improper handling of dry cleaning solvents and other chemicals during transportation, use, storage and disposal may impact the drinking water supply.	PWS should verify nature of operations and potential risk.
	Dry Cleaners					Between 5-yr and 10-yr TOT for S. 4th St. Shallow Well	Higher	Spills, leaks, or improper handling of dry cleaning solvents and other chemicals during transportation, use, storage and disposal may impact the drinking water supply.	PWS should verify nature of operations and potential risk.
	Dry Cleaners					Between 2-yr and 5-yr TOT for S. 4th St. Deep Well	Higher	Spills, leaks, or improper handling of dry cleaning solvents and other chemicals during transportation, use, storage and disposal may impact the drinking water supply.	PWS should verify nature of operations and potential risk.

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Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
28	UST - Status Unknown	Schrum Ford Sales Inc.	E. 3rd Street	Prineville	Database (2) Field-Observation	Between 5-yr and 10-yr TOT for Yancy Well	Higher	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	Appears to be gone - PWS should verify.
	UST - Status Unknown					Between 2-yr and 5-yr TOT for S. 4th St. Shallow Well	Higher	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	Appears to be gone - PWS should verify.
	UST - Status Unknown					Between 2-yr and 5-yr TOT for S. 4th St. Deep Well	Higher	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	Appears to be gone - PWS should verify.

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PWS# 4100682 PRINEVILLE, CITY OF

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
29	UST - Confirmed Leaking Tanks - DEQ List	Shell Gas	E. Ochoco Highway & Combs Flat Road	Prineville	Database (2) Field-Observation	Between 2-yr and 5-yr TOT for S. 4th St. Deep Well	Higher	Existing contamination from spills, leaks, or improper handling of stored materials may impact the drinking water supply.	Also listed as Shell Bulk Plant.
	Automobiles - Gas Stations					Between 5-yr and 10-yr TOT for Yancy Well	Higher	Spills, leaks, or improper handling of fuels and other materials during transportation, transfer, and storage may impact the drinking water supply.	Also listed as Shell Bulk Plant.
	Automobiles - Gas Stations					Between 5-yr and 10-yr TOT for S. 4th St. Shallow Well	Higher	Spills, leaks, or improper handling of fuels and other materials during transportation, transfer, and storage may impact the drinking water supply.	Also listed as Shell Bulk Plant.
	Automobiles - Gas Stations					Between 2-yr and 5-yr TOT for S. 4th St. Deep Well	Higher	Spills, leaks, or improper handling of fuels and other materials during transportation, transfer, and storage may impact the drinking water supply.	Also listed as Shell Bulk Plant.
	UST - Confirmed Leaking Tanks - DEQ List					Between 5-yr and 10-yr TOT for Yancy Well	Higher	Existing contamination from spills, leaks, or improper handling of stored materials may impact the drinking water supply.	Also listed as Shell Bulk Plant.
	UST - Confirmed Leaking Tanks - DEQ List					Between 5-yr and 10-yr TOT for S. 4th St. Shallow Well	Higher	Existing contamination from spills, leaks, or improper handling of stored materials may impact the drinking water supply.	Also listed as Shell Bulk Plant.
	Other - State cleanup site (ECSI)						Higher	The impacts of this potential contaminant source will be addressed during the enhanced inventory.	Also listed as Shell Bulk Plant.
	Other - State cleanup site (ECSI)					Between 5-yr and 10-yr TOT for Yancy Well	Higher	The impacts of this potential contaminant source will be addressed during the enhanced inventory.	Also listed as Shell Bulk Plant.

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PWS# 4100682 PRINEVILLE, CITY OF

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29	Other - State cleanup site (ECSI)	Shell Gas	E. Ochoco Highway & Combs Flat Road	Prineville	Database (2) Field-Observation	Between 2-yr and 5-yr TOT for S. 4th St. Deep Well	Higher	The impacts of this potential contaminant source will be addressed during the enhanced inventory.	Also listed as Shell Bulk Plant.
30	Automobiles - Gas Stations	Cross Street Station	NE 3rd Street	Prineville	Database (2)	Between 2-yr and 5-yr TOT for S. 4th St. Deep Well	Higher	Spills, leaks, or improper handling of fuels and other materials during transportation, transfer, and storage may impact the drinking water supply.	PCS location based on regulatory database search - needs verification.
	Automobiles - Gas Stations					Between 5-yr and 10-yr TOT for S. 4th St. Shallow Well	Higher	Spills, leaks, or improper handling of fuels and other materials during transportation, transfer, and storage may impact the drinking water supply.	PCS location based on regulatory database search - needs verification.
	Automobiles - Gas Stations					Between 5-yr and 10-yr TOT for Yancy Well	Higher	Spills, leaks, or improper handling of fuels and other materials during transportation, transfer, and storage may impact the drinking water supply.	PCS location based on regulatory database search - needs verification.
	UST - Upgraded/Registered - Active					Between 2-yr and 5-yr TOT for S. 4th St. Deep Well	Lower	Spills or improper handling during tank filling or product distribution may impact the drinking water supply.	PCS location based on regulatory database search - needs verification.
	UST - Upgraded/Registered - Active					Between 5-yr and 10-yr TOT for S. 4th St. Shallow Well	Lower	Spills or improper handling during tank filling or product distribution may impact the drinking water supply.	PCS location based on regulatory database search - needs verification.
	UST - Upgraded/Registered - Active					Between 5-yr and 10-yr TOT for Yancy Well	Lower	Spills or improper handling during tank filling or product distribution may impact the drinking water supply.	PCS location based on regulatory database search - needs verification.

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Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
31	Campgrounds/RV Parks	RV Park	Ochoco Highway	Prineville	Field-Observation	Between 2-yr and 5-yr TOT for S. 4th St. Deep Well	Lower	Leaks or spills of automotive fluids or improperly managed septic systems and wastewater disposal may impact drinking water supply. Heavy usage along edge of waterbody may contribute to erosion, causing turbidity.	
	Campgrounds/RV Parks					Between 5-yr and 10-yr TOT for S. 4th St. Shallow Well	Lower	Leaks or spills of automotive fluids or improperly managed septic systems and wastewater disposal may impact drinking water supply. Heavy usage along edge of waterbody may contribute to erosion, causing turbidity.	
32	RV/Mini Storage	A to Z Storage	Ochoco Highway	Prineville	Field-Observation	Between 2-yr and 5-yr TOT for S. 4th St. Deep Well	Lower	Spills, leaks, or improper handling of automotive fluids and other materials during transportation, storage and disposal may impact the drinking water supply.	
	RV/Mini Storage					Between 5-yr and 10-yr TOT for S. 4th St. Shallow Well	Lower	Spills, leaks, or improper handling of automotive fluids and other materials during transportation, storage and disposal may impact the drinking water supply.	
33	Automobiles - Repair Shops	Ford	Ochoco Highway	Prineville	Field-Observation	Between 2-yr and 5-yr TOT for S. 4th St. Deep Well	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.	
	Automobiles - Repair Shops					Between 5-yr and 10-yr TOT for S. 4th St. Shallow Well	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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PWS# 4100682 PRINEVILLE, CITY OF

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
34	Fleet/Trucking/Bus Terminals	Simmon's Trucking	Ochoco Highway	Prineville	Field-Observation	Between 2-yr and 5-yr TOT for S. 4th St. Deep Well	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.	
	Fleet/Trucking/Bus Terminals					Within the 2-yr TOT for Stadium Well	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.	
	Fleet/Trucking/Bus Terminals					Between 5-yr and 10-yr TOT for S. 4th St. Shallow Well	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	Medical/Vet Offices	Veterinary Clinic	Laughlin Road	Prineville	Field-Observation	Between 5-yr and 10-yr TOT for S. 4th St. Shallow Well	Moderate	Spills, leaks, or improper handling of x-ray, biological, chemical, and radioactive wastes and other materials during transportation, use, storage and disposal may impact the drinking water supply.	
	Medical/Vet Offices					Between 2-yr and 5-yr TOT for S. 4th St. Deep Well	Moderate	Spills, leaks, or improper handling of x-ray, biological, chemical, and radioactive wastes and other materials during transportation, use, storage and disposal may impact the drinking water supply.	

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36	Utility Stations - Maintenance Transformer Storage	Utility substation	Laughlin Road	Prineville	Field-Observation	Between 5-yr and 10-yr TOT for Yancy Well	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.	
	Utility Stations - Maintenance Transformer Storage					Between 5-yr and 10-yr TOT for S. 4th St. Shallow Well	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.	
	Utility Stations - Maintenance Transformer Storage					Between 2-yr and 5-yr TOT for S. 4th St. Deep Well	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.	

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(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# 4100682 PRINEVILLE, CITY OF

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
37	UST - Status Unknown	Crook County Schools	Knowledge	Prineville	Database (2) Field-Observation	Between 5-yr and 10-yr TOT for Yancy Well	Higher	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	
	Schools					Between 2-yr and 5-yr TOT for S. 4th St. Shallow Well	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.	
	Schools					Between 5-yr and 10-yr TOT for Yancy Well	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					Between 2-yr and 5-yr TOT for S. 4th St. Shallow Well	Higher	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	
	UST - Status Unknown					Between 2-yr and 5-yr TOT for S. 4th St. Deep Well	Higher	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	
	UST - Status Unknown					Within the 2-yr TOT for Stadium Well	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.	

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TABLE 2. INVENTORY RESULTS - LIST OF POTENTIAL CONTAMINANT SOURCES

PWS# 4100682 PRINEVILLE, CITY OF

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
37	Schools	Crook County Schools	Knowledge	Prineville	Database (2) Field-Observation	Between 2-yr and 5-yr TOT for S. 4th St. Deep Well	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.	
38	Parks	School Ballfields	5th St.	Prineville	Field-Observation	Between 5-yr and 10-yr TOT for Yancy Well	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.	
	Parks					Between 2-yr and 5-yr TOT for S. 4th St. Shallow Well	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.	
	Parks					Between 2-yr and 5-yr TOT for S. 4th St. Deep Well	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.	
	Parks					Within the 2-yr TOT for Stadium Well	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.	

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TABLE 2. INVENTORY RESULTS - LIST OF POTENTIAL CONTAMINANT SOURCES

PWS# 4100682 PRINEVILLE, CITY OF

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
39	Other - State cleanup site (ECSI)	Ochoco Lumber	Coombs Flat Road	Prineville	Database (2) Field-Observation	Within the 2-yr TOT for Stadium Well	Higher	The impacts of this potential contaminant source will be addressed during the enhanced inventory.	
	Wood/Pulp/Paper Processing and Mills					Between 2-yr and 5-yr TOT for S. 4th St. Deep Well	Higher	Spills, leaks, or improper handling of wood preservatives and other chemicals during transportation, use, storage and disposal may impact the drinking water supply.	
	Other - State cleanup site (ECSI)					Between 5-yr and 10-yr TOT for S. 4th St. Shallow Well	Higher	The impacts of this potential contaminant source will be addressed during the enhanced inventory.	
	Wood/Pulp/Paper Processing and Mills						Higher	Spills, leaks, or improper handling of wood preservatives and other chemicals during transportation, use, storage and disposal may impact the drinking water supply.	
	Other - State cleanup site (ECSI)					Between 2-yr and 5-yr TOT for S. 4th St. Deep Well	Higher	The impacts of this potential contaminant source will be addressed during the enhanced inventory.	
	Wood/Pulp/Paper Processing and Mills					Within the 2-yr TOT for Stadium Well	Higher	Spills, leaks, or improper handling of wood preservatives and other chemicals 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# 4100682 PRINEVILLE, CITY OF

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
40	Homesteads - Rural - Machine Shops/Equipment Maintenance	Home Machine Shop	Coombs Flat Road	Prineville	Field-Observation	Within the 2-yr TOT for Stadium Well	Higher	Spills, leaks, or improper handling of solvents, fuels, and other materials or chemicals during transportation, use, storage and disposal may impact the drinking water supply.	Potential risk should be verified during enhanced inventory.
	Homesteads - Rural - Machine Shops/Equipment Maintenance					Between 2-yr and 5-yr TOT for S. 4th St. Shallow Well	Higher	Spills, leaks, or improper handling of solvents, fuels, and other materials or chemicals during transportation, use, storage and disposal may impact the drinking water supply.	Potential risk should be verified during enhanced inventory.
	Homesteads - Rural - Machine Shops/Equipment Maintenance					Between 2-yr and 5-yr TOT for S. 4th St. Deep Well	Higher	Spills, leaks, or improper handling of solvents, fuels, and other materials or chemicals during transportation, use, storage and disposal may impact the drinking water supply.	Potential risk should be verified during enhanced inventory.
41	Junk/Scrap/Salvage Yards	Private residence with salvage/scrap operation	Laughlin Road	Prineville	Field-Observation	Between 5-yr and 10-yr TOT for S. 4th St. Shallow Well	Higher	Spills, leaks, or improper handling of automotive chemicals, batteries, and other waste materials during storage and disposal may impact the drinking water supply.	
	Junk/Scrap/Salvage Yards					Between 2-yr and 5-yr TOT for S. 4th St. Deep Well	Higher	Spills, leaks, or improper handling of automotive chemicals, batteries, and other waste materials during storage and disposal may impact the drinking water supply.	
42	Homesteads - Rural - Machine Shops/Equipment Maintenance	Home Machine Shop	Coombs Flat Road	Prineville	Field-Observation	Between 5-yr and 10-yr TOT for S. 4th St. Shallow Well	Higher	Spills, leaks, or improper handling of solvents, fuels, and other materials or chemicals during transportation, use, storage and disposal may impact the drinking water supply.	Potential risk should be verified during enhanced inventory.

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TABLE 2. INVENTORY RESULTS - LIST OF POTENTIAL CONTAMINANT SOURCES

PWS# 4100682 PRINEVILLE, CITY OF

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
43	Automobiles - Body Shops	Wayne Duncan Autobody	Melrose	Prineville	Field-Observation	Between 2-yr and 5-yr TOT for S. 4th St. Deep Well	Higher	Improper management of vehicle paints, thinners, and primer products may impact the drinking water supply.	
	Automobiles - Body Shops					Between 5-yr and 10-yr TOT for S. 4th St. Shallow Well	Higher	Improper management of vehicle paints, thinners, and primer products may impact the drinking water supply.	
44	RV/Mini Storage	Ochoco Mini-Storage	Ochoco Highway	Prineville	Field-Observation	Between 2-yr and 5-yr TOT for Stadium Well	Lower	Spills, leaks, or improper handling of automotive fluids and other materials during transportation, storage and disposal may impact the drinking water supply.	
	RV/Mini Storage					Between 5-yr and 10-yr TOT for S. 4th St. Deep Well	Lower	Spills, leaks, or improper handling of automotive fluids and other materials during transportation, storage and disposal may impact the drinking water supply.	
	RV/Mini Storage					Between 5-yr and 10-yr TOT for S. 4th St. Shallow Well	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# 4100682 PRINEVILLE, CITY OF

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
45	Automobiles - Body Shops	Prineville Body and Paint	Ochoco Highway	Prineville	Field-Observation	Between 2-yr and 5-yr TOT for Stadium Well	Higher	Improper management of vehicle paints, thinners, and primer products may impact the drinking water supply.	
	Automobiles - Body Shops					Between 5-yr and 10-yr TOT for S. 4th St. Deep Well	Higher	Improper management of vehicle paints, thinners, and primer products may impact the drinking water supply.	
	Automobiles - Body Shops					Between 5-yr and 10-yr TOT for S. 4th St. Shallow Well	Higher	Improper management of vehicle paints, thinners, and primer products may impact the drinking water supply.	

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TABLE 2. INVENTORY RESULTS - LIST OF POTENTIAL CONTAMINANT SOURCES

PWS# 4100682 PRINEVILLE, CITY OF

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
46	Above Ground Storage Tanks - Excluding Water	Auto Shop	Ochoco Highway	Prineville	Field- Observation	Between 5-yr and 10-yr TOT for S. 4th St. Deep Well	Moderate	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	
	Above Ground Storage Tanks - Excluding Water					Between 5-yr and 10-yr TOT for S. 4th St. Shallow Well	Moderate	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	
	Above Ground Storage Tanks - Excluding Water					Between 2-yr and 5-yr TOT for Stadium Well	Moderate	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	
	Fleet/Trucking/Bus Terminals					Between 5-yr and 10-yr TOT for S. 4th St. Shallow Well	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.	
	Fleet/Trucking/Bus Terminals					Between 2-yr and 5-yr TOT for Stadium Well	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.	
	Automobiles - Repair Shops					Between 5-yr and 10-yr TOT for S. 4th St. Shallow Well	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.	
	Automobiles - Repair Shops					Between 5-yr and 10-yr TOT for S. 4th St. Deep Well	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# 4100682 PRINEVILLE, CITY OF

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
46	Automobiles - Repair Shops	Auto Shop	Ochoco Highway	Prineville	Field-Observation	Between 2-yr and 5-yr TOT for Stadium Well	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.	
	Fleet/Trucking/Bus Terminals					Between 5-yr and 10-yr TOT for S. 4th St. Deep Well	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.	

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PWS# 4100682 PRINEVILLE, CITY OF

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
47	UST - Status Unknown	Wallace L. Smith Trucking	E. 3rd Street	Prineville	Database (2)	Between 5-yr and 10-yr TOT for S. 4th St. Deep Well	Higher	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	
	Fleet/Trucking/Bus Terminals					Between 2-yr and 5-yr TOT for Stadium Well	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.	
	UST - Status Unknown					Between 5-yr and 10-yr TOT for S. 4th St. Shallow Well	Higher	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	
	UST - Status Unknown					Between 2-yr and 5-yr TOT for Stadium Well	Higher	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	
	Fleet/Trucking/Bus Terminals					Between 5-yr and 10-yr TOT for S. 4th St. Shallow Well	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.	
	Fleet/Trucking/Bus Terminals					Between 5-yr and 10-yr TOT for S. 4th St. Deep Well	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.	

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PWS# 4100682 PRINEVILLE, CITY OF

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
48	Fleet/Trucking/Bus Terminals	Ochoco Manufacturing Co.	E. 3rd Street	Prineville	Database (2) Field-Observation	Between 5-yr and 10-yr TOT for S. 4th St. Deep Well	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.	
	Fleet/Trucking/Bus Terminals					Between 5-yr and 10-yr TOT for S. 4th St. Shallow Well	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.	
	Above Ground Storage Tanks - Excluding Water					Between 2-yr and 5-yr TOT for Stadium Well	Moderate	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	
	Above Ground Storage Tanks - Excluding Water					Between 5-yr and 10-yr TOT for S. 4th St. Deep Well	Moderate	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	
	Above Ground Storage Tanks - Excluding Water					Between 5-yr and 10-yr TOT for S. 4th St. Shallow Well	Moderate	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	
	Fleet/Trucking/Bus Terminals					Between 2-yr and 5-yr TOT for Stadium Well	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.	

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PWS# 4100682 PRINEVILLE, CITY OF

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
49	Parking Lots/Malls (> 50 Spaces)	BLM	Ochoco Highway	Prineville	Field-Observation	Between 2-yr and 5-yr TOT for Stearns Well	Higher	Spills and leaks of automotive fluids in parking lots may impact the drinking water supply.	
	Parking Lots/Malls (> 50 Spaces)					Between 5-yr and 10-yr TOT for S. 4th St. Shallow Well	Higher	Spills and leaks of automotive fluids in parking lots may impact the drinking water supply.	
	Parking Lots/Malls (> 50 Spaces)					Between 2-yr and 5-yr TOT for Stadium Well	Higher	Spills and leaks of automotive fluids in parking lots may impact the drinking water supply.	
	Parking Lots/Malls (> 50 Spaces)					Between 5-yr and 10-yr TOT for S. 4th St. Deep Well	Higher	Spills and leaks of automotive fluids in parking lots may impact the drinking water supply.	
	Parking Lots/Malls (> 50 Spaces)					Between 2-yr and 5-yr TOT for Barney Well	Higher	Spills and leaks of automotive fluids in parking lots may impact the drinking water supply.	

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PWS# 4100682 PRINEVILLE, CITY OF

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
50	Injection/Dry Wells, Sumps - Class V UICs	Ochoco Building/Columbia Development Group	NE 3rd Street	Prineville	Database (2)	Between 5-yr and 10-yr TOT for S. 4th St. Shallow Well	Higher	Shallow injection wells may transport untreated wastewater (process or storm water) directly into groundwater and impact drinking water.	PCS location based on regulatory database search - needs verification.
	Injection/Dry Wells, Sumps - Class V UICs					Between 5-yr and 10-yr TOT for S. 4th St. Deep Well	Higher	Shallow injection wells may transport untreated wastewater (process or storm water) directly into groundwater and impact drinking water.	PCS location based on regulatory database search - needs verification.
	Injection/Dry Wells, Sumps - Class V UICs					Between 2-yr and 5-yr TOT for Steams Well	Higher	Shallow injection wells may transport untreated wastewater (process or storm water) directly into groundwater and impact drinking water.	PCS location based on regulatory database search - needs verification.
	Injection/Dry Wells, Sumps - Class V UICs					Between 2-yr and 5-yr TOT for Stadium Well	Higher	Shallow injection wells may transport untreated wastewater (process or storm water) directly into groundwater and impact drinking water.	PCS location based on regulatory database search - needs verification.
	Injection/Dry Wells, Sumps - Class V UICs					Between 2-yr and 5-yr TOT for Barney Well	Higher	Shallow injection wells may transport untreated wastewater (process or storm water) directly into groundwater and impact drinking water.	PCS location based on regulatory database search - needs verification.

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PWS# 4100682 PRINEVILLE, CITY OF

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
51	Fleet/Trucking/Bus Terminals	Oregon Dept. of Forestry (ODF)	NE 3rd Street	Prineville	Database (2) Field-Observation	Between 5-yr and 10-yr TOT for S. 4th St. Deep Well	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.	
	Above Ground Storage Tanks - Excluding Water					Within 2-yr TOT for Stearns Well	Moderate	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	
	Above Ground Storage Tanks - Excluding Water					Between 2-yr and 5-yr TOT for Stadium Well	Moderate	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	
	Fleet/Trucking/Bus Terminals					Within 2-yr TOT for Barney Well	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.	
	Fleet/Trucking/Bus Terminals					Within 2-yr TOT for Stearns Well	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.	
	Fleet/Trucking/Bus Terminals					Between 2-yr and 5-yr TOT for Stadium Well	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.	
	Above Ground Storage Tanks - Excluding Water					Within 2-yr TOT for Barney Well	Moderate	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	
	Above Ground Storage Tanks - Excluding Water					Between 5-yr and 10-yr TOT for S. 4th St. Deep Well	Moderate	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	

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PWS# 4100682 PRINEVILLE, CITY OF

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
52	Fleet/Trucking/Bus Terminals	Oregon Dept. of Transportation (ODOT)	NE 3rd Street	Prineville	Database (2) Field-Observation	Within 2-yr ~~and 5-yr~~ TOT for Stearns Well	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.	
	Above Ground Storage Tanks - Excluding Water					Between 5-yr and 10-yr TOT for S. 4th St. Deep Well	Moderate	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	
	Above Ground Storage Tanks - Excluding Water					Within 2-yr ~~and 5-yr~~ TOT for Stearns Well	Moderate	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	
	Above Ground Storage Tanks - Excluding Water					Between 2-yr and 5-yr TOT for Stadium Well	Moderate	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	
	Fleet/Trucking/Bus Terminals					Between 5-yr and 10-yr TOT for S. 4th St. Deep Well	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.	
	Fleet/Trucking/Bus Terminals					Between 2-yr and 5-yr TOT for Stadium Well	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.	
	Fleet/Trucking/Bus Terminals					Within 2-yr ~~and 5-yr~~ TOT for Barney Well	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.	
	Above Ground Storage Tanks - Excluding Water					Within 2-yr TOT for Barney Well	Moderate	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	

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PWS# 4100682 PRINEVILLE, CITY OF

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
53	Above Ground Storage Tanks - Excluding Water	Dave's Auto Wrecking	NE 3rd Street	Prineville	Database (2) Field-Observation	Within 2-yr ~~and 5-yr~~ TOT for Barney Well	Moderate	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	
	Above Ground Storage Tanks - Excluding Water					Between 2-yr and 5-yr TOT for Stadium Well	Moderate	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	
	Above Ground Storage Tanks - Excluding Water					Within 2-yr ~~and 5-yr~~ TOT for Stearns Well	Moderate	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	
	Junk/Scrap/Salvage Yards					within 2-yr TOT for stearns well	Higher	Spills, leaks, or improper handling of automotive chemicals, batteries, and other waste materials during storage and disposal may impact the drinking water supply.	
	Junk/Scrap/Salvage Yards					Within 2-yr ~~and 5-yr~~ TOT for Barney Well	Higher	Spills, leaks, or improper handling of automotive chemicals, batteries, and other waste materials during storage and disposal may impact the drinking water supply.	
	Junk/Scrap/Salvage Yards					Between 2-yr and 5-yr TOT for Stadium Well	Higher	Spills, leaks, or improper handling of automotive chemicals, batteries, and other waste materials during storage and disposal may impact the drinking water supply.	
	Above Ground Storage Tanks - Excluding Water					Between 5-yr and 10-yr TOT for S. 4th St. Deep Well	Moderate	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	
	Junk/Scrap/Salvage Yards						Higher	Spills, leaks, or improper handling of automotive chemicals, batteries, and other waste materials during storage and disposal may impact the drinking water supply.	

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TABLE 2. INVENTORY RESULTS - LIST OF POTENTIAL CONTAMINANT SOURCES

PWS# 4100682 PRINEVILLE, CITY OF

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
54	Automobiles - Repair Shops	Bob Sabin's Auto Repair	NE 3rd Street	Prineville	Database (2) Field-Observation	Between 2-yr and 5-yr TOT for Barney Well	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.	
	Automobiles - Repair Shops					Between 2-yr and 5-yr TOT for Stadium Well	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.	
	Automobiles - Repair Shops					Between 2-yr and 5-yr TOT for Stearns Well	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.	
	Automobiles - Repair Shops					Between 5-yr and 10-yr TOT for S. 4th St. Deep Well	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 - Decommissioned/Inactive					Between 2-yr and 5-yr TOT for Barney Well	Lower	Historic spills or leaks may impact the drinking water supply.	
	UST - Decommissioned/Inactive					Between 2-yr and 5-yr TOT for Stadium Well	Lower	Historic spills or leaks may impact the drinking water supply.	
	UST - Decommissioned/Inactive					Between 2-yr and 5-yr TOT for Stearns Well	Lower	Historic spills or leaks may impact the drinking water supply.	

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PWS# 4100682 PRINEVILLE, CITY OF

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
54	UST - Decommissioned/Inactive	Bob Sabin's Auto Repair	NE 3rd Street	Prineville	Database (2) Field-Observation	Between 5-yr and 10-yr TOT for S. 4th St. Deep Well	Lower	Historic spills or leaks may impact the drinking water supply.	
55	Grazing Animals (> 5 large animals or equivalent/acre)	Grazing animal area(s)	Throughout DWPA	Prineville	Field-Observation	Between 5-yr and 10-yr TOT for Stadium Well	Moderate	Improper storage and management of animal wastes may impact drinking water supply. Concentrated livestock may contribute to erosion and sedimentation of surface water bodies.	
	Grazing Animals (> 5 large animals or equivalent/acre)					Between 5-yr and 10-yr TOT for Stearns Well	Moderate	Improper storage and management of animal wastes may impact drinking water supply. Concentrated livestock may contribute to erosion and sedimentation of surface water bodies.	
	Grazing Animals (> 5 large animals or equivalent/acre)					Between 5-yr and 10-yr TOT for Barney Well	Moderate	Improper storage and management of animal wastes may impact drinking water supply. Concentrated livestock may contribute to erosion and sedimentation of surface water bodies.	
	Grazing Animals (> 5 large animals or equivalent/acre)					Between 5-yr and 10-yr TOT for S. 4th St. Deep Well	Moderate	Improper storage and management of animal wastes may impact drinking water supply. Concentrated livestock may contribute to erosion and sedimentation of surface water bodies.	

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TABLE 2. INVENTORY RESULTS - LIST OF POTENTIAL CONTAMINANT SOURCES

PWS[redacted]

Refer[redacted] No. ([redacted] Figur[redacted]	[redacted]	[redacted]	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
56[redacted]	[redacted]	[redacted]hway	Prineville	Field-Observation Interview	Between 5-yr and 10-yr TOT for S. 4th St. Deep Well	Higher	Improperly installed or maintained wells and abandoned wells may provide a direct conduit for contamination to groundwater and drinking water source.	
					Between 5-yr and 10-yr TOT for S. 4th St. Shallow Well	Higher	Improperly installed or maintained wells and abandoned wells may provide a direct conduit for contamination to groundwater and drinking water source.	
					Within the 2-yr TOT for Barney Well	Higher	Improperly installed or maintained wells and abandoned wells may provide a direct conduit for contamination to groundwater and drinking water source.	
					Within the 2-yr TOT for Stearns Well	Higher	Improperly installed or maintained wells and abandoned wells may provide a direct conduit for contamination to groundwater and drinking water source.	
	Wells/Abandoned Wells				Between 2-yr and 5-yr TOT for Stadium Well	Higher	Improperly installed or maintained wells and abandoned wells may provide a direct conduit for contamination to groundwater and drinking water source.	

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TABLE 2. INVENTORY RESULTS - LIST OF POTENTIAL CONTAMINANT SOURCES

PWS# 4100682 PRINEVILLE, CITY OF

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
57	Boarding Stables	Willamette Thoroughbred	NE Barnes Butte Road	Prineville	Database (2)	Between 2-yr and 5-yr TOT for Stadium Well	Moderate	Improper storage and management of animal wastes and wastewater in areas of concentrated livestock may impact drinking water.	PCS location based on regulatory database search - needs verification.
	Above Ground Storage Tanks - Excluding Water					Within the 2-yr TOT for Steams Well	Moderate	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	PCS location based on regulatory database search - needs verification.
	Above Ground Storage Tanks - Excluding Water					Within the 2-yr TOT for Barney Well	Moderate	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	PCS location based on regulatory database search - needs verification.
	Above Ground Storage Tanks - Excluding Water					Between 5-yr and 10-yr TOT for S. 4th St. Deep Well	Moderate	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	PCS location based on regulatory database search - needs verification.
	Above Ground Storage Tanks - Excluding Water					Between 2-yr and 5-yr TOT for Stadium Well	Moderate	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	PCS location based on regulatory database search - needs verification.
	Boarding Stables					Within the 2-yr TOT for Steams Well	Moderate	Improper storage and management of animal wastes and wastewater in areas of concentrated livestock may impact drinking water.	PCS location based on regulatory database search - needs verification.
	Boarding Stables					Between 5-yr and 10-yr TOT for S. 4th St. Deep Well	Moderate	Improper storage and management of animal wastes and wastewater in areas of concentrated livestock may impact drinking water.	PCS location based on regulatory database search - needs verification.

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TABLE 2. INVENTORY RESULTS - LIST OF POTENTIAL CONTAMINANT SOURCES

PWS# 4100682 PRINEVILLE, CITY OF

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
57	Boarding Stables	Willamette Thoroughbred	NE Barnes Butte Road	Prineville	Database (2)	Within the 2-yr TOT for Barney Well	Moderate	Improper storage and management of animal wastes and wastewater in areas of concentrated livestock may impact drinking water.	PCS location based on regulatory database search - needs verification.
58	Other - Unknown operation	Unknown operation	Cotes Road	Prineville	Field-Observation	Within the 2-yr TOT for Barney Well	Moderate	The impacts of this potential contaminant source will be addressed during the enhanced inventory.	Site is beyond public access, no visual observation - needs verification.
	Other - Unknown operation					Between 5-yr and 10-yr TOT for S. 4th St. Deep Well	Moderate	The impacts of this potential contaminant source will be addressed during the enhanced inventory.	Site is beyond public access, no visual observation - needs verification.
	Other - Unknown operation					Between 2-yr and 5-yr TOT for Stadium Well	Moderate	The impacts of this potential contaminant source will be addressed during the enhanced inventory.	Site is beyond public access, no visual observation - needs verification.
	Other - Unknown operation					Within the 2-yr TOT for Stearns Well	Moderate	The impacts of this potential contaminant source will be addressed during the enhanced inventory.	Site is beyond public access, no visual observation - needs verification.

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TABLE 2. INVENTORY RESULTS - LIST OF POTENTIAL CONTAMINANT SOURCES

PWS# 4100682 PRINEVILLE, CITY OF

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
59	Other - Unknown operation	Unknown operation	Cotes Road	Prineville	Field-Observation	Between 5-yr and 10-yr TOT for S. 4th St. Deep Well	Moderate	The impacts of this potential contaminant source will be addressed during the enhanced inventory.	Site is beyond public access, no visual observation - needs verification.
	Other - Unknown operation					Between 5-yr and 10-yr TOT for Stadium Well	Moderate	The impacts of this potential contaminant source will be addressed during the enhanced inventory.	Site is beyond public access, no visual observation - needs verification.
	Other - Unknown operation					Within the 2-yr TOT for Barney Well	Moderate	The impacts of this potential contaminant source will be addressed during the enhanced inventory.	Site is beyond public access, no visual observation - needs verification.
	Other - Unknown operation					Within the 2-yr TOT for Stearns Well	Moderate	The impacts of this potential contaminant source will be addressed during the enhanced inventory.	Site is beyond public access, no visual observation - needs verification.

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TABLE 2. INVENTORY RESULTS - LIST OF POTENTIAL CONTAMINANT SOURCES

PWS# 4100682 PRINEVILLE, CITY OF

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
60	Confined Animal Feeding Operations (CAFOs)	Potential Confined Animal Feeding Area with aboveground storage tank	Ochoco Highway	Prineville	Field-Observation	Between 5-yr and 10-yr TOT for Stadium Well	Higher	Improper storage and management of animal wastes and wastewater in areas of concentrated livestock may impact drinking water.	PWS should verify nature of operation and potential risk.
	Confined Animal Feeding Operations (CAFOs)					Within the 2-yr TOT for Barney Well	Higher	Improper storage and management of animal wastes and wastewater in areas of concentrated livestock may impact drinking water.	PWS should verify nature of operation and potential risk.
	Confined Animal Feeding Operations (CAFOs)					Within the 2-yr TOT for Stearns Well	Higher	Improper storage and management of animal wastes and wastewater in areas of concentrated livestock may impact drinking water.	PWS should verify nature of operation and potential risk.
	Above Ground Storage Tanks - Excluding Water					Between 5-yr and 10-yr TOT for Stadium Well	Moderate	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	PWS should verify nature of operation and potential risk.
	Above Ground Storage Tanks - Excluding Water					Within the 2-yr TOT for Barney Well	Moderate	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	PWS should verify nature of operation and potential risk.
	Above Ground Storage Tanks - Excluding Water					Within the 2-yr TOT for Stearns Well	Moderate	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	PWS should verify nature of operation and potential risk.

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PWS# 4100682 PRINEVILLE, CITY OF

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
61	Confined Animal Feeding Operations (CAFOs)	Potential Confined Animal Feeding Area with aboveground storage tank	Ochoco Highway	Prineville	Field-Observation	Between 5-yr and 10-yr TOT for Stearns Well	Higher	Improper storage and management of animal wastes and wastewater in areas of concentrated livestock may impact drinking water.	PWS should verify nature of operation and potential risk.
	Above Ground Storage Tanks - Excluding Water						Moderate	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	PWS should verify nature of operation and potential risk.
	Above Ground Storage Tanks - Excluding Water					Between 5-yr and 10-yr TOT for Barney Well	Moderate	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	PWS should verify nature of operation and potential risk.
	Confined Animal Feeding Operations (CAFOs)					Between 5-yr and 10-yr TOT for Stadium Well	Higher	Improper storage and management of animal wastes and wastewater in areas of concentrated livestock may impact drinking water.	PWS should verify nature of operation and potential risk.
	Confined Animal Feeding Operations (CAFOs)					Between 5-yr and 10-yr TOT for Barney Well	Higher	Improper storage and management of animal wastes and wastewater in areas of concentrated livestock may impact drinking water.	PWS should verify nature of operation and potential risk.
	Above Ground Storage Tanks - Excluding Water					Between 5-yr and 10-yr TOT for Stadium Well	Moderate	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	PWS should verify nature of operation and potential risk.

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PWS# 4100682 PRINEVILLE, CITY OF

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
62	Confined Animal Feeding Operations (CAFOs)	Potential Confined Animal Feeding Area with aboveground storage tank	Ochoco Highway	Prineville	Field-Observation	Between 5-yr and 10-yr TOT for Barney Well	Higher	Improper storage and management of animal wastes and wastewater in areas of concentrated livestock may impact drinking water.	
	Confined Animal Feeding Operations (CAFOs)					Between 5-yr and 10-yr TOT for Stadium Well	Higher	Improper storage and management of animal wastes and wastewater in areas of concentrated livestock may impact drinking water.	
	Confined Animal Feeding Operations (CAFOs)					Between 5-yr and 10-yr TOT for Stearns Well	Higher	Improper storage and management of animal wastes and wastewater in areas of concentrated livestock may impact drinking water.	
	Above Ground Storage Tanks - Excluding Water					Between 5-yr and 10-yr TOT for Barney Well	Moderate	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	
	Above Ground Storage Tanks - Excluding Water					Between 5-yr and 10-yr TOT for Stearns Well	Moderate	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	
	Above Ground Storage Tanks - Excluding Water					Between 5-yr and 10-yr TOT for Stadium Well	Moderate	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# 4100682 PRINEVILLE, CITY OF

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
63	Housing - High Density (> 1 House/0.5 acres)	High Density Housing	Throughout DWPA	Prineville	Field-Observation	Between 5-yr and 10-yr TOT for Stadium Well	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.	
	Septic Systems - High Density (> 1 system/acre)					Between 5-yr and 10-yr TOT for Barney Well	Higher	If not properly sited, designed, installed, and maintained, septic systems can impact drinking water. Cumulative effects of multiple systems in an area may impact drinking water supply.	
	Septic Systems - High Density (> 1 system/acre)					Between 5-yr and 10-yr TOT for Stadium Well	Higher	If not properly sited, designed, installed, and maintained, septic systems can impact drinking water. Cumulative effects of multiple systems in an area may impact drinking water supply.	
	Septic Systems - High Density (> 1 system/acre)					Between 5-yr and 10-yr TOT for Stearns Well	Higher	If not properly sited, designed, installed, and maintained, septic systems can impact drinking water. Cumulative effects of multiple systems in an area may impact drinking water supply.	
	Housing - High Density (> 1 House/0.5 acres)						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.	
	Housing - High Density (> 1 House/0.5 acres)					Between 5-yr and 10-yr TOT for Barney Well	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 2. INVENTORY RESULTS - LIST OF POTENTIAL CONTAMINANT SOURCES

PWS# 4100682 PRINEVILLE, CITY OF

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
64	Crops - Irrigated (inc. orchards, vineyards, nurseries, greenhouses)	Sod Farm	South of Hwy 26	Prineville	Field-Observation	Between 5-yr and 10-yr TOT for Barney Well	Moderate	Over-application or improper handling of pesticides/fertilizers may impact drinking water. Excessive irrigation may transport contaminants or sediments to groundwater/surface water through runoff. Drip-irrigated crops are considered to be a low risk.	
	Crops - Irrigated (inc. orchards, vineyards, nurseries, greenhouses)					Between 5-yr and 10-yr TOT for Stearns Well	Moderate	Over-application or improper handling of pesticides/fertilizers may impact drinking water. Excessive irrigation may transport contaminants or sediments to groundwater/surface water through runoff. Drip-irrigated crops are considered to be a low risk.	
	Crops - Irrigated (inc. orchards, vineyards, nurseries, greenhouses)					Between 5-yr and 10-yr TOT for Stadium Well	Moderate	Over-application or improper handling of pesticides/fertilizers may impact drinking water. Excessive irrigation may transport contaminants or sediments to groundwater/surface water through runoff. Drip-irrigated crops are considered to be a low risk.	
65	Homesteads - Rural - Septic Systems (< 1/acre)	Rural homes with septic systems and private wells	Throughout DWPA	Prineville	Field-Observation	Within the 2-yr TOT for Barney Well	Lower	If not properly sited, designed, installed, and maintained, septic systems can impact drinking water. Use of drain cleaners and dumping household hazardous wastes can result in groundwater contamination.	
	Homesteads - Rural - Septic Systems (< 1/acre)					Within the 2-yr TOT for Stearns Well	Lower	If not properly sited, designed, installed, and maintained, septic systems can impact drinking water. Use of drain cleaners and dumping household hazardous wastes can result in groundwater contamination.	

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TABLE 2. INVENTORY RESULTS - LIST OF POTENTIAL CONTAMINANT SOURCES

PWS# 4100682 PRINEVILLE, CITY OF

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
66	Parks	Park	Harwood Street	Prineville	Field-Observation	Within the 2-yr TOT for Yancy Well	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.	
67	Utility Stations - Maintenance Transformer Storage	Substation	Fairmont Street	Prineville	Field-Observation	Within the 2-yr TOT for Yancy Well	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.	
68	Furniture/Lumber/Parts Stores	Parr Lumber Co.	N. Main Street	Prineville	Database (2) Field-Observation	Within the 2-yr TOT for Yancy Well	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.	
69	Automobiles - Repair Shops	Robert Bailey Used Cars	Main Street	Prineville	Field-Observation	Within the 2-yr TOT for Yancy Well	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.	
70	UST - Status Unknown	Ray's Auto Motor Car Wash	Main Street	Prineville	Database (2)	Within the 2-yr TOT for Yancy Well	Higher	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	PCS location based on regulatory database search - needs verification.
	Automobiles - Car Washes						Moderate	Improper management of vehicle wash water may result in soaps, oils, greases, and metals impacting the drinking water supply.	PCS location based on regulatory database search - needs verification.

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PWS# 4100682 PRINEVILLE, CITY OF

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
71	UST - Upgraded/Registered - Active	Main Station Express	N. Main Street	Prineville	Database (2) Field-Observation	Within the 2-yr TOT for Yancy Well	Lower	Spills or improper handling during tank filling or product distribution may impact the drinking water supply.	
	Automobiles - Gas Stations						Higher	Spills, leaks, or improper handling of fuels and other materials during transportation, transfer, and storage may impact the drinking water supply.	
72	Chemical/Petroleum Processing/Storage	Your Paint Box	10th and Lamonta Road	Prineville	Database (2) Field-Observation	Within the 2-yr TOT for Yancy Well	Higher	Spills, leaks, or improper handling of chemicals and other materials during transportation, use, storage and disposal may impact the drinking water supply.	
73	Chemical/Petroleum Processing/Storage	City of Prineville Railway	Station House - 985 feet west of 185 E. 10th	Prineville	Database (2)	Within the 2-yr TOT for Yancy Well	Higher	Spills, leaks, or improper handling of chemicals and other materials during transportation, use, storage and disposal may impact the drinking water supply.	PCS location based on regulatory database search - needs verification.
74	Chemical/Petroleum Processing/Storage	Duckett Welding	N. Beaver	Prineville	Database (2) Field-Observation	Within the 2-yr TOT for Yancy Well	Higher	Spills, leaks, or improper handling of chemicals and other materials during transportation, use, storage and disposal may impact the drinking water supply.	
75	Transportation - Railroads	Railroad	Runs through DWPA	Prineville	Field-Observation	Within the 2-yr TOT for Yancy Well	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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Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
76	Junk/Scrap/Salvage Yards	Mor Diesel Truck Repair	N. Clay Pool	Prineville	Database (2) Field-Observation	Within the 2-yr TOT for Yancy Well	Higher	Spills, leaks, or improper handling of automotive chemicals, batteries, and other waste materials during storage and disposal may impact the drinking water supply.	
	Above Ground Storage Tanks - Excluding Water						Moderate	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.	
77	Wood/Pulp/Paper Processing and Mills	Clear Pine Moldings	N. Main Street	Prineville	Database (2) Field-Observation	Within the 2-yr TOT for Yancy Well	Higher	Spills, leaks, or improper handling of wood preservatives and other chemicals during transportation, use, storage and disposal may impact the drinking water supply.	
78	Other - State cleanup site (ECSI)	Prineville Railroad Buried Vault	Lamonta Rd and Deer Street (NW corner of)	Prineville	Database (2)	Within the 2-yr TOT for Yancy Well	Higher	The impacts of this potential contaminant source will be addressed during the enhanced inventory.	PCS location based on regulatory database search - needs verification.
79	Fleet/Trucking/Bus Terminals	Ochoco Irrigation District	N. Deer Street	Prineville	Database (2) Field-Observation	Within the 2-yr TOT for Yancy Well	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.	
	Above Ground Storage Tanks - Excluding Water						Moderate	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# 4100682 PRINEVILLE, CITY OF

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
80	Above Ground Storage Tanks - Excluding Water	Overall Petroleum Bulk Plant	NW Lamonta Road	Prineville	Database (2) Field-Observation	Within the 2-yr TOT for Yancy Well	Moderate	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	Also listed as Walt Haynes Estate.
	Chemical/Petroleum Processing/Storage						Higher	Spills, leaks, or improper handling of chemicals and other materials during transportation, use, storage and disposal may impact the drinking water supply.	Also listed as Walt Haynes Estate.
	Automobiles - Gas Stations						Higher	Spills, leaks, or improper handling of fuels and other materials during transportation, transfer, and storage may impact the drinking water supply.	Also listed as Walt Haynes Estate.
	UST - Not Upgraded and/or Registered Tanks						Higher	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	Also listed as Walt Haynes Estate.
81	Fleet/Trucking/Bus Terminals	US Forest Service Ochoco National Forest office	NW Lamonta Road	Prineville	Field-Observation	Within the 2-yr TOT for Yancy Well	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.	
82	Automobiles - Repair Shops	Myrmo and Sons	Harwood Street	Prineville	Field-Observation	Between 2-yr and 5-yr TOT for Yancy Well	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.	
83	RV/Mini Storage	Prineville Self Storage	Harwood Street	Prineville	Field-Observation	Between 2-yr and 5-yr TOT for Yancy Well	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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PWS# 4100682 PRINEVILLE, CITY OF

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
84	Medical/Vet Offices	Animal Hospital	Harwood Street	Prineville	Field-Observation	Between 2-yr and 5-yr TOT for Yancy Well	Moderate	Spills, leaks, or improper handling of x-ray, biological, chemical, and radioactive wastes and other materials during transportation, use, storage and disposal may impact the drinking water supply.	
85	Automobiles - Repair Shops	City Public Works	N. Lamonta Street	Prineville	Database (2) Field-Observation	Between 2-yr and 5-yr TOT for Yancy Well	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.	
	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.	
	Above Ground Storage Tanks - Excluding Water						Moderate	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	
86	Other - Unknown operation	Unknown operation	N. Lamonta Street	Prineville	Field-Observation	Between 2-yr and 5-yr TOT for Yancy Well	Moderate	The impacts of this potential contaminant source will be addressed during the enhanced inventory.	Steel drums observed on site.
87	Fleet/Trucking/Bus Terminals	Economy Rentals	N. Lamonta	Prineville	Field-Observation	Between 2-yr and 5-yr TOT for Yancy Well	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.	
88	Cemeteries - Pre-1945	Cemetery	N. Main Street	Prineville	Field-Observation	Between 2-yr and 5-yr TOT for Yancy Well	Moderate	Embalming fluids (for example, arsenic) and decomposition by-products may impact drinking water supply.	
	Cemeteries - Pre-1945					Between 5-yr and 10-yr TOT for Lamonta Well	Moderate	Embalming fluids (for example, arsenic) and decomposition by-products may impact drinking water supply.	

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TABLE 2. INVENTORY RESULTS - LIST OF POTENTIAL CONTAMINANT SOURCES

PWS# 4100682 PRINEVILLE, CITY OF

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
89	Cement/Concrete Plants	Ochoco Ready Mix	N. Elm Street	Prineville	Field-Observation	Between 2-yr and 5-yr TOT for Yancy Well	Moderate	Spills, leaks, or improper handling of chemicals and high turbidity wastewaters during transportation, use, storage and disposal may impact the drinking water supply.	
90	Automobiles - Body Shops	Dave Barlow's Auto Body	N. Main Street	Prineville	Database (2) Field-Observation	Between 2-yr and 5-yr TOT for Yancy Well	Higher	Improper management of vehicle paints, thinners, and primer products may impact the drinking water supply.	
91	Parking Lots/Malls (> 50 Spaces)	Large Parking Lot	N. Main Street	Prineville	Field-Observation	Between 2-yr and 5-yr TOT for Yancy Well	Higher	Spills and leaks of automotive fluids in parking lots may impact the drinking water supply.	
92	Chemical/Petroleum Processing/Storage	Prineville Funeral Home	NE 10th Street	Prineville	Database (2) Field-Observation	Between 2-yr and 5-yr TOT for Yancy Well	Higher	Spills, leaks, or improper handling of chemicals and other materials during transportation, use, storage and disposal may impact the drinking water supply.	
93	RV/Mini Storage	Mini-Stor	10th Street	Prineville	Field-Observation	Between 2-yr and 5-yr TOT for Yancy Well	Lower	Spills, leaks, or improper handling of automotive fluids and other materials during transportation, storage and disposal may impact the drinking water supply.	
94	Fleet/Trucking/Bus Terminals	Hooker Creek Equipment Rental	10th Street and Court Street	Prineville	Field-Observation	Between 2-yr and 5-yr TOT for Yancy Well	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.	

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TABLE 2. INVENTORY RESULTS - LIST OF POTENTIAL CONTAMINANT SOURCES

PWS# 4100682 PRINEVILLE, CITY OF

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
95	Medical/Vet Offices	Pioneer Memorial Hospital	NE Elm Street	Prineville	Database (2) Field-Observation	Between 2-yr and 5-yr TOT for Yancy Well	Moderate	Spills, leaks, or improper handling of x-ray, biological, chemical, and radioactive wastes and other materials during transportation, use, storage and disposal may impact the drinking water supply.	
	Above Ground Storage Tanks - Excluding Water						Moderate	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	
96	Medical/Vet Offices	Ochoco Care Center	N. Elm Street	Prineville	Field-Observation	Between 2-yr and 5-yr TOT for Yancy Well	Moderate	Spills, leaks, or improper handling of x-ray, biological, chemical, and radioactive wastes and other materials during transportation, use, storage and disposal may impact the drinking water supply.	
97	UST - Confirmed Leaking Tanks - DEQ List	Prineville Community Church	N. Elm Street	Prineville	Database (2) Field-Observation	Between 2-yr and 5-yr TOT for Yancy Well	Higher	Existing contamination from spills, leaks, or improper handling of stored materials may impact the drinking water supply.	
98	Automobiles - Repair Shops	Crown Auto Craft	NE 5th Street	Prineville	Database (2)	Between 2-yr and 5-yr TOT for Yancy Well	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.	PCS location based on regulatory database search - needs verification.
99	Photo Processing/Printing	Central Oregonian	N. Main Street	Prineville	Database (2) Field-Observation	Between 2-yr and 5-yr TOT for Yancy Well	Higher	Spills, leaks, or improper handling of photographic chemicals 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# 4100682 PRINEVILLE, CITY OF

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
100	UST - Decommissioned/Inactive	Terry's Auto Repair	N. Main Street	Prineville	Database (2) Field-Observation	Between 2-yr and 5-yr TOT for Yancy Well	Lower	Historic spills or leaks may impact the drinking water supply.	Also listed as Floreine Hudspeth.
	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.	Also listed as Floreine Hudspeth.
101	Automobiles - Body Shops	Showcraft Industrial	N. Main Street	Prineville	Database (2)	Between 2-yr and 5-yr TOT for Yancy Well	Higher	Improper management of vehicle paints, thinners, and primer products may impact the drinking water supply.	PCS location based on regulatory database search - needs verification.
	Chemical/Petroleum Processing/Storage						Higher	Spills, leaks, or improper handling of chemicals and other materials during transportation, use, storage and disposal may impact the drinking water supply.	PCS location based on regulatory database search - needs verification.
102	UST - Decommissioned/Inactive	Bishops Car Wash and Tire Service	740 N. Main Street	Prineville	Database (2) Field-Observation	Between 2-yr and 5-yr TOT for Yancy Well	Lower	Historic spills or leaks may impact the drinking water supply.	
103	Automobiles - Repair Shops	Bishops Car Wash and Tire Service	790 N. Main Street	Prineville	Database (2) Field-Observation	Between 2-yr and 5-yr TOT for Yancy Well	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.	
104	Other - Irrigation canal/ditch	Ryegrass Ditch	Runs through DWPA	Prineville	Field-Observation	Within the 2-yr TOT for Lamonta Well	Moderate	The impacts of this potential contaminant source will be addressed during the enhanced inventory.	

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TABLE 2. INVENTORY RESULTS - LIST OF POTENTIAL CONTAMINANT SOURCES

PWS# 4100682 PRINEVILLE, CITY OF

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
105	RV/Mini Storage	Rhoden Storage	Smith	Prineville	Field-Observation	Within the 2-yr TOT for Lamonta Well	Lower	Spills, leaks, or improper handling of automotive fluids and other materials during transportation, storage and disposal may impact the drinking water supply.	
106	Above Ground Storage Tanks - Excluding Water	Residential aboveground storage tanks	Throughout DWPA	Prineville	Field-Observation	Within the 2-yr TOT for Lamonta Well	Moderate	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	
107	Fleet/Trucking/Bus Terminals	Crook Co. Unit School District - School Bus Yard	Lamonta Road	Prineville	Database (2) Field-Observation	Within the 2-yr TOT for Lamonta Well	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.	
	Above Ground Storage Tanks - Excluding Water						Moderate	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	
108	Automobiles - Repair Shops	Barrs Truck	Lamonta Road	Prineville	Field-Observation	Within the 2-yr TOT for Lamonta Well	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.	PWS should verify potential risk.

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PWS# 4100682 PRINEVILLE, CITY OF

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
109	Above Ground Storage Tanks - Excluding Water	Chevron/Carson Oil	N. Lamonta Road	Prineville	Database (2) Field-Observation	Within the 2-yr TOT for Lamonta Well	Moderate	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	
	Other - State cleanup site (ECSI)						Higher	The impacts of this potential contaminant source will be addressed during the enhanced inventory.	
	Automobiles - Gas Stations						Higher	Spills, leaks, or improper handling of fuels and other materials during transportation, transfer, and storage 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.	
110	RV/Mini Storage	Goodman Storage	N. Lamonta Road	Prineville	Field-Observation	Within the 2-yr TOT for Lamonta Well	Lower	Spills, leaks, or improper handling of automotive fluids and other materials during transportation, storage and disposal may impact the drinking water supply.	
111	Furniture/Lumber/Parts Stores	Lumber Storage	N. Lamonta Road	Prineville	Field-Observation	Within the 2-yr TOT for Lamonta Well	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.	
112	Above Ground Storage Tanks - Excluding Water	Consolidated Pine	NW Lamonta Road	Prineville	Database (2) Field-Observation	Within the 2-yr TOT for Lamonta Well	Moderate	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	PWS should verify business type and potential risk.
	Wood Preserving/Treating						Higher	Spills, leaks, or improper handling of chemicals and other materials during transportation, use, storage and disposal may impact the drinking water supply.	PWS should verify business type and potential risk.

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PWS# 4100682 PRINEVILLE, CITY OF

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
113	Other - Unknown operation	Unknown operation	Lamonta Road	Prineville	Field-Observation	Between 2-yr and 5-yr TOT for Lamonta Well	Moderate	The impacts of this potential contaminant source will be addressed during the enhanced inventory.	Unknown operations - needs verification.
114	RV/Mini Storage	Lamonta Mini-Storage	Lamonta Road	Prineville	Field-Observation	Between 2-yr and 5-yr TOT for Lamonta Well	Lower	Spills, leaks, or improper handling of automotive fluids and other materials during transportation, storage and disposal may impact the drinking water supply.	
115	Other - Industrial Facility	Unknown Operation	South of well by railroad tracks	Prineville	Field-Observation	Between 5-yr and 10-yr TOT for Lamonta Well	Higher	The impacts of this potential contaminant source will be addressed during the enhanced inventory.	
116	Waste Transfer/Recycling Stations	Prineville Disposal Reload Station	SW Corner Peters and NE Main	Prineville	Database (2)	Between 5-yr and 10-yr TOT for Lamonta Well	Moderate	Improper management of water contacting waste material may impact the drinking water supply.	PCS location based on regulatory database search - needs verification. PWS needs to verify location of facility.
117	Wood/Pulp/Paper Processing and Mills	American Pine Products	N Main Street	Prineville	Database (2) Field-Observation	Between 5-yr and 10-yr TOT for Lamonta Well	Higher	Spills, leaks, or improper handling of wood preservatives and other chemicals during transportation, use, storage and disposal may impact the drinking water supply.	
118	Other - Warehouse	Unknown Operation	Rolla Rd	Prineville	Field-Observation	Between 5-yr and 10-yr TOT for Lamonta Well	Moderate	The impacts of this potential contaminant source will be addressed during the enhanced inventory.	

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PWS# 4100682 PRINEVILLE, CITY OF

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
119	Homesteads - Rural - Machine Shops/Equipment Maintenance	Aboveground Storage Tank	Terrace Ln	Prineville	Field-Observation	Between 5-yr and 10-yr TOT for Lamonta Well	Higher	Spills, leaks, or improper handling of solvents, fuels, and other materials or chemicals during transportation, use, storage and disposal may impact the drinking water supply.	Potential risk should be verified during enhanced inventory.
	Above Ground Storage Tanks - Excluding Water						Moderate	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	Potential risk should be verified during enhanced inventory.
120	Homesteads - Rural - Machine Shops/Equipment Maintenance	Home Machine Shop	Apollo	Prineville	Field-Observation	Between 5-yr and 10-yr TOT for Lamonta Well	Higher	Spills, leaks, or improper handling of solvents, fuels, and other materials or chemicals during transportation, use, storage and disposal may impact the drinking water supply.	Potential risk and use should be verified during enhanced inventory.
121	Fleet/Trucking/Bus Terminals	Well Drilling and Pump Service	Prineville Airport	Prineville	Field-Observation	Within the 2-yr TOT for Airport Well	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.	
122	Airport - Maintenance/Fueling Area	Central Oregon Interagency Dispatch	Prineville Airport	Prineville	Field-Observation	Within the 2-yr TOT for Airport Well	Higher	Spills, leaks, or improper handling of fuels, de-icers, and other chemicals during transportation, use, storage and disposal may impact the drinking water supply.	Prineville Helibase
123	UST - Status Unknown	Prineville Aviation	Prineville Airport/Airport Road	Prineville	Database (2) Field-Observation	Within the 2-yr TOT for Airport Well	Higher	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	
	Airport - Maintenance/Fueling Area						Higher	Spills, leaks, or improper handling of fuels, de-icers, and other chemicals during transportation, use, storage and disposal may impact the drinking water supply.	

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PWS# 4100682 PRINEVILLE, CITY OF

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
124	Above Ground Storage Tanks - Excluding Water	Experimental Aircraft Assn.	Prineville Airport/Airport Road	Prineville	Field-Observation	Within the 2-yr TOT for Airport Well	Moderate	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	
125	Above Ground Storage Tanks - Excluding Water	Les Schwab Flight Dept.	Prineville Airport/Airport Road	Prineville	Database (2) Field-Observation	Within the 2-yr TOT for Airport Well	Moderate	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	Appears empty
126	Transportation - Freeways/State Highways/Other Heavy Use Roads	Highway 126	Runs through DWPA	Prineville	Field-Observation	Within the 2-yr TOT for Airport Well	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.	
127	Other - State cleanup site (ECSI)	Prineville Airport Pesticide Applicators	Prineville Airport	Prineville	Database (2)	Within the 2-yr TOT for Airport Well	Higher	The impacts of this potential contaminant source will be addressed during the enhanced inventory.	PCS location based on regulatory database search - needs verification.
128	UST - Decommissioned/Inactive	City of Prineville/Airport	Prineville Airport	Prineville	Database (2)	Within the 2-yr TOT for Airport Well	Lower	Historic spills or leaks may impact the drinking water supply.	PCS location based on regulatory database search - needs verification.
	Airport - Maintenance/Fueling Area						Higher	Spills, leaks, or improper handling of fuels, de-icers, and other chemicals during transportation, use, storage and disposal may impact the drinking water supply.	PCS location based on regulatory database search - needs verification.

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PWS# 4100682 PRINEVILLE, CITY OF

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
129	RV/Mini Storage	RV Storage	Prineville Airport	Prineville	Field-Observation	Between 2-yr and 5-yr TOT for Airport Well	Lower	Spills, leaks, or improper handling of automotive fluids and other materials during transportation, storage and disposal may impact the drinking water supply.	
	Above Ground Storage Tanks - Excluding Water						Moderate	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	
130	Other - Unknown operation	Unknown operation	Prineville Airport	Prineville	Field-Observation	Between 2-yr and 5-yr TOT for Airport Well	Moderate	The impacts of this potential contaminant source will be addressed during the enhanced inventory.	Unknown operations - needs verification.
131	Automobiles - Gas Stations	CFN Gas Station (Cardlock)	SW Millican Road	Prineville	Field-Observation	Between 5-yr and 15-yr TOT for Airport Well	Higher	Spills, leaks, or improper handling of fuels and other materials during transportation, transfer, and storage may impact the drinking water supply.	
	Above Ground Storage Tanks - Excluding Water						Moderate	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	
132	Automobiles - Repair Shops	Les Schwab	SW Millican Road	Prineville	Database (2) Field-Observation	Between 5-yr and 15-yr TOT for Airport Well	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.	
	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.	
	Injection/Dry Wells, Sumps - Class V UICs - stormwater drainage						Higher	Shallow injection wells may transport untreated wastewater (process or storm water) directly into groundwater and impact drinking water.	

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TABLE 3. RESULTS OF REGULATORY DATABASE SEARCH

PWS# 4100682 PRINEVILLE, CITY OF

Reference No. (1)	Name	Database Listings (2)
10	US Postal Service	UIC list with 7 Active UIC's Classified as Storm Water Drainage
13	Crook County Unit School	SFM - Fuel Oil #5 stored in Underground Tank
14	Crook County Unit School Bus Garage	LUST list with unknown status
		SFM - Chemco 2742 stored in Plastic Or Non-metallic Drum
		SFM - Product 2742 stored in Plastic Or Non-metallic Drum
		UST list-PWS needs to verify tank permit status
15	Texaco Service Station	ECSI site with a confirmed release.
		LUST list with unknown status
		UST list-PWS needs to verify tank permit status
16	Downtown Prineville Groundwater Contamination	ECSI site with suspected contamination.
18	Crook County Parks and Recreation	SFM - Sodium Hypochlorite 12% Solution stored in Plastic Or Non-metallic Drum
19	B&S Logging	SFM - Gasoline stored in Aboveground Tank
		ECSI site with suspected contamination.
		SFM - Diesel Fuel stored in Aboveground Tank
22	Les Schwab	SFM - White Wall Cleaner stored in Steel Drum
		SFM - Calcium Chloride stored in Bag
		SFM - Lead Wheel Weights stored in Box
23	Crook County Unit School District	SFM - Fuel Oil stored in Underground Tank
24	Ochoco Plaza Cleaners	ECSI site with no further state action required.

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# 4100682 PRINEVILLE, CITY OF

Reference No. (1)	Name	Database Listings (2)
24	Ochoco Plaza Cleaners	SFM - Perchloromethyl Mercaptan stored in Other
25	Rite Aid	SFM - Floor Finish Remover stored in Plastic Bottle, Jug, Bucket SFM - Nutra Clean Deodorizing Floor Cleaner stored in Plastic Bottle, Jug, Bucket SFM - Perma Bright Floor Finish stored in Plastic Bottle, Jug, Bucket
28	Schrum Ford Sales Inc.	UST list-PWS needs to verify tank permit status
29	Shell Gas	UST list-PWS needs to verify tank permit status ECSI site with a confirmed release. LUST cleanup initiated on 11/23/1999. PWS should verify cleanup progress. LUST list with unknown status
30	Cross Street Station	UST list with a status of 3 UST(s) upgraded and 0 not upgraded to DEQ 1998 technical standards.
37	Crook County Schools	SFM - Fuel Oil stored in Underground Tank SFM - Fuel Oil stored in Underground Tank
39	Ochoco Lumber	ECSI site with suspected contamination.
47	Wallace L. Smith Trucking	UST list-PWS needs to verify tank permit status
48	Ochoco Manufacturing Co.	SFM - Resin stored in Steel Drum SFM - Waste Paint Thinner stored in Steel Drum SFM - Paint Thinner stored in Steel Drum SFM - Paint stored in Can SFM - Oil stored in Steel Drum

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# 4100682 PRINEVILLE, CITY OF

Reference No. (1)	Name	Database Listings (2)
48	Ochoco Manufacturing Co.	SFM - Cleaning Solvent stored in Steel Drum
		SFM - Adhere stored in Plastic Or Non-metallic Drum
		SFM - Acetone stored in Steel Drum
		HWIMSY list as a conditionally exempt generator.
		SFM - Diesel Fuel stored in Steel Drum
50	Ochoco Building/Columbia Development Group	UIC list with 1 Active UIC's Classified as Industrial Storm Water Drainage
		UIC list with 1 Active UIC's Classified as Direct Heat Reinjection
51	Oregon Dept. of Forestry (ODF)	SFM - Waste Oil stored in Aboveground Tank
		SFM - Unocal Guardol M O 15w/40 stored in Steel Drum
52	Oregon Dept. of Transportation (ODOT)	SFM - Waste Oil stored in Aboveground Tank
		SFM - Transmission Fluid stored in Steel Drum
		SFM - Oil, Petroleum, N.o.s. stored in Steel Drum
		SFM - Hydraulic Oil stored in Steel Drum
		SFM - Diesel Fuel stored in Aboveground Tank
		SFM - Gasoline stored in Aboveground Tank
53	Dave's Auto Wrecking	SFM - Diesel stored in Aboveground Tank
		SFM - Gasoline stored in Aboveground Tank
54	Bob Sabin's Auto Repair	UST list-PWS needs to verify tank permit status
		LUST list with unknown status
57	Willamette Thoroughbred	SFM - Diesel Fuel stored in Aboveground 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# 4100682 PRINEVILLE, CITY OF

Reference No. (1)	Name	Database Listings (2)
68	Parr Lumber Co.	SFM - Concrete Mix stored in Bag
		SFM - Lime stored in Bag
		SFM - Silica Sand stored in Bag
		SFM - Cement stored in Bag
70	Ray's Auto Motor Car Wash	UST list-PWS needs to verify tank permit status
71	Main Station Express	SFM - Diesel stored in Underground Tank
		SFM - Gasoline Unleaded stored in Underground Tank
		UST list with a status of 4 UST(s) upgraded and 0 not upgraded to DEQ 1998 technical standards.
72	Your Paint Box	SFM - Lacquer Thinner stored in Can
		SFM - Paint Thinner stored in Plastic Bottle, Jug, Bucket
		SFM - Lacquer stored in Can
74	Duckett Welding	SFM - Used Oil stored in Steel Drum
76	Mor Diesel Truck Repair	SFM - Oxygen stored in Tank Inside Building
		SFM - Used Motor Oil stored in Aboveground Tank
77	Clear Pine Moldings	SFM - Woodlife F stored in Tank Inside Building
		SFM - Pure Chlor Sanitizer stored in Plastic Or Non-metallic Drum
		SFM - Paint Water Based stored in Steel Drum
		SFM - Paints - Solvent stored in Steel Drum
		SFM - Paint Latex stored in Can
		SFM - Paracol 700n stored in Steel Drum
		SFM - Poly Patch B stored in Steel Drum
		SFM - Polyurethane Adhesive stored in Steel Drum

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# 4100682 PRINEVILLE, CITY OF

Reference No. (1)	Name	Database Listings (2)
77	Clear Pine Moldings	SFM - Pva Glue stored in Tank Inside Building
		SFM - Solvents-embark stored in Steel Drum
		SFM - Tanner Gas stored in Steel Drum
		SFM - Transmission Fluid stored in Steel Drum
		SFM - Waste Oil stored in Steel Drum
		SFM - Paint Enamel stored in Can
		SFM - Waste Woodlife stored in Steel Drum
		SFM - Gasoline stored in Aboveground Tank
		SIS list with a GEN12Z NPDES for stormwater from industrial activities.
		SFM - Waste Paint Material stored in Totebin
		SFM - Catalyst-aluminum Chloride stored in Plastic Or Non-metallic Drum
		ECSI site with suspected contamination.
		HWIMSY list as a large quantity generator of dangerous/hazardous waste.
		SFM - Antifreeze stored in Steel Drum
		SFM - Hydraulic Oil stored in Steel Drum
		SFM - Calcium Chloride stored in Bag
		SFM - Nalco 2828 Plus stored in Steel Drum
		SFM - Chemcoa S766 stored in Plastic Or Non-metallic Drum
		SFM - Cp Oil (air Line Oil) stored in Steel Drum
		SFM - Cpm Blend stored in Steel Drum
		SFM - Diesel stored in Aboveground Tank
		SFM - Ds-100-g Flocculant stored in Steel Drum
		SFM - Duraloc Glue stored in Totebin

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# 4100682 PRINEVILLE, CITY OF

Reference No. (1)	Name	Database Listings (2)
77	Clear Pine Moldings	SFM - Greases And Lubricants stored in Can
		SFM - Isoset Cx-47 stored in Steel Drum
		SFM - Isoset Wd3-a312 stored in Tank Inside Building
		SFM - Motor Oil stored in Steel Drum
		SFM - Berryman B-12 stored in Can
78	Prineville Railroad Buried Vault	ECSI site with suspected contamination.
79	Ochoco Irrigation District	SFM - Aquatic Weed Killer stored in Aboveground Tank
		SFM - Copper Sulfate stored in Bag
		SFM - Magnacide H Herbicide stored in Cylinder
		UST list-PWS needs to verify tank permit status
80	Overall Petroleum Bulk Plant	HWIMSY list as a conditionally exempt generator.
		UST list with a status of 0 UST(s) upgraded and 2 not upgraded to DEQ 1998 technical standards.
		LUST cleanup initiated on 11/1/1989. PWS should verify cleanup progress.
		SFM - Diesel #2 High Sulfur stored in Aboveground Tank
		SFM - Diesel Fuel #2 Low Sulfur stored in Aboveground Tank
		SFM - Gasoline Unleaded stored in Aboveground Tank
		SFM - Gasoline Unleaded Supreme stored in Aboveground Tank
		SFM - Heating Fuel #1 stored in Aboveground Tank
		SFM - Kerosene stored in Aboveground Tank
		SFM - Motor Oil stored in Plastic Or Non-metallic Drum
		SFM - Solvent 325 stored in Steel Drum

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# 4100682 PRINEVILLE, CITY OF

Reference No. (1)	Name	Database Listings (2)
80	Overall Petroleum Bulk Plant	ECSI site with suspected contamination.
85	City Public Works	SFM - Diesel Fuel stored in Aboveground Tank
		SFM - Motor Oil stored in Steel Drum
90	Dave Barlow's Auto Body	SFM - Stove Oil stored in Steel Drum
92	Prineville Funeral Home	SFM - Introfiant stored in Plastic Bottle, Jug, Bucket
		SFM - Silktex stored in Plastic Bottle, Jug, Bucket
		SFM - Plasdo-25 stored in Plastic Bottle, Jug, Bucket
		SFM - Rectifiant stored in Plastic Bottle, Jug, Bucket
		SFM - Pierce Solvex Thinner stored in Plastic Bottle, Jug, Bucket
		SFM - Pierce Blender stored in Plastic Bottle, Jug, Bucket
		SFM - Metasyn stored in Plastic Bottle, Jug, Bucket
		SFM - Metaflow stored in Plastic Bottle, Jug, Bucket
		SFM - Dodge Dis-spray stored in Plastic Bottle, Jug, Bucket
		SFM - Restorative stored in Plastic Bottle, Jug, Bucket
		SFM - Feature Builder stored in Plastic Bottle, Jug, Bucket
		SFM - Chromatech Pink stored in Plastic Bottle, Jug, Bucket
		SFM - Dodge Syncav - Cavity Embalming Fluid stored in Plastic Bottle, Jug, Bucket
		SFM - Dodge Syngel stored in Plastic Bottle, Jug, Bucket
		SFM - Dry Wash stored in Plastic Bottle, Jug, Bucket
		SFM - Dryene stored in Plastic Bottle, Jug, Bucket
		SFM - Edemaco stored in Plastic Bottle, Jug, Bucket
95	Pioneer Memorial Hospital	SFM - Oxygen Liquid stored in Aboveground 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# 4100682 PRINEVILLE, CITY OF

Reference No. (1)	Name	Database Listings (2)
97	Prineville Community Church	LUST cleanup initiated on 8/27/1998. PWS should verify cleanup progress.
98	Crown Auto Craft	HWIMSY list as a conditionally exempt generator.
		SFM - Lacquer Thinner stored in Steel Drum
		SFM - Paint stored in Can
99	Central Oregonian	SFM - Water Work S Developer stored in Plastic Bottle, Jug, Bucket
		SFM - Colorlock Universal Fixer stored in Plastic Bottle, Jug, Bucket
		SFM - Quick Fix stored in Plastic Bottle, Jug, Bucket
		SFM - Colorlock Rapid Access Developer stored in Plastic Bottle, Jug, Bucket
		SFM - Blanket Wash 10p stored in Tank Inside Building
		SFM - Foto Liquid Scanner Developer stored in Plastic Bottle, Jug, Bucket
		SFM - Ink stored in Steel Drum
100	Terry's Auto Repair	SFM - Chassis Lube stored in Steel Drum
		UST list-PWS needs to verify tank permit status
		SFM - Window Cleaner stored in Plastic Bottle, Jug, Bucket
		SFM - Used Motor Oil stored in Steel Drum
		SFM - Solvent stored in Steel Drum
		SFM - Motor Oil stored in Tank Inside Building
		SFM - Lead Acid Batteries-wet stored in Other
		SFM - Gear Oil stored in Steel Drum
		SFM - Carburetor Cleaner stored in Can
		SFM - Antifreeze stored in Plastic Bottle, Jug, Bucket

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# 4100682 PRINEVILLE, CITY OF

Reference No. (1)	Name	Database Listings (2)
100	Terry's Auto Repair	LUST list with unknown status
		HWIMSY list as a conditionally exempt generator.
		SFM - Hot Tank Spraycab stored in Tank Inside Building
101	Showcraft Industrial	SFM - Diesel stored in Aboveground Tank
102	Bishops Car Wash and Tire Service	LUST list with unknown status
103	Bishops Car Wash and Tire Service	SFM - Lead Acid Batteries-wet stored in Other
107	Crook Co. Unit School District - School Bus Yard	SFM - Diesel Fuel #2 stored in Aboveground Tank
		SFM - Duplicating Fluid stored in Plastic Bottle, Jug, Bucket
		SFM - Gasoline Unleaded stored in Aboveground Tank
		SFM - Motor Oil stored in Steel Drum
		SFM - Waste Oil stored in Aboveground Tank
109	Chevron/Carson Oil	ECSI site with suspected contamination.
		SFM - Solvents/motor Oils stored in Steel Drum
		SFM - Petroleum Naphtha stored in Aboveground Tank
		SFM - Methylene Chloride stored in Steel Drum
		SFM - Kerosene stored in Aboveground Tank
		SFM - Gasoline stored in Aboveground Tank
		SFM - Acetone stored in Steel Drum
		SFM - Diesel stored in Aboveground Tank
112	Consolidated Pine	SFM - Motor Oil stored in Aboveground Tank
		SFM - Diesel Fuel stored in Aboveground Tank
		SFM - Gasoline stored in Aboveground 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# 4100682 PRINEVILLE, CITY OF

Reference No. (1)	Name	Database Listings (2)
112	Consolidated Pine	SFM - Adhesive stored in Plastic Or Non-metallic Drum
		SFM - Methyl Alcohol stored in Aboveground Tank
116	Prineville Disposal Reload Station	SWMS list-PWS needs to verify permit status.
117	American Pine Products	SFM - Urethane A Patch stored in Steel Drum
		SFM - Hydraulic Fluid stored in Aboveground Tank
		SFM - Latex Paint With Biocide stored in Totebin
		SFM - Paint Latex stored in Tank Inside Building
		SIS list with a GEN12Z NPDES for stormwater from industrial activities.
		SFM - Polyal 201 stored in Plastic Or Non-metallic Drum
		SFM - U-100-b Patch Catalyst stored in Steel Drum
		SFM - Wbc Concentrate stored in Steel Drum
		SFM - Wonderbond Hardener stored in Plastic Or Non-metallic Drum
		SFM - Woodlife F stored in Underground Tank
		SFM - Calcium Chloride Pellets stored in Bag
		SFM - Gear Lubricant Sae 80-90 stored in Tank Inside Building
		SFM - Thinner 325 stored in Steel Drum
		SFM - 1 Clear Lube stored in Plastic Bottle, Jug, Bucket
		SFM - Cascoset Fm 302-w stored in Fiber Drum
		HWIMSY list as a conditionally exempt generator.
		SFM - Gasoline stored in Aboveground Tank
		SFM - Acetone stored in Steel Drum
		SFM - B-40 Polymer stored in Plastic Or Non-metallic Drum
		SFM - Borden Casco Resin stored in Totebin

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# 4100682 PRINEVILLE, CITY OF

Reference No. (1)	Name	Database Listings (2)
117	American Pine Products	SFM - Calcium Hydroxide (lime) stored in Bag SFM - Chevron Dexron Iii stored in Steel Drum SFM - Chevron Oils Fluids (various) stored in Steel Drum SFM - Chevron Soluable B Oil stored in Steel Drum SFM - Diesel Fuel stored in Aboveground Tank SFM - Borden Exterior Glue stored in Tank Inside Building
123	Prineville Aviation	SFM - Aviation Fuel stored in Underground Tank SFM - Jet Fuel stored in Underground Tank SFM - Aeroshell 15w-50 stored in Steel Drum
125	Les Schwab Flight Dept.	SFM - Dice Flash 190 stored in Steel Drum SFM - Thinner 325 stored in Steel Drum SFM - Aviation Fuel stored in Steel Drum
127	Prineville Airport Pesticide Applicators	ECSI site with a confirmed release.
128	City of Prineville/Airport	LUST list with unknown status UST list with a status of 2 UST(s) upgraded and 0 not upgraded to DEQ 1998 technical standards.
132	Les Schwab	UIC list with 2 Active UIC's Classified as Industrial Storm Water Drainage

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.

Stearns Well

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.

CROO 2083

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

RECEIVED FEB 6 1973 STATE ENGINEER SALEM OREGON

State Well No. 15S/16E-4ad
State Permit No. G-6313

(1) OWNER:
Name PACIFIC POWER AND LIGHT
Address PUBLIC SERVICE BLDG. PORTLAND, ORE. 97204

(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 ☒
24" Diam. from +1 ft. to 225 ft. Gage .375
12" Diam. from +2 ft. to 226 ft. Gage .330
" 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 U.O.P. JOHNSON
Type STAINLESS STEEL Model No.
Diam. 12 Slot size 130 Set from 226 ft. to 246 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? STRASSER
Yield: 820 gal./min. with 136 ft. drawdown after 10 hrs.
550 " 73 " 12 "
" " "
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow 100 g.p.m.
Temperature of water 56° Depth artesian flow encountered 223 ft.

(9) CONSTRUCTION:
CEMENT GROUT FROM 32 FT. TO 75 FT.
Well seal—Material used READY MIX 0-32 FT
Well sealed from land surface to 75 ft.
Diameter of well bore to bottom of seal 30 in.
Diameter of well bore below seal 24 in.
Number of sacks of cement used in well seal 38 sacks
Number of sacks of bentonite used in well seal sacks
Brand name of bentonite
Number of pounds of bentonite per 100 gallons of water lbs./100 gals.
Was a drive shoe used? ☒ Yes ☐ No Plugs Size: location ft.
Did any strata contain unusable water? ☐ Yes ☒ No
Type of water? depth of strata
Method of sealing strata off
Was well gravel packed? ☒ Yes ☐ No Size of gravel: 3/8-1/8
Gravel placed from 226 ft. to 246 ft.

(10) LOCATION OF WELL:
County CROOK Driller's well number 5430
SE ¼ NE ¼ Section 4 T. 15S R. 16E W.M.
Bearing and distance from section or subdivision corner

(11) WATER LEVEL: Completed well.
Depth at which water was first found 223 ft.
Static level ft. below land surface. Date
Artesian pressure 3.5 lbs. per square inch. Date 1/22/73

(12) WELL LOG:
Diameter of well below casing —
Depth drilled 246 ft. Depth of completed well 246 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
SILTY SAND	0	13	
GRAVEL	13	24	
BLUE SILTY CLAY	24	220	
BROWN CLAY AND GRAVEL	220	223	
WATER BEARING GRAVEL	223	245	
CLAY AND GRAVEL	245	246	

Work started NOV 6 1972 Completed JAN 22 1973
Date well drilling machine moved off of well JAN 23 1973

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] Jon V. Hohman Date 1/30, 1973
(Drilling Machine Operator)
Drilling Machine Operator's License No. 57

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 R.J. STRASSER DRILLING Co
(Person, firm or corporation) (Type or print)
Address 8110 SE SUNSET LANE PORTLAND ORE
[Signed] Robert L. Strasser
(Water Well Contractor)
Contractor's License No. 10 Date JAN 30, 1973

(USE ADDITIONAL SHEETS IF NECESSARY)

SP*45656-119

4th Street Deep Well

RECEIVED NOV 17 1960 STATE ENGINEER

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

WATER WELL REPORT
STATE OF OREGON

CROO 2121

State Well No. 15/16 - 5 E (4)

State Permit No. ....

(1) OWNER:
Name Pacific Power and Light Co.
Address Prineville, Oregon

(2) LOCATION OF WELL:
County Crook Owner's number, if any—
SW ¼ NW ¼ Section 5 T. 15S R. 16W W.M.
Bearing and distance from section or subdivision corner (approx.)
375 feet North and 370 feet East of quarter section corner to Section 5 & 6, T15S, R16E, WM

(3) TYPE OF WORK (check):
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 ☒
24" Diam. from Surf. ft. to 222 ft. Gage 3/8" wal
12" Diam. from Surf ft. to 222 ft. Gage 43.45 #
12" Diam. from 242.5 ft. to 252 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 Johnson
Type Stainless Steel Model No.
Diam. 12 Slot size 100 Set from 222 ft. to 242.5 ft.
Diam. .... Slot size .... Set from .... ft. to .... ft.

(9) CONSTRUCTION:
Was well gravel packed? ☒ Yes ☐ No Size of gravel: ¼" to #10
Gravel placed from 202 ft. to 252 ft.
Was a surface seal provided? ☒ Yes ☐ No To what depth? 40 ft.
Material used in seal— neat cement grout
Did any strata contain unusable water? ☐ Yes ☐ No
Type of water? Depth of strata
Method of sealing strata off

(10) WATER LEVELS:
Static level 35 ft. below land surface Date Oct. 6, 60
Artesian pressure lbs. per square inch Date

Log Accepted by:

[Signed] .... Date ...., 19....
(Owner)

(11) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? ☒ Yes ☐ No If yes, by whom?
Yield: 400 gal./min. with 74 ft. drawdown after 12 hrs.
" 600 " 116 " 12 "
" 650 " 130 " 12 "
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? ☐ Yes ☐ No

(12) WELL LOG: Diameter of well 12 inches.
Depth drilled 252 ft. Depth of completed well 252 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
Black silty clay	0	6
Cemented gravel	6	9
sand, silt, and gravel	9	27
Sand and gravel - water	27	38
Packed sand	38	43
Sandy silt	43	68
Blue silt	68	81
Sandy silt	81	103
Black silt	103	149
Silt and broken rock	149	155
Sandy silt	155	161
Black silt	161	173
Grey silt	173	206
Sticky green clay	206	221
Water bearing sand and gravel	221	242
Sandy silt	242	252

Work started July 22 19 60 Completed Oct. 12 19 60

(13) PUMP:
Manufacturer's Name ....
Type: .... H.P. ....

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 SE Sunset Lane, Portland 6, Oregon

Driller's well number 4103

[Signed] Robert L. Strasser
partner (Well Driller)

License No. 10 Date Oct. 17, 19 60

CC (USE ADDITIONAL SHEETS IF NECESSARY)

ORIGINAL
File Original and Duplicate with the STATE ENGINEER, SALEM, OREGON

CROO 1540

WATER WELL REPORT
STATE OF OREGON

CROO 1540

Well No. 14/16-31 DDa

State Permit No. G-506

(1) OWNER:

Name Pacific Power & Light Company
Address 920 S. W. 6th Avenue
Portland 4, Oregon 97204

(2) LOCATION OF WELL:

County Crook County — Owner's number, if any— Well #7
NW ¼ NW ¼ Section 31 T. 14S R. 16 E W.M.
Bearing and distance from section or subdivision corner
S 58° 13' 20" East 1447 feet from N.W. corner of Section 31, T 14 S, R 16 E, WM.

(3) TYPE OF WORK (check):

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 ☒

24" O. Diam. from 0 ft. to 230 ft. Gage 5/16" wall
12" I. Diam. from 0 ft. to 228 ft. Gage 5/16" wall
12" I. Diam. from 253 ft. to 256 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 A D Cook & Son
Type Wire Wound Model No. 75WS
Diam. 12" I.D. Slot size 25 Set from 228 ft. to 253 ft.
Diam. Slot size Set from ft. to ft.

(9) CONSTRUCTION:

Was well gravel packed? ☒ Yes ☐ No Size of gravel:
Gravel placed from 253 ft. to 205 ft.
Was a surface seal provided? ☒ Yes ☐ No To what depth? 15 ft.
Material used in seal— Concrete
Did any strata contain unusable water? ☒ Yes ☐ No
Type of water? Surface Water Depth of strata 0 to 12 ft.
Method of sealing strata off Cased off and concrete seal.

(10) WATER LEVELS:

Static level 17 ft. below land surface Date Sept. 4, '57
Artesian pressure Slight lbs. per square inch Date Sept. 27 '57

Log Accepted by: PACIFIC POWER & LIGHT COMPANY
[Signed] George T. Bragg (Owner) Date January 28, 1958
Vice President

(11) WELL TESTS: Drawdown is amount water level is lowered below static level

Was a pump test made? ☒ Yes ☐ No If yes, by whom?
Yield: 550 gal./min. with 84 ft. drawdown after 8 hrs.
" 800 " 200 " 1 "
" " " "
Bailer test No gal./min. with ft. drawdown after hrs.
Artesian flow Slight g.p.m. Date Sept. 27, 1957
Temperature of water — Was a chemical analysis made? ☒ Yes ☐ No Attached.

(12) WELL LOG: Diameter of well 24 inches.

Depth drilled 256 ft. Depth of completed well 256 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
Soft sand	0	2
Sand Stone & Surface Water	2	12
Clay	12	19
Gravel with Clay Binder	19	31
Sandy Silt	31	52
Sandy Silt & Some Gravel	52	57
Sandy Silt	57	101
Sandy Silt & Some Gravel	101	122
Silt	122	194
Sticky Shale	194	223
Yellow Silt	223	228
Cemented Gravel	228	231
Sand & Gravel, Water Bearing	231	252
Yellow Clay	252	256

Work started May 20 1957. Completed Sept. 4 1957

(13) PUMP:

Manufacturer's Name Fairbanks Morse Co. Pamona Pump Di
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 R. J. Strasser Drilling Co
(Person, firm, or corporation) (Type or print)
Address 8110 SE Sunset Lane —Portland 6, Oreg
Driller's well number 3092

[Signed] Robert L. Strasser - Partner
(Well Driller)
License No. 10 Date Jan. 23, 1958

(USE ADDITIONAL SHEETS IF NECESSARY)

Lamonta Well

CROO 1540

17/16-31D (1) ...

App G605
Per G506
Crook Co

PRospect 1-2355

Lamonta Well

R. J. Strasser Drilling Co.

8110 S. E. Sunset Lane
Portland 6, Oregon

Sept. 17, 1957

Log of 12" well drilled for Pacific Power & Light Company.
Legal Description of well location: S 58degrees 13 min. 20 sec.east for 1447 ft. from N.W. Corner of Sec. 31, Township 14 S. R 16E Willamette Meridian, Crook County, Ore.

0 - 2	Soft sand
2 - 12	Sandstone, with surface water
12 - 19	Clay
19 - 31	Gravel with clay binder.
31 - 52	Sandy silt
52 - 57	Sandy silt with some gravel
57 -101	Sandy silt
101 -122	Sandy silt with some gravel
122 -194	Silt
194 -223	Sticky shale
223 -228	Yellow silt
228 -231	Cemented gravel
231 -252	Sand and gravel, water-bearing
252 -256	Yellow clay

Casing:
0 - 230 ft.---24" O.D. 5/16 wall pipe.
0- 230 ft.---12" I.D. 5/16 wall pipe.
230 - 253 ft.---12" I.D. Cook Well Screen
253 - 256 ft.---12" I.D. 5/16 wall pipe. Steel plate welded on bottom of pipe.
Opening between 12" pipe and inside of 24" pipe filled with gravel-pack material to 205 ft. Opening between 15 ft. and 205 ft. filled with clay. Cement seal from 5 ft. to 15 ft.

Static water level---17 ft.
Pumping level, at 550 g.p.m.---101 ft.

R J Strasser

OBSERVATION WELL

Yancey Well

STATE ENGINEER
Salem, Oregon

CROO 50181

Well Record

#89

STATE WELL NO. 14/16-31Q(1)
COUNTY Crook
APPLICATION NO. U-241
PERMIT U-215
C 22839

OWNER: Pacific Power & Light Co.
MAILING ADDRESS:

LOCATION OF WELL: Owner's No. 4-Yancey
CITY AND STATE: Prineville, Oregon

SW ¼ SE ¼ Sec. 31 T. 14 ~~N.~~ S., R. 16 E ~~W.~~, W.M.

Bearing and distance from section or subdivision corner N 55° 00' E 1070' of S¼ Cor. Sec. 31

Q(1)

Section 31

Altitude at well 2858

TYPE OF WELL: Drilled Date Constructed 1917

Depth drilled 228 Depth cased

CASING RECORD:

8-inch

FINISH:

AQUIFERS:

WATER LEVEL:

16.2 feet above land surface, October 26, 1944

PUMPING EQUIPMENT: Type Turbine H.P.
Capacity 360 G.P.M.

WELL TESTS:
Drawdown 96 ft. after 20 hours pumping 360 G.P.M.
Drawdown ft. after hours G.P.M.

USE OF WATER Municipal Temp. 56 °F. , 19
SOURCE OF INFORMATION U-241 U.S.G.S. report
DRILLER or DIGGER
ADDITIONAL DATA:
Log Water Level Measurements Chemical Analysis Aquifer Test

REMARKS:

4th St. Shallow Well

OBSERVATION WELL

STATE ENGINEER
Salem, Oregon

CRUO 2130

Well Record

STATE WELL NO. 15/16-5E(3)
COUNTY Crook
APPLICATION NO. U-396
Permit U-370

OWNER: Pacific Power & Light Co.
MAILING ADDRESS:

LOCATION OF WELL: Owner's No. 5
CITY AND STATE: Prineville, Oregon

SW ¼ NW ¼ Sec. 5 T. 15 ~~N.~~ S., R. 16 E ~~W~~., W.M.

Bearing and distance from section or subdivision corner Lot 9, Block 8, Oregon & Western Add.
Well approx. 20' N. of well 5E(1)

E(3)

Altitude at well

TYPE OF WELL: Drilled Date Constructed Aug. 50

Depth drilled 75 Depth cased 61

Section 5

CASING RECORD:

10-inch casing to 61 feet, backfilled with gravel to 51 feet

FINISH:

Perforations from 13 to 22 feet

AQUIFERS:

Gravel from 13 to 28 feet

WATER LEVEL:

4.5 feet below land surface, August 8, 1950

PUMPING EQUIPMENT: Type Centrifugal H.P. 25
Capacity 450 G.P.M.

WELL TESTS:
Drawdown ft. after hours G.P.M.
Drawdown ft. after hours G.P.M.

USE OF WATER Municipal Temp. °F. , 19
SOURCE OF INFORMATION U-396
DRILLER or DIGGER
ADDITIONAL DATA:
Log x Water Level Measurements Chemical Analysis Aquifer Test

REMARKS:

State Printing 89316

4th St. Shallow Well

STATE ENGINEER
Salem, Oregon

State Well No. 15/16-5E(3)
County Crook
Application No. U-396

Well Log

Owner: Pacific Power & Light Co. Owner's No. 5

Driller: Date Drilled August 1950

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Clay and silt	0	6	6
Gravel, coarse	6	11	5
Gravel, cemented	11	13	2
Gravel	13	28	15
Sand, brown	28	38	10
Sand, black	38	65	27
Clay	65	75	10

Stadium Well

15S/16E-5da

CROO 184

RECEIVED FEB 18 1987 WATER RESOURCES DEPT SALEM, OREGON

STATE OF OREGON
WATER WELL REPORT
(as required by ORS 537.765)

(1) OWNER:
Well Number:
Name: City of Prineville
Address: 400 East Third Street
City: Prineville State: Oregon Zip: 97754

(2) TYPE OF WORK:
[X] New Well [ ] Deepen [ ] Recondition [ ] Abandon

(3) DRILL METHOD
[X] Rotary Air [ ] Rotary Mud [X] Cable
[ ] Other

(4) PROPOSED USE:
[ ] Domestic [X] Community [ ] Industrial [ ] Irrigation
[ ] Thermal [ ] Injection [ ] Other

(5) BORE HOLE CONSTRUCTION:
Special Construction approval: Yes [X] No [ ] Depth of Completed Well 259 ft.
Explosives used: Yes [ ] No [X] Type ____ Amount ____

HOLE Diameter	From	To	SEAL Material	From	To	Amount sacks or pounds
16	0	225	Concrete	0	10	7 cu. yds
12	225	260	Cement	10	225	272 sacks
8	260	263				

How was seal placed: Method [ ] A [ ] B [X] C [ ] D [ ] E
[X] Other 0'-9' tremied & probed
Backfill placed from 259 ft. to 263 ft. Material sand
Gravel placed from ____ ft. to ____ ft. Size of gravel ____

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	12	+3.5	228	.250	[X]	[ ]	[X]	[ ]
					[ ]	[ ]	[ ]	[ ]
					[ ]	[ ]	[ ]	[ ]
					[ ]	[ ]	[ ]	[ ]
Liner:	10	218	228	.250	[X]	[ ]	[X]	[ ]
	10	249	259	.250	[X]	[ ]	[X]	[ ]

Final location of shoe(s)

(7) PERFORATIONS/SCREENS:
[ ] Perforations Method
[X] Screens Type wire wrap Material S.S.

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
228	232	.050		12	TS	[ ]	[ ]
232	249	.090		12	TS	[ ]	[ ]
						[ ]	[ ]
						[ ]	[ ]
						[ ]	[ ]
						[ ]	[ ]
						[ ]	[ ]

(8) WELL TESTS: Minimum testing time is 1 hour
[X] Pump [ ] Bailer [ ] Air [ ] Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
400	175		1 hr.
400	188.5		4 hrs
300	142		16 hrs

Temperature of water 57°F Depth Artesian Flow Found 225
Was a water analysis done? [X] Yes By whom WF & R Lab
Did any strata contain water not suitable for intended use? [ ] Too little
[ ] Salty [ ] Muddy [ ] Odor [ ] Colored [ ] Other
Depth of strata:

(9) LOCATION OF WELL by legal description:
County Crook Latitude ____ Longitude ____
Township 15S N or S, Range 16E E or W, WM.
Section 5 NE 1/4 of SE 1/4
Tax Lot ____ Lot ____ Block ____ Subdivision ____
Street Address of Well (or nearest address)

(10) STATIC WATER LEVEL:
31 ft. below land surface. Date 1/21/87
Artesian pressure ____ lb. per square inch. Date ____

(11) WATER BEARING ZONES:
Depth at which water was first found 8

From	To	Estimated Flow Rate	SWL
225	249	See well test	
8	199	>100 gpm	8

(12) WELL LOG:
Ground elevation Approx. 2880

Material	From	To	SWL
Clay, brown	0	8	
Grvl, lg & sand, crse, brown	8	26	8
Sand, brown w/gravel	26	30	
Sand, brown, med.	30	41	
Sand, black, med-fine	41	72	
Sand, grey, fine-silt w/wood	72	184	
Sand, grey, fine-silt w/clay lenses	184	199	
Clay, grey, sticky	199	225	
Sand, black, coarse-fine	225	228	
Gravel & sand, blk, coarse	228	231	
Gravel, lg & sand, some cement	231	238	
Gravel, med-small & sand, med-coarse	238	249	
Clay, grey, firm	249	267	
Clay, grey, soft	261	263	

Date started 8/26/86 Completed 2/4/87

(unbonded) Water Well Constructor Certification:
I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to my best knowledge and belief.
WWC Number 1394
Signed Eugene Clark Date 2/13/87

(bonded) Water Well Constructor Certification:
I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. all work performed during this time is in compliance with Oregon well construction standards. This report is true to the best of my knowledge and belief.
WWC Number 649
Signed Stephen Schneider Date 2/13/87

SEI #8703

Airport Well

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

CROO 1894

WATER WELL REPORT JAN 13 1981
STATE OF OREGON WATER RESOURCES DEPT SALEM, OREGON
(Please type or print)
(Do not write above this line)

State Well No. 15s-15E-11db
State Permit No.

(1) OWNER:
Name JERE Gruniger
Address P.O Box 182
Redmond, Oregon 97756

(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 ☒
8" Diam. from +2 ft. to 25 ft. Gage .250
" Diam. from ft. to ft. Gage
" Diam. from ft. to ft. Gage

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

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

(8) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? ☐ Yes ☒ No If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
Blow Tested @ 135 G.P.M 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 25 ft.
Diameter of well bore to bottom of seal 12 in.
Diameter of well bore below seal 8 in.
Number of sacks of cement used in well seal 17 sacks
How was cement grout placed? Pressure grouted with 1" pipe from 25 ft. to Surface

Was a drive shoe used? ☐ Yes ☒ No Plugs Size: location ft.
Did any strata contain unusable water? ☐ Yes ☒ No
Type of water? — depth of strata —
Method of sealing strata off —
Was well gravel packed? ☐ Yes ☒ No Size of gravel:
Gravel placed from ft. to ft.

(10) LOCATION OF WELL:
County Crook Driller's well number
N.W ¼ S.E ¼ Section 11 T. 15S R. 15E W.M.
Bearing and distance from section or subdivision corner
Prineville Airport

(11) WATER LEVEL: Completed well.
Depth at which water was first found 448 ft.
Static level 414 ft. below land surface. Date 12-11-80
Artesian pressure — lbs. per square inch. Date —

(12) WELL LOG: Diameter of well below casing 8"
Depth drilled 492 ft. Depth of completed well 475 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
Overburden	0	1	
BASALT	1	195	
SANdstone & Cong, br.	195	448	414
Waterbearing BASALT	448	475	

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DEC 15 1980
WATER RESOURCES DEPT
SALEM, OREGON

Work started 11-1-19 Completed 12-11 1980
Date well drilling machine moved off of well 12-12 1980

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] M. Gordon Davidson Date 11-12 1980
(Drilling Machine Operator)
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 P.O Box 315 Redmond, Ore.
[Signed] M. Gordon Davidson
(Water Well Contractor)
Contractor's License No. 548 Date 11-12, 1980

(USE ADDITIONAL SHEETS IF NECESSARY)

SP*45656-119

Barney Well

15S/16E/4ac

11

CROO 3132

RECEIVED
FEB - 2 1995
WATER RESOURCES DEPT.
SALEM, OREGON

STATE OF OREGON
WATER WELL REPORT
(as required by ORS 537.765)

(START CARD) # 69126

(1) OWNER: Well Number #1, Barney Well
Name City of Prineville
Address 400 E. Third St.
City Prineville State Or. Zip 97754

(2) TYPE OF WORK:
[X] New Well [ ] Deepen [ ] Recondition [ ] Abandon

(3) DRILL METHOD:
[ ] Rotary Air [X] Rotary Mud [ ] Cable
[ ] Other

(4) PROPOSED USE:
[ ] Domestic [X] Community [ ] Industrial [ ] Irrigation
[ ] Thermal [ ] Injection [ ] Other

(5) BORE HOLE CONSTRUCTION:
Special Construction approval [ ] Yes [X] No Depth of Completed Well 280' ft.
Explosives used [ ] Yes [X] No Type ___ Amount ___

HOLE Diameter	From	To	SEAL Material	From	To	Amount sacks or pounds
22"	0	280	cement	0	207	135 sacks

How was seal placed: Method [ ] A [ ] B [ ] C [ ] D [ ] E
[ ] Other pumped via tremie pipe
Backfill placed from 207 ft. to 214 ft. Material .30 sand
Gravel placed from 214 ft. to 279 ft. Size of gravel 3/8 washed

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	10"	+2	280	388	[X]	[ ]	[X]	[ ]
tremie	4"	+1.5	215	250	[X]	[ ]	[ ]	[X]

Final location of shoe(s)

(7) PERFORATIONS/SCREENS:
[X] Perforations Method factory
[ ] Screens Type ___ Material ___

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
219	279	1/8	3000	10"		[X]	[ ]

(8) WELL TESTS: Minimum testing time is 1 hour
[ ] Pump [ ] Bailer [X] Air [ ] Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
700 +	110'	250	1 hr.

Temperature of Water 65 Depth Artesian Flow Found 217
Was a water analysis done? [X] Yes By whom City of Prineville
Did any strata contain water not suitable for intended use? [ ] Too little
[ ] Salty [ ] Muddy [ ] Odor [ ] Colored [X] Other Artesian sealing
Depth of strata: 22-35

(9) LOCATION OF WELL by legal description:
County Crook Latitude ___ Longitude ___
Township 15 S N or S. Range 16 E E or W. WM.
Section 4 SW ¼ NE ¼
Tax Lot 2500 Lot ___ Block ___ Subdivision ___
Street Address of Well (or nearest address) Barney Well Site

(10) STATIC WATER LEVEL:
35' ft. below land surface. Date 12-14-94
Artesian pressure -0- lb. per square inch. Date

(11) WATER BEARING ZONES:
Depth at which water was first found 22' & 217'

From	To	Estimated Flow Rate	SWL
22	35	100 gpm	9'
217'	265'	700 +	35'

(12) WELL LOG:
Ground elevation

Material	From	To	SWL
top soil	0	12	
gravel & brown clay	12	22	
w/b gravel	22	35	
soft black clay	35	120	
sticky black clay	120	217	35
coarse sand,med. gravel	217	238	"
coarse gravels	238	265	"
hard blue claystone	265	280	"

All construction and test pumping information of this well can be attained from David Evans and Assoc. Bend, Or. .
All construction standards were varified by David Evans & Assoc. , under contract to the City of Prineville.

Date started 11-10-94 Completed 12-14-94

(unbonded) Water Well Constructor Certification:
I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to my best knowledge and belief.
WWC Number ___
Signed ___ Date ___

(bonded) Water Well Constructor Certification:
I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon well construction standards. This report is true to the best of my knowledge and belief.
WWC Number 741
Signed Curt Clemens Date 12-29-94

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

APPENDIX J
Available Reservoir Inspection Reports

American Pine Tank

Inland Potable Services, Inc.

Business Office
16297 E. Crestline Lane
Centennial, CO 80015
Phone: 303-699-2729
Fax: 303-693-1843

Sales Office
Phone: 303-400-4220
Fax: 303-400-4215

Inspection Report for

City of Prineville
Prineville, OR

1MG Steel On-Grade
American Pine Tank

Date Completed: October 6, 2011

Commercial Dive Team:

Diver –James Cullen
Dive Controller –James Bingham
Tender –Ryan Torgerson

Scope of Work:

Our team completed sediment removal from the tank floor using underwater vacuum equipment. Sediment depth averaging 1/4 inch (iron & manganese) was removed from tank floor. When the cleaning process was finished, a full visual inspection was performed of the tank interior and all interior fixtures. The team also performed a full visual inspection of the tank exterior and all attached fixtures. The details of the inspection findings are included in the report below.

Summary of the Inspection:

Exterior Inspection

1. There was good access to the tank.
2. The ladder and manways were found secure and in good condition with less than 1% corrosion noted.
3. The hatch was found locked with no gasket and in good condition with de-lamination and less than 1% corrosion noted.
4. The roof, walls and foundation were found in excellent condition.
5. The vent was found in good condition with less than 1% corrosion noted.

Interior Inspection

1. The inlet, outlet and drain were found in good condition with heavy staining and 1% corrosion noted.
2. The ladder and manways were found in good condition with heavy staining and 1% corrosion noted.
3. The overflow was found in good condition with rust nodules noted on the hardware, staining and less than 1% corrosion noted.
4. The interior walls and the floor were found in good condition with heavy staining and 1% corrosion noted.
5. The interior roof and support column were found in good condition with less than 1% corrosion noted.

Recommendations:

1. Install a gasket on the access hatch.
2. Clean and inspect every 3-5 years per AWWA recommendations.

Key

Excellent – Like new, no repairs needed
Good – Cosmetic problems, repair if utility wants
Fair – Minor problems, repairs needed
Poor – Major problems, fix now

Inland Potable Services, Inc.

Exterior Inspection Report

Access Ladder Condition

Ladder Type: Steel
Coating Condition: Good
Corrosion Present? Y ☒ N ☐
Seams/Welds Condition: Excellent
Oxidation Present? Y ☐ N ☒
De-lamination Present? Y ☐ N ☒
Stand Off Supports Condition: Excellent
Safety Climb Type: Cage
Safety Climb Condition: Excellent
Is Top Of Tank Easily Accessible? Y ☒ N ☐
Is The Ladder and Safety Climb **OSHA** Approved? Y ☒ N ☐

Summary: The ladder was found secure, OSHA approved and in good condition with less than 1% corrosion noted.

Roof Condition

Coating Condition: Excellent
Corrosion Present? Y ☐ N ☒
  Percentage: N/A
Seams/Welds Condition: Excellent
Oxidation Present? Y ☐ N ☒
De-lamination Present? Y ☐ N ☒
Low Spots Present? Y ☐ N ☒
Holes in Roof? Y ☐ N ☒
Cathodic Protection Plates Present? Y ☐ N ☒
  Sealed Edges: Y ☐ N ☐ NA ☒
  Loose Plates? Y ☐ N ☐ NA ☒
  Missing Plates? Y ☐ N ☐ NA ☒

Summary: The roof was found in excellent condition.

Access Hatch Condition

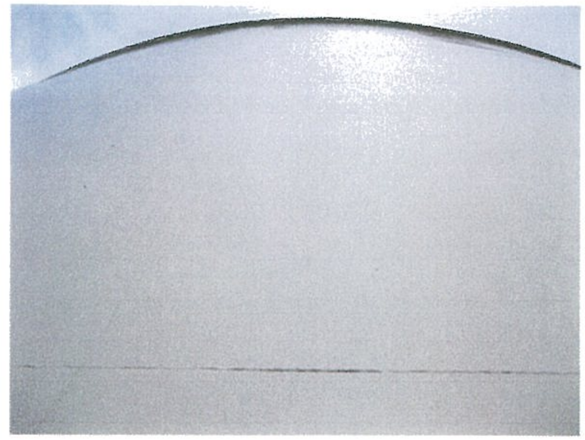
Coating Condition: Good
Corrosion Present: Y ☒ N ☐
Seams/Welds Condition: Excellent
Oxidation Present? Y ☐ N ☒
De-lamination Present? Y ☒ N ☐
Hatch Size: 3 foot square
  Hatch Locked? Y ☒ N ☐
  Hinge Condition: Excellent
Gasket Present? Y ☐ N ☒
  Intact? Y ☐ N ☐ NA ☒
Insects, Dirt Or Debris Present Under Hatch? Y ☐ N ☒

Summary: The hatch was found locked with no gasket present and in good condition with de-lamination and less than 1% corrosion noted.

Wall Panel Condition

Coating Condition: Excellent
Corrosion Present? Y ☐ N ☒
Percentage: N/A
Seams/Welds Condition: Excellent
Oxidation Present? Y ☐ N ☒
De-lamination Present? Y ☐ N ☒
Dents Present? Y ☐ N ☒
Holes Present? Y ☐ N ☒

Summary: The walls were found in excellent condition.

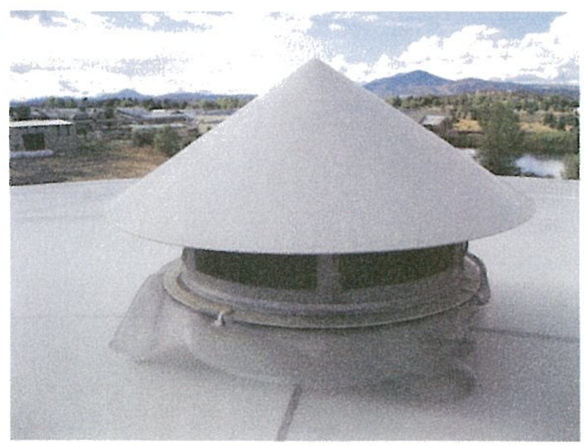


Vent Condition

Coating Condition: Good
Corrosion Present: Y ☒ N ☐
Percentage: less than 1%
Seams/Welds Condition: Excellent
Oxidation Present? Y ☐ N ☒
De-lamination Present? Y ☐ N ☒

Screen in Place? Y ☒ N ☐
Condition: Good
All Openings Sealed? Y ☒ N ☐
Cap Condition: Excellent

Summary: The vent was found in good condition with less than 1% corrosion noted and a screen in place.

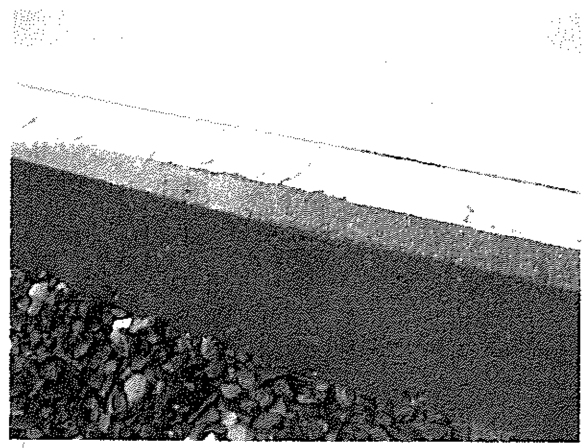


Foundation Condition

Foundation Exposed? Y ☒ N ☐
Anchor Bolts Present? Y ☐ N ☒
Corrosion on Anchor Bolts Present? Y ☐ N ☐ NA ☒
Anchor Bolts Loose? Y ☐ N ☐ NA ☒

Cracking Noted In Foundation? Y ☐ N ☒
Spalling Noted? Y ☐ N ☒

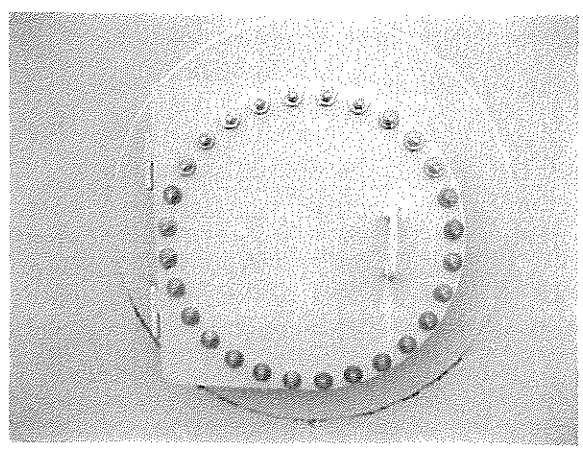
Summary: The foundation was found in excellent condition.



Manway Condition

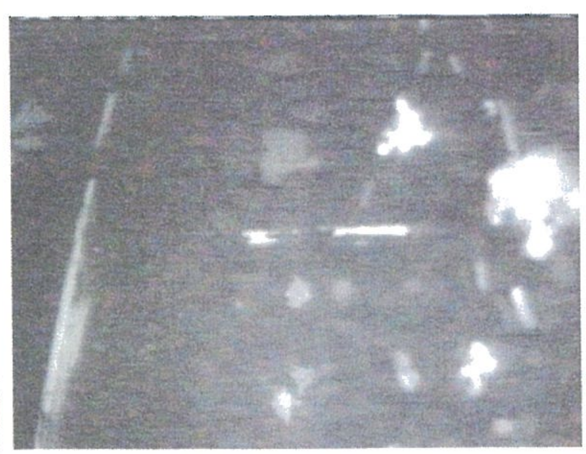
Coating Condition: Both Good
Weld/Seam Condition: Both Excellent
Corrosion Present? Y ☒ N ☐
Percentage: less than 1%
Pitting Noted In Metal? Y ☐ N ☒
Depth: N/A

Summary: The manways were found secure and in good condition with less than 1% corrosion noted.



Inland Potable Services, Inc.

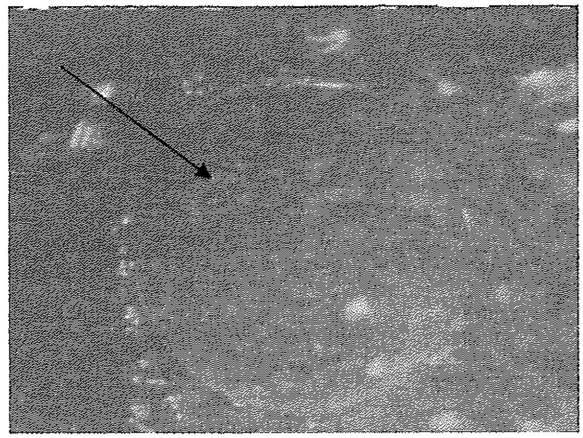
Interior Inspection Report

Inlet and Outlet Condition	
Common Inlet/Outlet? Y ☐ N ☒ Location: N/A If No: Outlet Location: 1 o'clock Inlet Location: 9 o'clock Coating Condition: Both Good Weld/Seam Condition: Both Excellent Corrosion Present? Y ☒ N ☐ Percentage: 1% Pitting Noted In Metal? Y ☐ N ☒ Depth: N/A Summary: The inlet and outlet were found in good condition with heavy staining and 1% corrosion noted.	
	
Ladder Condition	
Ladder Location: 12 o'clock Coating Condition: Good Weld/Seam Condition: Excellent Supports Condition: Excellent Corrosion Present? Y ☒ N ☐ Percentage: 1% Pitting Noted In Metal? Y ☐ N ☒ Depth: N/A Summary: The ladder was found in good condition with heavy staining and 1% corrosion noted.	

Manway Condition

Manway Locations: 11:30 o'clock & 5:30 o'clock
Coating Condition: Both Good
Weld/Seam Condition: Both Excellent
Corrosion Present? Y ☒ N ☐
Percentage: 1%
Pitting Noted In Metal? Y ☐ N ☒
Depth: N/A

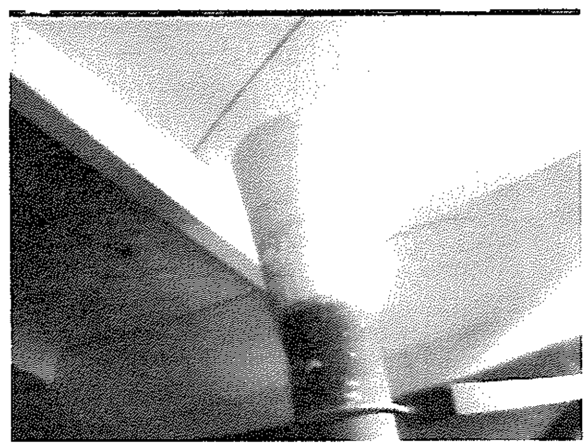
Summary: The manways were found in good condition with heavy staining and 1% corrosion noted.



Overflow Condition

Overflow Location: 11:45 o'clock
Coating Condition: Good
Weld/Seam Condition: Excellent
Corrosion Present? Y ☒ N ☐
Percentage: less than 1%
Pitting Noted In Metal? Y ☐ N ☒
Depth: N/A

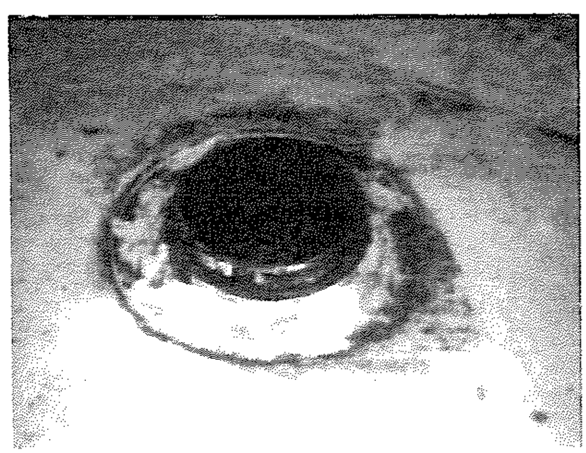
Summary: The overflow was found in good condition with rust nodules noted on the hardware, staining and less than 1% corrosion noted.



Drain Condition

Drain Location: 11:30 o'clock
Coating Condition: Good
Weld/Seam Condition: Excellent
Corrosion Present? Y ☒ N ☐
Percentage: 1%
Pitting Noted In Metal? Y ☐ N ☒
Depth: N/A

Summary: The drain was found in good condition with heavy staining and 1% corrosion noted.



Wall Panel Condition

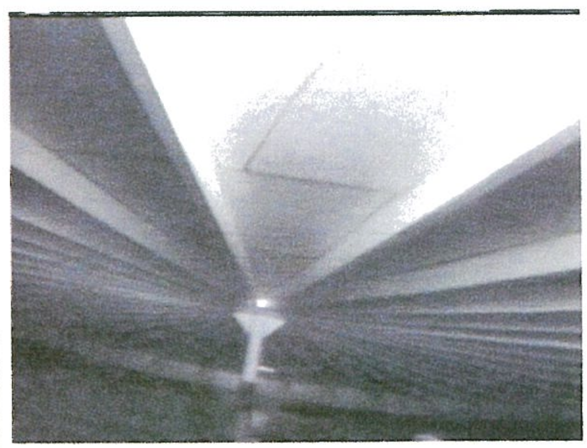
Coating Condition: Good
Welds/seam Condition: Excellent
Corrosion Present On Panel? Y ☒ N ☐
Percentage: 1%
Pitting Noted In Metal? Y ☐ N ☒
Depth: N/A

Summary: The interior walls were found in good condition with heavy staining and 1% corrosion noted.

Roof Condition

Coating Condition: Good
Welds/seam Condition: Excellent
Corrosion Present On Panels? Y ☒ N ☐
Percentage: less than 1%
Metal De-alloying Noted? Y ☐ N ☒
Percentage: N/A

Summary: The interior roof was found in good condition with concentrated cell corrosion and less than 1% surface corrosion noted.



Support Column Condition

Coating Condition: Good
Welds/seam Condition: Excellent
Corrosion Present? Y ☒ N ☐
Percent: less than 1%
Pitting Noted In Metal? Y ☐ N ☒
Depth: N/A

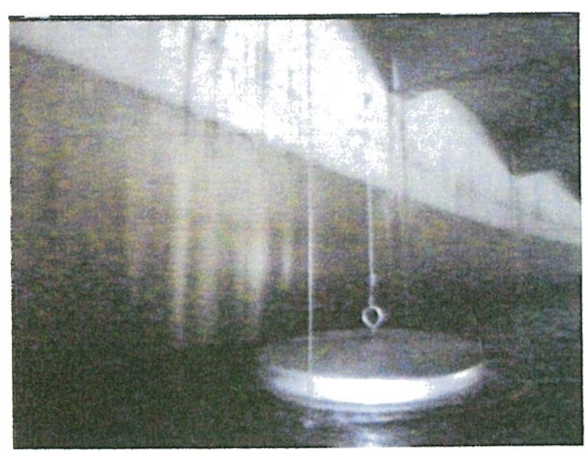
Summary: The support column was found secure and in good condition with minor cracking in the coating and less than 1% corrosion noted.

Floor Condition

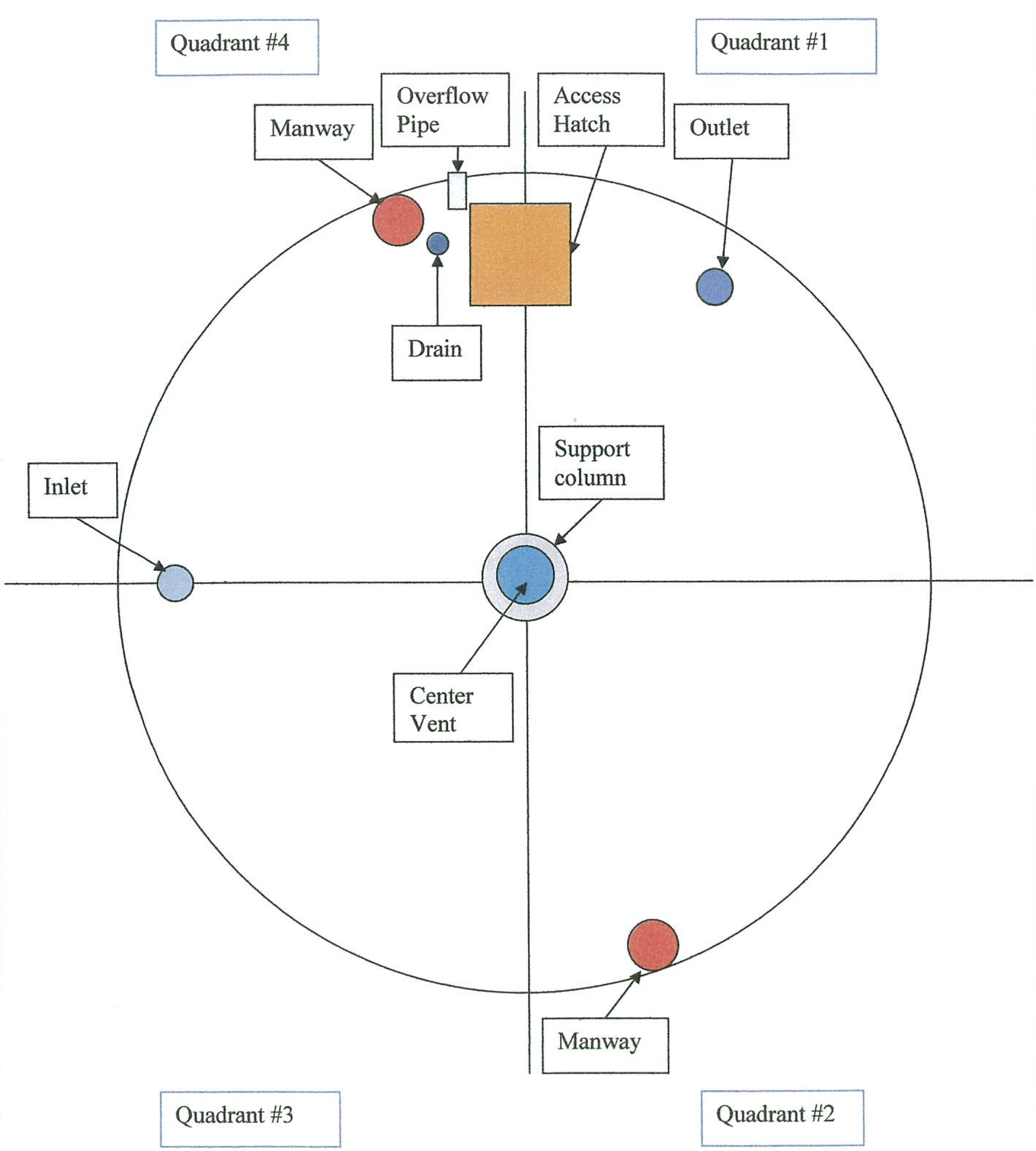
Coating Condition: Good
Welds/seam Condition: Excellent
Corrosion Present? Y ☒ N ☐
Percentage: 1%
Pitting Noted In Metal? Y ☐ N ☒
Depth: N/A

Summary: The floor was found in good condition with heavy staining and 1% corrosion noted.

Float



Tank Layout


Quadrant #4
Quadrant #1
Manway
Overflow Pipe
Access Hatch
Outlet
Drain
Support column
Inlet
Center Vent
Manway
Quadrant #3
Quadrant #2

East Ochoco No. 1 Tank

Inland Potable Services, Inc.

Business Office
16297 E. Crestline Lane
Centennial, CO 80015
Phone: 303-699-2729
Fax: 303-693-1843

Sales Office
Phone: 303-400-4220
Fax: 303-400-4215

Inspection Report for

City of Prineville
Prineville, OR

500KG Steel On-Grade
East Ochoco #1 Tank

Date Completed: October 6, 2011

Commercial Dive Team:

Diver –James Cullen
Dive Controller –James Bingham
Tender –Ryan Torgerson

Scope of Work:

Our team completed sediment removal from the tank floor using underwater vacuum equipment. Iron and manganese sediment, with depths ranging from 1/4 inch (on floor) to 4 inches (around the inlet), was removed from tank. When the cleaning process was finished, a full visual inspection was performed of the tank interior and all interior fixtures. The team also performed a full visual inspection of the tank exterior and all attached fixtures. The details of the inspection findings are included in the report below.

Summary of the Inspection:

Exterior Inspection

1. There was good access to the tank. (In a gated area)
2. The ladder and manway were found secure and in good condition with 1% corrosion noted.
3. The hatch was found locked with no gasket and in good condition with 5% corrosion noted.
4. The roof was found in fair condition with 10% surface corrosion noted and nonfunctioning cathodic lines.
5. The walls were found in good condition with less than 1% corrosion noted.

Interior Inspection

1. The inlet was found in good condition with pitting and corrosion noted. The outlet was found in fair condition with pitting, noduling and corrosion noted.
2. The ladder and manway were found in poor condition with pitting, heavy noduling and 90% corrosion noted.
3. The drain and support column were found in poor condition with pitting, noduling and 80% corrosion noted.
4. The interior roof was found in poor condition with de-alloying and 95% corrosion noted.
5. The interior walls and the floor were found in poor condition with pitting, blistering and 90% corrosion noted.

Recommendations:

1. Install a gasket on the access hatch.
2. Replace the cathodic lines.
3. Schedule time to have a blast and recoat done to the interior of the tank.
4. Schedule time for epoxy repairs to the exterior of the tank as budget allows.
5. Clean and inspect every 3-5 years per AWWA recommendations.

Key

Excellent – Like new, no repairs needed
Good – Cosmetic problems, repair if utility wants
Fair – Minor problems, repairs needed
Poor – Major problems, fix now

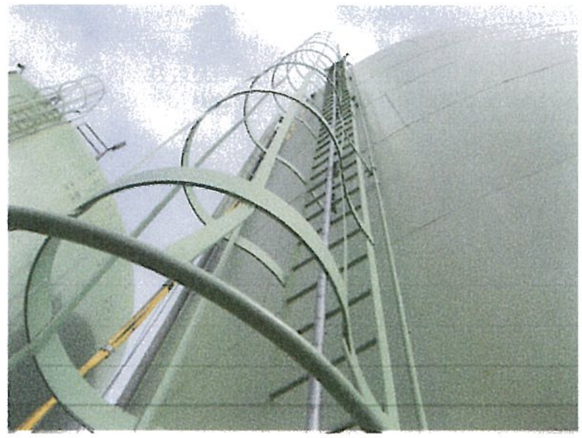
Inland Potable Services, Inc.

Exterior Inspection Report

Access Ladder Condition

Ladder Type: Steel
Coating Condition: Good
Corrosion Present? Y ☒ N ☐
Seams/Welds Condition: Excellent
Oxidation Present? Y ☒ N ☐
De-lamination Present? Y ☐ N ☒
Stand Off Supports Condition: Excellent
Safety Climb Type: Cage
Safety Climb Condition: Excellent
Is Top Of Tank Easily Accessible? Y ☒ N ☐
Is The Ladder and Safety Climb **OSHA** Approved? Y ☒ N ☐

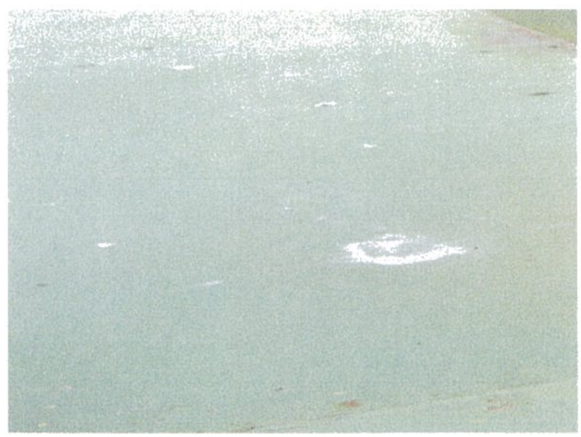
Summary: The ladder was found secure, OSHA approved and in good condition with 1% corrosion noted.



Roof Condition

Coating Condition: Fair
Corrosion Present? Y ☒ N ☐
  Percentage: 10%
Seams/Welds Condition: Excellent
Oxidation Present? Y ☒ N ☐
De-lamination Present? Y ☐ N ☒
Low Spots Present? Y ☐ N ☒
Holes in Roof? Y ☐ N ☒
Cathodic Protection Plates Present? Y ☒ N ☐
  Sealed Edges: Y ☒ N ☐ NA ☐
  Loose Plates? Y ☒ N ☐ NA ☐
  Missing Plates? Y ☐ N ☒ NA ☐

Summary: The roof was found in fair condition with 10% surface corrosion noted and nonfunctioning cathodic lines.



Access Hatch Condition

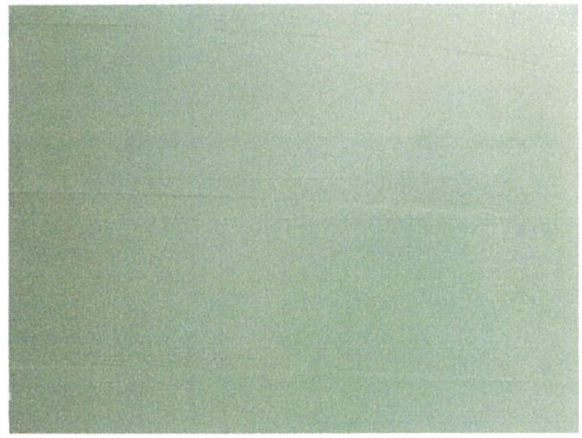
Coating Condition: Good
Corrosion Present: Y ☒ N ☐
Seams/Welds Condition: Good
Oxidation Present? Y ☒ N ☐
De-lamination Present? Y ☐ N ☒
Hatch Size: 2 foot square
  Hatch Locked? Y ☒ N ☐
  Hinge Condition:
Gasket Present? Y ☐ N ☒
  Intact? Y ☐ N ☐ NA ☒
Insects, Dirt Or Debris Present Under Hatch? Y ☐ N ☒

Summary: The hatch was found locked with no gasket present and in good condition with 5% surface corrosion noted. Recommend a gasket.

Wall Panel Condition

Coating Condition: Good
Corrosion Present? Y ☒ N ☐
Percentage: less than 1%
Seams/Welds Condition: Excellent
Oxidation Present? Y ☒ N ☐
De-lamination Present? Y ☐ N ☒
Dents Present? Y ☐ N ☒
Holes Present? Y ☐ N ☒

Summary: The walls were found in good condition with less than 1% corrosion noted.

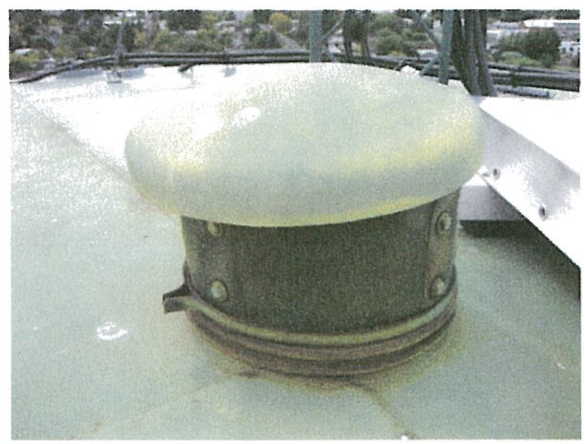


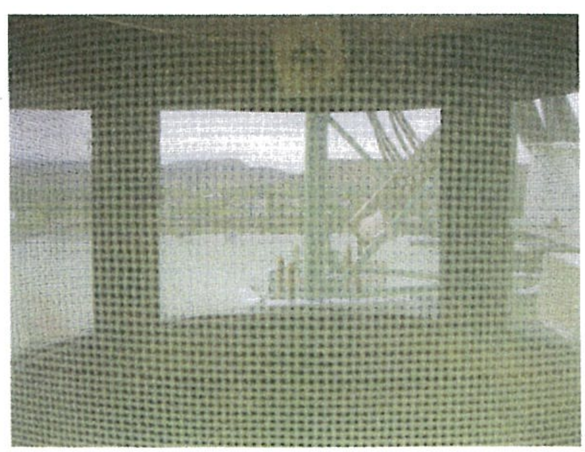
Vent Condition

Coating Condition: Good
Corrosion Present? Y ☒ N ☐
Percentage: 3%
Seams/Welds Condition: Excellent
Oxidation Present? Y ☒ N ☐
De-lamination Present? Y ☐ N ☒

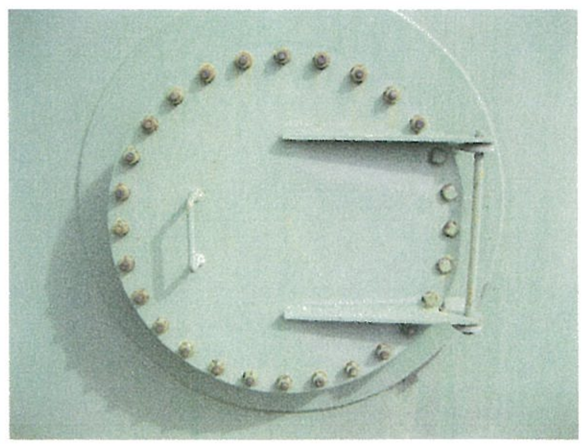
Screen in Place? Y ☒ N ☐
Condition: Good
All Openings Sealed? Y ☒ N ☐
Cap Condition: Good

Summary: The vent was found in good condition with 3% surface corrosion noted and a screen in place.





Foundation Condition	
Foundation Exposed? Y ☒ N ☐ Anchor Bolts Present? Y ☐ N ☒ Corrosion on Anchor Bolts Present? Y ☐ N ☐ NA ☒ Anchor Bolts Loose? Y ☐ N ☐ NA ☒ Cracking Noted In Foundation? Y ☐ N ☒ Spalling Noted? Y ☐ N ☒ Summary: The foundation was found in excellent condition.	

Manway Condition	
Coating Condition: Good Weld/Seam Condition: Excellent Corrosion Present? Y ☒ N ☐ Percentage: 1% Pitting Noted In Metal? Y ☐ N ☒ Depth: N/A Summary: The manway was found secure and in good condition with 1% corrosion noted on the bolts.	

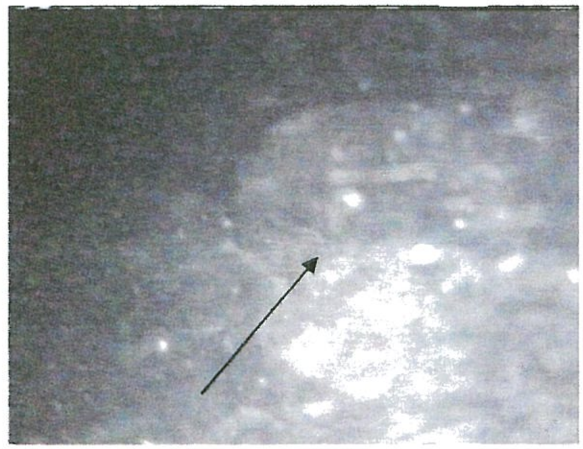
Inland Potable Services, Inc.

Interior Inspection Report

Inlet and Outlet Condition

Common Inlet/Outlet? Y ☐ N ☒ Location: N/A
If No:
Inlet Location: 11:55 o'clock (center)
Coating Condition: Good
Weld/Seam Condition: Good
Corrosion Present? Y ☒ N ☐
Percentage: 5%
Pitting Noted In Metal? Y ☒ N ☐
Depth: 1/16 inch

Summary: The inlet was found in good condition with pitting and 5% corrosion noted.



Common Inlet/Outlet? Y ☐ N ☒ Location: N/A
If No:
Outlet Location: 11 o'clock
Coating Condition: Fair
Weld/Seam Condition: Good
Corrosion Present? Y ☒ N ☐
Percentage: 10%
Pitting Noted In Metal? Y ☒ N ☐
Depth: 1/16 inch

Summary: The outlet was found in fair condition with pitting, noduling and 10% surface corrosion noted.

Ladder Condition

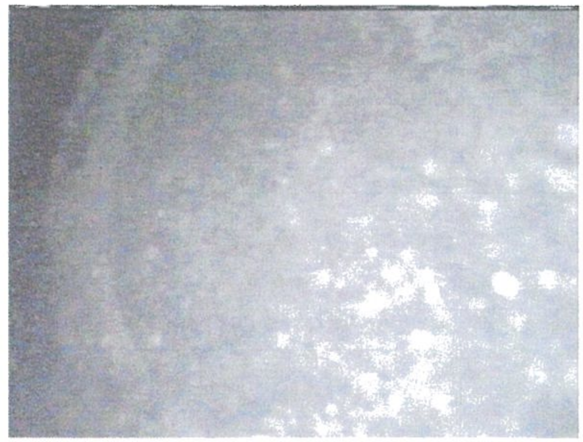
Ladder Location: 12 o'clock
Coating Condition: Poor
Weld/Seam Condition: Fair
Supports Condition: Fair
Corrosion Present? Y ☒ N ☐
Percentage: 90%
Pitting Noted In Metal? Y ☒ N ☐
Depth: 1/16 inch

Summary: The ladder was found in poor condition with heavy rust noduling, pitting and 90% corrosion noted.

Manway Condition

Manway Location: 11 o'clock
Coating Condition: Poor
Weld/Seam Condition: Fair
Corrosion Present? Y ☒ N ☐
Percentage: 90%
Pitting Noted In Metal? Y ☒ N ☐
Depth: 1/16 inch

Summary: The manway was found in poor condition with heavy rust noduling, pitting and 90% corrosion noted.



Overflow Condition

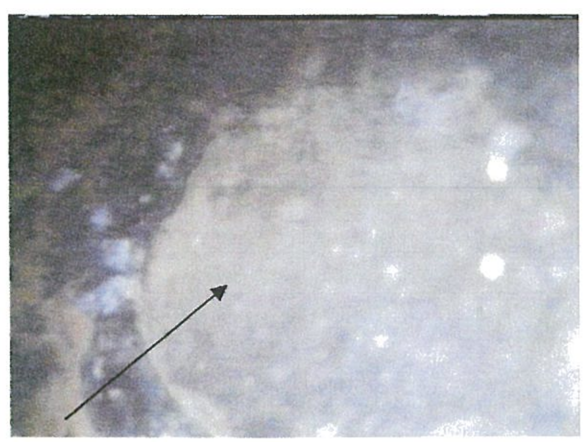
Overflow Location: 3 o'clock
Coating Condition: Good
Weld/Seam Condition: Good
Corrosion Present? Y ☒ N ☐
Percentage: less than 1%
Pitting Noted In Metal? Y ☐ N ☒
Depth: N/A

Summary: The overflow was found in good condition with less than 1% corrosion noted.

Drain Condition

Drain Location: 11 o'clock
Coating Condition: Poor
Weld/Seam Condition: Fair
Corrosion Present? Y ☒ N ☐
Percentage: 80%
Pitting Noted In Metal? Y ☒ N ☐
Depth: 1/16 inch

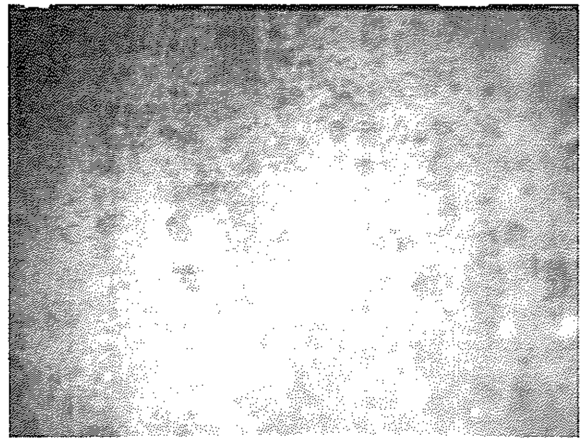
Summary: The drain was found in poor condition with noduling, pitting, coating failure and 80% corrosion noted.



Wall Panel Condition

Coating Condition: Poor
Welds/seam Condition: Fair
Corrosion Present On Panel? Y ☒ N ☐
Percentage: 90%
Pitting Noted In Metal? Y ☒ N ☐
Depth: 1/16 inch

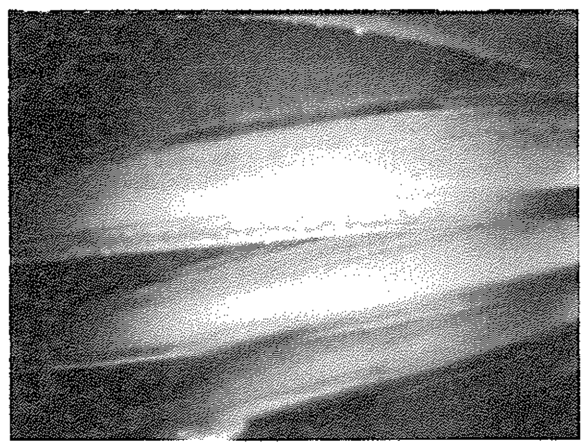
Summary: The interior walls were found in poor condition with pitting, 30% blistering and 90% corrosion noted.



Roof Condition

Coating Condition: Poor
Welds/seam Condition: Fair
Corrosion Present On Panels? Y ☒ N ☐
Percentage: 95%
Metal De-alloying Noted? Y ☒ N ☐
Percentage: less than 1%

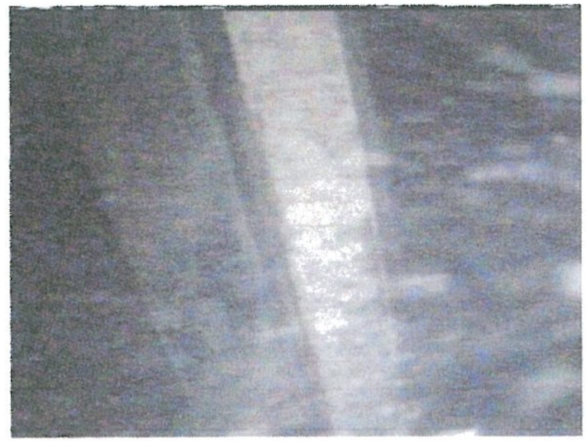
Summary: The interior roof was found in poor condition with less than 1% de-alloying and 95% corrosion noted.



Support Column Condition

Coating Condition: Poor
Welds/seam Condition: Poor
Corrosion Present? Y ☒ N ☐
Percent: 80%
Pitting Noted In Metal? Y ☒ N ☐
Depth: 1/16 inch

Summary: The support column was found in poor condition with pitting, heavy noduling and 80% surface corrosion noted.



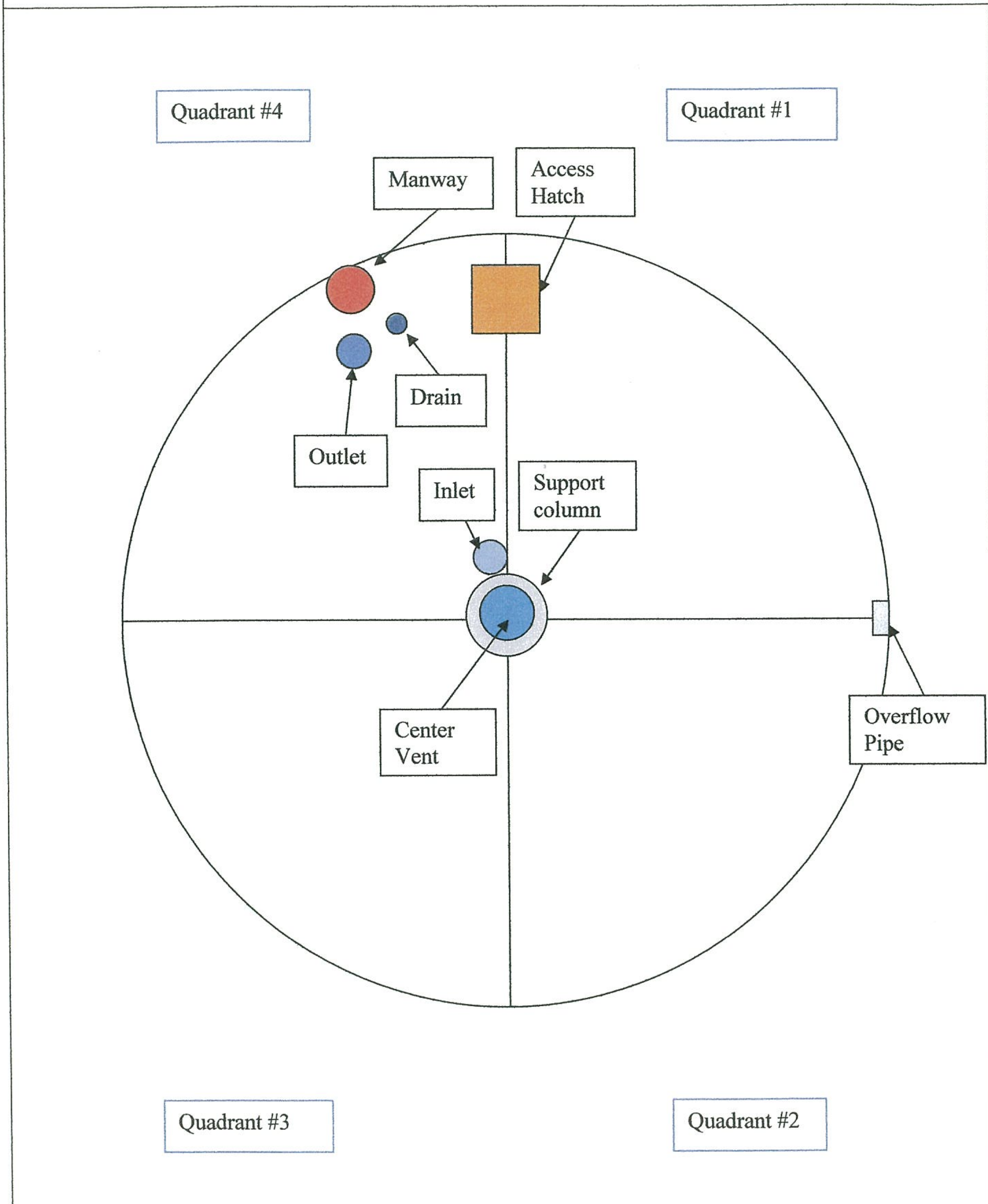
Floor Condition

Coating Condition: Poor
Welds/seam Condition: Poor
Corrosion Present? Y ☒ N ☐
Percentage: 90%
Pitting Noted In Metal? Y ☒ N ☐
Depth: 1/16 inch

Summary: The floor was found in poor condition with pitting and 90% surface corrosion noted.

Float

Tank Layout



Quadrant #4
Quadrant #1
Manway
Access Hatch
Drain
Outlet
Inlet
Support column
Center Vent
Overflow Pipe
Quadrant #3
Quadrant #2

West Ochoco No. 2 Tank

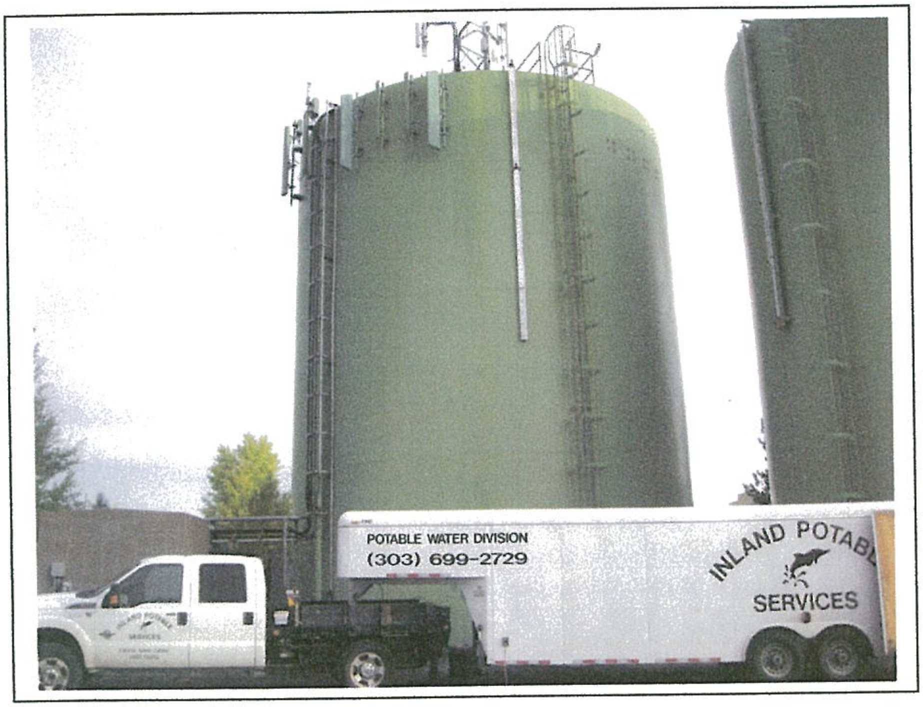
Inland Potable Services, Inc.

Business Office
16297 E. Crestline Lane
Centennial, CO 80015
Phone: 303-699-2729
Fax: 303-693-1843

Sales Office
Phone: 303-400-4220
Fax: 303-400-4215

Inspection Report for

City of Prineville
Prineville, OR



500KG Steel On-Grade
West Ochoco #2 Tank

Date Completed: October 6, 2011

Commercial Dive Team:

Diver –James Cullen
Dive Controller –James Bingham
Tender –Ryan Torgerson

Scope of Work:

Our team completed sediment removal from the tank floor using underwater vacuum equipment. Sediment depth averaging 1/4 inch (iron & manganese) was removed from tank floor. When the cleaning process was finished, a full visual inspection was performed of the tank interior and all interior fixtures. The team also performed a full visual inspection of the tank exterior and all attached fixtures. The details of the inspection findings are included in the report below.

Summary of the Inspection:

Exterior Inspection

1. There was good access to the tank. (In a gated area)
2. The ladder and manways were found secure and in good condition with less than 1% corrosion noted.
3. The hatch was found locked with no gasket and in good condition with 3% corrosion noted.
4. The vent and the exposed section of the overflow were found in good condition with 1% corrosion noted.
5. The roof was found in good to fair condition with 5% corrosion noted.
6. The walls and foundation were found in good condition.

Interior Inspection

1. The common inlet/outlet, ladder, drain and support column were found in poor condition with pitting, heavy rust noduling and 90% corrosion noted.
2. The manways were found in poor condition with pitting, heavy rust noduling and 80% corrosion noted.
3. The interior walls and the floor were found in poor condition with pitting, heavy rust noduling and 90% corrosion noted. (Total coating failure.)
4. The overflow was found in fair condition with minor cracks and 10% corrosion noted.
5. The roof was found in poor condition with 60% concentrated cell corrosion noted.

Recommendations:

1. Install a gasket on the access hatch.
2. Schedule time for a blast and recoat to the interior of the tank.
3. Schedule time for epoxy repairs to the exterior of the tank as budget allows.
4. Clean and inspect every 3-5 years per AWWA recommendations.

Key

Excellent – Like new, no repairs needed
Good – Cosmetic problems, repair if utility wants
Fair – Minor problems, repairs needed
Poor – Major problems, fix now

Inland Potable Services, Inc.

Exterior Inspection Report

Access Ladder Condition

Ladder Type: Steel
Coating Condition: Good
Corrosion Present? Y ☒ N ☐
Seams/Welds Condition: Excellent
Oxidation Present? Y ☒ N ☐
De-lamination Present? Y ☐ N ☒
Stand Off Supports Condition: Excellent
Safety Climb Type: Cage
Safety Climb Condition: Excellent
Is Top Of Tank Easily Accessible? Y ☒ N ☐
Is The Ladder and Safety Climb **OSHA** Approved? Y ☒ N ☐

Summary: The ladder was found secure, OSHA approved and in good condition with less than 1% corrosion noted.

Roof Condition

Coating Condition: Fair
Corrosion Present? Y ☒ N ☐
    Percentage: 5%
Seams/Welds Condition: Excellent
Oxidation Present? Y ☒ N ☐
De-lamination Present? Y ☐ N ☒
Low Spots Present? Y ☐ N ☒
Holes in Roof? Y ☐ N ☒
Cathodic Protection Plates Present? Y ☒ N ☐
    Sealed Edges: Y ☒ N ☐ NA ☐
    Loose Plates? Y ☐ N ☒ NA ☐
    Missing Plates? Y ☐ N ☒ NA ☐

Summary: The roof was found in good to fair condition with 5% corrosion noted.

Access Hatch Condition

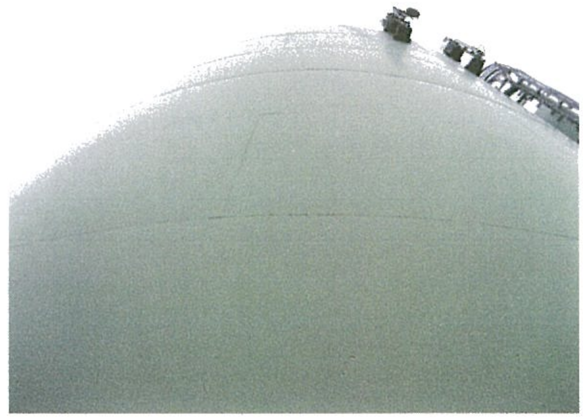
Coating Condition: Good
Corrosion Present: Y ☒ N ☐
Seams/Welds Condition: Excellent
Oxidation Present? Y ☒ N ☐
De-lamination Present? Y ☐ N ☒
Hatch Size: 2 foot square
    Hatch Locked? Y ☒ N ☐
    Hinge Condition: Good
Gasket Present? Y ☐ N ☒
    Intact? Y ☐ N ☐ NA ☒
Insects, Dirt Or Debris Present Under Hatch? Y ☐ N ☒

Summary: The hatch was found locked with no gasket present and in good condition with 3% corrosion noted. Recommend a gasket.

Wall Panel Condition

Coating Condition: Good
Corrosion Present? Y ☒ N ☐
Percentage: less than 1%
Seams/Welds Condition: Excellent
Oxidation Present? Y ☒ N ☐
De-lamination Present? Y ☐ N ☒
Dents Present? Y ☐ N ☒
Holes Present? Y ☐ N ☒

Summary: The walls were found in good condition with less than 1% surface corrosion noted.



Overflow Structure Condition

Coating Condition: Good
Corrosion Present? Y ☒ N ☐
Percentage: 1%
Seams/Welds Condition: Excellent
Oxidation Present? Y ☒ N ☐
De-lamination Present? Y ☐ N ☒
Stand Off Supports Condition: Excellent
End Cap Present? Y ☐ N ☒
Hinge And Cap Condition: N/A
Screen Present? Y ☐ N ☒
Condition: N/A

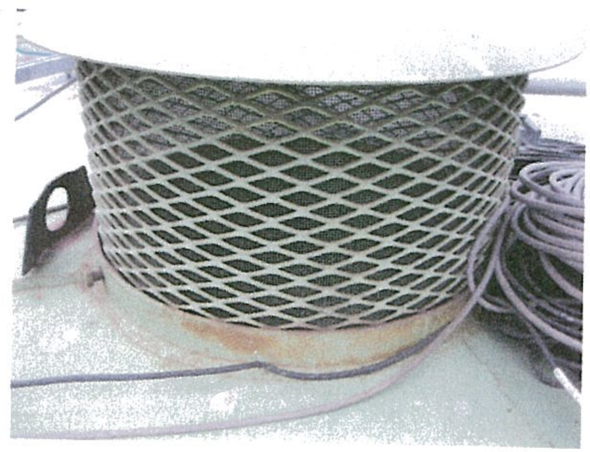
Summary: The exposed section of the overflow was found in good condition with 1% corrosion noted.

Vent Condition

Coating Condition: Good
Corrosion Present: Y ☒ N ☐
Percentage: 1%
Seams/Welds Condition: Excellent
Oxidation Present? Y ☒ N ☐
De-lamination Present? Y ☐ N ☒

Screen in Place? Y ☒ N ☐
Condition: Excellent
All Openings Sealed? Y ☒ N ☐
Cap Condition: Good

Summary: The vent was found in good condition with 1% corrosion noted and a screen in place.

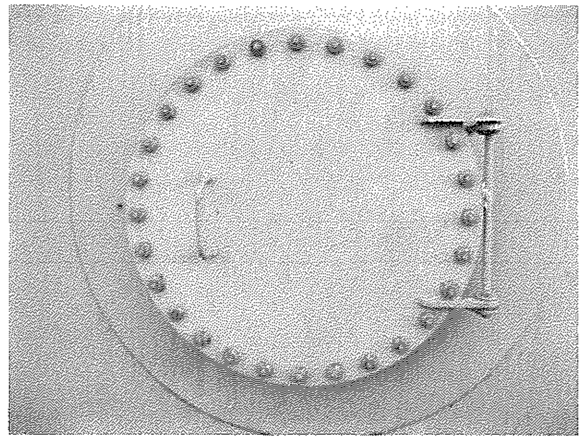
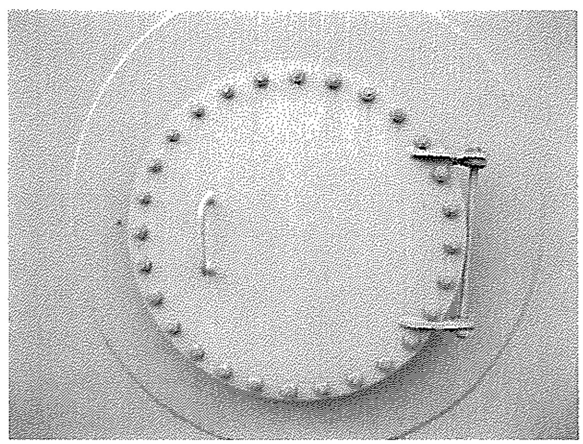


Foundation Condition

Foundation Exposed? Y ☒ N ☐
Anchor Bolts Present? Y ☐ N ☒
Corrosion on Anchor Bolts Present? Y ☐ N ☐ NA ☒
Anchor Bolts Loose? Y ☐ N ☐ NA ☒

Cracking Noted In Foundation? Y ☒ N ☐
Spalling Noted? Y ☐ N ☒

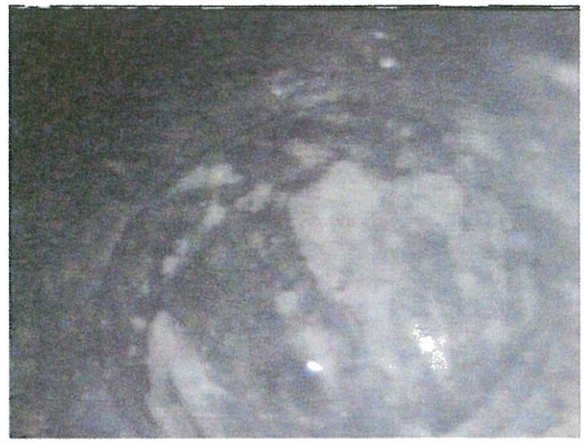
Summary: The foundation was found in good condition with hairline cracks, due to settling, noted.

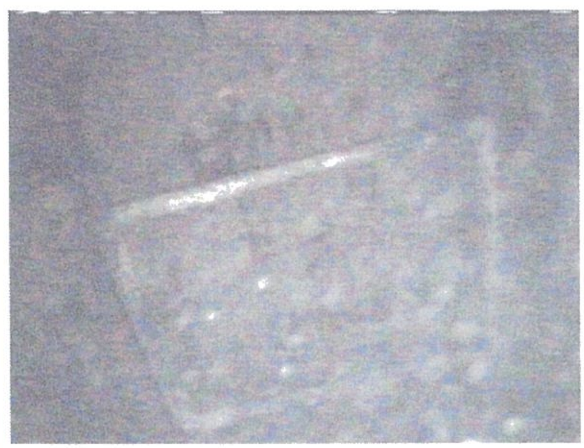
Manway Condition	
Coating Condition: Both Good Weld/Seam Condition: Both Excellent Corrosion Present? Y ☒ N ☐ Percentage: less than 1% Pitting Noted In Metal? Y ☐ N ☒ Depth: N/A Summary: The manways were found in good condition with less than 1% corrosion noted on the bolts.	
	

Inland Potable Services, Inc.

Interior Inspection Report

<table>
<tr><th colspan="2">Inlet and Outlet Condition</th></tr>
<tr><td>Common Inlet/Outlet? Y ☒ N ☐ Location: 12:45 o'clock
If No:
Outlet Location: N/A
Inlet Location: N/A
Coating Condition: Poor
Weld/Seam Condition: Fair
Corrosion Present? Y ☒ N ☐
Percentage: 90%
Pitting Noted In Metal? Y ☒ N ☐
Depth: 1/16 inch

Summary: The common inlet/outlet was found in poor condition with pitting, staining, heavy rust noduling and 90% corrosion noted.</td><td></td></tr>
<tr><th colspan="2">Ladder Condition</th></tr>
<tr><td>Ladder Location: 12 o'clock
Coating Condition: Poor
Weld/Seam Condition: Fair
Supports Condition: Good
Corrosion Present? Y ☒ N ☐
Percentage: 90%
Pitting Noted In Metal? Y ☒ N ☐
Depth: 1/16 inch

Summary: The ladder was found in poor condition with pitting, heavy rust noduling and 90% corrosion noted.</td><td></td></tr>
</table>

Manway Condition

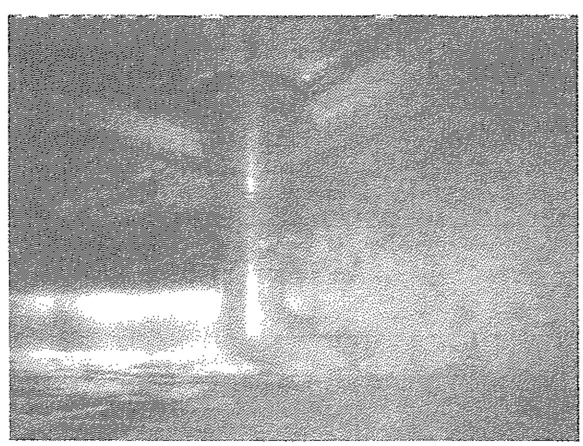
Manway Locations: 12:30 o'clock & 6:30 o'clock
Coating Condition: Both Poor
Weld/Seam Condition: Both Good
Corrosion Present? Y ☒ N ☐
Percentage: 80%
Pitting Noted In Metal? Y ☒ N ☐
Depth: 1/16 inch

Summary: The manways were found in poor condition with pitting, heavy rust noduling and 80% surface corrosion noted.

Overflow Condition

Overflow Location: 2 o'clock
Coating Condition: Fair
Weld/Seam Condition: Excellent
Corrosion Present? Y ☒ N ☐
Percentage: 10%
Pitting Noted In Metal? Y ☐ N ☒
Depth: N/A

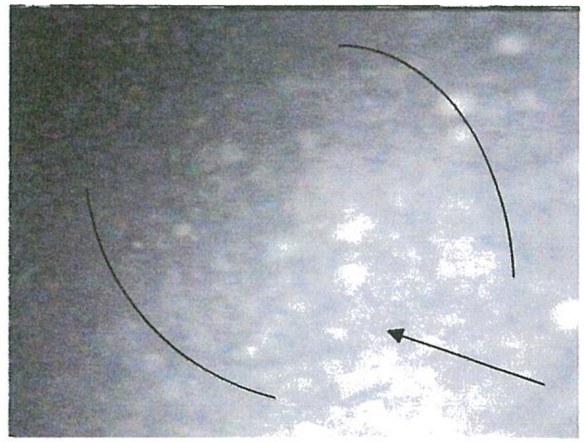
Summary: The overflow was found in fair condition with minor cracks and 10% corrosion noted.



Drain Condition

Drain Location: 1 o'clock
Coating Condition: Poor
Weld/Seam Condition: Fair
Corrosion Present? Y ☒ N ☐
Percentage: 90%
Pitting Noted In Metal? Y ☒ N ☐
Depth: 1/16 inch

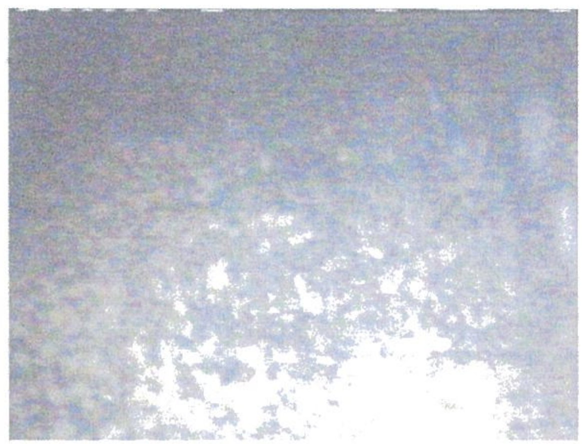
Summary: The drain was found in poor condition with pitting, heavy rust noduling and 90% surface corrosion noted.



Wall Panel Condition

Coating Condition: Poor
Welds/seam Condition: Fair
Corrosion Present On Panel? Y ☒ N ☐
Percentage: 90%
Pitting Noted In Metal? Y ☒ N ☐
Depth: 1/16 inch

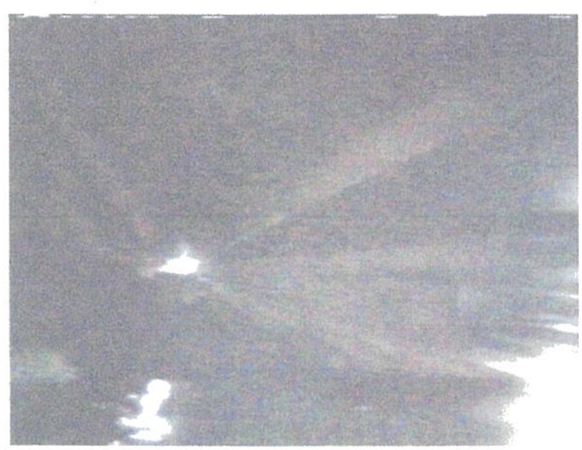
Summary: The interior walls were found in poor condition with pitting, heavy rust noduling and 90% surface corrosion noted.

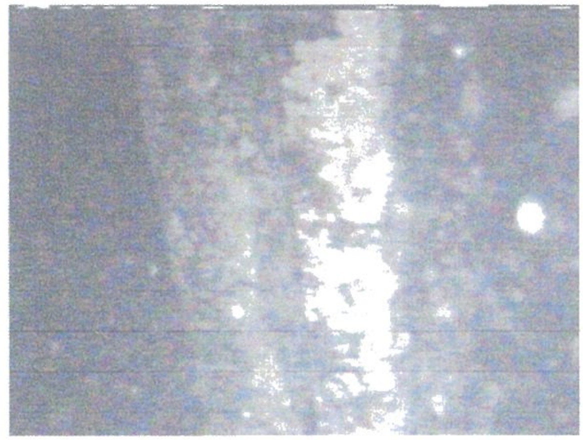


Roof Condition

Coating Condition: Poor
Welds/seam Condition: Good
Corrosion Present On Panels? Y ☒ N ☐
Percentage: 60%
Metal De-alloying Noted? Y ☐ N ☒
Percentage: N/A

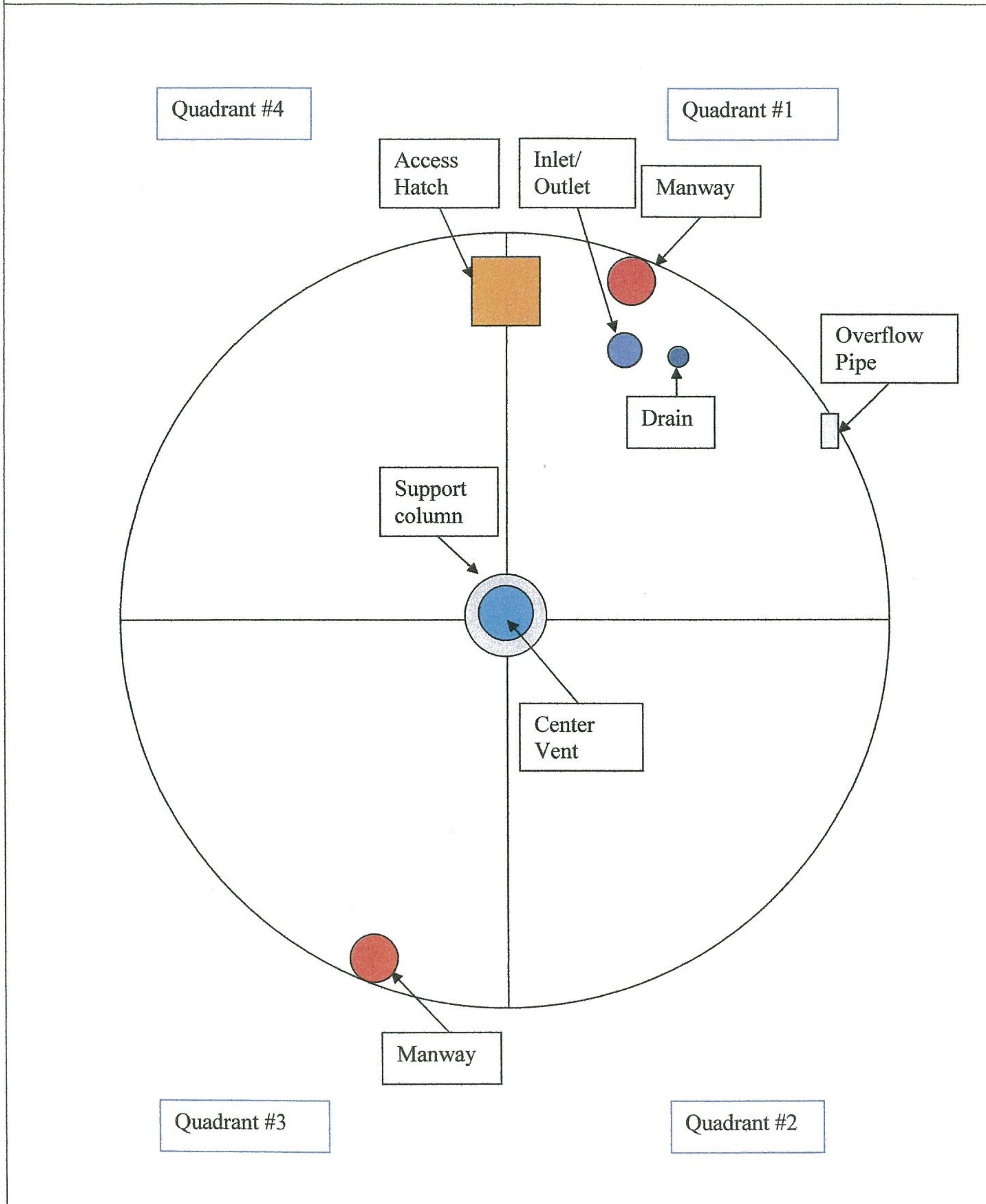
Summary: The interior roof was found in poor condition with 60% concentrated cell corrosion noted.



Support Column Condition	
Coating Condition: Poor Welds/seam Condition: Fair Corrosion Present? Y ☒ N ☐ Percent: 90% Pitting Noted In Metal? Y ☒ N ☐ Depth: 1/16 inch Summary: The support column was found in poor condition with pitting, heavy rust noduling and 90% surface corrosion noted. There was also moderate de-alloying at the top.	

Floor Condition	
Coating Condition: Poor Welds/seam Condition: Poor Corrosion Present? Y ☒ N ☐ Percentage: 90% Pitting Noted In Metal? Y ☒ N ☐ Depth: 1/16 inch Summary: The floor was found in poor condition with pitting, heavy rust noduling and 90% surface corrosion noted.	

Tank Layout


Quadrant #4
Quadrant #1
Access Hatch
Inlet/ Outlet
Manway
Overflow Pipe
Drain
Support column
Center Vent
Manway
Quadrant #3
Quadrant #2

APPENDIX K
Existing System Peak Day Extended Period Analysis

Existing System Peak Day Extended Period Analysis - Tank % Full Values