



City of Boardman, Oregon

WATER SYSTEM MASTER PLAN

2015



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WATER SYSTEM MASTER PLAN

FOR

CITY OF BOARDMAN, OREGON

2015



RENEWES 12-31-15
SIGNED 08-25-15



The City of Boardman, Oregon, has reviewed this Water System Master Plan and adopted it.

Karen Pettigrew
Signature and Title CITY MANAGER

9-1-2015
Date

ANDERSON PERRY & ASSOCIATES, INC.

La Grande, Oregon
Prineville, Oregon
Walla Walla, Washington

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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 Boardman, Oregon. The recommendations outlined hereafter have been developed in cooperation with the Boardman City Council and staff. The focus of the WSMP is on the overall water system, including the water supply, treatment, storage, and distribution systems. This WSMP includes an analysis of the existing system and its performance, evaluation of system needs, recommendations for system improvements, and development of a financial plan and project implementation plan. Included in this Executive Summary is a brief discussion of the existing water system, the water system improvements selected by the City Council, the current financial status of the Water Department, and a preliminary project implementation plan. For a more detailed discussion of the information presented in this Executive Summary, please refer to the individual chapters of this WSMP.

Present Water Supply, Treatment, and Water Rights

Water Supply

The City of Boardman has two primary water supply sources consisting of two Ranney collectors adjacent to the Columbia River. Ranney Collector No. 1 is the City's original collector built in 1977. This collector produces approximately 6,000 gallons per minute (gpm) of water from the underlying strata adjacent to the Columbia River. Ranney Collector No. 2 was constructed in 2002 and can produce approximately 10,000 gpm. Ranney Collector No. 2 also draws from the underlying strata adjacent to the Columbia River. Pumps contained within the collectors deliver raw water to the storage reservoir/booster pump station. The pumps are line shaft turbine pumps with the drive shafts extending to the bottom of the collector and the pump motor above grade.

Ranney Collector No. 1 has been designated by the Oregon Health Authority - Drinking Water Services (DWS) as a groundwater source. Ranney Collector No. 2 has been equipped to pump up to 10,000 gpm; however, at this production rate, river water reportedly intrudes into the well. Ranney Collector No. 2 also has nitrate concentrations just above regulatory limits that reportedly lower to acceptable levels with continued use. To combat the river water intrusion, Ranney Collector No. 2 has been limited to 6,000 gpm. Ranney Collector No. 2 is currently off line pending a decision from the DWS regarding its classification (see Chapter 3).

The City also has a deep groundwater supply well located adjacent to the elevated storage reservoir. The well source is from a deeper basalt aquifer and has a water right that allows a withdrawal rate of 670 gpm. The basalt well exhibits hydrogen sulfide gas (rotten egg smell) and, although the well can be used in emergency situations, it has been taken off line for day-to-day operations.

Water Treatment

Water treatment is provided by an on-site sodium hypochlorite (chlorine) generator station. The station includes a generator, salt storage tank, hypochlorite storage tank, pumping systems, and electrical controls. The salt storage tank and the hypochlorite storage tank are located outside the

pump station building. Both tanks are constructed of fiberglass reinforced plastic and have a foam-insulated exterior coating. The chlorine generator, pumping systems, and controls are located in the pump station building. The chlorine is injected into a chlorine injection manhole at the pump station that allows distribution to either the ground-level storage reservoir or the clear well. The storage reservoir and clear well provide the required chlorine contact time.

Water Rights

The City of Boardman has water rights for the deep basalt well and for the Ranney collectors. Groundwater Right G-2664 allows a withdrawal rate of 1.5 cubic feet per second (cfs), equaling up to 673 gpm from the deep basalt supply well. Surface Water Permit S-40336 allows a withdrawal rate of 36 cfs, equaling 16,150 gpm from the City's Ranney collector system. Permit S-40336 shows approximate withdrawal rates for Ranney Collectors No. 1 and No. 2 and future Ranney Collector No. 3. Water right information is summarized on the following table.

**TABLE ES-1
MUNICIPAL WATER RIGHT SUMMARY**

Source	Permit No.	Certificate No.	Allowed Volume (gpm)	Priority Date
Ranney Collector No. 1	S-40336	--	6,600	September 22, 1975
Ranney Collector No. 2	S-40336	--	4,100	September 22, 1975
Future Ranney Collector No. 3	S-40336	--	5,400	September 22, 1975
Basalt Well	G-2664	34275	673	May 20, 1964

Existing Water Storage

The City of Boardman has three separate storage reservoirs: a 125,000-gallon elevated steel storage reservoir, a 300,000-gallon ground-level steel storage reservoir, and a 300,000-gallon buried clear well. The 300,000-gallon ground-level steel storage reservoir and 300,000-gallon clear well are actively utilized with the water system and are both used to provide disinfection contact time.

The 300,000-gallon ground-level reservoir is a welded steel, painted reservoir that was constructed in 2002 in conjunction with the Ranney Collector No. 2 improvements. This reservoir is the City's primary storage reservoir, providing needed storage capacity to deliver water to the City's booster pump station. The 300,000-gallon reservoir is approximately 35 feet tall and has a diameter of 39.5 feet. The clear well was constructed in 1977 in conjunction with the Ranney Collector No. 1 improvements.

The City's 125,000-gallon elevated steel reservoir was constructed in 1968. This reservoir consists of bolted steel sheets and is a common type of reservoir for the time period it was installed. The reservoir is supported by a steel frame and has a full elevation that is approximately 100 feet above the ground surface. Because this reservoir provides only about 45 pounds per square inch (psi) at its base, it is not actively connected to the water system. The City does keep the reservoir full and available as an emergency storage source.

Existing Booster Pump Station

System pressure in the City of Boardman is provided by a continuously operated booster pump system located adjacent to the City's primary storage reservoir. The booster pump system utilizes six pumps to

meet system demands, ranging in capacity from 0 to approximately 12,000 gpm. The pumps are controlled by system pressure and flow rate to meet varying system demands. The system static pressures range from approximately 58 psi to 90 psi. Six booster pumps (Pumps 1 through 6) are available to meet the wide range of system demands. Pumps 1 through 4 are rated at 100 horsepower (Hp). Pumps 5 and 6 are rated at 200 Hp.

Existing Distribution System

The City of Boardman's existing distribution system consists of pipelines ranging in size from 4-inch diameter to 30-inch diameter. There are approximately 17.5 miles of distribution system main lines in the City. During the 1960s and 1970s, distribution system main lines were constructed using asbestos cement pipe and concrete cylinder pipe. Since about 1980, distribution piping has been constructed using polyvinyl chloride (PVC) pipe.

Approximately 46 percent of the distribution system consists of asbestos concrete pipe, with PVC pipe being about 39 percent of the distribution system. The remaining portions of the system consist of ductile iron pipe (14 percent) and concrete cylinder pipe (1 percent). The primary pipeline size is 8-inch diameter (48 percent of all piping), with 10-inch and larger pipelines being 28 percent of all piping. Six-inch diameter piping makes up approximately 14 percent of all piping, and the remaining 10 percent consists of 4-inch and smaller pipe.

Specific service areas of the distribution system are mostly looped. However, the City's distribution system has expanded as needed to serve isolated areas of development within the City limits. This expansion has created large areas isolated from other areas, with inadequate looping between areas.

General System Operation

Water supply from each of the two Ranney collectors is conveyed through a 20-inch pipeline for Collector No. 1 and a 28-inch high density polyethylene pipeline for Collector No. 2 to the booster pump station. The pipelines discharge into the 300,000-gallon ground-level storage reservoir. Just upstream of the discharge point, chlorinated water is introduced into the pipeline. Adjacent to the ground-level storage reservoir is the building that houses the booster pump station. The pump station includes six separate centrifugal pumps that supply water and pressure to the distribution system. Water from the ground-level storage reservoir discharges into a clear well incorporated into the pump station building. A suction manifold from the pump station piping extends into the clear well, subsequently providing water to each pump. Backup power is provided by an 800 kilowatt diesel-powered CAT generator. The generator provides emergency power for Ranney Collector No. 1, the booster pumping system, chlorination system, and building lighting.

Summary of Proposed System Recommendations and Recommended Improvements

As outlined in this WSMP, several improvements have been identified for the City of Boardman's water system. The following discussion summarizes the recommended system improvements.

1. **Water Supply Recommendations.** As shown in Chapter 3, the City has adequate water supply for the time represented by this WSMP if Ranney Collector No. 2 can be returned to service and classified as a groundwater (GW) source. Not only does the second collector provide additional capacity, but it also provides a second water supply source that enhances the system's reliability and ability to safely provide water to Boardman's citizens. Additionally, the second water

source assures continued service to the Port of Morrow and allows the City to invite additional business ventures to locate in Boardman. It is imperative to obtain the final GW classification and use approval from the DWS so this needed source can be utilized.

2. **Water Storage Recommendations.** When considering the capacities and condition of the existing water supply and storage components, it appears that the City of Boardman has adequate water storage for the duration of this WSMP. It is recommended that the City pay close attention to the actual growth over the 20-year planning period of this WSMP. Additional storage could be warranted sooner than planned if sufficient growth occurs.
3. **Water Distribution System Improvements.** Water distribution system improvements are shown graphically on the Proposed Water System Improvements Map contained in a pocket at the end of this WSMP and are also shown on Figure 5-3 in Chapter 5. Generally the water distribution system is in good condition and performs adequately for the City of Boardman. However, several areas of the City have been developed without sufficient looping and there is no redundancy for the main water supply line that feeds the entire distribution grid from the pump station. All water supplied to the City of Boardman must be conveyed through a single pipe that goes from the booster pump station, under the railroad, and under the freeway to the main water distribution grid. This situation represents a significant system vulnerability.

The following discussion provides a summary of the projects in order of importance. Project ranking was based on the most immediate need and the project's affordability.

Priority No. 1 relocates Chaparral Drive and the associated 12-inch water line approximately 500 feet south, effectively aligning Chaparral Drive with Hood Avenue, making a safer, more uniform intersection than previously envisioned. The Chaparral Drive water line will connect directly with the West End Loop.

The second most important project (Priority No. 2) is the 24-inch diameter West End Loop. A single pipe installed in 1977 feeds the entire City. If the current connection fails, no water would be available for municipal or commercial purposes or fire suppression. The West End Loop connects to the current booster pump station supply line, follows the railroad right-of-way west, goes south under the railroad, continues west along the opposite side of the railroad, turns south along the Faler Road alignment extension, continues south under Interstate 84, terminating at the connection to the relocated water line in Chaparral Drive. With the West End Loop in place, the City will have two methods of conveying water to its users and can reliably provide water and fire suppression services. Fire flow capacities in most of the City will be improved.

A pipeline extension along Wilson Road beginning slightly west of Locust Road, continuing east through the intersection of Wilson Road and South Main, and terminating slightly east of Anderson Road, was ranked Priority No. 3. This proposed 18-inch, 12-inch, and 8-inch pipeline eliminates four dead-end water lines and connects three isolated areas of the distribution system, providing improved water quantity and quality. The two elementary schools located on Wilson Road will also benefit from improved fire flows.

The Priority No. 4 distribution system improvement is an 18-inch line extending east from the main 30-inch primary transmission line and connecting to Olson Road. This line is needed to provide adequate service and fire flow capacity to the northeast industrial areas within the City of Boardman.

Priority No. 5 extends the water line along N.W. Front Street to West First Street and connects to Boardman Avenue. This 8-inch connection will complete a loop around the motel and Chevron gas station, providing additional fire suppression to the area.

Priority No. 6 is a relatively short (350-foot) 8-inch connection from Boardman Avenue to Marshall Loop. This improvement will provide increased system circulation and improved fire flows and complete a circular loop around the high school where fire flows are currently lower than desired.

Priority No. 7 replaces a 4-inch water main line in Boardman Avenue from East First Street to North Main Street with an 8-inch line. This area is zoned commercial/industrial and fire flows from the 4-inch main line are insufficient.

Summary of Estimated Costs for Selected Improvements

The year 2016 estimated costs for the selected water system improvements are outlined on Figure ES-1 at the end of this Executive Summary. The total year 2016 estimated project cost of \$2,454,000 includes construction, administrative, legal, engineering, right-of-way and easements, permitting, Operation and Maintenance Manual, archaeological monitoring, and contingencies.

Current Financial Status

The annual cost of operating and maintaining the Boardman water system is summarized on Figure 7-1 in Chapter 7. The City's Water Department revenues have exceeded annual operation, maintenance, and repair (OM&R) for all six years from the 2008-09 budget year through the 2013-14 budget year. A graphical plot of the City of Boardman's water system budget, showing revenue and expenditures, can be found on Chart 7-1 in Chapter 7. The trend line for the City of Boardman's OM&R shows expenditures increasing to approximately \$500,000 in the 2014-15 budget year. It is recommended that the City continue to allocate funds to a water reserve fund to cover future maintenance and replacement costs of equipment and facilities. Pump replacement, water meter repairs, etc., are all items that require funds from time to time in order to maintain a healthy water system.

Estimated Debt Capacity and Funding Scenarios

In order to determine the City's ability to fund a water system improvements project, considerable analysis was completed in Chapter 7 of this WSMP. The analysis in Chapter 7 provides a general idea of the amount of debt the City could afford to service at various average monthly water costs and/or property taxes. The data indicate that the City could afford to provide full water service OM&R revenue and also service a loan in the range of \$2,500,000 with an approximate average monthly residential user cost as follows for the funding programs shown:

Rural Development (RD) Loan	\$27/month
Business Oregon - Infrastructure Finance Authority (IFA) Loan	\$31/month
Standard Safe Drinking Water Revolving Loan Fund (SDWRLF) Loan	\$30/month

Of the various funding programs summarized in Chapter 7, the most likely sources of loan funding for Boardman's water system improvements project appears to be RD or the SDWRLF. It is recommended that the City thoroughly investigate potential funding sources, as described in Chapter 7, to ensure the best funding package is obtained for the project.

Project Development Action Items

The following action items will need to be taken by the City of Boardman to implement the desired water system improvements project. The steps outlined are general in nature and include the major steps that need to be undertaken.

1. The City will need to finalize and adopt this WSMP and recommended improvements once agencies review the draft WSMP. This action item occurred on September 1, 2015, when the City of Boardman City Council adopted this WSMP and the recommended system improvements.
2. The City needs to submit a Letter of Interest to the DWS for the SDWRLF project priority list.
3. If funding assistance is desired, the City needs to contact the IFA Regional Coordinator to initiate funding discussions.
4. The City may need to schedule a One Stop meeting with IFA to discuss potential funding options for the proposed improvements.
5. If IFA funding is identified as a potential source in the One Stop meeting, the City and IFA should work together to draft a Project Notification and Intake Form (PNIF).
6. The City will need to hold public information meetings to inform its citizens of the need for and scope of the project, to answer questions, and to explain the need for increases in user fees. Some funding programs have specific requirements that need to be addressed in public meetings.
7. Working with the various funding agencies, the City will need to develop a funding plan for the desired improvements.
8. The City will need to prepare funding applications for the water system improvements project and submit them to the appropriate funding agencies. The City will need to budget appropriate up-front funds to go through the funding application process.

Proposed Improvement Implementation Plan

The City of Boardman City Council adopted this WSMP and the recommended system improvements at their September 1, 2015, Council meeting. The following Implementation Plan outlines the key steps the City will need to undertake if outside funding is desired. It is important to note that it usually takes approximately two to three years, at a minimum, from the date a city decides to proceed with an improvements project until the project is completed and serving the community. The following Implementation Plan uses summer 2015 as a starting date and assumes a two-year implementation schedule. The following schedule is optimistic. It should be noted that these implementation steps, as presented hereafter, may be different if the City elects to delay the project further in the future.

ITEM	COMPLETION DATE
1. Initiate funding discussions with IFA and RD.	Summer 2015
2. Complete a Letter of Interest for the SDWRLF project priority list. Hold a One Stop meeting with agencies.	Summer 2015
3. Complete a public outreach and education program.	Summer 2015
4. Work with IFA to submit a PNIF (if IFA funding is identified as a potential source of funds).	Summer 2015
5. Submit funding application(s) to agencies.	Fall 2015
6. Finalize project funding.	Fall 2015
7. Design distribution system improvements.	Winter 2015-16
8. Bid and award distribution system improvements contract.	Spring 2016
9. Construct distribution system improvements.	Summer/Fall 2016
10. Close out project.	Fall 2016

The key to implementing the City of Boardman's water system improvements is the ability of the City to acquire funding that will allow water rates to remain as low as possible. The water system improvements outlined herein are anticipated to provide Boardman with a high quality water system with significantly improved reliability. The identified distribution system improvements will help improve water quality, circulation, and will significantly improve fire flow capacity in most areas of the City. Overall, the proposed water system improvements will provide a much improved and more reliable water system that should serve the City of Boardman for many years.

**CITY OF BOARDMAN, OREGON
SUMMARY OF ESTIMATED COSTS FOR
WATER SYSTEM IMPROVEMENTS**

TABLE NO.	ITEM	2015 ESTIMATED CONSTRUCTION COST	2015 CUMULATIVE PROJECT ESTIMATED COST
Priority Distribution System Improvements			
6-1	Chaparral Drive Relocate	84,500	84,500
6-2	West End Loop	911,000	995,500
6-3	Wilson Road and Main Street Connection	258,550	1,254,050
6-4	Olson Road Loop Line	170,750	1,424,800
6-5	Front Street Water Line Extension	131,300	1,556,100
6-6	Marshall Loop Connection	21,600	1,577,700
6-7	Boardman Avenue Connection	46,200	1,623,900
		\$ 1,623,900	
	Subtotal, 2015 Estimated Construction Cost	\$ 1,623,900	
	Administrative, Legal, Engineering, and Contingency Costs at 35%	568,300	
	Land and Right-of-Way Costs	50,000	
	Archaeological Monitoring	50,000	
	Permitting	30,000	
	Operation and Maintenance Manual	15,000	
	TOTAL 2015 ESTIMATED COST	\$ 2,337,200	
	TOTAL 2016 ESTIMATED COST*	\$ 2,454,000	

* Assumes a 5 percent annual inflation rate.

Chapter 1 - Background Information

Purpose of Study

This study presents the results of a Water System Master Plan (WSMP) for the City of Boardman's municipal water system. This WSMP is intended to satisfy the criteria of the Oregon Health Authority - Drinking Water Services (DWS) and Oregon Administrative Rule 333-061-0060. DWS require communities to maintain a current master plan that evaluates the water system needs for at least a 20-year period. The City of Boardman does not have a current WSMP; therefore, this WSMP is intended to fulfill DWS' requirements for a current master plan for the next 20 years. The WSMP was authorized by an agreement between the City and Anderson Perry & Associates, Inc., dated August 30, 2012. The purpose of the WSMP has been to develop water system design criteria for a 20-year planning period; evaluate the adequacy of the existing water supply, storage, and distribution systems; evaluate alternatives for improving the City's water system; and develop a financial plan for implementing the recommended improvements.

Organization of this Master Plan

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

- A. An Executive Summary of the overall study that describes water quality and service goals (design criteria), present and future water system deficiencies, the Engineer's recommended alternatives for achieving the goals and correcting the deficiencies, and the recommended implementation schedule and financing program for constructing improvements.
- B. Chapter 1, "Background Information," discusses the objectives of the WSMP, describes the community and environment, and provides a brief history of the past development and operation of the City of Boardman's water system.
- C. Chapter 2, "Water System Requirements," develops the data upon 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," reviews Boardman's water rights and permits, references a previous partial Water Master Plan prepared by CH2M Hill (see Appendix E), discusses microscopic particulate analysis (MPA) test results conducted on water from Ranney Collectors No. 1 and No. 2, and discusses the DWS review of MPA sampling results. MPA testing was needed to determine if water supplied from the collectors could be categorized as groundwater or groundwater under the direct influence of surface water.

- 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, discusses 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 flow information. Existing deficiencies and deficiencies likely to develop during the planning period are identified. Improvements are presented to resolve distribution system deficiencies.
- G. Chapter 6, "Recommended System Improvements and Operational Recommendations," presents information related to water supply, storage, and distribution system improvements developed in Chapters 3, 4, and 5 of this WSMP. Cost estimates are presented 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. The number of residential, commercial, and industrial equivalent dwelling units is provided. Potential water rate increases and identification of rate implementation procedures are also presented. A recommended water system improvement program including the recommended engineering alternative and estimated costs; the recommended financing alternative; an estimated loan repayment schedule and operation, maintenance, and replacement requirements; and an implementation schedule 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 water right information, test 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 the 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 in part on the completeness and accuracy of the information provided.

Review and Updating of Master Plan

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

Objectives of this Master Plan

The primary objectives of this WSMP are to accomplish the following:

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 needs including alternatives for correcting existing system deficiencies. Outline general operation and maintenance requirements for the water supply system.
3. Analyze the existing water storage facilities considering capacity, condition of reservoirs, and distribution system pressures. Assess the City's storage capacity considering emergency storage, operational storage, equalization storage, and fire reserve storage. Identify the storage requirements of the water system for the planning period.
4. Update the City's existing CAD-based map of the distribution system including line sizes, line types, valve and hydrant locations, etc., when known.
5. Utilizing existing distribution system maps and City records, generally 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 operation and maintenance requirements of the distribution system as well.
6. Review the status of the existing Water Department financial condition considering historical water system revenues, operational and maintenance costs, and debt service including the adequacy of existing water user fees. Project the future cost of operation and maintenance, capital improvement investments, and debt service for the water system. Develop a financing plan for meeting system needs including general user rate charges and outside financial assistance.
7. 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.
8. Prepare a summary identifying current and future water system needs with their associated estimated cost. Provide recommendations for meeting the water system needs for the planning period.

Regional Setting

Morrow County is bordered on the north by the Columbia River and Washington State, on the east by Umatilla County, on the south by Grant County, and on the west by Gilliam and Wheeler Counties. The Columbia River generally flows east to west along the north boundary of Morrow County. The general slope of the County is to the northwest, with major drainages flowing west and northwest. Elevations gradually rise as one travels southeast to nearly 6,000 feet at the southeast limit of the County. Arbuckle Mountain, located in the southeast area of the County, is the highest point in Morrow County with an elevation of 5,827 feet. Elevations in the City of Boardman range from 280 to 360 feet.

The summer is typically dry with clear days. Winters bring rain, snow, and frozen soils. Temperatures vary from extremes of just below 0°F to just over 100°F. Extreme temperatures are not usually prolonged. The closest Western Regional Climate Center weather station is located approximately 22 miles east of Boardman in Hermiston; since the climatic conditions in Hermiston are similar to

Boardman's, it is reasonable to use this information to approximate weather conditions in Boardman. Based on the data, as compiled by the National Climatic Data Center, the average annual temperature of Hermiston is approximately 52.7°F and the annual average precipitation is about 9 inches. Boardman's average annual temperature and precipitation are expected to be approximately the same.

U.S. Interstate 84 (I-84) is the major east/west route in the area that also provides transportation to the City of Boardman. There are no major north/south routes from Boardman, in part because northern travel is prevented by the Columbia River. The closest northerly route from Boardman is the Columbia River Highway (Route 730), and the closest southerly route is the Heppner Highway (Route 74). The junctions to these routes from I-84 are approximately 5 miles east and 17 miles west, respectively.

The City of Boardman's air is essentially pollution-free. The clean air quality can be attributed to two main factors: clean industry and wind. Industrial work in the Boardman area is mostly composed of food processing plants and a Portland General Electric (PGE) power generation plant. The food processors generally emit steam from food processing, while the PGE power generation plant's emissions are strictly regulated by the State of Oregon and the Environmental Protection Agency. PGE completed installation of additional emissions reduction equipment in 2011.

Predictable, almost constant wind also modifies Boardman's air quality. The high annual wind velocity is approximately 30 miles per hour (mph), usually occurring in January and February. The lowest average monthly wind velocity occurs in March at about 12 mph. The average wind velocity is roughly 15 mph. Clean industry coupled with wind generally ensures almost pollution-free air in and around Boardman.

Soils

Soils in the study area are predominantly fine sands and loamy sands underlain by basalt bedrock. Water-bearing zones in basalt layers form a deep aquifer system. A shallow groundwater aquifer is present in sand and gravel layers over area basalt formations. Groundwater can be found 10 to 100 feet below ground surface in the study area. Groundwater quality in the shallow alluvial aquifer system is considered "degraded" from elevated levels of nitrate and nitrogen. The Lower Umatilla Basin Groundwater Management Area, encompassing parts of northern Morrow and Umatilla Counties, was formed to address elevated nitrate and nitrogen levels in area groundwater.

The Columbia River is the only perennial surface water stream in the study area. The developed area of the City of Boardman lies outside the Columbia River 100-year floodplain. Only a few wetland areas are present in the study area. Wetlands lie near, and are influenced by, the Columbia River or result from irrigation canal and return-water operations associated with irrigated agriculture. No wetlands are expected to be impacted by water system improvements proposed in this WSMP. Excessively drained soils common to the study area, coupled with low annual precipitation, have precluded widespread wetland formation.

For a more detailed description of soil groups and types in and around the City of Boardman, refer to the "Soil Survey of Morrow County, Oregon" completed by the Soil Conservation Service.

Location and Study Area

The City of Boardman is located adjacent to the Columbia River on I-84, approximately 22 miles west of Hermiston. The location of the community and the layout of the City relative to surrounding physical features are shown on Figure 1-1, Location and Vicinity Maps.

The study area for this WSMP encompasses the entire area within Boardman's City limits and Urban Growth Boundary (UGB). The City limits and UGB are shown on Figure 1-1 and Figure 1-2, Aerial Photograph.

Water System History

Overview

The City of Boardman operates a water system that serves their community within the City limits and some areas within the UGB. The system contains two Ranney collectors for water supply, a pump station, a 300,000-gallon ground-level storage reservoir, a chlorination system, an elevated storage reservoir (currently off line but available for use), a 300,000-gallon belowground clear well (reservoir), and a distribution system. The City also has a groundwater supply well used only during emergency conditions. The location of the Ranney collectors, pump station, reservoirs, and groundwater supply well is shown on Figure 1-3, Water System Component Map.

Ranney Collector No. 1 is the City's original collector built in 1977. This collector produces approximately 6,000 gallons per minute (gpm) of water from the underlying strata adjacent to the Columbia River in an area called Lake Umatilla. Ranney Collector No. 2 was constructed in 2002 and can produce approximately 10,000 gpm. Ranney Collector No. 2 has been adjusted to produce 6,000 gpm to avoid overloading the naturally-occurring gravel filter system. This collector also draws from the underlying strata adjacent to the Columbia River but is currently off line. As shown on Figure 1-3, Collector No. 2 is located southwest of Collector No. 1. A future Collector No. 3 is also shown on Figure 1-3. Pumps contained within the collectors deliver raw water to the storage reservoir/booster pump station. The pumps are line shaft turbine pumps with the drive shafts extending to the bottom of the collector and the pump motor above grade.

From the collectors, the raw water is conveyed through a 20-inch pipeline for Collector No. 1 and a 28-inch HDPE pipeline for Collector No. 2 to the booster pump station. The pipelines discharge into the 300,000-gallon ground-level storage reservoir. Just upstream of the discharge point, chlorinated water is introduced into the pipeline. The chlorinated water injection point is below grade and fully enclosed. The chlorinated water injected into the raw water is used for disinfection purposes. The ground-level storage reservoir is constructed of welded steel plate with an interior and exterior coating. Access is via a security enclosure and caged access ladder. Adjacent to the ground-level storage reservoir is the building that houses the booster pump station. The pump station includes six separate centrifugal pumps that supply water and pressure to the distribution system. Water from the ground-level storage reservoir discharges into a clear well incorporated into the pump station building. A suction manifold from the pump station piping extends into the clear well, subsequently providing water to each pump. Pumps are called to start as needed to meet system demand through the supervisory control and data acquisition (SCADA) system.

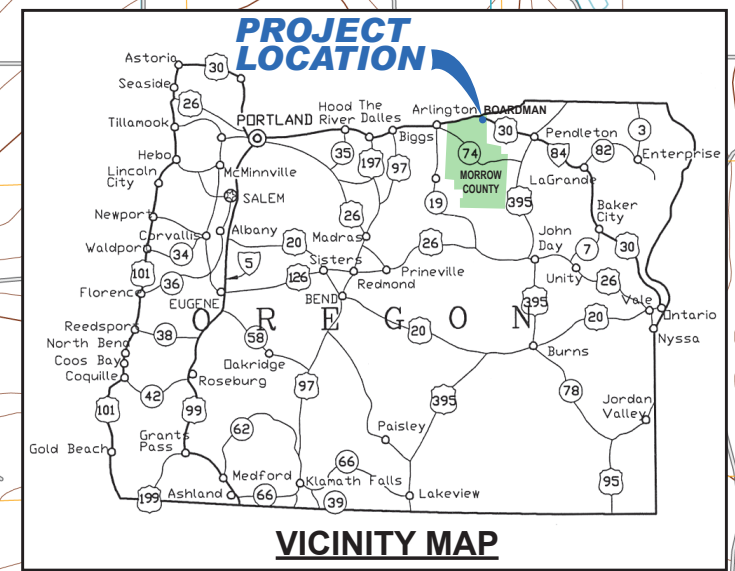
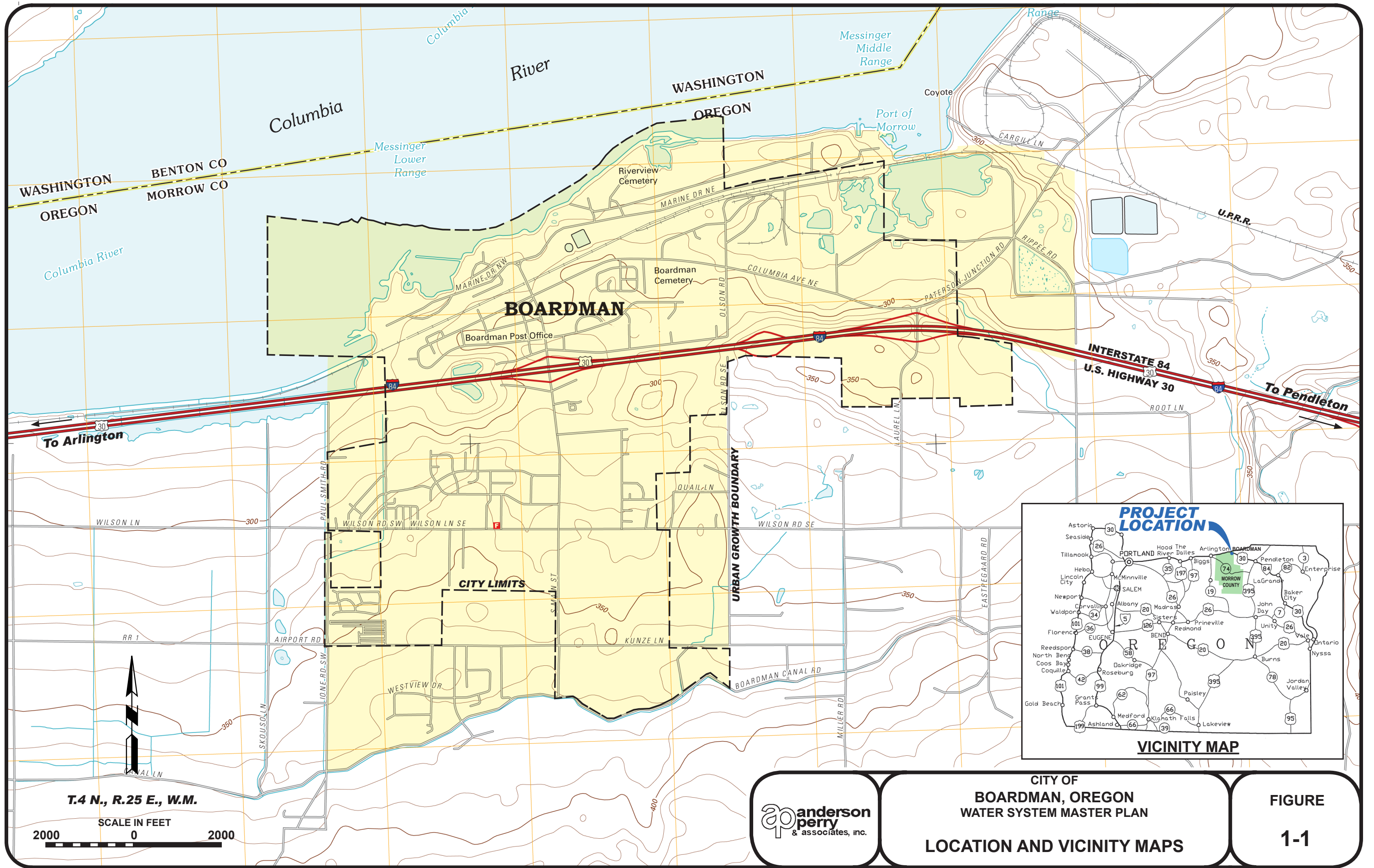
The chlorination system consists of a hypochlorination generator station. The station includes a generator, salt storage tank, hypochlorite storage tank, pumping systems, and electrical controls. The salt storage tank and the hypochlorite storage tank are located outside the pump station building. Both tanks are constructed of fiberglass reinforced plastic and have a foam-insulated exterior coating. The chlorine generator, pumping systems, and controls are located in the pump station building.

Backup power is provided by an 800 kilowatt diesel-powered CAT generator. The generator provides emergency power for Ranney Collector No. 1, the booster pumping system, chlorination system, and building lighting. The diesel tank is housed outside the building and provides a minimum of 24 hours of continuous operation. The generator automatically runs for one hour each Monday. The City has a service agreement with Western States Caterpillar for routine maintenance and emergency repairs.

The City also has a deep groundwater supply well located adjacent to the elevated storage reservoir. This well is used only in emergency conditions because of the water's high hydrogen sulfide content and is considered "off line." The well can supply up to approximately 800 gpm.

The distribution system operates as a closed system, meaning that one or more booster pumps must run continuously to maintain system pressures. The elevated storage reservoir cannot be used to provide system-wide pressure because the operating level of the reservoir is below the hydraulic grade line needed to provide adequate system pressure. This reservoir is used only for emergency conditions. If pressures within the system fall below 45 pounds per square inch, water can be drawn from the reservoir.

The City's distribution system comprises about 16.5 miles of 4- to 30-inch diameter distribution mains. About 54 percent of the system is composed of asbestos cement pipe. The two largest mains, 24 and 30 inches in diameter, are concrete cylinder pipe. The 18-inch main is ductile iron pipe. Most of the pipe installed in recent years is polyvinyl chloride pipe.

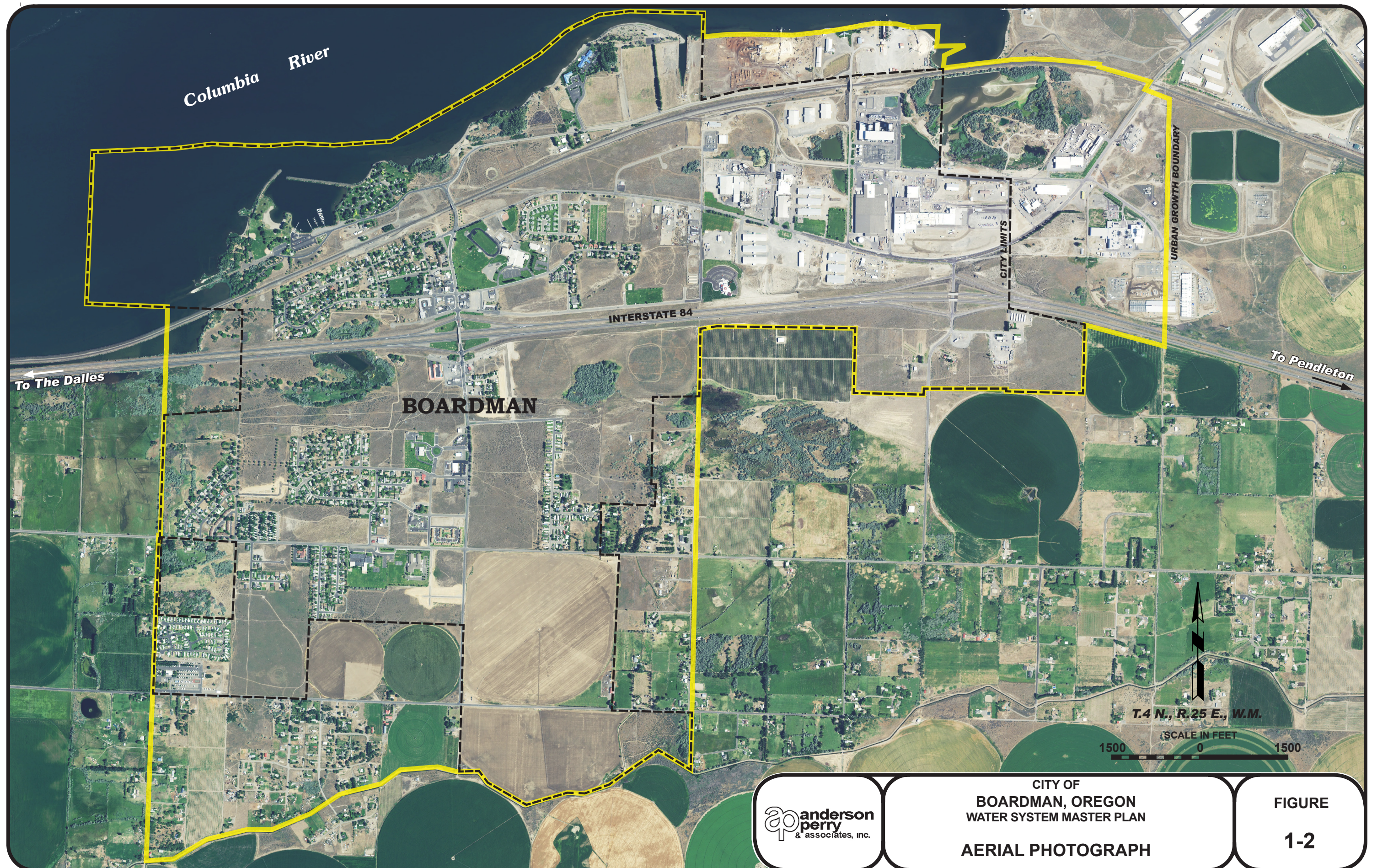


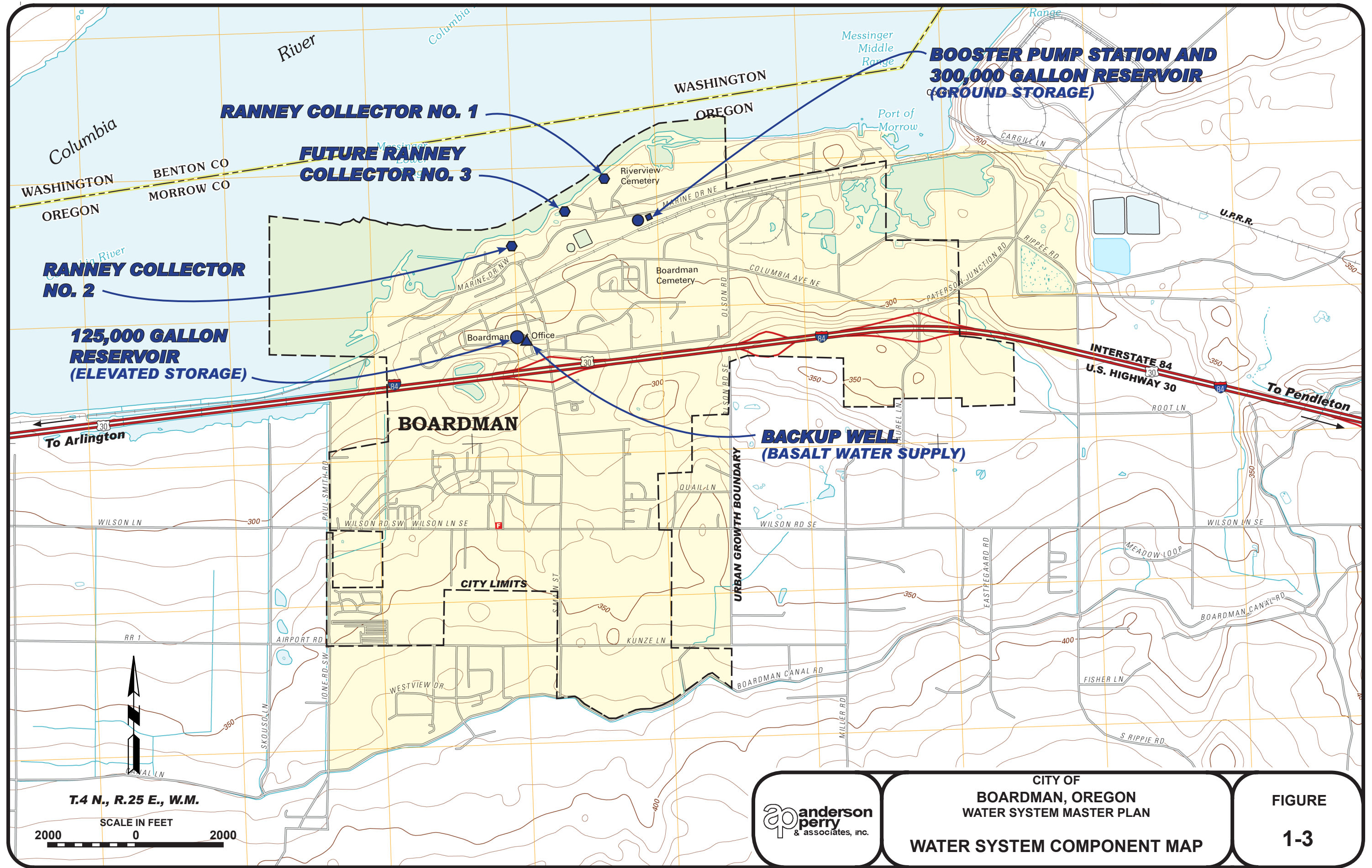


**CITY OF
BOARDMAN, OREGON
WATER SYSTEM MASTER PLAN**

LOCATION AND VICINITY MAPS

**FIGURE
1-1**





	CITY OF BOARDMAN, OREGON WATER SYSTEM MASTER PLAN WATER SYSTEM COMPONENT MAP	FIGURE 1-3
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Chapter 2 - Water System Requirements

Introduction

This chapter of the Water System Master Plan (WSMP) presents basic information from which criteria have been developed for evaluating the City's 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, land use, water use, and state and federal requirements is presented.

Service Area

The term "service area" refers to the area being served with water from the City's water system. The present service area primarily consists of developed lands within the City limits. The City's water system has expanded to areas of development with large open areas present between developed areas. This has created a "patchwork" of developed and undeveloped areas, creating challenges for water system service and connectivity. For the purposes of this WSMP, the future service area consists of the present service area and the area within the Urban Growth Boundary (UGB).

Many areas with large tracts of undeveloped land currently exist within the City limits. The largest of these areas generally include:

- The south portion of the City, south of Wilson Road.
- The south portion of the City, between I-84 and Wilson Road, east of South Main Street.

There are also many smaller undeveloped areas spread throughout the City that could support further development. The elevations of these areas are similar to surrounding areas already served by the water distribution system and can be incorporated into the water distribution system without creating low pressure areas. The open areas within the City are shown on Figure 2-1, Aerial Map of Potential Development Areas.

Service Population and Planning Period

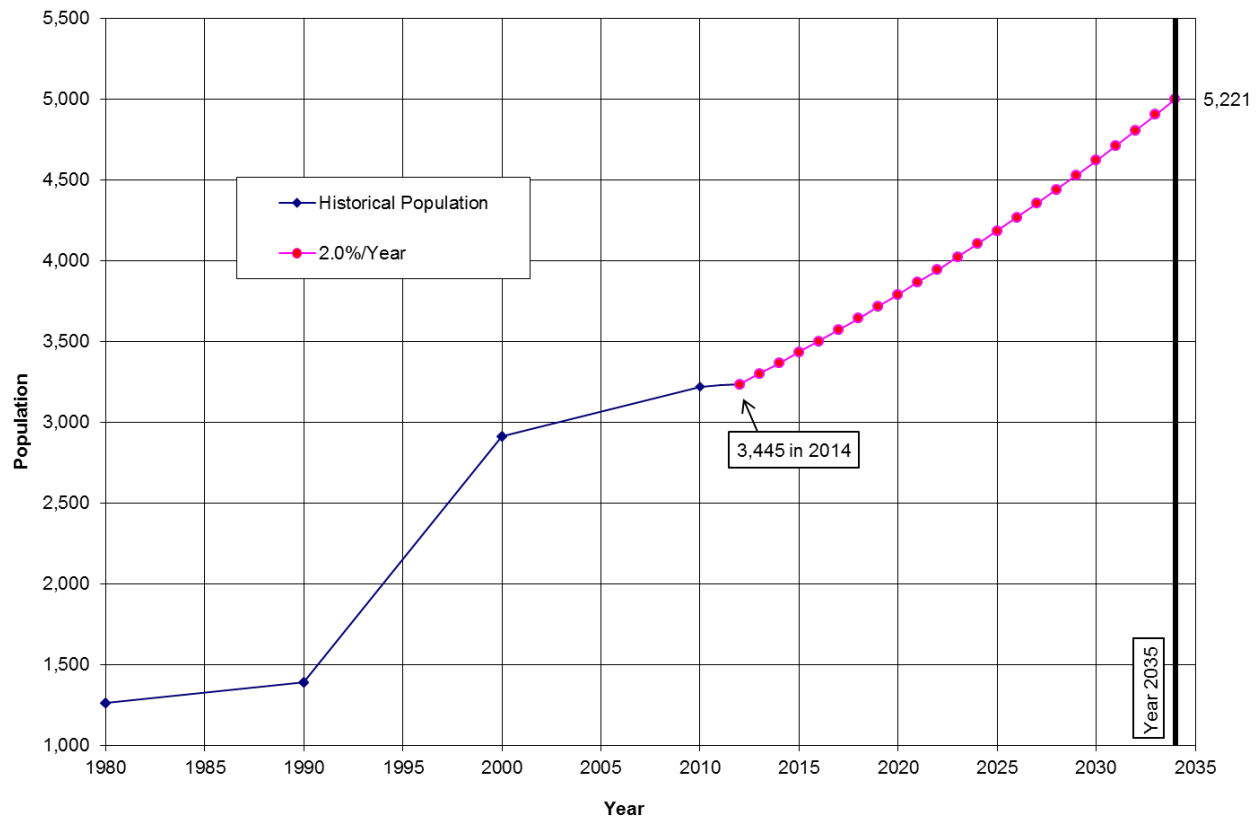
To estimate the demands that may be placed on a municipal water system, a determination of the population to be served must be made. Population estimates must be made with reference to time. Projections are usually made on the basis of an annual percentage increase estimated from past growth rates, tempered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

The period of time over which the population is to be projected usually depends on the type of improvements being considered. Improvements requiring long-term financing should be designed for no less than the term of the financing. Facilities that are readily expanded or modified are normally designed for 10 to 20 years. Facilities that are 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 2010 U.S. Census reports the City of Boardman's population as 3,220. Past population trends for the City show the population increased from 1,348 in 1990 to 3,220 in 2010. This represents a historical

growth rate from 1990 through 2010 of 4.6 percent per year. The majority of this growth took place during the period from 1990 to 1995 when an average growth rate of 13.6 percent per year increased the population from 1,348 to 2,550 residents. Growth slowed considerably from 2000 to 2010, averaging 1.1 percent per year. Boardman's population declined slightly between 2010 and 2012, increasing again in 2013 and 2014. Historical populations are shown on Chart 2-1.

**CHART 2-1
HISTORICAL AND PROJECTED POPULATION**



The historical population data shown on Chart 2-1 was provided by the Population Research Center located at Portland State University. This agency is the recognized primary source of population data available in Oregon between the official Census data generated at the beginning of each decade. The University does not project population increases for individual cities within the state.

The Oregon Office of Economic Analysis completes long-term population forecasts for counties in Oregon. Their data forecasts Morrow County's population to increase at an annual rate of just over 2 percent. Based on this projection and the historical population growth in Boardman, the City selected a 2 percent growth rate for this WSMP. A population projection rate of 2 percent per year through the year 2035 is shown on Chart 2-1.

Based on a 2014 population of 3,445 and a 2 percent growth rate, the population projection would result in 5,221 people by the year 2035. This population projection of 5,221 people will be utilized in

estimating the City's water demands. It should be recognized that over the planning period of this WSMP, actual growth could exceed or fall well below the projection presented on Chart 2-1.

Land Use

This WSMP has been prepared to consider water use requirements within Boardman's City limits and UGB. The City has established zoning within the City limits while Morrow County establishes zoning in the areas between the City limits and the UGB. The City and County work cooperatively to ensure adjoining zones are compatible. The City's current (2011) zoning map lists seven zones and five sub districts that lie within their host zone. The zoning classification in the City limits and UGB is shown on Figure 2-2, Zoning Map.

The main zones within the City limits are listed as commercial, light industrial, general industrial, port industrial, service center, residential, and future urban.

Sub districts are designated commercial-highway, Bonneville Power Administration (BPA) transmission line easement, residential (Sunridge Terrace), residential (multifamily), and residential (manufactured home). Parks are listed separately as public/open space. In addition to the City-designated zones, Morrow County has the following zones within the UGB: general industrial, suburban residential (1 acre), farm residential (2 acres), small farm (40 acres), and exclusive farm use.

The City of Boardman has a significant amount of undeveloped land within the City limits that is zoned residential. There is also a large amount of undeveloped land outside the City limits and within the UGB zoned suburban residential. Undeveloped residential property lies primarily in the southern portion of the City, both within the City limits and outside the City limits but within the UGB. Some property for residential development is also available north of Interstate 84 in the eastern portion of the City.

The City has undeveloped industrial land available in the northeastern portion of the City adjacent to existing industrial developments including portions of the Port of Morrow. These properties are located both within City limits and outside City limits but within the UGB.

In general, the City of Boardman has large areas of land available for residential expansion inside the City limits and the UGB. These available areas are anticipated to be more than sufficient to accommodate the anticipated 20 years of planned growth. There are also expansion areas available for commercial and industrial use. These undeveloped growth areas are important when analyzing the City's water system capabilities because distribution system improvements must be designed to accommodate the projected use of the growth area.

Regulatory Requirements

The City of Boardman's water system comes under the jurisdiction of the Oregon Health Authority - Drinking Water Services (DWS). The DWS assumed primacy (responsibility) from the U.S. Environmental Protection Agency (EPA) in February 1986 for enforcement of the Federal Safe Drinking Water Act (SDWA). Therefore, the City of Boardman is currently, and will be dealing principally, with the DWS as the regulating agency regarding their water system.

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, record keeping, 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 (MCLs), 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 the State of 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 make sure 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.

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 in order 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 (CWSs) 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 CWSs and NTNCs and in October 2013 for all CWSs 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 CWSs to report detection of unregulated contaminants in their annual Consumer Confidence Report.

Upcoming Regulatory Changes

The following rule will be enacted in the near future:

- 1. Revised Total Coliform Rule,** which requires that total coliform samples be collected by public water systems at sites that are representative of water quality throughout the distribution system according to a written sample site identification plan subject to state review and revision. The rule goes into effect on April 1, 2016. The City should work with the DWS to develop the required sampling plan prior to April 1, 2016.

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 CWSs that use groundwater or mixed groundwater and surface water.
- 2. Third Contaminant Candidate List (CCL3) Regulatory Determinations.** The EPA has made a preliminary determination to regulate strontium. After public comment, the EPA is expected to release a final determination in 2015. The Fourth Contaminant Candidate List is currently in draft form and is expected to be published in 2015.
- 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 cVOCs and up to eight from the CCL3.
- 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. The State of 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.

Regulatory Violations

The City of Boardman has good water quality with a well-run water system meeting federal and state water quality criteria. The DWS has issued six violations against the City in the past seven years related to late chemical/non-reporting. Corrective action was taken in each case and the City is in compliance. These violations are documented in the DWS's Water Quality Summaries presented in Appendix A.

Regulatory Requirements Summary

In summary, there are many regulations that affect operation of the City of Boardman's water system. The information presented herein provides the City with a brief summary of the regulations and possible future regulations that will likely affect operation of the City's water system. In general, it appears that the City is keeping up to date with water testing and reporting requirements. Water system regulations continue to expand and require careful attention to maintain compliance. It is recommended that the City of Boardman periodically consult with the DWS in Pendleton, Oregon, with any regulatory questions or issues.

Sanitary Survey

The DWS conducts sanitary surveys of 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 Boardman's latest sanitary survey was conducted on November 1, 2012. The primary findings of the survey are summarized below:

- Cross-connection Annual Summary Report must be completed for calendar year 2011 (OAR 333-061-0070(9)c).
- No current approved Water System Master Plan (OAR 333-061-0060(5)).
- Under-certified operator protocol should be developed for anyone making process control changes that may impact water quality and who are not certified as a WD1 (OAR 333-061-0225(5)).
- No current Coliform Sampling Plan (OAR 333-061-0036(6)(G)).
- Chlorine not measured twice a week in the distribution system as required (OAR 333-061-0036(9)).
- Turbidity not measured as required under OAR 333-061-0032(8) using a calibrated turbidimeter.

A copy of the full 2012 sanitary survey is included in Appendix B.

The DWS also published a checklist of sanitary survey significant deficiencies (included in Appendix B) for City staff to periodically review and address any noted deficiencies. This allows the City to take a proactive approach to sanitary surveys. At the time this WSMP was prepared, the City was actively addressing system deficiencies with the goal to have all deficiencies addressed by October 2015.

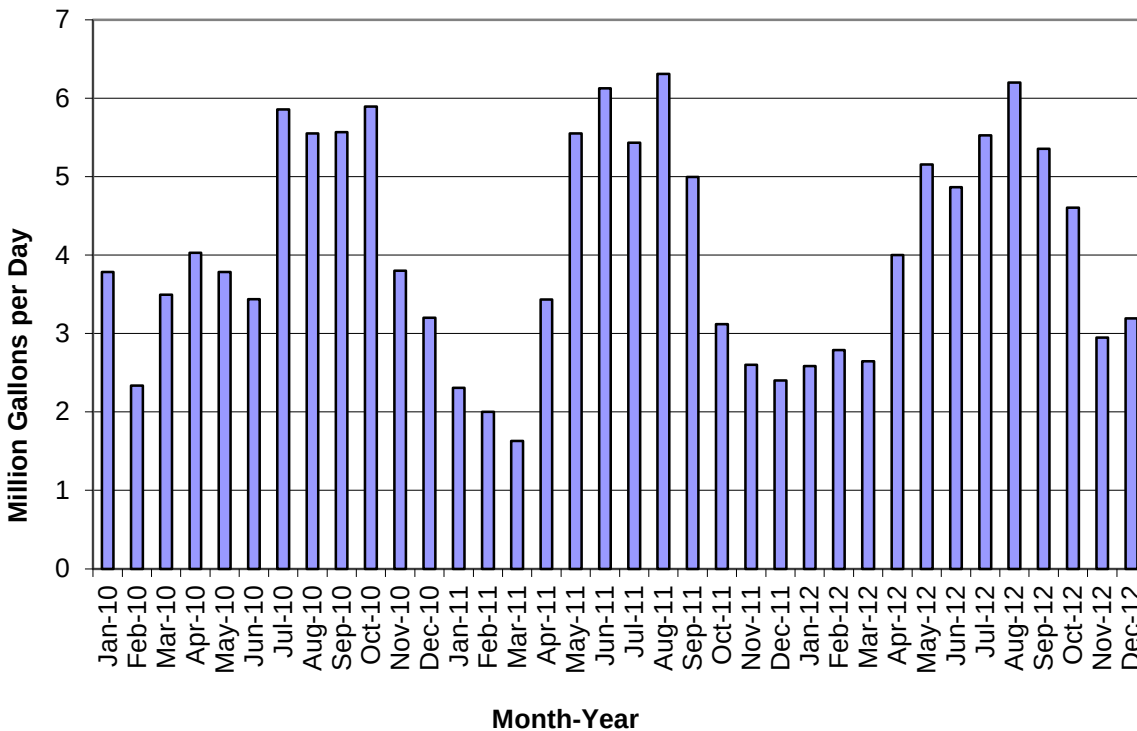
Water Demand

For the purpose of identifying needed future water system improvements, future water demands can be estimated from past water use and future population projections. Water use characteristics 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 evaluation of a water supply system are:

- **Average Day Demand (ADD)** - The ADD equals the total amount of water used in a year divided by 365 days. ADD is presented as gallons per day (gpd) or gallons per capita (per person) per day (gpcd). Gpd represents the City's water consumption as a whole, while gpcd equates the total City use to an average amount of water per person per day.
- **Peak Day Demand (PDD)** - The PDD is the maximum total amount of water used during any 24-hour period. PDD is presented as gpcd. This is the peak daily amount of water used on the highest water use day of the year equated to the total population. The highest water use day of the year normally occurs during the warmer summer months when irrigation uses are highest.
- **Peak Hour or Peak Instantaneous Demand (PHD)** - The PHD is a measure of the maximum flow of water at any given time, often over a one-hour period. The PHD normally occurs during the warmer summer months of the year.

Water supply facilities are normally designed for peak daily demands. As a rule, a well would be sized for supplying the needed water during the peak day, without continuous 24-hour operation. For example, if the water usage during high use summer months requires a well pump to operate 18 hours or more per day to keep up with the PDD, the situation may warrant an additional water supply source in order 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 (reserves) is usually provided in water storage reservoirs for emergencies and fire suppression. Monthly peak day flows from 2010 through 2012 are shown on Chart 2-2.

**CHART 2-2
MONTHLY PEAK DAY FLOW**



Per Capita Water Use

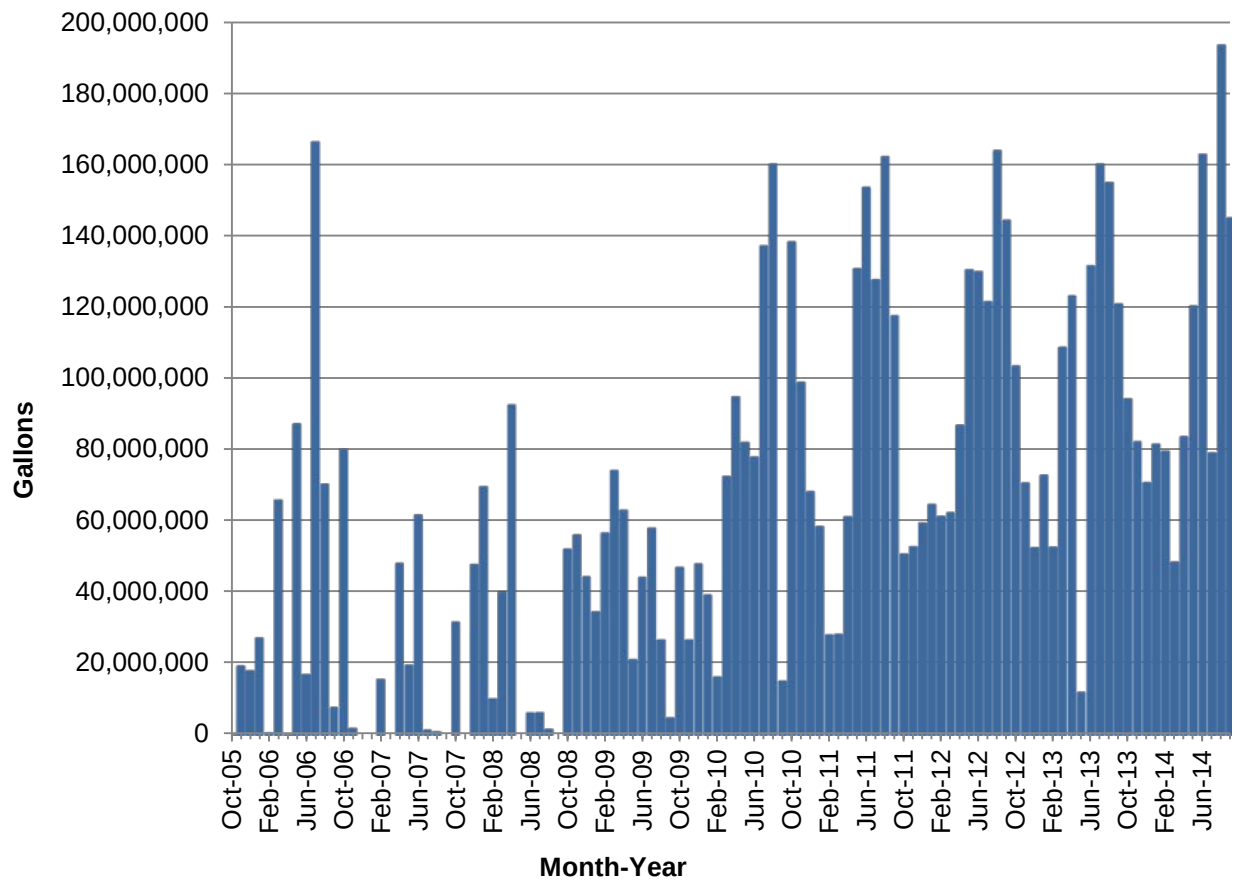
To be utilized for projecting future water demands, past water use characteristics must be converted to a per capita (per person) rate of use. This is calculated by dividing the average day, peak day, and peak instantaneous water use rates by the number of people being served by the water system. These water demand rates would then be expressed as gpcd. These values multiplied by a population projected for some future year would then give estimated total demand rates for that year, assuming water use characteristics did not change significantly.

Historical Average Water Use

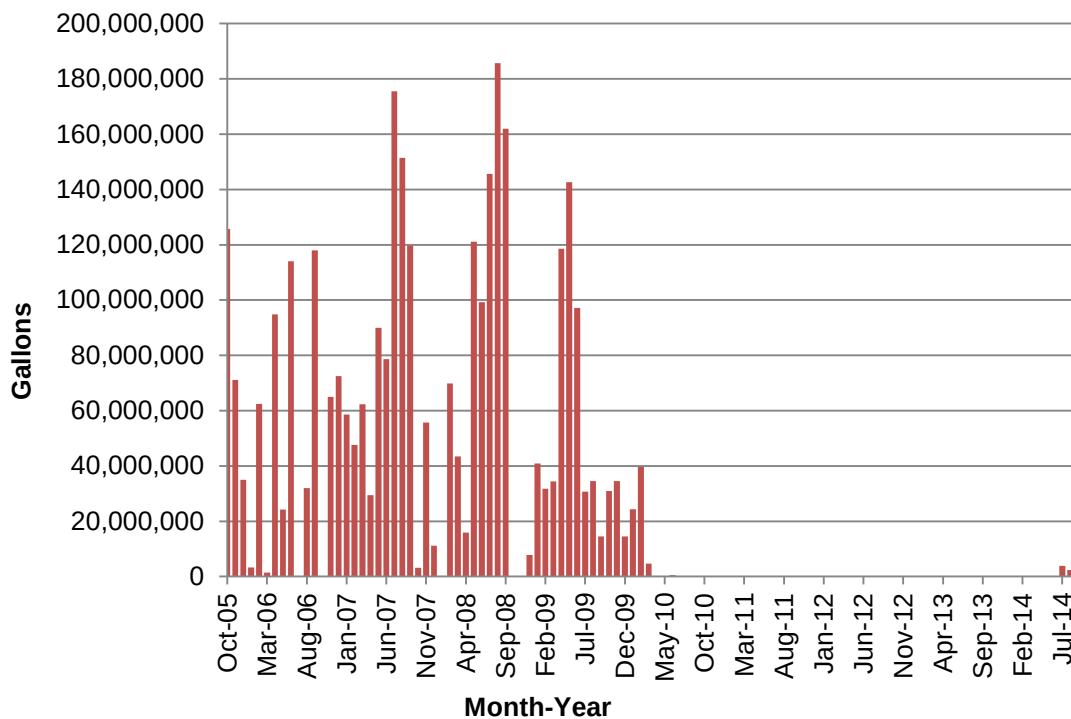
In order to determine current water demands, pumping records and customer billing records for the City's water system were reviewed from 1995 through 2014. The billing records were used in the ADD calculations instead of production records because a majority of the City's water is used by the Port of Morrow. Therefore, it is imperative that the Port of Morrow's usage be separated from the City's usage to be able to determine an accurate ADD for the City of Boardman.

Monthly production for Ranney Collectors No. 1 and 2 for October 2005 through September 2014 are shown on Chart 2-3 and Chart 2-4, respectively.

CHART 2-3
RANNEY COLLECTOR NO. 1 MONTHLY PRODUCTION



**CHART 2-4
RANNEY COLLECTOR NO. 2 MONTHLY PRODUCTION**



The combined monthly production from the City's two collectors is shown on Chart 2-5.

**CHART 2-5
COMBINED WATER PRODUCTION (MG)**

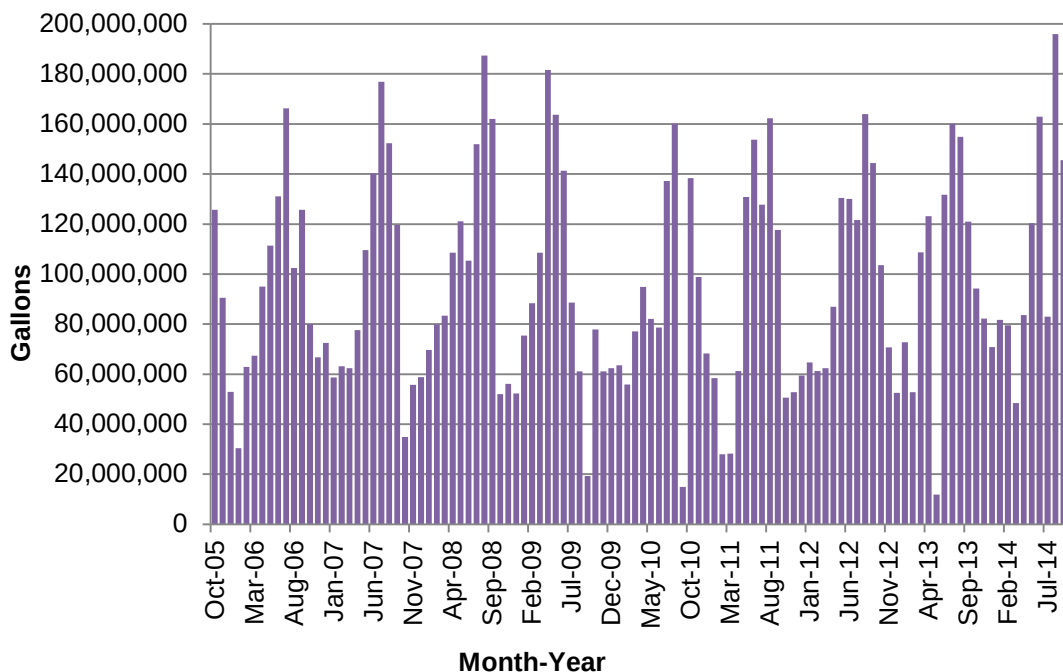
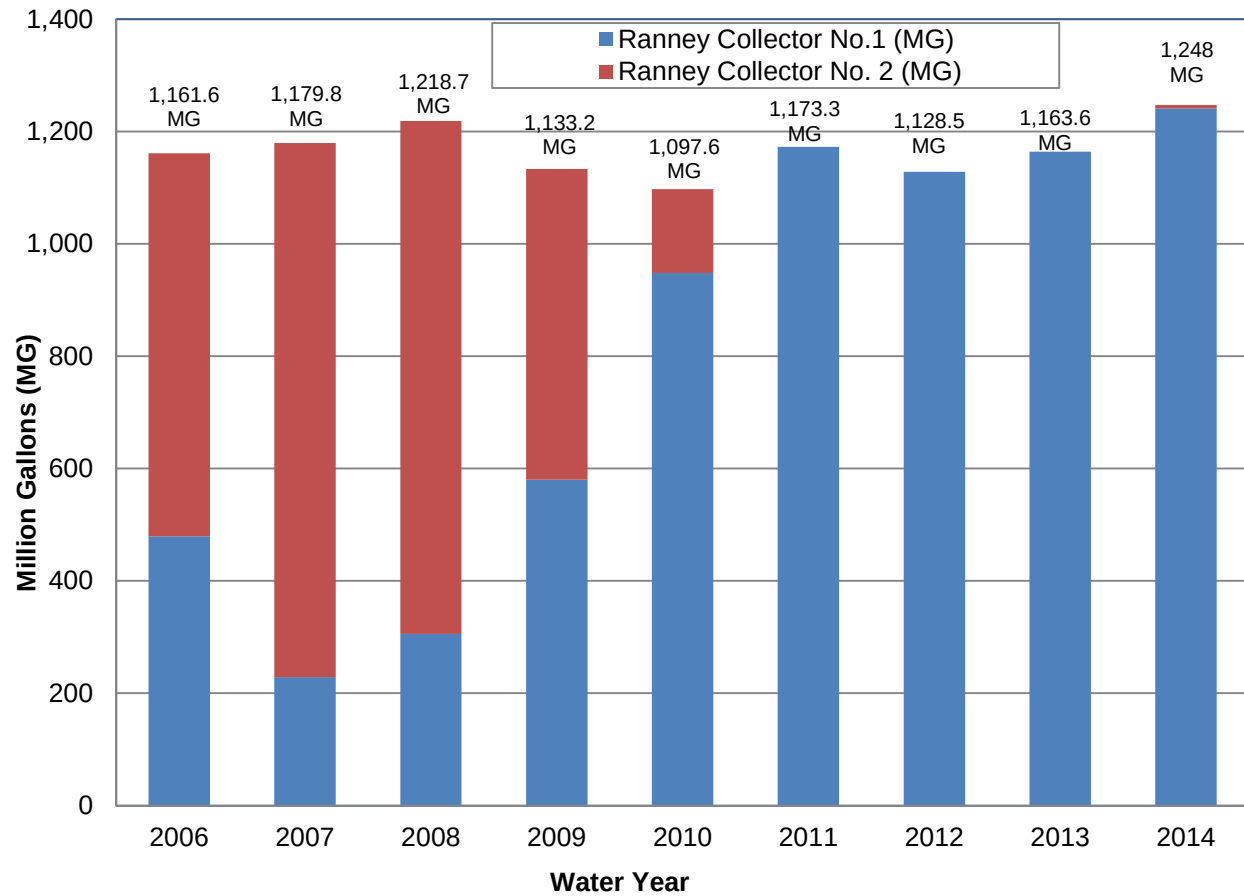


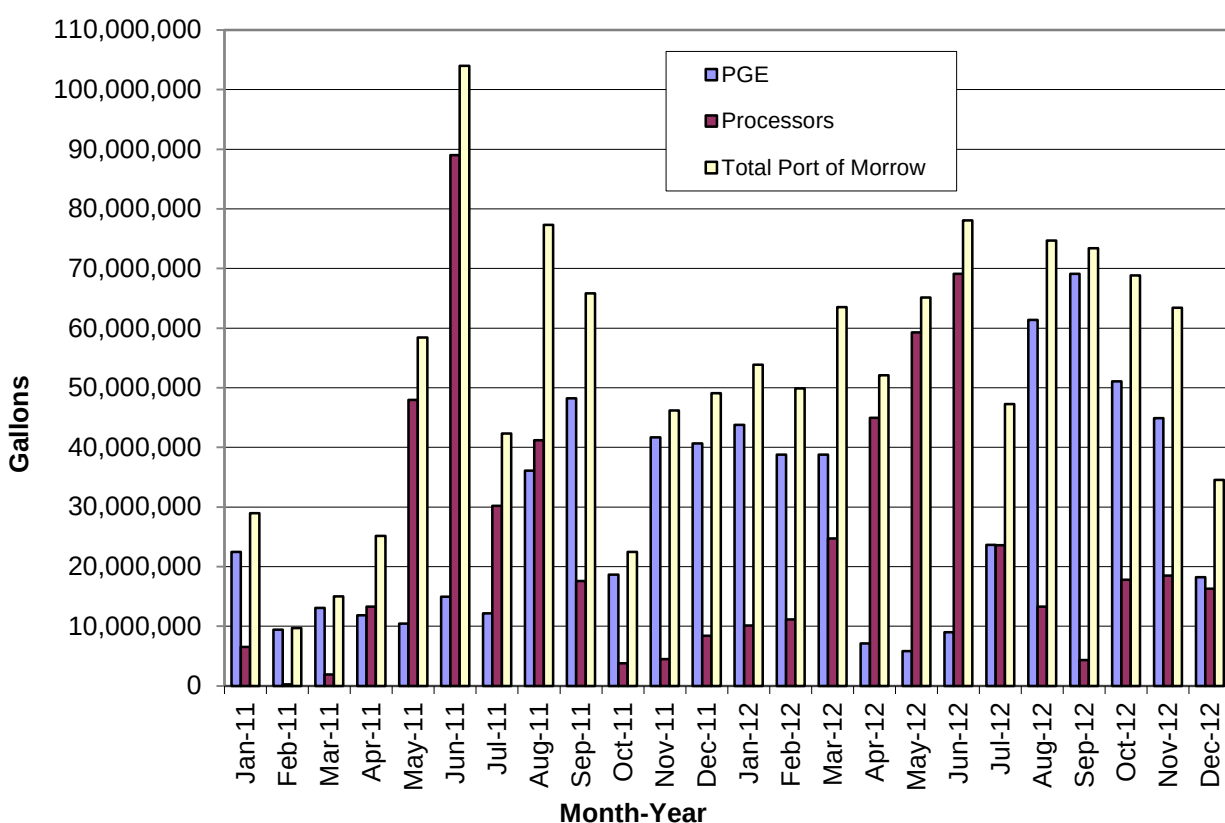
Chart 2-6 shows the annual water produced from 2006 through 2014. These records show typical patterns of high summer demand and low fall, winter, and spring demand.

CHART 2-6
TOTAL YEARLY WATER PRODUCTION



The Port of Morrow represents nearly twice as much annual usage as the entire City of Boardman. The total water use (use of the City of Boardman water) by the Port of Morrow is shown on the following chart.

**CHART 2-7
PORT OF MORROW MONTHLY CONSUMPTION**



The Port of Morrow water use must be accounted for separately when determining average water use by the residences and businesses of the City of Boardman. The total flow data for each calendar year and the average water use is as follows:

**TABLE 2-1
AVERAGE PER CAPITA WATER USE**

Year	Population	Boardman's Usage (MG)	Port of Morrow Usage (MG) ¹	Annual Total (MG)	Average Daily Demand (City) (gpcd) ²	Total Average Daily Demand (City and Port of Morrow) (gpcd) ³
2008	3,330	392.180	728.042	1,120	323	922
2009	3,295	375.983	681.665	1,058	313	879
2010	3,220	311.064	648.764	960	265	817
2011	3,232	361.380	544.314	906	306	768
2012	3,220	363.700	724.753	1,088	309	926
2013	3,405			1,164		
2014	3,445			1,248		

¹ Port of Morrow use was estimated from 11 months of data.

² Average Daily Demand is based on the City of Boardman's usage only.

³ Total Average Daily Demand is based on the usage of both the City of Boardman and the Port of Morrow.

Based on the water use data for 2008 through 2014, the City of Boardman's gpcd water use has varied from a low of 265 gpcd in 2010 to a high of 323 gpcd in 2008. The average gallons per capita day from 2008 through 2014 equals 307 gpcd. Prior to 2008, the City of Boardman experienced ADDs ranging from 337 gpcd to 417 gpcd, with an average of 373 gpcd.

For this WSMP, an average daily flow of 320 gpcd was selected for planning purposes.

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

City	Average Day Demand (gpcd)	Peak Day Demand (gpcd)	Peak Factor (peak daily)	Population
Lostine, Oregon	170	544	3.2	250
Adams, Oregon	195	625	3.2	265
Cove, Oregon	215	628	2.9	594
Stanfield, Oregon	217	705	3.2	1,620
Prairie City, Oregon	234	549	2.3	1,195
Pilot Rock, Oregon	240	810	3.4	1,675
Prescott, Washington	240	1,032	4.3	300
Mt. Vernon, Oregon	240	585	2.4	617
Umatilla, Oregon	245	565	2.3	4,281
Athena, Oregon	250	810	3.2	1,120
Island City, Oregon	270	810	3.0	1,030
John Day, Oregon	270	865	3.2	2,010
Irrigon, Oregon	290	800	2.8	1,790
Boardman, Oregon	320	960	3.0	3,445
Helix, Oregon	323	1,130	3.5	155
Vale, Oregon	328	820	2.5	1,500
Condon, Oregon	345	835	2.4	759
Arlington, Oregon	360	1,200	3.3	500
Joseph, Oregon	375	1,100	2.9	1,060
Ione, Oregon	461	1,865	4.0	250
Dayton, Washington	425 (est.)	1,100	2.6	2,700

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

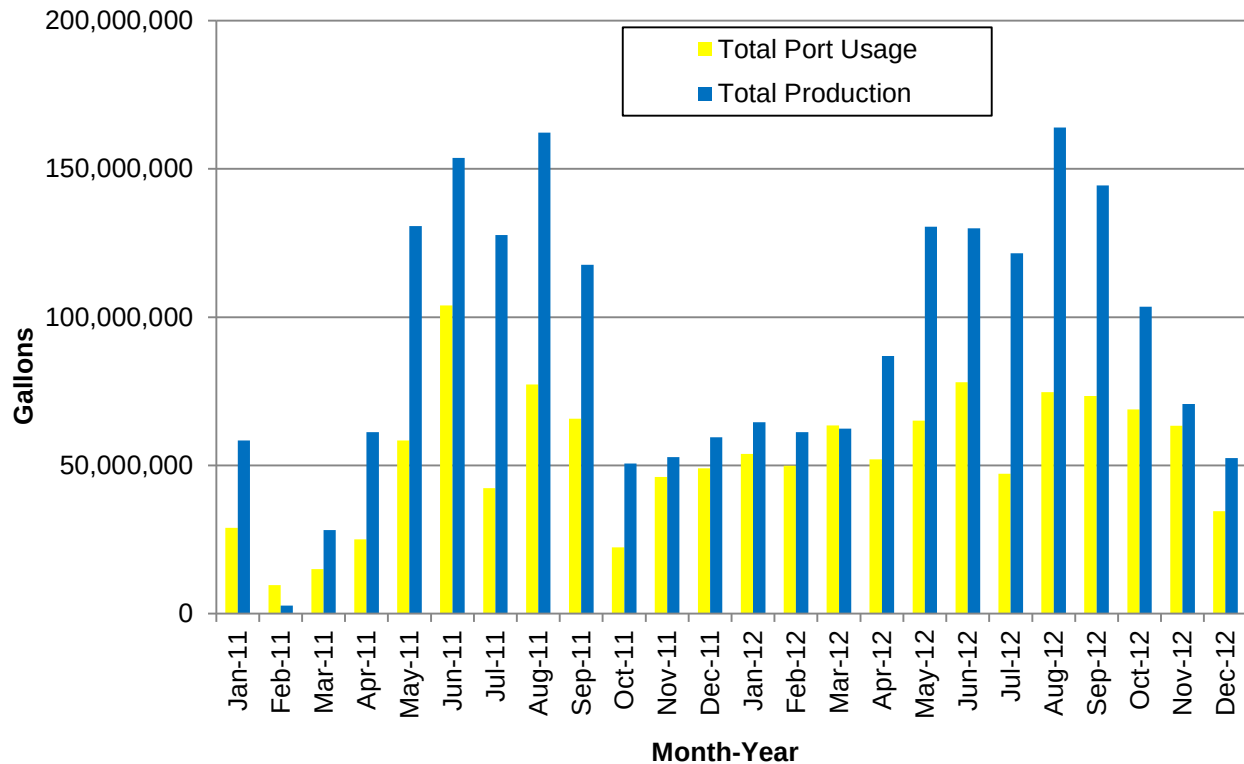
Peak Daily Demands

PDDs usually occur during a particular day from June through September, which is when water use is normally at its greatest due to irrigation and other summer uses. Peak daily flows can occur in other months but normally occur during the hottest period of the year. The 2010 through 2012 data illustrated on Chart 2-2 shows the highest peak day water use of 6,313,000 gallons on August 24, 2011. Peak daily flows occurred in August for two of the three years shown on Chart 2-2.

To estimate peak daily demands for the City of Boardman only, a comparison of monthly flows for the Port of Morrow and the City are shown on Chart 2-8. The Port of Morrow peak months appear to occur in June, whereas peak flows for the City typically occur in August. When the peak daily flow of 6,313,000 gallons occurred in August 2011, the Port of Morrow monthly flow was approximately half of

the total monthly flow. It was assumed that Port of Morrow demands are fairly steady during a month period, unlike typical peak flows that would occur in a City.

CHART 2-8
COMPARISON, PORT OF MORROW CONSUMPTION TO TOTAL PRODUCTION



For the peak day of 6,313,000 gallons on August 24, 2011, the City of Boardman's population was 3,235. Using the total peak day flow, this equates to a peak day flow of 1,951 gpcd. Assuming the Port of Morrow flow for a given day is about half of the total flow, the peak daily flow for the City only on August 24, 2011, would be 3,156,500 gallons, using 3,235 people, this equates to a peak daily demand estimate of 976 gpcd.

A typical industry standard range for a ratio of ADD to PDD is 2.5 to 4, as shown on Table 2-2. Using an ADD of 320 gpcd compared to the estimated PDD of 975 gpcd, the ratio would be 3.05. A ratio of 3.0 was assumed for planning purposes for this WSMP.

In summary, the highest use day showed a peaking factor of approximately 3.0, which is comparable to cities similar to Boardman in eastern Oregon. A peaking factor of 3.0 was selected to provide a slightly conservative estimate. For planning purposes, the ADD of 320 gpcd and PDD = 960 gpcd will be used in this WSMP.

Fire Demand

The City routinely flushes and flow tests their fire hydrants to help ensure the hydrants remain operable and to maintain an accurate hydrant database. Fire hydrant flushing and flow testing data completed in 2006, 2008, and 2009 were provided by the City for this WSMP. Based on the test results, the City of Boardman's water system is generally able to deliver fire flows ranging from approximately 339 to 4,100 gallons per minute (gpm). Copies of the fire hydrant flushing and maintenance records are included in Appendix C.

Flow rates for fire suppression in residential, commercial, and industrial areas within developed communities are usually determined from the size, density, and occupancy of buildings; type of construction materials; and desired fire insurance rating. Incorporated cities and some rural areas are given a fire suppression rating by Insurance Services Office Commercial Risk Services, 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 the receiving and handling of fire alarms; the fire district's manpower, equipment, and training; and the capability of the water system to provide fire flows.

ISO periodically evaluates fire suppression capabilities of incorporated cities and rural fire districts. The numerical ratings range from Class 1 to Class 10, with Class 1 indicating the highest fire suppression capability and Class 10 the lowest. A Class 10 rating is reserved for unprotected areas that have no fire department and no water supply system. Most protected areas outside of cities have a Class 9 rating, and most small rural cities with municipal water systems are rated Class 8, 7, or 6, depending on the strength of their water system and fire department. The ISO rating for Boardman is Class 5, as of January 2009, which is a good rating for a rural community the size of Boardman. A copy of the City's ISO rating information can be found in Appendix D.

ISO's fire suppression rating schedule evaluates the City's capability and the domestic water supply on an approximate equal basis (50 percent and 40 percent of the rating schedule, respectively). In order to reduce the cost of fire insurance in a community, improvements usually must be made to the fire department, the water system, or both, depending on their present condition. It is difficult to determine possible fire insurance savings on commercial buildings because the insurance costs are determined by many other factors related to the type of occupancy and the type of building construction. The City of Boardman has an average rating for typical rural communities of similar size. Improving the rating as a result of water system improvements may be possible.

ISO also recommends fire flows for various conditions in residential and commercial settings. Recommended fire flows for residential areas are set forth in the 1980 ISO Schedule as shown below.

TABLE 2-3
ISO FIRE FLOW REQUIREMENTS

Distance Between Buildings	Required Fire Flows
Over 500 feet	500 gpm
31 to 100 feet	750 gpm
11 to 30 feet	1,000 gpm
10 feet or less	1,500 gpm

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 2 hours in all other occupancies. The 2010 Oregon Fire Code (OFC), paragraph B105.2 allows a minimum fire flow of 1,000 gpm for one hour in one- and two-family residences with less than 3,600 square feet of fire flow calculation area at 20 pounds per square inch (psi) residual pressure. The residual pressure minimum of 20 psi is required for the entire water system. Fire flow requirements increase with the square footage of the building and can be quite high for commercial and institutional buildings (schools). Attaining the required fire flows for commercial areas may not be realistically achievable. The IFC has an allowance for decreases in the required fire flows for small communities (if approved by the local fire chief), where development of full fire flows is impractical.

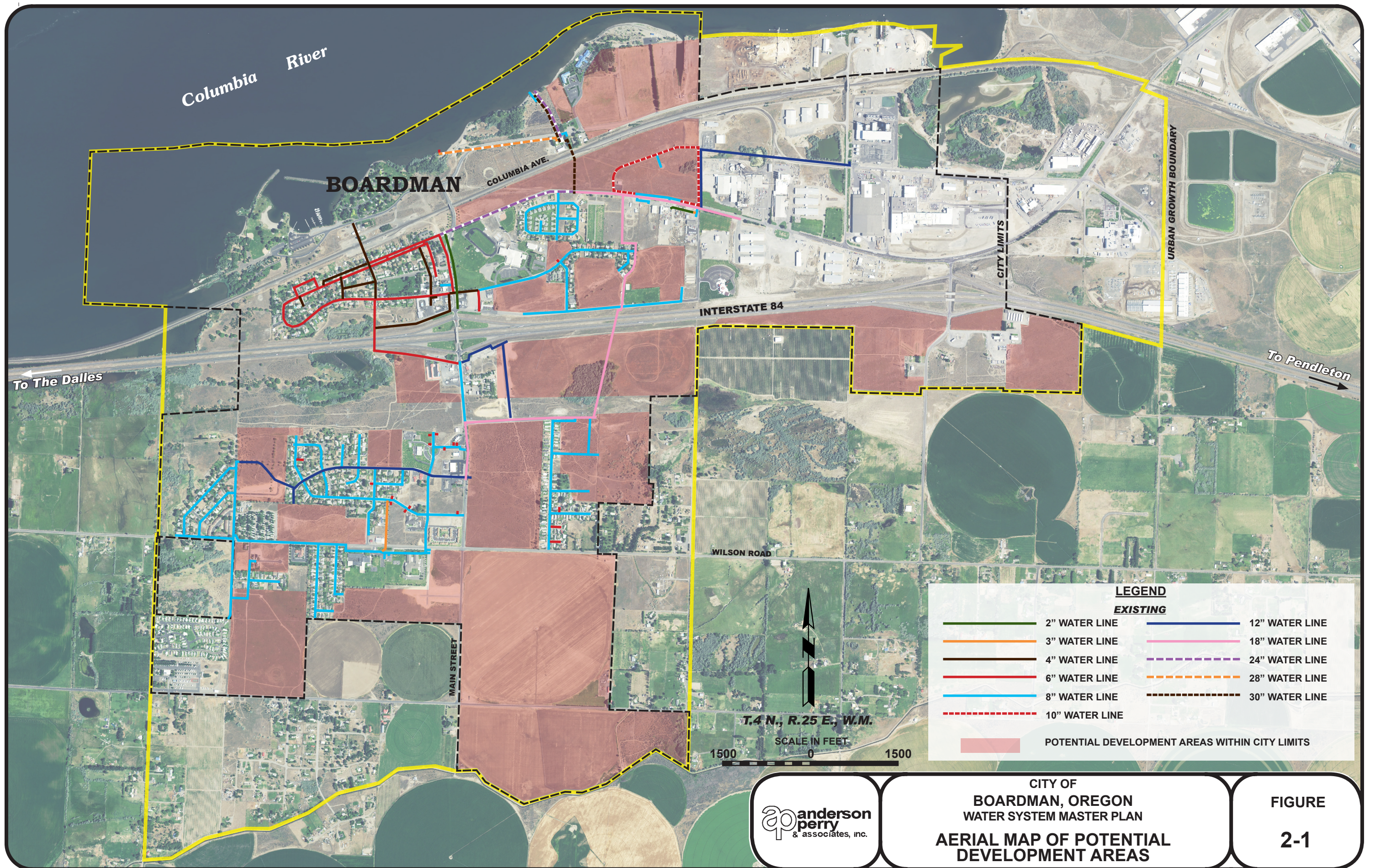
At least five fire hydrants in Boardman produce substandard flows. The fire department reports that the substandard flows result from small/undersized main lines. Two of the fire hydrants serve Riverside High School. The remaining underperforming fire hydrants serve the old downtown area specifically near the Village Inn. The referenced hydrants produce 362 gpm at Riverside High School and 788 gpm on N.W. Columbia Avenue. While the required fire flow depends on construction type and occupancy, the lowest flow requirement listed in OFC Table 105.1 for schools is 3,000 gpm for three hours.

The City is encouraged to evaluate the existing water system when considering any new commercial, industrial, or institutional buildings being developed in the City to identify distribution system improvements that may be required to facilitate the new development.

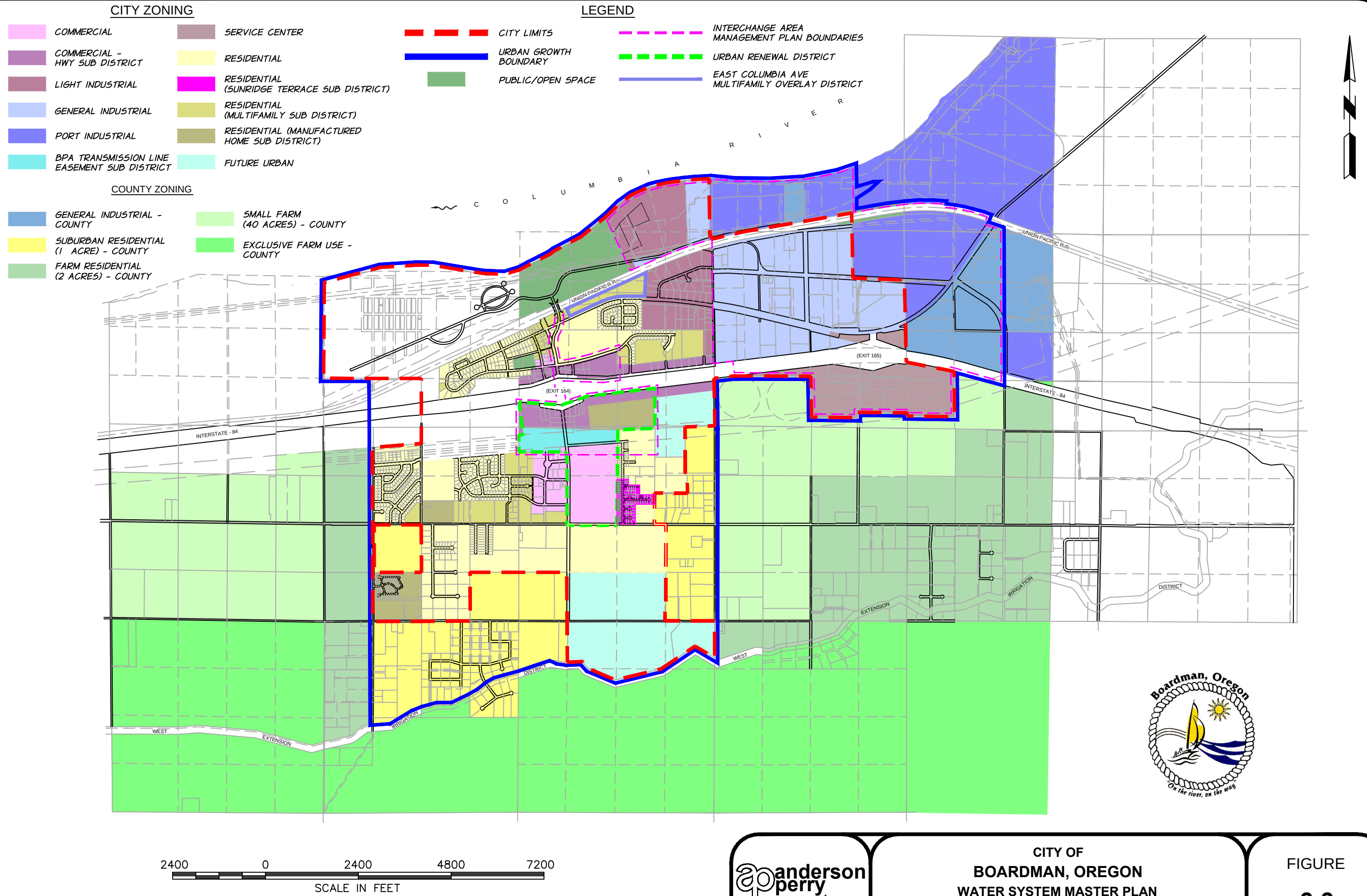
Design Criteria

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 are set by both the EPA and the DWS. In addition to public health and safety requirements, many other factors control the design parameters for municipal water systems. The City must evaluate 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 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, storage, and distribution system facilities. Figure 2-3 presents design criteria based on the 2014 population of 3,445 and the estimated average and peak day demands. Design criteria are also shown for the year 2035, based on a 2.0 percent growth rate per year 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.



Q:\BOARDMAN\439-41 Water System Master Plan\Dwg\ZoneMap_FIG 2-3.dwg, FIGURE 2-3, 8/24/2015 10:54:05 AM, prichardson



SUMMARY OF DESIGN CRITERIA

	<u>Year 2014</u>	<u>Year 2035</u>
Design Population ¹	3,445	5,221
Supply		
<i>Average Day:</i>		
City Demand (gpcd)	320	320
City Daily Flow (gpd)	1,102,400	1,670,720
City Daily Flow (gpm)	766	1,160
Port of Morrow Flow (gpd) ²	1,777,436	4,050,364
Port of Morrow Flow (gpm) ²	1,234	2,813
Total Average Daily Flow (gpd)	2,879,836	5,721,084
Total Average Daily Flow (gpm)	2,000	3,973
<i>Peak Day:</i>		
City Demand (gpcd)	960	960
City Flow (gpd)	3,307,200	5,012,160
Port of Morrow Flow (gpd) ³	3,005,800	6,849,521
Total Peak Daily Flow (gpd) (August 24, 2011) ⁴	6,313,000	11,861,681
Total Peak Daily Flow (gpm) (August 24, 2011) ⁴	4,384	8,237
Peak Hourly Flow (gpm) ⁵	7,829	13,458
Supply Flow Required (gpm) ⁶	5,845	10,983
Estimated Supply Flow Available (gpm) ⁷	12,000	12,000
Fire Demand		
Residential (gpm)	1,000	1,000
Duration (Hours)	1	1
Commercial/Public (gpm)	3,500	3,500
Duration (Hours)	2	2
Minimum Residual Line Pressure Under Peak Demand Plus Fire Flow (psi)	20	20
Storage		
Equalization Storage (gal) ⁸	0	218,742
Operating Storage (gal) ⁹	32,000	32,000
Fire Reserve (gal) ¹⁰	420,000	420,000
Emergency Reserve (gal) ¹¹	1,102,400	1,670,720
Total Storage	1,554,400	2,341,462

Notes:

¹ 2014 Portland State University.

² Port of Morrow projections for 2035 based on a 4 percent annual increase in flows.

³ Based on total peak daily flow minus estimated City peak daily flow.

⁴ Combined = City Flow plus Port of Morrow Flow.

⁵ 2.5 times the City peak daily flow plus Port of Morrow peak daily flow.

⁶ 18-hour operation to meet peak daily flow demand.

⁷ Ranney Collector No. 1 produces 6,000 gpm. Ranney Collector No. 2 has been limited to 6,000 gpm to satisfy regulatory issues.

⁸ Equalization Storage = Peak hourly flow less maximum pumping capacity times 2.5 hours.

⁹ Two percent growth rate selected by the City.

¹⁰ 3,500 gpm for 2-hour duration.

¹¹ One-day supply at average day demand (City of Boardman only).

Abbreviations:

gal = gallons

gpcd = gallons per capita day

gpd = gallons per day

gpm = gallons per minute

psi = pounds per square inch



CITY OF
BOARDMAN, OREGON
WATER SYSTEM MASTER PLAN

SUMMARY OF DESIGN CRITERIA

**FIGURE
2-3**

Chapter 3 - Water Supply

Introduction

The City of Boardman completed a draft Water Master Plan in 1999, prepared by CH2M Hill. For this Water System Master Plan (WSMP), the existing water supply and proposed water supply improvements previously developed by CH2M Hill will be referenced and utilized. Selected chapters of the 1999 CH2M Hill Water Master Plan are provided in Appendix E. Pages 5-1 and 5-2 of the CH2M Hill report discuss the City of Boardman's authority to obtain water under Certificate of Water Right G-2664, which pertains to Boardman's basalt well, and Water Permit S-40336, which pertains to Ranney Collectors No. 1 and No. 2, and future Ranney Collector No. 3.

Groundwater Right G-2664 allows a withdrawal rate of 1.5 cubic feet per second (cfs), equaling up to 670 gallons per minute (gpm). Surface Water Permit S-40336 allows a withdrawal rate of 36 cfs, equaling 16,150 gpm. Permit S-40336 shows approximate withdrawal rates for Ranney Collectors No. 1 and No. 2 and future Ranney Collector No. 3. Water right information is provided in Appendix F and summarized in the following table.

**TABLE 3-1
MUNICIPAL WATER RIGHT SUMMARY**

Source	Permit No.	Certificate No.	Allowed Volume (gpm)	Priority Date
Ranney Collector No. 1	S-40336	--	6,600	September 22, 1975
Ranney Collector No. 2	S-40336	--	4,100	September 22, 1975
Future Ranney Collector No. 3	S-40336	--	5,400	September 22, 1975
Basalt Well	G-2664	34275	673	May 20, 1964

Water Supply Alternatives and Implementation

Pages 5-3 through 5-6 of the CH2M Hill report list six alternatives to increase water supply to the City, as follows:

1. Install a new Ranney collector.
2. Regularly use existing basalt well.
3. Purchase water from the Port of Morrow.
4. Implement an aquifer storage and recovery (ASR) program.
5. Direct surface water intake on the Columbia River.
6. Increase water conservation measures.

Three of the alternatives were considered feasible, specifically a new Ranney collector, increased water conservation, and ASR. Two of the measures, a new Ranney collector and implementation of

conservation measures, have been implemented. ASR has not been implemented because of questions regarding connectivity of Boardman's alluvial aquifer and the "shallow" basalt aquifer.

Even though the City proactively constructed and commissioned Ranney Collector No. 2, it is currently off line because of regulatory concerns. The following discussion of microscopic particulate analysis (MPA) reviews the regulatory concerns for Ranney Collector No. 2 and the City's efforts to comply with Oregon Health Authority - Drinking Water Services' (DWS) requests.

Microscopic Particulate Analysis

The City completed MPA on Ranney Collector No. 2 by GSI Water Solutions, Inc., in 2010. Information summarized below was obtained from a memo dated March 19, 2012, from GSI Water Solutions, Inc., to the City of Boardman. A copy of the memo is included in Appendix G.

The collector system is the primary source of drinking water for the City of Boardman. Both collector wells have laterals that extend underneath the Columbia River and into the sedimentary aquifer that lies adjacent to the river. The river water infiltrates through the sediments of the riverbed and through the underlying alluvial layers to reach the collector well laterals. The Ranney collectors are considered hydraulically connected with the Columbia River because of the design of the collector system. Since the potential exists for the collectors to be under the influence of surface water, the City was required by the federal Surface Water Treatment Rule of the Safe Drinking Water Act to perform testing to ensure a giardia- and cryptosporidium-free water supply.

Groundwater-based public water systems that are hydraulically connected to surface water and are determined to be vulnerable to surface water pathogens, specifically giardia and cryptosporidium, are classified as Groundwater Under the Direct Influence of Surface Water (GWUDI) and are subject to the Surface Water Treatment Rule (Oregon Administrative Rule 333-061-0032(8)(q)). To determine if a public water system is a GWUDI, the system must perform an MPA. The MPA method utilizes organisms such as algae to evaluate the risk from potential pathogens because giardia and cryptosporidium are not always present in the surface water.

Testing completed for Ranney Collector No. 1 in 1993 through 1994 determined that the source was hydraulically connected to the Columbia River but was not a GWUDI and, therefore, should be classified as a groundwater source.

Water produced from Ranney Collector No. 2 was evaluated for GWUDI using the MPA method in 2003 and 2004. The results from August 2003 and April 2004 indicated that the source was a low risk but further testing was required. The additional testing, completed in July and August 2004, resulted in the source being classified as a moderate risk (score of 16). DWS rules require that if any single MPA score is greater than 19, or two or more MPA scores greater than 14, then the system shall be classified as GWUDI.

Since there were conflicting test results from the 2003 and 2004 Ranney Collector No. 2 MPA testing, thought to be caused by varying pumping rates during the time of testing, the City performed additional MPA testing on Ranney Collector No. 2. Testing was completed in April 2010 and August 2010, maintaining the pumping rate at an even 6,000 gpm. The April 2010 testing indicated a low risk score of 4 and the August 2010 testing resulted in a low risk score of 5. The 2010 MPA scores for Ranney Collector No. 2 indicated that the water supplying the collector at 6,000 gpm is not a GWUDI and should

be classified as a groundwater source. Ranney Collector No. 2 is currently off line pending analysis and further evaluation by the DWS that the Ranney Collector No. 2 water is groundwater.

DWS Review of March 19, 2012, GSI Memorandum

The DWS completed a review of the March 19, 2012, GSI technical memorandum. A copy of the DWS review response is included in Appendix H. The DWS indicated in an October 9, 2012, e-mail that several additional questions would need to be answered by the City or the City's consultant before the DWS could make a final determination on the reclassification of Ranney Collector No. 2 from Groundwater Under the Direct Influence of Surface Water (GWUDI/GU) to Groundwater (GW). The October 9, 2012, DWS review included five questions about the 2010 MPA tests and an additional four questions concerning the 1993 and 1994 MPA testing for Ranney Collector No. 1. At the time this WSMP was prepared, the City had not responded to the DWS' questions. It is important that the City expeditiously respond to the DWS questions for Ranney Collector No. 2.

Ranney Collector No. 2 Nitrate Concentrations

Ranney Collector No. 2 reportedly showed nitrate concentrations slightly higher than the Environmental Protection Agency maximum contaminant level of 10 milligrams per liter during MPA testing completed in 2010. The collector was off line but undergoing MPA testing when these nitrate concentrations were observed. During continued pumping at 6,000 gpm, nitrate concentrations decreased to less than half of the regulatory limit. It is believed that nitrate concentrations would again reach these lower levels and remain within regulatory limits with continued use of Ranney Collector No. 2. When the collector is ready for use (after pending groundwater classification results), the City will need to pump the collector to waste and monitor nitrate levels to ensure they remain at acceptable levels prior to putting the collector back into municipal use. These activities should be closely coordinated with the DWS to help ensure regulatory compliance with operation of Ranney Collector No. 2.

Water Supply Recommendations

The design criteria evaluation for the City of Boardman's municipal water supply system showed that both Ranney Collectors No. 1 and No. 2 are needed to meet current and future water supply demands. This chapter of the WSMP summarizes MPA sampling efforts that have already been completed, as well as ongoing DWS analysis to ensure Ranney Collector No. 2 secures a GW classification. This WSMP assumes the City will secure this GW classification to meet projected supply demands. It is imperative the City actively and expeditiously pursue the GW classification as soon as possible. It is recommended the City pursue this classification prior to this WSMP being finalized, in the event additional work is required.

The City's Ranney collectors are currently in permit status. It is also recommended the City complete the necessary paperwork to prove up on the water use for Ranney Collectors No. 1 and No. 2 so water right certificates can be secured.

Water Management and Conservation Plan

The City of Boardman most recently completed a Water Management and Conservation Plan (WMCP) Update in 2011. The WMCP Update was completed in accordance with Oregon Administrative Rule (OAR) Chapter 690, Division 86. The WMCP Update was reviewed by the Oregon Water Resources

Department and approved via Final Order dated February 23, 2012. Conditions in the Final Order include the following:

- The WMCP shall remain in effect until February 23, 2022.
- The City is currently limited to 18.7 cfs (8,393 gpm) under Permit S-40336.
- A progress report containing the information required under OAR 690-086-0120(4) shall be submitted by February 23, 2017.
- An updated WMCP shall be submitted no later than February 23, 2021.

A copy of the Final Order is included in Appendix I.

Summary

The City of Boardman has sufficient water supply capacity from Ranney Collectors No. 1 and No. 2 to meet current and projected water supply demands, assuming Ranney Collector No. 2 obtains a GW classification. It is important the City pursue the GW classification as soon as reasonably possible.

Chapter 4 - Water Storage

Introduction

This chapter presents information on the City's water storage facilities. The purpose for storage in municipal water systems is discussed, and the types of storage facilities generally available are outlined. The condition and needs of the City's existing storage reservoirs are outlined and recommended storage requirements are presented.

General

Water storage facilities are constructed to meet several purposes. First, storage reservoirs are 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 water supply. This reserve is called "equalization storage." Third, reserve storage is usually provided to supply large demands such as fire flows. This is referred to as "fire reserve." Finally, reserve storage is 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 probability of such an occurrence. The amount of emergency storage provided usually becomes a balance between need and affordability. This storage allowance is usually called "emergency reserve."

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

Storage reservoirs are generally constructed of steel or reinforced 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 storage facilities, presents a discussion of future storage needs, and evaluates alternatives for satisfying those needs.

Existing Facilities

The City of Boardman has three separate storage reservoirs: a 125,000-gallon elevated steel storage reservoir, a 300,000-gallon ground-level steel storage reservoir, and a 300,000-gallon clear well. The elevated steel storage reservoir is not utilized for daily operations because it does not provide adequate distribution pressure. The 300,000-gallon ground-level steel storage reservoir and 300,000-gallon clear well are actively utilized with the water system. The clear well was constructed in 1977 in conjunction

with the Ranney Collector No. 1 improvements. The ground-level steel storage reservoir was constructed in conjunction with Ranney Collector No. 2 improvements in 2002.

Raw water from the two Ranney collectors feeds into the 300,000-gallon ground-level storage reservoir. Upstream of the reservoir, chlorinated water is injected into the inlet piping. The ground-level storage reservoir and the clear well are both used to provide disinfection contact time. From the ground-level storage reservoir, water can either enter into the clear well (which is normal operation) or into the suction piping of the booster pump station. The booster pump suction piping extends into the clear well. The maximum operating level of the clear well is elevation 286.0 feet above mean sea level (MSL). The maximum operating level of the ground storage reservoir is elevation 315.75 feet above MSL. Because of the positioning of the booster pump suction piping, only about 120,000 gallons of the clear well are available for storage. All of the ground-level storage reservoir capacity is available for storage. The two aboveground storage reservoirs are described in more detail as follows.

300,000-Gallon Ground-Level Steel Reservoir

As stated earlier, the City of Boardman's 300,000-gallon ground-level reservoir is a welded steel, painted reservoir that was constructed in 2002. This reservoir is the City's primary storage reservoir, providing needed storage capacity to deliver water to the City's booster pump station. The 300,000-gallon reservoir is approximately 35 feet tall and has a diameter of 39.5 feet. The reservoir was constructed by Morse Construction Group, Inc., of Everett, Washington.

The 300,000-gallon reservoir was constructed in accordance with AWWA D100, having the required access hatches, vents, and secured exterior access ladder to a secured roof hatch. The reservoir has not had any significant work completed since its initial installation in 2002. While it is expected that the reservoir coating system should last another 20 years or more, the City should routinely inspect the coating system to ensure repairs are not needed sooner and to plan for repairs, as required.

125,000-Gallon Elevated Steel Reservoir

The City of Boardman's 125,000-gallon elevated steel reservoir was constructed in 1968. This reservoir consists of bolted steel sheets and is a common type of reservoir for the time period it was installed. The reservoir is supported by a steel frame and has a full elevation that is approximately 100 feet above the ground surface. Similar reservoirs are present in other eastern Oregon cities, specifically North Powder, Haines, and Stanfield. Because this reservoir only provides about 45 psi at its base, it is not actively connected to the water system. The City does keep the reservoir full and available as an emergency storage source.

Existing Pressure Zone

The City of Boardman's distribution system has one pressure zone. System pressure is provided by the existing booster pump system within the water plant building adjacent to the 300,000-gallon reservoir. The current booster pump system provides approximately 90 psi at the system outlet. The discharge pipe elevation at this location is approximately 285 feet above MSL. Although distribution system pressure is discussed in more detail in Chapter 5, a general discussion of system pressure is presented herein as it relates to potential future reservoir configurations.

Elevations within the City limits of Boardman range from a low of approximately 280 feet to a high of approximately 350 feet above MSL. Assuming a system pressure of 90 psi at the booster pump system outlet (elevation of 285 feet), static water pressures for these users range from approximately 60 to 90 psi. In order to provide gravity flow and similar pressures for existing users, a reservoir water level elevation would need to be approximately 490 feet above MSL. This would give 60 psi static pressure for areas within the City limits at the upper service range elevation of 350 feet. The nearest area to develop this water level elevation using a ground-level storage reservoir is approximately one mile south of the south Urban Growth Boundary (UGB).

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 methods involve a rational approach to estimating the volume of each storage component consisting of operation, equalization, emergency, and fire reserve. The decision can then be made as to which storage component controls and which storage volumes will actually be necessary. For example, the decision may be made to provide storage for operation, equalization, and fire reserve only, assuming any emergency storage would be available from the fire reserve. If this option were selected, there may not be adequate fire storage available if there is a sustained power outage or if the collector well pumps are out of service.

Since the two separate collector wells provide redundancy, the main cause for a water supply interruption would be failure of the booster pump station. Currently the City has six separate booster pumps that meet system demand and pressure. This pumping system can provide a flow rate up to 12,000 gallons per minute (gpm). Also, the City has an emergency generator at the pump station to supply power to one collector well and the booster pump station. With these features, the City has considerable redundancy for the water supply and booster pump systems.

Fire Reserve Storage

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

Emergency Storage

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, booster pumps, or other equipment. The City of Boardman has an emergency power supply (800 kW CAT diesel) to operate Ranney Collector No. 1 and the booster pumps in the event of a power outage. One day of storage at the current average day demand would be 1,102,400 gallons, and the year 2035 average day demand emergency storage would be 1,670,720 gallons. These emergency storage volumes may not be economically feasible for the City. In addition, considerable redundancy is present for backup power for Ranney Collector No. 1 and the booster pump system. Provisions have already been made to connect a portable electrical power generator to the

electrical supply system of Ranney Collector No. 2. To provide increased redundancy, the City should consider an emergency generator for Ranney Collector No. 2.

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. The City of Boardman's 300,000-gallon reservoir is allowed to lower 4 feet from the full level before the Ranney collector pumps are called to operate. This corresponds to an operational storage of approximately 32,000 gallons.

Equalization Storage

Equalization storage must be provided to balance out the difference between peak hour demand and water supply capacity during a peak day demand period. An empirical method for estimating the required equalization storage uses the difference between the peak hourly flow and the peak water supply availability for a specific number (2.5 hours) of peak hours per day. Based on the 2035 estimated peak hourly flow of about 13,458 gpm and assuming 12,000 gpm of supply is available, additional supply of 1,458 gpm is required for 2.5 hours, which equates to a future equalization storage of 218,742 gallons.

Summary of Storage Requirements

The four storage components indicate a total of approximately 1,554,400 gallons of storage is currently needed and approximately 2,341,462 gallons of storage is needed to meet the year 2035 design criteria (see Figure 2-3). The City's current available storage total is 545,000 gallons, roughly 35 percent of the currently recommended volume.

As stated earlier, the City has a significant water supply capacity from Ranney Collectors No. 1 and No. 2, as well as standby power for Ranney Collector No. 1. The means to quickly connect Ranney Collector No. 2 to a portable generator is also present. Furthermore, both sources are tied to shallow groundwater and the Columbia River, which results in a significant supply source capacity. As a result of these items, it is likely reasonable to eliminate the one-day emergency reserve component from the calculated storage requirements. With this assumption, current and year 2035 storage requirements become 452,000 gallons and 670,742 gallons, respectively. These storage volumes can be currently met using the 300,000-gallon storage reservoir, the useable clear-well storage volume of 120,000 gallons, and the 125,000-gallon elevated reservoir. If significant growth does occur within the City, it will be prudent for the City to consider additional storage capacity. For example, additional storage may be needed prior to the year 2035. If additional growth does occur, additional users will be contributing to City finances, making the addition of a new reservoir more feasible.

The City's reservoirs will need maintenance at some point in the future to remain in service. It is recommended that the City complete routine inspections and needed maintenance on the reservoirs to ensure continued reliable service.

Storage Reservoir Alternatives

While a new reservoir is likely not needed during the 20-year design criteria period of this Water System Master Plan, new storage reservoir concepts are summarized herein. These alternatives have been prepared to provide a general idea of options available to the City for additional storage. Three alternatives are presented, as follows.

1. **Construction of a ground-level type storage reservoir near the existing reservoir.** This alternative would result in the need to continue to rely on the continuously-operated booster pump system for pressure, as is the current situation. This alternative maximizes the use of existing infrastructure.
2. **Construct a standpipe ground storage reservoir near the south UGB that will provide gravity flow and maintain system pressure.** This alternative would provide system pressure by gravity flow and would reduce operation time of the booster pumps. The booster pump station would run only when needed to fill and maintain the standpipe water level. Standpipe reservoirs are typically quite expensive to construct when compared to ground-level type reservoirs.
3. **Construct a ground-level storage reservoir further south of the UGB that will provide gravity flow and maintain system pressure.** This alternative would provide system pressure by gravity flow but would require a long water supply line.

Typically, standpipe and elevated reservoirs are more expensive for the same storage volume when compared to ground-level reservoirs. Storage from the lower portion of a standpipe type reservoir is not always available by gravity flow and usually requires booster pumps to maintain distribution system pressure. From an operational standpoint, it is preferable to have the entire storage volume available by gravity flow. Gravity flow can be achieved only if the ground-level type storage reservoir is located at an elevation sufficiently higher than the distribution system to create the desired pressures. Elevated storage reservoirs are normally the most expensive capital and maintenance cost options.

Reservoir Materials

Storage reservoirs may be constructed of either steel, reinforced concrete, or prestressed concrete. The choice is usually based on an economic analysis made for the particular installation. For smaller ground-level reservoirs, steel reservoirs are usually less expensive to construct when compared to concrete reservoirs, but the two can be comparable in cost when storage volumes exceed one million gallons. There are two primary types of steel reservoirs: bolted steel reservoirs with glass-fused-to-steel or epoxy coatings, and welded steel reservoirs coated with a paint system. Glass-fused bolted steel reservoirs are usually more expensive to install when compared to epoxy-coated steel reservoirs, but are comparable in cost to a welded steel reservoir with a paint system. When comparing lifecycle costs that include maintenance, such as recoating, the glass-fused-to-steel bolted steel reservoir typically results in less overall maintenance cost because sandblasting and recoating is not required. If configured correctly, it is possible to add limited additional height to a bolted reservoir for added capacity when needed.

Gravity Flow Ground-Level Type Reservoir Location

When considering sites for a proposed reservoir, it is important to evaluate existing system pressure. To maintain distribution system pressure similar to that currently provided by the booster pump system, the full water service elevation of a proposed ground-level type reservoir in Boardman must be at least 490 feet above MSL. The highest elevation areas surrounding Boardman are to the south of the City. The 460-foot elevation contour roughly follows the south side of the West Extension Irrigation Canal located south of the City, as shown on Figure 4-1, Gravity Flow Reservoir Location Map. To achieve the desired base elevation for the proposed reservoir and, assuming a ground-level reservoir about 30 feet tall is constructed, the site will need to be along the 460-foot elevation line shown on Figure 4-1.

Existing Reservoir Maintenance

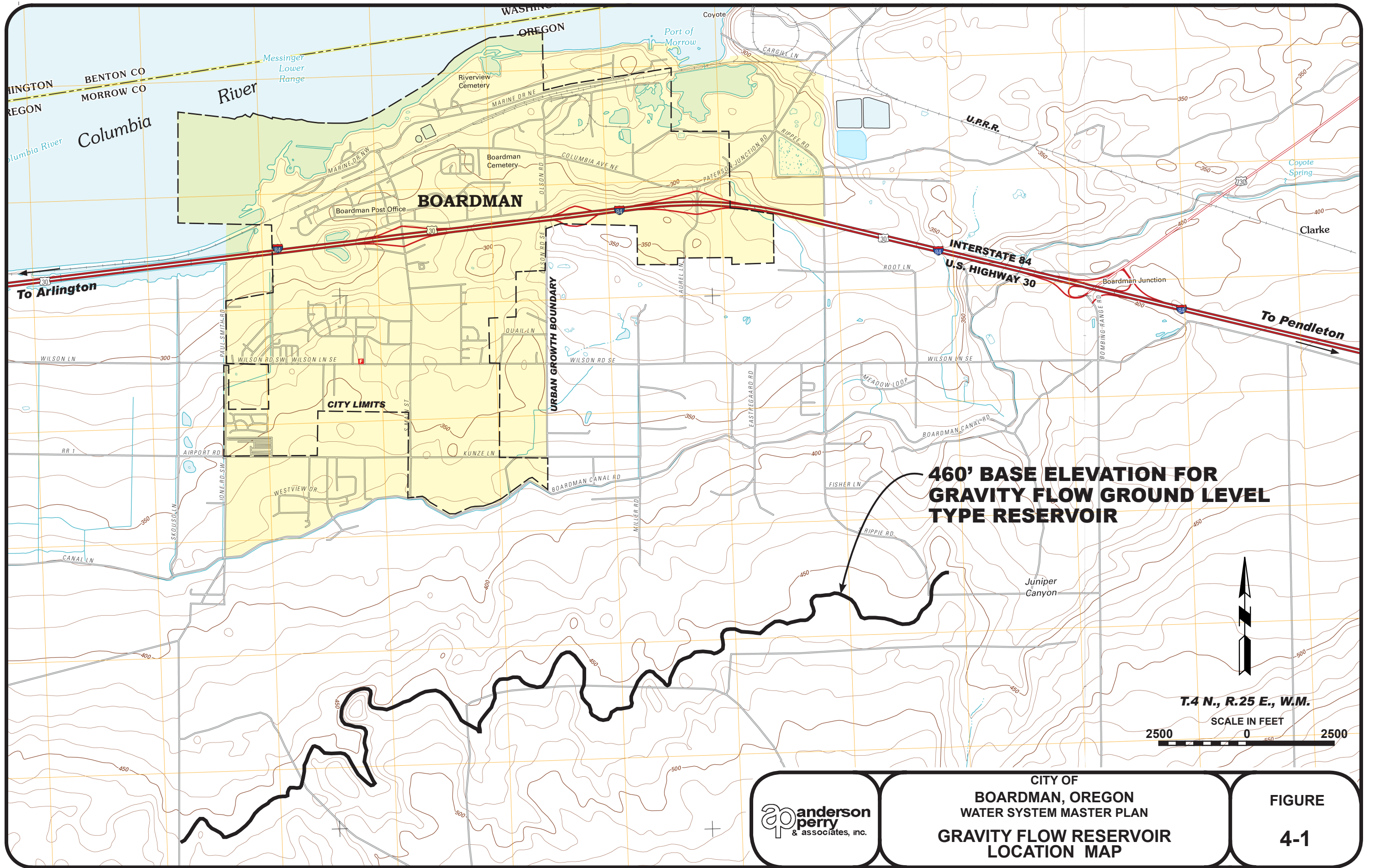
Normally, maintenance is recommended for existing storage reservoirs to ensure continued reliable service. As previously discussed, the City's 300,000-gallon reservoir was constructed in 2002 and is presumed to be in good condition. However, it would be wise to inspect the reservoir periodically (typically at five-year intervals) to address minor deterioration as it occurs and ensure the 300,000-gallon reservoir does not need recoating prior to the year 2035. If the City constructs an additional reservoir, the City will be able to drain one reservoir for inspection and repairs while leaving the other reservoir in service, eliminating the need and associated costs for underwater inspection.

Summary

Boardman's Ranney collector water supply system has been designed to take advantage of a large reservoir (Lake Umatilla) produced by the John Day Dam near Rufus, Oregon. The John Day Dam is a multipurpose structure managed by the U.S. Army Corps of Engineers to control seasonal flooding, support inland shipping, provide irrigation water, and produce hydroelectricity.

The John Day Dam has been assumed to remain constant for well beyond the planning period represented in this Water System Master Plan. If the Dam were deliberately removed, there would most likely be sufficient time for the City to plan, design, and construct alternative water sources and storage.

Boardman's two multi-pump Ranney collectors, multi-pump booster station, 300,000-gallon reservoir, 120,000-gallon clear well, and backup power generator provide a series of redundant, fail-safe mechanisms to supply municipal water and fire flows to the City. As a result, additional storage capacity is not currently needed. However, if significant growth occurs in the City, it would be wise to begin planning for a new reservoir before the need for one becomes critical.



Chapter 5 - Distribution System

Introduction

This chapter discusses the City's water distribution system that delivers water to residential, commercial, and industrial users. The distribution system includes a booster pump station, pipelines, valves, water service lines, fire hydrants, and ancillary equipment. These components have been evaluated considering both existing conditions and future service needs. Alternatives have been developed to address existing deficiencies and provide future service to help meet Oregon Health Authority - Drinking Water Services (DWS) requirements and the Insurance Services Office Commercial Risk Services, Inc. (ISO) fire flow requirements. Cost estimates for recommended improvements are presented in Chapter 6.

Existing System

Historical information for the existing distribution system was obtained from past water studies, a 2012 Water Management and Conservation Plan prepared by Anderson Perry & Associates, Inc. (AP), a 1999 CH2M Hill draft Water Master Plan, and the City's existing water system map. Additional information was provided by City of Boardman staff during site visits and through e-mails and phone conversations during preparation of this Water System Master Plan (WSMP). The following discussion provides background information to develop appropriate system improvement recommendations.

During the 1960s and 1970s, distribution system main lines were constructed using asbestos cement pipe and concrete cylinder pipe. Since about 1980, distribution piping has been constructed using polyvinyl chloride (PVC) pipe. The following tables show the size, material, and approximate length of existing distribution system piping.

**TABLE 5-1
EXISTING DISTRIBUTION SYSTEM PIPE SIZE AND TYPE**

Size	Type	Approximate Length (Feet)	Percentage of Total Length by Size
2"	PVC	484	0.5
3"	PVC	957	0.5
4"	Asbestos Concrete	6,471	7
	PVC	1,515	2
6"	Asbestos Concrete	6,890	7
	PVC	6,510	7
8"	Asbestos Concrete	24,224	26
	PVC	20,339	22
10"	Asbestos Concrete	3,514	4
12"	Asbestos Concrete	1,562	2
	PVC	6,559	7
18"	Ductile Iron	10,172	11
24"	Ductile Iron	2,500	3
30"	Concrete Cylinder	967	1
Total Water Distribution Main Line Length		92,664	100

TABLE 5-2
TOTAL LENGTHS OF EACH PIPE TYPE

Pipe Type	Approximate Length (Feet)	Percentage of Total Length
Asbestos Concrete	42,661	46
PVC	36,364	39
Ductile Iron	12,672	14
Concrete Cylinder	967	1

In general, specific service areas of the distribution system are mostly looped. However, the City's distribution system has expanded as needed to serve isolated areas of development within the City limits. This expansion has created large areas isolated from other areas, with inadequate looping between areas.

The existing distribution system layout, including fire hydrant and valve locations and pipe size and locations, is shown on the Existing Water System Map contained in a pocket at the end of this WSMP. The Existing Water System Map was prepared using the City's existing CAD-based base map. Available resources were used to make the map as accurate as possible. There may be inaccuracies in the depiction of the water 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.

Existing Distribution System Service Areas

Boardman's distribution system has developed into four main service areas, with Interstate 84 (I-84) and Main Street separating each area. The water system layout, including pipe size, is shown on Figure 5-1, Existing Distribution System. The northwest service area is in the oldest part of Boardman, where the town was relocated due to the rising floodwater from the John Day Dam. This area lies south of the Union Pacific Railroad, north of I-84, and west of Main Street. This area is served by a 6-inch diameter looped water line with internal connectivity consisting of 4-inch diameter water lines. The original well and elevated storage reservoir are connected to this portion of the distribution grid; however, neither the well nor the elevated storage reservoir is currently in regular active service. This area connects to the rest of the distribution system network through a 24-inch diameter pipe in the north, a 6-inch diameter pipe in the south, and a 4-inch diameter pipe to the east.

The majority of the northwest service area contains residential housing; however, several commercial enterprises such as the Fairdeal Inn and a Shell gas station are also located in this portion of the service area. The marina area is fed by a single 4-inch main line from the northwest service area. It is undersized and is a dead-end line.

The northeast service area is present between the Union Pacific Railroad main line and I-84, and is immediately east of Main Street, extending to the Port of Morrow to the east. The northeast service area is home to two residential subdivisions and Riverside High School. This area is fed through the 30-inch diameter concrete cylinder pipe that feeds the entire distribution system. Water main lines are primarily 8-inch diameter.

The southeast service area extends from the eastern City limit to S. Main Street and from Wilson Road to I-84 Oregon Trail Boulevard. This area is fed by an 18-inch water main line extending from the northeast service area. The southeast service area primarily serves some commercial development along Main Street and a large residential area north of Wilson Road. Water main lines are primarily 8-inch diameter.

The southwest service area extends west from S. Main Street and is present south of I-84. This area contains the downtown business district and Sam Boardman Elementary and Windy River Elementary Schools, Boardman's shopping center, City Hall, and several subdivisions, including an over-55 gated community subdivision that is mostly modular housing is also present in the southwest service area. This area is fed from the same 18-inch diameter pipe that feeds the southeast service area.

All water service to the southwest service area is provided by one 18-inch line in S. Main Street. If a catastrophic event damages this water line, the entire southwest portion of the City would be without municipal water and fire suppression services.

Overall, Boardman's water system appears to be in good repair and is properly constructed; however, the four main service basins need to be interconnected with properly-sized water main lines to improve municipal service, fire suppression flows, and reliability.

Undersized Main Lines

A main line is generally considered undersized if it serves several users and is less than 6 inches in diameter. Desired fire flows often dictate the needed main line size. Many cities have adopted a minimum main line size of 8 inches in diameter, because an 8-inch diameter pipe can flow almost twice the amount of a 6-inch water line with a relatively small increase in capital cost.

Some areas within Boardman have undersized main lines. Most of these lines are in the older northwest section of Boardman. As can be seen on Figure 5-1, there are several 4-inch main lines within the northwest section of Boardman. The remaining main lines within this area are 6-inch diameter.

Lines in Poor Condition, Lines of Concern

Discussions with City personnel did not reveal any water distribution lines that were considered to be in poor condition. Concern was expressed about the single 30-inch concrete cylinder pipe that provides the entire City's water supply (from the booster pump station, under the railroad tracks, and to the distribution grid), and there was also concern regarding the single line in S. Main that serves the entire southwest area of Boardman.

Dead-End Main Lines

Most of the north side system is looped except along Front Street and in the industrial area to the northeast. Several areas of the south system are not properly looped. Except for the center area of the south system, most existing developments have some dead-end lines. Wherever possible, dead-end lines should be looped to provide adequate circulation and improved fire protection.

Recommended distribution system piping improvements are listed toward the end of this chapter.

Distribution System Water Quality

The City obtains four routine samples per month from the distribution system for analysis of total coliform. For the period from January 2, 2002, through March 17, 2015, total coliforms were "no detect" in samples obtained during routine monthly sampling events.

The City also obtains samples from the distribution system every three years for chemical analysis of total lead and total copper. For the period from 1993 through 2012, concentrations of lead ranged from 0.0016 to 0.0090 milligrams per liter (mg/L). The Environmental Protection Agency (EPA) action limit for total lead in municipal water systems is 0.015 mg/L. Copper was detected at concentrations ranging from 0.12 to 0.28 mg/L. The EPA action level for copper is 1.3 mg/L. Based on the lead and copper analytical results from 1993 through 2012, all detected concentrations of lead and copper were less than their corresponding EPA action levels. The City is also in compliance with the Disinfection Byproducts Rule and has completed monitoring as required. A summary of the test results is included in the DWS's Quality Testing Summary in Appendix A.

Stagnant water in the distribution system can lead to water quality problems. Historically, water lines are stubbed out to the edge of new construction to accommodate connectivity to the next expansion effort. This can result in dead-end main lines that can contribute to stagnant water. The City mitigates stagnant water by flushing dead-end lines at least once per year.

Distribution System Pressure

The City of Boardman's water distribution system is pressurized from the booster pump station. The result is a single pressure zone system. The current booster pump station was constructed in 2002 and provides 90 pounds per square inch (psi) at the system outlet and about 58 psi at the higher elevation areas (southwest corner) of the system. The booster pump station operates continuously to meet system volume and pressure demands utilizing six vertical mount centrifugal pumps. A schematic layout of the existing booster pump station is shown on Figure 5-2, Existing Booster Pump Station. The booster pump system is described hereafter.

Existing Booster Pump Information

The booster pump system utilizes six pumps to meet system demands, ranging in capacity from 0 to approximately 12,000 gallons per minute (gpm). The pumps are controlled by system pressure and flow rate. A pressure transducer on the discharge piping measures pressure while a flowmeter on the discharge piping measures the flow rate. An algorithm within the programmable logic controller (PLC) uses the pressure and flow rate to determine which pumps to use and at what speed to set the variable frequency drives (VFD) to meet varying system demands.

The discharge pipe elevation at the booster pump station outlet is approximately 285 feet above mean sea level (MSL). The ground surface elevation for current water system users within the City limits ranges from a low of approximately 280 feet to a high of approximately 350 feet above MSL. Assuming a discharge pressure of 90 psi at the pump station, the system static pressures range from about 58 psi to about 90 psi. Developments along the south City boundary, which are both the highest elevation areas and furthest distance from the booster pump station, experience the lowest static pressures.

Pumps are numbered 1, on the north, through 6, on the south. Pumps 1 through 4 are rated at 100 horsepower (Hp). Pumps 5 and 6 are rated at 200 Hp. Each pump can be isolated, removed, and repaired without affecting the operation of the remaining pumps. The City has a proactive repair schedule in progress to help ensure all pumps remain in peak operating condition.

Generally, water is pumped from either Ranney collector to the pump station. Prior to use, the raw water is chlorinated and stored in a 300,000-gallon aboveground steel reservoir or in the belowground clear well. The holding capacity of either component provides chlorine contact time, assuring water disinfection.

Chlorine is produced with a USFilter On-Site Electrocatalytic Chlorination sodium hypochlorite generation system. The brine tank and day tank are located outside the building to prevent chemical corrosion of sensitive electronic components. Chlorine residual concentrations are measured with a Hach CL 17 free chlorine analyzer.

Backup power is provided to the booster pump station (and Ranney Collector No. 1) with a diesel powered 800 kilowatt CAT generator. The generator is equipped with an external fuel storage tank that provides at least 24 hours of run time. The generator is rated for exterior use and is equipped with sound attenuation. The generator is exercised (run) for one hour each week on Monday, triggered by the supervisory control and data acquisition system (SCADA), to ensure the system is working properly. The City has an open contract with Western States Caterpillar to maintain the generator and motor.

Fire Protection

The City's water supply, storage, and distribution systems provides adequate fire protection to the majority of the system, although there are certain areas of the City that do not have adequate fire protection. The fire hydrant flow test at Sam Boardman Elementary showed a low flow of 1,752 gpm, a maximum flow of 3,295 gpm, and an average flow of 2,478 gpm. The fire department is satisfied with this performance. However, flows at Riverside High School are much lower. The fire department explained that two of the three fire hydrants around the school are connected to a 3-inch diameter main line and that these two fire hydrants flow 400 to 600 gpm.

Fire Hydrant Flow Tests

The City performed flow tests of fire hydrants within the distribution system in 2006, 2008, and 2009. Based on the hydrant flow test results, the City of Boardman water system is able to deliver fire flows ranging from approximately 385 to 5,912 gpm while maintaining a residual pressure of 20 psi. Copies of the hydrant testing events can be found in Appendix C.

Physical Limitations

It is important to realize that physical limitations exist in most water systems that do not normally allow fire flow capacity as high as those calculated by hydrant fire flow tests. The City's hydrant testing methods did not calculate available fire flows, rather the data sheets list what flow actually came out of a fire hydrant during the test. These data are representative of the physical conditions for the particular hydrant.

In some cases, such as ISO fire hydrant flow testing, the available flow capacity from a fire hydrant is calculated using a theoretical formula. The formula assumes the water supply "feeding" the tested area is unlimited and the 20 psi residual pressure resulting from the fire flow occurs in the general area of the hydrants tested. In practice, the 20 psi minimum residual pressure could be experienced sooner at higher elevations and in the more remote portions of the distribution grid. In this situation, the ISO theoretical formula can overestimate the 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 generally provide flows from 800 to 1,200 gpm using the small port and nearly 2,000 gpm from both small ports or the larger "pumper" port.

For the Boardman system, the booster pump capacity and main line sizes dictate what fire flows are available as opposed to the physical limitations of the fire hydrants. To achieve the maximum flow during a fire, more than one fire hydrant would need to be used to overcome normal fire hydrant physical limitations.

Fire Hydrant Spacing

The City of Boardman's fire hydrants, as identified on the Existing Water System Map, are spaced approximately 500 feet apart. The 2010 Edition of the Oregon Fire Code (OFC) outlines maximum recommended fire hydrant spacing. Generally the higher the fire flow requirement for the building type/occupancy, the closer the hydrant spacing. As recommended by the OFC (Appendix C, Table C105.1), the maximum spacing between any two hydrants should be 500 feet. Fire hydrant spacing reduces to 350 feet when the occupancy and construction type dictate a fire flow of 2,500 to 4,000 gpm.

The spacing of the City of Boardman's existing hydrants was analyzed to identify areas that are not covered in accordance with the maximum spacing and frontage distance to a fire hydrant as recommended in the OFC. To assist with the fire hydrant spacing analysis, the Existing Water System Map prepared for this WSMP was utilized, and 500-foot diameter circles were placed around each hydrant. Areas with limited fire hydrant coverage became readily apparent on the map. A copy of the Fire Hydrant Coverage Plan is included in a pocket at the back of this WSMP. The fire chief is the final authority on fire hydrant spacing requirements and can adjust hydrant spacing requirements as needed.

In general, the City has adequate fire coverage for most developed areas inside the City limits. The primary areas of inadequate fire hydrant coverage are as follows:

- Riverside High School
- Fairdeal Inn
- Old downtown area
- Marina

Fire hydrants in the above-listed areas are primarily served by 4-inch diameter and smaller main lines. Their respective flows are in the 400, 600, and 800 gpm ranges. Fire hydrants providing lower flow than required represent a fire flow limitation to the City, especially in the high school area.

Undersized main lines should be replaced with appropriately sized main lines and up-to-date fire hydrants as soon as reasonably practical. Replacement water main line projects with fire hydrants should be pursued, where needed, in cooperation with the fire department.

Water Meters

The majority of the City's existing water meters consist of touch-read meters. The City routinely reads meters once per month. Any defective meters are replaced as needed. The City indicated that the water meters are in fairly good condition, with no specific needs required at this time. Ongoing annual inspection and routine meter replacements will help ensure the City's water meters remain in good condition.

Water Loss

In order to conduct a water audit to estimate "unaccounted for water," the City routinely compares gallons sold to gallons pumped annually. A system in good condition should show a 10 percent or less variance between gallons pumped and sold.

The water audit results for the period from 2006 through 2012 are presented hereafter.

**TABLE 5-3
WATER AUDIT RESULTS**

Year	Gallons Produced	Gallons Sold	Gallons Lost	Calculated Water Loss (percent)
2006	1,161,550	1,058,925	102,625	8.8
2007	1,179,779	1,027,646	152,133	12.9
2008	1,218,740	1,120,222	98,518	8.1
2009	1,133,244	1,057,648	75,596	6.7
2010	1,097,560	960,404	137,156	12.5
2011	965,666	905,690	59,976	6.2
2012	1,134,507	1,088,450	46,057	4.1

The above results show that the City occasionally experiences water loss slightly in excess of 10 percent, but has observed water loss below 10 percent five out of seven years. The average annual water loss from 2006 to 2012 was 8.5 percent. The City should investigate all sources of potential water loss and make corrections where possible.

The City does not complete formal leak detection surveys at this time. When suspected leaks are discovered by routine monitoring or flow records, the City determines the location of the leak and completes repairs as soon as practically possible. By using these monitoring techniques to identify suspected leaks, the City is proactively using the Best Management Practices available to them to identify water losses and improve the distribution system.

Maintenance Records

One of the important operational functions for the City's distribution system is to keep accurate records of various system components. These records become valuable as time passes in terms of planning future improvements and replacing old or deteriorated components. It is recommended that the City keep accurate records on all hydrants, valves, water meters, and other distribution system components. Selected water meters should be periodically removed, checked for accuracy, and replaced as needed. Hydrants should be checked, at least annually, for proper operation, and all water valves should be exercised, at least annually, with records kept on their operating condition and location. Malfunctioning valves should be repaired immediately or removed and replaced.

Recommended Distribution System Improvements

Several distribution system improvements are recommended in this WSMP. The recommended improvements were developed in cooperation with City staff and the Fire Department to meet the following objectives.

- Eliminate the most significant areas of system vulnerability, where areas of the system are fed by only one pipeline.
- Provide additional system looping, both to improve fire flow capacity as well as improve distribution system water quality.

The recommended distribution system improvements are shown on a large Proposed Water System Improvements Map contained in a pocket at the end of this WSMP. The improvements are also shown on Figure 5-3, Proposed Distribution System Improvements. The improvements have been presented in priority, based on needs in the City. The following table summarizes the recommended distribution system improvements and outlines the purpose of the improvements.

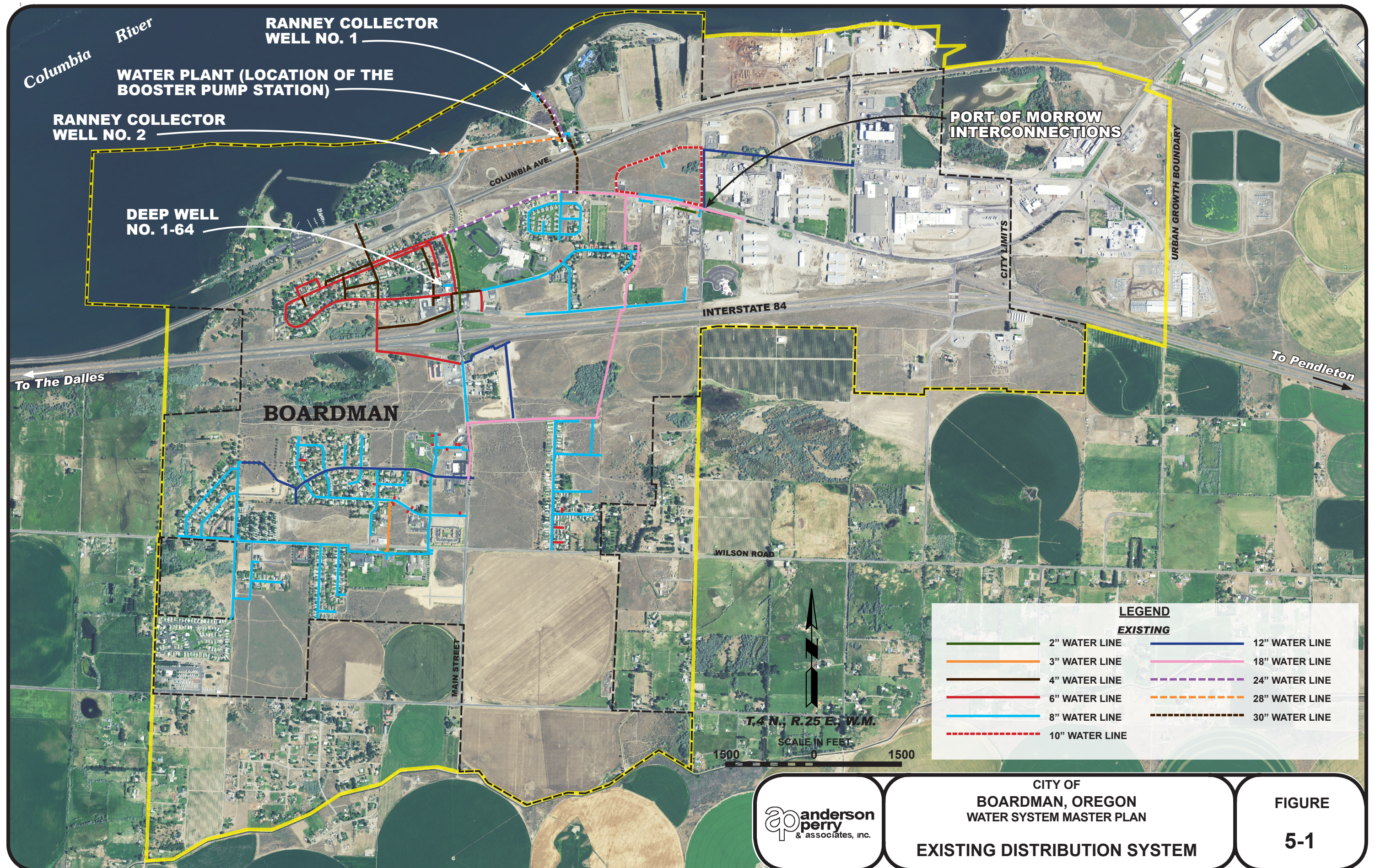
TABLE 5-4
RECOMMENDED DISTRIBUTION SYSTEM IMPROVEMENTS

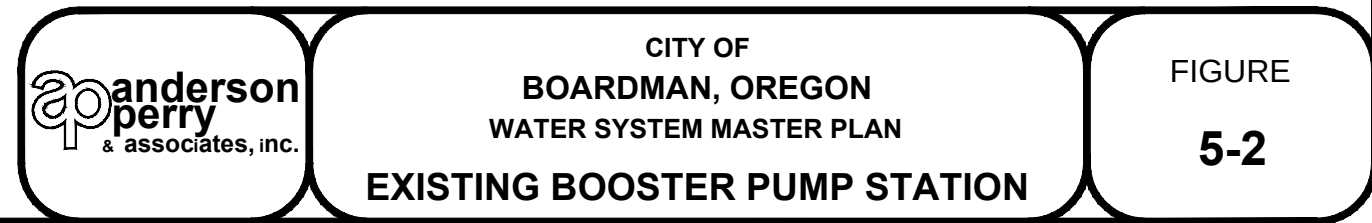
No.	Size and Description	Purpose of Improvement
1	12-inch Chaparral Drive water line loop	Provide a needed 12-inch loop to relocate the existing 12-inch line that must be relocated to rights-of way.
2	24-inch west end loop line	Provide a secondary distribution system feed line extending from the booster pump station to the west end of the City. This loop line is critical, as it provides redundancy for two highly vulnerable areas, which are the single 30-inch pipeline beneath the UPRR main line that serves the entire City and the single 18-inch main line in S. Main Street that serves the entire southwest portion of the City. This loop line will also significantly improve fire flow capacity in three-fourths of the City.
3	18-inch S. Main line, including a 12-inch East Wilson Road line and an 8-inch West Wilson Road line	These three lines will provide looping to the southwest and southeast areas of the City and will significantly improve fire flow capacities in the elementary school area.
4	18-inch Olson Road water line loop	This loop line will provide much needed additional capacity and fire flows to the northeast corner of the City.

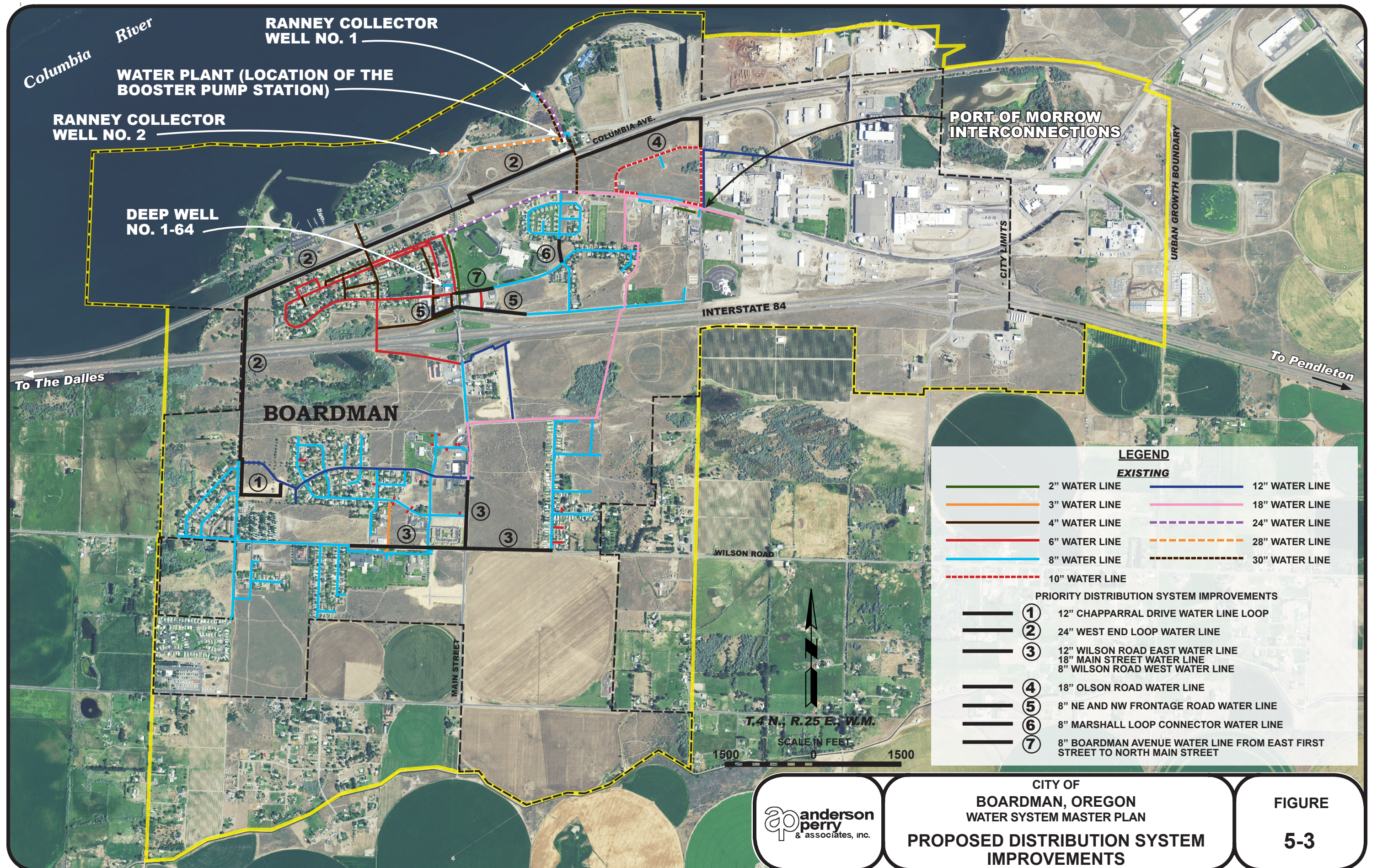
No.	Size and Description	Purpose of Improvement
5	8-inch Frontage Road loop line, Front Street northwest and Front Street northeast	This 8-inch line will provide much needed looping and fire flow capacity in the commercial areas north of I-84.
6	8-inch Marshall loop connection	This 8-inch line will provide a loop to serve a dead-end residential area system and will help improve area fire flow capacity.
7	8-inch Boardman Avenue loop	This 8-inch line will provide looping from East First Street to North Main Street, improving fire flow capacity and system circulation.

Summary

The City's distribution system has two main areas that are highly susceptible to an interruption of water service due to a lack of redundancy. The entire City is served by the single 30-inch diameter main line from the booster pump station, south beneath the UPRR main line. In addition, the entire southwest area of the City is served by a single 18-inch line in Main Street. Several areas need looping to significantly improve fire flow capacity, to provide much-needed redundancy, and to improve water quality. Implementation of these recommended distribution system improvements will provide a much safer distribution system with significantly improved fire flow capacity. Cost estimates for the recommended system improvements are included in Chapter 6, Recommended System Improvements.







Chapter 6 - Recommended System Improvements

Introduction

This chapter summarizes the recommendations for the water system and outlines the estimated costs of the proposed water system improvements. Detailed descriptions of the water supply system, storage system, and distribution system are contained in Chapters 3, 4, and 5, respectively. The Proposed Water System Improvements Map contained in a pocket at the end of this Water System Master Plan (WSMP) shows prioritized and long-term distribution system improvements.

Summary of Proposed System Recommendations and Recommended Improvements

As outlined in previous chapters, several improvements have been identified for the City of Boardman's water system. Although the West End Loop with alternative railroad and freeway crossings is the most operationally important and needed upgrade to the City's water distribution system, potential projects were prioritized based on immediate needs. The following discussions summarize the recommended system improvements.

1. **Water Supply Recommendations.** As shown in Chapter 3, the City has adequate water supply for the time represented by this WSMP if Ranney Collector No. 2 can be returned to service and classified as a groundwater (GW) source. Not only does the second collector provide additional capacity, but it also provides a second water supply source that enhances the system's reliability and ability to safely provide water to Boardman's citizens. Additionally, the second water source assures continued service to the Port of Morrow and allows the City to invite additional business ventures to locate in Boardman. It is imperative to obtain the final GW classification and use approval from the Oregon Drinking Water Services (DWS) so this needed source can be utilized.
2. **Water Storage Recommendations.** As described in Chapter 4, the City of Boardman has three storage reservoirs: a 125,000-gallon elevated steel storage reservoir, a 300,000-gallon ground-level welded steel storage reservoir, and a 300,000-gallon concrete clear well.

Each Ranney collector and the water supply pump station have multiple pumps designed to ensure adequate water flow during normal and emergency situations. Ranney Collector No. 1 and the pump station are directly connected to a backup power supply. Ranney Collector No. 2 has the ability to be immediately connected to a portable generator. In addition, both collectors are served by shallow groundwater and the Columbia River, which represents considerable reliable storage and supply.

When considering the capacities and condition of the existing water supply and storage components, it appears that the City of Boardman has adequate water storage for the duration of this WSMP. It is recommended that the City pay close attention to the actual growth over the 20-year planning period of this WSMP. Additional storage could be warranted sooner than planned if sufficient growth occurs.

3. **Water Distribution System Improvements.** Water distribution system improvements are shown graphically on the Proposed Water System Improvements Map contained in a pocket at the end of this WSMP and are also shown on Figure 5-3 in Chapter 5. Generally the water distribution system is in good condition and performs adequately for the City of Boardman. However, several areas of the City have been developed without sufficient looping and there is no redundancy for the main water supply line that feeds the entire distribution grid from the pump station. All water supplied to the City of Boardman must be conveyed through a single pipe that goes from the booster pump station, under the railroad, and under the freeway to the main water distribution grid. This situation represents a significant system vulnerability.

A water system workshop was held with City personnel to discuss potential system improvements and to determine project priorities. The following discussion provides a summary of the projects in order of importance. Project ranking was based on the most immediate need and the project's affordability.

Priority No. 1 relocates Chaparral Drive and the associated 12-inch water line approximately 500 feet south, effectively aligning Chaparral Drive with Hood Avenue, making a safer, more uniform intersection than previously envisioned. The Chaparral Drive water line will connect directly with the West End Loop. The total estimated project cost of the Priority No. 1 improvement is \$114,000, as summarized on Figure 6-1.

The second most important project (Priority No. 2) is the 24-inch diameter West End Loop. A single pipe installed in 1977 feeds the entire City. If the current connection fails, no water would be available for municipal or commercial purposes or fire suppression. The West End Loop connects to the current booster pump station supply line, follows the railroad right-of-way west, goes south under the railroad, continues west along the opposite side of the railroad, turns south along the Faler Road alignment extension, continues south under Interstate 84 (I-84), terminating at the connection to the relocated water line in Chaparral Drive. With the West End Loop in place, the City will have two methods of conveying water to its users and can reliably provide water and fire suppression services. Fire flow capacities in most of the City will be improved. The total estimated cost of the Priority No. 2 improvement is \$1,230,000, as summarized on Figure 6-2.

A pipeline extension along Wilson Road beginning slightly west of Locust Road, continuing east through the intersection of Wilson Road and South Main, and terminating slightly east of Anderson Road, was ranked Priority No. 3. This proposed 18-inch, 12-inch, and 8-inch pipeline eliminates four dead-end water lines and connects three isolated areas of the distribution system, providing improved water quantity and quality. The two elementary schools located on Wilson Road will also benefit from improved fire flows. The total estimated cost of the Priority No. 3 improvement is \$349,000, as summarized on Figure 6-3.

The Priority No. 4 distribution system improvement is an 18-inch line extending east from the main 30-inch primary transmission line and connecting to Olson Road. This line is needed to provide adequate service and fire flow capacity to the northeast industrial areas within the City of Boardman. The total estimated cost of the Priority No. 4 improvement is \$230,500, as summarized on Figure 6-4.

Priority No. 5 extends the water line along N.W. Front Street to West First Street and connects to Boardman Avenue. This 8-inch connection will complete a loop around the motel and Chevron gas station, providing additional fire suppression to the area. The total estimated cost of the Priority No. 5 improvement is \$177,000, as summarized on Figure 6-5.

Priority No. 6 is a relatively short (350-foot) 8-inch connection from Boardman Avenue to Marshall Loop. This improvement will provide increased system circulation and improved fire flows, and complete a circular loop around the high school where fire flows are currently lower than desired. The total estimated cost of the Priority No. 6 improvement is \$29,200, as summarized on Figure 6-6.

Priority No. 7 replaces a 4-inch water main line on Boardman Avenue from East First Street to North Main Street with an 8-inch line. This area is zoned commercial/industrial and fire flows from the 4-inch main line are insufficient. The total estimated cost for the Priority No. 7 improvement is \$62,500, as summarized on Figure 6-7.

The following distribution system improvements have been identified as long-term improvements that should be completed with area development. These projects have not been prioritized and are not included in cost estimates herein. These long-term pipeline improvements are shown on the large Proposed Water System Improvements Map contained in a pocket at the end of this WSMP.

1. Olson Road perimeter water line.
2. Wilson Road from Anderson Road to Olson Road.
3. South side of the Bonneville Power Administration easement east to Olson Road and south to Kunze Road.
4. Kunze Road from Olson Road to the western City limits.
5. Future Oregon Trail Boulevard west extension.
6. Tatone Drive north extension.
7. Paul Smith Road Southwest.

Cost Summary

Year 2015 estimated costs for the prioritized improvements are outlined on Figures 6-1 through 6-7 and summarized on Figure 6-8. The total year 2015 estimated project costs presented on Figure 6-8 (\$2,337,200) were increased at a 5 percent inflation rate to account for construction in 2016. The total 2016 project cost of \$2,454,000 includes construction, administrative, legal, engineering, and contingencies. The total also includes anticipated expenditures for land/easements and archaeological monitoring.

Recommendations Related to Regulatory Requirements

Based on the summary of regulatory requirements discussed in Chapter 2, it appears the City will need to implement some measures to comply with new regulatory requirements. The Public Health and Security and Bioterrorism Preparedness and Response Act of 2002 and the Drinking Water Services statewide enactment of provisions of the Act in Oregon Administrative Rules 333-061-0064 requires the City of Boardman to develop an Emergency Response Plan and an Operation and Maintenance (O&M) Manual. The City currently has an Emergency Response Plan in place but does not have an O&M Manual. The process of collecting details related to existing system components on which to base O&M practices can be extensive. Along with many of the general O&M activities discussed in the General Operation and Maintenance Recommendations section of this chapter, an O&M Manual should include detailed O&M procedures related to the City's water supply sources, treatment systems, reservoir, and distribution system components. Standard procedures for certified operators should also be included.

The O&M Manual can be prepared at any time. It may be more cost-effective to prepare a detailed O&M Manual after completion of the proposed water system improvements. This will help ensure the Manual is as current as possible upon completion of the improvements.

General Operation and Maintenance Recommendations

As the City of Boardman develops and expands its water system, diligent O&M activities for the various system components will be critical for providing a reliable, efficiently operated water system. Accurate and complete records provide one of the most valuable tools for analyzing present trends and projecting future needs of a water system and for general equipment upkeep. At a minimum, data should be kept by the City on daily flows from master meters, water quality tests, and as-built records on all underground piping, service line, and tap locations.

The following recommendations are intended to provide general guidance to the City but do not provide a comprehensive list of O&M activities related to the City's water system. The recommended O&M activities and suggested recurrence intervals are listed below.

- Obtain water quality tests as required by regulations and submit the results to the DWS.
- Record daily water meter readings at every supply well. Try to record the readings at the same time of day so the data from each well are comparable over equal time periods.
- Periodically record static and pumping water levels at each Ranney collector.
- Record daily chemical consumption to track chemical use relative to water flow data.
- Keep maintenance cards on all valves, fire hydrants, and miscellaneous system components in the City.
- Exercise fire hydrants at least once per year and record information on their condition.
- Exercise valves at least once per year and record operation data and any problems experienced.
- Develop an annual replacement schedule for individual service meters in the system.
- Exercise pumps per the manufacturer's recommendations.
- Clean and inspect the reservoir every five to seven years, or as often as required.

- Annually or biennially review water loss to identify potential leaks or improperly operating water meters.
- Reconcile gallons sold to gallons pumped at least annually to ensure appropriate billing.

Summary

The City of Boardman has a well-run and maintained water system. Additional looping and larger pipelines are needed in some key areas to ensure adequate fire protection, especially in areas served by 4-inch diameter water main lines. An additional main supply pipe that crosses under the railroad and I-84 is needed (the West End Loop) to ensure uninterrupted domestic and fire service to the south side of the City. With the entire City served by one 30-inch diameter pipeline, considerable system vulnerability exists and several of the proposed improvements will provide improved system reliability. Overall, distribution system circulation and fire flow capacity will also be significantly improved. Continued, diligent system operation should ensure safe and compliant water service to the City.

**CITY OF BOARDMAN, OREGON
ESTIMATED COST
PRIORITY NO. 1 DISTRIBUTION SYSTEM IMPROVEMENTS
(YEAR 2015 COSTS)**

NO.	DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT PRICE	TOTAL PRICE
Chaparral Drive Relocate, Kinkade Road to Faler Road					
1	Mobilization @ 5%	LS	All Req'd	\$ 4,150	\$ 4,150
2	12-inch C900 PVC Water Line	LF	1,750	35	61,250
3	Connect to Existing Line	EA	2	1,000	2,000
4	12-inch Gate Valve	EA	3	2,000	6,000
5	Fire Hydrant Assembly	EA	1	3,600	3,600
6	Gravel Surface Restoration	SY	1,000	7.50	7,500
Total Estimated Construction Cost					\$ 84,500
Administration, Legal, Engineering, and Contingencies @ 35%					29,500
TOTAL ESTIMATED PROJECT COST					\$ 114,000

**CITY OF BOARDMAN, OREGON
ESTIMATED COST
PRIORITY NO. 2 DISTRIBUTION SYSTEM IMPROVEMENTS
(YEAR 2015 COSTS)**

NO.	DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT PRICE	TOTAL PRICE
West End Loop					
1	Mobilization @ 5%	LS	All Req'd	\$ 43,500	\$ 43,500
2	24-inch DR 11 HDPE Water Line	LF	9,200	67	616,400
3	24-inch Butterfly Valve	EA	9	6,000	54,000
4	Bore Railroad, Estimated 250 LF	LS	All Req'd	70,000	70,000
5	Bore Freeway, Estimated 400 LF	LS	All Req'd	110,000	110,000
6	Connect to Existing Line	EA	3	2,000	6,000
7	Fire Hydrant Assembly	EA	1	3,600	3,600
8	Gravel Surface Restoration	SY	1,000	7.50	7,500
Total Estimated Construction Cost					\$ 911,000
Administration, Legal, Engineering, and Contingencies @ 35%					319,000
TOTAL ESTIMATED PROJECT COST					\$ 1,230,000

**CITY OF BOARDMAN, OREGON
ESTIMATED COST
PRIORITY NO. 3 DISTRIBUTION SYSTEM IMPROVEMENTS
(YEAR 2015 COSTS)**

NO.	DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT PRICE	TOTAL PRICE
Connect Wilson Road to Main from West Side of School to East Side of Anderson Road					
1	Mobilization @ 5%	LS	All Req'd	\$ 12,300	\$ 12,300
2	18-inch C905 PVC Water Line	LF	1,150	50	57,500
3	12-inch C900 PVC Water Line	LF	1,450	35	50,750
4	8-inch C900 PVC Water Line	LF	2,050	30	61,500
5	18-inch Butterfly Valve	EA	4	4,000	16,000
6	12-inch Gate Valve	EA	2	2,000	4,000
7	8-inch Gate Valve	EA	3	1,200	3,600
8	Connect to Existing Line	EA	6	1,000	6,000
9	Fire Hydrant Assembly	EA	4	3,600	14,400
10	Gravel Surface Restoration	SY	3,000	7.50	22,500
11	Asphalt Concrete Surface Restoration	SY	200	50	10,000
Total Estimated Construction Cost					\$ 258,550
Administration, Legal, Engineering, and Contingencies @ 35%					90,450
TOTAL ESTIMATED PROJECT COST					\$ 349,000

**CITY OF BOARDMAN, OREGON
ESTIMATED COST
PRIORITY NO. 4 DISTRIBUTION SYSTEM IMPROVEMENTS
(YEAR 2015 COSTS)**

NO.	DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT PRICE	TOTAL PRICE
Olson Road Loop Line					
1	Mobilization @ 5%	LS	All Req'd	\$ 8,150	\$ 8,150
2	18-inch C905 PVC Water Line	LF	2,700	50	135,000
3	18-inch Butterfly Valve	EA	2	2,000	4,000
4	Connect to Existing Line	EA	2	2,500	5,000
5	Fire Hydrant Assembly	EA	1	3,600	3,600
6	Gravel Surface Restoration	SY	2,000	7.50	15,000
Total Estimated Construction Cost					\$ 170,750
Administration, Legal, Engineering, and Contingencies @ 35%					59,750
TOTAL ESTIMATED PROJECT COST					\$ 230,500

**CITY OF BOARDMAN, OREGON
ESTIMATED COST
PRIORITY NO. 5 DISTRIBUTION SYSTEM IMPROVEMENTS
(YEAR 2015 COSTS)**

NO.	DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT PRICE	TOTAL PRICE
Extend Water on N.W. Front Street from West Terminus to West First Street and Connect to Boardman Avenue					
1	Mobilization @ 5%	LS	All Req'd	\$ 6,250	\$ 6,250
2	8-inch C900 PVC Water Line	LF	2,050	30	61,500
3	8-inch Gate Valve	EA	3	1,200	3,600
4	Connect to Existing Line	EA	4	1,000	4,000
5	Fire Hydrant Assembly	EA	2	3,600	7,200
6	Gravel Surface Restoration	SY	1,500	7.50	11,250
7	Asphalt Surface Restoration	SY	750	50	37,500
Total Estimated Construction Cost					\$ 131,300
Administration, Legal, Engineering, and Contingencies @ 35%					45,700
TOTAL ESTIMATED PROJECT COST					\$ 177,000

**CITY OF BOARDMAN, OREGON
ESTIMATED COST
PRIORITY NO. 6 DISTRIBUTION SYSTEM IMPROVEMENTS
(YEAR 2015 COSTS)**

NO.	DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT PRICE	TOTAL PRICE
Connect 2nd from Boardman Avenue to Marshall Loop					
1	Mobilization @ 5%	LS	All Req'd	\$ 1,075	\$ 1,075
2	8-inch C900 PVC Water Line	LF	350	30	10,500
3	8-inch Gate Valve	EA	2	1,200	2,400
4	Connect to Existing Line	EA	2	1,000	2,000
5	Gravel Surface Restoration	SY	250	7.50	1,875
6	Asphalt Surface Restoration	SY	75	50	3,750
Total Estimated Construction Cost					\$ 21,600
Administration, Legal, Engineering, and Contingencies @ 35%					7,600
TOTAL ESTIMATED PROJECT COST					\$ 29,200

**CITY OF BOARDMAN, OREGON
ESTIMATED COST
PRIORITY NO. 7 DISTRIBUTION SYSTEM IMPROVEMENTS
(YEAR 2015 COSTS)**

NO.	DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT PRICE	TOTAL PRICE
Boardman Avenue from East First to North Main					
1	Mobilization @ 5%	LS	All Req'd	\$ 2,200	\$ 2,200
2	8-inch C900 PVC Water Line	LF	500	30	15,000
3	8-inch Gate Valve	EA	2	1,200	2,400
4	Connect to Existing Line	EA	3	1,000	3,000
5	Fire Hydrant Assembly	EA	1	3,600	3,600
6	Asphalt Concrete Surface Restoration	SY	400	50	20,000
Total Estimated Construction Cost					\$ 46,200
Administration, Legal, Engineering, and Contingencies @ 35%					16,300
TOTAL ESTIMATED PROJECT COST					\$ 62,500

**CITY OF BOARDMAN, OREGON
SUMMARY OF ESTIMATED COSTS FOR
WATER SYSTEM IMPROVEMENTS**

TABLE NO.	ITEM	2015 ESTIMATED CONSTRUCTION COST	2015 CUMULATIVE PROJECT ESTIMATED COST
Priority Distribution System Improvements			
6-1	Chaparral Drive Relocate	84,500	84,500
6-2	West End Loop	911,000	995,500
6-3	Wilson Road and Main Street Connection	258,550	1,254,050
6-4	Olson Road Loop Line	170,750	1,424,800
6-5	Front Street Water Line Extension	131,300	1,556,100
6-6	Marshall Loop Connection	21,600	1,577,700
6-7	Boardman Avenue Connection	46,200	1,623,900
		\$ 1,623,900	
	Subtotal, 2015 Estimated Construction Cost	\$ 1,623,900	
	Administrative, Legal, Engineering, and Contingency Costs at 35%	568,300	
	Land and Right-of-Way Costs	50,000	
	Archaeological Monitoring	50,000	
	Permitting	30,000	
	Operation and Maintenance Manual	15,000	
	TOTAL 2015 ESTIMATED COST	\$ 2,337,200	
	TOTAL 2016 ESTIMATED COST*	\$ 2,454,000	

* Assumes a 5 percent annual inflation rate.

Chapter 7 - Project Financing and Implementation

Introduction

This chapter evaluates the financial status of the City's Water Department and outlines alternatives for financing Boardman's water system improvements, should the City elect to pursue an improvements project. A summary of state and federal funding programs is presented, including a review of funding options 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 Boardman must be developed.

Although a detailed analysis of Boardman's current water rate structure is beyond the scope of this Water System Master Plan (WSMP), some discussion of the existing rate structure and water system budgets is included. As a general rule, most utility rate structures include funding for periodic minor system improvements and maintenance, staff payroll costs, and a set-aside for future improvements. The set-aside is typically for smaller items, such as a new pump, new meters, etc.

Current Water Use Rates and Revenue

The operation and maintenance of the existing water system is financed through the City's annual budget. Water system revenue is obtained primarily from water user fees. Copies of the City of Boardman's water rate resolutions No. 12-2008 and No. 8-2011 are presented in Appendix J. The water rates (per month) in effect at the time of this WSMP are summarized hereafter.

**TABLE 7-1
WATER RATE INFORMATION**

Usage Type	Available Use for Base Fee (gallons)	Monthly Cost
Residential (Inside City Limits)	7,000	\$15.00 base fee, \$0.44 per 1,000 gallons overage
Residential (Outside City Limits)	7,000	\$22.50 base fee, \$0.63 per 1,000 gallons overage
Commercial	8,000	\$19.00 base fee, \$0.80 per 1,000 gallons overage
Schools	6,000	\$9.75 base fee, \$0.26 per 1,000 gallons overage

As of June 2012, the City of Boardman had the following number of water service accounts that were metered and billed:

**TABLE 7-2
WATER SERVICE ACCOUNTS**

Account Type	Total Number of Accounts
Residential	715
Commercial	50
Industrial	2
Outside City Limits	2
Schools	11
TOTAL	780

The revenue generated from the City's water rates and connection fees is presented below. Water rate revenue generated in fiscal year 2013-14 was \$650,922, including revenue from the Port of Morrow account.

**TABLE 7-3
WATER DEPARTMENT REVENUE**

Fiscal Year	Total Revenue from Water Rates and Connection Fees
2007-08	\$497,693
2008-09	\$529,326
2009-10	\$554,186
2010-11	\$520,265
2011-12	\$554,946
2012-13	\$564,918
2013-14	\$650,922

The 2011-12 gross revenue amount of \$554,946 is summarized in the following table to provide a general comparison of fees contributed by the Port of Morrow.

**TABLE 7-4
2011-12 FEE SUMMARY**

Type	Number of Connections	Amount
Residential, Commercial, and Schools	778	\$315,430
Industrial (Port of Morrow)	2	\$231,014
Connection Fees		\$8,502
Total		\$554,946

The average monthly water rate for residential, commercial, and school connections equals $\$315,430 \div 12 \text{ months} \div 778 \text{ connections} = \33.79 per month. The average monthly revenue from the Port of Morrow equals $\$231,014 \div 12 \text{ months} = \$19,251$ per month.

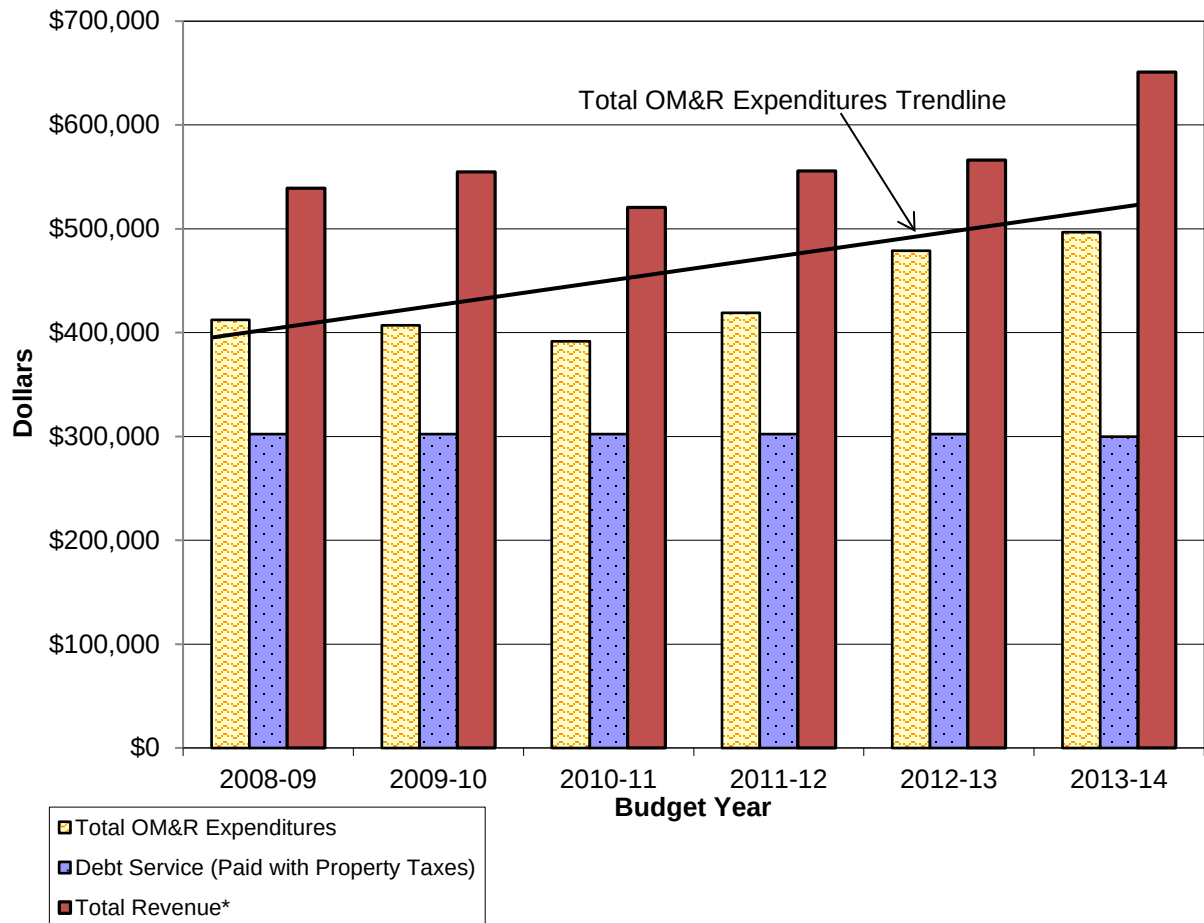
Current Financial Status

The annual cost of operating and maintaining the Boardman water system is summarized on Figure 7-1. The costs presented were obtained from the City's financial statements and include all costs for the water system, such as operation, maintenance, and equipment replacement (OM&R) and staff payroll.

Historical and Projected Budget Trends

The City's Water Department revenues have exceeded annual OM&R for all six years from the 2008-09 budget year through the 2013-14 budget year. A graphical plot of the City of Boardman's water system budget, showing revenue and expenditures, can be found on Chart 7-1. By plotting a trend line for the expenditures, the expenditures in a future year can be estimated, assuming no changes to the water system occur. The trend line for the City of Boardman's OM&R shows expenditures increasing to approximately \$500,000 in the 2014-15 budget year. Increases must be considered during annual budget cycles.

**CHART 7-1
HISTORICAL AND PROJECTED WATER BUDGET**



* Revenues do not include property tax revenue.

Transfers of Other Funds

The City has allocated funds to a water reserve account for anticipated water system maintenance and replacement. This is an excellent practice that will help fund future water system expenses, emergencies, and equipment replacement of items such as booster pumps, well pumps, and chemical injection equipment. Pump replacement, water meter repairs, line repairs, and hydrant upgrades are all items that require funds from time to time. Typically, reserve and replacement funds are not sufficient to finance capital improvements such as a new well, new pump station, or new reservoir. However, a healthy reserve account provides flexibility to the City such that equipment failures can be managed internally.

Existing Debt

The City of Boardman currently has outstanding revenue bonds on the water system. The combined annual payments equal \$302,200 and are paid from property tax revenue.

Water System Improvements Funding

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

These agencies can provide low interest loan funding, and possibly grant funding, to assist rural communities on public works projects. Most funding agencies require increases in existing water rates to support loans for system improvements, both as a condition of receiving monies and prior to being considered eligible for grant funds. Some funding programs provide funding only if the improvements address documented water quality compliance issues. There are potential opportunities for low interest loan funds for completion of the recommended water system improvements. A summary of potential funding programs is presented hereafter.

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 that the monthly user rates discussed in this section can represent a combination of monthly usage fees and taxes.

Federal Grant and Loan Programs

USDA 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 interest rate varies, but is generally about 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. According to RD staff, the most recent water user cost requirements have been around \$40 to \$45 per month before a community qualifies for grant funds. It should be noted that loans without grant funds may be acquired from RD that may not require rates to reach this level, depending on the results of an RD funding analysis. The user costs must provide sufficient revenue to pay for all system OM&R

costs and pay for the local debt service incurred as a result of the project. All project costs above this level may be paid for by grant funds, up to given limits, which are typically in the 25 percent of total project cost range and usually not more than 45 percent of the total project cost. The objective of the RD loan/grant program is to keep the cost for utilities in small, rural communities at a level that is similar to what other communities are paying.

Another of the agency's requirements is that loan recipients establish a reserve fund of 10 percent of the bond repayment during the first 10 years of the project, which can make the net interest rate higher. The RD program requires either revenue or general obligation bonds to be established through the agency for the project (refer to the Local Financing Options section of this chapter for further discussion). These bonds can usually be purchased for a period of 40 years if grant funding is also received. A loan from RD may be an option for the City to implement water system improvements.

Economic Development Administration

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

State Grant and Loan Programs - Oregon Business Development Department - Infrastructure Finance Authority

Safe Drinking Water Revolving Loan Fund (SDWRLF)

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

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

Water/Wastewater Financing Program

This is a loan and grant program that provides for the design and construction of public infrastructure when needed to ensure compliance with the Safe Drinking Water Act or the Clean Water Act. 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 Safe Drinking Water Act or the Clean Water Act.

While primarily a loan program, grants are available for municipalities that meet the eligibility criteria. The loan/grant amounts are determined by financial analysis of the applicant's ability to afford a loan (debt capacity, repayment sources, current and projected utility rates, and other factors). The maximum loan term is 25 years or the useful life of the infrastructure financed, whichever is less. Loan amounts are 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 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. *The City of Boardman's 2009 to 2013 5-year average MHI was 88 percent of the statewide MHI. However, the City is not currently out of compliance with the Safe Drinking Water Act, so a combination of loan and grant funding from this program may not be possible.*

Community Development Block Grant (CDBG) Program

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

This is a 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 (program guidelines). It is not possible to determine if any grant funds may be awarded prior to an analysis of the application and financial information.

Eligibility for the CDBG program requires that greater than 51 percent of persons within the community fall into the low to moderate income category. *The City of Boardman's percentage of low to moderate income is 46.0 percent according to current IFA resources, so the City does not appear to be eligible for CDBG program funding.*

Special Public Works Fund (SPWF)

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.

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.

For IFA Programs - Contact Regional Coordinator

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

Preliminary Equivalent Dwelling Unit Analysis

When projecting future revenue for a water system, an Equivalent Dwelling Unit (EDU) analysis is usually completed. One EDU is intended to represent the average residential water use in a given city. As an example, each residential connection in Boardman would represent one EDU. A commercial or industrial connection user with water use volumes similar to the average residential use amount would also be considered one EDU. A commercial connection such as a salon or RV park, with three times the typical water usage as an average residential connection, would be considered three EDUs.

The City's water service accounts, as of June 2011, were analyzed to provide a preliminary EDU determination. The City provided a detailed listing of annual water use for all water service accounts from July 2010 through June 2011. The total annual water use for all residential accounts for that period was determined to be 220,580,673 gallons. This total use, divided by 717 billable residential accounts results in an average monthly residential water use volume of 25,637 gallons (307,644 gallons per year). This average residential water use volume was then divided into the total water use for commercial, schools, and industrial accounts to estimate the EDUs for each category. The preliminary results are summarized in the following table. The Port of Morrow was not included in the EDU calculation below. The City has separate billing arrangements for their Port of Morrow accounts.

**TABLE 7-5
PRELIMINARY EDU ANALYSIS**

Type of User	Number of Accounts	Total Volume Consumed per Year (gallons)	Estimated EDUs
Residential	717	220,580,673	717
Commercial	50	30,747,900	100
Schools/Public	11	122,711,416	399
Total	778	374,039,989	1,216

On the above table, residential users were considered to include accounts such as the mobile home trailer park. As shown on the table, residential water use accounts for approximately 21 percent of the total water billed in the City of Boardman.

Funding agencies typically use an EDU determination as the basis for estimating future yearly revenues and debt capabilities for a city. The EDU determination, which is based on average residential water consumption, is intended to equitably distribute water costs among all users. The EDU determination helps funding agencies determine the maximum loan (debt) amount a city can afford to service. The analysis presented hereafter for the City's future water rate revenue and estimated debt capacity is based on the preliminary determination of 1,261 EDUs, not the current 780 accounts.

Debt Capacity

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

1. For Figures 7-2 and 7-3, water user fee revenue is based on the preliminary determination of 1,261 EDUs and a typical annual revenue from the Port of Morrow in the range of \$230,000.
2. For Figure 7-2, the estimated OM&R was determined from the historical trend line shown on Chart 7-1. The figure shows that the City can expect their OM&R costs to be approximately \$500,000 in 2014-15.
3. The City's existing debt service was not included in the expenditure calculations because the City pays the debt service with property taxes.
4. For Figures 7-2 and 7-3, future debt service was calculated based on typical RD financing (4.0 percent interest for a 40-year repayment period), a typical SDWRLF loan (at 4.0 percent interest for a 20-year repayment period), and an IFA loan (at 5.0 percent interest for a 20 year repayment period), depending on which financing program is able to assist the City.

The data shown on Figure 7-2 provides a general idea of the amount of debt the City could afford to service at various average monthly water costs. Figure 7-3 provides a general idea of the impact to property taxes for varying interest rates and loan amounts if the debt payment is supported only by property taxes. For example, the data indicate that the City could afford to provide full water service OM&R revenue and also service a loan in the range of \$2,500,000 with an approximate average monthly residential user cost as follows for the funding programs shown:

RD Loan	\$27/month
IFA Loan	\$31/month
Standard SDWRLF Loan	\$30/month

The City could service similar debt amounts using taxes only, which would result in annual property taxes increasing by approximately \$3.00 to \$4.50 (depending on the funding source) per \$1,000 of taxed assessed value. The estimated taxable assessed value of the City was \$371,500,000 in 2012-13.

Average monthly water costs of \$40 to \$45 are now required by RD to provide a combination of grant and loan monies for projects like Boardman's. The City would need to raise rates to the \$27 per month range for a USDA loan of approximately \$2,500,000, which likely would not be enough to qualify for a USDA grant. In 2015, IFA is using 1.25 percent of a community's 2009-2013 MHI as the basis for residential monthly water user cost requirements to be eligible for grant funding. In the City of Boardman's case, the MHI is \$44,167. This MHI corresponds to a monthly residential water user cost of \$46.01. IFA's residential rate requirement is based on an assumed residential use of 7,500 gallons per month. The City's current residential charge for 7,500 gallons of water use is \$15.22. In addition to the monthly water rate, residents pay annual property taxes that fund the water debt service. The City of Boardman has two water bonds that require annual payments of \$28,700 and \$273,500. Repayment is calculated for each user at \$0.8252 per \$1,000 of assessed value. To provide a monthly rate estimate, a home valued at \$100,000 would have an assessed water bond repayment of \$82.52 per year, or \$6.87 per month. A home valued at \$150,000 would have an annual assessment of \$123.78, or \$10.32 per month. Combining water rates and taxes, the equivalent monthly rate per water connection then becomes \$15.44 + \$6.87, or \$22.31 per month, to \$15.44 + \$10.32, or \$25.76 per month. Therefore, to reach the 1.25 percent MHI threshold (\$46.01 per month), the City would need to consider raising water rates approximately \$24.00 per month to obtain low interest loans and/or grant funds through IFA.

It is important to note that the estimated loan capacities shown on Figure 7-2 are based on the current estimate of 1,261 EDUs, not the current 780 connections and an annual Port of Morrow revenue of \$230,000. The EDU figures will need to be verified and updated as project funding proceeds. It should be recognized that this is a very preliminary analysis, and the financial assumptions and figures presented in this WSMP should be refined as project implementation proceeds in the future and as agreements are worked out with funding agencies. If the City incurs further debt before obtaining loan or grant funds, these figures will need to be adjusted accordingly to reflect the debt payment requirements for the overall City budget.

Project Funding Scenarios

Of the various funding programs, the most likely sources of loan funding for Boardman's water system improvements project appears to be RD or the SDWRLF. It is recommended that the City thoroughly investigate potential funding sources, as described previously, to ensure the best funding package is obtained for the project. Summarized hereafter are possible funding breakdowns from the RD and SDWRLF programs. Actual funding amounts and breakdowns will be based on a financial review completed by each agency and could vary from the estimated amounts shown here.

RD Funding Option

As shown on Table 6-8, the 2016 estimated total project cost for the recommended water system improvements is \$2,454,000. Figure 7-2 shows that an RD loan of approximately \$2,500,000 can be financed with a total monthly rate in the \$27 range.

SDWRLF Option

Figure 7-2 shows that a SDWRLF loan of approximately \$2,500,000 can be financed with a total monthly rate in the \$30 range.

One Stop Meeting and Project Intake Form

To evaluate all potential project funding options, a One Stop meeting is generally requested by the City. One Stop meetings are typically scheduled in Salem where representatives of IFA and other funding agencies meet with the City to discuss the project and funding needs and identify the funding program best suited for the project. To avoid requiring City representatives to travel to Salem, IFA can hold these meetings by teleconference. IFA utilizes a Project Intake Form to outline a city's project, including the needs, project requirements, affected area, estimated project cost, time frame, schedule, etc. IFA evaluates the project based on information presented on the Intake Form to determine the best funding program suited to the project. The City is usually invited to submit a funding application to the best funding program(s) identified in the meeting.

Local Funding Options

Depending on the ultimate project scope and agency from which the City may obtain loan funds, the City may need to develop authorization to incur debt (i.e., bonding) for the selected improvements. The need to develop authorization to incur debt depends on funding agency requirements and provisions in the City Charter. Bonding is not normally required by most state funding programs such as the SDWRLF; however, bonding is required by RD. There are generally two options the City may use for its bonding authority: general obligation bonds or 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 rate revenue, or a combination of both. The taxing authority of the City provides the guarantee for the debt. Revenue bonds are financed through revenues of the water system. Authority to issue revenue bonds can come in two forms. One would be through a local bond election similar to that needed to sell a general obligation bond, and the second would be through Council action authorizing the sale of revenue bonds, if the City Charter allows. If citizens do not object to the bonding authority resolution during a 60-day remonstrance period, the City would have authority to sell these revenue bonds.

It should be noted that Oregon law currently requires a 50 percent voter turnout to pass a property 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 property tax measure. Due to current tax measure limitations in the State of Oregon, careful consultation with experienced, licensed bonding attorneys should occur if the City begins the process of obtaining bonding authority for the proposed water system improvements.

Project Development Action Items

The following action items will need to be taken by the City of Boardman to implement the desired water system improvements project should the City desire to secure outside funding for the recommended system improvements. The steps outlined are general in nature and include the major steps that need to be undertaken.

Project Development Action Items

1. The City will need to finalize and adopt this WSMP and recommended improvements once agencies review the draft WSMP. This action item occurred on September 1, 2015, when the City of Boardman City Council adopted this WSMP and the recommended system improvements.

2. The City needs to submit a Letter of Interest to the Oregon Health Authority - Drinking Water Services for the SDWRLF project priority list.
3. If funding assistance is desired, the City needs to contact the IFA Regional Coordinator to initiate funding discussions.
4. The City may need to schedule a One Stop meeting with IFA to discuss potential funding options for the proposed improvements.
5. If IFA funding is identified as a potential source in the One Stop Meeting, the City and IFA should work together to draft a Project Notification and Intake Form (PNIF).
6. The City will need to hold public information meetings to inform its citizens of the need for and scope of the project, to answer questions, and to explain the need for increases in user fees. Some funding programs (such as CDBG) have specific requirements that need to be addressed in public meetings.
7. Working with the various funding agencies, the City will need to develop a funding plan for the desired improvements.
8. The City will need to prepare funding applications for the water system improvements project and submit them to the appropriate funding agencies. The City will need to budget appropriate up-front funds to go through the funding application process.

Proposed Improvement Implementation Plan

The City of Boardman City Council adopted this WSMP and the recommended system improvements at their September 1, 2015, Council meeting. The following Implementation Plan outlines the key steps the City will need to undertake if outside funding is desired. It is important to note that it usually takes approximately two to three years, at a minimum, from the date the City decides to proceed with an improvements project until the project is completed and serving the community. The following Implementation Plan uses summer 2015 as a starting date and assumes a two-year implementation schedule. The following schedule is optimistic. It should be noted that these implementation steps, as presented hereafter, may be different if the City elects to delay the project further in the future.

ITEM	COMPLETION DATE
1. Initiate funding discussions with IFA and RD.	Summer 2015
2. Complete a Letter of Interest for the SDWRLF project priority list. Hold a One Stop meeting with agencies.	Summer 2015
3. Complete a public outreach and education program.	Summer 2015
4. Work with IFA to submit a PNIF (if IFA funding is identified as a potential source of funds).	Summer 2015

- | | | |
|-----|--|------------------|
| 5. | Submit funding application(s) to agencies. | Fall 2015 |
| 6. | Finalize project funding. | Fall 2015 |
| 7. | Design distribution system improvements. | Winter 2015-16 |
| 8. | Bid and award distribution system improvements contract. | Spring 2016 |
| 9. | Construct distribution system improvements. | Summer/Fall 2016 |
| 10. | Close out project. | Fall 2016 |

The key to implementing the City of Boardman's water system improvements is the ability of the City to acquire funding that will allow water rates to remain as low as possible. The City should work closely with its citizens through public meetings to inform them of the system needs and the necessity for increased water user costs. If a project in the range of \$2,500,000 is pursued, the City will need to plan on raising average residential water costs by approximately \$12 to \$15 per month if using RD or SDWRLF funds. It should be noted that these average monthly water costs include base rates and overage rates. It is also a good practice to increase rates annually in order to adequately fund operation and maintenance of the existing and improved water system and to keep up with inflation.

The water system improvements outlined herein are anticipated to provide Boardman with a more reliable, high quality water system with significantly improved reliability. The identified distribution system improvements will help improve water quality, circulation, and will significantly improve fire flow capacity in most areas of the City. Overall, the proposed water system improvements will provide a much improved and more reliable water system that should serve the City of Boardman for many years.

HISTORICAL WATER DEPARTMENT FUND

Fiscal Year	Revenue				Expenditures						Net Operating Income (Loss)
	Fee Revenue	Reimbursable Payments	Other Revenue	Total Revenue	Personnel Services	Materials and Services	Capital Outlay	Total OM&R Expenditures ¹	Debt Service ²	Total Expenditures	
2008-09	\$ 529,326	\$ 348	\$ 9,323	\$ 538,997	\$ 235,568	\$ 164,254	\$ 12,641	\$ 412,463	\$ -	\$ 412,463	\$ 126,534
2009-10	\$ 554,186	\$ -	\$ 431	\$ 554,617	\$ 242,439	\$ 164,685	\$ -	\$ 407,123	\$ -	\$ 407,123	\$ 147,494
2010-11	\$ 520,265	\$ 141	\$ 72	\$ 520,477	\$ 228,869	\$ 158,933	\$ 3,897	\$ 391,699	\$ -	\$ 391,699	\$ 128,779
2011-12	\$ 554,946	\$ 600	\$ -	\$ 555,546	\$ 248,969	\$ 170,167	\$ -	\$ 419,135	\$ -	\$ 419,135	\$ 136,411
2012-13	\$ 564,917	\$ -	\$ 1,128	\$ 566,045	\$ 261,717	\$ 217,203	\$ -	\$ 478,920	\$ -	\$ 478,920	\$ 87,125
2013-14	\$ 650,922	\$ -	\$ 284	\$ 651,206	\$ 289,871	\$ 190,815	\$ 16,159	\$ 496,845	\$ -	\$ 496,845	\$ 154,361

Notes:

¹OM&R refers to Operation, Maintenance, and Repair

²No debt to service from the Water Department Fund. Debt is serviced from property tax revenues as described in Chapter 7..



CITY OF
BOARDMAN, OREGON
WATER SYSTEM MASTER PLAN
HISTORICAL WATER
DEPARTMENT FUND

**FIGURE
7-1**

WATER RATE ANALYSIS FOR LOAN CAPACITY

Rates		Expenditures				Debt Service	Financing Options		
Average Monthly Cost ¹	Estimated Annual Revenue ²	Estimated OM&R Costs ³	Existing Debt Cost	Revenue Available for Future Debt Service	Total Expenditures	Property Tax-Based Only	Rural Development Loan Capacity ⁴	IFA Loan Capacity ⁵	SDWRLF Standard Loan Capacity ⁶
\$18	\$502,400	\$500,000	\$0	\$2,400	\$502,400	\$302,200	\$43,000	\$30,000	\$33,000
\$19	\$517,500	\$500,000	\$0	\$17,500	\$517,500	\$302,200	\$312,000	\$218,000	\$238,000
\$20	\$532,600	\$500,000	\$0	\$32,600	\$532,600	\$302,200	\$581,000	\$406,000	\$443,000
\$21	\$547,800	\$500,000	\$0	\$47,800	\$547,800	\$302,200	\$851,000	\$596,000	\$650,000
\$22	\$562,900	\$500,000	\$0	\$62,900	\$562,900	\$302,200	\$1,120,000	\$784,000	\$855,000
\$23	\$578,000	\$500,000	\$0	\$78,000	\$578,000	\$302,200	\$1,389,000	\$972,000	\$1,060,000
\$24	\$593,200	\$500,000	\$0	\$93,200	\$593,200	\$302,200	\$1,660,000	\$1,161,000	\$1,267,000
\$25	\$608,300	\$500,000	\$0	\$108,300	\$608,300	\$302,200	\$1,929,000	\$1,350,000	\$1,472,000
\$26	\$623,400	\$500,000	\$0	\$123,400	\$623,400	\$302,200	\$2,198,000	\$1,538,000	\$1,677,000
\$27	\$638,600	\$500,000	\$0	\$138,600	\$638,600	\$302,200	\$2,469,000	\$1,727,000	\$1,884,000
\$28	\$653,700	\$500,000	\$0	\$153,700	\$653,700	\$302,200	\$2,738,000	\$1,915,000	\$2,089,000
\$29	\$668,800	\$500,000	\$0	\$168,800	\$668,800	\$302,200	\$3,007,000	\$2,104,000	\$2,294,000
\$30	\$684,000	\$500,000	\$0	\$184,000	\$684,000	\$302,200	\$3,278,000	\$2,293,000	\$2,501,000

¹ The current base rate of \$15.00 (residential) is based on fiscal year 2011-12 (assuming 778 water service accounts).

² Assumes 1,261 EDUs and an annual revenue from the Port of Morrow of \$230,000. Values rounded to the nearest \$100. Refer to the EDU discussion in Chapter 7 for the assumed EDU value.

³ Budget year 2013-14 OM&R cost of \$500,000 was assumed.

⁴ Assumes loan funding at 4.0 percent for 40 years (loan capacity determined after 10 percent reserve payment removed from revenue available for debt service). Values rounded to nearest \$1,000.

⁵ Assumes loan funding at 5.0 percent for 20 years. Values rounded to nearest \$1,000.

⁶ Assumes loan funding at 4.0 percent for 20 years. Values rounded to the nearest \$1,000.

EDU = Equivalent Dwelling Units

IFA = Infrastructure Finance Authority

OM&R = Operation, Maintenance, and Repair

SDWRLF = Safe Drinking Water Revolving Loan Fund



CITY OF
BOARDMAN, OREGON
WATER SYSTEM MASTER PLAN
WATER RATE ANALYSIS
FOR LOAN CAPACITY

**FIGURE
7-2**

PRELIMINARY
PROPERTY TAX ANALYSIS FOR WATER SYSTEM BONDING CAPACITY

Typical Rural Development Loan

Loan Amount	Interest Rate ¹	Loan Period	Estimated Annual Payment	Estimated Annual Tax Rate Increase per \$1,000 ²	Estimated Annual Tax Increase for a \$100,000 Home	
					Monthly	Annual
\$1,000,000	4%	40 Yrs	\$50,523	\$0.14	\$1.17	\$14.00
\$2,000,000	4%	40 Yrs	\$101,047	\$0.27	\$2.25	\$27.00
\$3,000,000	4%	40 Yrs	\$151,570	\$0.14	\$3.42	\$41.00
\$4,000,000	4%	40 Yrs	\$202,094	\$0.54	\$4.50	\$54.00

Typical IFA Loan

Loan Amount	Interest Rate ¹	Loan Period	Estimated Annual Payment	Estimated Annual Tax Rate Increase per \$1,000 ²	Estimated Annual Tax Increase for a \$100,000 Home	
					Monthly	Annual
\$1,000,000	5%	20 Yrs	\$80,243	\$0.22	\$1.83	\$22.00
\$2,000,000	5%	20 Yrs	\$160,485	\$0.43	\$3.58	\$43.00
\$3,000,000	5%	20 Yrs	\$240,728	\$0.35	\$5.42	\$65.00
\$4,000,000	5%	20 Yrs	\$320,970	\$0.86	\$7.17	\$86.00

Typical SDWRLF Loan

Loan Amount	Interest Rate ¹	Loan Period	Estimated Annual Payment	Estimated Annual Tax Rate Increase per \$1,000 ²	Estimated Annual Tax Increase for a \$100,000 Home	
					Monthly	Annual
\$1,000,000	4.0%	20 Yrs	\$73,582	\$0.20	\$1.67	\$20.00
\$2,000,000	4.0%	20 Yrs	\$147,164	\$0.40	\$3.33	\$40.00
\$3,000,000	4.0%	20 Yrs	\$220,745	\$0.59	\$4.92	\$59.00
\$4,000,000	4.0%	20 Yrs	\$294,327	\$0.79	\$6.58	\$79.00

¹ Actual loan interest rates could vary.

² The annual tax rate increase is based on the City of Boardman's 2013 assessed valuation of \$371,500,000. It was also assumed that 100 percent of taxes would be collected. Typically a small percentage of taxes are not paid, which would require the estimated tax rate to be slightly higher than shown.

IFA = Infrastructure Finance Authority
SDWRLF = Safe Drinking Water Revolving Loan Fund

**Placeholder for
Existing Water System Map**

**Placeholder for
Proposed Water System Improvements Map**

**Placeholder for
Fire Hydrant Coverage Plan Map**

**APPENDICES
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APPENDIX A

Water Quality Data

City of Boardman 2013 Water Quality Report

The Boardman Public Works Department is pleased to provide you with this summary of 2013 drinking water quality information. We wish to keep you informed about the quality and services delivered to you over the past year. Our goal is and has always been, to provide you a safe and dependable supply of drinking water. The City obtains water from a Horizontal Collector Well, which draws water from a shallow aquifer adjacent to, and under the Columbia River. As water from the aquifer is withdrawn the water from the river recharges the aquifer through what is termed as "induced infiltration". The Collector is located on the banks of the Columbia River north of the water distribution pumping facility on E. Marine Dr. A second collector, which is now in operation is located just west of Sailboard Beach. The second collector was part of the water system expansion project. Also as part of the expansion project was an on-site sodium hypochlorite generation system for disinfection. This system is cost effective and less hazardous than the one ton chlorine cylinders that were being used. As the federal and state rules and regulations become increasingly more stringent, the City is looking to meet or exceed these criteria at affordable costs.

We are pleased to report that our drinking water is safe and meets or exceeds state and federal water quality guidelines. Sodium Hypochlorite is added to the water for disinfection. There is no other treatment at this time. This report shows our water quality and defines what it means.

HEALTH INFORMATION

The Public Works Department routinely monitors for contaminants in your drinking water according to Federal and State laws. The tables included in this report show the results of our monitoring for the period of January 1st to December 31st, 2012, or in some cases the most recent sampling completed in accordance with state and federal regulations.

All drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that the water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the Environmental Protection Agency's (EPA's) Safe Drinking Water Hotline at 1-800-426-4791.

Some people may be more vulnerable to contaminants in drinking water than the general public. Immune-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 more risk from infections. These people should seek advice about drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of infection by *Cryptosporidium* and other microbial contaminants are available from the Safe Drinking Water Hotline at 1-800-426-4791.

EXPLANATION OF EXPECTED CONTAMINANTS

The sources of drinking water (both tap water 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 or from human activity.

Contaminants that may be present in City of Boardman source water include:

- Microbial contaminants, such as viruses and bacteria, which may come from septic systems, livestock, wild animals or human recreation.
- Inorganic contaminants, such as salts and metals, which can be naturally occurring or result from urban storm water runoff, industrial or domestic wastewater discharges, mining or farming activities.
- Pesticides and herbicides, which may come from a variety of sources such as farming, home or business use, or urban storm water runoff.
- Organic Chemical contaminants, including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production, and can also come from gas stations, urban storm water runoff and septic systems.
- Radioactive contaminants, which occur naturally and as a result of human activity up river.

In order to ensure that tap water is safe to drink, EPA prescribes regulations which limit the amount of certain contaminants in water provided by public water systems. Maximum Contaminant Levels (MCL's) are set at very stringent levels. To understand the possible health effects described for many regulated constituents, a person would have to drink 2 liters of water, at the MCL level, every day for a lifetime to have a one-in-a million chance of having the described health effect. Food and Drug Administration (FDA) regulations establish limits for contaminants in bottled water which must provide the same protection for public health.

DEFINITIONS

In this report you will find many terms and abbreviations you might not be familiar with. To assist you in better understanding these terms, the following definitions are offered:

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

Not Available (NA) – some values are not available at this time.

Parts per million (ppm) or Milligrams per liter (mg/L) – one part per million corresponds to one minute in two years or a single penny in \$10,000.00.

Parts per billion (ppb) or Micrograms per liter (Micrograms/L) - one part per billion corresponds to one minute in 2,000 years or a single penny in \$10,000,000.00.

Parts per trillion (ppt) or Nanograms per liter (Nanograms/L) - one part per trillion corresponds to one minute in 2,000,000 years, or a single penny in \$10,000,000,000.00.

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

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

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

Maximum Contaminant Level (MCL) – The “Maximum Allowed” is the highest level of a contaminant that is allowed in drinking water. MCL's are set as close to MCLG's as feasible using the best available treatment technology.

Maximum Contaminant Level Goal (MCLG) – The “Goal” is the level of a contaminant in drinking water below which there is no known or expected risk to health. MCLG's allow for a margin of safety.

Million Fibers per Liter (MFL) – This measurement is used to address Asbestos fibers of greater than 10 microns in size that may come from deterioration of asbestos cement pipe.

µmhos/cm – Is a measurement for conductivity in drinking water. The EPA limit is proposed for 700 µmhos/cm

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

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

RESULTS OF MONITORING OF LEAD & COPPER SAMPLING AT RESIDENTIAL WATER TAPS:

PARAMETER	90th PERCENTILE VALUES	No. of SITES EXCEEDING ACTION LEVELS	ACTION LEVEL (AL)	MCLG	POTENTIAL SOURCES of CONTAMINANT
Lead	0.0030 ppm	0	15 ppm	0	Corrosion of household plumbing; erosion of natural deposits
Copper	0.2520 ppm	0	1.3 ppm	1.3 ppm	

These parameters were sampled in 2012, in accordance with state and federal regulations

RESULTS OF MONITORING FOR REGULATED CONTAMINANTS

The items listed below were the only contaminants detected in Boardman's water during the last monitoring period. Note that all parameters listed meet or surpass state and federal drinking water standards. **Not listed in the table below are 9 inorganic compounds, 21 volatile organic compounds and 32 synthetic organic compounds for which samplings showed NOT DETECTED.**

Contaminant	Violation Y/N	Level Detected	Unit Measurement	MCLG	MCL	Likely Sours of Contamination
Radioactive :						
Gross Alpha	N	ND	PCi /l	6	15	Erosion of natural deposits
Combined radium	N	ND	PCi/l	0	5	Erosion of natural deposits
Inorganic:						
Arsenic	N	ND	ppb	N/A	10	Erosion of natural deposits; runoff from orchards; runoff from glass and electronics production wastes
Barium	N	0.0450	ppm	2	2	Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits
Chromium	N	0.0010	ppb	100	100	Discharge from steel and pulp mills; erosion of natural deposits
Fluoride	N	0.4000	ppm	4	4	Erosion of natural deposits; water additive which promotes strong teeth; discharge from fertilizer and aluminum factories
Nitrate as (nitrogen)	N	.787	ppm	10	10	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits
Disinfectant Byproducts:						
Total (TTHM)	N	0.0311	ppm	0	80	By-product of drinking water chlorination
Total (HAA5)	N	0.00580	ppm	0	60	

These results are from 2011 - 2013 sampling In accordance with state and federal regulations.

While your drinking water meets EPA's standards for arsenic, it does contain low levels of arsenic. EPA's standard balances the current understanding of arsenic's possible health effects against the cost of removing arsenic from drinking water. EPA continues to research the health effects of low levels of arsenic, which is a mineral know to cause cancer in humans at high concentrations and is linked to other health effects such as skin damage and circulatory problems. Some people who drink water containing arsenic in the excess of the MCL over many years could experience skin damage or problems with their circulatory system, and may have an increased risk of getting cancer.

Nitrate in drinking water at levels above 10ppm is a health risk for infants of less than six months of age. High nitrate levels in drinking water can cause blue baby syndrome. Nitrate levels may rise quickly for short periods of time because of rainfall or agricultural activity. If you are caring for an infant you should ask advice from your health care provider.

ADDITIONAL WATER QUALITY SAMPLING INFORMATION

Unregulated Contaminants

Although some contaminants are not yet regulated, they may be of interest to some of our customers. The following table shows results from the last sampling of some of the unregulated elements tested for.

PARAMETER	MEASURED LEVEL	PROPOSED EPA LIMIT
Sodium	31 ppm	NA

Microbiological Contaminants

Microbiological testing of water helps protect the public from diseases. Chlorine is added to drinking water as a disinfectant to destroy or inactivate bacteria, viruses, and protozoa. City of Boardman drinking water is routinely sampled for Total Coliform. Total Coliform bacteria are naturally present in the environment. Their presence is an indicator that other, potentially harmful bacteria may be present. The City performed 52 routine microbiological samples throughout the distribution system in 2013, and had no positive samples detected.

Daily Monitoring

The following table is a list of the high and low values for sampling performed daily at the water distribution facility prior to the water entering the distribution system. The values listed in the tables are the range that was seen during each month of the calendar year 2013

Month	NTU (Turbidity) High / Low	Free Chlorine (ppm) High / Low	Total Chlorine (ppm) High / Low	pH High / Low	Hardness grains/gal High & Low	Alkalinity grains/gal High & Low	Temperature C High / Low
Jan 13	0.056 / 0.050	0.7/ 0.5	0.7 / 0.5	8.2/ 7.9	6/5	3/3	16/15
Feb 13	0.053 / 0.050	0.7/ 0.5	0.7 / 0.6	8.4/ 8.1	7/6	3/3	15/13
Mar 13	0.056/ 0.050	0.7/ 0.5	0.7/ 0.6	8.3/ 8.1	7/6	3/3	15/14
Apr 13	0.054/ 0.051	0.7/ 0.5	0.7/ 0.6	8.2/ 7.9	7/6	3/3	16/14
May 13	0.056/ 0.054	0.7/ 0.5	0.7/ 0.6	8.6/ 8.1	6/5	3/3	19/16
Jun 13	0.057/ 0.054	0.6/ 0.5	0.7 / 0.6	8.4/ 8.3	6/5	3/3	22/19
Jul 13	0.054/ 0.049	0.7/ 0.5	0.7/ 0.5	8.6/ 8.1	6/5	5/3	26/22
Aug 13	0.051/0.048	0.7/ 0.6	0.7/ 0.6	8.6/ 7.4	6/5	3/3	27/26
Sep 13	0.053/ 0.048	0.7/ 0.6	0.7/ 0.6	8.6/ 8.3	6/5	3/3	24/25
Oct 13	0.051/ 0.048	0.7/ 0.4	0.7/ 0.4	8.9/ 8.6	6/5	3/3	25/22
Nov 13	0.050/ 0.048	0.7/ 0.5	0.7/ 0.4	9.1/ 8.9	6/5	3/3	22/18
Dec 13	0.049/ 0.048	0.7/ 0.4	0.7/ 0.5	9.2/ 9.0	6/5	3/3	18/15

* This information compiled from 2013 daily operator logs.

COMMONLY ASKED QUESTIONS:

Is Boardman's water hard or soft?

Boardman's water is classified as moderately hard.

Does Boardman add fluoride to the water?

Boardman does not add fluoride to the water at this time.

IF YOU WOULD LIKE MORE INFORMATION:

If you have any questions about this report or the City of Boardman Water system, please contact Dave Winters at Boardman City Hall, 541-481-9252. We want our valued customers to be informed about their water supply and water utility. If you want to learn more or take a more active role in regards to your drinking water supply please let us know.

Si Ud. no comprende el Ingles, puede hacer una cita con Dave Winters y con un interprete que le puede esplicar el reporte de la calidad tocante a la calidad de el agua.

City of Boardman 2011 Water Quality Report

The Boardman Public Works Department is pleased to provide you with this summary of 2011 drinking water quality information. We wish to keep you informed about the quality and services delivered to you over the past year. Our goal is and has always been, to provide you a safe and dependable supply of drinking water. The City obtains water from a Horizontal Collector Well, which draws water from a shallow aquifer adjacent to, and under the Columbia River. As water from the aquifer is withdrawn the water from the river recharges the aquifer through what is termed as "induced infiltration". The Collector is located on the banks of the Columbia River north of the water distribution pumping facility on E. Marine Dr. A second collector, which is now in operation is located just West of Sailboard Beach. The second collector was part of the water system expansion project. Also as part of the expansion project was an on-site sodium hypochlorite generation system for disinfection. This system is cost effective and less hazardous than the one ton chlorine cylinders that were being used. As the federal and state rules and regulations become increasingly more stringent, the City is looking to meet or exceed these criteria at affordable costs.

We are pleased to report that our drinking water is safe and meets or exceeds state and federal water quality guidelines. Sodium Hypochlorite is added to the water for disinfection. There is no other treatment at this time. This report shows our water quality and defines what it means.

HEALTH INFORMATION

The Public Works Department routinely monitors for contaminants in your drinking water according to Federal and State laws. The tables included in this report show the results of our monitoring for the period of January 1st to December 31st, 2011, or in some cases the most recent sampling completed in accordance with state and federal regulations.

All drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that the water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the Environmental Protection Agency's (EPA's) Safe Drinking Water Hotline at 1-800-426-4791.

Some people may be more vulnerable to contaminants in drinking water than the general public. 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 more risk from infections. These people should seek advice about drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline at 1-800-426-4791.

EXPLANATION OF EXPECTED CONTAMINANTS

The sources of drinking water (both tap water 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 or from human activity.

Contaminants that may be present in City of Boardman source water include:

- Microbial contaminants, such as viruses and bacteria, which may come from septic systems, livestock, wild animals or human recreation.
- Inorganic contaminants, such as salts and metals, which can be naturally occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, mining or farming activities.
- Pesticides and herbicides, which may come from a variety of sources such as farming, home or business use, or urban stormwater runoff.
- Organic Chemical contaminants, including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff and septic systems.
- Radioactive contaminants, which occur naturally and as a result of human activity up river.

In order to ensure that tap water is safe to drink, EPA prescribes regulations which limit the amount of certain contaminants in water provided by public water systems. Maximum Contaminant Levels (MCL's) are set at very stringent levels. To understand the possible health effects described for many regulated constituents, a person would have to drink 2 liters of water, at the MCL level, every day for a lifetime to have a one-in-a million chance of having the described health effect. Food and Drug Administration (FDA) regulations establish limits for contaminants in bottled water which must provide the same protection for public health.

DEFINITIONS

In this report you will find many terms and abbreviations you might not be familiar with. To assist you in better understanding these terms, the following definitions are offered:

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

Not Available (NA) – some values are not available at this time.

Parts per million (ppm) or Milligrams per liter (mg/L) – one part per million corresponds to one minute in two years or a single penny in \$10,000.00.

Parts per billion (ppb) or Micrograms per liter (Micrograms/L) – one part per billion corresponds to one minute in 2,000 years or a single penny in \$10,000,000.00.

Parts per trillion (ppt) or Nanograms per liter (Nanograms/L) – one part per trillion corresponds to one minute in 2,000,000 years, or a single penny in \$10,000,000,000.00.

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

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

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

Maximum Contaminant Level (MCL) – The “Maximum Allowed” is the highest level of a contaminant that is allowed in drinking water. MCL's are set as close to MCLG's as feasible using the best available treatment technology.

Maximum Contaminant Level Goal (MCLG) – The “Goal” is the level of a contaminant in drinking water below which there is no known or expected risk to health. MCLG's allow for a margin of safety.

Million Fibers per Liter (MFL) – This measurement is used to address Asbestos fibers of greater than 10 microns in size that may come from deterioration of asbestos cement pipe.

µmhos/cm – Is a measurement for conductivity in drinking water. The EPA limit is proposed for 700 µmhos/cm

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

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

RESULTS OF MONITORING OF LEAD & COPPER SAMPLING AT RESIDENTIAL WATER TAPS:

PARAMETER	90th PERCENTILE VALUES	No. of SITES EXCEEDING ACTION LEVELS	ACTION LEVEL (AL)	MCLG	POTENTIAL SOURCES of CONTAMINANT
Lead	0.0016 ppm	0	15 ppm	0	Corrosion of household plumbing; erosion of natural deposits
Copper	0.2650 ppm	0	1.3 ppm	1.3 ppm	

These parameters were sampled in 2009, in accordance with state and federal regulations

RESULTS OF MONITORING FOR REGULATED CONTAMINANTS

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Inorganic :						
Arsenic	N	ND	ppb	N/A	10	Erosion of natural deposits; runoff from orchards; runoff from glass and electronics production wastes
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Chromium	N	0.0010	ppb	100	100	Discharge from steel and pulp mills; erosion of natural deposits
Fluoride	N	0.4000	ppm	4	4	Erosion of natural deposits; water additive which promotes strong teeth; discharge from fertilizer and aluminum factories
Nitrate as (nitrogen)	N	0.6	ppm	10	10	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits
Disinfectant Byproducts:						
Total (TTHM)	N	0.0311	ppm	0	80	By-product of drinking water chlorination
Total (HAA5)	N	0.00580	ppm	0	60	

These results are from 2003 - 2011 sampling in accordance with state and federal regulations.

While your drinking water meets EPA's standards for arsenic, it does contain low levels of arsenic. EPA's standard balances the current understanding of arsenic's possible health effects against the cost of removing arsenic from drinking water. EPA continues to research the health effects of low levels of arsenic, which is a mineral know to cause cancer in humans at high concentrations and is linked to other health effects such as skin damage and circulatory problems. Some people who drink water containing arsenic in the excess of the MCL over many years could experience skin damage or problems with their circulatory system, and may have an increased risk of getting cancer.

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PARAMETER	MEASURED LEVEL	PROPOSED EPA LIMIT
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May 11	0.063/ 0.048	0.7/ 0.6	0.7/ 0.6	8.0/ 6.8	7/6	3/3	18/15
Jun 11	0.063/ 0.053	0.7/ 0.6	0.7 / 0.6	8.8/ 6.9	7/6	3/3	20/18
Jul 11	0.065/ 0.053	0.8/ 0.6	0.8/ 0.6	8.3/ 7.9	7/6	3/3	22/20
Aug 11	0.056/0.052	0.7/ 0.6	0.7/ 0.6	8.4/ 7.9	7/6	3/2	24/22
Sep 11	0.053/ 0.051	0.7/ 0.6	0.7/ 0.6	8.2/ 7.9	6/5	3/3	25/24
Oct 11	0.062/ 0.051	0.7/ 0.6	0.7/ 0.6	8.4/ 8.1	6/5	3/3	24/22
Nov 11	0.053/ 0.050	0.7/ 0.6	0.7/ 0.6	8.6/ 8.1	6/5	3/3	22/18
Dec 11	0.067/ 0.050	0.7/ 0.5	0.7/ 0.5	7.8/ 6.9	7/6	3/3	18/16

* This information compiled from 2011 daily operator logs.

COMMONLY ASKED QUESTIONS:

Is Boardman's water hard or soft?

Boardman's water is classified as moderately hard.

Does Boardman add fluoride to the water?

Boardman does not add fluoride to the water at this time.

IF YOU WOULD LIKE MORE INFORMATION:

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**Oregon Public Health
Drinking Water Data Online**


Introduction :: Data Search Options :: WS Name Look Up :: WS ID Look Up :: DWS Home :: Quick Data Links

Water System #: OR4100130

BOARDMAN, CITY OF

Certification Level Required

Distribution: 2

Treatment: None

Filtration: None

Licensed Operators and their certification levels

License Number(s)	Name	Distribution Level	Is DRC* Distribution	Treatment Level	Is DRC* Treatment	Filtration Endorsement	License Expires (D and/or T)
D-6106 T-6106	Kevin S. Kennedy	2	DRC Dist	1	DRC Treat		12/31/2016 12/31/2016
D-6912	Guy A. Marzek	1					12/31/2015

*Direct Responsible Charge

**Contract Operator

***Only Operators with a current certification will appear.

Distribution Grade 2

Oregon Administrative Rule

333-061-0235

OPERATOR

REQUIREMENTS

LEVELS 1-4

Requirements

HS/GED and 3 years experience,

OR

HS/GED and 1 year relevant post-high school education and 2 years experience



Oregon Public Health Drinking Water Data Online



Introduction :: Data Search Options :: WS Name Look Up :: WS ID Look Up :: DWS Home :: Quick Data Links

OR41 00130**BOARDMAN, CITY OF****Classification: COMMUNITY**

Contact: KEVIN S KENNEDY
PO BOX 229
BOARDMAN, OR 97818

Phone: 541-481-9252**County:** MORROW**Activity Status:** ACTIVE -- History**Population:** 3,310**Number of Connections:** 808**Operating Period:** January 1 to December 31**Regulating Agency:** REGION 1**Certified Operator(s)****Owner Type:** LOCAL GOVERNMENT

Required: Y

Licensed By: N/A

Distribution class: 2

Approved Drinking Water Protection Plan: No

Treatment class: None

Source Water Assessment: Yes

Filtration Endorsement Required: No

Last Survey Date: Nov 01, 2012**Sources**

<u>Facility ID</u>	<u>Facility Name - Well Logs</u>	<u>Activity Status</u>	<u>Availability</u>	<u>Source Type</u>
EP-A	EP FOR RANNEY WELLS (COLUMBIA RIVER)	A		GW
SRC-AA	RANNEY WELL #1 (COLUMBIA RIVER)	A	Permanent	GW
SRC-AB	RANNEY WELL #2 L42611 (COLUMBIA RIVER)	I	Emergency	GU
EP-B	EP FOR EMERGENCY WELL 1-64 (MORR745)	I		GW
SRC-BA	EMERGENCY WELL 1-64 (MORR745)	I	Emergency	GW

Treatment

<u>State ID</u>	<u>Facility Name</u>	<u>Treatment Process</u>	<u>Treatment Objective</u>	<u>Filter Type</u>
WTP-A	TP FOR RANNEY WELLS (COLUMBIA RIVER)	RESID. MAINT. HYPOCHLORINATION	OTHER	

Consumer Confidence Reports (Last 5 Years)

<u>For Year</u>	<u>Date Received</u>	<u>Date Certified</u>
2014	Due 7/1/2015	
2013	Jul 02, 2014	Jul 02, 2014
2012	May 08, 2013	May 08, 2013
2011	Nov 01, 2012	Apr 30, 2012
2010	Jun 03, 2011	Jun 03, 2011

Cross Connection/Backflow Prevention Information (Last 3 Records)

<u>Ordinance Received</u>	<u>Annual Summary Report Received</u>	<u>Fee Invoice Paid</u>
Yes	2013	2015
	2000	2014
	1999	2013



Oregon Public Health Drinking Water Data Online



Introduction :: Data Search Options :: WS Name Look Up :: WS ID Look Up :: DWS Home :: Quick Data Links

PWS ID: 00130 ---- BOARDMAN, CITY OF

For questions regarding these violations contact: REGION 1 — Bill Goss/Amy Word — (541) 276-8006

Violations are displayed for the last 5 years only.

Group Abbreviations: ASB = Asbestos, SOC = Synthetic Organic Chemicals, TCR = Total Coliform Rule

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	Monitoring Period End	Facility ID	Analyte Group	Violation Type - Analyte Count <i>Show analytes for all violations</i>	Enforcement Action - Date <i>Show history</i>	Points
903213342	Y	May 01, 2014	May 31, 2014		TCR	Routine Coliform - Did Not Report Enough - 1	Returned To Compliance - Jun 17, 2014	1
903213341	Y	Jan 01, 2011	Dec 31, 2013	EP-A	SOC	Chemical Late/Nonreporting - 29 <i>Show analytes</i>	Returned To Compliance - Mar 06, 2014	1
903213309	Y	Jan 01, 2002	Dec 31, 2010	DIST-A	ASB	Chemical Late/Nonreporting - 1	Returned To Compliance - Apr 05, 2011	1

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:	3

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 04/03/2015, 7 hours ago.

For further information on this public water system, click on the area of interest below:

[System Info](#) :: [Report for Lenders](#) :: [Alerts](#) :: [Violations](#) :: [Enforcements](#) :: [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](#)

[DBPs](#) :: [TOC & Alkalinity](#) :: [DBP Sample Sites](#) :: [FANLs](#) :: [MRDL](#) :: [Turbidity](#) :: [SWTR](#) :: [RAA](#) :: [LRAA](#)

Oregon Public Health
Drinking Water Data Online[Introduction](#) :: [Data Search Options](#) :: [WS Name Look Up](#) :: [WS ID Look Up](#) :: [DWP Home](#) :: [Quick Data Links](#)PWS ID: **00130** ---- **BOARDMAN, CITY OF**

For questions regarding these violations contact: REGION 1 ---- Bill Goss/Amy Word ---- (541) 276-8006

Violations are displayed for the last 5 years only.

Group Abbreviations: ARS = Arsenic, ASB = Asbestos, DBP = Disinfection Byproducts, NO3 = Nitrate, SOC = Synthetic Organic Chemicals, VOC = Volatile Organic Chemicals

Gray shading indicates return to compliance.

[Show Determination Dates](#)[Click here to see public notices.](#)

Violation History

Violation Number	Monitoring Period Begin	Monitoring Period End	Facility ID	Analyte Group	Violation Type - Analyte Count <i>Show analytes for all violations</i>	Enforcement Action - Date <i>Show history</i>	Points
903213309	Jan 01, 2002	Dec 31, 2010	DIST-A	ASB	Chemical Late/Nonreporting - 1	Returned To Compliance - Apr 05, 2011	1
3218609	Jan 01, 2009	Dec 31, 2009	EP-A	NO3	Chemical Late/Nonreporting - 1	Returned To Compliance - Mar 17, 2010	5
3218608	Jan 01, 2005	Dec 31, 2007	EP-A	VOC	Chemical Late/Nonreporting - 21 <i>Show analytes</i>	Returned To Compliance - Nov 07, 2008	1
3216508	Jan 01, 2005	Dec 31, 2007	DIST-A	DBP	DBP1 Late/Nonreporting - 2 <i>Show analytes</i>	Returned To Compliance - Dec 17, 2008	1
3216308	Jan 01, 2005	Dec 31, 2007	EP-A	SOC	Chemical Late/Nonreporting - 29 <i>Show analytes</i>	Returned To Compliance - Nov 07, 2008	1
3213408	Jan 01, 2005	Dec 31, 2007		ARS	Chemical Late/Nonreporting - 1	Returned To Compliance - Nov 07, 2008	1
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, DWP 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 06/04/2012, 8 hours ago.

For further information on this public water system, click on the area of interest below:

[System Info](#) :: [Report for Lenders](#) :: [Alerts](#) :: [Violations](#) :: [Enforcements](#) :: [Contacts](#) :: [Site Visits](#) :: [Public Notice](#) :: [Plan Review](#)[Coliform Summary](#) :: [Coliform Results](#) :: [Coliform Results before 2002](#) :: [Sampling Schedule for Coliform](#)[Chemical Group Summary](#) :: [Latest Chemical Results](#) :: [Entry Point Detects](#) :: [Single Analyte Results](#)[Chemical Schedule Summary](#) :: [Chemical Schedule Details](#) ::[Lead & Copper](#) :: [Corrosion Control\(LCR\)](#) :: [Nitrates](#) :: [Arsenic](#) :: [Radionuclides](#)[DBPs](#) :: [TOC & Alkalinity](#) :: [DBP/TOC/Bromate/Chlorine Monitoring](#) :: [FANLs](#) :: [MRDL](#) :: [Turbidity](#) :: [SWTR](#) :: [RAA](#)[Inventory List](#) for all Oregon Drinking Water Systems in Excel or printable screen format[Tools for Laboratories](#)[Introduction](#) :: [Data Search Options](#) :: [WS Name Look Up](#) :: [WS ID Look Up](#) :: [DWP Home](#)



Introduction :: Data Search Options :: WS Name Look Up :: WS ID Look Up :: DWS Home :: Quick Data Links

BOARDMAN, CITY OF

PWS #: 00130 ---- System Status: Active System Type: C Population: 3,310

Current Open Coliform Sample Schedule

(subject to change based upon future test results)

GWR: SRC-AA: 1 Assessment sample(s) per Year to be taken beginning 01/01/2013 -

DIST-A: 4 Routine sample(s) per Month to be taken beginning 05/01/2009 -

(A begin date of 01/01/1991 indicates the year the Total Coliform Rule was established)

Community and Non-transient Non-community water systems that use chlorine or chloramines must measure the residual disinfectant level at the same points in the distribution system and at the same time when total coliforms are sampled.

Repeat, Temporary Routine, and Prior Coliform Sample Schedules

*(Schedules in **bold** reflect current schedules.)*

GWR: 1 Routine sample(s) per Month to be taken 05/01/2011 - 05/31/2012 at SRC-AA RANNEY WELL #1 (COLUMBIA RIVER)

TCR: 3 Routine sample(s) per Month to be taken 01/01/1991 - 04/30/2009 at DIST-A

Instructions and Notes

- 1) If no prior sample schedules appear, then no prior schedules exist within the database.
- 2) Schedules for water systems that are classified as "NP" (State Regulated) may not appear. If the system is active, the system must sample and test for the presence of coliform bacteria with a frequency of 1 sample per quarter (1 sample per month for those systems with a surface water source or a groundwater source determined to be under the influence of surface water). If the sample tests positive for the presence of total or fecal coliform or E-Coli, a minimum of 4 repeat samples must be taken. 5 routine samples must then be taken the following month. If these 5 samples test negative for the presence of coliform bacteria, the system may return to a quarterly sample schedule beginning with the next quarter (e.g. a routine quarterly sample tests positive in January, 4 repeats need to be taken within 24 hours following the positive sample, 5 routine samples need to be taken in February and if none of these samples tests positive, the system can go back on a quarterly schedule beginning April 1st).

In any case, as soon as a sample tests positive for the presense of coliform bacteria, the system should contact the Department of Human Services at 971-673-0405 and ask to speak with the person handling phone duty for the Drinking Water Services.



Oregon Public Health Drinking Water Data Online



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[Coliform Fact Sheet](#) :: [Spreadsheet](#) :: [MRDL Summary](#)

Sample Types: AS=Assessment, CO=Confirmation, RP=Repeat, RT=Routine, SP=Special, TG=Triggered, [Show special samples](#)

Recent Coliform Test Results - PWS ID: 00130 — BOARDMAN, CITY OF

Sample Date	# Samples	Sample Type	Coliform Type	Results ID	Repeat of Sample ID	Sample Site	Facility	CI Residual	Receive Date
Mar 17, 2015	1	RT	Total	Absent--150317K1			DIST-A	0.03	Mar 24, 2015
Mar 10, 2015	1	RT	Total	Absent--150310M1			DIST-A	0.72	Mar 17, 2015
Mar 03, 2015	1	RT	Total	Absent--150303J1			DIST-A	0.03	Mar 09, 2015
Feb 24, 2015	1	RT	Total	Absent--150224J1			DIST-A	0.70	Mar 09, 2015
Feb 18, 2015	1	RT	Total	Absent--150218K1			DIST-A	0.03	Feb 21, 2015
Feb 10, 2015	1	RT	Total	Absent--150210M1			DIST-A	0.68	Feb 11, 2015
Feb 04, 2015	1	RT	Total	Absent--150204K1			DIST-A	0.03	Feb 09, 2015
Jan 27, 2015	1	RT	Total	Absent--150127G1			DIST-A	0.68	Feb 02, 2015
Jan 21, 2015	1	RT	Total	Absent--150121H1			DIST-A	0.30	Feb 02, 2015
Jan 13, 2015	1	RT	Total	Absent--150113L1			DIST-A	0.77	Feb 02, 2015
Jan 06, 2015	1	RT	Total	Absent--150106L1			DIST-A	0.03	Jan 08, 2015
Dec 30, 2014	1	RT	Total	Absent--141230J1			DIST-A	0.67	Jan 08, 2015
Dec 22, 2014	1	RT	Total	Absent--141222F1			DIST-A	0.30	Jan 08, 2015
Dec 16, 2014	1	RT	Total	Absent--141216K2			DIST-A	0.72	Dec 20, 2014
Dec 16, 2014	1	AS	Total	Absent--141216K1		RANNEY WELL #1(COLUMBIA RIVER)	SRC-AA		Dec 20, 2014
Dec 09, 2014	1	RT	Total	Absent--141209Q1			DIST-A	0.03	Dec 20, 2014
Dec 02, 2014	1	RT	Total	Absent--141202M1			DIST-A	0.70	Dec 20, 2014
Nov 25, 2014	1	RT	Total	Absent--141125K1			DIST-A	0.03	Dec 08, 2014
Nov 18, 2014	1	RT	Total	Absent--141118M1			DIST-A	0.69	Dec 08, 2014
Nov 13, 2014	1	RT	Total	Absent--141113O1			DIST-A	0.03	Dec 08, 2014
Sample Date	# Samples	Sample Type	Coliform Type	Results--ID	Repeat of Sample ID	Sample Site	Facility	CI Residual	Receive Date
Nov 04, 2014	1	RT	Total	Absent--141104J1			DIST-A	0.73	Dec 08, 2014
Oct 28, 2014	1	RT	Total	Absent--141028E1			DIST-A	0.03	Nov 04, 2014
Oct 21, 2014	1	RT	Total	Absent--141021E1			DIST-A	0.74	Oct 30, 2014
Oct 14, 2014	1	RT	Total	Absent--141014G1			DIST-A	0.03	Nov 04, 2014
Oct 07, 2014	1	RT	Total	Absent--141007M1			DIST-A	0.30	Oct 09, 2014
Sep 30, 2014	1	RT	Total	Absent--140930H1			DIST-A	0.30	Oct 09, 2014
Sep 23, 2014	1	RT	Total	Absent--140923N1			DIST-A	0.69	Oct 09, 2014
Sep 16, 2014	1	RT	Total	Absent--140916N1			DIST-A	0.03	Oct 09, 2014
Sep 09, 2014	1	RT	Total	Absent--140909L1			DIST-A	0.67	Oct 09, 2014
Sep 02, 2014	1	RT	Total	Absent--140902M1			DIST-A	0.03	Sep 09, 2014
Aug 26, 2014	1	RT	Total	Absent--140826M1			DIST-A	0.72	Sep 10, 2014
Aug 19, 2014	1	RT	Total	Absent--140819J1			DIST-A	0.03	Sep 10, 2014
Aug 12, 2014	1	RT	Total	Absent--140812T1			DIST-A	0.30	Sep 09, 2014
Aug 05, 2014	1	RT	Total	Absent--140805M1			DIST-A	0.03	Sep 09, 2014
Jul 29, 2014	1	RT	Total	Absent--140729G1			DIST-A	0.67	Aug 08, 2014
Jul 22, 2014	1	RT	Total	Absent--140722I1			DIST-A	0.03	Aug 08, 2014
Jul 15, 2014	1	RT	Total	Absent--140715I1			DIST-A	0.69	Aug 08, 2014

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Jul 08, 2014	1	RT	Total	Absent--140708O1			DIST-A	0.03	Jul 10, 2014
Jul 01, 2014	1	RT	Total	Absent--140701M1			DIST-A	0.30	Aug 08, 2014
Jun 24, 2014	1	RT	Total	Absent--140624N1			DIST-A	0.30	Jul 10, 2014

Sample Date	# Samples	Sample Type	Coliform Type	Results-ID	Repeat of Sample ID	Sample Site	Facility	CI Residual	Receive Date
Jun 17, 2014	1	RT	Total	Absent--140617J1			DIST-A	0.30	Jun 21, 2014
Jun 10, 2014	1	RT	Total	Absent--140610N1			DIST-A	0.30	Jun 17, 2014
Jun 03, 2014	1	RT	Total	Absent--140603S1			DIST-A	0.68	Jun 17, 2014
May 27, 2014	1	RT	Total	Absent--140527B1A			DIST-A	0.30	Jun 16, 2014
May 20, 2014	1	RT	Total	Absent--140520I1			DIST-A	0.03	Jun 10, 2014
May 13, 2014	1	RT	Total	Absent--140513J1			DIST-A	0.03	May 22, 2014
May 06, 2014	1	RT	Total	Absent--140506K1			DIST-A	0.03	Jun 10, 2014
Apr 29, 2014	1	RT	Total	Absent--140429J1			DIST-A	0.03	May 07, 2014
Apr 22, 2014	1	RT	Total	Absent--140422I1			DIST-A	0.03	May 07, 2014
Apr 15, 2014	1	RT	Total	Absent--140415M2			DIST-A	0.03	May 01, 2014
Apr 15, 2014	1	RT	Total	Absent--140415M1			DIST-A	0.67	May 01, 2014
Apr 08, 2014	1	RT	Total	Absent--140408K1			DIST-A	0.03	May 01, 2014
Mar 25, 2014	1	RT	Total	Absent--140325K1			DIST-A	0.72	Apr 05, 2014
Mar 18, 2014	1	RT	Total	Absent--140318P1			DIST-A	0.03	Mar 25, 2014
Mar 11, 2014	1	RT	Total	Absent--140311G1			DIST-A	0.30	Mar 25, 2014
Mar 04, 2014	1	RT	Total	Absent--140304Q1			DIST-A	0.03	Mar 14, 2014
Feb 25, 2014	1	RT	Total	Absent--140225G1			DIST-A	0.69	Feb 27, 2014
Feb 18, 2014	1	RT	Total	Absent--140218I1			DIST-A	0.03	Feb 24, 2014
Feb 11, 2014	1	RT	Total	Absent--140211G1			DIST-A	0.69	Feb 14, 2014
Feb 04, 2014	1	RT	Total	Absent--140204I1			DIST-A	0.03	Feb 14, 2014

Sample Date	# Samples	Sample Type	Coliform Type	Results-ID	Repeat of Sample ID	Sample Site	Facility	CI Residual	Receive Date
Jan 28, 2014	1	RT	Total	Absent--140128I1			DIST-A	0.72	Feb 09, 2014
Jan 21, 2014	1	RT	Total	Absent--140121D1			DIST-A	0.03	Feb 10, 2014
Jan 14, 2014	1	RT	Total	Absent--140114L1			DIST-A	0.68	Feb 09, 2014
Jan 07, 2014	1	RT	Total	Absent--140107N1			DIST-A	0.03	Feb 10, 2014
Dec 30, 2013	1	RT	Total	Absent--131230D1			DIST-A	0.30	Jan 08, 2014
Dec 23, 2013	1	RT	Total	Absent--131223H1			DIST-A	0.03	Jan 07, 2014
Dec 18, 2013	1	AS	Total	Absent--131218C1		RANNEY WELL	SRC-AA		Jan 06, 2014
Dec 17, 2013	1	RT	Total	Absent--131217L1			DIST-A	0.68	Jan 06, 2014
Dec 11, 2013	1	RT	Total	Absent--131211C1			DIST-A	0.03	Jan 10, 2014
Dec 03, 2013	1	RT	Total	Absent--131203I1			DIST-A	0.72	Dec 09, 2013
Nov 26, 2013	1	RT	Total	Absent--131126M1A			DIST-A	0.03	Dec 09, 2013
Nov 19, 2013	1	RT	Total	Absent--131119L1			DIST-A	0.68	Dec 09, 2013
Nov 12, 2013	1	RT	Total	Absent--131112J1			DIST-A	0.03	Dec 06, 2013
Nov 05, 2013	1	RT	Total	Absent--131105N1			DIST-A	0.70	Dec 09, 2013
Oct 29, 2013	1	RT	Total	Absent--131029F1			DIST-A	0.03	Nov 05, 2013
Oct 22, 2013	1	RT	Total	Absent--131022F1			DIST-A	0.69	Nov 05, 2013
Oct 15, 2013	1	RT	Total	Absent--131015N1			DIST-A	0.03	Nov 06, 2013
Oct 08, 2013	1	RT	Total	Absent--131008L1			DIST-A	0.68	Nov 06, 2013
Oct 01, 2013	1	RT	Total	Absent--131001H1			DIST-A	0.03	Oct 04, 2013
Sep 24, 2013	1	RT	Total	Absent--130924Y1			DIST-A	0.69	Oct 04, 2013

Repeat
of

Sample Date	# Samples	Sample Type	Coliform Type	Results--ID	Sample ID	Sample Site	Facility	CI Residual	Receive Date
Sep 17, 2013	1	RT	Total	Absent--130917BB1			DIST-A	0.03	Oct 04, 2013
Sep 10, 2013	1	RT	Total	Absent--130910O1			DIST-A	0.70	Oct 04, 2013
Sep 03, 2013	1	RT	Total	Absent--130903Q1			DIST-A	0.03	Oct 04, 2013
Aug 27, 2013	1	RT	Total	Absent--130827N1			DIST-A	0.68	Sep 10, 2013
Aug 20, 2013	1	RT	Total	Absent--130820J1			DIST-A	0.03	Sep 10, 2013
Aug 13, 2013	1	RT	Total	Absent--130813O1			DIST-A	0.10	Sep 10, 2013
Aug 06, 2013	1	RT	Total	Absent--130806O1			DIST-A	0.03	Sep 10, 2013
Jul 30, 2013	1	RT	Total	Absent--130730L1			DIST-A	0.70	Aug 09, 2013
Jul 23, 2013	1	RT	Total	Absent--130723L1			DIST-A	0.03	Aug 09, 2013
Jul 16, 2013	1	RT	Total	Absent--130716E1		N/A	DIST-A	0.68	Jul 19, 2013
Jul 09, 2013	1	RT	Total	Absent--130709K1		N/A	DIST-A	0.03	Jul 22, 2013
Jul 02, 2013	1	RT	Total	Absent--130702J1		N/A	DIST-A	0.72	Jul 19, 2013
Jun 25, 2013	1	RT	Total	Absent--130625J1		N/A	DIST-A	0.03	Jun 28, 2013
Jun 18, 2013	1	RT	Total	Absent--130618H1		N/A	DIST-A	0.62	Jun 28, 2013
Jun 11, 2013	1	RT	Total	Absent--130611L1		N/A	DIST-A	0.03	Jun 28, 2013
Jun 04, 2013	1	RT	Total	Absent--130604M1		N/A	DIST-A	0.69	Jun 07, 2013
May 28, 2013	1	RT	Total	Absent--130528G1		N/A	DIST-A	0.03	Jun 07, 2013
May 21, 2013	1	RT	Total	Absent--130521M1		N/A	DIST-A	0.72	May 24, 2013
May 14, 2013	1	RT	Total	Absent--130514L1		N/A	DIST-A	0.03	May 16, 2013
May 07, 2013	1	RT	Total	Absent--130507M1		N/A	DIST-A	0.70	May 16, 2013

Sample Date	# Samples	Sample Type	Coliform Type	Results--ID	Repeat of Sample ID	Sample Site	Facility	CI Residual	Receive Date
Apr 30, 2013	1	RT	Total	Absent--130430F1		N/A	DIST-A	0.03	May 03, 2013
Apr 23, 2013	1	RT	Total	Absent--130423M1		N/A	DIST-A	0.70	May 03, 2013
Apr 16, 2013	1	RT	Total	Absent--130416I1		N/A	DIST-A	0.03	Apr 24, 2013
Apr 09, 2013	1	RT	Total	Absent--130409J1		N/A	DIST-A	0.72	Apr 24, 2013
Apr 02, 2013	1	RT	Total	Absent--130402N1		N/A	DIST-A	0.03	Apr 10, 2013
Mar 26, 2013	1	RT	Total	Absent--130326H1		N/A	DIST-A	0.70	Mar 27, 2013
Mar 19, 2013	1	RT	Total	Absent--130319M1		N/A	DIST-A	0.03	Mar 27, 2013
Mar 12, 2013	1	RT	Total	Absent--130312I1		N/A	DIST-A	0.70	Mar 15, 2013
Mar 05, 2013	1	RT	Total	Absent--130305K1		N/A	DIST-A	0.03	Mar 08, 2013
Feb 26, 2013	1	RT	Total	Absent--130226D1		N/A	DIST-A	0.70	Mar 06, 2013
Feb 19, 2013	1	RT	Total	Absent--130219I1		N/A	DIST-A	0.03	Feb 21, 2013
Feb 12, 2013	1	RT	Total	Absent--130212I1A		N/A	DIST-A	0.72	Feb 21, 2013
Feb 06, 2013	1	RT	Total	Absent--130206E1		N/A	DIST-A	0.03	Feb 07, 2013
Jan 29, 2013	1	RT	Total	Absent--130129M1		N/A	DIST-A	0.69	Feb 07, 2013
Jan 22, 2013	1	RT	Total	Absent--130122D1		N/A	DIST-A	0.03	Feb 07, 2013
Jan 15, 2013	1	RT	Total	Absent--130115H1		N/A	DIST-A	0.70	Jan 22, 2013
Jan 08, 2013	1	RT	Total	Absent--130108L1		N/A	DIST-A	0.03	Feb 07, 2013
Jan 03, 2013	1	RT	Total	Absent--130103L1		N/A	DIST-A	0.72	Feb 07, 2013
Dec 27, 2012	1	RT	Total	Absent--121227G1		N/A	DIST-A	0.03	Dec 31, 2012
Dec 18, 2012	1	RT	Total	Absent--121218O1		N/A	DIST-A	0.72	Dec 21, 2012

Sample Date	# Samples	Sample Type	Coliform Type	Results--ID	Repeat of Sample ID	Sample Site	Facility	CI Residual	Receive Date
Dec 11, 2012	1	RT	Total	Absent--121211P1		N/A	DIST-A	0.03	Dec 21, 2012
Dec 04, 2012	1	RT	Total	Absent--121204M1		N/A	DIST-A	0.72	Dec 12, 2012

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Nov 27, 2012	1	RT	Total	Absent--12112711	N/A	DIST-A	0.03	Dec 04, 2012
Nov 20, 2012	1	RT	Total	Absent--121120G1	N/A	DIST-A	0.72	Nov 27, 2012
Nov 13, 2012	1	RT	Total	Absent--121113E1	N/A	DIST-A	0.30	Nov 19, 2012
Nov 05, 2012	1	RT	Total	Absent--12110511	N/A	DIST-A	0.72	Nov 08, 2012
Oct 29, 2012	1	RT	Total	Absent--121029G1	N/A	DIST-A	0.03	Nov 05, 2012
Oct 22, 2012	1	RT	Total	Absent--538157	N/A	DIST-A	0.66	Oct 25, 2012
Oct 15, 2012	1	RT	Total	Absent--537794	N/A	DIST-A	0.30	Oct 18, 2012
Oct 08, 2012	1	RT	Total	Absent--537400		DIST-A	0.68	Oct 12, 2012
Oct 04, 2012	1	RT	Total	Absent--537259		DIST-A	0.03	Oct 12, 2012
Sep 24, 2012	1	RT	Total	Absent--536282	N/A	DIST-A	0.72	Oct 05, 2012
Sep 18, 2012	1	RT	Total	Absent--536030	N/A	DIST-A	0.03	Oct 05, 2012
Sep 10, 2012	1	RT	Total	Absent--535463	N/A	DIST-A	0.69	Sep 21, 2012
Sep 04, 2012	1	RT	Total	Absent--535260	N/A	DIST-A	0.03	Sep 21, 2012
Aug 28, 2012	1	RT	Total	Absent--534877		DIST-A	0.68	Aug 30, 2012
Aug 20, 2012	1	RT	Total	Absent--534466		DIST-A	0.03	Aug 28, 2012
Aug 13, 2012	1	RT	Total	Absent--534107		DIST-A	0.72	Aug 21, 2012
Aug 06, 2012	1	RT	Total	Absent--533635		DIST-A	0.03	Aug 14, 2012
Jul 30, 2012	1	RT	Total	Absent--533394		DIST-A	0.72	Aug 07, 2012

Sample Date	# Samples	Sample Type	Coliform Type	Results-ID	Repeat of Sample ID	Sample Site	Facility	CI Residual	Receive Date
Jul 23, 2012	1	RT	Total	Absent--533098			DIST-A	0.03	Jul 30, 2012
Jul 16, 2012	1	RT	Total	Absent--532725			DIST-A	0.68	Jul 30, 2012
Jul 09, 2012	1	RT	Total	Absent--532272			DIST-A	0.03	Jul 20, 2012
Jul 02, 2012	1	RT	Total	Absent--531939			DIST-A	0.74	Jul 10, 2012
Jun 25, 2012	1	RT	Total	Absent--531555			DIST-A	0.03	Jul 10, 2012
Jun 18, 2012	1	RT	Total	Absent--187071			DIST-A	0.30	Jun 29, 2012
Jun 11, 2012	1	RT	Total	Absent--530924			DIST-A	0.30	Jun 26, 2012
Jun 04, 2012	1	RT	Total	Absent--530389			DIST-A	0.98	Jun 26, 2012
May 29, 2012	1	RT	Total	Absent--530233			DIST-A	0.03	Jun 05, 2012
May 21, 2012	1	RT	Total	Absent--529940			DIST-A	0.69	May 29, 2012
May 14, 2012	1	RT	Total	Absent--529502			DIST-A	0.03	May 24, 2012
May 07, 2012	1	AS	Total	Absent--529165		Ranney well	SRC-AA		May 24, 2012
May 07, 2012	1	RT	Total	Absent--529164			DIST-A	0.72	May 24, 2012
Apr 30, 2012	1	RT	Total	Absent--528717			DIST-A	0.03	May 02, 2012
Apr 23, 2012	1	RT	Total	Absent--528482			DIST-A	0.72	May 02, 2012
Apr 16, 2012	1	RT	Total	Absent--528044			DIST-A	0.72	Apr 26, 2012
Apr 16, 2012	1	RT	Total	Absent--528043			DIST-A	0.03	Apr 26, 2012
Apr 09, 2012	1	AS	Total	Absent--527672		Ranney Well #1	SRC-AA		Apr 27, 2012
Apr 02, 2012	1	RT	Total	Absent--527274			DIST-A	0.03	Apr 27, 2012
Mar 26, 2012	1	RT	Total	Absent--527009			DIST-A	0.72	Mar 29, 2012

Sample Date	# Samples	Sample Type	Coliform Type	Results-ID	Repeat of Sample ID	Sample Site	Facility	CI Residual	Receive Date
Mar 19, 2012	1	RT	Total	Absent--526702			DIST-A	0.03	Mar 28, 2012
Mar 12, 2012	1	RT	Total	Absent--526249			DIST-A	0.63	Mar 16, 2012
Mar 05, 2012	1	RT	Total	Absent--525875			DIST-A	0.03	Mar 16, 2012
Mar 05, 2012	1	AS	Total	Absent--525874		Ranney Well 1	SRC-AA		Mar 16, 2012
Feb 27, 2012	1	RT	Total	Absent--525634			DIST-A	0.72	Mar 01, 2012
Feb 21, 2012	1	RT	Total	Absent--525426			DIST-A	0.03	Mar 01, 2012

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Feb 13, 2012	1	RT	Total	Absent--525014		DIST-A	0.72	Mar 01, 2012
Feb 06, 2012	1	AS	Total	Absent--524591		SRC-AA		Feb 28, 2012
Feb 06, 2012	1	RT	Total	Absent--524590		DIST-A	0.03	Feb 28, 2012
Jan 30, 2012	1	RT	Total	Absent--524277		DIST-A	0.72	Feb 08, 2012
Jan 23, 2012	1	RT	Total	Absent--524075		DIST-A	0.67	Feb 08, 2012
Jan 17, 2012	1	RT	Total	Absent--523852		DIST-A	0.69	Jan 24, 2012
Jan 09, 2012	1	RT	Total	Absent--523395		DIST-A	0.03	Jan 19, 2012
Jan 03, 2012	1	AS	Total	Absent--523068	well 1	SRC-AA		Jan 06, 2012
Jan 03, 2012	1	RT	Total	Absent--523067		DIST-A	0.72	Jan 06, 2012
Dec 27, 2011	1	RT	Total	Absent--522766		DIST-A	0.03	Jan 04, 2012
Dec 19, 2011	1	RT	Total	Absent--522372		DIST-A	0.69	Jan 04, 2012
Dec 12, 2011	1	RT	Total	Absent--522027		DIST-A	0.03	Dec 27, 2011
Dec 05, 2011	1	RT	Total	Absent--521451		DIST-A	0.71	Dec 27, 2011
Dec 05, 2011	1	AS	Total	Absent--521450	RAINEY WELL #1	SRC-AA		Dec 27, 2011

Sample Date	# Samples	Sample Type	Coliform Type	Results--ID	Repeat of Sample ID	Sample Site	Facility	CI Residual	Receive Date
Nov 28, 2011	1	RT	Total	Absent--521272			DIST-A	0.03	Dec 06, 2011
Nov 21, 2011	1	RT	Total	Absent--521142			DIST-A	0.69	Dec 06, 2011
Nov 14, 2011	1	RT	Total	Absent--520740			DIST-A	0.03	Nov 18, 2011
Nov 07, 2011	1	RT	Total	Absent--520370			DIST-A	0.72	Nov 18, 2011
Nov 07, 2011	1	AS	Total	Absent--520369		Ranney well #1	SRC-AA		Nov 18, 2011
Oct 31, 2011	1	RT	Total	Absent--519864			DIST-A	0.72	Nov 02, 2011
Oct 24, 2011	1	RT	Total	Absent--519573			DIST-A	0.03	Nov 10, 2011
Oct 17, 2011	1	RT	Total	Absent--519183			DIST-A		Nov 04, 2011
Oct 10, 2011	1	RT	Total	Absent--518778			DIST-A	0.03	Nov 04, 2011
Oct 03, 2011	1	AS	Total	Absent--518288			SRC-AA		Nov 04, 2011
Oct 03, 2011	1	RT	Total	Absent--518287			DIST-A	0.03	Nov 04, 2011
Sep 26, 2011	1	RT	Total	Absent--517893			DIST-A	0.72	Oct 10, 2011
Sep 19, 2011	1	RT	Total	Absent--517510			DIST-A	0.03	Oct 10, 2011
Sep 12, 2011	1	RT	Total	Absent--517104			DIST-A	0.70	Sep 15, 2011
Sep 06, 2011	1	AS	Total	Absent--516737		well #1	SRC-AA		Sep 15, 2011
Sep 06, 2011	1	RT	Total	Absent--516736			DIST-A	0.03	Sep 15, 2011
Aug 29, 2011	1	RT	Total	Absent--516381			DIST-A	0.70	Sep 07, 2011
Aug 22, 2011	1	RT	Total	Absent--516086			DIST-A	0.03	Aug 26, 2011
Aug 15, 2011	1	RT	Total	Absent--515657			DIST-A	0.72	Aug 18, 2011
Aug 08, 2011	1	RT	Total	Absent--515245			DIST-A	0.03	Aug 16, 2011

Sample Date	# Samples	Sample Type	Coliform Type	Results--ID	Repeat of Sample ID	Sample Site	Facility	CI Residual	Receive Date
Aug 01, 2011	1	RT	Total	Absent--514759			DIST-A	0.70	Aug 09, 2011
Aug 01, 2011	1	AS	Total	Absent--514758		well #1	SRC-AA		Aug 09, 2011
Jul 25, 2011	1	RT	Total	Absent--514378			DIST-A	0.03	Aug 01, 2011
Jul 18, 2011	1	RT	Total	Absent--513995			DIST-A	0.69	Aug 01, 2011
Jul 14, 2011	1	RT	Total	Absent--513900			DIST-A	0.03	Aug 01, 2011
Jul 05, 2011	1	RT	Total	Absent--513161			DIST-A	0.69	Aug 01, 2011
Jul 05, 2011	1	AS	Total	Absent--513160		rainey well #1	SRC-AA		Aug 01, 2011
Jun 27, 2011	1	RT	Total	Absent--512724			DIST-A	0.03	Jul 07, 2011
Jun 20, 2011	1	RT	Total	Absent--512421			DIST-A	0.68	Jun 27, 2011
Jun 13, 2011	1	RT	Total	Absent--511977			DIST-A	0.03	Jun 21, 2011
Jun 06, 2011	1	RT	Total	Absent--511480			DIST-A	0.69	Jun 21, 2011

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Jun 06, 2011	1	AS	Total	Absent--511479	well #1	SRC-AA	Jun 21, 2011
May 31, 2011	1	RT	Total	Absent--511221		DIST-A	0.03 Jun 08, 2011
May 23, 2011	1	RT	Total	Absent--510828		DIST-A	0.70 May 27, 2011
May 16, 2011	1	RT	Total	Absent--510410		DIST-A	0.03 May 23, 2011
May 09, 2011	1	AS	Total	Absent--510032	ranney well #1	SRC-AA	May 23, 2011
May 09, 2011	1	RT	Total	Absent--510031		DIST-A	0.69 May 23, 2011
May 02, 2011	1	RT	Total	Absent--509579		DIST-A	0.03 May 10, 2011
Apr 25, 2011	1	RT	Total	Absent--509247		DIST-A	0.67 May 09, 2011
Apr 18, 2011	1	RT	Total	Absent--508851		DIST-A	0.30 Apr 26, 2011

Sample Date	# Samples	Sample Type	Coliform Type	Results--ID	Repeat of Sample ID	Sample Site	Facility	CI Residual	Receive Date
Apr 11, 2011	1	RT	Total	Absent--508506			DIST-A	0.64	Apr 19, 2011
Apr 04, 2011	1	RT	Total	Absent--507991			DIST-A	0.03	May 10, 2011
Mar 28, 2011	1	RT	Total	Absent--507727			DIST-A	0.30	Mar 30, 2011
Mar 21, 2011	1	RT	Total	Absent--507416			DIST-A	0.03	Mar 30, 2011
Mar 14, 2011	1	RT	Total	Absent--507034			DIST-A	0.69	Mar 23, 2011
Mar 07, 2011	1	RT	Total	Absent--506529			DIST-A	0.03	Mar 23, 2011
Feb 28, 2011	1	RT	Total	Absent--506097			DIST-A	0.68	Mar 07, 2011
Feb 22, 2011	1	RT	Total	Absent--505896			DIST-A	0.03	Mar 07, 2011
Feb 14, 2011	1	RT	Total	Absent--505361			DIST-A	0.62	Mar 07, 2011
Feb 07, 2011	1	RT	Total	Absent--504873			DIST-A	0.64	Feb 14, 2011
Jan 31, 2011	1	RT	Total	Absent--504397			DIST-A	0.70	Feb 09, 2011
Jan 24, 2011	1	RT	Total	Absent--504229			DIST-A	0.03	Feb 03, 2011
Jan 18, 2011	1	RT	Total	Absent--503780			DIST-A	0.63	Jan 24, 2011
Jan 10, 2011	1	RT	Total	Absent--503317			DIST-A	0.03	Jan 18, 2011
Jan 03, 2011	1	RT	Total	Absent--502765			DIST-A	0.68	Jan 11, 2011
Dec 27, 2010	1	RT	Total	Absent--502426			DIST-A	0.03	Jan 10, 2011
Dec 20, 2010	1	RT	Total	Absent--502117			DIST-A		Dec 28, 2010
Dec 13, 2010	1	RT	Total	Absent--501661			DIST-A	0.30	Dec 17, 2010
Dec 06, 2010	1	RT	Total	Absent--501127			DIST-A	0.69	Dec 17, 2010
Nov 29, 2010	1	RT	Total	Absent--500760			DIST-A		Dec 06, 2010

Sample Date	# Samples	Sample Type	Coliform Type	Results--ID	Repeat of Sample ID	Sample Site	Facility	CI Residual	Receive Date
Nov 22, 2010	1	RT	Total	Absent--500557			DIST-A	0.77	Dec 02, 2010
Nov 15, 2010	1	RT	Total	Absent--500101			DIST-A	0.30	Nov 19, 2010
Nov 08, 2010	1	RT	Total	Absent--499616			DIST-A	0.70	Nov 12, 2010
Nov 01, 2010	1	RT	Total	Absent--499066			DIST-A	0.03	Nov 03, 2010
Oct 25, 2010	1	RT	Total	Absent--498637			DIST-A	0.66	Oct 28, 2010
Oct 18, 2010	1	RT	Total	Absent--498198			DIST-A	0.03	Oct 22, 2010
Oct 11, 2010	1	RT	Total	Absent--497673			DIST-A	0.71	Oct 14, 2010
Oct 04, 2010	1	RT	Total	Absent--497204			DIST-A	0.30	Oct 08, 2010
Sep 27, 2010	1	RT	Total	Absent--496752			DIST-A	0.71	Oct 01, 2010
Sep 20, 2010	1	RT	Total	Absent--496301			DIST-A	0.30	Sep 27, 2010
Sep 13, 2010	1	RT	Total	Absent--495817			DIST-A	0.63	Sep 16, 2010
Sep 07, 2010	1	RT	Total	Absent--495487			DIST-A		Sep 10, 2010
Aug 30, 2010	1	RT	Total	Absent--494976			DIST-A	0.70	Sep 03, 2010
Aug 23, 2010	1	RT	Total	Absent--494694			DIST-A	0.30	Aug 26, 2010
Aug 16, 2010	1	RT	Total	Absent--494118			DIST-A	0.30	Aug 20, 2010

Aug 09, 2010	1	RT	Total	Absent--493700		DIST-A	0.30	Aug 13, 2010
Aug 02, 2010	1	RT	Total	Absent--493136		DIST-A	0.68	Aug 05, 2010
Jul 28, 2010	1	RT	Total	Absent--492970		DIST-A	0.30	Aug 04, 2010
Jul 19, 2010	1	RT	Total	Absent--492207		DIST-A	0.68	Jul 22, 2010
Jul 12, 2010	1	RT	Total	Absent--491732		DIST-A	0.30	Jul 20, 2010

Sample Date	# Samples	Sample Type	Coliform Type	Results-ID	Repeat of Sample ID	Sample Site	Facility	CI Residual	Receive Date
Jul 06, 2010	1	RT	Total	Absent--491381			DIST-A	0.74	Jul 20, 2010
Jun 21, 2010	1	RT	Total	Absent--490456			DIST-A	0.68	Jul 06, 2010
Jun 20, 2010	1	RT	Total	Absent--490858			DIST-A	0.30	Jul 09, 2010
Jun 14, 2010	1	RT	Total	Absent--490076		SBE	DIST-A	0.30	Jun 28, 2010
Jun 07, 2010	1	RT	Total	Absent--489526			DIST-A	0.68	Jun 23, 2010
Jun 02, 2010	1	RT	Total	Absent--489208			DIST-A	0.30	Jun 23, 2010
May 24, 2010	1	RT	Total	Absent--488588			DIST-A	0.60	Jun 10, 2010
May 17, 2010	1	RT	Total	Absent--488085			DIST-A	0.30	Jun 01, 2010
May 10, 2010	1	RT	Total	Absent--487686			DIST-A	0.67	May 19, 2010
May 03, 2010	1	RT	Total	Absent--487209			DIST-A	0.30	May 14, 2010
Apr 26, 2010	1	RT	Total	Absent--486859			DIST-A	0.71	May 07, 2010
Apr 21, 2010	1	RT	Total	Absent--486673			DIST-A	0.30	May 03, 2010
Apr 12, 2010	1	RT	Total	Absent--485881			DIST-A	0.66	Apr 22, 2010
Apr 05, 2010	1	RT	Total	Absent--485364			DIST-A	0.30	Apr 14, 2010
Mar 29, 2010	1	RT	Total	Absent--485125			DIST-A	0.70	Apr 08, 2010
Mar 22, 2010	1	RT	Total	Absent--484781			DIST-A	0.30	Apr 08, 2010
Mar 15, 2010	1	RT	Total	Absent--484372			DIST-A	0.74	Mar 25, 2010
Mar 08, 2010	1	RT	Total	Absent--483932			DIST-A	0.30	Mar 17, 2010
Mar 01, 2010	1	RT	Total	Absent--483465			DIST-A	0.62	Mar 08, 2010
Feb 22, 2010	1	RT	Total	Absent--483121			DIST-A	0.03	Mar 05, 2010

Sample Date	# Samples	Sample Type	Coliform Type	Results-ID	Repeat of Sample ID	Sample Site	Facility	CI Residual	Receive Date
Feb 16, 2010	1	RT	Total	Absent--482814			DIST-A	0.83	Mar 05, 2010
Feb 08, 2010	1	RT	Total	Absent--482221			DIST-A	0.30	Feb 19, 2010
Feb 01, 2010	1	RT	Total	Absent--481755			DIST-A	0.68	Feb 16, 2010
Jan 25, 2010	1	RT	Total	Absent--481420			DIST-A	0.30	Feb 08, 2010
Jan 19, 2010	1	RT	Total	Absent--481132			DIST-A	0.67	Feb 04, 2010
Jan 11, 2010	1	RT	Total	Absent--480550			DIST-A	0.30	Jan 19, 2010
Jan 04, 2010	1	RT	Total	Absent--480077			DIST-A	0.73	Jan 13, 2010
Dec 28, 2009	1	RT	Total	Absent--479871			DIST-A	0.30	Jan 08, 2010
Dec 21, 2009	1	RT	Total	Absent--479580			DIST-A	0.64	Jan 08, 2010
Dec 14, 2009	1	RT	Total	Absent--479114			DIST-A	0.30	Dec 23, 2009
Dec 07, 2009	1	RT	Total	Absent--478755			DIST-A	0.59	Dec 17, 2009
Nov 30, 2009	1	RT	Total	Absent--47823			DIST-A	0.30	Dec 10, 2009
Nov 23, 2009	1	RT	Total	Absent--478058			DIST-A	0.71	Dec 10, 2009
Nov 16, 2009	1	RT	Total	Absent--477568			DIST-A	0.30	Nov 30, 2009
Nov 09, 2009	1	RT	Total	Absent--477144			DIST-A	0.58	Nov 23, 2009
Nov 02, 2009	1	RT	Total	Absent--476611			DIST-A	0.30	Nov 16, 2009
Oct 26, 2009	1	RT	Total	Absent--476276			DIST-A	0.59	Nov 06, 2009
Oct 19, 2009	1	RT	Total	Absent--475786			DIST-A	0.03	Nov 02, 2009

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Oct 12, 2009	1	RT	Total	Absent--475302			DIST-A	0.63	Oct 27, 2009
Oct 05, 2009	1	RT	Total	Absent--0910016815			DIST-A	0.03	Oct 07, 2009

Sample Date	# Samples	Sample Type	Coliform Type	Results--ID	Repeat of Sample ID	Sample Site	Facility	CI Residual	Receive Date
Sep 28, 2009	1	RT	Total	Absent--0909056210			DIST-A	0.61	Sep 30, 2009
Sep 21, 2009	1	RT	Total	Absent--090904285			DIST-A	0.30	Sep 23, 2009
Sep 14, 2009	1	RT	Total	Absent--0909031809			DIST-A	0.65	Sep 16, 2009
Sep 08, 2009	1	RT	Total	Absent--0909020514			DIST-A	0.30	Sep 10, 2009
Aug 31, 2009	1	RT	Total	Absent--0909010101			DIST-A		Sep 02, 2009
Aug 24, 2009	1	RT	Total	Absent--090824F1			DIST-A	0.30	Sep 10, 2009
Aug 17, 2009	1	RT	Total	Absent--090817C1			DIST-A	0.64	Sep 10, 2009
Aug 10, 2009	1	RT	Total	Absent--090810G1			DIST-A	0.30	Aug 21, 2009
Aug 03, 2009	1	RT	Total	Absent--090803K1			DIST-A	0.52	Aug 10, 2009
Jul 27, 2009	1	RT	Total	Absent--090727B1-1			DIST-A	0.42	Aug 03, 2009
Jul 27, 2009	1	RT	Total	Absent--090727B1-2			DIST-A	0.42	Aug 03, 2009
Jul 13, 2009	1	RT	Total	Absent--090713Q1			DIST-A	0.30	Aug 03, 2009
Jul 06, 2009	1	RT	Total	Absent--090706Q1			DIST-A	0.57	Aug 03, 2009
Jun 29, 2009	1	RT	Total	Absent--090629J1			DIST-A	0.30	Jul 10, 2009
Jun 22, 2009	1	RT	Total	Absent--090622F1			DIST-A	0.66	Jul 10, 2009
Jun 15, 2009	1	RT	Total	Absent--090615G1			DIST-A	0.30	Jul 10, 2009
Jun 08, 2009	1	RT	Total	Absent--090608D1			DIST-A	0.62	Jun 15, 2009
Jun 01, 2009	1	RT	Total	Absent--090601L1			DIST-A	0.30	Jun 09, 2009
May 26, 2009	1	RT	Total	Absent--090526C1			DIST-A	0.61	Jun 09, 2009
May 26, 2009	1	RT	Total	Absent--090526C2			DIST-A	0.30	Jun 09, 2009

Sample Date	# Samples	Sample Type	Coliform Type	Results--ID	Repeat of Sample ID	Sample Site	Facility	CI Residual	Receive Date
May 11, 2009	1	RT	Total	Absent--090511H1			DIST-A	0.70	Jun 09, 2009
May 04, 2009	1	RT	Total	Absent--090504K2			DIST-A	0.30	Jun 09, 2009
Apr 27, 2009	1	RT	Total	Absent--090427D1			DIST-A	0.65	May 08, 2009
Apr 20, 2009	1	RT	Total	Absent--090420C1			DIST-A	0.30	May 09, 2009
Apr 13, 2009	1	RT	Total	Absent--090413S1			DIST-A	0.25	Jun 09, 2009
Apr 13, 2009	1	RT	Total	Absent--090413G1			DIST-A	0.25	May 09, 2009
Apr 06, 2009	1	RT	Total	Absent--090406I1			DIST-A	0.30	Apr 10, 2009
Mar 30, 2009	1	RT	Total	Absent--090330E1			DIST-A	0.62	Apr 20, 2009
Mar 23, 2009	1	RT	Total	Absent--090323D1			DIST-A	0.30	Apr 03, 2009
Mar 16, 2009	1	RT	Total	Absent--090316D1			DIST-A	0.60	Mar 23, 2009
Mar 09, 2009	1	RT	Total	Absent--090309B11			DIST-A	0.30	Mar 16, 2009
Mar 02, 2009	1	RT	Total	Absent--090302D1			DIST-A	0.66	Apr 03, 2009
Feb 24, 2009	1	RT	Total	Absent--090224L1			DIST-A	0.03	Mar 09, 2009
Feb 17, 2009	1	RT	Total	Absent--090217G1			DIST-A	0.65	Mar 09, 2009
Feb 09, 2009	1	RT	Total	Absent--090209E1			DIST-A	0.30	Feb 13, 2009
Feb 01, 2009	1	RT	Total	Absent--090202G2			DIST-A	0.65	Feb 06, 2009
Jan 26, 2009	1	RT	Total	Absent--090126A2			DIST-A	0.30	Feb 05, 2009
Jan 21, 2009	1	RT	Total	Absent--090121J2			DIST-A	0.00	Jan 29, 2009
Jan 12, 2009	1	RT	Total	Absent--090112F2			DIST-A	0.30	Jan 22, 2009
Jan 05, 2009	1	RT	Total	Absent--090105I2			DIST-A	0.66	Jan 12, 2009

Sample	#	Sample	Coliform	Repeat of Sample	Sample	CI	Receive
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Date	Samples	Type	Type	Results-ID	ID	Site	Facility	Residual	Date
Dec 29, 2008	1	RT	Total	Absent--081229G2			DIST-A	0.30	Jan 07, 2009
Dec 22, 2008	1	RT	Total	Absent--081222A1			DIST-A	0.69	Jan 07, 2009
Dec 15, 2008	1	RT	Total	Absent--081215C1L			DIST-A	0.30	Dec 24, 2008
Dec 08, 2008	1	RT	Total	Absent--081208E1			DIST-A	0.69	Dec 15, 2008
Dec 01, 2008	1	RT	Total	Absent--081201G1			DIST-A	0.30	Dec 05, 2008
Nov 24, 2008	1	RT	Total	Absent--081124J1			DIST-A	0.73	Dec 03, 2008
Nov 17, 2008	1	RT	Total	Absent--081117D1			DIST-A	0.36	Nov 21, 2008
Nov 10, 2008	1	RT	Total	Absent--081110H1			DIST-A	0.65	Nov 21, 2008
Nov 03, 2008	1	RT	Total	Absent--081103K1			DIST-A	0.30	Nov 07, 2008
Oct 27, 2008	1	RT	Total	Absent--081027B1			DIST-A	0.58	Nov 07, 2008
Oct 20, 2008	1	RT	Total	Absent--081020D1			DIST-A	0.30	Oct 27, 2008
Oct 13, 2008	1	RT	Total	Absent--081013F1			DIST-A	0.30	Oct 23, 2008
Oct 06, 2008	1	RT	Total	Absent--081006K1			DIST-A	0.30	Oct 14, 2008
Sep 29, 2008	1	RT	Total	Absent--080929H1			DIST-A	0.30	Oct 06, 2008
Sep 22, 2008	1	RT	Total	Absent--080922D1			DIST-A	0.30	Oct 06, 2008
Sep 15, 2008	1	RT	Total	Absent--080915D1			DIST-A	0.70	Sep 24, 2008
Sep 08, 2008	1	RT	Total	Absent--080908I1			DIST-A	0.30	Sep 24, 2008
Aug 25, 2008	1	RT	Total	Absent--080825C1			DIST-A	0.70	Sep 05, 2008
Aug 18, 2008	1	RT	Total	Absent--080818D1			DIST-A	0.70	Aug 28, 2008
Aug 11, 2008	1	RT	Total	Absent--080811G1			DIST-A	0.30	Aug 28, 2008

Sample Date	# Samples	Sample Type	Coliform Type	Results-ID	Repeat of Sample ID	Sample Site	Facility	CI Residual	Receive Date
Aug 04, 2008	1	RT	Total	Absent--080804G1			DIST-A	0.73	Aug 14, 2008
Jul 29, 2008	1	RT	Total	Absent--A80730F1		SBE	DIST-A	0.30	Aug 05, 2008
Jul 26, 2008	1	RT	Total	Absent--X00813B			DIST-A	0.47	Jul 31, 2008
Jul 26, 2008	1	RT	Total	Absent--X00811B			DIST-A	0.73	Jul 31, 2008
Jul 26, 2008	1	RT	Total	Absent--X00812B			DIST-A	0.73	Jul 31, 2008
Jul 07, 2008	1	RT	Total	Absent--MO080707PJ217			DIST-A	0.30	Aug 06, 2008
Jun 30, 2008	1	RT	Total	Absent--MO080630PC25			DIST-A	0.30	Jul 07, 2008
Jun 23, 2008	1	RT	Total	Absent--MO080623PF115			DIST-A	0.30	Jul 07, 2008
Jun 16, 2008	1	RT	Total	Absent--MO080616PC13			DIST-A	0.30	Jul 02, 2008
Jun 09, 2008	1	RT	Total	Absent--MO080609PF114			DIST-A	0.50	Jul 02, 2008
Jun 02, 2008	1	RT	Total	Absent--MO080602PI217			DIST-A	0.30	Jul 02, 2008
May 27, 2008	1	RT	Total	Absent--MO080527PE216			DIST-A	0.30	Jun 02, 2008
May 19, 2008	1	RT	Total	Absent--MO080519PE16			DIST-A	0.30	May 27, 2008
May 12, 2008	1	RT	Total	Absent--MO080512PS120			DIST-A	0.30	Jun 02, 2008
May 12, 2008	1	RT	Total	Absent--MO080512PS120			DIST-A	0.30	May 27, 2008
Apr 28, 2008	1	RT	Total	Absent--MO080428PC13			DIST-A	0.30	May 07, 2008
Apr 21, 2008	1	RT	Total	Absent--M0080421PG114			DIST-A	0.30	May 01, 2008
Apr 14, 2008	1	RT	Total	Absent--MO080414PH112			DIST-A	0.30	May 02, 2008
Apr 07, 2008	1	RT	Total	Absent--M0080407PI113			DIST-A	0.30	May 01, 2008
Mar 31, 2008	1	RT	Total	Absent--M0080331PB12			DIST-A	0.30	Apr 09, 2008

Sample Date	# Samples	Sample Type	Coliform Type	Results-ID	Repeat of Sample ID	Sample Site	Facility	CI Residual	Receive Date
Mar 24, 2008	1	RT	Total	Absent--M0080324PC17			DIST-A	0.30	Mar 31, 2008
Mar 17, 2008	1	RT	Total	Absent--M0080317PJ113			DIST-A	0.30	Mar 31, 2008
Mar 13, 2008	1	RT	Total	Absent--M0080313PB12			DIST-A	0.30	Mar 31, 2008

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Mar 03, 2008	1	RT	Total	Absent--M0080303PI110	DIST-A	0.30	Mar 10, 2008
Feb 25, 2008	1	RT	Total	Absent--M0080225PE15	DIST-A	0.30	Mar 03, 2008
Feb 19, 2008	1	RT	Total	Absent--M0080219PH117	DIST-A	0.03	Feb 25, 2008
Feb 11, 2008	1	RT	Total	Absent--M0080211PG17	DIST-A	0.30	Feb 19, 2008
Feb 04, 2008	1	RT	Total	Absent--M0080204PG113	DIST-A	0.30	Feb 11, 2008
Jan 28, 2008	1	RT	Total	Absent--M0080128PA11	DIST-A	0.30	Feb 04, 2008
Jan 22, 2008	1	RT	Total	Absent--M0080122PD14	DIST-A	0.30	Jan 28, 2008
Jan 14, 2008	1	RT	Total	Absent--M0080114PH119	DIST-A	0.30	Jan 22, 2008
Jan 07, 2008	1	RT	Total	Absent--M0080107PH117	DIST-A	0.30	Jan 14, 2008
Jan 02, 2008	1	RT	Total	Absent--M0080102PE112	DIST-A	0.30	Jan 10, 2008

Recent Batch Numbers

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Sample Types: AS=Assessment, CO=Confirmation, RP=Repeat, RT=Routine, SP=Special, TG=Triggered, [Show special samples](#)


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Sample Types: AS=Assessment, CO=Confirmation, RP=Repeat, RT=Routine, SP=Special, TG=Triggered

Recent Coliform Test Results - PWS ID: 00130 ---- BOARDMAN, CITY OF

Sample Date	# Samples	Sample Type	Coliform Type	Results ID	Repeat of Sample ID	Sample Site	Facility	CI Residual	Receive Date
May 29, 2012	1	RT	Total	Absent--530233		N/A	DIST-A	0.03	Jun 05, 2012
May 21, 2012	1	RT	Total	Absent--529940		N/A	DIST-A	0.69	May 29, 2012
May 14, 2012	1	RT	Total	Absent--529502		N/A	DIST-A	0.03	May 24, 2012
May 07, 2012	1	RT	Total	Absent--529164		N/A	DIST-A	0.72	May 24, 2012
May 07, 2012	1	AS	Total	Absent--529165		Ranney well	SRC-AA		May 24, 2012
Apr 30, 2012	1	RT	Total	Absent--528717		N/A	DIST-A	0.03	May 02, 2012
Apr 23, 2012	1	RT	Total	Absent--528482		N/A	DIST-A	0.72	May 02, 2012
Apr 16, 2012	1	RT	Total	Absent--528043		N/A	DIST-A	0.03	Apr 26, 2012
Apr 16, 2012	1	RT	Total	Absent--528044		N/A	DIST-A	0.72	Apr 26, 2012
Apr 09, 2012	1	AS	Total	Absent--527672		Ranny Well #1	SRC-AA		Apr 27, 2012
Apr 02, 2012	1	RT	Total	Absent--527274		N/A	DIST-A	0.03	Apr 27, 2012
Mar 26, 2012	1	RT	Total	Absent--527009		N/A	DIST-A	0.72	Mar 29, 2012
Mar 19, 2012	1	RT	Total	Absent--526702		N/A	DIST-A	0.03	Mar 28, 2012
Mar 12, 2012	1	RT	Total	Absent--526249		N/A	DIST-A	0.63	Mar 16, 2012
Mar 05, 2012	1	AS	Total	Absent--525874		Rainney Well 1	SRC-AA		Mar 16, 2012
Mar 05, 2012	1	RT	Total	Absent--525875		N/A	DIST-A	0.03	Mar 16, 2012
Feb 27, 2012	1	RT	Total	Absent--525634		N/A	DIST-A	0.72	Mar 01, 2012
Feb 21, 2012	1	RT	Total	Absent--525426		N/A	DIST-A	0.03	Mar 01, 2012
Feb 13, 2012	1	RT	Total	Absent--525014		N/A	DIST-A	0.72	Mar 01, 2012
Feb 06, 2012	1	RT	Total	Absent--524590		N/A	DIST-A	0.03	Feb 28, 2012
Sample Date	# Samples	Sample Type	Coliform Type	Results--ID	Repeat of Sample ID	Sample Site	Facility	CI Residual	Receive Date
Feb 06, 2012	1	AS	Total	Absent--524591		N/A	SRC-AA		Feb 28, 2012
Jan 30, 2012	1	RT	Total	Absent--524277		N/A	DIST-A	0.72	Feb 08, 2012
Jan 23, 2012	1	RT	Total	Absent--524075		N/A	DIST-A	0.67	Feb 08, 2012
Jan 17, 2012	1	RT	Total	Absent--523852		N/A	DIST-A	0.69	Jan 24, 2012
Jan 09, 2012	1	RT	Total	Absent--523395		N/A	DIST-A	0.03	Jan 19, 2012
Jan 03, 2012	1	RT	Total	Absent--523067		N/A	DIST-A	0.72	Jan 06, 2012
Jan 03, 2012	1	AS	Total	Absent--523068		well 1	SRC-AA		Jan 06, 2012
Dec 27, 2011	1	RT	Total	Absent--522766		N/A	DIST-A	0.03	Jan 04, 2012
Dec 19, 2011	1	RT	Total	Absent--522372		N/A	DIST-A	0.69	Jan 04, 2012
Dec 12, 2011	1	RT	Total	Absent--522027		N/A	DIST-A	0.03	Dec 27, 2011
Dec 05, 2011	1	AS	Total	Absent--521450		RAINEY WELL #1	SRC-AA		Dec 27, 2011
Dec 05, 2011	1	RT	Total	Absent--521451		N/A	DIST-A	0.71	Dec 27, 2011
Nov 28, 2011	1	RT	Total	Absent--521272		N/A	DIST-A	0.03	Dec 06, 2011
Nov 21, 2011	1	RT	Total	Absent--521142		N/A	DIST-A	0.69	Dec 06, 2011
Nov 14, 2011	1	RT	Total	Absent--520740		N/A	DIST-A	0.03	Nov 18, 2011
Nov 07, 2011	1	AS	Total	Absent--520369		Ranney well #1	SRC-AA		Nov 18, 2011

Nov 07, 2011	1	RT	Total	Absent--520370	N/A	DIST-A	0.72	Nov 18, 2011
Oct 31, 2011	1	RT	Total	Absent--519864	N/A	DIST-A	0.72	Nov 02, 2011
Oct 24, 2011	1	RT	Total	Absent--519573	N/A	DIST-A	0.03	Nov 10, 2011
Oct 17, 2011	1	RT	Total	Absent--519183	N/A	DIST-A		Nov 04, 2011

Sample Date	# Samples	Sample Type	Coliform Type	Results--ID	Repeat of Sample ID	Sample Site	Facility	CI Residual	Receive Date
Oct 10, 2011	1	RT	Total	Absent--518778		N/A	DIST-A	0.03	Nov 04, 2011
Oct 03, 2011	1	RT	Total	Absent--518287		N/A	DIST-A	0.03	Nov 04, 2011
Oct 03, 2011	1	AS	Total	Absent--518288		N/A	SRC-AA		Nov 04, 2011
Sep 26, 2011	1	RT	Total	Absent--517893		N/A	DIST-A	0.72	Oct 10, 2011
Sep 19, 2011	1	RT	Total	Absent--517510		N/A	DIST-A	0.03	Oct 10, 2011
Sep 12, 2011	1	RT	Total	Absent--517104		N/A	DIST-A	0.70	Sep 15, 2011
Sep 06, 2011	1	RT	Total	Absent--516736		N/A	DIST-A	0.03	Sep 15, 2011
Sep 06, 2011	1	AS	Total	Absent--516737		well #1	SRC-AA		Sep 15, 2011
Aug 29, 2011	1	RT	Total	Absent--516381		N/A	DIST-A	0.70	Sep 07, 2011
Aug 22, 2011	1	RT	Total	Absent--516086		N/A	DIST-A	0.03	Aug 26, 2011
Aug 15, 2011	1	RT	Total	Absent--515657		N/A	DIST-A	0.72	Aug 18, 2011
Aug 08, 2011	1	RT	Total	Absent--515245		N/A	DIST-A	0.03	Aug 16, 2011
Aug 01, 2011	1	AS	Total	Absent--514758		well #1	SRC-AA		Aug 09, 2011
Aug 01, 2011	1	RT	Total	Absent--514759		N/A	DIST-A	0.70	Aug 09, 2011
Jul 25, 2011	1	RT	Total	Absent--514378		N/A	DIST-A	0.03	Aug 01, 2011
Jul 18, 2011	1	RT	Total	Absent--513995		N/A	DIST-A	0.69	Aug 01, 2011
Jul 14, 2011	1	RT	Total	Absent--513900		N/A	DIST-A	0.03	Aug 01, 2011
Jul 05, 2011	1	AS	Total	Absent--513160		rainey well #1	SRC-AA		Aug 01, 2011
Jul 05, 2011	1	RT	Total	Absent--513161		N/A	DIST-A	0.69	Aug 01, 2011
Jun 27, 2011	1	RT	Total	Absent--512724		N/A	DIST-A	0.03	Jul 07, 2011

Sample Date	# Samples	Sample Type	Coliform Type	Results--ID	Repeat of Sample ID	Sample Site	Facility	CI Residual	Receive Date
Jun 20, 2011	1	RT	Total	Absent--512421		N/A	DIST-A	0.68	Jun 27, 2011
Jun 13, 2011	1	RT	Total	Absent--511977		N/A	DIST-A	0.03	Jun 21, 2011
Jun 06, 2011	1	AS	Total	Absent--511479		well #1	SRC-AA		Jun 21, 2011
Jun 06, 2011	1	RT	Total	Absent--511480		N/A	DIST-A	0.69	Jun 21, 2011
May 31, 2011	1	RT	Total	Absent--511221		N/A	DIST-A	0.03	Jun 08, 2011
May 23, 2011	1	RT	Total	Absent--510828		N/A	DIST-A	0.70	May 27, 2011
May 16, 2011	1	RT	Total	Absent--510410		N/A	DIST-A	0.03	May 23, 2011
May 09, 2011	1	RT	Total	Absent--510031		N/A	DIST-A	0.69	May 23, 2011
May 09, 2011	1	AS	Total	Absent--510032		ranney well #1	SRC-AA		May 23, 2011
May 02, 2011	1	RT	Total	Absent--509579		N/A	DIST-A	0.03	May 10, 2011
Apr 25, 2011	1	RT	Total	Absent--509247		N/A	DIST-A	0.67	May 09, 2011
Apr 18, 2011	1	RT	Total	Absent--508851		N/A	DIST-A	0.30	Apr 26, 2011
Apr 11, 2011	1	RT	Total	Absent--508506		N/A	DIST-A	0.64	Apr 19, 2011
Apr 04, 2011	1	RT	Total	Absent--507991		N/A	DIST-A	0.03	May 10, 2011
Mar 28, 2011	1	RT	Total	Absent--507727		N/A	DIST-A	0.30	Mar 30, 2011
Mar 21, 2011	1	RT	Total	Absent--507416		N/A	DIST-A	0.03	Mar 30, 2011
Mar 14, 2011	1	RT	Total	Absent--507034		N/A	DIST-A	0.69	Mar 23, 2011
Mar 07, 2011	1	RT	Total	Absent--506529		N/A	DIST-A	0.03	Mar 23, 2011

Feb 28, 2011	1	RT	Total	Absent--506097	N/A	DIST-A	0.68	Mar 07, 2011
Feb 22, 2011	1	RT	Total	Absent--505896	N/A	DIST-A	0.03	Mar 07, 2011

Sample Date	# Samples	Sample Type	Coliform Type	Results--ID	Repeat of Sample ID	Sample Site	Facility	CI Residual	Receive Date
Feb 14, 2011	1	RT	Total	Absent--505361		N/A	DIST-A	0.62	Mar 07, 2011
Feb 07, 2011	1	RT	Total	Absent--504873		N/A	DIST-A	0.64	Feb 14, 2011
Jan 31, 2011	1	RT	Total	Absent--504397		N/A	DIST-A	0.70	Feb 09, 2011
Jan 24, 2011	1	RT	Total	Absent--504229		N/A	DIST-A	0.03	Feb 03, 2011
Jan 18, 2011	1	RT	Total	Absent--503780		N/A	DIST-A	0.63	Jan 24, 2011
Jan 10, 2011	1	RT	Total	Absent--503317		N/A	DIST-A	0.03	Jan 18, 2011
Jan 03, 2011	1	RT	Total	Absent--502765		N/A	DIST-A	0.68	Jan 11, 2011
Dec 27, 2010	1	RT	Total	Absent--502426		N/A	DIST-A	0.03	Jan 10, 2011
Dec 20, 2010	1	RT	Total	Absent--502117		N/A	DIST-A		Dec 28, 2010
Dec 13, 2010	1	RT	Total	Absent--501661		N/A	DIST-A	0.30	Dec 17, 2010
Dec 06, 2010	1	RT	Total	Absent--501127		N/A	DIST-A	0.69	Dec 17, 2010
Nov 29, 2010	1	RT	Total	Absent--500760		N/A	DIST-A		Dec 06, 2010
Nov 22, 2010	1	RT	Total	Absent--500557		N/A	DIST-A	0.77	Dec 02, 2010
Nov 15, 2010	1	RT	Total	Absent--500101		N/A	DIST-A	0.30	Nov 19, 2010
Nov 08, 2010	1	RT	Total	Absent--499616		N/A	DIST-A	0.70	Nov 12, 2010
Nov 01, 2010	1	RT	Total	Absent--499066		N/A	DIST-A	0.03	Nov 03, 2010
Oct 25, 2010	1	RT	Total	Absent--498637		N/A	DIST-A	0.66	Oct 28, 2010
Oct 18, 2010	1	RT	Total	Absent--498198		N/A	DIST-A	0.03	Oct 22, 2010
Oct 11, 2010	1	RT	Total	Absent--497673		N/A	DIST-A	0.71	Oct 14, 2010
Oct 04, 2010	1	RT	Total	Absent--497204		N/A	DIST-A	0.30	Oct 08, 2010

Sample Date	# Samples	Sample Type	Coliform Type	Results--ID	Repeat of Sample ID	Sample Site	Facility	CI Residual	Receive Date
Sep 27, 2010	1	RT	Total	Absent--496752		N/A	DIST-A	0.71	Oct 01, 2010
Sep 20, 2010	1	RT	Total	Absent--496301		N/A	DIST-A	0.30	Sep 27, 2010
Sep 13, 2010	1	RT	Total	Absent--495817		N/A	DIST-A	0.63	Sep 16, 2010
Sep 07, 2010	1	RT	Total	Absent--495487		N/A	DIST-A		Sep 10, 2010
Aug 30, 2010	1	RT	Total	Absent--494976		N/A	DIST-A	0.70	Sep 03, 2010
Aug 23, 2010	1	RT	Total	Absent--494694		N/A	DIST-A	0.30	Aug 26, 2010
Aug 16, 2010	1	RT	Total	Absent--494118		N/A	DIST-A	0.30	Aug 20, 2010
Aug 09, 2010	1	RT	Total	Absent--493700		N/A	DIST-A	0.30	Aug 13, 2010
Aug 02, 2010	1	RT	Total	Absent--493136		N/A	DIST-A	0.68	Aug 05, 2010
Jul 28, 2010	1	RT	Total	Absent--492970		N/A	DIST-A	0.30	Aug 04, 2010
Jul 19, 2010	1	RT	Total	Absent--492207		N/A	DIST-A	0.68	Jul 22, 2010
Jul 12, 2010	1	RT	Total	Absent--491732		N/A	DIST-A	0.30	Jul 20, 2010
Jul 06, 2010	1	RT	Total	Absent--491381		N/A	DIST-A	0.74	Jul 20, 2010
Jun 21, 2010	1	RT	Total	Absent--490456		N/A	DIST-A	0.68	Jul 06, 2010
Jun 20, 2010	1	RT	Total	Absent--490858		N/A	DIST-A	0.30	Jul 09, 2010
Jun 14, 2010	1	RT	Total	Absent--490076		SBE	DIST-A	0.30	Jun 28, 2010
Jun 07, 2010	1	RT	Total	Absent--489526		N/A	DIST-A	0.68	Jun 23, 2010
Jun 02, 2010	1	RT	Total	Absent--489208		N/A	DIST-A	0.30	Jun 23, 2010
May 24, 2010	1	RT	Total	Absent--488588		N/A	DIST-A	0.60	Jun 10, 2010
May 17, 2010	1	RT	Total	Absent--488085		N/A	DIST-A	0.30	Jun 01, 2010

Sample Date	# Samples	Sample Type	Coliform Type	Results--ID	Repeat of Sample ID	Sample Site	Facility	CI Residual	Receive Date
May 10, 2010	1	RT	Total	Absent--487686		N/A	DIST-A	0.67	May 19, 2010
May 03, 2010	1	RT	Total	Absent--487209		N/A	DIST-A	0.30	May 14, 2010
Apr 26, 2010	1	RT	Total	Absent--486859		N/A	DIST-A	0.71	May 07, 2010
Apr 21, 2010	1	RT	Total	Absent--486673		N/A	DIST-A	0.30	May 03, 2010
Apr 12, 2010	1	RT	Total	Absent--485881		N/A	DIST-A	0.66	Apr 22, 2010
Apr 05, 2010	1	RT	Total	Absent--485364		N/A	DIST-A	0.30	Apr 14, 2010
Mar 29, 2010	1	RT	Total	Absent--485125		N/A	DIST-A	0.70	Apr 08, 2010
Mar 22, 2010	1	RT	Total	Absent--484781		N/A	DIST-A	0.30	Apr 08, 2010
Mar 15, 2010	1	RT	Total	Absent--484372		N/A	DIST-A	0.74	Mar 25, 2010
Mar 08, 2010	1	RT	Total	Absent--483932		N/A	DIST-A	0.30	Mar 17, 2010
Mar 01, 2010	1	RT	Total	Absent--483465		N/A	DIST-A	0.62	Mar 08, 2010
Feb 22, 2010	1	RT	Total	Absent--483121		N/A	DIST-A	0.03	Mar 05, 2010
Feb 16, 2010	1	RT	Total	Absent--482814		N/A	DIST-A	0.83	Mar 05, 2010
Feb 08, 2010	1	RT	Total	Absent--482221		N/A	DIST-A	0.30	Feb 19, 2010
Feb 01, 2010	1	RT	Total	Absent--481755		N/A	DIST-A	0.68	Feb 16, 2010
Jan 25, 2010	1	RT	Total	Absent--481420		N/A	DIST-A	0.30	Feb 08, 2010
Jan 19, 2010	1	RT	Total	Absent--481132		N/A	DIST-A	0.67	Feb 04, 2010
Jan 11, 2010	1	RT	Total	Absent--480550		N/A	DIST-A	0.30	Jan 19, 2010
Jan 04, 2010	1	RT	Total	Absent--480077		N/A	DIST-A	0.73	Jan 13, 2010
Dec 28, 2009	1	RT	Total	Absent--479871		N/A	DIST-A	0.30	Jan 08, 2010

Sample Date	# Samples	Sample Type	Coliform Type	Results--ID	Repeat of Sample ID	Sample Site	Facility	CI Residual	Receive Date
Dec 21, 2009	1	RT	Total	Absent--479580		N/A	DIST-A	0.64	Jan 08, 2010
Dec 14, 2009	1	RT	Total	Absent--479114		N/A	DIST-A	0.30	Dec 23, 2009
Dec 07, 2009	1	RT	Total	Absent--478755		N/A	DIST-A	0.59	Dec 17, 2009
Nov 30, 2009	1	RT	Total	Absent--47823		N/A	DIST-A	0.30	Dec 10, 2009
Nov 23, 2009	1	RT	Total	Absent--478058		N/A	DIST-A	0.71	Dec 10, 2009
Nov 16, 2009	1	RT	Total	Absent--477568		N/A	DIST-A	0.30	Nov 30, 2009
Nov 09, 2009	1	RT	Total	Absent--477144		N/A	DIST-A	0.58	Nov 23, 2009
Nov 02, 2009	1	RT	Total	Absent--476611		N/A	DIST-A	0.30	Nov 16, 2009
Oct 26, 2009	1	RT	Total	Absent--476276		N/A	DIST-A	0.59	Nov 06, 2009
Oct 19, 2009	1	RT	Total	Absent--475786		N/A	DIST-A	0.03	Nov 02, 2009
Oct 12, 2009	1	RT	Total	Absent--475302		N/A	DIST-A	0.63	Oct 27, 2009
Oct 05, 2009	1	RT	Total	Absent--0910016815		N/A	DIST-A	0.03	Oct 07, 2009
Sep 28, 2009	1	RT	Total	Absent--0909056210		N/A	DIST-A	0.61	Sep 30, 2009
Sep 21, 2009	1	RT	Total	Absent--090904285		N/A	DIST-A	0.30	Sep 23, 2009
Sep 14, 2009	1	RT	Total	Absent--0909031809		N/A	DIST-A	0.65	Sep 16, 2009
Sep 08, 2009	1	RT	Total	Absent--0909020514		N/A	DIST-A	0.30	Sep 10, 2009
Aug 31, 2009	1	RT	Total	Absent--0909010101		N/A	DIST-A		Sep 02, 2009
Aug 24, 2009	1	RT	Total	Absent--090824F1		N/A	DIST-A	0.30	Sep 10, 2009
Aug 17, 2009	1	RT	Total	Absent--090817C1		N/A	DIST-A	0.64	Sep 10, 2009
Aug 10, 2009	1	RT	Total	Absent--090810G1		N/A	DIST-A	0.30	Aug 21, 2009

Sample	#	Sample	Coliform	Repeat of Sample	Sample	CI	Receive
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Date	Samples	Type	Type	Results--ID	ID	Site	Facility	Residual	Date
Aug 03, 2009	1	RT	Total	Absent--090803K1		N/A	DIST-A	0.52	Aug 10, 2009
Jul 27, 2009	1	RT	Total	Absent--090727B1-2		N/A	DIST-A	0.42	Aug 03, 2009
Jul 27, 2009	1	RT	Total	Absent--090727B1-1		N/A	DIST-A	0.42	Aug 03, 2009
Jul 13, 2009	1	RT	Total	Absent--090713Q1		N/A	DIST-A	0.30	Aug 03, 2009
Jul 06, 2009	1	RT	Total	Absent--090706Q1		N/A	DIST-A	0.57	Aug 03, 2009
Jun 29, 2009	1	RT	Total	Absent--090629J1		N/A	DIST-A	0.30	Jul 10, 2009
Jun 22, 2009	1	RT	Total	Absent--090622F1		N/A	DIST-A	0.66	Jul 10, 2009
Jun 15, 2009	1	RT	Total	Absent--090615G1		N/A	DIST-A	0.30	Jul 10, 2009
Jun 08, 2009	1	RT	Total	Absent--090608D1		N/A	DIST-A	0.62	Jun 15, 2009
Jun 01, 2009	1	RT	Total	Absent--090601L1		N/A	DIST-A	0.30	Jun 09, 2009
May 26, 2009	1	RT	Total	Absent--090526C2		N/A	DIST-A	0.30	Jun 09, 2009
May 26, 2009	1	RT	Total	Absent--090526C1		N/A	DIST-A	0.61	Jun 09, 2009
May 11, 2009	1	RT	Total	Absent--090511H1		N/A	DIST-A	0.70	Jun 09, 2009
May 04, 2009	1	RT	Total	Absent--090504K2		N/A	DIST-A	0.30	Jun 09, 2009
Apr 27, 2009	1	RT	Total	Absent--090427D1		N/A	DIST-A	0.65	May 08, 2009
Apr 20, 2009	1	RT	Total	Absent--090420C1		N/A	DIST-A	0.30	May 09, 2009
Apr 13, 2009	1	RT	Total	Absent--090413G1		N/A	DIST-A	0.25	May 09, 2009
Apr 13, 2009	1	RT	Total	Absent--090413S1		N/A	DIST-A	0.25	Jun 09, 2009
Apr 06, 2009	1	RT	Total	Absent--090406I1		N/A	DIST-A	0.30	Apr 10, 2009
Mar 30, 2009	1	RT	Total	Absent--090330E1		N/A	DIST-A	0.62	Apr 20, 2009

Sample Date	# Samples	Sample Type	Coliform Type	Results--ID	Repeat of Sample ID	Sample Site	Facility	CI Residual	Receive Date
Mar 23, 2009	1	RT	Total	Absent--090323D1		N/A	DIST-A	0.30	Apr 03, 2009
Mar 16, 2009	1	RT	Total	Absent--090316D1		N/A	DIST-A	0.60	Mar 23, 2009
Mar 09, 2009	1	RT	Total	Absent--090309B11		N/A	DIST-A	0.30	Mar 16, 2009
Mar 02, 2009	1	RT	Total	Absent--090302D1		N/A	DIST-A	0.66	Apr 03, 2009
Feb 24, 2009	1	RT	Total	Absent--090224L1		N/A	DIST-A	0.03	Mar 09, 2009
Feb 17, 2009	1	RT	Total	Absent--090217G1		N/A	DIST-A	0.65	Mar 09, 2009
Feb 09, 2009	1	RT	Total	Absent--090209E1		N/A	DIST-A	0.30	Feb 13, 2009
Feb 01, 2009	1	RT	Total	Absent--090202G2		N/A	DIST-A	0.65	Feb 06, 2009
Jan 26, 2009	1	RT	Total	Absent--090126A2		N/A	DIST-A	0.30	Feb 05, 2009
Jan 21, 2009	1	RT	Total	Absent--090121J2		N/A	DIST-A	0.00	Jan 29, 2009
Jan 12, 2009	1	RT	Total	Absent--090112F2		N/A	DIST-A	0.30	Jan 22, 2009
Jan 05, 2009	1	RT	Total	Absent--090105I2		N/A	DIST-A	0.66	Jan 12, 2009
Dec 29, 2008	1	RT	Total	Absent--081229G2		N/A	DIST-A	0.30	Jan 07, 2009
Dec 22, 2008	1	RT	Total	Absent--081222A1		N/A	DIST-A	0.69	Jan 07, 2009
Dec 15, 2008	1	RT	Total	Absent--081215C1L		N/A	DIST-A	0.30	Dec 24, 2008
Dec 08, 2008	1	RT	Total	Absent--081208E1		N/A	DIST-A	0.69	Dec 15, 2008
Dec 01, 2008	1	RT	Total	Absent--081201G1		N/A	DIST-A	0.30	Dec 05, 2008
Nov 24, 2008	1	RT	Total	Absent--081124J1		N/A	DIST-A	0.73	Dec 03, 2008
Nov 17, 2008	1	RT	Total	Absent--081117D1		N/A	DIST-A	0.36	Nov 21, 2008
Nov 10, 2008	1	RT	Total	Absent--081110H1		N/A	DIST-A	0.65	Nov 21, 2008

Sample Date	# Samples	Sample Type	Coliform Type	Results--ID	Repeat of Sample ID	Sample Site	Facility	CI Residual	Receive Date
Nov 03, 2008	1	RT	Total	Absent--081103K1		N/A	DIST-A	0.30	Nov 07, 2008

Oct 27, 2008	1	RT	Total	Absent--081027B1	N/A	DIST-A	0.58	Nov 07, 2008
Oct 20, 2008	1	RT	Total	Absent--081020D1	N/A	DIST-A	0.30	Oct 27, 2008
Oct 13, 2008	1	RT	Total	Absent--081013F1	N/A	DIST-A	0.30	Oct 23, 2008
Oct 06, 2008	1	RT	Total	Absent--081006K1	N/A	DIST-A	0.30	Oct 14, 2008
Sep 29, 2008	1	RT	Total	Absent--080929H1	N/A	DIST-A	0.30	Oct 06, 2008
Sep 22, 2008	1	RT	Total	Absent--080922D1	N/A	DIST-A	0.30	Oct 06, 2008
Sep 15, 2008	1	RT	Total	Absent--080915D1	N/A	DIST-A	0.70	Sep 24, 2008
Sep 08, 2008	1	RT	Total	Absent--080908I1	N/A	DIST-A	0.30	Sep 24, 2008
Aug 25, 2008	1	RT	Total	Absent--080825C1	N/A	DIST-A	0.70	Sep 05, 2008
Aug 18, 2008	1	RT	Total	Absent--080818D1	N/A	DIST-A	0.70	Aug 28, 2008
Aug 11, 2008	1	RT	Total	Absent--080811G1	N/A	DIST-A	0.30	Aug 28, 2008
Aug 04, 2008	1	RT	Total	Absent--080804G1	N/A	DIST-A	0.73	Aug 14, 2008
Jul 29, 2008	1	RT	Total	Absent--A80730F1	SBE	DIST-A	0.30	Aug 05, 2008
Jul 26, 2008	1	RT	Total	Absent--X00812B	N/A	DIST-A	0.73	Jul 31, 2008
Jul 26, 2008	1	RT	Total	Absent--X00811B	N/A	DIST-A	0.73	Jul 31, 2008
Jul 26, 2008	1	RT	Total	Absent--X00813B	N/A	DIST-A	0.47	Jul 31, 2008
Jul 07, 2008	1	RT	Total	Absent--MO080707PJ217	N/A	DIST-A	0.30	Aug 06, 2008
Jun 30, 2008	1	RT	Total	Absent--MO080630PC25	N/A	DIST-A	0.30	Jul 07, 2008
Jun 23, 2008	1	RT	Total	Absent--MO080623PF115	N/A	DIST-A	0.30	Jul 07, 2008

Sample Date	# Samples	Sample Type	Coliform Type	Results--ID	Repeat of Sample ID	Sample Site	Facility	CI Residual	Receive Date
Jun 16, 2008	1	RT	Total	Absent--MO080616PC13		N/A	DIST-A	0.30	Jul 02, 2008
Jun 09, 2008	1	RT	Total	Absent--MO080609PF114		N/A	DIST-A	0.50	Jul 02, 2008
Jun 02, 2008	1	RT	Total	Absent--MO080602PI217		N/A	DIST-A	0.30	Jul 02, 2008
May 27, 2008	1	RT	Total	Absent--MO080527PE216		N/A	DIST-A	0.30	Jun 02, 2008
May 19, 2008	1	RT	Total	Absent--MO080519PE16		N/A	DIST-A	0.30	May 27, 2008
May 12, 2008	1	RT	Total	Absent--MO080512PS120		N/A	DIST-A	0.30	May 27, 2008
May 12, 2008	1	RT	Total	Absent--MO080512PS120		N/A	DIST-A	0.30	Jun 02, 2008
Apr 28, 2008	1	RT	Total	Absent--MO080428PC13		N/A	DIST-A	0.30	May 07, 2008
Apr 21, 2008	1	RT	Total	Absent--M0080421PG114		N/A	DIST-A	0.30	May 01, 2008
Apr 14, 2008	1	RT	Total	Absent--MO080414PH112		N/A	DIST-A	0.30	May 02, 2008
Apr 07, 2008	1	RT	Total	Absent--M0080407PI113		N/A	DIST-A	0.30	May 01, 2008
Mar 31, 2008	1	RT	Total	Absent--M0080331PB12		N/A	DIST-A	0.30	Apr 09, 2008
Mar 24, 2008	1	RT	Total	Absent--M0080324PC17		N/A	DIST-A	0.30	Mar 31, 2008
Mar 17, 2008	1	RT	Total	Absent--M0080317PJ113		N/A	DIST-A	0.30	Mar 31, 2008
Mar 13, 2008	1	RT	Total	Absent--M0080313PB12		N/A	DIST-A	0.30	Mar 31, 2008
Mar 03, 2008	1	RT	Total	Absent--M0080303PI110		N/A	DIST-A	0.30	Mar 10, 2008
Feb 25, 2008	1	RT	Total	Absent--M0080225PE15		N/A	DIST-A	0.30	Mar 03, 2008
Feb 19, 2008	1	RT	Total	Absent--M0080219PH117		N/A	DIST-A	0.03	Feb 25, 2008
Feb 11, 2008	1	RT	Total	Absent--M0080211PG17		N/A	DIST-A	0.30	Feb 19, 2008
Feb 04, 2008	1	RT	Total	Absent--M0080204PG113		N/A	DIST-A	0.30	Feb 11, 2008

Sample Date	# Samples	Sample Type	Coliform Type	Results--ID	Repeat of Sample ID	Sample Site	Facility	CI Residual	Receive Date
Jan 28, 2008	1	RT	Total	Absent--M0080128PA11		N/A	DIST-A	0.30	Feb 04, 2008
Jan 22, 2008	1	RT	Total	Absent--M0080122PD14		N/A	DIST-A	0.30	Jan 28, 2008
Jan 14, 2008	1	RT	Total	Absent--M0080114PH119		N/A	DIST-A	0.30	Jan 22, 2008

Jan 07, 2008	1	RT	Total	Absent--M0080107PH117	N/A	DIST-A	0.30	Jan 14, 2008
Jan 02, 2008	1	RT	Total	Absent--M0080102PE112	N/A	DIST-A	0.30	Jan 10, 2008
Dec 26, 2007	1	RT	Total	Absent--M0071226PA11	N/A	DIST-A	0.30	Dec 31, 2007
Dec 17, 2007	1	RT	Total	Absent--M0071217PF129	N/A	DIST-A	0.30	Dec 24, 2007
Dec 10, 2007	1	RT	Total	Absent--M0071210PG17	N/A	DIST-A	0.30	Dec 17, 2007
Dec 03, 2007	1	RT	Total	Absent--M0071203PN126	N/A	DIST-A	0.30	Dec 11, 2007
Nov 26, 2007	1	RT	Total	Absent--M0071126PF16	N/A	DIST-A	0.30	Dec 03, 2007
Nov 19, 2007	1	RT	Total	Absent--M0071119PD18	N/A	DIST-A	0.30	Nov 23, 2007
Nov 13, 2007	1	RT	Total	Absent--M0071113PJ111	N/A	DIST-A	0.30	Nov 21, 2007
Nov 05, 2007	1	RT	Total	Absent--M0071105PL118	N/A	DIST-A	0.30	Nov 13, 2007
Oct 29, 2007	1	RT	Total	Absent--M0071029PD14	N/A	DIST-A	0.30	Nov 05, 2007
Oct 22, 2007	1	RT	Total	Absent--M0071022PC1L6	N/A	DIST-A		Oct 31, 2007
Oct 15, 2007	1	RT	Total	Absent--M0071015PF16	N/A	DIST-A	0.30	Oct 19, 2007
Oct 08, 2007	1	RT	Total	Absent--M0071008PC14	N/A	DIST-A	0.30	Oct 15, 2007
Oct 01, 2007	1	RT	Total	Absent--M0071001PJ117	N/A	DIST-A	0.30	Oct 09, 2007
Sep 24, 2007	1	RT	Total	Absent--M0070924PH110	N/A	DIST-A	0.30	Oct 01, 2007
Sep 17, 2007	1	RT	Total	Absent--M0070917PD16	N/A	DIST-A	0.30	Sep 24, 2007

Sample Date	# Samples	Sample Type	Coliform Type	Results--ID	Repeat of Sample ID	Sample Site	Facility	CI Residual	Receive Date
Sep 10, 2007	1	RT	Total	Absent--M0070910PB16		N/A	DIST-A	0.30	Sep 17, 2007
Sep 04, 2007	1	RT	Total	Absent--M0070904PK121		N/A	DIST-A	0.30	Sep 10, 2007
Aug 27, 2007	1	RT	Total	Absent--M0070827PD15		N/A	DIST-A	0.30	Sep 06, 2007
Aug 20, 2007	1	RT	Total	Absent--M0070820PD16		N/A	DIST-A	0.30	Aug 27, 2007
Aug 13, 2007	1	RT	Total	Absent--M0070813PH119		N/A	DIST-A	0.30	Aug 20, 2007
Aug 06, 2007	1	RT	Total	Absent--M0070806PN121		N/A	DIST-A	0.30	Aug 13, 2007
Jul 30, 2007	1	RT	Total	Absent--M0070730PA11		N/A	DIST-A	0.30	Aug 06, 2007
Jul 23, 2007	1	RT	Total	Absent--M0070723PC112		N/A	DIST-A	0.30	Aug 01, 2007
Jul 16, 2007	1	RT	Total	Absent--M0070716PC14		N/A	DIST-A	0.30	Jul 23, 2007
Jul 09, 2007	1	RT	Total	Absent--M0070709PI113		N/A	DIST-A	0.30	Jul 16, 2007
Jul 02, 2007	1	RT	Total	Absent--M0070702PP134		N/A	DIST-A	0.30	Jul 09, 2007
Jun 26, 2007	1	RT	Total	Absent--M0070626PQ121		N/A	DIST-A	0.30	Jul 05, 2007
Jun 18, 2007	1	RT	Total	Absent--M0070618PE115		N/A	DIST-A	0.30	Jun 25, 2007
Jun 11, 2007	1	RT	Total	Absent--M0070611PH117		N/A	DIST-A	0.30	Jun 18, 2007
Jun 04, 2007	1	RT	Total	Absent--M0070604PHIL15		N/A	DIST-A		Jun 11, 2007
May 29, 2007	1	RT	Total	Absent--M0070529PC13		N/A	DIST-A	0.30	Jun 04, 2007
May 21, 2007	1	RT	Total	Absent--M0070521PF16		N/A	DIST-A	0.30	May 29, 2007
May 14, 2007	1	RT	Total	Absent--M0070514PC13		N/A	DIST-A	0.30	May 21, 2007
May 07, 2007	1	RT	Total	Absent--M0070507PE110		N/A	DIST-A	0.30	May 14, 2007
Apr 30, 2007	1	RT	Total	Absent--M0070430PE17		N/A	DIST-A	0.30	May 07, 2007

Sample Date	# Samples	Sample Type	Coliform Type	Results--ID	Repeat of Sample ID	Sample Site	Facility	CI Residual	Receive Date
Apr 23, 2007	1	RT	Total	Absent--M0070423PE112		N/A	DIST-A	0.30	May 02, 2007
Apr 16, 2007	1	RT	Total	Absent--M0070416PD19		N/A	DIST-A	0.30	Apr 23, 2007
Apr 09, 2007	1	RT	Total	Absent--M0070409PH113		N/A	DIST-A	0.30	Apr 16, 2007
Apr 02, 2007	1	RT	Total	Absent--M0070402PH111		N/A	DIST-A	0.30	Apr 09, 2007
Mar 26, 2007	1	RT	Total	Absent--M070326PD15		N/A	DIST-A	0.30	Apr 02, 2007

Mar 19, 2007	1	RT	Total	Absent--M0070319PB12	N/A	DIST-A	0.30	Mar 26, 2007
Mar 12, 2007	1	RT	Total	Absent--M0070312PC13	N/A	DIST-A	0.30	Mar 19, 2007
Mar 05, 2007	1	RT	Total	Absent--M0070305PE17	N/A	DIST-A	0.30	Mar 14, 2007
Feb 26, 2007	1	RT	Total	Absent--M0070226PD14	N/A	DIST-A	0.30	Mar 05, 2007
Feb 21, 2007	1	RT	Total	Absent--M0070221PL121	N/A	DIST-A	0.30	Feb 26, 2007
Feb 12, 2007	1	RT	Total	Absent--M0070212PC13	N/A	DIST-A	0.30	Feb 20, 2007
Feb 05, 2007	1	RT	Total	Absent--M0070205PE16	N/A	DIST-A	0.30	Feb 12, 2007
Jan 29, 2007	1	RT	Total	Absent--M0070129PB12	N/A	DIST-A	0.30	Feb 05, 2007
Jan 22, 2007	1	RT	Total	Absent--M0070122PC13	N/A	DIST-A	0.30	Jan 29, 2007
Jan 16, 2007	1	RT	Total	Absent--M0070116PF110	N/A	DIST-A	0.30	Jan 22, 2007
Jan 08, 2007	1	RT	Total	Absent--M0070108PH110	N/A	DIST-A	0.30	Jan 16, 2007
Jan 02, 2007	1	RT	Total	Absent--M0070102PH19	N/A	DIST-A	0.30	Jan 10, 2007
Dec 26, 2006	1	RT	Total	Absent--M0061226PA11	N/A	DIST-A	0.30	Jan 03, 2007
Dec 18, 2006	1	RT	Total	Absent--M0061218PC14	N/A	DIST-A	0.30	Dec 26, 2006
Dec 11, 2006	1	RT	Total	Absent--M0061211PE15	N/A	DIST-A	0.30	Dec 18, 2006

Sample Date	# Samples	Sample Type	Coliform Type	Results--ID	Repeat of Sample ID	Sample Site	Facility	CI Residual	Receive Date
Dec 04, 2006	1	RT	Total	Absent--M0061204PE16		N/A	DIST-A	0.30	Dec 11, 2006
Nov 27, 2006	1	RT	Total	Absent--M0061127PF17		N/A	DIST-A	0.30	Nov 30, 2006
Nov 20, 2006	1	RT	Total	Absent--M0061120PE112		N/A	DIST-A	0.30	Nov 30, 2006
Nov 13, 2006	1	RT	Total	Absent--M0061113PH112		N/A	DIST-A	0.30	Nov 20, 2006
Nov 06, 2006	1	RT	Total	Absent--M0061106PF110		N/A	DIST-A	0.30	Nov 10, 2006
Oct 30, 2006	1	RT	Total	Absent--M0061030PC13		N/A	DIST-A	0.30	Nov 06, 2006
Oct 26, 2006	1	RT	Total	Absent--M0061026PI110		N/A	DIST-A	0.30	Oct 30, 2006
Oct 16, 2006	1	RT	Total	Absent--M0061016PE15		N/A	DIST-A	0.30	Oct 23, 2006
Oct 10, 2006	1	RT	Total	Absent--M0061010PL117		N/A	DIST-A	0.30	Oct 16, 2006
Oct 02, 2006	1	RT	Total	Absent--M0061002PF19		N/A	DIST-A	0.30	Oct 12, 2006
Sep 25, 2006	1	RT	Total	Absent--M0060925PE112		N/A	DIST-A	0.30	Oct 04, 2006
Sep 18, 2006	1	RT	Total	Absent--M0060918PG19		N/A	DIST-A	0.30	Sep 25, 2006
Sep 11, 2006	1	RT	Total	Absent--M0060911PG112		N/A	DIST-A	0.30	Sep 20, 2006
Sep 06, 2006	1	RT	Total	Absent--M0060906PX139		N/A	DIST-A	0.30	Sep 11, 2006
Aug 28, 2006	1	RT	Total	Absent--M0060828PE16		N/A	DIST-A	0.30	Sep 05, 2006
Aug 21, 2006	1	RT	Total	Absent--M0060821PD115		N/A	DIST-A	0.30	Aug 28, 2006
Aug 14, 2006	1	RT	Total	Absent--M0060814PF19		N/A	DIST-A	0.30	Aug 23, 2006
Aug 07, 2006	1	RT	Total	Absent--M0060807PD111		N/A	DIST-A	0.30	Aug 15, 2006
Jul 31, 2006	1	RT	Total	Absent--M0060731PG112		N/A	DIST-A	0.30	Aug 07, 2006
Jul 24, 2006	1	RT	Total	Absent--M0060724PD14		N/A	DIST-A	0.30	Aug 01, 2006

Sample Date	# Samples	Sample Type	Coliform Type	Results--ID	Repeat of Sample ID	Sample Site	Facility	CI Residual	Receive Date
Jul 17, 2006	1	RT	Total	Absent--W0060717PC16		N/A	DIST-A	0.30	Jul 24, 2006
Jul 10, 2006	1	RT	Total	Absent--M0060710PI118		N/A	DIST-A	0.30	Jul 17, 2006
Jul 05, 2006	1	RT	Total	Absent--M0060705PQ122		N/A	DIST-A	0.30	Jul 10, 2006
Jun 26, 2006	1	RT	Total	Absent--M0060626PF19		N/A	DIST-A	0.30	Jul 03, 2006
Jun 19, 2006	1	RT	Total	Absent--M0060619PF211		N/A	DIST-A	0.30	Jun 26, 2006
Jun 12, 2006	1	RT	Total	Absent--M0060612PH210		N/A	DIST-A	0.30	Jun 20, 2006
Jun 05, 2006	1	RT	Total	Absent--M0060605PH28		N/A	DIST-A	0.30	Jun 12, 2006

May 30, 2006	1	RT	Total	Absent--M0060530PD14	N/A	DIST-A	0.30	Jun 05, 2006
May 22, 2006	1	RT	Total	Absent--M0060522PD15	N/A	DIST-A	0.30	May 30, 2006
May 15, 2006	1	RT	Total	Absent--M0060515PC13	N/A	DIST-A	0.30	May 22, 2006
May 08, 2006	1	RT	Total	Absent--M0060508PH113	N/A	DIST-A	0.30	May 17, 2006
May 01, 2006	1	RT	Total	Absent--M0060501PG29	N/A	DIST-A	0.03	May 08, 2006
Apr 24, 2006	1	RT	Total	Absent--M0060424PG214	N/A	DIST-A	0.30	May 01, 2006
Apr 17, 2006	1	RT	Total	Absent--M0060417PC23	N/A	DIST-A	0.30	Apr 26, 2006
Apr 10, 2006	1	RT	Total	Absent--M0060410PJ115	N/A	DIST-A	0.30	Apr 17, 2006
Apr 03, 2006	1	RT	Total	Absent--M0060403PI110	N/A	DIST-A	0.30	Apr 10, 2006
Mar 27, 2006	1	RT	Total	Absent--M0060327PF110	N/A	DIST-A	0.30	Apr 03, 2006
Mar 20, 2006	1	RT	Total	Absent--M0060320PE111	N/A	DIST-A	0.30	Mar 27, 2006
Mar 13, 2006	1	RT	Total	Absent--M0060313PF111	N/A	DIST-A	0.30	Mar 20, 2006
Mar 06, 2006	1	RT	Total	Absent--M0060306PG18	N/A	DIST-A	0.30	Mar 13, 2006

Sample Date	# Samples	Sample Type	Coliform Type	Results--ID	Repeat of Sample ID	Sample Site	Facility	CI Residual	Receive Date
Feb 27, 2006	1	RT	Total	Absent--M0060227PD14		N/A	DIST-A	0.30	Mar 06, 2006
Feb 22, 2006	1	RT	Total	Absent--M0060222PN117		N/A	DIST-A	0.30	Mar 01, 2006
Feb 13, 2006	1	RT	Total	Absent--M0060213PE112		N/A	DIST-A	0.30	Feb 21, 2006
Feb 06, 2006	1	RT	Total	Absent--M0060206PK119		N/A	DIST-A	0.30	Feb 13, 2006
Jan 30, 2006	1	RT	Total	Absent--M0060130PD15		N/A	DIST-A	0.30	Feb 03, 2006
Jan 23, 2006	1	RT	Total	Absent--M0060123PD15		N/A	DIST-A	0.30	Jan 30, 2006
Jan 18, 2006	1	RT	Total	Absent--M0060118PN119		N/A	DIST-A	0.30	Jan 23, 2006
Jan 09, 2006	1	RT	Total	Absent--M0060109PL113		N/A	DIST-A	0.30	Jan 18, 2006
Jan 03, 2006	1	RT	Total	Absent--M0060103PN120		N/A	DIST-A	0.30	Jan 09, 2006
Dec 27, 2005	1	RT	Total	Absent--M0051227PE16		N/A	DIST-A	0.30	Jan 03, 2006
Dec 19, 2005	1	RT	Total	Absent--M0051219PD14		N/A	DIST-A	0.30	Dec 27, 2005
Dec 12, 2005	1	RT	Total	Absent--M0051212PJ112		N/A	DIST-A	0.30	Dec 19, 2005
Dec 05, 2005	1	RT	Total	Absent--M0051205PF16		N/A	DIST-A	0.30	Dec 12, 2005
Nov 28, 2005	1	RT	Total	Absent--M0051128PE120		N/A	DIST-A	0.30	Dec 05, 2005
Nov 21, 2005	1	RT	Total	Absent--M0051121PD115		N/A	DIST-A	0.30	Dec 05, 2005
Nov 14, 2005	1	RT	Total	Absent--M0051114PH114		N/A	DIST-A	0.30	Nov 21, 2005
Nov 07, 2005	1	RT	Total	Absent--M0051107PF16		N/A	DIST-A	0.30	Nov 16, 2005
Oct 31, 2005	1	RT	Total	Absent--M0051031PC13		N/A	DIST-A	0.30	Nov 07, 2005
Oct 24, 2005	1	RT	Total	Absent--M0051024PF19		N/A	DIST-A	0.30	Oct 31, 2005
Oct 17, 2005	1	RT	Total	Absent--M0051017PF16		N/A	DIST-A	0.30	Oct 24, 2005

Sample Date	# Samples	Sample Type	Coliform Type	Results--ID	Repeat of Sample ID	Sample Site	Facility	CI Residual	Receive Date
Oct 10, 2005	1	RT	Total	Absent--M0051010PD18		N/A	DIST-A	0.30	Oct 17, 2005
Oct 03, 2005	1	RT	Total	Absent--M0051003PJ110		N/A	DIST-A	0.30	Oct 12, 2005
Sep 26, 2005	1	RT	Total	Absent--M0050926PJ126		N/A	DIST-A	0.30	Oct 04, 2005
Sep 19, 2005	1	RT	Total	Absent--M0050919PG17		N/A	DIST-A	0.30	Sep 27, 2005
Sep 12, 2005	1	RT	Total	Absent--M0050912PH122		N/A	DIST-A	0.30	Sep 19, 2005
Sep 06, 2005	1	RT	Total	Absent--M0050907PAA164		N/A	DIST-A	0.30	Sep 12, 2005
Aug 29, 2005	1	RT	Total	Absent--M0050829PI113		N/A	DIST-A	0.30	Sep 06, 2005
Aug 22, 2005	1	RT	Total	Absent--M0050822PF16		N/A	DIST-A	0.03	Aug 29, 2005
Aug 15, 2005	1	RT	Total	Absent--M0050815PH112		N/A	DIST-A	0.30	Aug 22, 2005

Aug 08, 2005	1	RT	Total	Absent--M0050808PF111	N/A	DIST-A	0.30	Aug 16, 2005
Aug 01, 2005	1	RT	Total	Absent--M0050801PO120	N/A	DIST-A	0.30	Aug 09, 2005
Jul 25, 2005	1	RT	Total	Absent--M0050725PE19	N/A	DIST-A	0.30	Aug 01, 2005
Jul 18, 2005	1	RT	Total	Absent--M0050718PK117	N/A	DIST-A	0.30	Jul 25, 2005
Jul 11, 2005	1	RT	Total	Absent--M0050711PM128	N/A	DIST-A	0.30	Jul 18, 2005
Jul 05, 2005	1	RT	Total	Absent--M0050705PN122	N/A	DIST-A	0.30	Jul 11, 2005
Jun 27, 2005	1	RT	Total	Absent--M0050627PD15	N/A	DIST-A	0.03	Jul 06, 2005
Jun 20, 2005	1	RT	Total	Absent--M0050620PH110	N/A	DIST-A	0.30	Jun 27, 2005
Jun 13, 2005	1	RT	Total	Absent--M0050613PE28	N/A	DIST-A	0.30	Jun 20, 2005
Jun 06, 2005	1	RT	Total	Absent--M0050606PE15	N/A	DIST-A	0.30	Jun 13, 2005
May 31, 2005	1	RT	Total	Absent--M0050531PF211	N/A	DIST-A	0.30	Jun 06, 2005

Sample Date	# Samples	Sample Type	Coliform Type	Results--ID	Repeat of Sample ID	Sample Site	Facility	CI Residual	Receive Date
May 23, 2005	1	RT	Total	Absent--M0050523PD18		N/A	DIST-A	0.30	May 31, 2005
May 16, 2005	1	RT	Total	Absent--M0050516PE112		N/A	DIST-A	0.30	May 23, 2005
May 09, 2005	1	RT	Total	Absent--M0050509PK228		N/A	DIST-A	0.30	May 16, 2005
May 02, 2005	1	RT	Total	Absent--M0050502PJ113		N/A	DIST-A	0.30	May 11, 2005
Apr 25, 2005	1	RT	Total	Absent--M0050425PG19		N/A	DIST-A	0.30	May 02, 2005
Apr 18, 2005	1	RT	Total	Absent--M0050418PH113		N/A	DIST-A	0.30	Apr 28, 2005
Apr 11, 2005	1	RT	Total	Absent--A50412F1		HOSE BIB	DIST-A	0.30	Apr 20, 2005
Apr 04, 2005	1	RT	Total	Absent--M0050404PG118		N/A	DIST-A	0.03	Apr 08, 2005
Mar 28, 2005	1	RT	Total	Absent--M0050328PE25-2		N/A	DIST-A	0.03	Apr 04, 2005
Mar 28, 2005	1	RT	Total	Absent--M0050328PE25-1		N/A	DIST-A	0.03	Apr 04, 2005
Mar 14, 2005	1	RT	Total	Absent--M0050314PF19		N/A	DIST-A	0.03	Mar 21, 2005
Mar 07, 2005	1	RT	Total	Absent--M0050307PE18		N/A	DIST-A	0.30	Mar 14, 2005
Feb 28, 2005	1	RT	Total	Absent--M0050228PB12		N/A	DIST-A	0.30	Mar 09, 2005
Feb 22, 2005	1	RT	Total	Absent--M0050222PG111		N/A	DIST-A	0.30	Mar 02, 2005
Feb 07, 2005	1	RT	Total	Absent--M0050207PF111		N/A	DIST-A	0.30	Feb 14, 2005
Jan 31, 2005	1	RT	Total	Absent--M0050131PD14		N/A	DIST-A	0.30	Feb 07, 2005
Jan 31, 2005	1	RT	Total	Absent--M0050214PD15		N/A	DIST-A	0.30	Feb 22, 2005
Jan 24, 2005	1	RT	Total	Absent--M0050124PD15		N/A	DIST-A	0.30	Jan 31, 2005
Jan 18, 2005	1	RT	Total	Absent--M0050118PF111		N/A	DIST-A	0.30	Jan 24, 2005
Jan 10, 2005	1	RT	Total	Absent--M0050110PE114		N/A	DIST-A	0.30	Jan 18, 2005

Sample Date	# Samples	Sample Type	Coliform Type	Results--ID	Repeat of Sample ID	Sample Site	Facility	CI Residual	Receive Date
Jan 03, 2005	1	RT	Total	Absent--M0050103PH112		N/A	DIST-A	0.30	Jan 10, 2005
Dec 27, 2004	1	RT	Total	Absent--M0041227PB15		N/A	DIST-A	0.30	Jan 05, 2005
Dec 20, 2004	1	RT	Total	Absent--M0041220PE110		N/A	DIST-A	0.30	Dec 28, 2004
Dec 13, 2004	1	RT	Total	Absent--M0041213PF111		N/A	DIST-A	0.30	Dec 20, 2004
Dec 06, 2004	1	RT	Total	Absent--M0041206PK116		N/A	DIST-A	0.30	Dec 13, 2004
Nov 29, 2004	1	RT	Total	Absent--M0041129PD15		N/A	DIST-A	0.30	Dec 06, 2004
Nov 22, 2004	1	RT	Total	Absent--M0041122PC18		N/A	DIST-A	0.30	Dec 01, 2004
Nov 15, 2004	1	RT	Total	Absent--M0041115PI115		N/A	DIST-A	0.30	Nov 24, 2004
Nov 08, 2004	1	RT	Total	Absent--M0041108PI117		N/A	DIST-A	0.30	Nov 18, 2004
Nov 01, 2004	1	RT	Total	Absent--M0041101PI116		N/A	DIST-A	0.30	Nov 10, 2004
Oct 25, 2004	1	RT	Total	Absent--M0041025PC13		N/A	DIST-A	0.30	Nov 03, 2004

Oct 18, 2004	1	RT	Total	Absent--M0041018PE114	N/A	DIST-A	0.30	Oct 25, 2004
Oct 11, 2004	1	RT	Total	Absent--M0041011PG113	N/A	DIST-A	0.30	Oct 18, 2004
Oct 04, 2004	1	RT	Total	Absent--M0041004PJ119	N/A	DIST-A	0.30	Oct 12, 2004
Sep 27, 2004	1	RT	Total	Absent--M0040927PE18	N/A	DIST-A	0.30	Oct 04, 2004
Sep 20, 2004	1	RT	Total	Absent--M0040920PD14	N/A	DIST-A	0.30	Oct 04, 2004
Sep 13, 2004	1	RT	Total	Absent--M0040913PI123	N/A	DIST-A	0.30	Sep 20, 2004
Sep 07, 2004	1	RT	Total	Absent--M0040907PF113	N/A	DIST-A	0.30	Sep 17, 2004
Aug 30, 2004	1	RT	Total	Absent--M0040830PE17	N/A	DIST-A	0.03	Sep 03, 2004
Aug 23, 2004	1	RT	Total	Absent--M0040823PC18	N/A	DIST-A	0.03	Aug 30, 2004

Sample Date	# Samples	Sample Type	Coliform Type	Results--ID	Repeat of Sample ID	Sample Site	Facility	CI Residual	Receive Date
Aug 16, 2004	1	RT	Total	Absent--M0040816PE111		N/A	DIST-A	0.30	Aug 23, 2004
Aug 09, 2004	1	RT	Total	Absent--M0040809PG18		N/A	DIST-A	0.30	Aug 16, 2004
Aug 02, 2004	1	RT	Total	Absent--M0040802PM121		N/A	DIST-A	0.30	Aug 11, 2004
Jul 26, 2004	1	RT	Total	Absent--M0040726PA112		N/A	DIST-A	0.30	Aug 02, 2004
Jul 19, 2004	1	RT	Total	Absent--M0040719PC13		N/A	DIST-A	0.30	Jul 29, 2004
Jul 12, 2004	1	RT	Total	Absent--M0040712PH118		N/A	DIST-A	0.04	Jul 19, 2004
Jul 07, 2004	1	RT	Total	Absent--M0040707PH113		N/A	DIST-A	0.20	Jul 12, 2004
Jun 28, 2004	1	RT	Total	Absent--M0040628PA22		N/A	DIST-A		Jul 12, 2004
Jun 21, 2004	1	RT	Total	Absent--M0040621PD14		N/A	DIST-A		Jun 28, 2004
Jun 14, 2004	1	RT	Total	Absent--M0040614PF111		N/A	DIST-A		Jun 21, 2004
Jun 07, 2004	1	RT	Total	Absent--M0040607PF17		N/A	DIST-A		Jun 17, 2004
Jun 01, 2004	1	RT	Total	Absent--M0040601PK115		N/A	DIST-A		Jun 07, 2004
May 24, 2004	1	RT	Total	Absent--M0040524PH212		N/A	DIST-A		Jun 02, 2004
May 17, 2004	1	RT	Total	Absent--M0040517PG216		N/A	DIST-A		May 25, 2004
May 10, 2004	1	RT	Total	Absent--M0040510PI111		N/A	DIST-A		May 17, 2004
May 03, 2004	1	RT	Total	Absent--M0040503PJ122		N/A	DIST-A		May 10, 2004
Apr 26, 2004	1	RT	Total	Absent--M0040426PE17		N/A	DIST-A		May 04, 2004
Apr 19, 2004	1	RT	Total	Absent--M0040419PG116		N/A	DIST-A		Apr 28, 2004
Apr 12, 2004	1	RT	Total	Absent--M0040412PC14		N/A	DIST-A		Apr 20, 2004
Apr 05, 2004	1	RT	Total	Absent--M0040405PB112		N/A	DIST-A		Apr 12, 2004

Sample Date	# Samples	Sample Type	Coliform Type	Results--ID	Repeat of Sample ID	Sample Site	Facility	CI Residual	Receive Date
Mar 29, 2004	1	RT	Total	Absent--M0040329PD18		N/A	DIST-A		Apr 05, 2004
Mar 22, 2004	1	RT	Total	Absent--M0040322PF17		N/A	DIST-A		Mar 29, 2004
Mar 15, 2004	1	RT	Total	Absent--M0040315PB12		N/A	DIST-A		Mar 22, 2004
Mar 08, 2004	1	RT	Total	Absent--M0040308PB12		N/A	DIST-A		Mar 15, 2004
Mar 01, 2004	1	RT	Total	Absent--M0040301PF110		N/A	DIST-A		Mar 09, 2004
Feb 23, 2004	1	RT	Total	Absent--M0040223PA11		N/A	DIST-A		Mar 01, 2004
Feb 17, 2004	1	RT	Total	Absent--M0040217PG17		N/A	DIST-A		Feb 25, 2004
Feb 09, 2004	1	RT	Total	Absent--M0040209PD16		N/A	DIST-A		Feb 17, 2004
Feb 02, 2004	1	RT	Total	Absent--M0040202PK113		N/A	DIST-A		Feb 09, 2004
Jan 26, 2004	1	RT	Total	Absent--M0040126PD111		N/A	DIST-A		Feb 04, 2004
Jan 19, 2004	1	RT	Total	Absent--M0040119PC13		N/A	DIST-A		Jan 26, 2004
Jan 13, 2004	1	RT	Total	Absent--M0040113PF17		N/A	DIST-A		Jan 20, 2004
Jan 05, 2004	1	RT	Total	Absent--M0040105PB1		N/A	DIST-A		Jan 22, 2004

Dec 29, 2003	1	RT	Total	Absent--M0031229PA11	N/A	DIST-A	Jan 12, 2004
Dec 22, 2003	1	RT	Total	Absent--M0031222PB12	N/A	DIST-A	Jan 12, 2004
Dec 15, 2003	1	RT	Total	Absent--M0031215PA11	N/A	DIST-A	Jan 12, 2004
Dec 08, 2003	1	RT	Total	Absent--M0031208PE112	N/A	DIST-A	Jan 12, 2004
Dec 01, 2003	1	RT	Total	Absent--M0031201PB12	N/A	DIST-A	Apr 02, 2004
Nov 24, 2003	1	RT	Total	Absent--M0031124PA11	N/A	DIST-A	Dec 08, 2003
Nov 17, 2003	1	RT	Total	Absent--M0031117PB12	N/A	DIST-A	Dec 08, 2003

Sample Date	# Samples	Sample Type	Coliform Type	Results--ID	Repeat of Sample ID	Sample Site	Facility	CI Residual	Receive Date
Nov 10, 2003	1	RT	Total	Absent--M0031110PB12		N/A	DIST-A		Dec 08, 2003
Nov 03, 2003	1	RT	Total	Absent--M0031103PC13		N/A	DIST-A		Dec 08, 2003
Oct 27, 2003	1	RT	Total	Absent--M0031027PB12		N/A	DIST-A		Nov 17, 2003
Oct 20, 2003	1	RT	Total	Absent--M0031020PB15		N/A	DIST-A		Nov 17, 2003
Oct 13, 2003	1	RT	Total	Absent--M0031013PB12		N/A	DIST-A		Nov 17, 2003
Oct 06, 2003	1	RT	Total	Absent--M0031006PF16		N/A	DIST-A		Nov 17, 2003
Sep 30, 2003	1	RT	Total	Absent--M0030930PJ210		N/A	DIST-A		Oct 10, 2003
Sep 15, 2003	1	RT	Total	Absent--M0030915PB12		N/A	DIST-A		Oct 10, 2003
Sep 08, 2003	1	RT	Total	Absent--M0030908PB12		N/A	DIST-A		Oct 10, 2003
Sep 02, 2003	1	RT	Total	Absent--M0030902PC14		N/A	DIST-A		Oct 10, 2003
Aug 25, 2003	1	RT	Total	Absent--M0030825PB14		N/A	DIST-A		Sep 11, 2003
Aug 18, 2003	1	RT	Total	Absent--M0030818PF16		N/A	DIST-A		Sep 11, 2003
Aug 11, 2003	1	RT	Total	Absent--M0030811PD14		N/A	DIST-A		Sep 11, 2003
Jul 28, 2003	1	RT	Total	Absent--M0030728PA11		N/A	DIST-A		Aug 12, 2003
Jul 21, 2003	1	RT	Total	Absent--M0030721PA11		N/A	DIST-A		Aug 12, 2003
Jul 14, 2003	1	RT	Total	Absent--M0030714PD17		N/A	DIST-A		Aug 12, 2003
Jul 07, 2003	1	RT	Total	Absent--M0030707PD14		N/A	DIST-A		Aug 12, 2003
Jun 30, 2003	1	RT	Total	Absent--M0030630PA11		N/A	DIST-A		Jul 09, 2003
Jun 23, 2003	1	RT	Total	Absent--M0030623PF16		N/A	DIST-A		Jul 09, 2003
Jun 16, 2003	1	RT	Total	Absent--M0030616PC13		N/A	DIST-A		Jul 09, 2003

Sample Date	# Samples	Sample Type	Coliform Type	Results--ID	Repeat of Sample ID	Sample Site	Facility	CI Residual	Receive Date
Jun 09, 2003	1	RT	Total	Absent--M0030609PC14		N/A	DIST-A		Jul 09, 2003
Jun 02, 2003	1	RT	Total	Absent--M0030602PF16		N/A	DIST-A		Jul 09, 2003
May 27, 2003	1	RT	Total	Absent--M0030527PA11		N/A	DIST-A		Jun 09, 2003
May 19, 2003	1	RT	Total	Absent--M0030519PE15		N/A	DIST-A		Jun 09, 2003
May 12, 2003	1	RT	Total	Absent--M0030512PB12		N/A	DIST-A		Jun 09, 2003
May 05, 2003	1	RT	Total	Absent--M0030505PB12		N/A	DIST-A		Jun 09, 2003
Apr 28, 2003	1	RT	Total	Absent--M0030428PB1		N/A	DIST-A		May 09, 2003
Apr 21, 2003	1	RT	Total	Absent--M0030421PB1		N/A	DIST-A		May 09, 2003
Apr 14, 2003	1	RT	Total	Absent--M0030414PA11		N/A	DIST-A		May 09, 2003
Apr 07, 2003	1	RT	Total	Absent--M0030407PC1		N/A	DIST-A		May 09, 2003
Apr 01, 2003	1	RT	Total	Absent--M0030401PH1		N/A	DIST-A		May 09, 2003
Mar 24, 2003	1	RT	Total	Absent--M0030329PB12		N/A	DIST-A		Apr 01, 2003
Mar 17, 2003	1	RT	Total	Absent--M0030317PB12		N/A	DIST-A		Apr 01, 2003
Mar 10, 2003	1	RT	Total	Absent--M0030310PE15		N/A	DIST-A		Apr 04, 2003
Mar 04, 2003	1	RT	Total	Absent--M0030304PR125		N/A	DIST-A		Apr 01, 2003

Feb 24, 2003	1	RT	Total	Absent--M0030224PB12	N/A	DIST-A	Mar 04, 2003
Feb 18, 2003	1	RT	Total	Absent--M0030219PA11	N/A	DIST-A	Mar 04, 2003
Feb 12, 2003	1	RT	Total	Absent--M0030212PE18	N/A	DIST-A	Mar 04, 2003
Feb 03, 2003	1	RT	Total	Absent--M0030203PI19	N/A	DIST-A	Mar 04, 2003
Jan 28, 2003	1	RT	Total	Absent--M0030129PF110	N/A	DIST-A	Feb 04, 2003

Sample Date	# Samples	Sample Type	Coliform Type	Results--ID	Repeat of Sample ID	Sample Site	Facility	CI Residual	Receive Date
Jan 21, 2003	1	RT	Total	Absent--M0030121PD19		N/A	DIST-A		Feb 04, 2003
Jan 14, 2003	1	RT	Total	Absent--M0030114PJ118		N/A	DIST-A		Feb 04, 2003
Jan 06, 2003	1	RT	Total	Absent--M0030106PA22		N/A	DIST-A		Feb 04, 2003
Dec 23, 2002	1	RT	Total	Absent--01223PE15		N/A	DIST-A		Jan 13, 2003
Dec 18, 2002	1	RT	Total	Absent--021218PC14		N/A	DIST-A		Jan 13, 2003
Dec 10, 2002	1	RT	Total	Absent--21710PT114		N/A	DIST-A		Jan 13, 2003
Dec 03, 2002	1	RT	Total	Absent--21203PO127		N/A	DIST-A		Jan 13, 2003
Nov 25, 2002	1	RT	Total	Absent--021125PD14		N/A	DIST-A		Dec 09, 2002
Nov 19, 2002	1	RT	Total	Absent--21119PG126		N/A	DIST-A		Dec 09, 2002
Nov 12, 2002	1	RT	Total	Absent--21112PD113		N/A	DIST-A		Dec 09, 2002
Sep 24, 2002	1	RT	Total	Absent--20924PP129		N/A	DIST-A		Oct 10, 2002
Sep 18, 2002	1	RT	Total	Absent--020918PE15		N/A	DIST-A		Oct 10, 2002
Sep 10, 2002	1	RT	Total	Absent--20910PN139		N/A	DIST-A		Oct 10, 2002
Sep 03, 2002	1	RT	Total	Absent--20903PE111		N/A	DIST-A		Oct 10, 2002
Aug 21, 2002	1	RT	Total	Absent--020821PC13		N/A	DIST-A		Sep 09, 2002
Aug 13, 2002	1	RT	Total	Absent--20813PN128		N/A	DIST-A		Sep 09, 2002
Aug 06, 2002	1	RT	Total	Absent--20806PM117		N/A	DIST-A		Sep 09, 2002
Jul 23, 2002	1	RT	Total	Absent--20723PC19		N/A	DIST-A		
Jul 17, 2002	1	RT	Total	Absent--20717PE112		N/A	DIST-A		
Jul 10, 2002	1	RT	Total	Absent--020710PE16		N/A	DIST-A		

Sample Date	# Samples	Sample Type	Coliform Type	Results--ID	Repeat of Sample ID	Sample Site	Facility	CI Residual	Receive Date
Jul 02, 2002	1	RT	Total	Absent--20702PQ129		N/A	DIST-A		
Jun 18, 2002	1	RT	Total	Absent--20618PH111		N/A	DIST-A		
Jun 13, 2002	1	RT	Total	Absent--20613PN122		N/A	DIST-A		
May 29, 2002	1	RT	Total	Absent--020529PD15		N/A	DIST-A		Jun 10, 2002
May 20, 2002	1	RT	Total	Absent--020520PB12		N/A	DIST-A		Jun 10, 2002
May 14, 2002	1	RT	Total	Absent--20514PG18		N/A	DIST-A		Jun 10, 2002
Apr 23, 2002	1	RT	Total	Absent--20423PF17		N/A	DIST-A		May 01, 2002
Apr 15, 2002	1	RT	Total	Absent--020415PG18		N/A	DIST-A		May 01, 2002
Apr 03, 2002	1	RT	Total	Absent--20403PG17		N/A	DIST-A		May 01, 2002
Mar 28, 2002	1	RT	Total	Absent--20328PJ114		N/A	DIST-A		Apr 04, 2002
Mar 19, 2002	1	RT	Total	Absent--20319PC13		N/A	DIST-A		Apr 04, 2002
Mar 11, 2002	1	RT	Total	Absent--203011PA11		N/A	DIST-A		Apr 04, 2002
Mar 06, 2002	1	RT	Total	Absent--20306PI110		N/A	DIST-A		Apr 04, 2002
Feb 27, 2002	1	RT	Total	Absent--020227PD14		N/A	DIST-A		Mar 07, 2002
Feb 19, 2002	1	RT	Total	Absent--020219PA11		N/A	DIST-A		Mar 07, 2002
Feb 12, 2002	1	RT	Total	Absent--020212PC13		N/A	DIST-A		Mar 07, 2002
Feb 06, 2002	1	RT	Total	Absent--020206PF18		N/A	DIST-A		Mar 07, 2002

Jan 22, 2002	1	RT	Total	Absent--20122PA11	N/A	DIST-A	Feb 04, 2002
Jan 14, 2002	1	RT	Total	Absent--20114PC13	N/A	DIST-A	Feb 04, 2002
Jan 08, 2002	1	RT	Total	Absent--20108PJ316	N/A	DIST-A	Feb 04, 2002

Sample Date	# Samples	Sample Type	Coliform Type	Results--ID	Repeat of Sample ID	Sample Site	Facility	CI Residual	Receive Date
Jan 02, 2002	1	RT	Total	Absent--20102PC14		N/A	DIST-A		Feb 04, 2002

Recent Batch Numbers[Click here to only show results since 2008](#)

Sample Types: AS=Assessment, CO=Confirmation, RP=Repeat, RT=Routine, SP=Special, TG=Triggered

MRDL Monitoring Requirements :: Excel Spreadsheet

PWS ID: 00130 ---- BOARDMAN, CITY OF**Maximum Residual Disinfection Level (MRDL) Samples**

Monitoring Period	Received	Entry Point	Samples Required	Samples Collected	Period Avg	Annual Avg	Level Compliance
Mar 01, 2015		DIST-A	4	3	0.26	0.3	Y
Feb 01, 2015		DIST-A	4	4	0.4	0.3	Y
Jan 01, 2015		DIST-A	4	4	0.4	0.3	Y
Dec 01, 2014		DIST-A	4	5	0.5	0.3	Y
Nov 01, 2014		DIST-A	4	4	0.37	0.3	Y
Oct 01, 2014		DIST-A	4	4	0.3	0.3	Y
Sep 01, 2014		DIST-A	4	5	0.3	0.3	Y
Aug 01, 2014		DIST-A	4	4	0.3	0.3	Y
Jul 01, 2014		DIST-A	4	5	0.3	0.3	Y
Jun 01, 2014		DIST-A	4	4	0.4	0.3	Y
May 01, 2014		DIST-A	4	4	0.1	0.3	Y
Apr 01, 2014		DIST-A	4	5	0.16	0.3	Y
Mar 01, 2014		DIST-A	4	4	0.3	0.3	Y
Feb 01, 2014		DIST-A	4	4	0.36	0.4	Y
Jan 01, 2014		DIST-A	4	4	0.37	0.4	Y
Dec 01, 2013		DIST-A	4	5	0.4	0.4	Y
Nov 01, 2013		DIST-A	4	4	0.4	0.4	Y
Oct 01, 2013		DIST-A	4	5	0.29	0.4	Y
Sep 01, 2013		DIST-A	4	4	0.4	0.4	Y
Aug 01, 2013		DIST-A	4	4	0.2	0.4	Y
Jul 01, 2013		DIST-A	4	5	0.4	0.4	Y
Jun 01, 2013		DIST-A	4	4	0.34	0.4	Y
May 01, 2013		DIST-A	4	4	0.4	0.4	Y
Apr 01, 2013		DIST-A	4	5	0.3	0.4	Y
Mar 01, 2013		DIST-A	4	4	0.4	0.4	Y
Feb 01, 2013		DIST-A	4	4	0.4	0.4	Y
Jan 01, 2013		DIST-A	4	5	0.4	0.4	Y
Dec 01, 2012		DIST-A	4	4	0.38	0.4	Y
Nov 01, 2012		DIST-A	4	4	0.4	0.4	Y
Oct 01, 2012		DIST-A	4	5	0.3	0.4	Y
Sep 01, 2012		DIST-A	4	4	0.37	0.4	Y
Aug 01, 2012		DIST-A	4	4	0.37	0.4	Y
Jul 01, 2012		DIST-A	4	5	0.44	0.4	Y
Jun 01, 2012		DIST-A	4	4	0.4025	0.4	Y
May 01, 2012		DIST-A	4	4	0.3675	0.4	Y
Apr 01, 2012		DIST-A	4	5	0.3060	0.4	Y
Mar 01, 2012		DIST-A	4	4	0.3525	0.4	Y
Feb 01, 2012		DIST-A	4	4	0.3750	0.4	Y
Jan 01, 2012		DIST-A	4	5	0.5660	0.4	Y
Dec 01, 2011		DIST-A	4	4	0.3650	0.4	Y
Nov 01, 2011		DIST-A	4	4	0.3675	0.4	Y
Oct 01, 2011		DIST-A	4	4	0.2025	0.4	Y
Sep 01, 2011		DIST-A	4	4	0.3700	0.4	Y
Aug 01, 2011		DIST-A	4	5	0.4360	0.4	Y
Jul 01, 2011		DIST-A	4	4	0.3600	0.4	Y
Jun 01, 2011		DIST-A	4	4	0.3575	0.4	Y
May 01, 2011		DIST-A	4	5	0.2960	0.4	Y
Apr 01, 2011		DIST-A	4	4	0.4100	0.4	Y
Mar 01, 2011		DIST-A	4	4	0.2625	0.4	Y
Feb 01, 2011		DIST-A	4	4	0.4925	0.5	Y
Jan 01, 2011		DIST-A	4	5	0.4140	0.5	Y

Dec 01, 2010		DIST-A	4	3	0.3400	0.5	Y
Nov 01, 2010		DIST-A	4	4	0.4500	0.5	Y
Oct 01, 2010		DIST-A	4	4	0.4250	0.5	Y
Sep 01, 2010		DIST-A	4	3	0.5467	0.5	Y
Aug 01, 2010		DIST-A	4	5	0.4560	0.5	Y
Jul 01, 2010		DIST-A	4	4	0.5050	0.5	Y
Jun 01, 2010		DIST-A	4	5	0.4520	0.5	Y
May 01, 2010		DIST-A	4	4	0.4675	0.5	Y
Apr 01, 2010		DIST-A	4	4	0.4925	0.5	Y
Mar 01, 2010		DIST-A	4	5	0.5320	0.4	Y
Feb 01, 2010		DIST-A	4	4	0.4600	0.4	Y
Jan 01, 2010		DIST-A	4	4	0.5000	0.4	Y
Dec 01, 2009		DIST-A	4	4	0.4575	0.4	Y
Nov 01, 2009		DIST-A	4	5	0.4380	0	Y
Oct 01, 2009		DIST-A	4	4	0.3200	0	Y
Sep 01, 2009		DIST-A	4	4	0.4650	0	Y
Aug 01, 2009	Sep 25, 2009	DIST-A	4	4	0.4400	0	Y
Jul 01, 2009	Sep 25, 2009	DIST-A	4	4	0.4275	0	Y
Jun 01, 2009	Sep 25, 2009	DIST-A	4	5	0.4360	0	Y
May 01, 2009		DIST-A	4	4	0.4775	0	Y
Apr 01, 2009	May 20, 2009	DIST-A	3	5	0.3500	0	Y
Mar 01, 2009	May 20, 2009	DIST-A	3	5	0.4960	0	Y
Feb 01, 2009	May 20, 2009	DIST-A	3	4	0.4075	0	Y
Jan 01, 2009	Feb 11, 2009	DIST-A	3	4	0.3150	0	Y
Dec 01, 2008	Feb 11, 2009	DIST-A	3	5	0.4560	0	Y
Nov 01, 2008	Feb 11, 2009	DIST-A	3	4	0.5100	0	Y
Oct 01, 2008	Feb 11, 2009	DIST-A	3	4	0.3700	0	Y
Sep 01, 2008		DIST-A	3	4	0.4000	0	Y
Aug 01, 2008		DIST-A	3	4	0.6075	0	Y
Jul 01, 2008		DIST-A	3	5	0.5060	0	Y
Jun 01, 2008		DIST-A	3	5	0.3400	0	Y
May 01, 2008		DIST-A	3	4	0.3000	0	Y
Apr 01, 2008		DIST-A	3	4	0.3000	0	Y
Mar 01, 2008		DIST-A	3	5	0.3000	0	Y
Feb 01, 2008		DIST-A	3	4	0.2325	0	Y
Jan 01, 2008		DIST-A	3	5	0.3000	0	Y
Dec 01, 2007		DIST-A	3	4	0.3000	0	Y
Nov 01, 2007		DIST-A	3	4	0.3000	0	Y
Oct 01, 2007		DIST-A	3	4	0.3000	0	Y
Sep 01, 2007	Oct 17, 2007	DIST-A	3	4	0.3000	0	Y
Aug 01, 2007	Oct 17, 2007	DIST-A	3	4	0.3000	0	Y
Jul 01, 2007	Oct 17, 2007	DIST-A	3	5	0.3000	0	Y
Jun 01, 2007	Jul 17, 2007	DIST-A	3	3	0.3000	0	Y
May 01, 2007	Jul 17, 2007	DIST-A	3	4	0.3000	0	Y
Apr 01, 2007	Jul 17, 2007	DIST-A	3	5	0.3000	0	Y
Mar 01, 2007		DIST-A	3	4	0.3000	0	Y
Feb 01, 2007		DIST-A	3	4	0.3000	0	Y
Jan 01, 2007	Apr 16, 2007	DIST-A	3	5	0.3000	0	Y
Dec 01, 2006	Mar 12, 2007	DIST-A	3	4	0.3000	0	Y
Nov 01, 2006	Mar 12, 2007	DIST-A	3	4	0.3000	0	Y
Oct 01, 2006	Mar 12, 2007	DIST-A	3	5	0.3000	0	Y
Sep 01, 2006	Mar 12, 2007	DIST-A	3	4	0.3000	0	Y
Aug 01, 2006	Mar 12, 2007	DIST-A	3	4	0.3000	0	Y
Jul 01, 2006	Mar 12, 2007	DIST-A	3	5	0.3000	0	Y
Jun 01, 2006	Mar 12, 2007	DIST-A	3	4	0.3000	0	Y
May 01, 2006	Mar 12, 2007	DIST-A	3	5	0.2460	0	Y
Apr 01, 2006	Mar 12, 2007	DIST-A	3	4	0.3000	0	Y

4/3/2015

00130 MRDL Samples | Data Online | Oregon Drinking Water Services

Mar 01, 2006	Mar 12, 2007	DIST-A	3	4	0.3000	0	Y
Feb 01, 2006	Mar 12, 2007	DIST-A	3	4	0.3000	0	Y
Jan 01, 2006	Mar 12, 2007	DIST-A	3	5	0.3000	0	Y
Dec 01, 2005	May 16, 2006	DIST-A	3	4	0.3000	0	Y
Nov 01, 2005	May 16, 2006	DIST-A	3	4	0.3000	0	Y
Oct 01, 2005	May 16, 2006	DIST-A	3	5	0.3000	0	Y
Sep 01, 2005	May 16, 2006	DIST-A	3	4	0.3000	0	Y
Aug 01, 2005	May 16, 2006	DIST-A	3	5	0.2460	0	Y
Jul 01, 2005	May 16, 2006	DIST-A	3	4	0.3000	0	Y
Jun 01, 2005	May 16, 2006	DIST-A	3	4	0.2325	0	Y
May 01, 2005	May 16, 2006	DIST-A	3	5	0.3000	0	Y
Apr 01, 2005	May 16, 2006	DIST-A	3	4	0.2325	0	Y
Mar 01, 2005	May 16, 2006	DIST-A	3	4	0.0975	0	Y
Feb 01, 2005	May 16, 2006	DIST-A	3	3	0.3000	0	Y
Jan 01, 2005	May 16, 2006	DIST-A	3	6	0.3000	0	Y
Dec 01, 2004		DIST-A	3	4	0.3000	0	Y
Nov 01, 2004	Dec 21, 2004	DIST-A	3	5	0.3000	0	Y
Oct 01, 2004		DIST-A	3	4	0.3000	0	Y
Sep 01, 2004	Nov 24, 2004	DIST-A	3	4	0.3000	0	Y



Oregon Public Health

Drinking Water Data Online

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PWSID: 00130
 PWSName: BOARDMAN, CITY OF
 Status: A
 System Type: C
 Population: 3310

[Fact Sheets](#)[Definitions](#)[Public Notice](#)[Alerts](#)[Enforcements](#)[Spreadsheet](#)

Action Levels: Lead = 0.0155 mg/l Copper = 1.35 mg/l

Lead and Copper 90th Percentile Summary Results

[details for latest summary](#)

Sample Date	Date Received	Sample Count	Duration	Lead (mg/l)	Copper (mg/l)
Sep 13, 2012 - Sep 17, 2012	Oct 05, 2012	20	3Y	0.0030	0.2520
Sep 30, 2009 - Sep 30, 2009	Dec 28, 2009	20	3Y	0.0016	0.2650
Oct 10, 2006 - Oct 10, 2006	Oct 24, 2006	10	3Y	0.0090	0.1200
Dec 14, 2004 - Dec 14, 2004	Jan 14, 2005	10	YR	0.0030	0.1200
Jan 01, 1998 - Sep 01, 1998	Oct 14, 1998	10	YR	0.0027	0.2600
Jan 01, 1996 - Sep 24, 1996	Oct 24, 1996	10	YR	0.0035	0.2800
Jan 01, 1994 - Mar 15, 1994	Apr 07, 1994	20	6M	0.0040	0.2200
Jul 01, 1993 - Oct 26, 1993	Nov 08, 1993	20	6M	0.0060	0.2800

More Info



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ND = Not Detected at the Minimum Reporting Level [Spreadsheet](#)

Nitrate Samples - PWS ID: 00130 — BOARDMAN, CITY OF

Sample ID	Sample Date	Receive Date	Analyte Name	Source Name	Source ID	Results	MCL	UOM
414801801-I	05/27/2014	06/10/2014	NITRATE	EP FOR RANNEY WELLS (COLUMBIA RIVER)	EP-A	1.1300000	10.0000	MG/L
333100404-I	11/26/2013	12/09/2013	NITRATE	EP FOR RANNEY WELLS (COLUMBIA RIVER)	EP-A	0.7870000	10.0000	MG/L
229700403-I	10/22/2012	10/25/2012	NITRATE	EP FOR RANNEY WELLS (COLUMBIA RIVER)	EP-A	1.9000000	10.0000	MG/L
128500404-I	10/11/2011	11/04/2011	NITRATE	EP FOR RANNEY WELLS (COLUMBIA RIVER)	EP-A	0.6000000	10.0000	MG/L
1006807-I	03/08/2010	03/17/2010	NITRATE	EP FOR RANNEY WELLS (COLUMBIA RIVER)	EP-A	1.0000000	10.0000	MG/L
080924E1Q-I	09/24/2008	11/07/2008	NITRATE	EP FOR RANNEY WELLS (COLUMBIA RIVER)	EP-A	2.9200000	10.0000	MG/L
A70430AC1	04/30/2007	05/14/2007	NITRATE	EP FOR RANNEY WELLS (COLUMBIA RIVER)	EP-A	1.1000000	10.0000	MG/L
A60327AL-1	03/27/2006	04/17/2006	NITRATE	EP FOR RANNEY WELLS (COLUMBIA RIVER)	EP-A	1.2000000	10.0000	MG/L
A41122AW-1	11/22/2004	12/07/2004	NITRATE	EP FOR RANNEY WELLS (COLUMBIA RIVER)	EP-A	0.9000000	10.0000	MG/L
A30630Y-1	06/30/2003	08/12/2003	NITRATE	EP FOR EMERGENCY WELL 1-64 (MORR745)	EP-B	4.4000000	10.0000	MG/L
A30630Y-1	06/30/2003		NITRATE-NITRITE	EP FOR EMERGENCY WELL 1-64 (MORR745)	EP-B	4.4000000	10.0000	MG/L
A30207U-1I	02/07/2003	04/04/2003	NITRATE	EP FOR RANNEY WELLS (COLUMBIA RIVER)	EP-A	7.5000000	10.0000	MG/L
A30207U-1I	02/07/2003		NITRATE-NITRITE	EP FOR RANNEY WELLS (COLUMBIA RIVER)	EP-A	7.5000000	10.0000	MG/L

Archived Nitrate Samples - PWS ID: 00130

Sample Date	Receive Date	Analyte Name	Source Name	Source ID	Results	MCL
08/08/01	10/03/01	Nitrate	EP for RANNEY WELL (COLUMBIA RIVER)	A	0.6300000	10.0000
07/13/00	07/24/00	Nitrate	RANNEY WELL (COLUMBIA RIVER)	AA	0.9000000	10.0000
12/09/99	01/05/00	Nitrate	EP for RANNEY WELL (COLUMBIA RIVER)	A	0.8200000	10.0000
07/27/98	09/08/98	Nitrate	EP for RANNEY WELL (COLUMBIA RIVER)	A	0.8900000	10.0000
09/16/96	06/23/98	Nitrate	EP for RANNEY WELL (COLUMBIA RIVER)	A	0.6100000	10.0000
02/05/93	10/11/93	Nitrate	RANNEY WELL (COLUMBIA RIVER)	AA	1.5000000	10.0000
02/05/93	10/11/93	Nitrate-Nitrite	RANNEY WELL (COLUMBIA RIVER)	AA	1.5000000	10.0000
06/24/92	07/27/92	Nitrate	RANNEY WELL (COLUMBIA RIVER)	A	0.4000000	10.0000
06/07/89	12/08/89	Nitrate	RANNEY WELL (COLUMBIA RIVER)	A	0.3500000	10.0000
			RANNEY WELL (COLUMBIA RIVER)			

4/3/2015

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05/10/88	03/09/89	Nitrate	RIVER)	A	0.1500000	10.0000
06/09/87	07/09/87	Nitrate	RANNEY WELL (COLUMBIA RIVER)	A	ND	10.0000
06/25/86	06/25/86	Nitrate	RANNEY WELL (COLUMBIA RIVER)	A	0.4100000	10.0000

A blank or a 0 in the MCL column indicates that a MCL has not been set for that chemical.



Oregon Public Health Drinking Water Data Online



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ND = Not Detected at the Minimum Reporting Level [Spreadsheet](#)

Arsenic Samples - PWS ID: 00130 — BOARDMAN, CITY OF

Sample ID	Sample Date	Receive Date	Source Name	Source ID	Results	MCL	UOM
414801801-I	05/27/14	06/10/14	EP FOR RANNEY WELLS (COLUMBIA RIVER)	EP-A	ND	0.010	MG/L
128500404-I	10/11/11	11/04/11	EP FOR RANNEY WELLS (COLUMBIA RIVER)	EP-A	ND	0.010	MG/L
080924E1-I	09/24/08	11/07/08	EP FOR RANNEY WELLS (COLUMBIA RIVER)	EP-A	0.0041500	0.010	MG/L
A30207U-1I	02/07/03	04/04/03	EP FOR RANNEY WELLS (COLUMBIA RIVER)	EP-A	0.0084000	0.050	MG/L

Archived Arsenic Samples - PWS ID: 00130

Sample ID	Sample Date	Receive Date	Source Name	Source ID	Results	MCL
A10808V*A	08/08/01	10/03/01	EP for RANNEY WELL (COLUMBIA RIVER)	A	0.0023000	0.050
960917N*A	09/16/96	06/23/98	EP for RANNEY WELL (COLUMBIA RIVER)	A	0.0019000	0.050
930206DA0	02/05/93	10/11/93	RANNEY WELL (COLUMBIA RIVER)	AA	ND	0.050
-1992120	06/24/92	07/27/92	RANNEY WELL (COLUMBIA RIVER)	A	ND	0.050
-1992121	06/07/89	12/08/89	RANNEY WELL (COLUMBIA RIVER)	A	ND	0.050
-1992122	05/10/88	03/09/89	RANNEY WELL (COLUMBIA RIVER)	A	0.0060000	0.050
-1992123	06/09/87	07/09/87	RANNEY WELL (COLUMBIA RIVER)	A	ND	0.050
-1992124	06/25/86	06/25/86	RANNEY WELL (COLUMBIA RIVER)	A	0.0030000	0.050

A blank or a 0 in the MCL column indicates that a MCL has not been set for that chemical.

[Bromate Monitoring Requirements](#) :: [DBP Monitoring Schedules](#) :: [Excel Spreadsheet](#)**PWS ID: 00130 ---- BOARDMAN, CITY OF**
Disinfection By-Product (DBP) Monitoring Samples

ND = Not Detected at the Minimum Reporting Level; -- = Not Sampled

Sample ID	Sample Date	Receive Date	Sample Point	Location	TTHM (mg/L) MCL = 0.080	HAA5 (mg/L) MCL = 0.060	Bromate (mg/L)	Notes
141001044001-D	09/30/14	10/22/14	2DBP-01	DRIFTWOOD RV PARK	0.0258000	0.0056200	--	
141003041001-D	09/30/14	10/22/14	2DBP-02	CITY HALL	0.0213000	0.0063400	--	
127201701-D	09/28/11	11/04/11	DBPMA01	DRIFTWOOD RV PARK	0.0311000	0.0058000	--	
080924E2	09/24/08	11/07/08	DBPMA01	DRIFTWOOD RV PARK	0.0155000	0.0049700	--	
A40927AR	09/27/04	11/08/04	DBPMA01	DRIFTWOOD RV PARK	0.0186000	0.0059000	--	

**DWP Outreach Plan**

PWS ID: 00130 ---- BOARDMAN, CITY OF

Stage 2 Waiver: 40/30

- ▼ Disinfectant Byproducts (DBP)
- ▼ Total Organic Carbon (TOC)
- ▼ Bromate
- ▼ Chlorine(MRDL) Monitoring and Results

DBP**Applicability**

DBP Monitoring applies to Community Water Systems and Non-Transient Non-Community water systems that add a chemical disinfectant (excluding U/V disinfection) to their water or that purchase from a system that adds a chemical disinfectant.

Description

Disinfectant Byproducts (DBPs) include Total Trihalomethanes (TTHM) and Haloacetic Acids (HAA5). These byproducts are formed when chemical disinfectants react with organic compounds (such as TOC). DBPs are a health concern because they may cause cancer, as well as liver, kidney, and central nervous system problems.

Monitoring

DBP Monitoring applies to Community Water Systems and Non-Transient Non-Community water systems that add a chemical disinfectant (excluding U/V disinfection) to their water or that purchase from a system that adds a chemical disinfectant. Monitoring is summarized in the table below:

Monitoring for Total Trihalomethanes & Haloacetic Acids

System Type	Routine Monitoring	Reduced Monitoring
Surface Water with Population 10,000 & Up	4 Samples per Plant per Quarter	1 Sample per Plant per Quarter
Surface Water with Population 500 – 9,999	1 Sample per Plant per Quarter	1 Sample per Plant per Year
Surface Water with Population less than 500	1 Sample per Plant per Year	No reduction
Groundwater with Population 10,000 & Up	1 Sample per Plant per Quarter	1 Sample per Plant per Year
Groundwater with Population less than 10,000	1 Sample per Plant per Year	1 Sample per Plant per 3 Year Cycle (Jan 1 – Dec 31)

Note: Surface water systems are eligible for reduced monitoring frequency when both DBP levels are $\leq$ 50% of the MCL and monthly source water TOC running annual average is $\leq$ 4.0 mg/l. (Once on reduced DBP monitoring, source water TOC can be reduced to quarterly.) Groundwater systems are eligible for reduced monitoring based on disinfection byproduct monitoring alone. A "Plant" can be a treatment facility, entry point, well, or a wellfield and is the point at which a disinfectant is added (refer to your water system info page to view a list of your active treatment plants and which plants include adding a disinfectant as a treatment process).

Monitoring schedules for your particular system will be available in the coming months.

Sample Points

Sample sites for your water system are listed below. DBPMAX refers to the point of maximum residence time in the distribution system and generally, this is the point farthest from the point of disinfection. DBP without the "MAX" designation refers to points within the distribution that represent an average disinfectant level.

DBP Sample Points for PWS ID: 00130 ---- BOARDMAN, CITY OF

Sample Point ID	Location
-----------------	----------

DBPMAX01

DBPMAX01

Results

All Results will be entered and taken into consideration when setting monitoring schedules and will be available in the coming months.

Maximum Contaminant Levels

Disinfection Byproduct	Maximum Contaminant Level (mg/l)
Total Trihalomethanes (TTHM)	0.080 as a Running Annual Average
Haloacetic Acids (five) (HAA5)	0.060 as a Running Annual Average

Determining Compliance with the Maximum Contaminant Levels

A running annual average is the arithmetic average of results and is calculated at the end of every quarter for the previous consecutive four-quarter period. Compliance is achieved when the running annual average of TTHM results are less than 0.080 mg/L and the running annual average of HAA5 results are below 0.060 mg/L.

Fact Sheets

Trihalomethanes Health Effects [\(PDF\)](#)

Haloacetic Acids Health Effects [\(PDF\)](#)

Quick Reference Guide (2 pages) [\(PDF\)](#)

General M-DBP Fact Sheet (5 pages) [\(PDF\)](#)

Stage 1 DBPR Fact Sheet (4 pages) [\(PDF\)](#)

EPA Microbial and Disinfectant Byproduct Rules Simultaneous Compliance Guidance Manual (150 pages) [\(PDF\)](#)

Flow Chart For Surface Water or Groundwater Under the Influence of Surface Water Sources [\(PDF\)](#)

Educational

Stage 1 Disinfection Byproduct Monitoring (PowerPoint presentation)

TOC**Applicability**

TOC monitoring applies to Community and Non-Transient Non-Community systems using surface water or groundwater under the direct influence of surface water and that add a chemical disinfectant and use conventional filtration (2.5-log) or softening. Monitoring also applies to any system seeking a reduction in DBP monitoring, but does not meet the applicability requirements described above, however, only raw water TOC sampling applies in this case.

NOT REQUIRED

(Raw TOC monitoring must be done quarterly by surface water systems on reduced DBP monitoring)

BOARDMAN, CITY OF (PWS ID: #00130)

Is not required to sample Raw water TOC, raw water Alkalinity, and Filtered Water TOC

Description

Total Organic Carbon (TOC) is naturally found in water and can react with disinfectants to produce DBPs. Reduction of TOC limits the formation of DBPs.

Monitoring

Community and Non-Transient Non-Community Systems

For Surface Systems with Conventional Treatment Plants (2.5-log) Only

Parameter	Routine Monitoring	Reduced Monitoring
Raw water TOC	1 Sample per month	1 Sample per quarter
Filtered water TOC	1 Sample per month	1 Sample per quarter
Raw water alkalinity	1 Sample per month	1 Sample per quarter

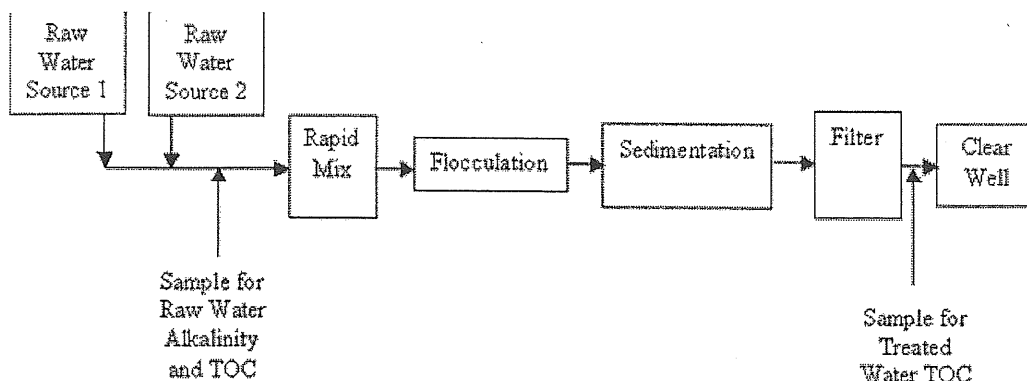
Note: Water systems are eligible for reduced monitoring frequency when the average treated TOC for 1 year is < 1.0 mg/l or the average treated TOC for 2 years is < 2.0 mg/l.

Sampling for both raw and filtered water parameters should occur on the same day.

Monitoring schedules for your particular system will be available in the coming months.

Sample Points

Sample sites for your water system should include a site at the raw water source coming into the treatment plant and the combined filter effluent. Example:



Results

All Results will be entered and taken into consideration when setting monitoring schedules and will be available in the coming months.

Minimum Treatment Technique Required (Equivalent to Maximum Contaminant Level)

The Minimum Treatment Technique Required is based on whether enhanced coagulation is required and on a ratio of the percent of TOC actually removed to the percent of TOC that should have been removed.

The running annual average of ratios must be greater than or equal to 1.00 (i.e. the amount of TOC that was actually removed must be equal to or greater than the TOC that should have been removed). A running annual average is the arithmetic average of a year's worth of monthly TOC results and is calculated at the end of every quarter.

Determining Compliance with the Minimum Treatment Technique Required

Compliance is based upon if you need enhanced coagulation. Answer the following six questions in the order that they are listed to determine if you need enhanced coagulation. (If you answer any of the questions with "Yes", you do not need to answer the rest of the questions).

Question #	Question	Answer (Yes/No)
1	Is the current Raw Water Running Annual Average (RAA) TOC (the average of the prior 12 months worth of raw water TOC data) less than or equal to 2.0 mg/L?	
2	Is the Filtered Water RAA TOC (average of the prior 12 months worth of combined filter effluent TOC data) less than or equal to 2.0 mg/L?	
3	Is the current Raw Water RAA TOC ≤ 4.0 mg/L, and the current Raw Water RAA Alkalinity > 60 mg/L, and the current RAA for HAA5 $\leq .030$ mg/L, and the current RAA for TTHM $\leq .040$ mg/L?	
4	Is Chlorine the only disinfectant used and is the current RAA for HAA5 $\leq .030$ mg/L and current RAA for TTHM $\leq .040$ mg/L?	
5	If you conduct source water specific UV light absorbance (SUVA) monitoring, is the current RAA SUVA < 2.0 L/mg-m? (your answer should be "No" if you do not conduct this monitoring)	
6	If you conduct filtered water SUVA monitoring, is the current RAA SUVA < 2.0 L/mg-m? (your answer should be "No" if you do not conduct this monitoring)	

If you answered "Yes" to any of the previous six questions, you are qualified to opt out of enhanced coagulation and you will not need to comply with the Minimum Treatment Technique Requirements (i.e. you do not need to use the Minimum Treatment Technique Requirement Compliance Calculations described below), however, the monitoring requirements still apply and all results must still be submitted to the Drinking Water Program.

If you did not answer "Yes" to any of the six questions, you cannot opt out of enhanced coagulation and compliance is based on a

ratio of the percent of TOC actually removed to the percent of TOC that should have been removed. Use the following compliance calculations to determine compliance with the Minimum Treatment Technique Requirement:

Minimum Treatment Technique Requirement Compliance Calculations

In order to achieve compliance, the running annual average of the ratio of the percent of TOC actually removed to the percent of TOC that should have been removed must be greater than or equal to 1.00 (i.e. the amount of TOC that was actually removed must be equal to or greater than the TOC that should have been removed). A running annual average is the arithmetic average of results and is calculated at the end of every quarter.

Where

TOC Actually Removed = TOC concentration (in mg/L) of raw water before filtration divided by the TOC concentration (in mg/L) of the combined filter effluent water.

TOC that should have been removed is based on the raw water TOC and the raw water alkalinity according to the following:

Source Water TOC (mg/l)	Source Water Alkalinity, mg/l as CaCO ₃		
	0 - 60	61 - 120	> 120*
> 2.0 – 4.0	35.0%	25.0%	15.0%
> 4.0 – 8.0	45.0%	35.0%	25.0%
> 8.0	50.0%	40.0%	30.0%

* Systems using enhanced softening must use the TOC removal percentages in this column.

Example: if the raw water alkalinity = 65 mg/L and the raw water TOC = 9.0 mg/L, then the required removal percentage = 40.0%.

Note: It is important to recognize that this percentage can change from month to month depending on the actual raw water TOC and Alkalinity.

Example:

Calculations to Determine Compliance with the Required Removal Ratio of 1.00

Source of Data	Parameter	Results
Raw Water Sampling Data	Source (Raw) Water Alkalinity	65 mg/L
Raw Water Sampling Data	Raw Water TOC	9.0 mg/L
Table of Required Removal Percentages (shown above)	Required Removal Percentage	40.0%
Treated Water Sampling Data	Treated Water TOC	4.0 mg/L
Calculated as Shown	TOC Removed (Raw Water TOC – Treated Water TOC)	9.0 – 4.0 = 5.0 mg/L
Calculated as Shown	Actual Removal Percentage (TOC Removed/Raw Water TOC)	5.0 / 9.0 = 0.556 (or 55.6%)
Calculated as Shown	Calculation of Removal Ratio (Actual Removal Percentage / Required Removal Percentage)	55.6 / 40.0 = 1.39
Calculated as Shown	Ultimate Removal Ratio	1.39 (which is greater than 1.00 therefore, compliance is achieved)

Bromate

Applicability

Bromate monitoring applies to Community and Non-Transient Non-Community systems using ozone as a disinfectant or oxidant.

Description

Bromate is disinfectant byproduct that is formed when ozone is used as a disinfectant in the presence of bromide, which is a naturally occurring element found in ground and surface water sources. Some people who drink water containing bromate in excess of the MCL over many years may have an increased risk of getting cancer.

Monitoring

Monitoring for Bromate for Systems Using Ozone

Location	Routine Monitoring	Reduced Monitoring
Entry Point for the WTP with Ozone	1 Sample per Month	1 Sample per Quarter

Note: Systems required to analyze for bromate may reduce monitoring from monthly to once per quarter, if the system demonstrates that the running annual average bromate concentration is less than or equal to < 0.0025 mg/L based upon routine monthly bromate measurements for the most recent four quarters.

Monitoring schedules for your particular system will be available in the coming months.

Sample Points

Sampling for your water system should be at the entry point to the distribution system.

Results

All Results will be entered and taken into consideration when setting monitoring schedules and will be available in the coming months.

Maximum Contaminant Level

The maximum contaminant level for Bromate is 0.010 mg/L.

Determining Compliance with the Maximum Contaminant Level

Compliance with the MCL is based on a running annual average. A running annual average is the arithmetic average of results and is calculated at the end of every quarter.

Chlorine Residual Disinfectant Level**Applicability**

Chlorine Residual monitoring is applicable to all Community and Non-Transient Non-Community water systems that use chlorine or chloramines as a disinfectant.

Description

Chlorine is a disinfectant that is used to control microbes. Some people who use water containing chlorine well in excess of the Maximum Residual Disinfectant Level could experience irritating effects to their eyes and nose and could experience stomach discomfort and anemia.

Monitoring

Systems must monitor for chlorine and chloramines every time they sample for total coliform - this includes repeat sampling.

Sample Points

Samples must be taken at the same location in the distribution system as those locations used for total coliform sampling. This is a separate requirement from the daily monitoring and recording of the disinfectant residual.

Results

Results may be submitted on the coliform sampling form (or on the coliform sampling summary forms) that each system currently uses. All Results will be entered and taken into consideration when setting monitoring schedules and will be available in the coming months. Schedules will reflect the current coliform monitoring schedules already available on-line at the following link located at the bottom of your water system's info page: Sampling Schedule-Coliform

Maximum Residual Disinfectant Level (MRDL)

The MRDL for chlorine is 4.0 mg/L (measured as free chlorine).

Determining Compliance with the MRDL

Compliance with the MRDL is based on a running annual average of monthly averages. Any running annual average that exceeds the MRDL is a violation.



Oregon Public Health Drinking Water Data Online



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ND = Not Detected at the Minimum Reporting Level; - = Not Sampled; [View all radionuclides](#)

Radionuclide Monitoring - PWS ID: <u>00130</u> = BOARDMAN, CITY OF						
Sample Date	Receive Date	Source ID	Gross Alpha [pCi/L] (EPA 4002, 4000) MCL = 15	Radium Combined (226,228) [pCi/L] (EPA 4010) MCL = 5	Uranium Combined [mg/L] (EPA 4006) MCL = .03	Gross Beta Particle Activity [pCi/L] (EPA 4100) MCL = 50
10/11/11	12/01/11	EP-A	-	-	0.0007700	-
12/08/03	03/10/04	EP-A	-	ND	ND	-
02/07/03	04/04/03	EP-A	ND	ND	0.0090000	-
04/18/02	11/18/02	EP-A	ND	-	-	-
Archived Results						
Sample Date	Receive Date	Chemical	Source ID	Results	MCL	
09/18/91	11/07/91	Gross Alpha, Excl. Radon & U	A	ND	15.0000	
09/09/87	09/25/87	Gross Alpha, Excl. Radon & U	A	0.3400000	15.0000	

**Oregon Public Health
Drinking Water Data Online**

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[Spreadsheet](#)

Facility Analyte Levels - PWS ID: 00130 — BOARDMAN, CITY OF

Source	Start Date	End Date	Control Level	Measure	UOM	Analyte	Analyte Code	MDBP Flag
DISTRIBUTION SYSTEM	01/01/2004		MAX	4.0000000	MG/L	CHLORINE	0999	Y



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ND = Not Detected at the Minimum Reporting Level

[Spreadsheet](#)

Latest Chemical Results - PWS ID: 00130 — BOARDMAN, CITY OF

Sample ID	Sample Date	Receive Date	Chemical	Source ID	Results	Current MCL	UOM
141001044001-D	09/30/2014	10/22/2014	TOTAL HALOACETIC ACIDS (HAA5)	DIST-A	0.0056200	0.0600000	MG/L
141001044001-D	09/30/2014	10/22/2014	TTHM	DIST-A	0.0258000	0.0800000	MG/L
141003041001-D	09/30/2014	10/22/2014	TOTAL HALOACETIC ACIDS (HAA5)	DIST-A	0.0063400	0.0600000	MG/L
141003041001-D	09/30/2014	10/22/2014	TTHM	DIST-A	0.0213000	0.0800000	MG/L
414801801-I	05/27/2014	06/10/2014	ARSENIC	EP-A	ND	0.0100000	MG/L
414801801-I	05/27/2014	06/10/2014	NITRATE	EP-A	1.1300000	10.000000	MG/L
140213025001-S	02/06/2014	03/06/2014	1,2-DIBROMO-3-CHLOROPROPANE	EP-A	ND	0.0002000	MG/L
140213025001-S	02/06/2014	03/06/2014	2,4,5-TP	EP-A	ND	0.0500000	MG/L
140213025001-S	02/06/2014	03/06/2014	2,4-D	EP-A	ND	0.0700000	MG/L
140213025001-S	02/06/2014	03/06/2014	ATRAZINE	EP-A	ND	0.0030000	MG/L
140213025001-S	02/06/2014	03/06/2014	BENZO(A)PYRENE	EP-A	ND	0.0002000	MG/L
140213025001-S	02/06/2014	03/06/2014	BHC-GAMMA	EP-A	ND	0.0002000	MG/L
140213025001-S	02/06/2014	03/06/2014	CARBOFURAN	EP-A	ND	0.0400000	MG/L
140213025001-S	02/06/2014	03/06/2014	CHLORDANE	EP-A	ND	0.0020000	MG/L
140213025001-S	02/06/2014	03/06/2014	DALAPON	EP-A	ND	0.2000000	MG/L
140213025001-S	02/06/2014	03/06/2014	DI(2-ETHYLHEXYL) ADIPATE	EP-A	ND	0.4000000	MG/L
140213025001-S	02/06/2014	03/06/2014	DI(2-ETHYLHEXYL) PHTHALATE	EP-A	ND	0.0060000	MG/L
140213025001-S	02/06/2014	03/06/2014	DINOSEB	EP-A	ND	0.0070000	MG/L
140213025001-S	02/06/2014	03/06/2014	DIQUAT	EP-A	ND	0.0200000	MG/L
140213025001-S	02/06/2014	03/06/2014	ENDOTHALL	EP-A	ND	0.1000000	MG/L
140213025001-S	02/06/2014	03/06/2014	ENDRIN	EP-A	ND	0.0020000	MG/L
140213025001-S	02/06/2014	03/06/2014	ETHYLENE DIBROMIDE	EP-A	ND	0.0000500	MG/L
140213025001-S	02/06/2014	03/06/2014	GLYPHOSATE	EP-A	ND	0.7000000	MG/L
140213025001-S	02/06/2014	03/06/2014	HEPTACHLOR	EP-A	ND	0.0004000	MG/L
140213025001-S	02/06/2014	03/06/2014	HEPTACHLOR EPOXIDE	EP-A	ND	0.0002000	MG/L
140213025001-S	02/06/2014	03/06/2014	HEXACHLOROBENZENE	EP-A	ND	0.0010000	MG/L
140213025001-S	02/06/2014	03/06/2014	HEXACHLOROCYCLOPENTADIENE	EP-A	ND	0.0500000	MG/L
140213025001-S	02/06/2014	03/06/2014	LASSO	EP-A	ND	0.0020000	MG/L
140213025001-S	02/06/2014	03/06/2014	METHOXYCHLOR	EP-A	ND	0.0400000	MG/L
140213025001-S	02/06/2014	03/06/2014	OXAMYL	EP-A	ND	0.2000000	MG/L
140213025001-S	02/06/2014	03/06/2014	PENTACHLOROPHENOL	EP-A	ND	0.0010000	MG/L
140213025001-S	02/06/2014	03/06/2014	PICLORAM	EP-A	ND	0.5000000	MG/L
140213025001-S	02/06/2014	03/06/2014	SIMAZINE	EP-A	ND	0.0040000	MG/L
140213025001-S	02/06/2014	03/06/2014	TOTAL POLYCHLORINATED BIPHENYLS (PCB)	EP-A	ND	0.0005000	MG/L
140213025001-S	02/06/2014	03/06/2014	TOXAPHENE	EP-A	ND	0.0030000	MG/L
333100404-I	11/26/2013	12/09/2013	NITRATE	EP-A	0.7870000	10.000000	MG/L
229700403-I	10/22/2012	10/25/2012	NITRATE	EP-A	1.9000000	10.000000	MG/L
226201703	09/17/2012	10/05/2012	COPPER	DIST-A	0.1500000	1.3000000	MG/L

226201703	09/17/2012	10/05/2012	LEAD	DIST-A	0.0030000	0.0150000	MG/L
226201704	09/17/2012	10/05/2012	COPPER	DIST-A	0.0870000	1.3000000	MG/L
226201704	09/17/2012	10/05/2012	LEAD	DIST-A	ND	0.0150000	MG/L
226201709	09/17/2012	10/05/2012	COPPER	DIST-A	ND	1.3000000	MG/L
226201709	09/17/2012	10/05/2012	LEAD	DIST-A	ND	0.0150000	MG/L
226201711	09/17/2012	10/05/2012	COPPER	DIST-A	ND	1.3000000	MG/L
226201711	09/17/2012	10/05/2012	LEAD	DIST-A	ND	0.0150000	MG/L
226201712	09/14/2012	10/05/2012	COPPER	DIST-A	0.0540000	1.3000000	MG/L
226201712	09/14/2012	10/05/2012	LEAD	DIST-A	ND	0.0150000	MG/L
226201718	09/14/2012	10/05/2012	COPPER	DIST-A	0.1070000	1.3000000	MG/L
226201718	09/14/2012	10/05/2012	LEAD	DIST-A	ND	0.0150000	MG/L
226201719	09/14/2012	10/05/2012	COPPER	DIST-A	ND	1.3000000	MG/L
226201719	09/14/2012	10/05/2012	LEAD	DIST-A	ND	0.0150000	MG/L
226201701	09/13/2012	10/05/2012	COPPER	DIST-A	ND	1.3000000	MG/L
226201701	09/13/2012	10/05/2012	LEAD	DIST-A	ND	0.0150000	MG/L
226201702	09/13/2012	10/05/2012	COPPER	DIST-A	0.2700000	1.3000000	MG/L
226201702	09/13/2012	10/05/2012	LEAD	DIST-A	ND	0.0150000	MG/L
226201705	09/13/2012	10/05/2012	COPPER	DIST-A	ND	1.3000000	MG/L
226201705	09/13/2012	10/05/2012	LEAD	DIST-A	ND	0.0150000	MG/L
226201706	09/13/2012	10/05/2012	COPPER	DIST-A	0.1350000	1.3000000	MG/L
226201706	09/13/2012	10/05/2012	LEAD	DIST-A	ND	0.0150000	MG/L
226201707	09/13/2012	10/05/2012	COPPER	DIST-A	ND	1.3000000	MG/L
226201707	09/13/2012	10/05/2012	LEAD	DIST-A	ND	0.0150000	MG/L
226201708	09/13/2012	10/05/2012	COPPER	DIST-A	0.2130000	1.3000000	MG/L
226201708	09/13/2012	10/05/2012	LEAD	DIST-A	0.0130000	0.0150000	MG/L
226201710	09/13/2012	10/05/2012	COPPER	DIST-A	ND	1.3000000	MG/L
226201710	09/13/2012	10/05/2012	LEAD	DIST-A	0.0020000	0.0150000	MG/L
226201713	09/13/2012	10/05/2012	COPPER	DIST-A	0.0550000	1.3000000	MG/L
226201713	09/13/2012	10/05/2012	LEAD	DIST-A	ND	0.0150000	MG/L
226201714	09/13/2012	10/05/2012	COPPER	DIST-A	ND	1.3000000	MG/L
226201714	09/13/2012	10/05/2012	LEAD	DIST-A	ND	0.0150000	MG/L
226201715	09/13/2012	10/05/2012	COPPER	DIST-A	0.0920000	1.3000000	MG/L
226201715	09/13/2012	10/05/2012	LEAD	DIST-A	0.0030000	0.0150000	MG/L
226201716	09/13/2012	10/05/2012	COPPER	DIST-A	0.2120000	1.3000000	MG/L
226201716	09/13/2012	10/05/2012	LEAD	DIST-A	ND	0.0150000	MG/L
226201717	09/13/2012	10/05/2012	COPPER	DIST-A	0.2520000	1.3000000	MG/L
226201717	09/13/2012	10/05/2012	LEAD	DIST-A	ND	0.0150000	MG/L
226201720	09/13/2012	10/05/2012	COPPER	DIST-A	0.3710000	1.3000000	MG/L
226201720	09/13/2012	10/05/2012	LEAD	DIST-A	ND	0.0150000	MG/L
111012052001-V	10/11/2011	11/02/2011	1,1,1-TRICHLOROETHANE	EP-A	ND	0.2000000	MG/L
111012052001-V	10/11/2011	11/02/2011	1,1,2-TRICHLOROETHANE	EP-A	ND	0.0050000	MG/L
111012052001-V	10/11/2011	11/02/2011	1,1-DICHLOROETHYLENE	EP-A	ND	0.0070000	MG/L
111012052001-V	10/11/2011	11/02/2011	1,2,4-TRICHLOROBENZENE	EP-A	ND	0.0700000	MG/L
111012052001-V	10/11/2011	11/02/2011	1,2-DICHLOROETHANE	EP-A	ND	0.0050000	MG/L
111012052001-V	10/11/2011	11/02/2011	1,2-DICHLOROPROPANE	EP-A	ND	0.0050000	MG/L
111012052001-V	10/11/2011	11/02/2011	BENZENE	EP-A	ND	0.0050000	MG/L
111012052001-V	10/11/2011	11/02/2011	CARBON TETRACHLORIDE	EP-A	ND	0.0050000	MG/L

111012052001-V	10/11/2011	11/02/2011	CHLOROBENZENE	EP-A	ND	0.1000000	MG/L
111012052001-V	10/11/2011	11/02/2011	CIS-1,2-DICHLOROETHYLENE	EP-A	ND	0.0700000	MG/L
111012052001-V	10/11/2011	11/02/2011	DICHLROMETHANE	EP-A	ND	0.0050000	MG/L
111012052001-V	10/11/2011	11/02/2011	ETHYLBENZENE	EP-A	ND	0.7000000	MG/L
111012052001-V	10/11/2011	11/02/2011	O-DICHLOROBENZENE	EP-A	ND	0.6000000	MG/L
111012052001-V	10/11/2011	11/02/2011	P-DICHLOROBENZENE	EP-A	ND	0.0750000	MG/L
111012052001-V	10/11/2011	11/02/2011	STYRENE	EP-A	ND	0.1000000	MG/L
111012052001-V	10/11/2011	11/02/2011	TETRACHLOROETHYLENE	EP-A	ND	0.0050000	MG/L
111012052001-V	10/11/2011	11/02/2011	TOLUENE	EP-A	ND	1.0000000	MG/L
111012052001-V	10/11/2011	11/02/2011	TRANS-1,2-DICHLOROETHYLENE	EP-A	ND	0.1000000	MG/L
111012052001-V	10/11/2011	11/02/2011	TRICHLOROETHYLENE	EP-A	ND	0.0050000	MG/L
111012052001-V	10/11/2011	11/02/2011	VINYL CHLORIDE	EP-A	ND	0.0020000	MG/L
111012052001-V	10/11/2011	11/02/2011	XYLENES, TOTAL	EP-A	ND	10.000000	MG/L
111012052002-S	10/11/2011	11/02/2011	1,2-DIBROMO-3-CHLOROPROPANE	EP-A	ND	0.0002000	MG/L
111012052002-S	10/11/2011	11/02/2011	2,4,5-TP	EP-A	ND	0.0500000	MG/L
111012052002-S	10/11/2011	11/02/2011	2,4-D	EP-A	ND	0.0700000	MG/L
111012052002-S	10/11/2011	11/02/2011	ATRAZINE	EP-A	ND	0.0030000	MG/L
111012052002-S	10/11/2011	11/02/2011	BENZO(A)PYRENE	EP-A	ND	0.0002000	MG/L
111012052002-S	10/11/2011	11/02/2011	BHC-GAMMA	EP-A	ND	0.0002000	MG/L
111012052002-S	10/11/2011	11/02/2011	CARBOFURAN	EP-A	ND	0.0400000	MG/L
111012052002-S	10/11/2011	11/02/2011	CHLORDANE	EP-A	ND	0.0020000	MG/L
111012052002-S	10/11/2011	11/02/2011	DALAPON	EP-A	ND	0.2000000	MG/L
111012052002-S	10/11/2011	11/02/2011	DI(2-ETHYLHEXYL) ADIPATE	EP-A	ND	0.4000000	MG/L
111012052002-S	10/11/2011	11/02/2011	DI(2-ETHYLHEXYL) PHTHALATE	EP-A	ND	0.0060000	MG/L
111012052002-S	10/11/2011	11/02/2011	DINOSEB	EP-A	ND	0.0070000	MG/L
111012052002-S	10/11/2011	11/02/2011	DIQUAT	EP-A	ND	0.0200000	MG/L
111012052002-S	10/11/2011	11/02/2011	ENDOTHALL	EP-A	ND	0.1000000	MG/L
111012052002-S	10/11/2011	11/02/2011	ENDRIN	EP-A	ND	0.0020000	MG/L
111012052002-S	10/11/2011	11/02/2011	ETHYLENE DIBROMIDE	EP-A	ND	0.0000500	MG/L
111012052002-S	10/11/2011	11/02/2011	GLYPHOSATE	EP-A	ND	0.7000000	MG/L
111012052002-S	10/11/2011	11/02/2011	HEPTACHLOR	EP-A	ND	0.0004000	MG/L
111012052002-S	10/11/2011	11/02/2011	HEPTACHLOR EPOXIDE	EP-A	ND	0.0002000	MG/L
111012052002-S	10/11/2011	11/02/2011	HEXACHLOROBENZENE	EP-A	ND	0.0010000	MG/L
111012052002-S	10/11/2011	11/02/2011	HEXACHLOROCYCLOPENTADIENE	EP-A	ND	0.0500000	MG/L
111012052002-S	10/11/2011	11/02/2011	LISSO	EP-A	ND	0.0020000	MG/L
111012052002-S	10/11/2011	11/02/2011	METHOXYCHLOR	EP-A	ND	0.0400000	MG/L
111012052002-S	10/11/2011	11/02/2011	OXAMYL	EP-A	ND	0.2000000	MG/L
111012052002-S	10/11/2011	11/02/2011	PENTACHLOROPHENOL	EP-A	ND	0.0010000	MG/L
111012052002-S	10/11/2011	11/02/2011	PICLORAM	EP-A	ND	0.5000000	MG/L
111012052002-S	10/11/2011	11/02/2011	SIMAZINE	EP-A	ND	0.0040000	MG/L
111012052002-S	10/11/2011	11/02/2011	TOTAL POLYCHLORINATED BIPHENYLS (PCB)	EP-A	ND	0.0005000	MG/L
111012052002-S	10/11/2011	11/02/2011	TOXAPHENE	EP-A	ND	0.0030000	MG/L
11101646001A-R	10/11/2011	12/01/2011	COMBINED URANIUM	EP-A	0.0007700	0.0300000	MG/L
128500404-I	10/11/2011	11/04/2011	ARSENIC	EP-A	ND	0.0100000	MG/L
128500404-I	10/11/2011	11/04/2011	NITRATE	EP-A	0.6000000	10.000000	MG/L
127201701-D	09/28/2011	11/04/2011	TOTAL HALOACETIC ACIDS (HAA5)	DIST-A	0.0058000	0.0600000	MG/L

127201701-D	09/28/2011	11/04/2011	TTHM	DIST-A	0.0311000	0.0800000	MG/L
110222H-A	02/22/2011	04/05/2011	ASBESTOS	DIST-A	ND	7.0000000	MFL
1006807-I	03/08/2010	03/17/2010	NITRATE	EP-A	1.0000000	10.000000	MG/L
080924E2	09/24/2008	11/07/2008	TOTAL HALOACETIC ACIDS (HAA5)	DIST-A	0.0049700	0.0600000	MG/L
080924E2	09/24/2008	11/07/2008	TTHM	DIST-A	0.0155000	0.0800000	MG/L
080924E1-I	09/24/2008	11/07/2008	ARSENIC	EP-A	0.0041500	0.0100000	MG/L
080924E1-S	09/24/2008	11/07/2008	1,2-DIBROMO-3-CHLOROPROPANE	EP-A	ND	0.0002000	MG/L
080924E1-S	09/24/2008	11/07/2008	2,4,5-TP	EP-A	ND	0.0500000	MG/L
080924E1-S	09/24/2008	11/07/2008	2,4-D	EP-A	ND	0.0700000	MG/L
080924E1-S	09/24/2008	11/07/2008	ATRAZINE	EP-A	ND	0.0030000	MG/L
080924E1-S	09/24/2008	11/07/2008	BENZO(A)PYRENE	EP-A	ND	0.0002000	MG/L
080924E1-S	09/24/2008	11/07/2008	BHC-GAMMA	EP-A	ND	0.0002000	MG/L
080924E1-S	09/24/2008	11/07/2008	CARBOFURAN	EP-A	ND	0.0400000	MG/L
080924E1-S	09/24/2008	11/07/2008	CHLORDANE	EP-A	ND	0.0020000	MG/L
080924E1-S	09/24/2008	11/07/2008	DALAPON	EP-A	ND	0.2000000	MG/L
080924E1-S	09/24/2008	11/07/2008	DI(2-ETHYLHEXYL) ADIPATE	EP-A	ND	0.4000000	MG/L
080924E1-S	09/24/2008	11/07/2008	DI(2-ETHYLHEXYL) PHTHALATE	EP-A	ND	0.0060000	MG/L
080924E1-S	09/24/2008	11/07/2008	DINOSEB	EP-A	ND	0.0070000	MG/L
080924E1-S	09/24/2008	11/07/2008	DIQUAT	EP-A	ND	0.0200000	MG/L
080924E1-S	09/24/2008	11/07/2008	ENDOTHALL	EP-A	ND	0.1000000	MG/L
080924E1-S	09/24/2008	11/07/2008	ENDRIN	EP-A	ND	0.0020000	MG/L
080924E1-S	09/24/2008	11/07/2008	ETHYLENE DIBROMIDE	EP-A	ND	0.0000500	MG/L
080924E1-S	09/24/2008	11/07/2008	GLYPHOSATE	EP-A	ND	0.7000000	MG/L
080924E1-S	09/24/2008	11/07/2008	HEPTACHLOR	EP-A	ND	0.0004000	MG/L
080924E1-S	09/24/2008	11/07/2008	HEPTACHLOR EPOXIDE	EP-A	ND	0.0002000	MG/L
080924E1-S	09/24/2008	11/07/2008	HEXACHLOROBENZENE	EP-A	ND	0.0010000	MG/L
080924E1-S	09/24/2008	11/07/2008	HEXACHLOROCYCLOPENTADIENE	EP-A	ND	0.0500000	MG/L
080924E1-S	09/24/2008	11/07/2008	LASSO	EP-A	ND	0.0020000	MG/L
080924E1-S	09/24/2008	11/07/2008	METHOXYCHLOR	EP-A	ND	0.0400000	MG/L
080924E1-S	09/24/2008	11/07/2008	OXAMYL	EP-A	ND	0.2000000	MG/L
080924E1-S	09/24/2008	11/07/2008	PENTACHLOROPHENOL	EP-A	ND	0.0010000	MG/L
080924E1-S	09/24/2008	11/07/2008	PICLORAM	EP-A	ND	0.5000000	MG/L
080924E1-S	09/24/2008	11/07/2008	SIMAZINE	EP-A	ND	0.0040000	MG/L
080924E1-S	09/24/2008	11/07/2008	TOTAL POLYCHLORINATED BIPHENYLS (PCB)	EP-A	ND	0.0005000	MG/L
080924E1-S	09/24/2008	11/07/2008	TOXAPHENE	EP-A	ND	0.0030000	MG/L
080924E1-V	09/24/2008	11/07/2008	1,1,1-TRICHLOROETHANE	EP-A	ND	0.2000000	MG/L
080924E1-V	09/24/2008	11/07/2008	1,1,2-TRICHLOROETHANE	EP-A	ND	0.0050000	MG/L
080924E1-V	09/24/2008	11/07/2008	1,1-DICHLOROETHYLENE	EP-A	ND	0.0070000	MG/L
080924E1-V	09/24/2008	11/07/2008	1,2,4-TRICHLOROBENZENE	EP-A	ND	0.0700000	MG/L
080924E1-V	09/24/2008	11/07/2008	1,2-DICHLOROETHANE	EP-A	ND	0.0050000	MG/L
080924E1-V	09/24/2008	11/07/2008	1,2-DICHLOROPROPANE	EP-A	ND	0.0050000	MG/L
080924E1-V	09/24/2008	11/07/2008	BENZENE	EP-A	ND	0.0050000	MG/L
080924E1-V	09/24/2008	11/07/2008	CARBON TETRACHLORIDE	EP-A	ND	0.0050000	MG/L
080924E1-V	09/24/2008	11/07/2008	CHLOROBENZENE	EP-A	ND	0.1000000	MG/L
080924E1-V	09/24/2008	11/07/2008	CIS-1,2-DICHLOROETHYLENE	EP-A	ND	0.0700000	MG/L
080924E1-V	09/24/2008	11/07/2008	DICHLOROMETHANE	EP-A	ND	0.0050000	MG/L

080924E1-V	09/24/2008	11/07/2008	ETHYLBENZENE	EP-A	ND	0.7000000	MG/L
080924E1-V	09/24/2008	11/07/2008	O-DICHLOROBENZENE	EP-A	ND	0.6000000	MG/L
080924E1-V	09/24/2008	11/07/2008	P-DICHLOROBENZENE	EP-A	ND	0.0750000	MG/L
080924E1-V	09/24/2008	11/07/2008	STYRENE	EP-A	ND	0.1000000	MG/L
080924E1-V	09/24/2008	11/07/2008	TETRACHLOROETHYLENE	EP-A	ND	0.0050000	MG/L
080924E1-V	09/24/2008	11/07/2008	TOLUENE	EP-A	ND	1.0000000	MG/L
080924E1-V	09/24/2008	11/07/2008	TRANS-1,2-DICHLOROETHYLENE	EP-A	ND	0.1000000	MG/L
080924E1-V	09/24/2008	11/07/2008	TRICHLOROETHYLENE	EP-A	ND	0.0050000	MG/L
080924E1-V	09/24/2008	11/07/2008	VINYL CHLORIDE	EP-A	ND	0.0020000	MG/L
080924E1-V	09/24/2008	11/07/2008	XYLENES, TOTAL	EP-A	ND	10.000000	MG/L
080924E1Q-I	09/24/2008	11/07/2008	NITRATE	EP-A	2.9200000	10.000000	MG/L
A70430AC1	04/30/2007	05/14/2007	NITRATE	EP-A	1.1000000	10.000000	MG/L
A60327AL-1	03/27/2006	04/17/2006	NITRATE	EP-A	1.2000000	10.000000	MG/L
A41122AW-1	11/22/2004	12/07/2004	NITRATE	EP-A	0.9000000	10.000000	MG/L
A40927AR	09/27/2004	11/08/2004	TOTAL HALOACETIC ACIDS (HAA5)	DIST-A	0.0059000	0.0600000	MG/L
A40927AR	09/27/2004	11/08/2004	TTHM	DIST-A	0.0186000	0.0800000	MG/L
A31208X-1R	12/08/2003	03/10/2004	COMBINED RADIUM (-226 & -228)	EP-A	ND	5.0000000	PCI/L
A31208X-1R	12/08/2003	03/10/2004	COMBINED URANIUM	EP-A	ND	0.0300000	MG/L
A30630Y-1	06/30/2003	08/12/2003	NITRATE	EP-B	4.4000000	10.000000	MG/L
A30630Y-1	06/30/2003	08/12/2003	NITRATE-NITRITE	EP-B	4.4000000	10.000000	MG/L
A30630Y-1	06/30/2003		NITRITE	EP-B	ND	1.0000000	MG/L
A30207U-1I	02/07/2003	04/04/2003	ANTIMONY, TOTAL	EP-A	ND	0.0060000	MG/L
A30207U-1I	02/07/2003	04/04/2003	ARSENIC	EP-A	0.0084000	0.0100000	MG/L
A30207U-1I	02/07/2003	04/04/2003	BARIUM	EP-A	0.0450000	2.0000000	MG/L
A30207U-1I	02/07/2003	04/04/2003	BERYLLIUM, TOTAL	EP-A	ND	0.0040000	MG/L
A30207U-1I	02/07/2003	04/04/2003	CADMIUM	EP-A	ND	0.0050000	MG/L
A30207U-1I	02/07/2003	04/04/2003	CHROMIUM	EP-A	0.0010000	0.1000000	MG/L
A30207U-1I	02/07/2003	04/04/2003	CYANIDE	EP-A	ND	0.2000000	MG/L
A30207U-1I	02/07/2003	04/04/2003	FLUORIDE	EP-A	0.4000000	4.0000000	MG/L
A30207U-1I	02/07/2003	04/04/2003	MERCURY	EP-A	ND	0.0020000	MG/L
A30207U-1I	02/07/2003	04/04/2003	NICKEL	EP-A	ND	0.1000000	MG/L
A30207U-1I	02/07/2003	04/04/2003	NITRATE	EP-A	7.5000000	10.000000	MG/L
A30207U-1I	02/07/2003	04/04/2003	NITRATE-NITRITE	EP-A	7.5000000	10.000000	MG/L
A30207U-1I	02/07/2003		NITRITE	EP-A	ND	1.0000000	MG/L
A30207U-1I	02/07/2003	04/04/2003	SELENIUM	EP-A	ND	0.0500000	MG/L
A30207U-1I	02/07/2003	04/04/2003	SODIUM	EP-A	31.000000		MG/L
A30207U-1I	02/07/2003	04/04/2003	THALLIUM, TOTAL	EP-A	ND	0.0020000	MG/L
A30207U-1S	02/07/2003	04/04/2003	1,2-DIBROMO-3-CHLOROPROPANE	EP-A	ND	0.0002000	MG/L
A30207U-1S	02/07/2003	04/04/2003	2,4,5-TP	EP-A	ND	0.0500000	MG/L
A30207U-1S	02/07/2003	04/04/2003	2,4-D	EP-A	ND	0.0700000	MG/L
A30207U-1S	02/07/2003	04/04/2003	ATRAZINE	EP-A	ND	0.0030000	MG/L
A30207U-1S	02/07/2003	04/04/2003	BENZO(A)PYRENE	EP-A	ND	0.0002000	MG/L
A30207U-1S	02/07/2003	04/04/2003	BHC-GAMMA	EP-A	ND	0.0002000	MG/L
A30207U-1S	02/07/2003	04/04/2003	CARBOFURAN	EP-A	ND	0.0400000	MG/L
A30207U-1S	02/07/2003	04/04/2003	CHLORDANE	EP-A	ND	0.0020000	MG/L
A30207U-1S	02/07/2003	04/04/2003	DALAPON	EP-A	ND	0.2000000	MG/L

A30207U-1S	02/07/2003	04/04/2003	DI(2-ETHYLHEXYL) ADIPATE	EP-A	ND	0.4000000	MG/L
A30207U-1S	02/07/2003	04/04/2003	DI(2-ETHYLHEXYL) PHTHALATE	EP-A	ND	0.0060000	MG/L
A30207U-1S	02/07/2003	04/04/2003	DINOSEB	EP-A	ND	0.0070000	MG/L
A30207U-1S	02/07/2003	04/04/2003	DIQUAT	EP-A	ND	0.0200000	MG/L
A30207U-1S	02/07/2003	04/04/2003	ENDOTHALL	EP-A	ND	0.1000000	MG/L
A30207U-1S	02/07/2003	04/04/2003	ENDRIN	EP-A	ND	0.0020000	MG/L
A30207U-1S	02/07/2003	04/04/2003	ETHYLENE DIBROMIDE	EP-A	ND	0.0000500	MG/L
A30207U-1S	02/07/2003	04/04/2003	GLYPHOSATE	EP-A	ND	0.7000000	MG/L
A30207U-1S	02/07/2003	04/04/2003	HEPTACHLOR	EP-A	ND	0.0004000	MG/L
A30207U-1S	02/07/2003	04/04/2003	HEPTACHLOR EPOXIDE	EP-A	ND	0.0002000	MG/L
A30207U-1S	02/07/2003	04/04/2003	HEXACHLOROBENZENE	EP-A	ND	0.0010000	MG/L
A30207U-1S	02/07/2003	04/04/2003	HEXACHLOROCYCLOPENTADIENE	EP-A	ND	0.0500000	MG/L
A30207U-1S	02/07/2003	04/04/2003	LASSO	EP-A	ND	0.0020000	MG/L
A30207U-1S	02/07/2003	04/04/2003	METHOXYCHLOR	EP-A	ND	0.0400000	MG/L
A30207U-1S	02/07/2003	04/04/2003	OXAMYL	EP-A	ND	0.2000000	MG/L
A30207U-1S	02/07/2003	04/04/2003	PENTACHLOROPHENOL	EP-A	ND	0.0010000	MG/L
A30207U-1S	02/07/2003	04/04/2003	PICLORAM	EP-A	ND	0.5000000	MG/L
A30207U-1S	02/07/2003	04/04/2003	SIMAZINE	EP-A	ND	0.0040000	MG/L
A30207U-1S	02/07/2003	04/04/2003	TOTAL POLYCHLORINATED BIPHENYLS (PCB)	EP-A	ND	0.0005000	MG/L
A30207U-1S	02/07/2003	04/04/2003	TOXAPHENE	EP-A	ND	0.0030000	MG/L
A30207U-1V	02/07/2003	04/04/2003	1,1,1-TRICHLOROETHANE	EP-A	ND	0.2000000	MG/L
A30207U-1V	02/07/2003	04/04/2003	1,1,2-TRICHLOROETHANE	EP-A	ND	0.0050000	MG/L
A30207U-1V	02/07/2003	04/04/2003	1,1-DICHLOROETHYLENE	EP-A	ND	0.0070000	MG/L
A30207U-1V	02/07/2003	04/04/2003	1,2,4-TRICHLOROBENZENE	EP-A	ND	0.0700000	MG/L
A30207U-1V	02/07/2003	04/04/2003	1,2-DICHLOROETHANE	EP-A	ND	0.0050000	MG/L
A30207U-1V	02/07/2003	04/04/2003	1,2-DICHLOROPROPANE	EP-A	ND	0.0050000	MG/L
A30207U-1V	02/07/2003	04/04/2003	BENZENE	EP-A	ND	0.0050000	MG/L
A30207U-1V	02/07/2003	04/04/2003	CARBON TETRACHLORIDE	EP-A	ND	0.0050000	MG/L
A30207U-1V	02/07/2003	04/04/2003	CHLOROBENZENE	EP-A	ND	0.1000000	MG/L
A30207U-1V	02/07/2003	04/04/2003	CIS-1,2-DICHLOROETHYLENE	EP-A	ND	0.0700000	MG/L
A30207U-1V	02/07/2003	04/04/2003	DICHLOROMETHANE	EP-A	ND	0.0050000	MG/L
A30207U-1V	02/07/2003	04/04/2003	ETHYLBENZENE	EP-A	ND	0.7000000	MG/L
A30207U-1V	02/07/2003	04/04/2003	O-DICHLOROBENZENE	EP-A	ND	0.6000000	MG/L
A30207U-1V	02/07/2003	04/04/2003	P-DICHLOROBENZENE	EP-A	ND	0.0750000	MG/L
A30207U-1V	02/07/2003	04/04/2003	STYRENE	EP-A	ND	0.1000000	MG/L
A30207U-1V	02/07/2003	04/04/2003	TETRACHLOROETHYLENE	EP-A	ND	0.0050000	MG/L
A30207U-1V	02/07/2003	04/04/2003	TOLUENE	EP-A	ND	1.0000000	MG/L
A30207U-1V	02/07/2003	04/04/2003	TRANS-1,2-DICHLOROETHYLENE	EP-A	ND	0.1000000	MG/L
A30207U-1V	02/07/2003	04/04/2003	TRICHLOROETHYLENE	EP-A	ND	0.0050000	MG/L
A30207U-1V	02/07/2003	04/04/2003	VINYL CHLORIDE	EP-A	ND	0.0020000	MG/L
A30207U-1V	02/07/2003	04/04/2003	XYLENES, TOTAL	EP-A	ND	10.000000	MG/L
A30207V-1R	02/07/2003	04/04/2003	COMBINED RADIUM (-226 & -228)	EP-A	ND	5.0000000	PCI/L
A30207V-1R	02/07/2003	04/04/2003	COMBINED URANIUM	EP-A	0.0090000	0.0300000	MG/L
A30207V-1R	02/07/2003	04/04/2003	GROSS ALPHA, EXCL. RADON & U	EP-A	ND	15.000000	PCI/L
A20418F-1	04/18/2002	11/18/2002	GROSS ALPHA, EXCL. RADON & U	EP-A	ND	15.000000	PCI/L

Archived Results

Sample Date	Receive Date	Chemical	Source ID	Results	MCL
08/08/2001	10/03/2001	1,1,1-Trichloroethane	A	ND	0.2000000
08/08/2001	10/03/2001	1,1,2-Trichloroethane	A	ND	0.0050000
08/08/2001	10/03/2001	1,1-Dichloroethylene	A	ND	0.0070000
08/08/2001	10/03/2001	1,2,4-Trichlorobenzene	A	ND	0.0700000
08/08/2001	10/03/2001	1,2-Dibromo-3-Chloropropane (DBCP)	A	ND	0.0002000
08/08/2001	10/03/2001	1,2-Dichloroethane	A	ND	0.0050000
08/08/2001	10/03/2001	1,2-Dichloropropane	A	ND	0.0050000
08/08/2001	10/03/2001	2,4,5-TP Silvex	A	ND	0.0500000
08/08/2001	10/03/2001	2,4-D	A	ND	0.0700000
08/08/2001	10/03/2001	Adipates (Di(2-Ethylhexyl))	A	ND	0.4000000
08/08/2001	10/03/2001	Alachlor (Lasso)	A	ND	0.0020000
08/08/2001	10/03/2001	Antimony Total	A	ND	0.0060000
08/08/2001	10/03/2001	Arsenic	A	0.0023000	0.0500000
08/08/2001	10/03/2001	Atrazine	A	ND	0.0030000
08/08/2001	10/03/2001	Barium	A	0.0150000	2.0000000
08/08/2001	10/03/2001	Benzene	A	ND	0.0050000
08/08/2001	10/03/2001	Benzo (A) Pyrene	A	ND	0.0002000
08/08/2001	10/03/2001	Beryllium Total	A	ND	0.0040000
08/08/2001	10/03/2001	BHC-gamma (Lindane)	A	ND	0.0002000
08/08/2001	10/03/2001	Cadmium	A	ND	0.0050000
08/08/2001	10/03/2001	Carbofuran	A	ND	0.0400000
08/08/2001	10/03/2001	Carbon Tetrachloride	A	ND	0.0050000
08/08/2001	10/03/2001	Chlordane	A	ND	0.0020000
08/08/2001	10/03/2001	Chromium	A	ND	0.1000000
08/08/2001	10/03/2001	Cis-1,2-Dichloroethylene	A	ND	0.0700000
08/08/2001	10/03/2001	Cyanide	A	ND	0.2000000
08/08/2001	10/03/2001	Dalapon	A	ND	0.2000000
08/08/2001	10/03/2001	Dichloromethane (Methylene Chloride)	A	ND	0.0050000
08/08/2001	10/03/2001	Dinoseb	A	ND	0.0070000
08/08/2001	10/03/2001	Diquat	A	ND	0.0200000
08/08/2001	10/03/2001	Endothall	A	ND	0.1000000
08/08/2001	10/03/2001	Endrin	A	ND	0.0020000
08/08/2001	10/03/2001	Ethylbenzene	A	ND	0.7000000
08/08/2001	10/03/2001	Ethylene Dibromide (EDB)	A	ND	0.0000500
08/08/2001	10/03/2001	Fluoride	A	ND	4.0000000
08/08/2001	10/03/2001	Glyphosate	A	ND	0.7000000
08/08/2001	10/03/2001	Heptachlor	A	ND	0.0004000
08/08/2001	10/03/2001	Heptachlor Epoxide	A	ND	0.0002000
08/08/2001	10/03/2001	Hexachlorobenzene (HCB)	A	ND	0.0010000
08/08/2001	10/03/2001	Hexachlorocyclopentadiene	A	ND	0.0500000
08/08/2001	10/03/2001	Mercury	A	ND	0.0020000
08/08/2001	10/03/2001	Methoxychlor	A	ND	0.0400000
08/08/2001	10/03/2001	Monochlorobenzene (Chlorobenzene)	A	ND	0.1000000
08/08/2001	10/03/2001	Nickel	A	ND	0.1000000
08/08/2001	10/03/2001	Nitrate	A	0.6300000	10.000000

08/08/2001	10/03/2001	Nitrite	A	ND	1.0000000
08/08/2001	10/03/2001	O-Dichlorobenzene	A	ND	0.6000000
08/08/2001	10/03/2001	P-Dichlorobenzene	A	ND	0.0750000
08/08/2001	10/03/2001	Pentachlorophenol	A	ND	0.0010000
08/08/2001	10/03/2001	Phthalates (Di(2-Ethylhexyl))	A	ND	0.0060000
08/08/2001	10/03/2001	Picloram	A	ND	0.5000000
08/08/2001	10/03/2001	Selenium	A	ND	0.0500000
08/08/2001	10/03/2001	Simazine	A	ND	0.0040000
08/08/2001	10/03/2001	Sodium	A	9.0000000	
08/08/2001	10/03/2001	Styrene	A	ND	0.1000000
08/08/2001	10/03/2001	Tetrachloroethylene	A	ND	0.0050000
08/08/2001	10/03/2001	Thallium Total	A	ND	0.0020000
08/08/2001	10/03/2001	Toluene	A	ND	1.0000000
08/08/2001	10/03/2001	Total Polychlorinated Biphenyls (PCB)	A	ND	0.0005000
08/08/2001	10/03/2001	Total Xylenes	A	ND	10.000000
08/08/2001	10/03/2001	Toxaphene	A	ND	0.0030000
08/08/2001	10/03/2001	Trans-1,2-Dichloroethylene	A	ND	0.1000000
08/08/2001	10/03/2001	Trichloroethylene	A	ND	0.0050000
08/08/2001	10/03/2001	Vinyl Chloride	A	ND	0.0020000
08/08/2001	10/03/2001	Vydate (Oxamyl)	A	ND	0.2000000
07/13/2000	07/24/2000	Nitrate	AA	0.9000000	10.000000
12/09/1999	01/05/2000	Nitrate	A	0.8200000	10.000000
07/27/1998	09/08/1998	Nitrate	A	0.8900000	10.000000
09/16/1996	06/23/1998	1,1,1,2-Tetrachloroethane	A	ND	
09/16/1996	06/23/1998	1,1,1-Trichloroethane	A	ND	0.2000000
09/16/1996	06/23/1998	1,1,2,2,-Tetrachloroethane	A	ND	
09/16/1996	06/23/1998	1,1,2-Trichloroethane	A	ND	0.0050000
09/16/1996	06/23/1998	1,1-Dichloroethane	A	ND	
09/16/1996	06/23/1998	1,1-Dichloroethylene	A	ND	0.0070000
09/16/1996	06/23/1998	1,1-Dichloropropene	A	ND	
09/16/1996	06/23/1998	1,2,3-Trichloropropane	A	ND	
09/16/1996	06/23/1998	1,2,4-Trichlorobenzene	A	ND	0.0700000
09/16/1996	06/23/1998	1,2-Dibromo-3-Chloropropane (DBCP)	A	ND	0.0002000
09/16/1996	06/23/1998	1,2-Dichloroethane	A	ND	0.0050000
09/16/1996	06/23/1998	1,2-Dichloropropane	A	ND	0.0050000
09/16/1996	06/23/1998	1,3-Dichloropropane	A	ND	
09/16/1996	06/23/1998	1,3-Dichloropropene	A	ND	
09/16/1996	06/23/1998	2,2-Dichloropropane	A	ND	
09/16/1996	06/23/1998	2,4,5-TP Silvex	A	ND	0.0500000
09/16/1996	06/23/1998	2,4-D	A	ND	0.0700000
09/16/1996	06/23/1998	3-Hydroxycarbofuran	A	ND	
09/16/1996	06/23/1998	Adipates (Di(2-Ethylhexyl))	A	ND	0.4000000
09/16/1996	06/23/1998	Alachlor (Lasso)	A	ND	0.0020000
09/16/1996	06/23/1998	Aldicarb	A	ND	
09/16/1996	06/23/1998	Aldicarb Sulfone	A	ND	
09/16/1996	06/23/1998	Aldicarb Sulfoxide	A	ND	

09/16/1996	06/23/1998	Aldrin	A	ND	
09/16/1996	06/23/1998	Antimony Total	A	ND	0.0060000
09/16/1996	06/23/1998	Arsenic	A	0.0019000	0.0500000
09/16/1996	06/23/1998	Atrazine	A	ND	0.0030000
09/16/1996	06/23/1998	Barium	A	0.0150000	2.0000000
09/16/1996	06/23/1998	Benzene	A	ND	0.0050000
09/16/1996	06/23/1998	Benzo (A) Pyrene	A	ND	0.0002000
09/16/1996	06/23/1998	Beryllium Total	A	ND	0.0040000
09/16/1996	06/23/1998	BHC-gamma (Lindane)	A	ND	0.0002000
09/16/1996	06/23/1998	Bromobenzene	A	ND	
09/16/1996	06/23/1998	Bromodichloromethane	A	0.0017000	
09/16/1996	06/23/1998	Bromoform	A	ND	
09/16/1996	06/23/1998	Bromomethane	A	ND	
09/16/1996	06/23/1998	Cadmium	A	ND	0.0050000
09/16/1996	06/23/1998	Carbaryl	A	ND	
09/16/1996	06/23/1998	Carbofuran	A	ND	0.0400000
09/16/1996	06/23/1998	Carbon Tetrachloride	A	ND	0.0050000
09/16/1996	06/23/1998	Chlordane	A	ND	0.0020000
09/16/1996	06/23/1998	Chloroethane	A	ND	
09/16/1996	06/23/1998	Chloroform	A	0.0047000	
09/16/1996	06/23/1998	Chloromethane	A	ND	
09/16/1996	06/23/1998	Chromium	A	ND	0.1000000
09/16/1996	06/23/1998	Cis-1,2-Dichloroethylene	A	ND	0.0700000
09/16/1996	06/23/1998	Cyanide	A	ND	0.2000000
09/16/1996	06/23/1998	Dalapon	A	ND	0.2000000
09/16/1996	06/23/1998	Dibromochloromethane	A	ND	
09/16/1996	06/23/1998	Dibromomethane	A	ND	
09/16/1996	06/23/1998	Dicamba	A	ND	
09/16/1996	06/23/1998	Dichloromethane (Methylene Chloride)	A	ND	0.0050000
09/16/1996	06/23/1998	Dieldrin	A	ND	
09/16/1996	06/23/1998	Dinoseb	A	ND	0.0070000
09/16/1996	06/23/1998	Diquat	A	ND	0.0200000
09/16/1996	06/23/1998	Endothall	A	ND	0.1000000
09/16/1996	06/23/1998	Endrin	A	ND	0.0020000
09/16/1996	06/23/1998	Ethylbenzene	A	ND	0.7000000
09/16/1996	06/23/1998	Ethylene Dibromide (EDB)	A	ND	0.0000500
09/16/1996	06/23/1998	Fluoride	A	ND	4.0000000
09/16/1996	06/23/1998	Glyphosate	A	ND	0.7000000
09/16/1996	06/23/1998	Heptachlor	A	ND	0.0004000
09/16/1996	06/23/1998	Heptachlor Epoxide	A	ND	0.0002000
09/16/1996	06/23/1998	Hexachlorobenzene (HCB)	A	ND	0.0010000
09/16/1996	06/23/1998	Hexachlorocyclopentadiene	A	ND	0.0500000
09/16/1996	06/23/1998	M-Dichlorobenzene	A	ND	
09/16/1996	06/23/1998	Mercury	A	ND	0.0020000
09/16/1996	06/23/1998	Methomyl	A	ND	
09/16/1996	06/23/1998	Methoxychlor	A	ND	0.0400000
09/16/1996	06/23/1998	Monochlorobenzene (Chlorobenzene)	A	ND	0.1000000

09/16/1996	06/23/1998	Nickel	A	ND	0.1000000
09/16/1996	06/23/1998	Nitrate	A	0.6100000	10.000000
09/16/1996	06/23/1998	Nitrite	A	ND	1.0000000
09/16/1996	06/23/1998	O-Chlorotoluene	A	ND	
09/16/1996	06/23/1998	O-Dichlorobenzene	A	ND	0.6000000
09/16/1996	06/23/1998	P-Chlorotoluene	A	ND	
09/16/1996	06/23/1998	P-Dichlorobenzene	A	ND	0.0750000
09/16/1996	06/23/1998	Pentachlorophenol	A	ND	0.0010000
09/16/1996	06/23/1998	Phthalates (Di(2-Ethylhexyl))	A	ND	0.0060000
09/16/1996	06/23/1998	Picloram	A	ND	0.5000000
09/16/1996	06/23/1998	Selenium	A	ND	0.0500000
09/16/1996	06/23/1998	Simazine	A	ND	0.0040000
09/16/1996	06/23/1998	Sodium	A	9.4000000	
09/16/1996	06/23/1998	Styrene	A	ND	0.1000000
09/16/1996	06/23/1998	Sulfate	A	12.000000	
09/16/1996	06/23/1998	Tetrachloroethylene	A	ND	0.0050000
09/16/1996	06/23/1998	Thallium Total	A	ND	0.0020000
09/16/1996	06/23/1998	Toluene	A	ND	1.0000000
09/16/1996	06/23/1998	Total Polychlorinated Biphenyls (PCB)	A	ND	0.0005000
09/16/1996	06/23/1998	Total Xylenes	A	ND	10.000000
09/16/1996	06/23/1998	Toxaphene	A	ND	0.0030000
09/16/1996	06/23/1998	Trans-1,2-Dichloroethylene	A	ND	0.1000000
09/16/1996	06/23/1998	Trichloroethylene	A	ND	0.0050000
09/16/1996	06/23/1998	Vinyl Chloride	A	ND	0.0020000
09/16/1996	06/23/1998	Vydate (Oxamyl)	A	ND	0.2000000
02/05/1993	10/11/1993	1,1,1,2-Tetrachloroethane	AA	ND	
02/05/1993	10/11/1993	1,1,1-Trichloroethane	AA	ND	0.2000000
02/05/1993	10/11/1993	1,1,2,2,-Tetrachloroethane	AA	ND	
02/05/1993	10/11/1993	1,1,2-Trichloroethane	AA	ND	0.0050000
02/05/1993	10/11/1993	1,1-Dichloroethane	AA	ND	
02/05/1993	10/11/1993	1,1-Dichloroethylene	AA	ND	0.0070000
02/05/1993	10/11/1993	1,1-Dichloropropene	AA	ND	
02/05/1993	10/11/1993	1,2,3-Trichloropropane	AA	ND	
02/05/1993	10/11/1993	1,2,4-Trichlorobenzene	AA	ND	0.0700000
02/05/1993	10/11/1993	1,2-Dibromo-3-Chloropropane (DBCP)	AA	ND	0.0002000
02/05/1993	10/11/1993	1,2-Dichloroethane	AA	ND	0.0050000
02/05/1993	10/11/1993	1,2-Dichloropropane	AA	ND	0.0050000
02/05/1993	10/11/1993	1,3-Dichloropropane	AA	ND	
02/05/1993	10/11/1993	1,3-Dichloropropene	AA	ND	
02/05/1993	10/11/1993	2,2-Dichloropropane	AA	ND	
02/05/1993	10/11/1993	2,4,5-TP Silvex	AA	ND	0.0500000
02/05/1993	10/11/1993	2,4-D	AA	ND	0.0700000
02/05/1993	10/11/1993	Adipates (Di(2-Ethylhexyl))	AA	ND	0.4000000
02/05/1993	10/11/1993	Alachlor (Lasso)	AA	ND	0.0020000
02/05/1993	10/11/1993	Antimony Total	AA	ND	0.0060000
02/05/1993	10/11/1993	Arsenic	AA	ND	0.0500000

02/05/1993	10/11/1993	Atrazine	AA	ND	0.0030000
02/05/1993	10/11/1993	Barium	AA	0.0120000	2.0000000
02/05/1993	10/11/1993	Benzene	AA	ND	0.0050000
02/05/1993	10/11/1993	Benzo (A) Pyrene	AA	ND	0.0002000
02/05/1993	10/11/1993	Beryllium Total	AA	ND	0.0040000
02/05/1993	10/11/1993	BHC-gamma (Lindane)	AA	ND	0.0002000
02/05/1993	10/11/1993	Bromobenzene	AA	ND	
02/05/1993	10/11/1993	Bromodichloromethane	AA	0.0020000	
02/05/1993	10/11/1993	Bromoform	AA	ND	
02/05/1993	10/11/1993	Bromomethane	AA	ND	
02/05/1993	10/11/1993	Butachlor	AA	ND	
02/05/1993	10/11/1993	Cadmium	AA	ND	0.0050000
02/05/1993	10/11/1993	Carbon Tetrachloride	AA	ND	0.0050000
02/05/1993	10/11/1993	Chlordane	AA	ND	0.0020000
02/05/1993	10/11/1993	Chloroethane	AA	ND	
02/05/1993	10/11/1993	Chloroform	AA	0.0030000	
02/05/1993	10/11/1993	Chloromethane	AA	ND	
02/05/1993	10/11/1993	Chromium	AA	ND	0.1000000
02/05/1993	10/11/1993	Cis-1,2-Dichloroethylene	AA	ND	0.0700000
02/05/1993	10/11/1993	Cyanide	AA	ND	0.2000000
02/05/1993	10/11/1993	Dalapon	AA	ND	0.2000000
02/05/1993	10/11/1993	Dibromochloromethane	AA	0.0006000	
02/05/1993	10/11/1993	Dibromomethane	AA	ND	
02/05/1993	10/11/1993	Dichloromethane (Methylene Chloride)	AA	ND	0.0050000
02/05/1993	10/11/1993	Dinoseb	AA	ND	0.0070000
02/05/1993	10/11/1993	Endrin	AA	ND	0.0020000
02/05/1993	10/11/1993	Ethylbenzene	AA	ND	0.7000000
02/05/1993	10/11/1993	Ethylene Dibromide (EDB)	AA	ND	0.0000500
02/05/1993	10/11/1993	Fluoride	AA	ND	4.0000000
02/05/1993	10/11/1993	Heptachlor	AA	ND	0.0004000
02/05/1993	10/11/1993	Heptachlor Epoxide	AA	ND	0.0002000
02/05/1993	10/11/1993	Hexachlorobenzene (HCB)	AA	ND	0.0010000
02/05/1993	10/11/1993	Hexachlorocyclopentadiene	AA	ND	0.0500000
02/05/1993	10/11/1993	M-Dichlorobenzene	AA	ND	
02/05/1993	10/11/1993	Mercury	AA	ND	0.0020000
02/05/1993	10/11/1993	Methoxychlor	AA	ND	0.0400000
02/05/1993	10/11/1993	Metolachlor	AA	ND	
02/05/1993	10/11/1993	Metribuzin	AA	ND	
02/05/1993	10/11/1993	Monochlorobenzene (Chlorobenzene)	AA	ND	0.1000000
02/05/1993	10/11/1993	Nickel	AA	ND	0.1000000
02/05/1993	10/11/1993	Nitrate	AA	1.5000000	10.000000
02/05/1993	10/11/1993	Nitrate-Nitrite	AA	1.5000000	10.000000
02/05/1993	10/11/1993	Nitrite	AA	ND	1.0000000
02/05/1993	10/11/1993	O-Chlorotoluene	AA	ND	
02/05/1993	10/11/1993	O-Dichlorobenzene	AA	ND	0.6000000
02/05/1993	10/11/1993	P-Chlorotoluene	AA	ND	

4/3/2015

00130 Chemical Results | Data Online | Oregon Drinking Water Services

02/05/1993	10/11/1993	P-Dichlorobenzene	AA	ND	0.0750000
02/05/1993	10/11/1993	Pentachlorophenol	AA	ND	0.0010000
02/05/1993	10/11/1993	Phthalates (Di(2-Ethylhexyl))	AA	ND	0.0060000
02/05/1993	10/11/1993	Picloram	AA	ND	0.5000000
02/05/1993	10/11/1993	Propachlor	AA	ND	
02/05/1993	10/11/1993	Selenium	AA	ND	0.0500000
02/05/1993	10/11/1993	Simazine	AA	ND	0.0040000
02/05/1993	10/11/1993	Sodium	AA	7.7000000	
02/05/1993	10/11/1993	Styrene	AA	ND	0.1000000
02/05/1993	10/11/1993	Sulfate	AA	43.3000000	
02/05/1993	10/11/1993	Tetrachloroethylene	AA	ND	0.0050000
02/05/1993	10/11/1993	Thallium Total	AA	ND	0.0020000
02/05/1993	10/11/1993	Toluene	AA	ND	1.0000000
02/05/1993	10/11/1993	Total Polychlorinated Biphenyls (PCB)	AA	ND	0.0005000
02/05/1993	10/11/1993	Total Xylenes	AA	ND	10.000000
02/05/1993	10/11/1993	Toxaphene	AA	ND	0.0030000
02/05/1993	10/11/1993	Trans-1,2-Dichloroethylene	AA	ND	0.1000000
02/05/1993	10/11/1993	Trichloroethylene	AA	ND	0.0050000
02/05/1993	10/11/1993	Vinyl Chloride	AA	ND	0.0020000
06/24/1992	07/27/1992	Arsenic	A	ND	0.0500000
06/24/1992	07/27/1992	Barium	A	0.1200000	2.0000000
06/24/1992	07/27/1992	Cadmium	A	ND	0.0050000
06/24/1992	07/27/1992	Chromium	A	ND	0.1000000
06/24/1992	07/27/1992	Fluoride	A	0.2000000	4.0000000
06/24/1992	07/27/1992	Lead	A	ND	0.0150000
06/24/1992	07/27/1992	Mercury	A	ND	0.0020000
06/24/1992	07/27/1992	Nitrate	A	0.4000000	10.000000
06/24/1992	07/27/1992	Selenium	A	ND	0.0500000
06/24/1992	07/27/1992	Silver	A	ND	0.1000000
09/18/1991	11/07/1991	Gross Alpha, Excl. Radon & U	A	ND	15.000000
05/15/1990	06/12/1990	2,4,5-TP Silvex	A	ND	0.0500000
05/15/1990	06/12/1990	2,4-D	A	ND	0.0700000
05/15/1990	06/12/1990	BHC-gamma (Lindane)	A	ND	0.0002000
05/15/1990	06/12/1990	Endrin	A	ND	0.0020000
05/15/1990	06/12/1990	Methoxychlor	A	ND	0.0400000
05/15/1990	06/12/1990	Toxaphene	A	ND	0.0030000
01/08/1990	01/16/1991	1,1,1-Trichloroethane	A	ND	0.2000000
01/08/1990	01/16/1991	1,1-Dichloroethylene	A	ND	0.0070000
01/08/1990	01/16/1991	1,2-Dichloroethane	A	ND	0.0050000
01/08/1990	01/16/1991	Benzene	A	ND	0.0050000
01/08/1990	01/16/1991	Carbon Tetrachloride	A	ND	0.0050000
01/08/1990	01/16/1991	P-Dichlorobenzene	A	ND	0.0750000
01/08/1990	01/16/1991	Trichloroethylene	A	ND	0.0050000
01/08/1990	01/16/1991	TThm	A	0.1010000	0.1000000
01/08/1990	01/16/1991	Vinyl Chloride	A	ND	0.0020000
10/11/1989	12/20/1990	1,1,1-Trichloroethane	A	ND	0.2000000
10/11/1989	12/20/1990	1,1-Dichloroethylene	A	ND	0.0070000

10/11/1989	12/20/1990	1,2-Dichloroethane	A	ND	0.0050000
10/11/1989	12/20/1990	Benzene	A	ND	0.0050000
10/11/1989	12/20/1990	Carbon Tetrachloride	A	ND	0.0050000
10/11/1989	12/20/1990	P-Dichlorobenzene	A	ND	0.0750000
10/11/1989	12/20/1990	Trichloroethylene	A	ND	0.0050000
10/11/1989	12/20/1990	TTHm	A	0.0173000	0.1000000
10/11/1989	12/20/1990	Vinyl Chloride	A	ND	0.0020000
07/10/1989	09/29/1989	1,1,1-Trichloroethane	A	ND	0.2000000
07/10/1989	09/29/1989	1,1-Dichloroethylene	A	ND	0.0070000
07/10/1989	09/29/1989	1,2-Dichloroethane	A	ND	0.0050000
07/10/1989	09/29/1989	Benzene	A	ND	0.0050000
07/10/1989	09/29/1989	Carbon Tetrachloride	A	ND	0.0050000
07/10/1989	09/29/1989	P-Dichlorobenzene	A	ND	0.0750000
07/10/1989	09/29/1989	Trichloroethylene	A	ND	0.0050000
07/10/1989	09/29/1989	Vinyl Chloride	A	ND	0.0020000
06/07/1989	12/08/1989	Arsenic	A	ND	0.0500000
06/07/1989	12/08/1989	Barium	A	ND	2.0000000
06/07/1989	12/08/1989	Cadmium	A	ND	0.0050000
06/07/1989	12/08/1989	Chromium	A	ND	0.1000000
06/07/1989	12/08/1989	Lead	A	ND	0.0150000
06/07/1989	12/08/1989	Mercury	A	ND	0.0020000
06/07/1989	12/08/1989	Nitrate	A	0.3500000	10.000000
06/07/1989	12/08/1989	Selenium	A	ND	0.0500000
06/07/1989	12/08/1989	Silver	A	ND	0.1000000
12/07/1988	03/09/1989	Chloride	A	15.500000	
12/07/1988	03/09/1989	Copper	A	ND	1.3000000
12/07/1988	03/09/1989	Fluoride	A	0.3000000	4.0000000
12/07/1988	03/09/1989	Hardness, Total (as CaCO3)	A	109.00000	
12/07/1988	03/09/1989	Iron	A	0.0400000	
12/07/1988	03/09/1989	Manganese	A	ND	
12/07/1988	03/09/1989	Ph	A	7.5000000	
12/07/1988	03/09/1989	Sulfate	A	18.000000	
12/07/1988	03/09/1989	Total Dissolved Solids (TDS)	A	202.00000	
12/07/1988	03/09/1989	Zinc	A	ND	
05/10/1988	03/09/1989	Arsenic	A	0.0060000	0.0500000
05/10/1988	03/09/1989	Barium	A	0.0450000	2.0000000
05/10/1988	03/09/1989	Cadmium	A	ND	0.0050000
05/10/1988	03/09/1989	Chromium	A	ND	0.1000000
05/10/1988	03/09/1989	Fluoride	A	0.1200000	4.0000000
05/10/1988	03/09/1989	Lead	A	ND	0.0150000
05/10/1988	03/09/1989	Mercury	A	ND	0.0020000
05/10/1988	03/09/1989	Nitrate	A	0.1500000	10.000000
05/10/1988	03/09/1989	Selenium	A	0.0020000	0.0500000
05/10/1988	03/09/1989	Silver	A	ND	0.1000000
09/09/1987	09/25/1987	Gross Alpha, Excl. Radon & U	A	0.3400000	15.000000
06/09/1987	07/09/1987	Arsenic	A	ND	0.0500000

06/09/1987	07/09/1987	Barium	A	ND	2.0000000
06/09/1987	07/09/1987	Cadmium	A	ND	0.0050000
06/09/1987	07/09/1987	Chromium	A	ND	0.1000000
06/09/1987	07/09/1987	Fluoride	A	ND	4.0000000
06/09/1987	07/09/1987	Lead	A	ND	0.0150000
06/09/1987	07/09/1987	Mercury	A	ND	0.0020000
06/09/1987	07/09/1987	Nitrate	A	ND	10.000000
06/09/1987	07/09/1987	Selenium	A	ND	0.0500000
06/09/1987	07/09/1987	Silver	A	ND	0.1000000
05/15/1987	07/09/1987	2,4,5-TP Silvex	A	ND	0.0500000
05/15/1987	07/09/1987	2,4-D	A	ND	0.0700000
05/15/1987	07/09/1987	BHC-gamma (Lindane)	A	ND	0.0002000
05/15/1987	07/09/1987	Endrin	A	ND	0.0020000
05/15/1987	07/09/1987	Methoxychlor	A	ND	0.0400000
05/15/1987	07/09/1987	Toxaphene	A	ND	0.0030000
06/25/1986	06/25/1986	Arsenic	A	0.0030000	0.0500000
06/25/1986	06/25/1986	Barium	A	0.0420000	2.0000000
06/25/1986	06/25/1986	Cadmium	A	ND	0.0050000
06/25/1986	06/25/1986	Chromium	A	ND	0.1000000
06/25/1986	06/25/1986	Fluoride	A	0.3600000	4.0000000
06/25/1986	06/25/1986	Lead	A	0.0300000	0.0150000
06/25/1986	06/25/1986	Mercury	A	0.0020000	0.0020000
06/25/1986	06/25/1986	Nitrate	A	0.4100000	10.000000
06/25/1986	06/25/1986	Selenium	A	0.0020000	0.0500000
06/25/1986	06/25/1986	Silver	A	ND	0.1000000
06/20/1984	06/20/1984	2,4,5-TP Silvex	A	ND	0.0500000
06/20/1984	06/20/1984	2,4-D	A	ND	0.0700000
06/20/1984	06/20/1984	BHC-gamma (Lindane)	A	ND	0.0002000
06/20/1984	06/20/1984	Endrin	A	ND	0.0020000
06/20/1984	06/20/1984	Methoxychlor	A	ND	0.0400000
06/20/1984	06/20/1984	Toxaphene	A	ND	0.0030000
01/16/1984	01/16/1984	Chloride	A	15.000000	
01/16/1984	01/16/1984	Copper	A	ND	1.3000000
01/16/1984	01/16/1984	Hardness, Total (as CaCO3)	A	126.00000	
01/16/1984	01/16/1984	Iron	A	ND	
01/16/1984	01/16/1984	Manganese	A	0.0050000	
01/16/1984	01/16/1984	Ph	A	7.9100000	
01/16/1984	01/16/1984	Residue, Total-Fixed	A	190.00000	
01/16/1984	01/16/1984	Zinc	A	0.0500000	
06/23/1982	06/23/1982	Sodium	A	13.800000	

A blank or a 0 in the MCL column indicates that a MCL has not been set for that chemical

This list represents the latest test results for all sources and entry points the system has. For systems with multiple sources the list will probably be a mix of results from all sources. But these are the latest results.



[Introduction](#) :: [Data Search Options](#) :: [WS Name Look Up](#) :: [WS ID Look Up](#) :: [DWS Home](#) :: [Quick Data Links](#)

**PWS ID: 00130 ---- BOARDMAN, CITY OF
11/01/2012 - Sanitary Survey, Finished**

Site Visit Details

No details entered.

Site Visit Deficiencies**Distribution System Violations**

Cross Connection - Annual summary report not issued (CWS)

Management & Operations Violations

Master plan not current (≥ 300 con.)

Monitoring & Reporting Violations

No coliform sampling plan

Operator Certification Violations

No protocol for under-certified operator

Treatment Deficiencies/Violations

Disinfection Deficiencies/Violations - Chlorine not measured & recorded as required

Surface Water Treatment Deficiencies - Turbidimeters not calibrated per manufacturer or at least quarterly

APPENDIX B

Sanitary Survey

November 8, 2012

Dave Winters
City of Boardman
PO Box 229
Boardman, OR 97818

800 NE Oregon Street #640
Portland OR 97232-2162
Phone 971-673-0191
Fax 971-673-0694
www.healthoregon.org/DWP

Re: City of Boardman (00130) November 1, 2012 Water System Survey

Dear Mr. Winters,

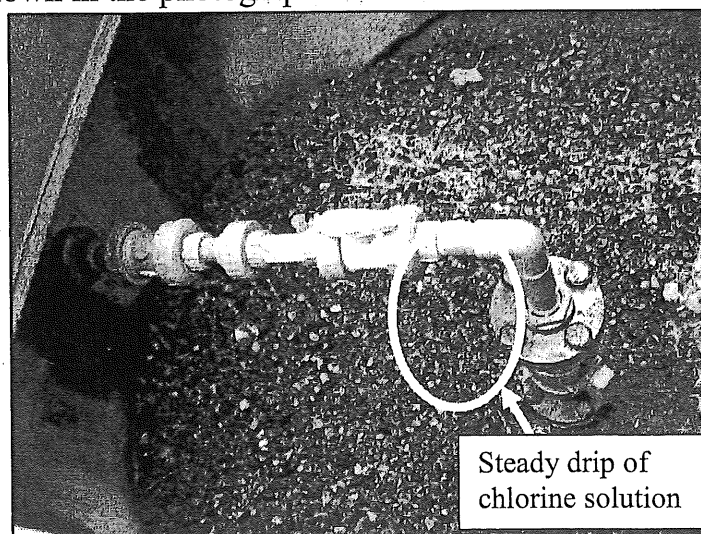
Thank you and Kevin Kennedy for meeting with me on November 1, 2012 to conduct a survey of the City of Boardman's water system. The main purpose of the survey is to evaluate the water system in terms of supplying safe drinking water to the public. I have enclosed a copy of the report for your records. Please let me know if any corrections need to be made.

Water system facilities were generally found to be well operated and maintained. The first page of the report lists significant deficiencies and rule violations (addressed in more detail below) in the system that will have to be corrected as soon as possible. **You must contact Bill Goss within 30 days and correct all deficiencies and violations by March 15, 2013, or be on an approved schedule for correction.** Once the deficiencies are corrected, you will need to send written verification that they have been corrected and the dates of correction.

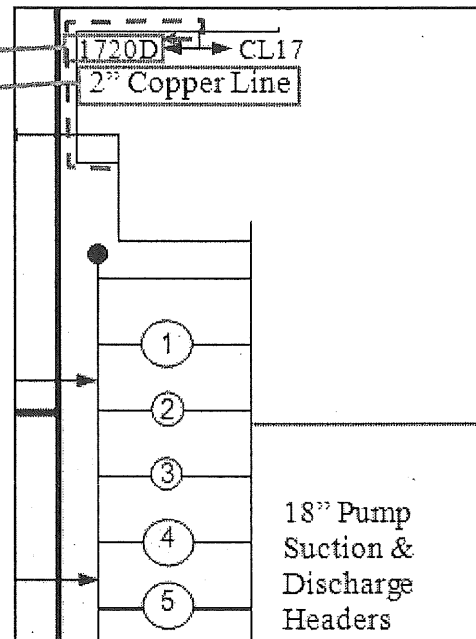
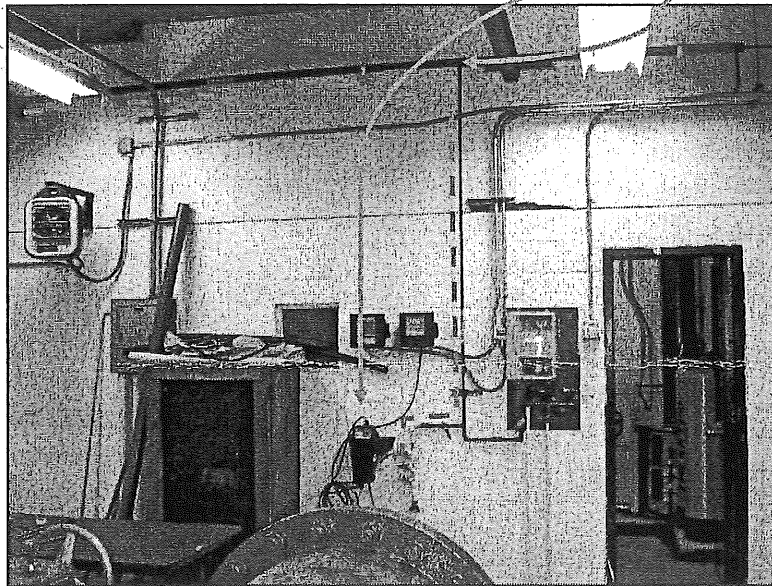
The significant deficiencies and rule violations noted are as follows:

1. **Cross-connection Annual Summary Report must be completed for calendar year 2011 (OAR 333-061-0070(9)(c)).** All backflow prevention devices must be tested annually. Records should be kept and should include a list of backflow assemblies installed, inspections completed, and backflow assembly test results. An annual report also needs to be submitted indicating which devices were tested, when they were tested and the results of any testing. Additionally, the check valve assembly in the 2" copper line used to isolate chemical treatment carry water should be replaced with a reduced pressure (RP) principal assembly, should the potential for back siphoning of the brine and/or chlorine solution exist.
2. **No current approved water system Master Plan (OAR 333-061-0060(5)).** Although a plan is not currently approved, the City is working on a 2011 revision to the 2006 draft Master Plan submitted under plan review #141-2008.

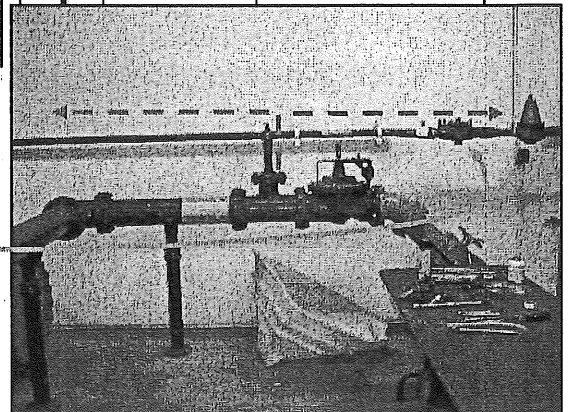
3. **Under-certified operator protocol should be developed for anyone making process control changes that may impact water quality and who are not certified as a WD1 (OAR 333-061-0225(5)).** This protocol should include all personnel who may be called upon to make to the distribution system operations that may affect water quality. The protocol needs to clarify the operational changes that can be made by staff without a WD1 license and those changes that need to be carried out under direct supervision of the WD1 operator.
4. **No Current Coliform Sampling Plan (OAR 333-061-0036(6)(G)).** The coliform sample plan needs to be updated to include 4 routine sample sites, instead of 3, and all associated repeat sample locations. The plan should also address triggered monitoring under the Groundwater Rule, which requires that 1 sample be taken prior to treatment at any groundwater source in use at the time of a coliform positive distribution sample. In addition to this triggered sampling, an annual assessment sample from any well in use is also required to be taken. Please refer to the instructions and sample coliform sample template available on-line at:
<http://public.health.oregon.gov/HealthyEnvironments/DrinkingWater/Rules/GWR/Documents/csp-template.pdf>
More information on coliform monitoring requirements can be found on-line at:
<http://public.health.oregon.gov/HealthyEnvironments/DrinkingWater/Monitoring/Pages/monitoring.aspx#coliform>
A non-chlorinated sample tap for Ranney Well #1 located in the Ranney Well vault can be used for this monitoring.
5. **Chlorine not measured twice a week in the distribution system as required (OAR 333-061-0036(9)).** Free chlorine residual (as opposed to total chlorine residual) needs to be checked in the distribution system at least twice a week. Sampling should incorporate a rotation schedule so that all parts of the distribution system are represented and verified as having a free chlorine residual. The leaking chlorine injector will also need to be repaired as soon as possible. This leaking injector is shown in the photograph below:



6. **Turbidity not measured as required under OAR 333-061-0032(8)(r) using a calibrated turbidimeter.** If an infiltration gallery, Ranney well, or dug well has been determined to be classified as groundwater under OAR 333-061-0032, the turbidity of the source must be monitored and recorded daily and kept by the water system operator using a calibrated turbidimeter. The turbidimeter must be calibrated at least quarterly using a primary calibration standard (formazin) and according to manufacturer recommendations. If the turbidity exceeds 5 NTU or if the surface water body changes course such that risk to the groundwater source is increased, an MPA must be taken at that time. Re-evaluation may be required by the Oregon Health Authority – Drinking Water Services. The existing on-line turbidimeter does not sample raw water from the source, but rather samples water after the tank and clearwells. [Means of sampling the raw water from each collector, prior to storage, must be identified in order to fulfill this requirement (grab samples taken from the sample tap in the Ranney Well #1 vault could be used)]. The following photograph and detail taken from the schematic on page 10 of the survey report illustrates this issue.

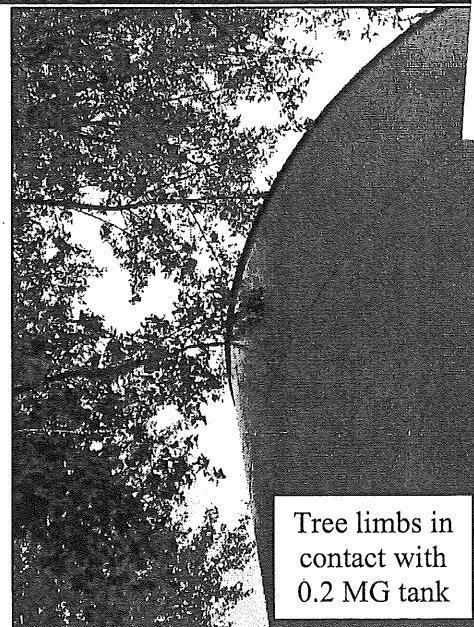
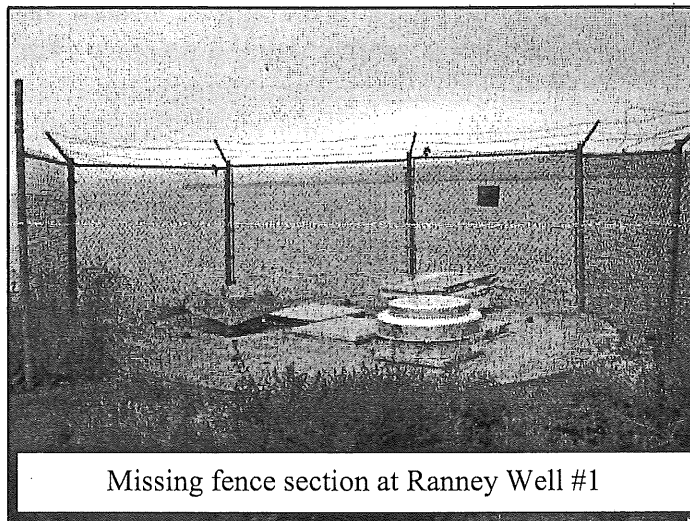


Check valve

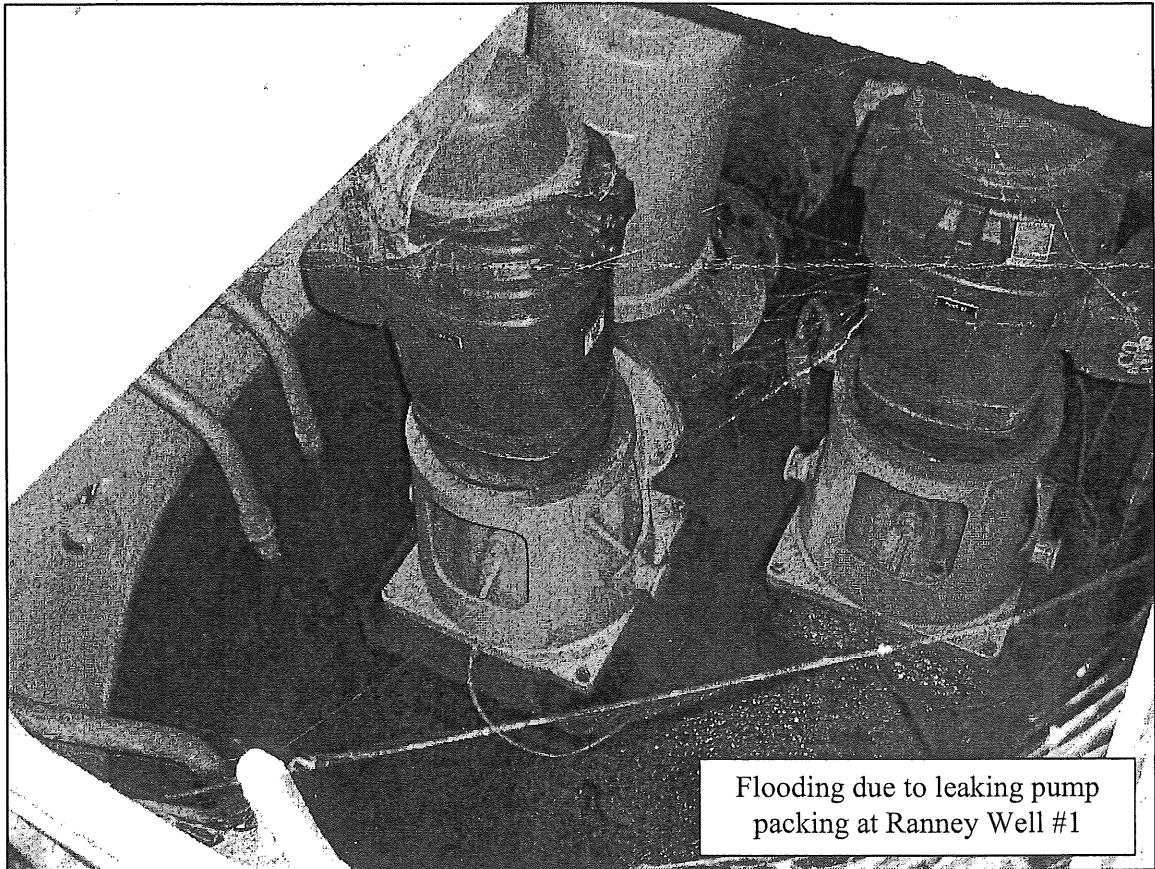


In addition, I have the following comments and recommendations:

1. The security fencing around Ranney well #1 should be restored. A large section of the fencing was absent as shown in the photograph below.
2. The City should strive to develop and implement distribution system flushing and valve exercising programs. Valves should be exercised and the system flushed at least annually.
3. Should the City decide to pursue or want to learn more about source water protection strategies, a geologist from our office may be able to offer free assistance. Please contact Bill Goss if the City would like more information.
4. The tree branches (shown in the photograph to the right) should be trimmed away from the 200,000 gallon tank at the treatment plant in order to prevent abrasion of the protective finish.
5. All tank vents should be regularly inspected to verify their ability to keep rodents and insects out.
6. The water system emergency response plan should be updated at least every 5 years.
7. The operations and maintenance manuals should be augmented with daily operations tasks (e.g. daily, weekly monitoring of raw water quality and checking of instruments, tanks, and sources). This should include regularly checking the chlorine injection site, which was found to be leaking at the time of this survey.
8. All reagents used in process monitoring instruments (DBP powder pillows, pH buffer solutions, etc.) should be current and not expired. Although not required monitoring for your system, the pH buffer had expired in February 2012.
9. Should the HACH 1720D on-line turbidimeter be used for process control or compliance monitoring, it should be calibrated with non-expired primary calibration standards at least once each quarter and maintained according to manufacturer specifications.



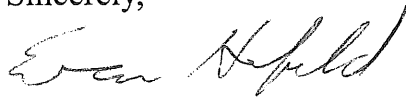
10. The floor drain for Ranney Well #1 vault should be made functional and the leaking pump packing should be remedied as soon as possible.



11. A summary of your monitoring requirements can be found on page 24 of the survey report. Please maintain a copy of this page and refer to it for future monitoring scheduling.

Thank you for your assistance in completing this survey and if you have any questions, or would like this report in an alternate format, please feel free to contact me at (971) 673-0419 or via e-mail at evan.e.hofeld@state.or.us.

Sincerely,



Evan Hofeld
Regional Engineer
OHA - Drinking Water Services

Deficiency Summary

Surveyor: Evan Hofeld

Date Corrective Action Plan is due: March 15, 2012

County: Morrow

Yes	No	Significant Deficiencies and Rule Violations:	Date to be corrected	Date corrected
☐	☒	Source: <i>Well construction:</i>		
		<i>Spring/other source:</i>		
☒	☐	Treatment: <i>Surface water treatment:</i>		
		<i>Disinfection:</i> Chlorine not measured & recorded as required		
		<i>Other treatment:</i> Turbidity is not measured as required under OAR 333-061-0032(8)(r) using a calibrated turbidimeter.		
☐	☒	Finished Water Storage:		
☒	☐	Distribution: Annual Summary Report Not Issued		
☒	☐	Monitoring: No Current Coliform Sampling Plan		
☒	☐	Management & Operations: No Current Approved Water System Master Plan		
☒	☐	Operator Certification: No protocol for under certified operator		
☐	☒	Other Rule Violations:		

Comments:

Deficiencies remaining from the 2009 survey include the lack of a non-DRC operator protocol and not having submitted the annual cross connection control program annual summary report.

☐ **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: Morrow

Type	Status	Size	Season
☒ Community (C)	Population:	3,310	☒ All year ☐ Seasonal
☐ Non Transient Non-Community (NTNC)	Connections:	808	Begins: (mm/dd) /
☐ Transient Non-Community (TNC)	Service Chars:	MU	Ends: (mm/dd) /
☐ State Reg/Non EPA (NP)	Ownership:	4	Coliform Sampling
	License		Period: ☒ Monthly ☐ Quarterly
	☒ Not Lic ☐ HD ☐ Ag		Samples Required: 4
Operator Certification Required			Responsible Agency
WD 2	WT	FE ☐ Small WS ☐	☒ State ☐ County ☐ Dept of Agriculture

Primary Administrative Contact (Mailing Address):

Contact Name: Dave Winters Phone: (541) 481-9252
 Title: Public Works Director Cell: ()
 Street Address: PO Box 229 Emergency #: ()
 City/State/Zip: Boardman, OR 97818 Email: publicworks@cityofboardman.com

Legal/Owner Address:

Contact Name: City of Boardman Phone: (541) 481-9252
 Title: Cell: ()
 Street Address: 200 City Center Circle Emergency #: ()
 City/State/Zip: Boardman, OR 97818 Email:

System Physical Address:

Contact Name: City of Boardman Phone: ()
 Title: Cell: ()
 Street Address: Near Boardman Park off of Marine Drive Emergency #: ()
 City/State/Zip: Boardman, OR 97818 Email:

Emergency Systems Available:

Name: Port of Morrow

PWS ID#: 41 01328

Narrative:

The City of Boardman has two radial collector wells located along the Columbia River to supply water to the system, however only Ranney well #1 is used until a GWUDI evaluation is completed for Ranney well #2. Water from the wells is chlorinated, enters a 300,000 gallon steel reservoir, and then flows into two 125,000 gallon concrete clearwells before being pumped into the distribution system. The City also owns an older drilled well and elevated tank located at the old City Hall building, both of which are off-line and only used in extreme emergencies. The City has an intertie to the Port of Morrow water system (PWS #01328), with an agreement to supply them 648 million gallons annually if needed. A SCADA system is used to manage tank levels and activate well pumps.

Service area characteristic and owner type codes:

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

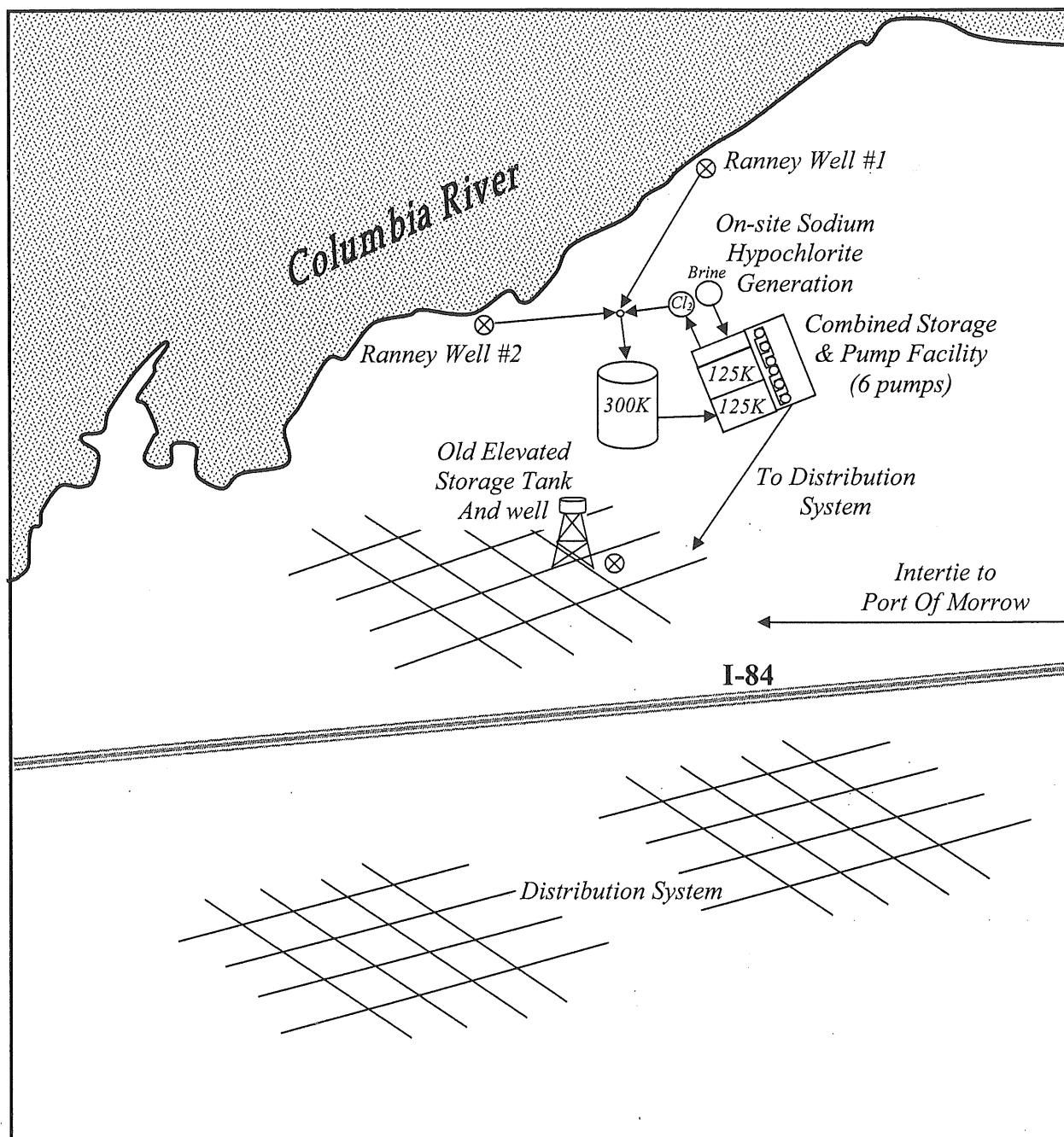
Determining System Type				
Population/Daily Use	Number of Connections	>25 Same Daily Users	≥25 Year Round Residents	System Type
<10	<4	No	No	Not a System
10 – 24	4-14	–	–	State Reg/Non-EPA
25+	–	No	No	Transient Non-Community
25+	–	Yes	No	Non-Transient Non-Community
25+	15+	Yes	Yes	Community

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

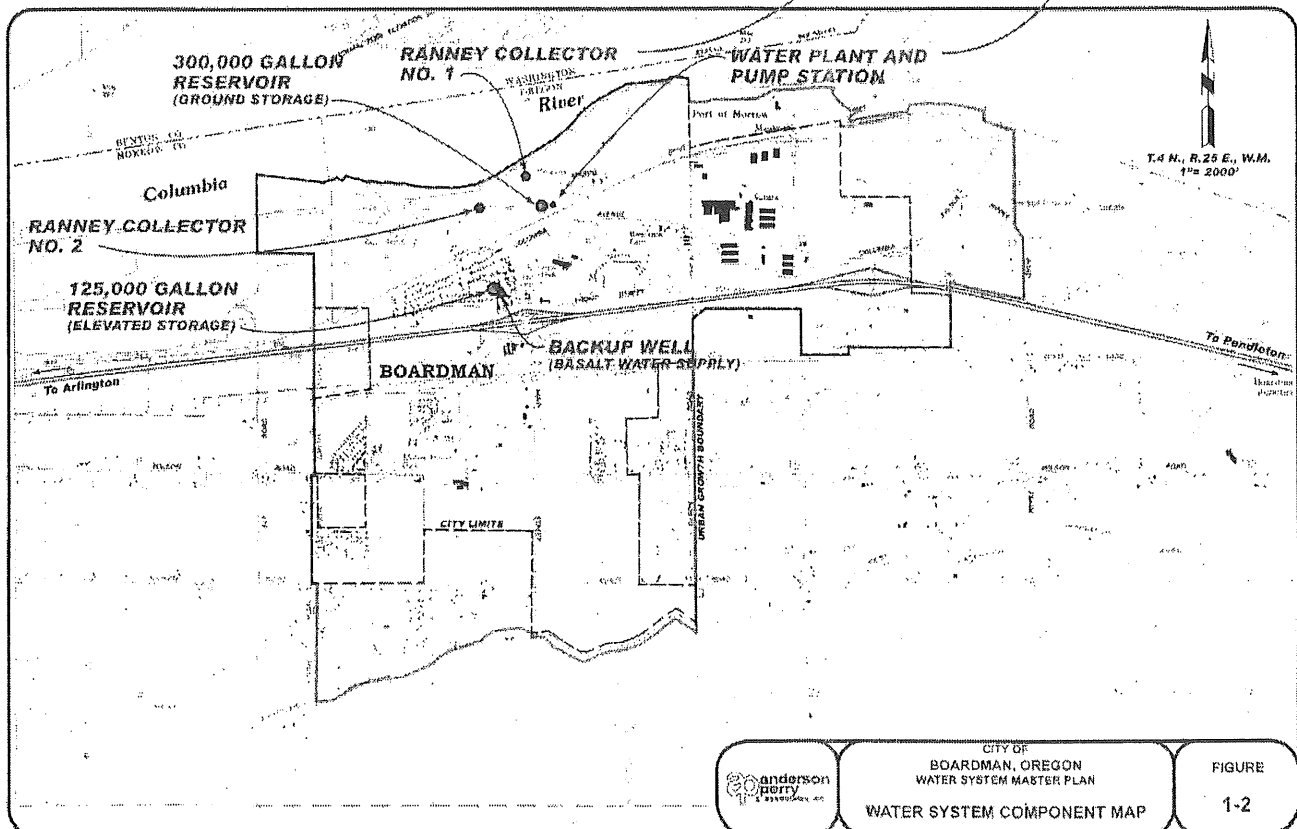
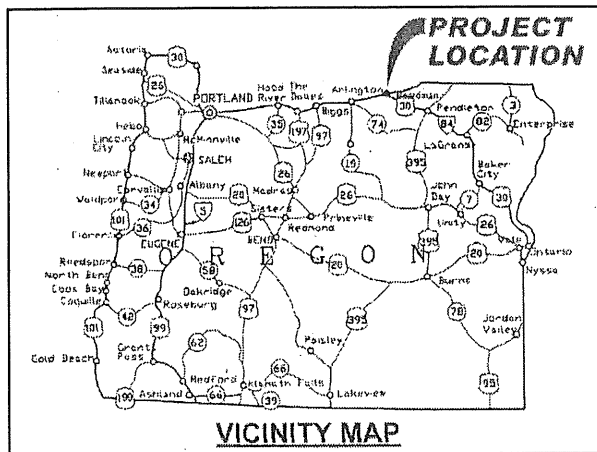
Owner Type	Code
Federal Government	1
Private	2
State Government	3
Local Government	4
Mixed Public/Private	5

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

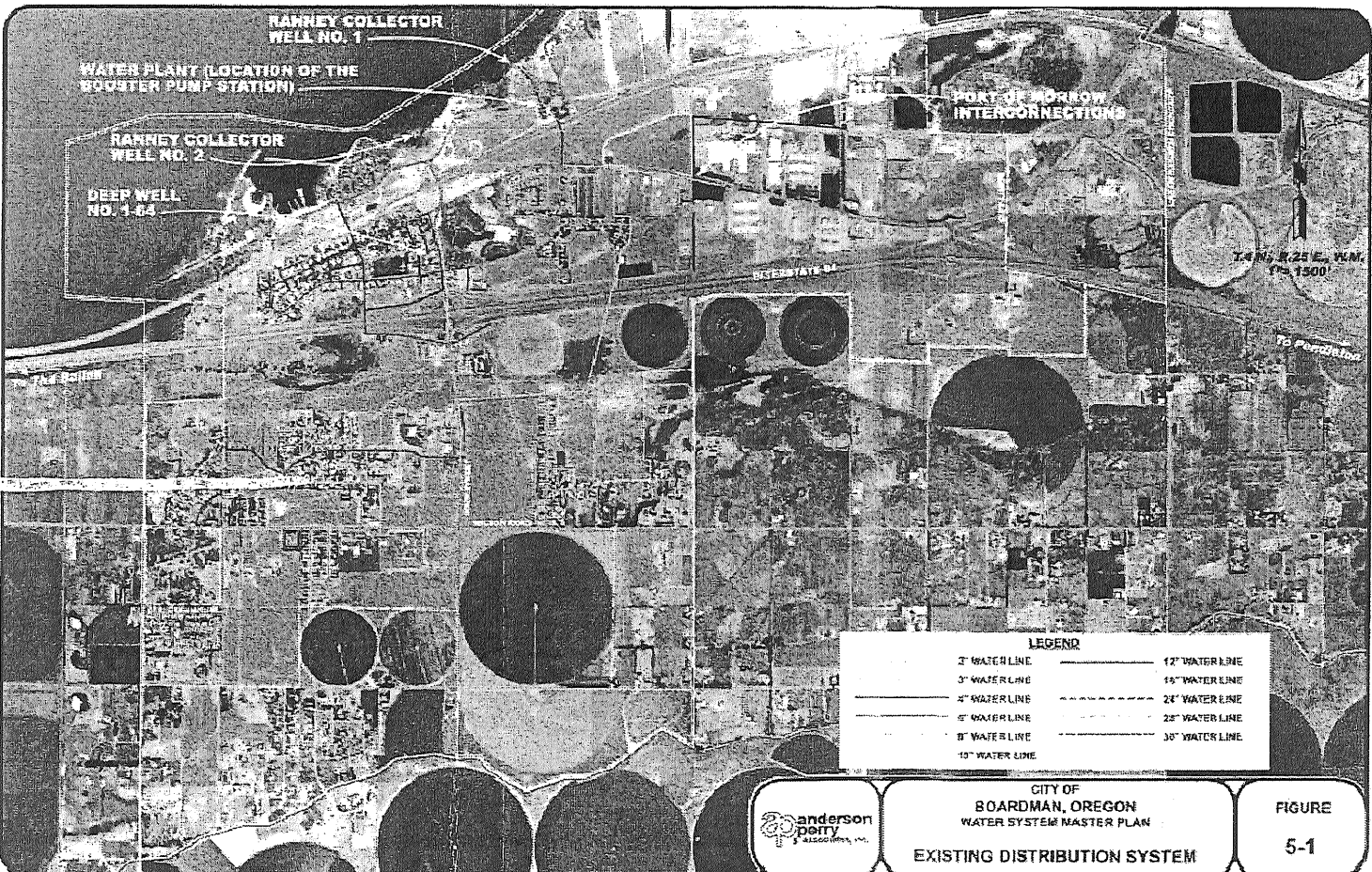
Water System Schematic



Major Facilities

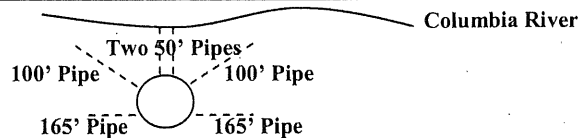
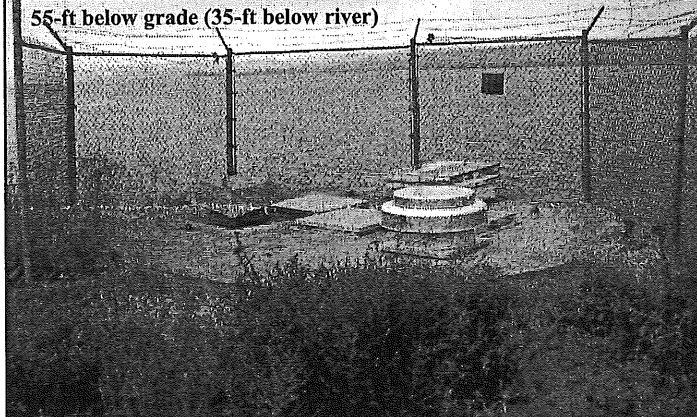


Distribution System

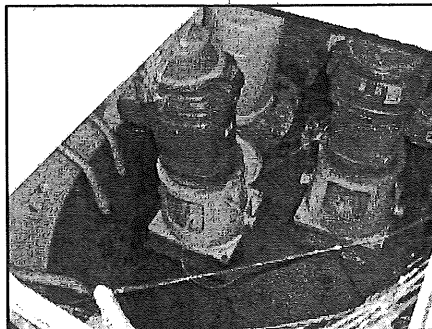


Ranney Wells #1 (SRC-AA) & #2 (SRC-AB)

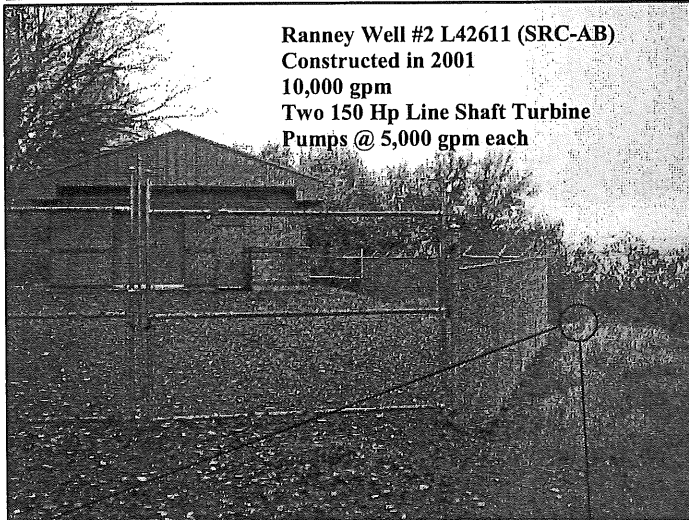
Ranney Well #1 (SRC-AA) Constructed in 1977
10,600 gpm capacity
Three 75Hp Line Shaft Turbine Pumps @ 3,000 gpm each
630 total ft of 10" diameter laterals are
55-ft below grade (35-ft below river)



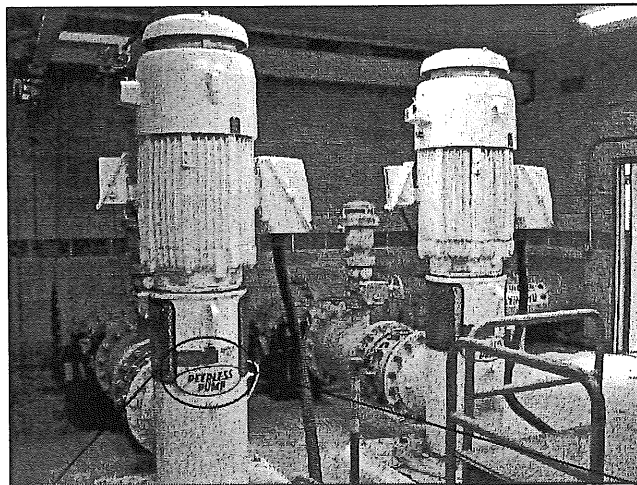
Ranney Well #1 (SRC-AA) 3 Line Shaft Turbine Pumps



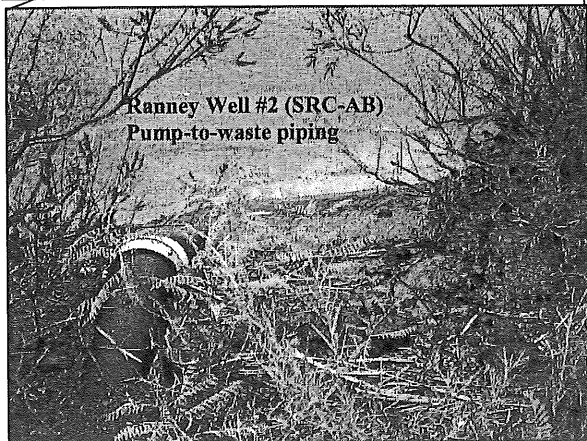
Ranney Well #2 L42611 (SRC-AB)
Constructed in 2001
10,000 gpm
Two 150 Hp Line Shaft Turbine
Pumps @ 5,000 gpm each



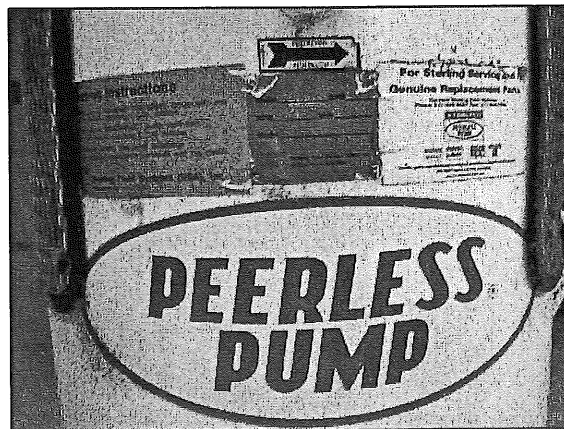
Ranney Well #2 (SRC-AB) Two 5,000 gpm Peerless Pumps



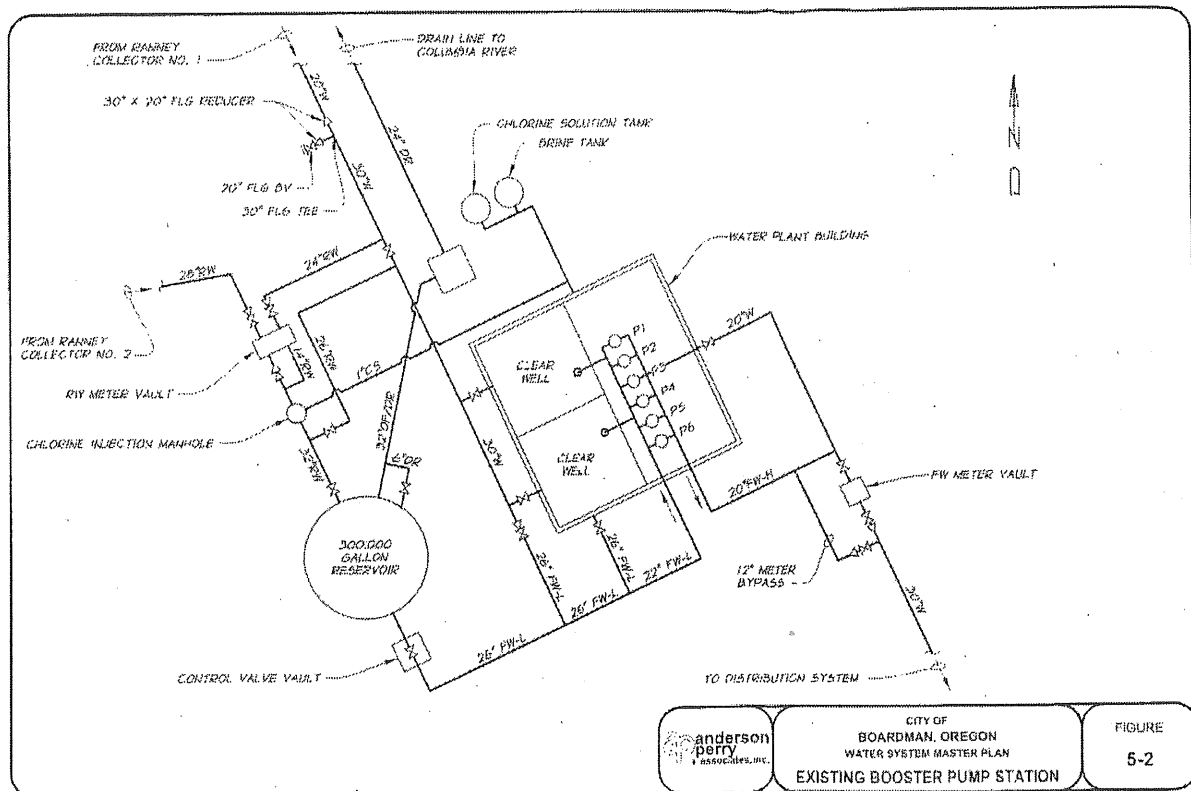
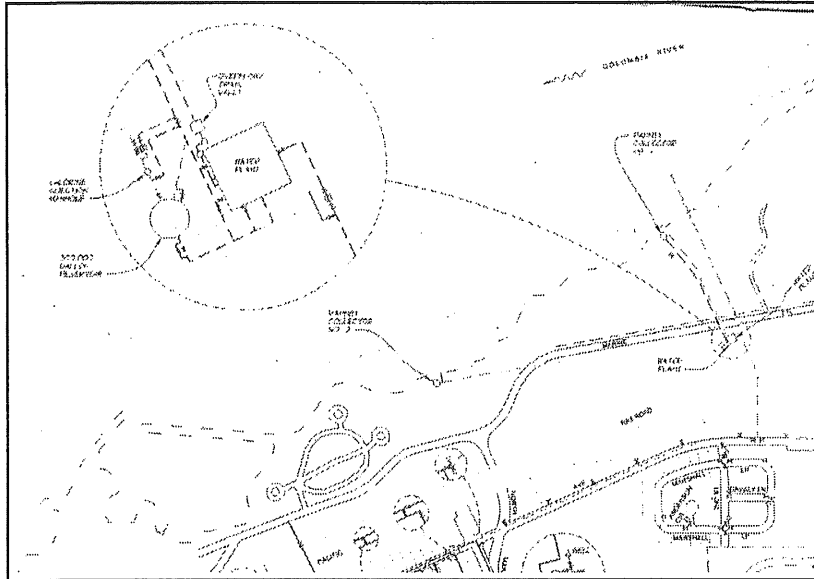
Ranney Well #2 (SRC-AB)
Pump-to-waste piping



Water Right
S40336 is for
36 cfs (16,156
gpm).



Booster Pump Station and Ranney Wells

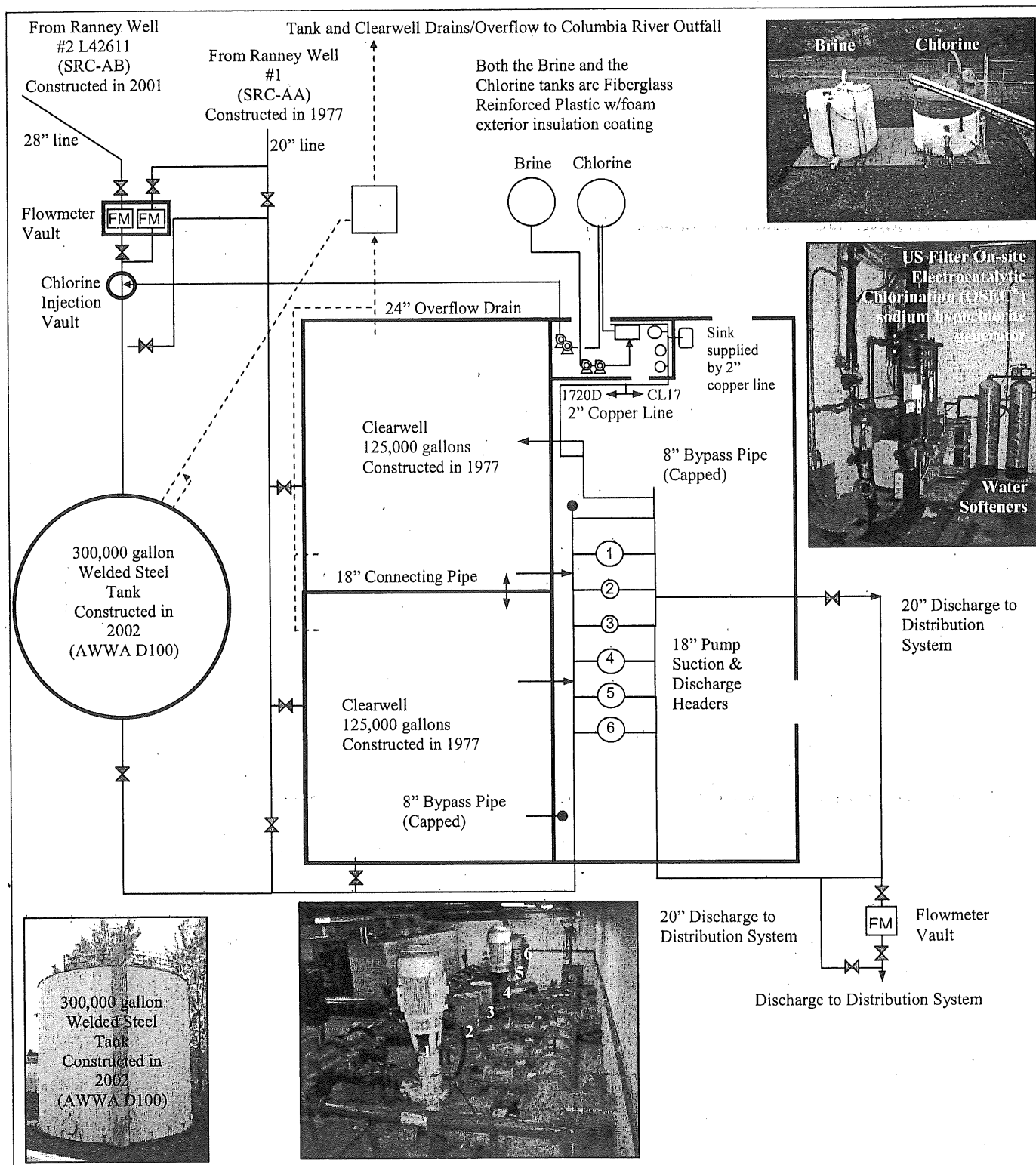


anderson
perry
ASSOCIATES, INC.

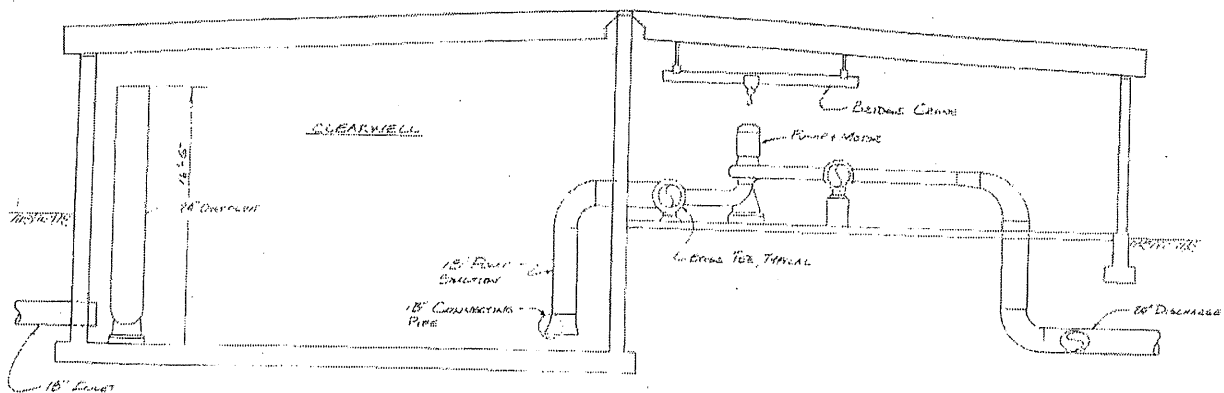
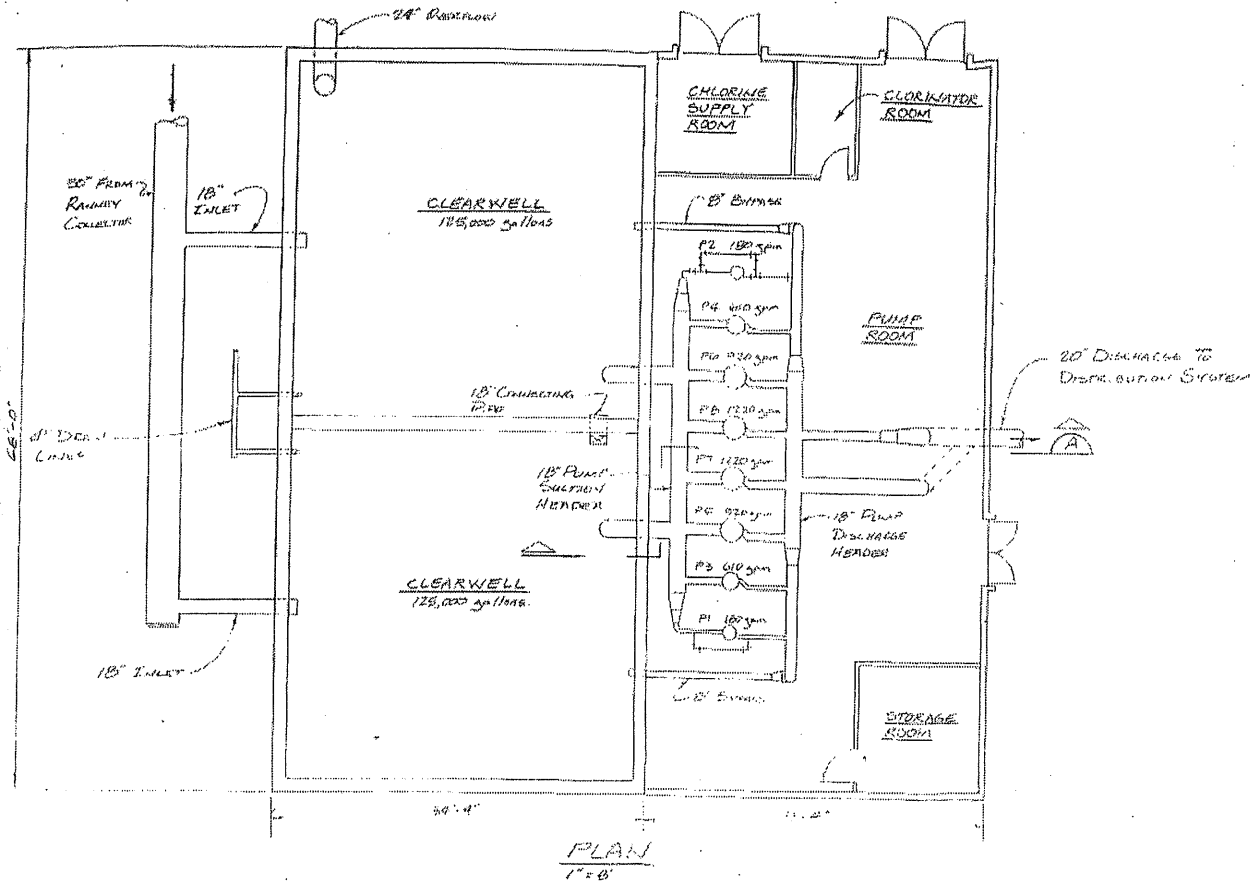
CITY OF
BOARDMAN, OREGON
WATER SYSTEM MASTER PLAN
EXISTING BOOSTER PUMP STATION

FIGURE
5-2

Booster Pump Station & Disinfection



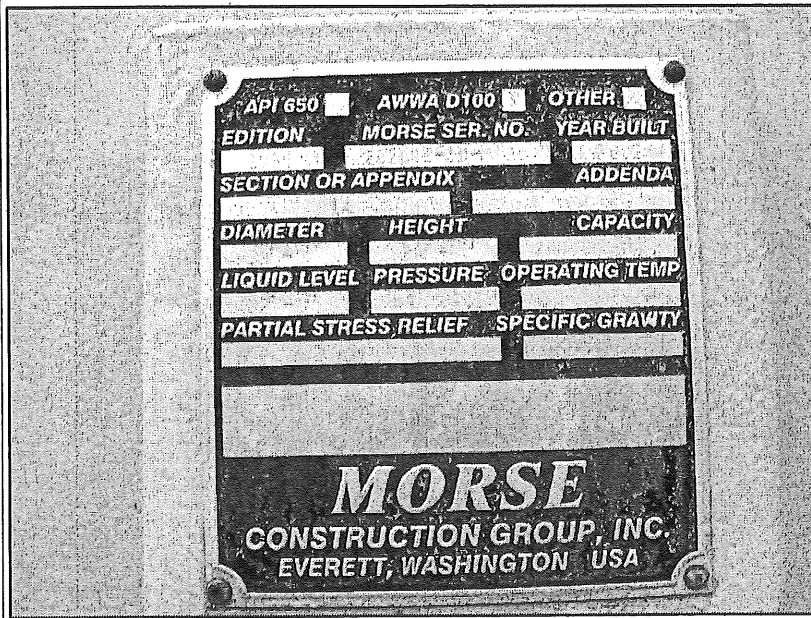
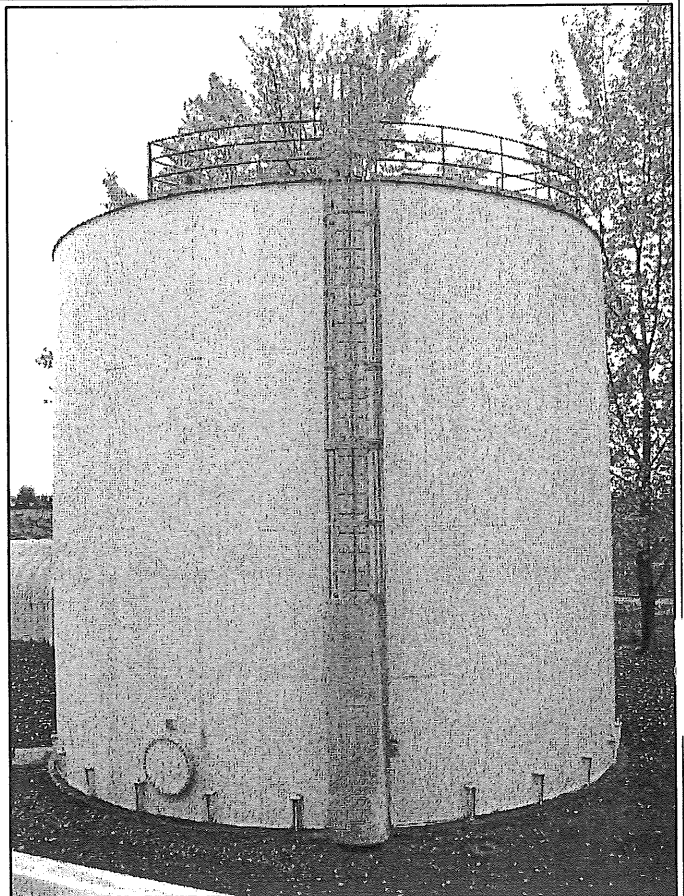
Booster Station Original Clearwell Plans



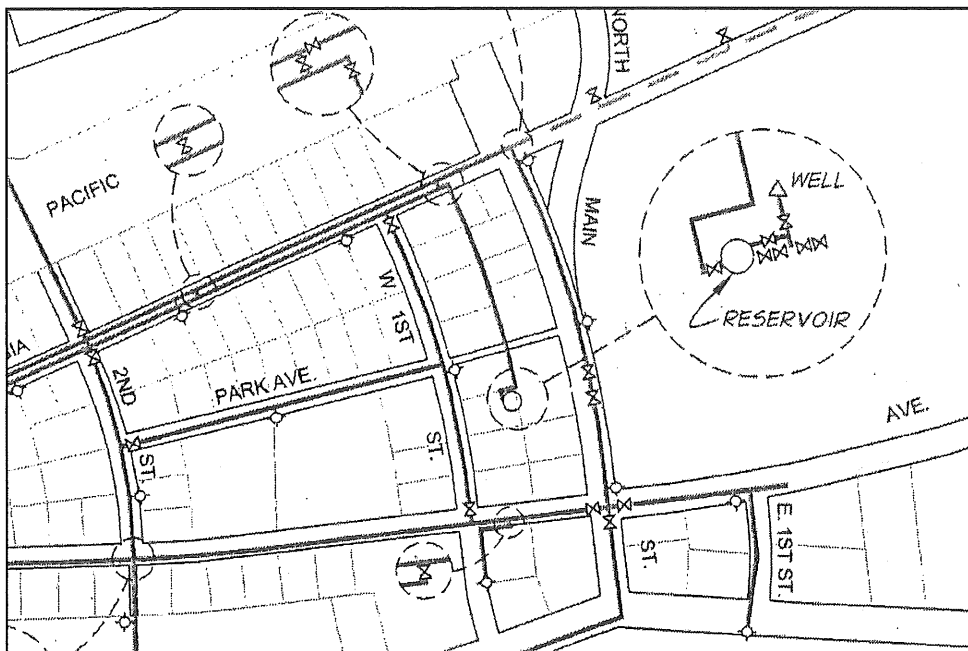
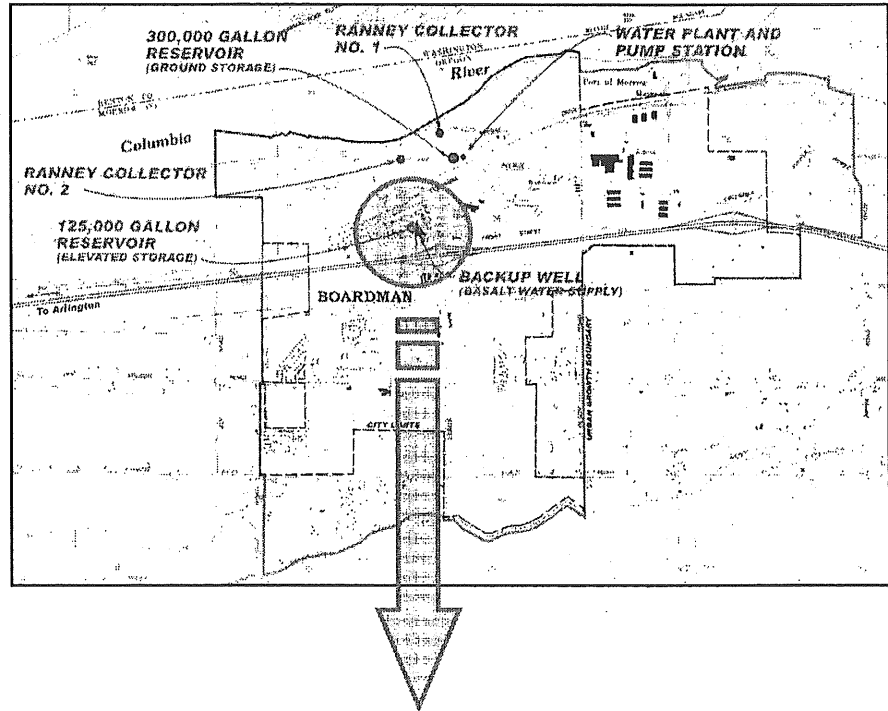
Maximum operating level is at elevation 286-ft

300,000 Gallon Reservoir

300,000 gallon Welded Steel Tank
Constructed in 2002
(AWWA D100, 1996 ed.)
Liquid level = 32'-9"
Height 34'-9"
OF Elev. = 315.75'
Diameter = 39'-6"
Morse Construction Group, Inc.
Everett, WA
Morse Serial #262601-B0-6938

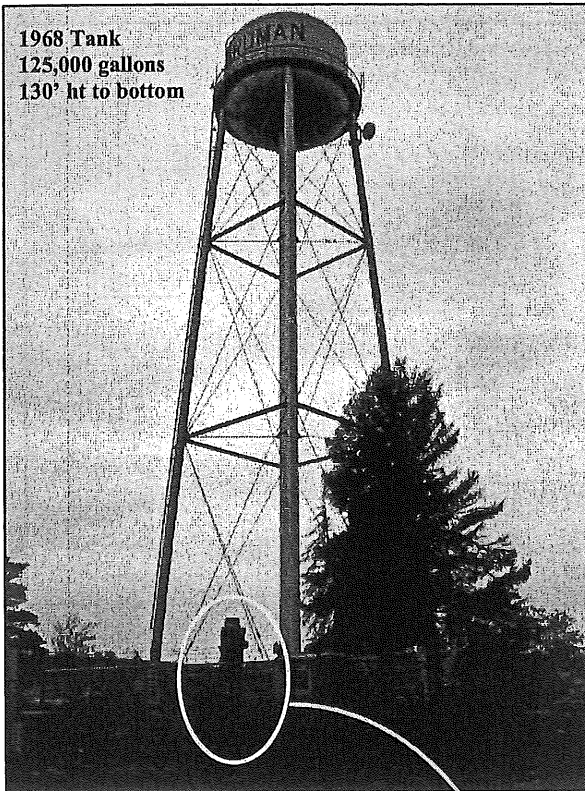


Emergency Well (SRC-BA) and Elevated Tank



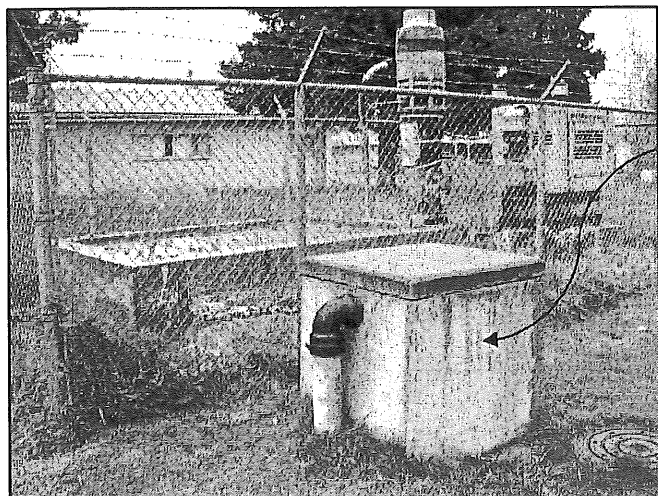
Emergency Well (SRC-BA) and Elevated Tank

1968 Tank
125,000 gallons
130' ht to bottom



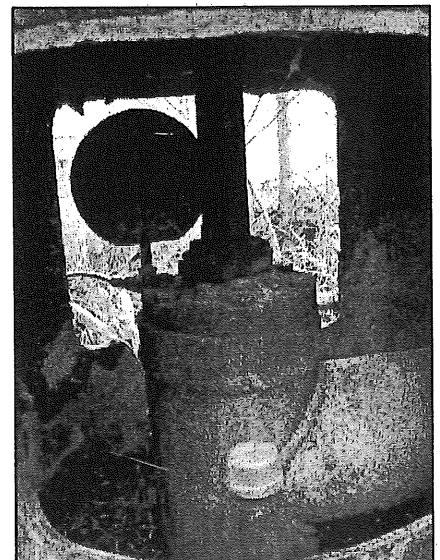
SRC-BA Emergency Well (MORR745)
1965 Well (Well No. 1-64 on water right)
585-ft deep
800-gpm vertical turbine pump
(Johnson Pump SN#JX-5551)
673-gpm water right (G2664, Cert 34275, 1.5 cfs)

Well Pump ID Plate →



Collection vault for
tank overflow/drain &
well pump to waste
vault

Wellhead →



Source Information

ID	Entry Points (Location where water enters distribution and is sampled)	Source Type						Availability				Treatment	
ID	Name	Ground	Surface	GWUDI	Pur. ground	Pur. surface	Permanent	Seasonal	Begins	Ends	Emergency	None	Treatment Codes**
A	EP for Ranney Wells (Columbia River)	☒	☐	☐	☐	☐	☒	☐			☐	☐	X 4 2 1
B	EP for Well 1-64 (MORR745)	☒	☐	☐	☐	☐	☐	☐			☒	☐	N o n e
		☐	☐	☐	☐	☐	☐	☐			☐	☐	
		☐	☐	☐	☐	☐	☐	☐			☐	☐	

ID	Individual Sources			Source Type					Availability					Treatment	
ID	Name	*Land Use	Capacity (GPM)	Ground	Surface	GWUDI	Pur. ground	Pur. surface	Permanent	Seasonal	Emergency	Abandoned	Disconnected	None	Treatment Codes**
AA	Ranney Well #1 (Columbia River)	B,C,L,M	10,600	☒	☐	☐	☐	☐	☒	☐	☐	☐	☐	☐	X 4 2 1
AB	Ranney Well #2 (Columbia River)	B,C,L,M	10,000*	☒	☐	☐	☐	☐	☐	☐	☐	☐	☒	☐	X 4 2 1
BA	Emergency Well 1-64 (MORR745)	B,C,L,M	800	☒	☐	☐	☐	☐	☐	☐	☒	☐	☐	☐	N o n e
				☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
				☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
				☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
				☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	

*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)

* Ranney #2 needs to be limited to 6,000 gpm in order to maintain GW designation. Ranney Well #1 is the primary source meeting both winter and summer demands. Ranney Well #2 is off-line until a determination as to whether the source is under the influence of surface water is made. The old well is also not used.

Yes No

- ☒ ☐ Does the water system have water rights for all sources? ☐ Not Required S40336 for Ranney Wells/G2664 for Well 1-64
☐ ☐ 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:

Locked fences prevent access to Ranney Well #2 and the old well. Ranney Well #1 is missing fence sections.

- ☐ ☐ Is the water system interested in source water protection? If yes, contact regional geologist at 541-726-2587.

Comments:

Source Water Assessment (June 2005) evaluated Ranney Well #1 as highly sensitive due to hydraulic connection with Columbia River and the number/type of potential contaminants nearby.

Well Information

		Source ID#:	BA									
		Source Name:	Well									
		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
		Well Log on File:	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐
		WRD Well Log ID (e.g. COLU123):	MORR745									
Wellhead Construction	Well still active	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Depth of well (ft.)	585										
	Depth of grout seal (ft.)	86										
	Year of installation (yr.)	1/28/65										
	Casing diameter (in.)	16										
	• Sanitary seal & casing watertight	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	• If vented, properly screened	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	• Wellhead protected from flooding	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	• Well meets setbacks from hazards	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Nearest hazard (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	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Heated	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Lighted	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Floor drain	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Well pump removal provision	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Pump	Pump type*	VT										
	Bearing lubrication (FG oil/water)											
	Pumping capacity (gpm)	800										
	Amount of water pumped per year (gallons)	0										
	Percent of total well supply provided (%)**	0										
	Static water level (ft below ground surface)	62										
	Static water level date	1/7/65										

* 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:

This well was not in use during survey and there are no plans to use it in the future. There is no well house/control building enclosing the wellhead.

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

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

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

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

- Gravity sewer line
- Septic Tank

Exemptions to these setbacks must be listed and documented within the plan approval letter.

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

Spring/Other Source

Source ID: AA AB

Source Name: Ranney Wells #1 and #2

Type: ☐ Spring ☐ Infiltration Gallery ☒ Ranney Well ☐ Dug Well ☐ Other: _____

Spring Data

- | | Yes | No |
|--|--------------------------|--------------------------|
| • Meets setback from hazards | ☐ | ☐ |
| • Raw water sample tap | ☐ | ☐ |
| • Treated water sample tap (if treating) | ☐ | ☐ |
| Fencing around spring area | ☐ | ☐ |
| Springbox | ☐ | ☐ |
| Springbox Type: _____ | | |
| • Impervious durable material | ☐ | ☐ |
| Hatch | ☐ | ☐ |
| Locked | ☐ | ☐ |
| Overlapping lid | ☐ | ☐ |
| • Watertight access | ☐ | ☐ |
| Intercepting ditch | ☐ | ☐ |
| • Screened overflow | ☐ | ☐ |
| Bottom drain & shutoff valve | ☐ | ☐ |

☐ N/A

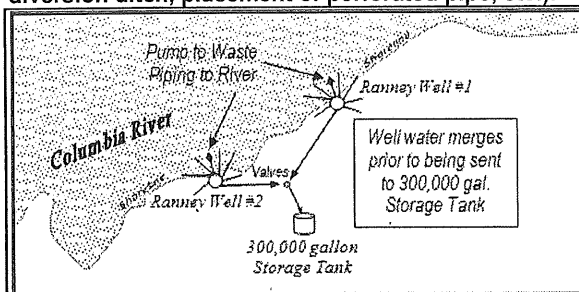
Infiltration Gallery

Number of laterals
Average depth (ft.)

Dug Well

Depth of well
Construction material

Drawing of source construction: (include details of access hatch, drain, overflow, description of collection piping, if known, diversion ditch, placement of perforated pipe, etc.). ---insert photo if possible---



	Ranney Well #1	Ranney Well #2 (L42611)
Built:	1976	2001
Depth:	59 ft	43.5 ft
# of laterals:	6	7
Lateral Diameter:	10 in	12 in
Lateral Lengths:	63-112 ft	65-190 ft
Total Capacity:	10,600	10,000
# of Pumps:	Three 3,000 gpm	Two 5,000 gpm pumps
Pump HP:	75	150
Access Hatch:	Yes	Yes
Secure:	No	Yes

Does surrounding area have:

Yes No

- ☐ ☒ Septic tanks/gravity sewer
- ☐ ☒ Drainfield/pressure sewer
- ☐ ☒ Grazing
- ☒ ☐ Surface water body (name) Columbia River < 50-ft away
- ☐ ☒ Other sanitary hazards
- ☐ ☒ Is there evidence of Infiltration of surface water run off?
- ☐ ☒ Has source been evaluated by DWP for direct influence of surface water?
- ☐ ☒ Does water quality vary seasonally? Explain: _____

Distance away:

(☐ ≥ 50 feet)
(☐ ≥ 100 feet)

*

Is source considered: groundwater (G), surface water (S), or groundwater under the direct influence (I)?

Comments: *Ranney Well #1 is considered groundwater. Ranney Well #2 is off-line and under evaluation for being under the influence of surface water, but no final determination has been made.

Disinfection

No #	Disinfection Method*	Location	Disinfection Source Water	Residual Maintenance	Other Purpose	Proportional to Flow	Dosage Recorded
1	On-site Generated Sodium Hypochlorite	Discharge pipes from Ranney wells	☐	☒		☒	☒

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

Yes No
☒ ☐ • Is a DPD or other EPA approved method used?
☐ ☒ • Are residuals recorded as required?
 Distribution: ☐ $\geq 2x$ weekly # samples: 2/mo ☒ w/Coliform Other: _____
 EP (SWTR & GWR Comp. Mon.): ☐ $\geq 1x$ Daily # samples: _____ ☒ Continuous if > 3300 pop ☐ N/A
 Range of chlorine residuals at first user: mg/l = 0.65-0.70
☒ ☐ • Are raw water samples taken as required (GWR assessment monitoring, etc.)? ☐ N/A
 How often? Annual

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

Yes No UV: ☐ 4.0-log virus ☐ Total coliform + ☐ Other: N/A
☐ ☐ • Plan Review approval
☐ ☐ • Does all water contact UV (no bypass)
☐ ☐ • Annual raw water sampling up to date ☐ N/A
 Yes No
☐ ☐ • Is lamp sleeve cleaned
☐ ☐ • Is lamp replaced per manufacturer
☐ ☐ • Intensity sensor with alarm or shut-off

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: 06/08/2009
 Demand flow (gpm): 4,791 gpm Baffling factor (%): Not determined
 Volume used (gal): 78-100% of 300,000 gal reservoir Results (min): 89 min
☐ ☐ Adequate alternate method for contact time? Describe: _____
 Peak hour demand flow over the past 12 months: gpm = 4,800 - 4,900
 Lowest operating volume over the past 12 months: gallons = 78%

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? Not Applicable
☐ ☐ • Are CT values met at all times? Not Applicable

Comments:

Chlorine residual and turbidity are monitored continuously before leaving the pump station, which is the first user. Residual levels are also reported when coliform samples are collected. In last year, reported residual levels ranged from 0.03 to 0.98 mg/l. Alarms are set for the CL17 at the plant at a high of 1 mg/l and a low of 0.05 mg/l.

Treatment

Process Used*	Chemical Added**	Purpose	Location in System	Code***
Pre hypochlorination	Sodium Hypochlorite (On-site)	Residual Maintenance	Ranney Wells prior to tank	X421

*See "Treatment Plant Inspection" page for details on filtration. **See "Disinfection" page for details on disinfection equipment. ***See Treatment Codes on back.

Yes No

- ☐ ☒ Is equipment maintained properly? CL17 is well maintained. 1720D is not maintained
☒ ☐ Is redundant equipment available? System has spare chemical injection pumps

What lab equipment is available and used? (jar testing, turbidimeter, pH meter, etc.):

On-line (post chlorination/clearwell) instrumentation includes a HACH CL17 chlorine analyzer and a HACH 1720D turbidimeter. Lab equipment includes a HACH color wheel for chlorine measurements and HACH pocket pH and temperature testers.

- ☒ ☐ • Are chemicals NSF Standard 60 certified or equivalent? (☐ N/A - no chemicals are used)

Comments:

System purchases rock salt in 1-ton totes provided by North American Salt and generates sodium hypochlorite on-site using a US Filter On-site Electrochemical (OSEC®) process. The OSEC electrolyzer cell includes a series of flat plate anode/cathode pairs, which are energized with DC power. The titanium anodes are coated with a precious metal oxide that acts as a reaction catalyst. The electrolyte solution is a 3% concentration of brine solution made from solar salt and softened water. Sodium hydroxide is formed at the cathode, and chlorine gas is formed at the anode. Through a series of intermediate reactions, sodium hypochlorite is created and discharged to the treatment process. The hydrogen byproduct is gathered in the product storage tank and disposed of through dilution with forced air, using blowers. For each pound of equivalent chlorine formed, 3 lbs of salt and 2 kWh of power are required. The resultant hypochlorite solution has a concentration of 0.8%.

Yes / No

- ☐ ☒ Does system practice corrosion control?
☐ ☐ • Is corrosion control operated within parameters set by DWP? ☒ N/A

Comments:

Records Kept:

Yes / No

- ☒ ☐ Dosages
☐ ☒ Raw pH
☐ ☒ Raw temperature
☐ ☒ Raw turbidity and/or particle counts

Yes / No

- ☒ ☐ Flowrate
☐ ☒ Treated pH
☐ ☒ Treated temperature
☐ ☒ Treated turbidity

Comments:

System also checks and records hardness (ranges around 3 mg/l as CaCO₃) Turbidity has not been measured as required under OAR 333-061-0032(8)(r) using a calibrated turbidimeter.

Treatment Codes:

Disinfection By-products Control

B121 Activated Carbon, Granular
B125 Activated Carbon, Powdered
B200 Chloramines
B220 Chlorine Dioxide
B240 Coagulation
B344 Filtration, Pressure Sand
B500 Lime-Soda Ash Addition
B600 Rapid Mix
B742 pH Adjustment, Pre
EP240 Enhanced Coagulation
ES240 Enhanced Softening

Disinfection

D200 Chloramines
D220 Chlorine Dioxide
D361 GWR 4-log Virus Compliance Mon.
D401 Gaseous Chlorination, Post
D403 Gaseous Chlorination, Pre
D421 Hypochlorination, Post
D423 Hypochlorination, Pre
D541 Ozonation, Post
D543 Ozonation, Pre
D455 Iodine
D720 Ultraviolet Radiation
D800 Mixed Oxidants

Residual Maintenance

X200 Residual Maintenance, Chloramines
X401 Residual Maintenance, Gas Chlorination
X421 Residual Maintenance, Hypochlorination
X800 Residual Maintenance, Mixed Oxidants

Dechlorination

E121 Activated Carbon, Granular
E627 Reducing Agent, Sulfur Dioxide

Corrosion Control

C441 Inhibitor, Bimetallic Phosphate
C443 Inhibitor, Hexametaphosphate
C445 Inhibitor, Orthophosphate
C447 Inhibitor, OrthoPolyphosphate Blend
C449 Inhibitor, Silicate
C501 pH/Alkalinity Adjustment-Lime
C502 pH/Alkalinity Adjustment-Soda Ash
C503 pH/Alkalinity Adjustment-Caustic Soda
C504 pH/Alkalinity Adjustment-Sodium Bicarbonate
C505 pH/Alkalinity Adjustment-Calcite Contractor
C506 Calcium Carbonate Precipitation
C550 LCCA for L/C
C999 Blending

Inorganics Removal

I344 Filtration, Pressure Sand
I460 Ion Exchange
I640 Reverse Osmosis
I999 Blending

Arsenic Removal

A100 Activated Alumina
A240 Coagulation
A320 Electrodialysis
A347 Microfiltration
A348 Filtered
A460 Ion Exchange
A500 Lime Softening
A640 Reverse Osmosis
A900 Granular Ferric Hydroxide
A999 Blending

Iron Removal

F343 Filtration, Greensand
F344 Filtration, Pressure Sand
F345 Filtration, Rapid Sand
F403 Gaseous Chlorination, Pre
F423 Hypochlorination, Pre
F460 Ion Exchange
F543 Ozonation, Pre
F560 Permanganate
F640 Reverse Osmosis
F680 Sequestration
F740 pH Adjustment

Manganese Removal

M343 Filtration, Greensand
M423 Hypochlorination, Pre
M560 Permanganate
M680 Sequestration

Other

Z380 Fluoridation
Z551 Public Education for L/C
Z580 Peroxide
Z720 Ultraviolet Radiation

"Non-Treatment"

N000 No Treatment / Not Applicable
N349 Unfiltered, Avoiding Filtration
N350 Unfiltered, Must Install Filter
N996 Treatment Applied by Seller

Organics Removal

O121 Activated Carbon, Granular
O145 Aeration, Packed Tower
O160 Algae Control
O423 Hypochlorination, Pre
O560 Permanganate
O742 pH Adjustment, Pre
O999 Blending

Particulate Removal (SWTR)

P240 Coagulation
P341 Filtration, Cartridge
P342 Filtration, Diatomaceous Earth
P344 Filtration, Pressure Sand
P345 Filtration, Rapid Sand
P346 Filtration, Slow Sand
P347 Filtration, Membrane
P349 Natural Filtration
P360 Flocculation
P520 Microscreening
P600 Rapid Mix
P660 Sedimentation
P700 Sludge Treatment
P742 pH Adjustment, Pre

Softening (Hardness Removal)

S240 Coagulation
S344 Filtration, Pressure Sand
S360 Flocculation
S460 Ion Exchange
S500 Lime - Soda Ash Addition
S640 Reverse Osmosis
S680 Sequestration

Taste/Odor Control

T121 Activated Carbon, Granular
T125 Activated Carbon, Powdered
T141 Aeration, Cascade
T143 Aeration, Diffused
T149 Aeration, Spray
T160 Algae Control
T403 Gaseous Chlorination, Pre
T423 Hypochlorination, Pre
D541 Ozonation, Post
D543 Ozonation, Pre
T560 Permanganate
T720 Ultraviolet Radiation

Storage and Pressure Tanks

Number	Name	Tank Type*	Tank Material	Year Built	Volume (gal.)
1	Pump Station Clearwells (Cells 1&2)	G	Concrete (125,000 ea)	1977	250,000
2	Steel Tank	E	Steel	2002	300,000
3	Elevated Tank (Emergency Use Only)	E	Steel	1968	125,000

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

Total Volume: 675,000

Reservoir Number:		1		2		3					
Reservoir Features		Yes	No	Yes	No	Yes	No	Yes	No	Yes	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	☐	☒	☐	☒	☐	☐	☐	☐	☐	☐
Plumbing Config.	Continuously disinfected (● post '81 redwood)	☒	☐	☒	☐	☐	☐	☐	☐	☐	☐
	Separate inlet/outlet	☒	☐	☒	☐	☐	☒	☐	☐	☐	☐
	Baffling	☐	☒	☐	☒	☐	☒	☐	☐	☐	☐
Used for contact time	☒	☐	☒	☐	☐	☒	☐	☐	☐	☐	
Pressure Tanks		Number:						Comments			
Pressure Tanks	Used for contact time	☐	☐	☐	☐	Pump station clearwells were inspected in 2004. The newer tank has not been inspected since installation in 2002. The elevated tank is empty and off-line, but is maintained for emergency purposes only.					
	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	☐	☐	☐	☐						

Distribution System Information

Service Area and Facility Map

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

☒ Water lines (including size and material)

Distribution Data

Yes No

☒ ☐

• System pressure >20 psi

☒ ☐

Are service connections metered? (what %)

☒ ☐

Water system leakage <10%

☒ ☐

Waterline depth >30"

☒ ☐

Piping looped

☒ ☐

Hydrants or blowoffs on all dead ends

☒ ☐

Routine flushing (How often)

☒ ☐

Adequate valving

☐ ☒

Routine valve turning (How often)

☐ ☒

Asbestos cement (AC) pipe absent from system

Comments

90 psi @ the plant high. 65-70 psi low pressure.

100%

Under 5% based on touch read meters w/alerting

3-4'. 36" for new construction

Mostly

Only with sewer flushing

Valves at each intersection

No

Still AC pipe in the system

Comments:

Cross Connection Control (CWS, NTNC, and TNC)

Yes No N/A

☒ ☐ ☐

• Ordinance or enabling authority (CWS)

☒ ☐ ☐

List of installed devices (CWS, NTNC, TNC)

☒ ☐ ☐

• Devices tested annually (CWS, NTNC, TNC)

☐ ☒ ☐

• Annual Summary Report submitted (CWS)

☒ ☐ ☐

• Certified Cross Connection

Control Specialist (CWS ≥ 300 connections) Dave Winters

Comments

Ordinance #2-2001

Customer responsibility

Comments:

Booster Pumps

Number	Name (location)	Deficiencies or Comments	HP	GPM	Aux. Power	
					Yes	No
1	Reservoir Pump Station	6 pumps total: 4-100hp, 2-200 hp			☒	☐
					☐	☐
					☐	☐
					☐	☐
					☐	☐
					☐	☐

Comments:

Four pumps have variable frequency drives to maintain constant pressure in the distribution system.

Water Quality Monitoring

Contaminant	N/A	Frequency	Next Tests Due
Entry Point Sampling:			
Nitrate	☐	1 Sample Every Year	2013
Arsenic	☐	One Sample Every 3 Years	
Inorganic Chemicals (Including Nitrite) (sw)	☒		
Inorganic Chemicals (Including Nitrite) (gw)	☐	One Sample Every 9 Years	2013
SOCs	☐	2 Consec Qt Every 3 Years	2014
VOCs (sw)	☒		
VOCs (gw)	☐	One Sample Every 3 Years	2014
Radionuclides (Community Water Systems Only):			
Gross Alpha	☐	One Sample Every 9 Years	2013
Radium 226/228	☐	One Sample Every 9 Years	2013
Uranium	☐	One Sample Every 6 Years	2017
Distribution System Sampling:			
Coliform Bacteria	☐	4 Samples Each Month	Monthly
Asbestos (for AC pipe/asbestos geologic areas) ...	☐	One Sample Every 9 Years	2020
TTHMs and HAA5s	☐	One Sample Every 3 Years	June 1 – Sept 30, 2014
Lead and Copper, # sites: 10	☐	10 Tap Samples Every 3 Yrs	June 1 – Sept 30, 2015
Other Sampling:			
TOC	☒		
Turbidity	☐	Daily at Ranney Well #1	Daily
Source Water Coliform	☐	Once From SRC-AA Each Year	2013
Other (specify)	☒		

Yes No

☒ ☐ ● Is all required monitoring current?

Comments:

System has nitrate results due by the end of this year, but is not past due.

Yes No

☐ ☒ Has the system experienced chemical (last 5 years) or bacteriological (last 2 years) detections?
If yes, list what contaminant and when?

☐ ☐

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

☒ ☐

Does the system have any monitoring reductions granted? Explain:

WAIVERS GRANTED

System has DBP Stage 2 40/30 waive (DBP every 3 YRS); Gross Alpha, Radium 226/228, IOC, and distribution asbestos every 9 YRS; L&C every 3 years.

☐ ☒

● Does the system have a written coliform sampling plan?

Does the plan include: Yes No

☐ ☐ Brief narrative
☐ ☐ Distribution map
☐ ☐ Sample site locations

Yes No

☐ ☐ Rotation schedule
☐ ☐ Repeat locations
☐ ☐ Source(s) ☐ N/A

☒ ☐

Are TTHM and HAA5 samples taken at correct location(s)? (☐ Not required)

Where in the system are the monitoring sites for TTHM and HAA5?

DBPMA01 – Driftwood RV Park

Comments:

System has a total coliform sample plan, but it is outdated calling for 3 routine samples instead of 4 and no source triggered sampling requirements identified.

Management & Operations

O&M Manual and Emergency Response Plan

Yes No

- ☒ ☐ • Does system have an operation and maintenance manual?
☒ ☐ • Does system have an emergency response plan?

Operator Certification

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

Name	Certification Number	WT Level	WD Level	FE	Small System
DRC:* Kevin S. Kennedy - DRC Treatment	6101	1	2	☐	☐
Dave P. Winters - DRC Distribution	1706	-	2	☐	☐
Guy A. Marzek	6912	-	1	☐	☐
				☐	☐
				☐	☐

*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 protocols for under-certified 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? 2006 Draft is still under review under PR#141-2008
☒ ☐ Does the master plan include a water conservation plan? – This is included in the draft 2011 master plan.

Compliance Status

Yes No

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

Other

- ☐ ☒ 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:

Emergency Response Plan last updated 12/09/05. CY2011 CCR was due 07/01/2012 (Cert recvd 04/30/12) – all others were received for CY2007-2010. A copy of the CY2011 CCR was obtained 11/01/12.



Oregon

Theodore R. Kulongoski, Governor

Department of Human Services

Public Health Division
Drinking Water Program
700 SE Emigrant, Rm 240
Pendleton OR 97801
(541) 276-8006
Fax (541) 276-4778



April 16, 2009

Dave Winters, Public Works Director
City of Boardman
PO Box 229
Boardman, OR 97818

Re: City of Boardman Water System Survey, PWS# OR4100130

Dear Mr. Winters:

I would like to thank you, Kevin Kennedy and Benny Sanchez for your time and assistance during the survey conducted on March 18, 2009. A copy of the report is enclosed for your records. The purpose of the water system survey is to evaluate the entire water system in terms of supplying safe drinking water to the public. Please let me know if any corrections need to be made to the report.

The water system appears to be in good operating condition. The deficiencies and recommendations for the water system are described in the text below. The water system will need to correct the deficiencies as soon as possible. Please send written verification of once the corrections have been made.

The deficiencies noted are as follows:

1. Asbestos monitoring. The most recent asbestos data we have on file is from 1993. **Please collect one (1) sample downstream from the Asbestos-Cement piping during the warmest month between June 30th and September 30th.** If the testing is completed inside a home instead of at one of the City's dedicated sampling stations, then the customer's aerator must be removed prior to sampling.
2. No written operating protocol for other operators. When several operators oversee maintenance and operational functions for the water system, it is necessary to have written operator protocol to describe operational tasks and

when to consult with Direct Responsible in Charge (DRC) person. A handout is enclosed for reference.

3. No Cross Connection Backflow Prevention Annual Summary Report (ASR). Water systems with 300 or more service connections are required to have a cross connection specialist on staff or on contract, and submit an ASR documenting cross connection control efforts, list and type of devices, and when devices are tested or replaced. The most recent ASR the Department has on file is 1999. An ASR form is enclosed for your reference. If you have additional questions about backflow prevention devices or cross connection control, please contact Michael Perry at (971) 673-1220.

The following are changes in monitoring/sampling frequency, in addition to recommendations that should be considered:

1. Coliform bacteria monitoring. Currently, the water system is required to collect and report three (3) coliform samples per month. Since the population being served has increased to 3,330, the coliform sampling frequency has increased. **Please collect and report four (4) coliform samples per month.**

A summary of the water system's monitoring requirements can be found on page 11 of the survey report.

2. Secure Fencing for Ranney Well #1. During the survey visit, the fencing around Ranney Well #1 was down. To better protect the well and its components, please repair the fencing and lock the gate to deter access and prevent vandalism.
3. Chlorine residual levels within the distribution system. In the last year, reported chlorine residual levels ranged from 0.00 to 0.73 mg/l. To ensure that a detectable chlorine residual is maintained, please check the residual levels at the end of the distribution system.
4. Please inspect the screened vent on the steel reservoir annually
5. To accurately determine the disinfectant contact time, it is recommended that the water system conduct a tracer study.

The 2003-2004 Microscopic Particulate Analysis (MPA) results for the Ranney Well #2 are being evaluated by Drinking Water Program staff. You will receive a separate letter regarding the determination for Ground Water Under Direct Influence (GWUDI).

If you have questions, corrections to the survey or other concerns, please contact Bill Goss at (541) 966-0900 or myself at (971) 673-0425. Additionally, per your request I have enclosed a copy of Port of Morrow Water System Survey completed in February 2009.

Sincerely,

Michelle Byrd
Drinking Water Program

Enclosures:

- City of Boardman Water System Survey Report
- Operations and Maintenance Manual Handout
- Cross Connection Backflow Prevention Annual Summary Report Form
- Port of Morrow Water System Survey Report

cc: DHS Drinking Water Program – Pendleton Office
DWP File

APPENDIX C

Hydrant Flushing Records

BREFD

Hydrant Flow Test By Hydrant

Hydrant Number \$ "CITY"

CITY000002 317 NW Boardman AVE		MULLER						
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
10/12/2006	86	30	28.00	0.00	3069	3354	3619	3869
09438	BROADBENT, MARTY K							
09/02/2008	86	38	26.00	0.00	2803	3329	3592	3840
09438	BROADBENT, MARTY K							
11/17/2009	90	40	30.00	0.00	3012	3612	3882	4137
09438	BROADBENT, MARTY K							
Subtotal Flow Tests:		3		Min:	2803	3329	3592	3840
				Max:	3069	3612	3882	4137
				Avg:	2961	3431	3697	3948

CITY000003 305 NW Boardman AVE		MULLER						
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
10/12/2006	85	42	32.00	0.00	950	1187	1283	1373
09438	BROADBENT, MARTY K							
09/02/2008	87	41	30.00	0.00	919	1126	1214	1296
09438	BROADBENT, MARTY K							
10/20/2009	86	42	32.00	0.00	950	1183	1276	1364
09438	BROADBENT, MARTY K							
Subtotal Flow Tests:		3		Min:	919	1126	1214	1296
				Max:	950	1187	1283	1373
				Avg:	939	1165	1257	1344

CITY000004 209 NW Boardman AVE		MULLER						
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
10/12/2006	78	42	32.00	0.00	950	1229	1339	1442
09438	BROADBENT, MARTY K							
09/02/2008	81	43	29.00	0.00	904	1167	1267	1360
09438	BROADBENT, MARTY K							
10/20/2009	82	44	32.00	0.00	950	1237	1342	1439
09438	BROADBENT, MARTY K							

BRFD

Hydrant Flow Test By Hydrant

Hydrant Number \$ "CITY"

CITY000004 209 NW Boardman AVE		MULLER						
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
Subtotal Flow Tests:		3		Min:	904	1167	1267	1360
				Max:	950	1237	1342	1442
				Avg:	934	1211	1316	1413

CITY000005 113 NW Boardman AVE		MULLER						
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
10/12/2006	84	60	12.00	0.00	581	987	1067	1143
19438	BROADBENT, MARTY K							
19/02/2008	82	46	14.00	0.00	635	852	923	990
19438	BROADBENT, MARTY K							
10/20/2009	83	15	55.00	0.00	1245	1195	1294	1386
19438	BROADBENT, MARTY K							
15/14/2012	78	38	52.00	0.00	1210	1479	1611	1735
19438	BROADBENT, MARTY K							
Subtotal Flow Tests:		4		Min:	581	852	923	990
				Max:	1245	1479	1611	1735
				Avg:	917	1128	1223	1313

CITY000006 NE Boardman AVE		WATEROUS Pacer						
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
10/11/2006	80	5	25.00	0.00	895	793	862	927
19438	BROADBENT, MARTY K							
18/28/2008	80	20	5.00	0.00	379	379	412	443
19438	BROADBENT, MARTY K							
Subtotal Flow Tests:		2		Min:	379	379	412	443
				Max:	895	793	862	927
				Avg:	637	586	637	685

BRFD

Hydrant Flow Test By Hydrant

Hydrant Number \$ "CITY"

CITY000008

305 NE Boardman AVE

DRESSER

date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
0/11/2006	78	35	50.00	0.00	4100	4819	5251	5655
9438	BROADBENT, MARTY K							
8/28/2008	86	50	35.00	0.00	3252	4511	4868	5204
9438	BROADBENT, MARTY K							
5/04/2010	81	52	35.00	0.00	3253	4860	5276	5665
5855	JOHNSON, BRYAN MALCOLM							
Subtotal Flow Tests:				3	Min:	3252	4511	4868
					Max:	4100	4860	5276
					Avg:	3535	4730	5131
							5204	5665
							5131	5508

CITY000009

295 NE Boardman AVE

WATEROUS

Pacer

date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
0/1/1998	0	0	0.00	0.00	2156	0	0	0
	<No Staff Member Listed>							
0/11/2006	80	32	44.00	0.00	3847	4340	4716	5069
9438	BROADBENT, MARTY K							
8/28/2008	79	50	33.00	0.00	3158	4634	5043	5425
9438	BROADBENT, MARTY K							
5/04/2010	80	50	35.00	0.00	3253	4730	5140	5525
1196	BONHAM, ROBERT EUGENE							
Subtotal Flow Tests:				4	Min:	2156	0	0
					Max:	3847	4730	5140
					Avg:	3103	3426	3724
							5525	4004

CITY000010

325 NE Boardman AVE

DRESSER

date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
0/11/2006	86	36	50.00	0.00	4100	4763	5140	5495
9438	BROADBENT, MARTY K							
8/28/2008	82	74	39.00	0.00	3433	10373	11245	12063
9438	BROADBENT, MARTY K							
5/04/2010	86	55	39.00	0.00	3434	5164	5573	5958
3/1/2012	VANGORDER, JENNY LEE							

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Scheduled Flow Test

BRFD

Hydrant Flow Test By Hydrant

Hydrant Number \$ "CITY"

CITY000010	325 NE Boardman AVE	DRESSER						
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
Subtotal Flow Tests:		3		Min:	3433	4763	5140	5495
				Max:	4100	10373	11245	12063
				Avg:	3655	6766	7319	7838

CITY000011	123 NW Columbia AVE	MULLER						
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
10/12/2006	90	67	15.00	0.00	693	1264	1359	1448
19438	BROADBENT, MARTY K							
09/02/2008	90	57	14.00	0.00	635	953	1024	1092
19438	BROADBENT, MARTY K							
11/17/2009	82	62	16.00	0.00	679	1251	1356	1455
19438	BROADBENT, MARTY K							
Subtotal Flow Tests:		3		Min:	635	953	1024	1092
				Max:	693	1264	1359	1455
				Avg:	669	1156	1246	1331

CITY000012	135 NW Columbia AVE	MULLER						
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
10/12/2006	90	64	14.00	0.00	670	1144	1229	1310
19438	BROADBENT, MARTY K							
08/29/2008	88	57	13.00	0.00	612	935	1007	1075
19438	BROADBENT, MARTY K							
11/17/2009	88	60	16.00	0.00	679	1096	1181	1260
19438	BROADBENT, MARTY K							
Subtotal Flow Tests:		3		Min:	612	935	1007	1075
				Max:	679	1144	1229	1310
				Avg:	653	1058	1139	1215

BRFD

Hydrant Flow Test By Hydrant

Hydrant Number \$ "CITY"

CITY000013

303 NW Columbia AVE

MULLER

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
10/12/2006	90	56	11.00	0.00	594	877	943	1005
19438	BROADBENT, MARTY K							
08/29/2008	86	49	12.00	0.00	588	804	867	927
19438	BROADBENT, MARTY K							
11/17/2009	88	72	14.00	0.00	635	1387	1494	1594
19438	BROADBENT, MARTY K							
Subtotal Flow Tests:				3	Min:	588	804	867
					Max:	635	1387	1494
					Avg:	605	1022	1101
							927	1594

CITY000014

205 NW Columbia AVE

MULLER

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
10/12/2006	89	48	10.00	0.00	566	750	807	860
	BROADBENT, MARTY K							
08/29/2008	88	40	10.00	0.00	537	648	698	745
19438	BROADBENT, MARTY K							
11/17/2009	88	43	12.00	0.00	588	735	791	845
19438	BROADBENT, MARTY K							
Subtotal Flow Tests:				3	Min:	537	648	698
					Max:	588	750	807
					Avg:	563	711	765
							745	860

CITY000015

309 NW Columbia AVE

MULLER

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
10/12/2006	90	56	11.00	0.00	594	877	943	1005
19438	BROADBENT, MARTY K							
08/29/2008	88	44	11.00	0.00	563	712	767	819
19438	BROADBENT, MARTY K							
11/17/2009	90	48	12.00	0.00	588	775	833	887
19438	BROADBENT, MARTY K							

BRFD

Hydrant Flow Test By Hydrant

Hydrant Number \$ "CITY"

CITY000015 309 NW Columbia AVE

MULLER

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
Subtotal Flow Tests:		3		Min:	563	712	767	819
				Max:	594	877	943	1005
				Avg:	581	788	847	903

CITY000016 315 Columbia AVE

MULLER

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
10/12/2006	90	58	12.00	0.00	2009	3066	3295	3511
19438	BROADBENT, MARTY K							
08/29/2008	92	50	11.00	0.00	563	753	808	860
19438	BROADBENT, MARTY K							
11/17/2009	92	52	13.00	0.00	612	841	902	960
19438	BROADBENT, MARTY K							
Subtotal Flow Tests:		3		Min:	563	753	808	860
				Max:	2009	3066	3295	3511
				Avg:	1061	1553	1668	1777

CITY000017 NE Columbia AVE & NE Olson RD

WATEROUS

Pacer

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
09/21/2000	92	0	16.00	0.00	2392	2095	2248	2392
12886	ROGELSTAD, MARC J							
08/22/2006	86	60	38.00	0.00	3575	5912	6380	6821
19438	BROADBENT, MARTY K							
Subtotal Flow Tests:		2		Min:	2392	2095	2248	2392
				Max:	3575	5912	6380	6821
				Avg:	2983	4003	4314	4606

BRFD

Hydrant Flow Test By Hydrant

Hydrant Number \$ "CITY"

CITY000018 CEMETA NE Columbia		MULLER						
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
09/22/2006	87	50	40.00	0.00	3668	5055	5449	5820
09438	BROADBENT, MARTY K							
Subtotal Flow Tests:				1	Min:	3668	5055	5449
					Max:	3668	5055	5449
					Avg:	3668	5055	5449

CITY000019 304 Donovan LOOP		MULLER						
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
10/12/2006	90	56	12.00	0.00	2009	2967	3189	3398
09438	BROADBENT, MARTY K							
08/29/2008	87	48	16.00	0.00	679	909	980	1047
09438	BROADBENT, MARTY K							
11/17/2009	88	48	13.00	0.00	612	815	878	937
	BROADBENT, MARTY K							
Subtotal Flow Tests:				3	Min:	612	815	878
					Max:	2009	2967	3189
					Avg:	1100	1563	1682

CITY000021 NW First ST & NW Park AVE		MULLER						
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
10/12/2006	84	52	10.00	0.00	1834	2667	2884	3088
09438	BROADBENT, MARTY K							
09/02/2008	82	44	12.00	0.00	588	766	830	891
09438	BROADBENT, MARTY K							
04/20/2010	85	45	12.00	0.00	588	764	826	883
09438	BROADBENT, MARTY K							
Subtotal Flow Tests:				3	Min:	588	764	826
					Max:	1834	2667	2884
					Avg:	1003	1399	1513

BREFD

Hydrant Flow Test By Hydrant

Hydrant Number \$ "CITY"

CITY000022 100 NW First ST

MULLER

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
0/11/2006	80	32	5.00	0.00	400	451	490	527
9438	BROADBENT, MARTY K							
8/29/2008	81	22	5.00	0.00	379	386	419	450
9438	BROADBENT, MARTY K							
0/20/2009	85	23	7.00	0.00	449	461	498	532
9438	BROADBENT, MARTY K							
5/14/2012	78	20	26.00	0.00	856	856	933	1005
	<No Staff Member Listed>							
Subtotal Flow Tests:				4	Min:	379	386	419
					Max:	856	856	933
					Avg:	521	538	585
								628

CITY000023 SEFST SE Front ST

MULLER

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
0/12/2006	84	22	5.00	0.00	400	407	440	471
9438	BROADBENT, MARTY K							
8/29/2008	81	20	4.00	0.00	339	339	368	395
9438	BROADBENT, MARTY K							
5/07/2009	84	18	6.00	0.00	416	409	443	474
9438	BROADBENT, MARTY K							
Subtotal Flow Tests:				3	Min:	339	339	368
					Max:	416	409	443
					Avg:	385	385	417
								446

CITY000024 1 NE Front ST

WATEROUS

Pacer

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
0/11/2006	80	44	32.00	0.00	3280	4322	4697	5048
9438	BROADBENT, MARTY K							
6/18/2008	79	42	30.00	0.00	2978	3831	4169	4486
9438	BROADBENT, MARTY K							
4/20/2010	80	47	30.00	0.00	2979	4114	4471	4806
	<No Staff Member Listed>							

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Hydrant Flow Test By Hydrant

Hydrant Number \$ "CITY"

CITY000024 1 NE Front ST		WATEROUS				Pacer		
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
Subtotal Flow Tests:		3		Min:	2978	3831	4169	4486
				Max:	3280	4322	4697	5048
				Avg:	3079	4089	4445	4780

CITY000025 2 NE Front ST & NE Second ST		WATEROUS				Pacer		
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
9/28/2006	80	59	40.00	0.00	3668	6466	7027	7553
9438	BROADBENT, MARTY K							
4/22/2008	81	55	37.00	0.00	3307	5241	5689	6108
9438	BROADBENT, MARTY K							
4/20/2010	82	49	31.00	0.00	3028	4256	4614	4950
9438	BROADBENT, MARTY K							
Subtotal Flow Tests:		3		Min:	3028	4256	4614	4950
				Max:	3668	6466	7027	7553
				Avg:	3334	5321	5776	6203

CITY000026 3 NE Front ST		WATEROUS				Pacer		
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
9/25/2006	82	56	36.00	0.00	3479	5562	6030	6469
9438	BROADBENT, MARTY K							
4/22/2008	82	60	38.00	0.00	3351	5864	6357	6819
9438	BROADBENT, MARTY K							
4/20/2010	82	43	29.00	0.00	2929	3762	4079	4375
9438	BROADBENT, MARTY K							
Subtotal Flow Tests:		3		Min:	2929	3762	4079	4375
				Max:	3479	5864	6357	6819
				Avg:	3253	5062	5488	5887

BRFD

Hydrant Flow Test By Hydrant

Hydrant Number \$ "CITY"

CITY000027 4 NE Front ST		WATEROUS			Pacer			
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
9/28/2006	86	30	44.00	0.00	3847	4204	4537	4850
9438	BROADBENT, MARTY K							
4/22/2008	88	42	30.00	0.00	2978	3678	3961	4227
9438	BROADBENT, MARTY K							
4/20/2010	88	48	38.00	0.00	3352	4464	4808	5131
9438	BROADBENT, MARTY K							
Subtotal Flow Tests:				Min:	2978	3678	3961	4227
				Max:	3847	4464	4808	5131
				Avg:	3392	4115	4435	4736

CITY000028 5 NE Front ST		WATEROUS			Pacer			
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
9/28/2006	86	29	44.00	0.00	3847	4164	4494	4804
9438	BROADBENT, MARTY K							
4/22/2008	0	0	0.00	0.00	0	0	0	0
9438	BROADBENT, MARTY K							
4/22/2008	86	50	32.00	0.00	3075	4266	4603	4921
9438	BROADBENT, MARTY K							
4/20/2010	87	50	32.00	0.00	3281	4521	4874	5206
9438	BROADBENT, MARTY K							
Subtotal Flow Tests:				Min:	0	0	0	0
				Max:	3847	4521	4874	5206
				Avg:	2550	3237	3492	3732

CITY000029 5 NE Front ST		WATEROUS			Pacer			
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
9/28/2006	82	50	32.00	0.00	3280	4688	5082	5452
9438	BROADBENT, MARTY K							
4/22/2008	82	51	35.00	0.00	3216	4676	5069	5438
9438	BROADBENT, MARTY K							
4/20/2010	81	55	39.00	0.00	3396	5382	5842	6273
9438	BROADBENT, MARTY K							

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Scheduled Flow Test

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Hydrant Flow Test By Hydrant

Hydrant Number \$ "CITY"

CITY000029 5 NE Front ST		WATEROUS			Pacer			
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
Subtotal Flow Tests:		3		Min:	3216	4676	5069	5438
				Max:	3396	5382	5842	6273
				Avg:	3297	4915	5331	5721

CITY000030 6 NE Front ST		WATEROUS			Pacer			
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
09/28/2006	82	55	35.00	0.00	3431	5375	5827	6251
09438	BROADBENT, MARTY K							
04/20/2010	83	50	35.00	0.00	3432	4866	5269	5647
09438	BROADBENT, MARTY K							
Subtotal Flow Tests:		2		Min:	3431	4866	5269	5647
				Max:	3432	5375	5827	6251
				Avg:	3431	5120	5548	5949

CITY000031 7 NE Front ST		WATEROUS			Pacer			
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
09/28/2006	83	55	32.00	0.00	3280	5082	5503	5898
09438	BROADBENT, MARTY K							
04/20/2010	84	51	36.00	0.00	3481	4978	5384	5765
09438	BROADBENT, MARTY K							
Subtotal Flow Tests:		2		Min:	3280	4978	5384	5765
				Max:	3481	5082	5503	5898
				Avg:	3380	5030	5443	5831

CITY000032 8 NE Front ST		WATEROUS			Pacer			
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
00/11/2006	80	42	32.00	0.00	3280	4198	4562	4903
09438	BROADBENT, MARTY K							
04/20/2010	82	56	40.00	0.00	3669	5866	6359	6822
09438	BROADBENT, MARTY K							

BREFD

Hydrant Flow Test By Hydrant

Hydrant Number \$ "CITY"

CITY000032 8 NE Front ST		WATEROUS			Pacer			
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
Subtotal Flow Tests:		2		Min:	3280	4198	4562	4903
				Max:	3669	5866	6359	6822
				Avg:	3474	5032	5460	5862

CITY000033 101 SW Front ST		WATEROUS			Pacer			
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
0/12/2006	82	44	9.00	0.00	537	699	758	813
9438	BROADBENT, MARTY K							
8/29/2008	82	20	13.00	0.00	612	612	663	712
9438	BROADBENT, MARTY K							
5/07/2009	84	20	14.00	0.00	635	635	687	735
9438	BROADBENT, MARTY K							
Subtotal Flow Tests:		3		Min:	537	612	663	712
				Max:	635	699	758	813
				Avg:	594	648	702	753

CITY000034 N Main Street & NE Boardman AVE		MULLER						
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
0/11/2006	80	28	40.00	0.00	3668	3963	4307	4629
9438	BROADBENT, MARTY K							
8/29/2008	86	36	25.00	0.00	2748	3192	3445	3683
9438	BROADBENT, MARTY K							
Subtotal Flow Tests:		2		Min:	2748	3192	3445	3683
				Max:	3668	3963	4307	4629
				Avg:	3208	3577	3876	4156

BRFD

Hydrant Flow Test By Hydrant

Hydrant Number \$ "CITY"

CITY000035 301 N Main Street

MULLER

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
10/11/2006	88	36	25.00	0.00	2899	3351	3609	3851
19438	BROADBENT, MARTY K							
08/29/2008	87	39	26.00	0.00	2803	3356	3618	3864
19438	BROADBENT, MARTY K							
Subtotal Flow Tests:		2		Min:	2803	3351	3609	3851
				Max:	2899	3356	3618	3864
				Avg:	2851	3353	3613	3857

CITY000036 N Main Street & NE Columbia AVE

MULLER

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
10/12/2006	90	24	62.00	0.00	1409	1454	1563	1666
19438	BROADBENT, MARTY K							
08/29/2008	92	58	12.00	0.00	588	882	946	1007
	BROADBENT, MARTY K							
11/17/2009	88	26	60.00	0.00	1315	1382	1489	1589
19438	BROADBENT, MARTY K							
Subtotal Flow Tests:		3		Min:	588	882	946	1007
				Max:	1409	1454	1563	1666
				Avg:	1104	1239	1332	1420

CITY000037 400 NE Olson RD

KENNEDY

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
07/18/2006	92	28	34.00	0.00	3381	3603	3865	4113
19438	BROADBENT, MARTY K							
09/04/2008	90	30	30.00	0.00	3011	3272	3517	3748
19438	BROADBENT, MARTY K							
Subtotal Flow Tests:		2		Min:	3011	3272	3517	3748
				Max:	3381	3603	3865	4113
				Avg:	3196	3437	3691	3930

BRFD

Hydrant Flow Test By Hydrant

Hydrant Number \$ "CITY"

CITY000038	NE PUSKRICH & NE Olson RD				KENNEDY			
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
07/18/2006	92	56	44.00	0.00	3847	5593	6000	6385
19438	BROADBENT, MARTY K							
Subtotal Flow Tests:				1	Min:	3847	5593	6000
					Max:	3847	5593	6000
					Avg:	3847	5593	6000
CITY000039	115 NW Park AVE				MULLER			
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
07/18/2006	86	44	9.00	0.00	537	685	740	791
19438	BROADBENT, MARTY K							
09/02/2008	86	39	12.00	0.00	588	706	762	815
19438	BROADBENT, MARTY K							
04/20/2010	85	38	10.00	0.00	537	640	691	739
19438	BROADBENT, MARTY K							
Subtotal Flow Tests:				3	Min:	537	640	691
					Max:	588	706	762
					Avg:	554	677	731
CITY000040	NE PUSKRICH & NE Turner				KENNEDY			
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
07/18/2006	90	52	40.00	0.00	3668	5102	5483	5843
19438	BROADBENT, MARTY K							
03/20/2008	90	64	49.00	0.00	3806	6497	6983	7442
19438	BROADBENT, MARTY K							
Subtotal Flow Tests:				2	Min:	3668	5102	5483
					Max:	3806	6497	6983
					Avg:	3737	5799	6233

BRFD

Hydrant Flow Test By Hydrant

Hydrant Number \$ "CITY"

CITY000041 NE PUSKRICH		KENNEDY						
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
07/18/2006	86	52	40.00	0.00	3668	5248	5663	6054
09438	BROADBENT, MARTY K							
03/20/2008	91	68	48.00	0.00	3725	6847	7351	7828
09438	BROADBENT, MARTY K							
Subtotal Flow Tests:		2		Min:	3668	5248	5663	6054
				Max:	3725	6847	7351	7828
				Avg:	3696	6047	6507	6941

CITY000042 NE PUSKRICH & NE Columbia AVE		KENNEDY						
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
07/18/2006	86	58	46.00	0.00	3933	6249	6744	7209
09438	BROADBENT, MARTY K							
03/20/2008	88	58	45.00	0.00	3647	5673	6110	6521
	BROADBENT, MARTY K							
Subtotal Flow Tests:		2		Min:	3647	5673	6110	6521
				Max:	3933	6249	6744	7209
				Avg:	3790	5961	6427	6865

CITY000043 Riverside High School NE		WATEROUS Pacer						
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
08/25/2006	80	19	5.00	0.00	1297	1285	1397	1502
9438	BROADBENT, MARTY K							
02/07/2007	83	16	6.00	0.00	411	398	430	461
9438	BROADBENT, MARTY K							
03/13/2009	81	16	5.00	0.00	375	362	393	422
9438	BROADBENT, MARTY K							
Subtotal Flow Tests:		3		Min:	375	362	393	422
				Max:	1297	1285	1397	1502
				Avg:	694	681	740	795

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Hydrant Flow Test By Hydrant

Hydrant Number \$ "CITY"

CITY000044 Riverside High School		WATEROUS				Pacer		
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
08/25/2006	77	36	20.00	0.00	2593	3098	3380	3644
19438	BROADBENT, MARTY K							
12/07/2007	84	38	27.00	0.00	2825	3376	3652	3911
19438	BROADBENT, MARTY K							
03/13/2009	82	40	27.00	0.00	2826	3487	3781	4056
19438	BROADBENT, MARTY K							
Subtotal Flow Tests:				Min:	2593	3098	3380	3644
				Max:	2826	3487	3781	4056
				Avg:	2748	3320	3604	3870

CITY000045 Riverside High School		MULLER						
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
08/25/2006	80	12	6.00	0.00	438	409	445	478
19438	BROADBENT, MARTY K							
12/07/2007	82	10	6.00	0.00	411	379	411	441
19438	BROADBENT, MARTY K							
03/13/2009	84	4	11.00	0.00	557	494	534	572
19438	BROADBENT, MARTY K							
Subtotal Flow Tests:				Min:	411	379	411	441
				Max:	557	494	534	572
				Avg:	468	427	463	497

CITY000046 203 NW Second ST		MULLER						
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
10/12/2006	80	52	12.00	0.00	2009	3032	3295	3541
19438	BROADBENT, MARTY K							
09/02/2008	82	43	11.00	0.00	563	723	784	841
19438	BROADBENT, MARTY K							
04/20/2010	84	44	12.00	0.00	588	758	820	878
19438	BROADBENT, MARTY K							

BRFD

Hydrant Flow Test By Hydrant

Hydrant Number \$ "CITY"

CITY000046 203 NW Second ST

MULLER

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
Subtotal Flow Tests:		3		Min:	563	723	784	841
				Max:	2009	3032	3295	3541
				Avg:	1053	1504	1633	1753

CITY000047 115 NE Second ST

DRESSER

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
10/11/2006	80	28	38.00	0.00	3575	3862	4197	4511
19438	BROADBENT, MARTY K							
08/28/2008	79	41	30.00	0.00	3011	3818	4155	4470
19438	BROADBENT, MARTY K							
05/04/2010	80	42	30.00	0.00	3012	3855	4189	4502
11196	BONHAM, ROBERT EUGENE							
Subtotal Flow Tests:		3		Min:	3011	3818	4155	4470
				Max:	3575	3862	4197	4511
				Avg:	3199	3845	4180	4494

CITY000048 Sam Boardman Elementary SW & Wilson LANE /West

WATEROUS

Pacer

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
07/23/2002	57	20	14.00	0.00	2034	2034	2314	2569
	<No Staff Member Listed>							
08/16/2006	61	44	24.00	0.00	877	1411	1587	1748
19438	BROADBENT, MARTY K							
12/07/2007	64	16	8.00	0.00	1538	1467	1639	1796
19438	BROADBENT, MARTY K							
03/13/2009	64	37	22.00	0.00	2551	3321	3709	4065
19438	BROADBENT, MARTY K							
Subtotal Flow Tests:		4		Min:	877	1411	1587	1748
				Max:	2551	3321	3709	4065
				Avg:	1750	2058	2312	2544

BRFD

Hydrant Flow Test By Hydrant

Hydrant Number \$ "CITY"

CITY000049		Sam Boardman Elementary SW & Wilson LANE /East				WATEROUS		Pacer	
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI	
07/16/2002	61	20	14.00	0.00	2034	2034	2288	2521	
	<No Staff Member Listed>								
08/16/2006	60	26	20.00	0.00	2593	2831	3193	3524	
09438	BROADBENT, MARTY K								
11/19/2007	62	14	12.00	0.00	1883	1752	1966	2162	
09438	BROADBENT, MARTY K								
03/13/2009	63	34	24.00	0.00	2664	3295	3689	4050	
09438	BROADBENT, MARTY K								
Subtotal Flow Tests:				4	Min:	1883	1752	1966	2162
					Max:	2664	3295	3689	4050
					Avg:	2293	2478	2784	3064

CITY000050		CITY SE Desert Springs & SE COR				M & H			
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI	
06/29/1999	52	0	5.00	0.00	413	318	368	413	
02886	ROGELSTAD, MARC J								
10/05/2004	62	10	6.00	0.00	1420	1265	1420	1561	
	<No Staff Member Listed>								
11/06/2006	66	8	8.00	0.00	1640	1447	1609	1759	
09438	BROADBENT, MARTY K								
07/18/2007	62	16	6.00	0.00	1332	1268	1423	1565	
09438	BROADBENT, MARTY K								
02/20/2009	71	10	9.00	0.00	1632	1482	1632	1771	
09438	BROADBENT, MARTY K								
Subtotal Flow Tests:				5	Min:	413	318	368	413
					Max:	1640	1482	1632	1771
					Avg:	1287	1156	1290	1413

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Hydrant Flow Test By Hydrant

Hydrant Number \$ "CITY"

CITY000051 300 SW Wilson RD

CLOW

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
10/13/2006	68	34	25.00	0.00	2899	3492	3868	4215
19438	BROADBENT, MARTY K							
11/19/2007	66	36	25.00	0.00	2718	3424	3807	4161
19438	BROADBENT, MARTY K							
04/03/2009	68	38	44.00	0.00	3607	4649	5149	5611
19438	BROADBENT, MARTY K							
Subtotal Flow Tests:				3	Min:	2718	3424	3807
					Max:	3607	4649	5149
					Avg:	3074	3855	4274
							4161	4662

CITY000052 Anthony DR SW/523 Anthony

WATEROUS

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
07/16/2002	65	4	5.00	0.00	1216	1032	1150	1258
	LOCKE, SEAN C							
10/18/2006	62	31	25.00	0.00	2899	3416	3833	4215
19438	BROADBENT, MARTY K							
11/19/2007	63	14	11.00	0.00	1803	1680	1881	2065
19438	BROADBENT, MARTY K							
03/05/2009	65	30	22.00	0.00	2551	2922	3256	3564
19438	BROADBENT, MARTY K							
Subtotal Flow Tests:				4	Min:	1216	1032	1150
					Max:	2899	3416	3833
					Avg:	2117	2262	2530
							1258	2775

CITY000053 Anthony DR SW/523 Anthony Drive

WATEROUS

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
07/16/2002	63	20	14.00	0.00	2034	2034	2277	2500
15075	SHELTON, KELLY E							
10/18/2006	66	15	10.00	0.00	1834	1735	1929	2108
19438	BROADBENT, MARTY K							
2007	62	6	6.00	0.00	1332	1140	1280	1407
	BROADBENT, MARTY K							

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* Scheduled Flow Test

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Hydrant Flow Test By Hydrant

Hydrant Number \$ "CITY"

CITY000053	Anthony DR SW/523 Anthony Drive				WATEROUS			
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
03/05/2009	67	11	7.00	0.00	1439	1309	1453	1585
09438	BROADBENT, MARTY K							
Subtotal Flow Tests:				4	Min:	1332	1140	1280
					Max:	2034	2034	2277
					Avg:	1659	1554	1734
								1407
								2500
								1900
CITY000054	Anthony DR SW & Anthony DR SW/Anthony end				WATEROUS			
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
07/16/2002	66	16	12.00	0.00	1883	1800	2002	2188
05069	LOCKE, SEAN C							
00/18/2006	66	24	16.00	0.00	2320	2437	2710	2961
09438	BROADBENT, MARTY K							
01/19/2007	64	17	11.00	0.00	1803	1740	1943	2130
09438	BROADBENT, MARTY K							
03/05/2009	61	27	19.00	0.00	2371	2623	2951	3251
09438	BROADBENT, MARTY K							
Subtotal Flow Tests:				4	Min:	1803	1740	1943
					Max:	2371	2623	2951
					Avg:	2094	2150	2401
								2130
								3251
								2632
CITY000055	Anthony DR SW/826 Anthony				WATEROUS			
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
00/18/2006	66	27	20.00	0.00	2593	2835	3152	3445
09438	BROADBENT, MARTY K							
01/19/2007	65	16	11.00	0.00	1803	1722	1919	2100
09438	BROADBENT, MARTY K							
03/05/2009	66	29	21.00	0.00	2492	2803	3117	3406
09438	BROADBENT, MARTY K							
Subtotal Flow Tests:				3	Min:	1803	1722	1919
					Max:	2593	2835	3152
					Avg:	2296	2453	2729
								2100
								3445
								2983

BRFD

Hydrant Flow Test By Hydrant

Hydrant Number \$ "CITY"

CITY000056 SW Wilson RD /Church Lot		DRESSER						
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
07/16/2002	65	20	14.00	0.00	2034	2034	2267	2481
5069	LOCKE, SEAN C							
0/18/2006	62	33	28.00	0.00	3069	3748	4207	4626
19438	BROADBENT, MARTY K							
1/19/2007	64	18	13.00	0.00	1960	1914	2137	2343
19438	BROADBENT, MARTY K							
03/05/2009	63	38	25.00	0.00	2719	3644	4080	4479
19438	BROADBENT, MARTY K							
Subtotal Flow Tests:		4		Min:	1960	1914	2137	2343
				Max:	3069	3748	4207	4626
				Avg:	2445	2835	3172	3482

CITY000057 6 Marine DR NE/rear		CLOW						
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
07/18/2002	60	30	20.00	0.00	2431	2840	3203	3535
5069	LOCKE, SEAN C							
Subtotal Flow Tests:		1		Min:	2431	2840	3203	3535
				Max:	2431	2840	3203	3535
				Avg:	2431	2840	3203	3535

CITY000059 2 Marine DR NE/east front		CLOW						
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
07/18/2002	60	28	38.00	0.00	3351	3780	4264	4705
5075	SHELTON, KELLY E							
Subtotal Flow Tests:		1		Min:	3351	3780	4264	4705
				Max:	3351	3780	4264	4705
				Avg:	3351	3780	4264	4705

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Hydrant Flow Test By Hydrant

Hydrant Number \$ "CITY"

CITY000060		2 Marine DR NE/west front			CLOW			
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
07/18/2002	53	25	40.00	0.00	3438	3757	4334	4852
15069	LOCKE, SEAN C							
Subtotal Flow Tests:				1	Min:	3438	3757	4334
					Max:	3438	3757	4334
					Avg:	3438	3757	4334

CITY000062		SW Wilson RD /Wilson Trailer Park			DRESSER			
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
08/14/2002	76	22	20.00	0.00	2431	2479	2709	2924
7671	BOHM, TOMMY J							
01/18/2006	69	23	20.00	0.00	2593	2683	2966	3228
9438	BROADBENT, MARTY K							
01/19/2007	72	35	26.00	0.00	2772	3331	3663	3971
9438	BROADBENT, MARTY K							
Subtotal Flow Tests:				3	Min:	2431	2479	2709
					Max:	2772	3331	3663
					Avg:	2598	2831	3112

CITY000063		SW Wilson RD /OutBack Apartments			MUELLER			
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
08/14/2002	80	22	20.00	0.00	2431	2476	2691	2892
7671	BOHM, TOMMY J							
01/18/2006	69	22	20.00	0.00	2593	2652	2932	3190
9438	BROADBENT, MARTY K							
01/19/2007	73	36	26.00	0.00	2772	3366	3695	4001
9438	BROADBENT, MARTY K							
Subtotal Flow Tests:				3	Min:	2431	2476	2691
					Max:	2772	3366	3695
					Avg:	2598	2831	3106

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Hydrant Flow Test By Hydrant

Hydrant Number \$ "CITY"

CITY000064 SW Wilson RD & Mt Hood SW		MUELLER						
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
08/14/2002	80	30	26.00	0.00	2772	3059	3324	3573
.7671	BOHM, TOMMY J							
10/23/2006	78	44	34.00	0.00	3381	4511	4916	5294
19438	BROADBENT, MARTY K							
11/19/2007	78	40	32.00	0.00	3075	3864	4210	4534
19438	BROADBENT, MARTY K							
03/05/2009	78	45	31.00	0.00	3028	4106	4474	4818
19438	BROADBENT, MARTY K							
Subtotal Flow Tests:		4	Min:		2772	3059	3324	3573
			Max:		3381	4511	4916	5294
			Avg:		3064	3885	4231	4554

CITY000065 721 Mt Hood SW		MUELLER						
	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
08/14/2002	74	32	24.00	0.00	2663	3050	3343	3616
.7671	BOHM, TOMMY J							
10/23/2006	80	46	35.00	0.00	3431	4663	5067	5446
19438	BROADBENT, MARTY K							
11/19/2007	80	42	30.00	0.00	2978	3811	4142	4452
19438	BROADBENT, MARTY K							
03/05/2009	80	50	34.00	0.00	3171	4611	5011	5385
19438	BROADBENT, MARTY K							
Subtotal Flow Tests:		4	Min:		2663	3050	3343	3616
			Max:		3431	4663	5067	5446
			Avg:		3060	4033	4390	4724

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Hydrant Flow Test By Hydrant

Hydrant Number \$ "CITY"

CITY000066		Faler & Mt Hood SW		MUELLER				
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
08/14/2002	74	32	22.00	0.00	2550	2921	3201	3462
.7671	BOHM, TOMMY J							
00/06/2004	74	46	35.00	0.00	1059	1510	1655	1790
09438	BROADBENT, MARTY K							
00/26/2006	80	70	11.00	0.00	594	1563	1699	1826
09438	BROADBENT, MARTY K							
03/05/2009	82	60	29.00	0.00	964	1687	1829	1962
09438	BROADBENT, MARTY K							
Subtotal Flow Tests:				4	Min:	594	1510	1655
					Max:	2550	2921	3201
					Avg:	1291	1920	2096
							2260	

CITY000067		Faler & MT Adams		MUELLER				
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
08/14/2002	80	36	26.00	0.00	2772	3277	3562	3828
.7671	BOHM, TOMMY J							
00/06/2004	78	46	35.00	0.00	3431	4730	5155	5551
09438	BROADBENT, MARTY K							
00/26/2006	82	72	14.00	0.00	2170	5812	6301	6760
09438	BROADBENT, MARTY K							
08/02/2007	77	40	30.00	0.00	2978	3761	4104	4424
09438	BROADBENT, MARTY K							
02/20/2009	80	35	50.00	0.00	3845	4491	4881	5246
09438	BROADBENT, MARTY K							
04/29/2010	78	50	32.00	0.00	3076	4558	4967	5349
05855	JOHNSON, BRYAN MALCOLM							
Subtotal Flow Tests:				6	Min:	2170	3277	3562
					Max:	3845	5812	6301
					Avg:	3045	4438	4828
							5193	

BRFD

Hydrant Flow Test By Hydrant

Hydrant Number \$ "CITY"

CITY000068

MT Adams & Mt Everest ST

MUELLER

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
08/14/2002	72	32	24.00	0.00	2663	3068	3374	3658
17671	BOHM, TOMMY J							
10/06/2004	77	44	34.00	0.00	3381	4542	4956	5343
09438	BROADBENT, MARTY K							
10/23/2006	78	46	34.00	0.00	3381	4661	5079	5470
09438	BROADBENT, MARTY K							
08/02/2007	75	40	32.00	0.00	3075	3925	4296	4641
09438	BROADBENT, MARTY K							
11/19/2007	68	16	14.00	0.00	2034	1948	2158	2351
09438	BROADBENT, MARTY K							
02/20/2009	80	49	35.00	0.00	3217	4595	4994	5368
09438	BROADBENT, MARTY K							
04/29/2010	80	45	30.00	0.00	2979	3985	4331	4655
05855	JOHNSON, BRYAN MALCOLM							
Total Flow Tests:				7	Min:	2034	1948	2158
					Max:	3381	4661	5079
					Avg:	2961	3817	4169
							4169	4498

CITY000069

MT Adams & SW Wilson RD

MUELLER

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
08/14/2002	720	36	32.00	0.00	3075	3114	3138	3161
17671	BOHM, TOMMY J							
10/06/2004	76	42	34.00	0.00	3381	4427	4837	5220
09438	BROADBENT, MARTY K							
10/23/2006	80	46	35.00	0.00	3431	4663	5067	5446
09438	BROADBENT, MARTY K							
08/02/2007	74	28	24.00	0.00	2663	2904	3183	3442
09438	BROADBENT, MARTY K							
02/20/2009	77	48	30.00	0.00	2979	4291	4682	5048
09438	BROADBENT, MARTY K							
04/29/2010	66	42	30.00	0.00	2979	4233	4707	5144
03188	VANGORDER, JENNY LEE							

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* Scheduled Flow Test

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Hydrant Flow Test By Hydrant

Hydrant Number \$ "CITY"

CITY000069	MT Adams & SW Wilson RD				MUELLER			
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
Subtotal Flow Tests:		6		Min:	2663	2904	3138	3161
				Max:	3431	4663	5067	5446
				Avg:	3084	3938	4269	4576

CITY000070	Faler /Out Back Apartments				MUELLER			
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
08/14/2002	72	4	24.00	0.00	2663	2304	2533	2746
BOHM	Unknown Name							
Subtotal Flow Tests:		1		Min:	2663	2304	2533	2746
				Max:	2663	2304	2533	2746
				Avg:	2663	2304	2533	2746

CITY000079	Riverridge Dr DR /South End of Vacant Lot				CLOW			
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
11/19/2007	64	28	13.00	0.00	0	0	0	0
09438	BROADBENT, MARTY K							
11/19/2007	64	28	13.00	0.00	1960	2184	2440	2674
09438	BROADBENT, MARTY K							
03/05/2009	66	25	17.00	0.00	2242	2386	2653	2899
09438	BROADBENT, MARTY K							
Subtotal Flow Tests:		3		Min:	0	0	0	0
				Max:	2242	2386	2653	2899
				Avg:	1400	1523	1697	1857

CITY000103	Desert Springs PARK SW/Space #36				DRESSER			
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
07/05/2004	63	9	5.00	0.00	1297	1147	1284	1410
09438	BROADBENT, MARTY K							
11/06/2006	64	7	8.00	0.00	1640	1426	1593	1746
09438	BROADBENT, MARTY K							

BRFD

Hydrant Flow Test By Hydrant

Hydrant Number \$ "CITY"

CITY000103		Desert Springs PARK SW/Space #36			DRESSER			
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
07/18/2007	62	10	5.00	0.00	1216	1084	1216	1337
19438	BROADBENT, MARTY K							
12/20/2009	71	12	11.00	0.00	1804	1667	1837	1994
19438	BROADBENT, MARTY K							
Subtotal Flow Tests:				Min:	1216	1084	1216	1337
				Max:	1804	1667	1837	1994
				Avg:	1489	1331	1482	1621

CITY000104		Desert Springs PARK SW/Space #69			WATEROUS			
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
00/05/2004	62	9	5.00	0.00	1297	1144	1284	1412
19438	BROADBENT, MARTY K							
01/06/2006	68	8	8.00	0.00	1640	1454	1610	1755
	BROADBENT, MARTY K							
07/18/2007	62	4	4.00	0.00	1087	913	1025	1127
19438	BROADBENT, MARTY K							
12/20/2009	62	19	5.00	0.00	1216	1201	1347	1482
19438	BROADBENT, MARTY K							
Subtotal Flow Tests:				Min:	1087	913	1025	1127
				Max:	1640	1454	1610	1755
				Avg:	1310	1178	1316	1444

CITY000105		Desert Springs PARK SW/Space #127			MCH			
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
00/05/2004	62	16	6.00	0.00	1420	1352	1517	1668
19438	BROADBENT, MARTY K							
01/06/2006	60	8	7.00	0.00	1534	1331	1502	1657
19438	BROADBENT, MARTY K							
07/10/2007	60	5	7.00	0.00	1438	1211	1366	1507
19438	BROADBENT, MARTY K							
01/06/2009	62	8	9.00	0.00	1632	1425	1599	1758
	BROADBENT, MARTY K							

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Scheduled Flow Test

BREFD

Hydrant Flow Test By Hydrant

Hydrant Number \$ "CITY"

CITY000105 Desert Springs PARK SW/Space #127

M@H

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
Subtotal Flow Tests:		4		Min:	1420	1211	1366	1507
				Max:	1632	1425	1599	1758
				Avg:	1506	1329	1496	1647

CITY000109 SW Drift Wood RV Park SW/Space #61

M@H

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
00/06/2004	64	4	4.50	0.00	1230	1040	1162	1274
09438	BROADBENT, MARTY K							
Subtotal Flow Tests:		1		Min:	1230	1040	1162	1274
				Max:	1230	1040	1162	1274
				Avg:	1230	1040	1162	1274

CITY000112 MT Adams /725 Mt. Adams

MUELLER

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
00/06/2004	79	44	33.00	0.00	3331	4416	4806	5170
09438	BROADBENT, MARTY K							
00/08/2004	0	0	0.00	0.00	0	0	0	0
	<No Staff Member Listed>							
00/23/2006	80	46	37.00	0.00	3527	4793	5209	5599
09438	BROADBENT, MARTY K							
08/02/2007	75	40	30.00	0.00	2978	3801	4160	4494
09438	BROADBENT, MARTY K							
02/20/2009	79	46	33.00	0.00	3124	4275	4653	5005
09438	BROADBENT, MARTY K							
04/29/2010	80	45	31.00	0.00	3028	4051	4403	4732
3188	VANGORDER, JENNY LEE							
Subtotal Flow Tests:		6		Min:	0	0	0	0
				Max:	3527	4793	5209	5599
				Avg:	2664	3556	3871	4166

BRFD

Hydrant Flow Test By Hydrant

Hydrant Number \$ "CITY"

CITY000115 NE PUSKRICH		KENNEDY						
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
07/18/2006	88	56	45.00	0.00	3890	5844	6294	6717
09438	BROADBENT, MARTY K							
03/20/2008	90	64	48.00	0.00	3767	6431	6912	7365
09438	BROADBENT, MARTY K							
Subtotal Flow Tests:		2		Min:	3767	5844	6294	6717
				Max:	3890	6431	6912	7365
				Avg:	3828	6137	6603	7041

CITY000116 500 Tatone /North Front		WATEROUS						
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
08/11/2006	66	24	24.00	0.00	2841	2984	3318	3626
09438	BROADBENT, MARTY K							
02/07/2007	69	38	27.00	0.00	2825	3617	3999	4352
	BROADBENT, MARTY K							
03/13/2009	72	40	29.00	0.00	2929	3807	4186	4538
09438	BROADBENT, MARTY K							
Subtotal Flow Tests:		3		Min:	2825	2984	3318	3626
				Max:	2929	3807	4186	4538
				Avg:	2865	3469	3834	4172

CITY000117 500 Tatone /South Front		WATEROUS						
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
08/11/2006	66	30	25.00	0.00	2899	3309	3680	4022
09438	BROADBENT, MARTY K							
02/07/2007	68	38	26.00	0.00	2772	3573	3957	4312
09438	BROADBENT, MARTY K							
03/13/2009	70	40	28.00	0.00	2878	3792	4185	4548
09438	BROADBENT, MARTY K							
Subtotal Flow Tests:		3		Min:	2772	3309	3680	4022
				Max:	2899	3792	4185	4548
				Avg:	2849	3558	3940	4294

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Hydrant Flow Test By Hydrant

Hydrant Number \$ "CITY"

CITY000118 500 Tatone /SW Corner		WATEROUS						
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
08/16/2006	68	32	25.00	0.00	2899	3386	3751	4087
09438	BROADBENT, MARTY K							
12/07/2007	68	38	25.00	0.00	2718	3503	3880	4228
09438	BROADBENT, MARTY K							
03/13/2009	68	28	39.00	0.00	3396	3747	4151	4523
09438	BROADBENT, MARTY K							
Subtotal Flow Tests:		3		Min:	2718	3386	3751	4087
				Max:	3396	3747	4151	4523
				Avg:	3004	3545	3927	4279

CITY000119 500 Tatone /west side		WATEROUS						
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
08/11/2006	68	32	25.00	0.00	2899	3386	3751	4087
09438	BROADBENT, MARTY K							
12/07/2007	70	59	14.00	0.00	2034	4607	5084	5525
09438	BROADBENT, MARTY K							
03/13/2009	70	42	30.00	0.00	2979	4074	4496	4886
09438	BROADBENT, MARTY K							
Subtotal Flow Tests:		3		Min:	2034	3386	3751	4087
				Max:	2979	4607	5084	5525
				Avg:	2637	4022	4443	4832

CITY000120 Boardman Marina Park /west		WATEROUS						
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
08/11/2006	90	0	2.00	0.00	820	716	769	820
09438	BROADBENT, MARTY K							
04/22/2008	92	3	2.00	0.00	237	211	227	241
09438	BROADBENT, MARTY K							
Subtotal Flow Tests:		2		Min:	237	211	227	241
				Max:	820	716	769	820
				Avg:	528	463	498	530

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Hydrant Flow Test By Hydrant

Hydrant Number \$ "CITY"

CITY000121 501 NE Columbia AVE /CID

M@H

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
08/22/2006	84	50	40.00	0.00	3668	5161	5582	5978
09438	BROADBENT, MARTY K							
04/22/2008	90	54	42.00	0.00	3523	5045	5422	5778
09438	BROADBENT, MARTY K							
Subtotal Flow Tests:		2		Min:	3523	5045	5422	5778
				Max:	3668	5161	5582	5978
				Avg:	3595	5103	5502	5878

CITY000122 Marshall Loop /NE 2nd Street

CLOW

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
08/24/2006	84	44	34.00	0.00	3381	4358	4713	5047
09438	BROADBENT, MARTY K							
04/22/2008	84	60	48.00	0.00	3767	6398	6919	7410
	BONHAM, ROBERT EUGENE							
05/25/2010	80	55	36.00	0.00	3263	5235	5690	6115
01196	BONHAM, ROBERT EUGENE							
Subtotal Flow Tests:		3		Min:	3263	4358	4713	5047
				Max:	3767	6398	6919	7410
				Avg:	3470	5330	5774	6190

CITY000123 NE Second ST /Davalay Lane

WATEROUS

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
08/24/2006	59	32	23.00	0.00	2781	3392	3837	4242
09438	BROADBENT, MARTY K							
03/20/2008	82	56	41.00	0.00	3481	5566	6034	6473
09438	BROADBENT, MARTY K							
05/25/2010	81	55	35.00	0.00	3217	5099	5534	5942
01196	BONHAM, ROBERT EUGENE							
Subtotal Flow Tests:		3		Min:	2781	3392	3837	4242
				Max:	3481	5566	6034	6473
				Avg:	3159	4685	5135	5552

BREFD

Hydrant Flow Test By Hydrant

Hydrant Number \$ "CITY"

CITY000124 301 Marshall Loop		WATEROUS						
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
08/24/2006	79	46	32.00	0.00	3280	4489	4885	5255
09438	BROADBENT, MARTY K							
03/20/2008	82	53	40.00	0.00	3438	5182	5618	6027
09438	BROADBENT, MARTY K							
05/25/2010	82	55	37.00	0.00	3308	5182	5618	6027
01196	BONHAM, ROBERT EUGENE							
Subtotal Flow Tests:				3	Min:	3280	4489	4885
					Max:	3438	5182	5618
					Avg:	3342	4951	5373
							5769	

CITY000125 Marshall Loop /Davalay Lane		WATEROUS						
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
08/24/2006	84	44	29.00	0.00	3123	4025	4354	4662
09438	BROADBENT, MARTY K							
03/20/2008	86	53	39.00	0.00	3395	4936	5327	5695
09438	BROADBENT, MARTY K							
05/25/2010	88	62	30.00	0.00	2979	5007	5392	5754
01196	BONHAM, ROBERT EUGENE							
Subtotal Flow Tests:				3	Min:	2979	4025	4354
					Max:	3395	5007	5392
					Avg:	3165	4656	5024
							5754	5370

CITY000126 358 Marshall Loop		WATEROUS						
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
08/24/2006	86	46	24.00	0.00	2841	3723	4018	4295
09438	BROADBENT, MARTY K							
03/20/2008	86	44	38.00	0.00	3351	4277	4616	4935
09438	BROADBENT, MARTY K							
05/25/2010	79	59	40.00	0.00	3440	6170	6714	7223
01196	BONHAM, ROBERT EUGENE							

BRFD

Hydrant Flow Test By Hydrant

Hydrant Number \$ "CITY"

CITY000126 358 Marshall Loop

WATEROUS

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
Subtotal Flow Tests:		3		Min:	2841	3723	4018	4295
				Max:	3440	6170	6714	7223
				Avg:	3210	4723	5116	5484

CITY000127 265 Marshall Loop

WATEROUS

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
8/24/2006	80	46	32.00	0.00	3280	4457	4844	5206
9438	BROADBENT, MARTY K							
4/22/2008	82	54	49.00	0.00	3806	5846	6338	6799
9438	BROADBENT, MARTY K							
5/25/2010	83	54	36.00	0.00	3263	4961	5372	5757
9438	BROADBENT, MARTY K							
Subtotal Flow Tests:		3		Min:	3263	4457	4844	5206
				Max:	3806	5846	6338	6799
				Avg:	3449	5088	5518	5920

CITY000128 248 Marshall Loop

WATEROUS

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
8/24/2006	80	46	32.00	0.00	3280	4457	4844	5206
9438	BROADBENT, MARTY K							
4/22/2008	81	50	34.00	0.00	3170	4569	4959	5325
9438	BROADBENT, MARTY K							
5/25/2010	82	52	36.00	0.00	3263	4829	5235	5616
9438	BROADBENT, MARTY K							
Subtotal Flow Tests:		3		Min:	3170	4457	4844	5206
				Max:	3280	4829	5235	5616
				Avg:	3237	4618	5012	5382

BRFD

Hydrant Flow Test By Hydrant

Hydrant Number \$ "CITY"

CITY000129 240 Marshall Loop		WATEROUS						
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
08/24/2006	79	37	38.00	0.00	3575	4295	4674	5029
19438	BROADBENT, MARTY K							
04/22/2008	80	35	48.00	0.00	3767	4400	4782	5140
19438	BROADBENT, MARTY K							
05/25/2010	80	50	33.00	0.00	3124	4542	4936	5306
19438	BROADBENT, MARTY K							
Subtotal Flow Tests:				Min:	3124	4295	4674	5029
				Max:	3767	4542	4936	5306
				Avg:	3488	4412	4797	5158

CITY000130 NE Front ST /4th Street		WATEROUS						
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
00/11/2006	80	44	34.00	0.00	3381	4455	4842	5204
19438	BROADBENT, MARTY K							
04/22/2008	78	45	32.00	0.00	3075	4170	4544	4893
19438	BROADBENT, MARTY K							
Subtotal Flow Tests:				Min:	3075	4170	4544	4893
				Max:	3381	4455	4842	5204
				Avg:	3228	4312	4693	5048

CITY000131 NE Columbia AVE /RHS Softball Field		KENNEDY						
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
00/11/2006	83	45	50.00	0.00	4100	5387	5833	6252
19438	BROADBENT, MARTY K							
08/29/2008	88	68	45.00	0.00	3687	7140	7689	8206
19438	BROADBENT, MARTY K							
Subtotal Flow Tests:				Min:	3687	5387	5833	6252
				Max:	4100	7140	7689	8206
				Avg:	3893	6263	6761	7229

BRFD

Hydrant Flow Test By Hydrant

Hydrant Number \$ "CITY"

CITY000132 NE Columbia AVE /RHS racetrack		KENNEDY						
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
10/11/2006	88	48	40.00	0.00	3668	4885	5261	5615
19438	BROADBENT, MARTY K							
08/29/2008	88	69	45.00	0.00	3687	7340	7905	8437
19438	BROADBENT, MARTY K							
Subtotal Flow Tests:		2		Min:	3668	4885	5261	5615
				Max:	3687	7340	7905	8437
				Avg:	3677	6112	6583	7026

CITY000133 325 NW Boardman AVE		KENNEDY						
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
10/12/2006	86	39	29.00	0.00	3123	3751	4048	4328
19438	BROADBENT, MARTY K							
09/02/2008	80	38	28.00	0.00	2909	3527	3833	4120
19438	BROADBENT, MARTY K							
11/17/2009	92	39	29.00	0.00	2961	3494	3748	3988
19438	BROADBENT, MARTY K							
Subtotal Flow Tests:		3		Min:	2909	3494	3748	3988
				Max:	3123	3751	4048	4328
				Avg:	2997	3590	3876	4145

CITY000134 105 Main Street		WATEROUS						
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
10/12/2006	80	0	2.00	0.00	820	702	763	820
19438	BROADBENT, MARTY K							
09/09/2008	80	0	2.00	0.00	777	665	723	777
19438	BROADBENT, MARTY K							
05/07/2009	0	0	0.00	0.00	0	0	0	0
19438	BROADBENT, MARTY K							
Subtotal Flow Tests:		3		Min:	0	0	0	0
				Max:	820	702	763	820
				Avg:	532	455	495	532

BREFD

Hydrant Flow Test By Hydrant

Hydrant Number \$ "CITY"

CITY000135 Main Street & Oregon Trail BLVD		WATEROUS						
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
10/12/2006	78	58	39.00	0.00	3621	6435	7012	7551
19438	BROADBENT, MARTY K							
08/29/2008	75	54	32.00	0.00	3110	5231	5724	6184
11196	BONHAM, ROBERT EUGENE							
04/03/2009	80	60	40.00	0.00	3478	6295	6841	7353
19438	BROADBENT, MARTY K							
Subtotal Flow Tests:		3		Min:	3110	5231	5724	6184
				Max:	3621	6435	7012	7551
				Avg:	3403	5987	6525	7029

CITY000136 301 Oregon Trail BLVD		WATEROUS						
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
10/12/2006	78	58	41.00	0.00	3713	6598	7190	7743
19438	BROADBENT, MARTY K							
08/28/2008	73	52	40.00	0.00	3477	5732	6293	6814
19438	BROADBENT, MARTY K							
04/03/2009	75	60	42.00	0.00	3564	7189	7867	8499
19438	BROADBENT, MARTY K							
Subtotal Flow Tests:		3		Min:	3477	5732	6293	6814
				Max:	3713	7189	7867	8499
				Avg:	3584	6506	7116	7685

CITY000137 Anderson RD /301 Sonoma		WATEROUS						
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
10/12/2006	76	54	37.00	0.00	3527	5841	6383	6889
19438	BROADBENT, MARTY K							
08/28/2008	74	56	35.00	0.00	3252	5886	6451	6977
19438	BROADBENT, MARTY K							
04/03/2009	74	55	39.00	0.00	3434	6036	6616	7156
19438	BROADBENT, MARTY K							

BREFD

Hydrant Flow Test By Hydrant

Hydrant Number \$ "CITY"

CITY000137 Anderson RD /301 Sonoma

WATEROUS

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
Subtotal Flow Tests:		3		Min:	3252	5841	6383	6889
				Max:	3527	6036	6616	7156
				Avg:	3404	5921	6483	7007

CITY000138 344 Anderson RD

WATEROUS

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
10/12/2006	78	50	34.00	0.00	3381	5010	5459	5879
19438	BROADBENT, MARTY K							
08/28/2008	74	42	31.00	0.00	3061	4060	4451	4814
19438	BROADBENT, MARTY K							
04/03/2009	79	52	36.00	0.00	3299	5032	5476	5891
19438	BROADBENT, MARTY K							
Subtotal Flow Tests:		3		Min:	3061	4060	4451	4814
				Max:	3381	5032	5476	5891
				Avg:	3247	4700	5128	5528

CITY000139 354 Anderson RD

WATEROUS

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
10/12/2006	78	50	0.00	0.00	0	0	0	0
19438	BROADBENT, MARTY K							
08/28/2008	73	40	30.00	0.00	3011	3889	4269	4623
19438	BROADBENT, MARTY K							
04/03/2009	76	41	31.00	0.00	3062	3947	4313	4654
19438	BROADBENT, MARTY K							
Subtotal Flow Tests:		3		Min:	0	0	0	0
				Max:	3062	3947	4313	4654
				Avg:	2024	2612	2860	3092

BRFD

Hydrant Flow Test By Hydrant

Hydrant Number \$ "CITY"

CITY000140 Anderson RD /318 Dunes		WATEROUS						
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
0/13/2006	45	26	36.00	0.00	3479	4035	4839	5542
9438	BROADBENT, MARTY K							
08/28/2008	72	26	12.00	0.00	1904	2034	2237	2425
9438	BROADBENT, MARTY K							
04/03/2009	72	42	27.00	0.00	2857	3845	4228	4584
1196	BONHAM, ROBERT EUGENE							
Subtotal Flow Tests:				3	Min:	1904	2034	2237
					Max:	3479	4035	4839
					Avg:	2746	3304	3768
							2425	5542
							4183	

CITY000141 Anderson RD /Malheur		WATEROUS						
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
0/13/2006	76	34	24.00	0.00	2841	3318	3626	3913
9438	BROADBENT, MARTY K							
08/28/2008	72	27	25.00	0.00	2748	2971	3267	3542
9438	BROADBENT, MARTY K							
04/03/2009	76	35	26.00	0.00	2804	3318	3626	3913
1196	BONHAM, ROBERT EUGENE							
Subtotal Flow Tests:				3	Min:	2748	2971	3267
					Max:	2841	3318	3626
					Avg:	2797	3202	3506
							3542	3913
							3789	

CITY000142 Anderson RD /328 Malheur Street		WATEROUS						
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
0/13/2006	74	30	24.00	0.00	2841	3173	3478	3762
9438	BROADBENT, MARTY K							
08/28/2008	70	30	20.00	0.00	2458	2773	3060	3325
9438	BROADBENT, MARTY K							
04/03/2009	76	30	22.00	0.00	2579	2868	3134	3382
9438	BROADBENT, MARTY K							

BRFD

Hydrant Flow Test By Hydrant

Hydrant Number \$ "CITY"

CITY000142 Anderson RD /328 Malheur Street		WATEROUS						
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
Subtotal Flow Tests:		3		Min:	2458	2773	3060	3325
				Max:	2841	3173	3478	3762
				Avg:	2626	2938	3224	3489

CITY000143 432 Anderson RD /Mohave Court		WATEROUS						
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
0/13/2006	73	26	23.00	0.00	2781	2967	3258	3527
19438	BROADBENT, MARTY K							
8/28/2008	70	28	20.00	0.00	2458	2701	2980	3239
19438	BROADBENT, MARTY K							
4/03/2009	73	32	23.00	0.00	2637	3029	3325	3601
19438	BROADBENT, MARTY K							
Subtotal Flow Tests:		3		Min:	2458	2701	2980	3239
				Max:	2781	3029	3325	3601
				Avg:	2625	2899	3187	3455

CITY000144 301 Anderson RD /Baja Court		WATEROUS						
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
0/13/2006	68	28	22.00	0.00	2720	3001	3324	3623
19438	BROADBENT, MARTY K							
8/28/2008	70	35	19.00	0.00	2396	2905	3205	3484
19438	BROADBENT, MARTY K							
4/03/2009	72	30	22.00	0.00	2579	2894	3183	3450
19438	BROADBENT, MARTY K							
Subtotal Flow Tests:		3		Min:	2396	2894	3183	3450
				Max:	2720	3001	3324	3623
				Avg:	2565	2933	3237	3519

BREFD

Hydrant Flow Test By Hydrant

Hydrant Number \$ "CITY"

CITY000145 210 Main Street /Napa Store		WATEROUS						
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
10/13/2006	78	50	36.00	0.00	3479	5155	5618	6050
19438	BROADBENT, MARTY K							
19/02/2008	78	55	37.00	0.00	3344	5510	6005	6466
19438	BROADBENT, MARTY K							
15/07/2009	75	50	42.00	0.00	3564	5456	5971	6450
19438	BROADBENT, MARTY K							
Subtotal Flow Tests:		3		Min:	3344	5155	5618	6050
				Max:	3564	5510	6005	6466
				Avg:	3462	5373	5864	6322

CITY000146 100 Tatone		WATEROUS						
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
10/13/2006	78	57	40.00	0.00	3668	6349	6918	7450
19438	BROADBENT, MARTY K							
19/02/2008	76	56	40.00	0.00	3477	6063	6625	7150
19438	BROADBENT, MARTY K							
15/07/2009	79	58	43.00	0.00	3606	6299	6855	7375
19438	BROADBENT, MARTY K							
Subtotal Flow Tests:		3		Min:	3477	6063	6625	7150
				Max:	3668	6349	6918	7450
				Avg:	3583	6237	6799	7325

CITY000147 100 Tatone		WATEROUS						
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
10/13/2006	79	58	40.00	0.00	3668	6408	6973	7502
19438	BROADBENT, MARTY K							
19/02/2008	75	59	41.00	0.00	3520	6857	7504	8107
19438	BROADBENT, MARTY K							
Subtotal Flow Tests:		2		Min:	3520	6408	6973	7502
				Max:	3668	6857	7504	8107
				Avg:	3594	6632	7238	7804

BRFD

Hydrant Flow Test By Hydrant

Hydrant Number \$ "CITY"

CITY000148

100 Tatone

WATEROUS

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
10/13/2006	80	50	38.00	0.00	3575	5198	5649	6072
09438	BROADBENT, MARTY K							
09/02/2008	76	57	41.00	0.00	3520	6310	6896	7441
09438	BROADBENT, MARTY K							
05/07/2009	89	58	42.00	0.00	3564	5490	5906	6299
09438	BROADBENT, MARTY K							
Subtotal Flow Tests:				Min:	3520	5198	5649	6072
				Max:	3575	6310	6896	7441
				Avg:	3553	5666	6150	6604

CITY000149

101 SW Kinkade AVE /Main

DRESSER

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
10/13/2006	76	52	38.00	0.00	3575	5649	6173	6662
09438	BROADBENT, MARTY K							
09/09/2008	78	51	37.00	0.00	3344	5053	5507	5930
09438	BROADBENT, MARTY K							
04/17/2009	76	56	40.00	0.00	3478	6064	6627	7152
09438	BROADBENT, MARTY K							
Subtotal Flow Tests:				Min:	3344	5053	5507	5930
				Max:	3575	6064	6627	7152
				Avg:	3465	5588	6102	6581

CITY000150

221 SW Kinkade AVE

DRESSER

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
10/13/2006	70	44	31.00	0.00	3229	4596	5072	5512
09438	BROADBENT, MARTY K							
09/09/2008	69	44	30.00	0.00	3011	4330	4787	5210
09438	BROADBENT, MARTY K							
04/17/2009	70	48	25.00	0.00	2749	4283	4726	5136
09438	BROADBENT, MARTY K							

BREFD

Hydrant Flow Test By Hydrant

Hydrant Number \$ "CITY"

CITY000150 221 SW Kinkade AVE

DRESSER

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
Subtotal Flow Tests:		3		Min:	2749	4283	4726	5136
				Max:	3229	4596	5072	5512
				Avg:	2996	4403	4861	5286

CITY000151 205 SW Kinkade AVE

DRESSER

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
10/13/2006	72	36	28.00	0.00	3069	3743	4116	4462
09438	BROADBENT, MARTY K							
09/09/2008	70	41	30.00	0.00	3011	4041	4459	4846
09438	BROADBENT, MARTY K							
04/17/2009	72	48	35.00	0.00	3253	4939	5431	5887
09438	BROADBENT, MARTY K							
Subtotal Flow Tests:		3		Min:	3011	3743	4116	4462
				Max:	3253	4939	5431	5887
				Avg:	3111	4241	4668	5065

CITY000152 308 SW Kinkade AVE

DRESSER

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
10/13/2006	70	36	28.00	0.00	3069	3780	4171	4533
09438	BROADBENT, MARTY K							
09/09/2008	71	10	9.00	0.00	1649	1497	1649	1790
09438	BROADBENT, MARTY K							
04/17/2009	0	0	0.00	0.00	0	0	0	0
09438	BROADBENT, MARTY K							
Subtotal Flow Tests:		3		Min:	0	0	0	0
				Max:	3069	3780	4171	4533
				Avg:	1572	1759	1940	2107

BRFD

Hydrant Flow Test By Hydrant

Hydrant Number \$ "CITY"

CITY000153 211 Blalock CT

DRESSER

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
10/13/2006	67	28	36.00	0.00	3479	3848	4270	4660
09438	BROADBENT, MARTY K							
09/09/2008	66	32	23.00	0.00	2636	3103	3451	3771
09438	BROADBENT, MARTY K							
04/17/2009	68	36	27.00	0.00	2857	3556	3939	4292
09438	BROADBENT, MARTY K							
Subtotal Flow Tests:				3	Min:	2636	3103	3451
					Max:	3479	3848	4270
					Avg:	2990	3502	3886
							4241	

CITY000154 Locust RD /South

KENNEDY

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
10/17/2006	66	38	28.00	0.00	3069	4013	4462	4876
	BROADBENT, MARTY K							
02/26/2008	65	38	28.00	0.00	2877	3791	4225	4624
09438	BROADBENT, MARTY K							
04/03/2009	68	36	26.00	0.00	2773	3452	3823	4166
09438	BROADBENT, MARTY K							
01/17/2012	60	38	26.00	0.00	2773	3830	4320	4767
03188	VANGORDER, JENNY LEE							
Subtotal Flow Tests:				4	Min:	2773	3452	3823
					Max:	3069	4013	4462
					Avg:	2873	3771	4207
							4608	

CITY000155 228 Sandy Court ST

WATEROUS

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
10/17/2006	69	48	35.00	0.00	3431	5422	5994	6522
09438	BROADBENT, MARTY K							
09/02/2008	69	46	30.00	0.00	3011	4530	5008	5449
09438	BROADBENT, MARTY K							
06/14/2009	66	48	33.00	0.00	3159	5243	5831	6372
06/14/2012	BONHAM, ROBERT EUGENE							

06/14/2012 08:37

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* Scheduled Flow Test

BRED

Hydrant Flow Test By Hydrant

Hydrant Number \$ "CITY"

CITY000155	228 Sandy Court ST	WATEROUS						
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
Subtotal Flow Tests:		3		Min:	3011	4530	5008	5449
				Max:	3431	5422	5994	6522
				Avg:	3200	5065	5611	6114
CITY000156	216 Sandy Court ST	WATEROUS						
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
10/17/2006	70	50	36.00	0.00	3479	5706	6297	6843
19438	BROADBENT, MARTY K							
19/02/2008	70	50	34.00	0.00	3205	5257	5801	6304
19438	BROADBENT, MARTY K							
14/03/2009	70	50	34.00	0.00	3206	5258	5802	6306
19438	BROADBENT, MARTY K							
Subtotal Flow Tests:		3		Min:	3205	5257	5801	6304
				Max:	3479	5706	6297	6843
				Avg:	3296	5407	5966	6484
CITY000157	SW Willow Fork DR /Tatone corner	DRESSER						
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
10/17/2006	74	48	38.00	0.00	3575	5305	5815	6289
19438	BROADBENT, MARTY K							
12/26/2008	74	46	36.00	0.00	3262	4651	5097	5513
19438	BROADBENT, MARTY K							
14/17/2009	78	48	34.00	0.00	3171	4527	4933	5312
19438	BROADBENT, MARTY K							
Subtotal Flow Tests:		3		Min:	3171	4527	4933	5312
				Max:	3575	5305	5815	6289
				Avg:	3336	4827	5281	5704

BRFD

Hydrant Flow Test By Hydrant

Hydrant Number \$ "CITY"

CITY000158 200 Tatone /Kinkade corner

DRESSER

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
0/17/2006	76	50	37.00	0.00	3527	5338	5833	6294
09438	BROADBENT, MARTY K							
09/09/2008	74	52	37.00	0.00	3344	5431	5952	6438
09438	BROADBENT, MARTY K							
04/17/2009	78	54	32.00	0.00	3111	5010	5459	5879
09438	BROADBENT, MARTY K							
Subtotal Flow Tests:				Min:	3111	5010	5459	5879
				Max:	3527	5431	5952	6438
				Avg:	3327	5259	5748	6203

CITY000159 SW Willow Fork DR /Corner South Main

DRESSER

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
0/17/2006	71	38	28.00	0.00	3069	3882	4276	4642
09438	BROADBENT, MARTY K							
02/26/2008	70	39	26.00	0.00	2772	3588	3960	4303
09438	BROADBENT, MARTY K							
04/17/2009	71	36	29.00	0.00	2929	3589	3954	4291
09438	BROADBENT, MARTY K							
Subtotal Flow Tests:				Min:	2772	3588	3954	4291
				Max:	3069	3882	4276	4642
				Avg:	2923	3686	4063	4412

CITY000160 210 SW Willow Fork DR

DRESSER

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
0/17/2006	74	46	34.00	0.00	3381	4820	5283	5714
09438	BROADBENT, MARTY K							
02/26/2008	75	43	33.00	0.00	3123	4184	4579	4947
09438	BROADBENT, MARTY K							
04/17/2009	72	48	34.00	0.00	3171	4814	5294	5739
09438	BROADBENT, MARTY K							

BREFD

Hydrant Flow Test By Hydrant

Hydrant Number \$ "CITY"

CITY000160 210 SW Willow Fork DR		DRESSER						
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
Subtotal Flow Tests:		3		Min:	3123	4184	4579	4947
				Max:	3381	4820	5294	5739
				Avg:	3225	4606	5052	5466

CITY000161 232 SW Willow Fork DR		DRESSER						
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
10/17/2006	68	37	28.00	0.00	3069	3886	4304	4690
19438	BROADBENT, MARTY K							
12/26/2008	68	36	27.00	0.00	2825	3516	3895	4244
19438	BROADBENT, MARTY K							
14/17/2009	70	42	30.00	0.00	2979	4074	4496	4886
19438	BROADBENT, MARTY K							
Subtotal Flow Tests:		3		Min:	2825	3516	3895	4244
				Max:	3069	4074	4496	4886
				Avg:	2957	3825	4231	4606

CITY000162 SW Willow Fork DR & Cottonwood LOOP		DRESSER						
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
10/17/2006	64	39	28.00	0.00	3069	4165	4652	5099
19438	BROADBENT, MARTY K							
19/08/2008	62	32	25.00	0.00	2748	3296	3698	4067
19438	BROADBENT, MARTY K							
14/17/2009	62	34	27.00	0.00	2857	3556	3991	4389
19438	BROADBENT, MARTY K							
Subtotal Flow Tests:		3		Min:	2748	3296	3698	4067
				Max:	3069	4165	4652	5099
				Avg:	2891	3672	4113	4518

BRFD

Hydrant Flow Test By Hydrant

Hydrant Number \$ "CITY"

CITY000163

408 SW Kinkade AVE

DRESSER

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
10/17/2006	76	44	36.00	0.00	3479	4706	5143	5550
19438	BROADBENT, MARTY K							
09/08/2008	76	44	32.00	0.00	3110	4207	4598	4962
19438	BROADBENT, MARTY K							
04/17/2009	78	46	35.00	0.00	3253	4485	4887	5263
19438	BROADBENT, MARTY K							
Subtotal Flow Tests:				Min:	3110	4207	4598	4962
				Max:	3479	4706	5143	5550
				Avg:	3280	4466	4876	5258

CITY000164

111 SW Willow Fork DR

DRESSER

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
10/17/2006	78	43	34.00	0.00	3381	4441	4840	5212
19438	BROADBENT, MARTY K							
09/08/2008	74	30	20.00	0.00	2458	2745	3009	3255
19438	BROADBENT, MARTY K							
04/17/2009	76	42	31.00	0.00	3062	4009	4381	4728
19438	BROADBENT, MARTY K							
Subtotal Flow Tests:				Min:	2458	2745	3009	3255
				Max:	3381	4441	4840	5212
				Avg:	2967	3731	4076	4398

CITY000165

111 Cottonwood LOOP

DRESSER

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
10/17/2006	72	27	19.00	0.00	2528	2733	3006	3258
19438	BROADBENT, MARTY K							
09/09/2008	76	22	11.00	0.00	1823	1859	2032	2192
19438	BROADBENT, MARTY K							
04/17/2009	74	36	23.00	0.00	2637	3188	3494	3779
19438	BROADBENT, MARTY K							

BREFD

Hydrant Flow Test By Hydrant

Hydrant Number \$ "CITY"

CITY000165 111 Cottonwood LOOP

DRESSER

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
Subtotal Flow Tests:		3		Min:	1823	1859	2032	2192
				Max:	2637	3188	3494	3779
				Avg:	2329	2593	2844	3076

CITY000166 SW Kinkade AVE & Cottonwood LOOP

DRESSER

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
10/17/2006	75	43	36.00	0.00	3479	4661	5101	5511
09438	BROADBENT, MARTY K							
09/08/2008	76	46	31.00	0.00	3061	4288	4686	5057
09438	BROADBENT, MARTY K							
04/17/2009	74	46	35.00	0.00	3253	4638	5083	5498
09438	BROADBENT, MARTY K							
Subtotal Flow Tests:		3		Min:	3061	4288	4686	5057
				Max:	3479	4661	5101	5511
				Avg:	3264	4529	4956	5355

CITY000167 109 SW Olive CT

DRESSER

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
10/17/2006	71	0	0.00	0.00	0	0	0	0
09438	BROADBENT, MARTY K							
09/09/2008	72	40	30.00	0.00	3011	3914	4303	4665
09438	BROADBENT, MARTY K							
04/17/2009	72	42	30.00	0.00	3012	4054	4458	4832
09438	BROADBENT, MARTY K							
Subtotal Flow Tests:		3		Min:	0	0	0	0
				Max:	3012	4054	4458	4832
				Avg:	2007	2656	2920	3165

BRFD

Hydrant Flow Test By Hydrant

Hydrant Number \$ "CITY"

CITY000168 SW Wilson RD /513 Juniper		MUELLER						
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
10/18/2006	62	22	24.00	0.00	2841	2917	3273	3600
09438	BROADBENT, MARTY K							
11/19/2007	66	18	12.00	0.00	1883	1840	2046	2236
09438	BROADBENT, MARTY K							
03/05/2009	66	32	22.00	0.00	2551	3003	3340	3650
09438	BROADBENT, MARTY K							
Subtotal Flow Tests:				3	Min:	1883	1840	2046
					Max:	2841	3003	3340
					Avg:	2425	2586	2886
							2236	3162

CITY000169 SW Wilson RD /North of Windy River		WATEROUS						
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
10/18/2006	69	10	8.00	0.00	1640	1484	1640	1785
	BROADBENT, MARTY K							
Subtotal Flow Tests:				1	Min:	1640	1484	1640
					Max:	1640	1484	1640
					Avg:	1640	1484	1640
							1785	1785

CITY000170 500 SW Wilson RD /Mormon Church		DRESSER						
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
10/18/2006	68	26	24.00	0.00	2841	3053	3382	3685
09438	BROADBENT, MARTY K							
11/19/2007	68	16	14.00	0.00	2034	1948	2158	2351
09438	BROADBENT, MARTY K							
03/05/2009	68	30	22.00	0.00	2551	2894	3205	3493
09438	BROADBENT, MARTY K							
Subtotal Flow Tests:				3	Min:	2034	1948	2158
					Max:	2841	3053	3382
					Avg:	2475	2631	2915
							2351	3176

BRFD

Hydrant Flow Test By Hydrant

Hydrant Number \$ "CITY"

CITY000171 SW Wilson RD /-Riverridge-115 Pheasant Cout CLOW

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
0/23/2006	68	24	16.00	0.00	2320	2432	2693	2935
9438	BROADBENT, MARTY K							
1/19/2007	70	21	16.00	0.00	2175	2199	2426	2637
9438	BROADBENT, MARTY K							
3/05/2009	70	23	16.00	0.00	2175	2249	2482	2697
9438	BROADBENT, MARTY K							
Subtotal Flow Tests:				3	Min:	2175	2199	2426
					Max:	2320	2432	2693
					Avg:	2223	2293	2533
							2637	2935
							2756	

CITY000172 SW Wilson RD /North Riverridge WATEROUS

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
0/23/2006	70	24	17.00	0.00	2391	2501	2760	2999
9438	BROADBENT, MARTY K							
1/19/2007	69	22	16.00	0.00	2175	2224	2459	2676
9438	BROADBENT, MARTY K							
3/05/2009	74	25	15.00	0.00	2106	2219	2433	2631
9438	BROADBENT, MARTY K							
Subtotal Flow Tests:				3	Min:	2106	2219	2433
					Max:	2391	2501	2760
					Avg:	2224	2314	2550
							2631	2999
							2768	

CITY000173 700 SW Wilson RD /"B" Outback Apartments MUELLER

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
0/24/2006	74	70	14.00	0.00	670	2732	2994	3239
9438	BROADBENT, MARTY K							
9/08/2008	74	71	31.00	0.00	3061	14578	15979	17282
9438	BROADBENT, MARTY K							
3/05/2009	77	46	35.00	0.00	3217	4470	4877	5258
9438	BROADBENT, MARTY K							

BRFD

Hydrant Flow Test By Hydrant

Hydrant Number \$ "CITY"

CITY000173 700 SW Wilson RD /"B" Outback Apartments

MUELLER

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
Subtotal Flow Tests:		3		Min:	670	2732	2994	3239
				Max:	3217	14578	15979	17282
				Avg:	2316	7260	7950	8593

CITY000174 Faler /between E & D Outback Apts

MUELLER

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
0/24/2006	80	44	34.00	0.00	3381	4455	4842	5204
9438	BROADBENT, MARTY K							
1/19/2007	78	46	30.00	0.00	2978	4106	4474	4818
9438	BROADBENT, MARTY K							
9/08/2008	75	48	37.00	0.00	3344	4911	5374	5806
9438	BROADBENT, MARTY K							
3/05/2009	79	52	36.00	0.00	3263	4977	5416	5826
3	BROADBENT, MARTY K							
Subtotal Flow Tests:		4		Min:	2978	4106	4474	4818
				Max:	3381	4977	5416	5826
				Avg:	3241	4612	5026	5413

CITY000200 331 NE Boardman AVE

MULLER

Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
0/11/2006	86	36	50.00	0.00	4100	4763	5140	5495
9438	BROADBENT, MARTY K							
8/28/2008	85	56	39.00	0.00	3433	5308	5735	6136
9438	BROADBENT, MARTY K							
5/04/2010	86	58	38.00	0.00	3390	5386	5813	6214
3188	VANGORDER, JENNY LEE							
Subtotal Flow Tests:		3		Min:	3390	4763	5140	5495
				Max:	4100	5386	5813	6214
				Avg:	3641	5152	5562	5948

BRFD

Hydrant Flow Test By Hydrant

Hydrant Number \$ "CITY"

CITY080	080 City Center BLVD	M@H						
Date	Static	Residual	Pitot	Pitot 2	GPM	20 PSI	10 PSI	0 PSI
09/02/2008	80	52	39.00	0.00	3433	5181	5631	6052
09438	BROADBENT, MARTY K							
05/07/2009	79	44	40.00	0.00	3478	4611	5018	5398
09438	BROADBENT, MARTY K							
Subtotal Flow Tests:				Min:	3433	4611	5018	5398
				Max:	3478	5181	5631	6052
				Avg:	3455	4896	5324	5725
Total Flow Tests:		2						
		397						

APPENDIX D
Insurance Services Office
Fire Classification Information



111 NORTH CANAL STREET SUITE 950 CHICAGO, IL 60606-7270
TEL: (312) 930-0070 (800) 444-4554 FAX: (312) 930-0017

January 14, 2009

Ms. Karen Pettigrew, City Manager
City of Boardman
P. O. Box 229
Boardman OR 97818

RE: City of Boardman, Morrow County, OR
Public Protection Classification: 5
Prior Public Protection Classification: 4/8B

Dear Ms. Pettigrew:

We wish to thank you, Chief Marc Rogelstad and Water Superintendent, Dave Winters and others for your cooperation during our recent Public Protection Classification (PPC™) survey. Insurance Services Office (ISO®) has completed its analysis of the structural fire suppression delivery system provided in your community. The resulting classification is indicated above. This is a retrogression from the previous classification.

Enclosed is a Public Protection Summary Report, which provides a detailed analysis of your fire suppression services. If you would like to know how your community's classification could improve or if you would like to learn about the potential effect of proposed changes to your fire suppression delivery system, please call us at the phone number listed below or visit our website - www.isomitigation.com.

We are not implementing the class change at this time. Before we make this change, we would like to know if you desire to develop a program to retain class 4. We request that you acknowledge this letter in writing within 30 days, and advise when this matter will be reviewed. If you choose to begin an improvement program, we would appreciate receiving a list of intended changes within 60 days. (The list of intended changes can be included in the 30 day letter if you wish.) In cases where improvements have not been completed within 6 months, or by July 17, 2009 in this case, ISO will publish the retrogressed classification, but will continue to work with your community towards an improved future classification.

The PPC program is not intended to analyze all aspects of a comprehensive structural fire suppression delivery system program. It is not for purposes of determining compliance with any state or local law, nor is it for making loss prevention or life safety recommendations.

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

Sincerely,

A handwritten signature in cursive script that reads 'Derrick A. Thomas'.

Derrick A. Thomas
Community Mitigation Analyst
(800) 930-1677 x 6209 Fax (312) 930-0038
Encl.

cc: Fire Chief, Marc Rogelstad
Dave Winters, Water Superintendent, City of Boardman
Rolf Prag, Water Superintendent, Port of Morrow

PUBLIC PROTECTION SUMMARY REPORT

BOARDMAN

Oregon

Prepared by

**Insurance Services Office, Inc.
111 North Canal Street, Suite 950
Chicago, Illinois 60606-7270
(312) 930-0070**

January 13, 2009

Background Information

Introduction

ISO collects and evaluates information from communities in the United States on their structure fire suppression capabilities. We analyze the data using our Fire Suppression Rating Schedule (FSRS™) and then assign a Public Protection Classification (PPC™) number 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.

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:

- **Fire alarm and communication systems**, including telephone systems, telephone lines, staffing, and dispatching systems
- **The fire department**, including equipment, staffing, training, and geographic distribution of fire companies
- **The water supply system**, 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 44,000 fire protection areas across the United States using its Fire Suppression Rating Schedule (FSRS). We use a combination of a meeting between a trained ISO field representative and the dispatch center coordinator, community fire official, and water superintendent 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 than a Class 9, three elements of fire suppression features are reviewed. These three elements are the fire alarm and communication system, the fire department and the water supply system.

A review of the **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** broken up 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** distributed 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. We also consider hydrant size, type, and installation, as well as the inspection frequency and condition of fire hydrants. The water supply system is weighted at **40 points** with concern for the following:

- Credit for the 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 preliminary 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 your preliminary scores if the fire department and water-supply scores are out of line with each other. 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:

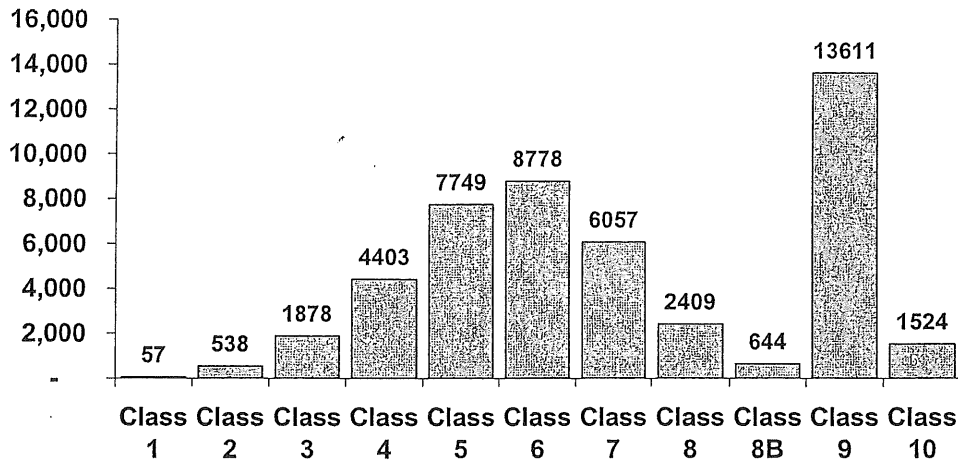
- Class 1 through (and including) Class 8 represents a fire suppression system that includes an FSRS creditable dispatch center, fire department and water supply.
- Class 8B is a special classification that recognizes a superior level of fire protection in otherwise Class 9 areas. It is designed to represent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

ISO develops a single Public Protection Classification for a community when 85% or more of the buildable area is served by a water supply capable of delivering 250 gpm of fire flow, uninterrupted, for a minimum period of 2-hours, and there are no areas beyond 5 road miles of the responding fire station. Under this condition, all of the structures in the community receive that classification. Over 60% of the communities ISO has evaluated do not have this capability, so ISO develops a split classification (for example, 5/9). When a split classification is published the first class (Class 5 in the example) applies to properties within 5 road miles of a recognized fire station and within 1,000 feet of a fire hydrant. The second class (Class 9 in the example) applies to properties within 5 road miles of a recognized fire station but beyond 1,000 feet of a hydrant. ISO generally assigns Class 10 to properties beyond 5 road miles.

Distribution of Public Protection Classification Numbers

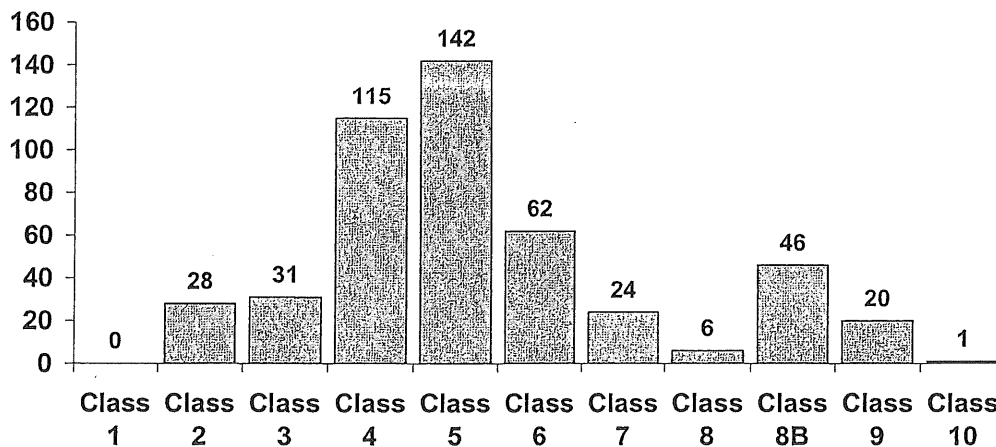
The 2007 published countrywide distribution of communities by the Public Protection Classification number is as follows:

Countrywide



The 2007 published distribution of communities in Oregon by the Public Protection Classification number is as follows:

OREGON



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 your 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 your 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 that is dedicated to our Community 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 and insights about the PPC grading processes. 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, send your request on fire department or chief administrative official's letterhead to:

ISO
Customer Service
545 Washington Boulevard
Jersey City, NJ 07310-1686

Be sure to include your name and title, address, daytime phone number and e-mail address. ISO will send you an e-mail containing your ID and password.

Classification Details

Public Protection Classification

On Sep 24, 2008 ISO concluded its review of the fire suppression features being provided for/by BOARDMAN. The resulting classification is a **Class 5**.

If the classification is a single class, the classification applies to all properties 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.
- Class 10 applies to properties over 5-road miles of a recognized fire station.

Summary Evaluation Analysis

The following points represent the analysis of the application of the criterion outlined in the FSRS of four topics— Receiving and Handling Fire Alarms, Fire Department, Water Supply and the Divergence factor for BOARDMAN:

FSRS Feature	Earned Credit	Credit Available
Receiving and Handling Fire Alarms		
414. Credit for Telephone Service	1.84	2
422. Credit for Operators	2.40	3
432. Credit for Dispatch Circuits	3.25	5
440. Credit for Receiving and Handling Fire Alarms	7.49	10
Fire Department		
513. Credit for Engine Companies	7.25	10
523. Credit for Reserve Pumpers	0.70	1
532. Credit for Pumper Capacity	5.00	5
549. Credit for Ladder Service	0.94	5
553. Credit for Reserve Ladder and Service Trucks	0.07	1
561. Credit for Distribution	1.41	4
571. Credit for Company Personnel	1.75	15
580. Credit for Training	1.89	9
590. Credit for Fire Department	19.01	50
Water Supply		
616. Credit for Supply System	31.06	35
621. Credit for Hydrants	1.96	2
631. Credit for Inspection and Condition	1.88	3
640. Credit for Water Supply	34.90	40
Divergence		
700: Divergence	-9.85	--
Total Credit	51.55	100.00

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. Often these intermediate values are based upon a 100-point scale, but they can be more (e.g., 654 for Item 513, "Credit for Engine Companies"). The ratios between the actual points scored in each of these subsections and 100 (or, as in Item 513, other scale number) are then multiplied by the points available for the subsection.

For instance, Item 414 "Credit for Telephone Service" 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:

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

Where $TS = TL + TD + RD$

Detailed Evaluation Analysis

On the following pages are the scoring details of each category of the evaluation of BOARDMAN. These details relate only to the fire insurance classification of your 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 scoring details for Receiving and Handling Fire Alarms, Fire Department, and Water Supply 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 of 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

The first item reviewed is Item 414 "Credit for Telephone Service". 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) needed to be 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 BOARDMAN has 4 lines reserved.	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 BOARDMAN has 0 lines in addition to the 4 lines reserved for receiving notification of fires (and other emergency calls).	16.67	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 maximum credit, 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:	51.67	60

Item 412 - "Review of Telephone Directory (TD)"	Earned Credit	Credit Available
A. Emergency number on the inside front cover or the front page For maximum 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 listed and the business number is listed.	5	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 listed and the business number is listed.	5	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:	20	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 two points available for the "Credit for Telephone Service (CTS)". The points calculated for BOARDMAN for this item are:

CTS = 1.84 points

Item 422 - Credit for Operators

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-five percent of emergency calls shall be dispatched within 60 seconds and ninety-nine percent of calls shall be dispatched within 90 seconds of answering the call.

To receive full credit for operators on duty, ISO must review documentation to show that your 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 you are currently using 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) need to be 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 2.23 operators on duty at the communication center.	80.00	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 0.00 operators awake at all times.	0.00	20
Review of Operators (PO) total:	80.00	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 three points available for the "Credit for Operators (CTO)". The points calculated for BOARDMAN for this item are:

CTO = 2.40 points

Item 432 - Credit for Dispatch Circuits

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 retransmitted automatically or manually from the communication center to an emergency response facility" (fire station or fire department member). 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 a fire, medical emergency or other situation that requires fire department action".

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 over 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.

Your score for Credit for Dispatch Circuits (CDC) is influenced by monitoring the 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 criterion is as follows:

The score that BOARDMAN 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.	0.00	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.	15.00	20
Item 431E - "When no circuit is needed" If all responding fire fighters 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:	65.00	100

After the Items in 431 are summed up to determine the points received for the "Credit for Dispatch Circuits", the sum is divided by the total possible points (100 points) to determine the factor that is applied to the five points available for the "Credit for Dispatch Circuits (CDC)". The points calculated for BOARDMAN for this item are:

CDC = 3.25 points

The final step in determining the credit for "Receiving and Handling Fire Alarms" is to add up the following three components:

Item	Earned Credit	Credit Available
414. Credit for Telephone Service (CTS)	1.84	2
422. Credit for Operators (CTO)	2.40	3
432. Credit for Dispatch Circuits (CDC)	3.25	5
Total Credit:	7.49	10

If the score BOARDMAN achieved for Receiving and Handling Fire Alarms was translated into a 100 point scale instead of the 10 points actually used, the relative Fire Suppression Rating Schedule classification for this section of the review would be a (relative) **Class 3**.

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

Item 501 - 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 601 Columbia Avenue, Boardman
- 5500 gpm 601 East Columbia Avenue, Boardman
- 5500 gpm 0-601 East Columbia Avenue, Boardman
- 4500 gpm 650 Columbia Avenue, Boardman
- 4500 gpm 210 Boardman Avenue, Boardman

The fifth largest needed fire flow is determined to be the Basic Fire Flow. The maximum that the Basic Fire Flow can be is 3500 gpm. The Basic Fire Flow for BOARDMAN has been determined to be 3500 gpm.

Item 513 - Credit for Engine Companies

The first item reviewed is Item 513 "Credit for Engine Companies". 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.

Item 501.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

For maximum credit, the FSRS indicates that 4 engine companies are needed in the fire district. This number is calculated as follows:

The greater of:

- a) 3 engine companies to support a Basic Fire Flow of 3500 gpm.
- b) 2 engine companies to provide fire suppression services to areas with a reasonable population of properties without a responding fire station within 1½ miles.
- c) 4 engine companies based upon the method of operation of the fire department.

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

For maximum credit in the FSRS, at least two engine companies should respond for all reported first alarms for fires in buildings. 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 engine, ISO reviews the pump capacity as indicated by a pumper test, the hose (including hose testing) and the equipment carried.

For maximum credit in the schedule, 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 in the schedule, 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*. Multiple jacket-lined hose manufactured prior to July, 1987 must be service tested at 250 psi. Relay supply hose that is 3½ inch to 5 inch should be tested at 200 psi and 5 inch to 6 inch relay supply hose should be tested at 150 psi. Hose that has been manufactured in July, 1987 and after should be tested to the service test pressure the manufacturer stenciled on the hose. All hose should be serviced tested for a minimum of 3 minutes.

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 your community, inter-department training with your fire department and the fire ground communications capability with your department.

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 (654 or 554) 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 the "Credit for Engine Companies (CEC)" to determine the final score for this item.

The points calculated for BOARDMAN for this item were:

CEC = 7.25 points

Item 523 - Credit for Reserve Pumpers

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 (654 or 554) times the Needed Engine Companies (NE). Finally, this quotient is multiplied by the 1 point available for the "Credit for Reserve Pumpers (CRP)".

These points calculated for BOARDMAN resulted in the following:

CRP = 0.70 points

Item 530 – Credit for Pump Capacity

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 BOARDMAN. 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 above is 8000 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 the "Credit for Pumper Capacity (CPC)". The points calculated for BOARDMAN for this item were as follows:

CPC = 5.00 points

Item 549 – Credit for Ladder Service

ISO establishes a "Credit for Ladder Service (CLS)" (FSRS Item 549). 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 3500 gpm, or any combination of this 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.

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. When long ladders are not needed in a community due to low height of buildings, the other support services tools and equipment are still needed. 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 height of buildings greater than 3 stories or 35 feet or more in height, buildings with a Needed Fire Flow greater than 3500 gpm, the response distance to built-upon areas, the method of operation and the response outside the city.

For maximum credit in the Schedule, 2 ladder companies are needed in your district. This is calculated as follows:

The greater of:

- a) 2 ladder companies due to the number of buildings over 3500 gpm or over 3 stories in height or the method of operation.

Plus

- b) 0 additional ladder companies 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.

We have recognized 1 ladder company.

For maximum credit in the Schedule, 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.

For maximum credit in the Schedule, 1 service company is needed in your district. This need is calculated as follows:

- 1 service company due to the lack of 5 or more buildings in response areas with a needed fire flow of over 3,500 gpm or over 3-stories in height; or due to the method of operation.

We have recognized 0.5 service companies.

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 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.

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 the "Credit for Ladder Service (CLS)". The points calculated for BOARDMAN resulted in the following:

CLS = 0.94 points

Item 533 – Credit for Reserve Ladder and Service Trucks

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 (784) times the Needed Ladder (NL) plus the total possible points (334) 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 the "Credit for Reserve Ladder and Service Trucks (CRLS)".

The credit for Reserve Ladder and Service Trucks was calculated for BOARDMAN as follows:

CRLS = 0.07 points

Item 561 – Credit for Distribution

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 first-due engine company within 1½ miles and a ladder-service company within 2½ miles.

To determine the Credit for Distribution, we begin by selecting certain values that have already been determined in the evaluation process. 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.

A company distribution study is conducted using a base map of the city drawn to scale. All named and numbered streets are depicted as well as all fire hydrant locations. The in-service engine company and in-service ladder and service company locations are plotted on the map. Using the prevailing map scale a 1½ mile polygon is drawn around each in-service engine company location and a 2½ mile polygon is drawn around each in-service ladder and service company location. Since the fire hydrant locations are indicative of growth and development they are used as a surrogate to quantify built-upon areas. All fire hydrants located within 1½ mile polygons are counted and summed. This number is divided by the total number of fire hydrants in the city and multiplied by 100 to determine the percent of built-upon area within 1½ miles of an existing engine company. Similarly, all fire hydrants located within 2½ mile polygons are counted and summed. This number is divided by the total number of fire hydrants in the city and multiplied by 100 to determine the percent of built-upon area within 2½ miles of existing ladder and service companies.

The points calculated for Credit for Distribution for BOARDMAN resulted in the following:

CD = 1.41 points

Item 571 – Credit for Company Personnel

Item 571 “Credit for Company Personnel (CCP)” reviews the average number of existing fire fighter and company officer personnel available to respond to reported “first alarm structure fires” in the city.

For on-duty strength, the total number of members on duty with companies is taken as the yearly average considering vacations, sick leave, holidays, “Kelley” days and other absences. When your fire department operates under a “minimum staffing” policy and sufficient funds are allocated in the fire department budget to hire back personnel from the off-shift to maintain the minimum staffing, ISO will use the minimum staffing in lieu of figuring an average.

Members 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.

Personnel 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 paid members responding on first alarms are considered on the same basis as call and volunteer members. For personnel not normally at the fire station, the value of responding members is divided by 3 to reflect the time needed to assemble at the fire scene and the fractured 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. While Public Safety Officers do not represent the ability to respond from a single location as a team, they are positioned in emergency vehicles within the jurisdiction boundaries. In recognition of this increased response capability the value of responding members is divided by 2.

Call and volunteer members sleeping at fire stations are considered as on-duty members for the proportional time that they at the fire station.

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

The maximum credit for any response of on-duty and call members are 12 fire fighters, including company officers, for each existing engine and ladder company and 6 for each existing service company.

The FSRS recognizes an average of 0.00 on-duty personnel and 12.63 volunteers respond on first alarm to structure fires.

The points calculated for Credit for Personnel for BOARDMAN resulted in the following:

CCP = 1.75 points

Item 581 – Credit for Training

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, 50% is attributed to specialized training and the final 15% is available for the pre-fire planning inspection program.

The following pages outline the points scored by Item for Training.

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 1500 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 should 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.	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 6.17 single company half-day drills.	0.31	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 2.67 multiple company drills.	0.27	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 -	0.78	
Average percentage participating in drills -	33%	
Factor for Use (FU):	0.26	1.0
Review of Facilities and Aids (FA) total:	14.00	35
"Facilities, Aids and Use" subtotal -	3.58	
Deduction for incomplete or missing records -	-0.00	

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

***Note:** 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 to determine the credit.

The points calculated for "Facilities, Aids and Use" for BOARDMAN resulted in the following:
Facilities, Aids and Use = 3.58 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 0.79 hours per month of company training received by company members and participation was 33% of those eligible to participate. 0.00 points will be deducted for missing or incomplete records.	0.33	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 0.00 half-day sessions received per year by drivers and operators and participation was 0% of those eligible to participate. 0.00 points will be deducted for missing or incomplete records.	0.00	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 0.00 hours received per year by new drivers and operators and participation was 0% of those eligible to participate. 0.00 points will be deducted for missing or incomplete records.	0.00	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 32.00 hours received per year and participation was 100% of those eligible to participate. 0.00 points will be deducted for missing or incomplete records.	0.67	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 your credit for Training, the points credited in Item 580.A through 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 BOARDMAN.

Finally, this sum is divided by 100 and then multiplied by the 9 points available for the "Credit for Training (CT)". These points calculated for BOARDMAN resulted in the following:

CT = 1.89 points

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

Item	Earned Credit	Credit Available
513. Credit for Engine Companies (CEC)	7.25	10
523. Credit for Reserve Pumpers (CRP)	0.70	1
532. Credit for Pumper Capacity (CPC)	5.00	5
549. Credit for Ladder Service (CLS)	0.94	5
553. Credit for Reserve Ladder and Service Trucks (CRLS)	0.07	1
561. Credit for Distribution (CD)	1.41	4
571. Credit for Company Personnel (CCP)	1.75	15
581. Credit for Training (CT)	1.89	9
Total Credit	19.01	50

If the score BOARDMAN achieved for the fire department was translated into a 100-point scale instead of the 50-points actually used, the relative Fire Suppression Rating Schedule classification for this section of the review would be a (relative) **Class 7**.

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:

- representative building locations in the city to determine the theoretical amount of water necessary for fire suppression purposes (needed fire flow up to 3,500 gpm)
- fire hydrants: size, type and installation to determine the capacity of the fire hydrants
- hydrants: inspection and condition to review the fire hydrant inspection frequency, the completeness of the inspections and the condition of the hydrants

Item 616 – Credit for Supply System

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 tests 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 reviewed. 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", three sub items (Item 612 "Supply Works Capacity", Item 613 "Main Capacity" and Item 614 "Hydrant Distribution") need to be evaluated.

We calculate the supply works capacity for each representative needed fire flow test location. In doing this, ISO considers a variety of water supply sources. These would 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 a supply 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 (NFF) 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 from each hydrant within 300 feet of the location, 670 gpm from hydrants within 301 to 600 feet of the location and 250 gpm from hydrants within 601 to 1,000 feet of the location. The normal distribution of hydrants in the vicinity of test locations considered in Items 612 and 613 are evaluated. These hydrant distribution allowances are based upon a standard fire hydrant with a pumper outlet conforming to the American Water Works Association (AWWA) Standard C-502 or C-503. In addition, they are based upon a standard complement of 1,200 feet of 2½ inch fire hose. If a hose diameter greater than 2½ inch is carried by all in-service pumpers, the hydrant distribution credit may be greater than that stated above due to the reduced friction loss in the larger diameter hose.

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.

- A. Sub-standard type hydrants with at least one fire department outlet are considered if they are capable of delivering at least 250 gpm.
- B. A cistern or other suction point must be capable of supplying 250 gpm for at least 2 hours to be recognized.
- C. The maximum credit for a hydrant may be limited by A or B above and is limited by the number and size of outlets as follows:

MAXIMUM CREDIT	
At least one pumper outlet	1,000 gpm
Two or more hose outlets, no pumper outlet	750 gpm
One hose outlet only	500 gpm

For maximum credit in the FSRS, 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.

A variety of buildings were used as representative building locations in the city to determine the theoretical amount of water necessary for fire suppression purposes (needed fire flow):

The points calculated for BOARDMAN resulted in the following:

CSS = 31.06

Item 621 – Credit for Hydrants

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 in the FSRS, 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 220 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 215 hydrants that have a 6 -inch or larger branch and a pumper outlet.	97.73	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.	0.57	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	98.30	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 220 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 220 hydrants that were reviewed, none had a different hose thread than the majority. There were no points deducted for this item.

To determine your "Credit for Hydrants", the points credited in Item 620.A through 680.F are summed. A deduction of 2 points is made for each 10% of hydrants not operating in a uniform direction of the majority, or with an operating nut different from the majority. A deduction of 10 points is also made if more than one thread is used for pumper or hose outlets. The sum is divided by 100 and then multiplied by the 2 points available for the "Credit for Hydrants (CH)". The points calculated for BOARDMAN resulted in the following:

$$CH = 1.96$$

Item 630 – Credit for Inspection and Condition

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 1: The points for inspection frequency are reduced by 10 points if the inspections are incomplete or does 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 in the Schedule, 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.

Item 630.A "Inspection (HI):"		Time Interval
Most recent inspection was Sep 01, 2008		
1 st prior inspection was Jul 01, 2007		1 year
2 nd prior inspection was Nov 01, 2006		0.5 year
Review of Inspection (HI):	Earned Credit	Credit Available
	90	100

For maximum credit in the Schedule, all hydrants should be conspicuous, well located for use by a pumper and in good condition. There were 14 hydrants examined in this FSRs item.

Item 630.B "Condition (HF):"		Maximum Factor
Standard: There were 11 hydrants considered in standard condition.		1.0
Usable: There were 3 hydrants considered in usable condition.		0.5
Not Usable: There were 0 hydrants considered not usable.		0.0
Review of Condition (HF):	Earned Credit	Credit Available
	0.89	1.0

The points calculated for the inspection and condition of hydrants for BOARDMAN resulted in the following:

CIC = 1.88

The final step in determining the credit for Water Supply is to add up the following three components:

Item	Earned Credit	Credit Available
616. Credit for Supply System (CSS)	31.06	35
621. Credit for Hydrants (CH)	1.96	2
631. Credit for Inspection and Condition (CIC)	1.88	3
Total Credit	34.90	40

If the score BOARDMAN achieved for the water supply system was translated into a 100 point scale instead of the 40 points actually used, the relative Fire Suppression Rating Schedule classification for this section of the review would be a (relative) **Class 2**.

Divergence

Divergence considers a difference between the protection provided by the Fire Department and the Water Supply. This difference would prevent the better feature from being utilized to its fullest extent. Therefore, an adjustment is made to reflect any difference between these two features. Because of the difference in total weights assigned to the two features, the total for the Fire Department, which has the higher total weight, is adjusted to make the comparison reflect the relative adequacies of the two features.

The expression $\frac{[(CWS) - 0.8(CFD)]}{10}$ in the following formula is the Divergence calculation:

$$PPC = \frac{[(CFA + CFD + CWS) - 0.5 \{ [(CWS) - 0.8 (CFD)] \}]}{10}$$

$$PPC = \frac{[(7.49 + 19.01 + 34.90) - 0.5 \{ [(34.90) - 0.8 (19.01)] \}]}{10}$$

Summary of Public Protection Classification Review

Completed by ISO on Sep 24, 2008

for

BOARDMAN

FSRS Item	Earned Credit	Credit Available
Receiving and Handling Fire Alarms		
414. Credit for Telephone Service	1.84	2
422. Credit for Operators	2.40	3
432. Credit for Dispatch Circuits	3.25	5
440. Credit for Receiving and Handling Fire Alarms	7.49	10
Fire Department		
513. Credit for Engine Companies	7.25	10
523. Credit for Reserve Pumpers	0.70	1
532. Credit for Pumper Capacity	5.00	5
549. Credit for Ladder Service	0.94	5
553. Credit for Reserve Ladder and Service Trucks	0.07	1
561. Credit for Distribution	1.41	4
571. Credit for Company Personnel	1.75	15
580. Credit for Training	1.89	9
590. Credit for Fire Department	19.01	50
Water Supply		
616. Credit for Supply System	31.06	35
621. Credit for Hydrants	1.96	2
631. Credit for Inspection and Condition	1.88	3
640. Credit for Water Supply	34.90	40
Divergence		
700: Divergence	-9.85	--
Total Credit	51.55	100.00

Community Classification = 5

If the individual scores BOARDMAN 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 3**

Fire Department: a (relative) **Class 7**

Water Supply: a (relative) **Class 2**

INSURANCE SERVICES OFFICE, INC.

CLASSIFICATION DETAILS

Graded Area: Boardman

County: Morrow

State: Oregon

Date Surveyed: September, 2008 Total credit: 51.55 Class: 05 Pop.: 3,400

RECEIVING AND HANDLING FIRE ALARMS

This section of the Fire Suppression Rating Schedule reviews the facilities provided for the general public to report fires, and for the operator on duty at the communication center to dispatch fire department companies to the fires.

	<u>Actual</u>	<u>Credit</u> <u>Maximum</u>
1. Credit for Telephone Service (Item 414)		
This item reviews the facilities provided for the public to report fires, including the listing of fire and business numbers in the telephone directory.	1.84	2.00
2. Credit for Operators (Item 422)		
This item reviews the number of operators on-duty at the communication center to handle fire calls.	2.40	3.00
3. Credit for Dispatch Circuits (Item 432)		
This item reviews the dispatch circuit facilities used to transmit alarms to fire department members.	3.25	5.00
4. Total Credit for Receiving and Handling Fire Alarms:	7.49	10.00
Relative Classification for Receiving and Handling Fire Alarms:	3	

CLASSIFICATION DETAILS

Graded Area: Boardman
 County: Morrow
 Date Surveyed: September, 2008 Total credit: 51.55 Class: 05 State: Oregon
 Pop.: 3,400

FIRE DEPARTMENT

This section of the Fire Suppression Rating Schedule reviews the engine and ladder-service companies, equipment carried, response to fires, training and available fire fighters.

	<u>Actual</u>	<u>Credit</u> <u>Maximum</u>
1. Credit for Engine Companies (Item 513)		
This item reviews the number of engine companies and the hose equipment carried.	7.25	10.00
2. Credit for Reserve Pumpers (Item 523)		
This item reviews the number of reserve pumpers, their pump capacity and the hose equipment carried on each.	0.70	1.00
3. Credit for Pump Capacity (Item 532)		
This item reviews the total available pump capacity.	5.00	5.00
4. Credit for Ladder-Service Companies (Item 549)		
This item reviews the number of ladder and service companies and the equipment carried.	0.94	5.00
5. Credit for Reserve Ladder-Service Companies (Item 553)		
This item reviews the number of reserve ladder and service trucks, and the equipment carried.	0.07	1.00

CLASSIFICATION DETAILS

Graded Area: Boardman
 County: Morrow
 Date Surveyed: September, 2008 Total credit: 51.55 Class: 05 State: Oregon
 Pop.: 3,400

FIRE DEPARTMENT (continued)

	<u>Actual</u>	<u>Credit</u> <u>Maximum</u>
6. Credit for Distribution (Item 561)		
This item reviews the percent of the built-upon area of the city which has an adequately-equipped, responding first-due engine company within 1.5 miles and an adequately-equipped, responding ladder-service company within 2.5 miles.	1.41	4.00
7. Credit for Company Personnel (Item 571)		
This item reviews the average number of equivalent fire fighters and company officers on duty with existing companies.	1.75	15.00+
8. Credit for Training (Item 581)		
This item reviews the training facilities and their use.	1.89	9.00
9. Total Credit for Fire Department:	19.01	50.00+

Relative Classification for Fire Department:

+ This indicates that credit for manning is open-ended, with no maximum credit for this item.

CLASSIFICATION DETAILS

Graded Area: Boardman

County: Morrow

State: Oregon

Date Surveyed: September, 2008 Total credit: 51.55 Class: 05 Pop.: 3,400

WATER SUPPLY

This section of the Fire Suppression Rating Schedule reviews the water supply system that is available for fire suppression in the city.

	<u>Actual</u>	<u>Credit</u> <u>Maximum</u>
1. Credit for the Water System (Item 616)		
This item reviews the supply works, the main capacity and hydrant distribution.	31.06	35.00
2. Credit for Hydrants (Item 621)		
This item reviews the type of hydrants, and method of installation.	1.96	2.00
3. Credit for Inspection and Condition of Hydrants (Item 631)		
This item reviews the frequency of inspections of hydrants and their condition.	1.88	3.00
4. Total Credit for Water Supply:	34.90	40.00
Relative Classification for Water Supply:	2	

Insurance Services Office, Inc.

Grading Sheet For: BOARDMAN, Oregon
Morrow County
Public Protection Class: 05

Surveyed: September, 2008

<u>Feature</u>	<u>Credit Assigned</u>	<u>Maximum Credit</u>
Receiving and Handling Fire Alarms	7.49%	10.00%
Fire Department	19.01%	50.00%
Water Supply	34.90%	40.00%
*Divergence	-9.85%	
Total Credit	<u>51.55%</u>	<u>100.00%</u>

The Public Protection Class is based on the total percentage credit as follows:

<u>Class</u>	<u>%</u>
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 to 9.99

*Divergence is a reduction in credit to reflect a difference in the relative credits for Fire Department and Water Supply.

The above classification has been developed for use in property insurance premium calculations.

INSURANCE SERVICES OFFICE, INC.
HYDRANT FLOW DATA SUMMARY

City Boardman
County Morrow

State Oregon

Witnessed by: Insurance Services Office, Inc.

Date: September 24, 2008

TEST NO.	TYPE DIST.*	TEST LOCATION	SERVICE	FLOW - GPM $Q=(29.83(C(d^2)p^{0.5}))$				PRESSURE PSI		FLOW -AT 20 PSI		REMARKS***
				INDIVIDUAL HYDRANTS			TOTAL	STATIC	RESID.	NEEDED **	AVAIL.	
1	Comm	113 Boardman Ave	City of Boardman, Main	670	530	0	1200	84	74	4000	3300	
1A	Comm	113 Boardman	City of Boardman, Main	670	530	0	1200	84	74	1500	3300	
2	Comm	Olson, north of Columbia	City of Boardman, Main	750	890	1430	3070	94	88	3500	11900	
3	Comm	650 Columbia Ave - rear	Port of Morrow, Main	240	580	970	1790	96	90	4500	7100	
3A	Comm	650 Columbia Ave - Front	Port of Morrow, Main	240	580	970	1790	96	90	2500	7100	
4	Comm	Wilson Rd, east of Anthony	City of Boardman, Main	560	580	750	1890	65	30	4500	2200	(A)-(2250 gpm)
4A	Comm	Wilson Rd, east of Anthony	City of Boardman, Main	560	580	750	1890	65	30	1000	2200	
5	Comm	305 Boardman	City of Boardman, Main	410	410	1280	2100	80	58	4500	3600	
5A	Comm	305 Boardman	City of Boardman, Main	410	410	1280	2100	80	58	1750	3600	
6	Comm	Columbia, west of Main St	City of Boardman, Main	860	670	0	1530	91	86	2250	6400	
7	Comm	601 E. Columbia Ave	Port of Morrow, Main	480	240	870	1590	86	26	5500	1700	(A)-(3590 gpm)
7A	Comm	601 E. Columbia Ave	Port of Morrow, Main	480	240	870	1590	86	26	3500	1700	

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

CH2M Hill 1999 Water Master Plan

Report

Boardman Water Master Plan

Prepared for
City of Boardman, Oregon

November 1999

CH2MHILL

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Appendix A Evaluation of Alternative Chlorination Systems

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Chapter 3. Existing System Description

CHAPTER 3

Existing System Description

The City of Boardman's 2,800 residents are served by a community public water system (Oregon Health Division ID No. 4100130). The major components of the system, including source, storage, treatment and distribution system, are shown schematically in Figure 1.

Water Sources

The system uses one primary source of water, a Ranney collector well located alongside the Columbia River. The current pumping capacity is approximately 6,030 gpm. It was installed in 1977.

The collector draws in both groundwater and surface water from the Columbia River, through six horizontal laterals. The resulting water quality has consistently tested free of pathogens and other surface water organisms. The state classifies the water as groundwater for establishing treatment requirements. This allows the water to be used without filtration and without a high level of disinfection. The only treatment is by chlorination.

The collector is classified as a surface water intake from the standpoint of water rights. The current collector pumps up to about 37 percent of the city's Columbia River water right permit (about 13.4 cubic feet per second of a total permit amount of 36 cubic feet per second).

The city's second source is a deep well that is used only for emergencies. The 532-foot-deep well was constructed in 1965. The pump capacity is about 800 gpm; however, the city holds a certificated water right for only 500 gpm. The well was relegated to an emergency supply status because of high hydrogen sulfide levels. It has been used very infrequently in recent years.

Treatment

Water from the Ranney collector is pumped to the water plant facility, where it is chlorinated before it enters the clearwell. The chlorination system is supplied by one-ton cylinders of gas. It is a pressure system and has no emergency treatment system for leaks. A limited amount of chlorine detention time is provided by the 300,000-gallon concrete clearwell. The clearwell also serves as a pump well to even out differences between the collector pumping rate and high service pumping rate.

Distribution

Water from the clearwell is pumped into the distribution system by various combinations of nine high-service pumps. The pump capacities range from approximately 120 gpm to 1200 gpm. They are used in various combinations to match system demands.

The clearwell/pump station plant is shown in Figures 2 and 3.

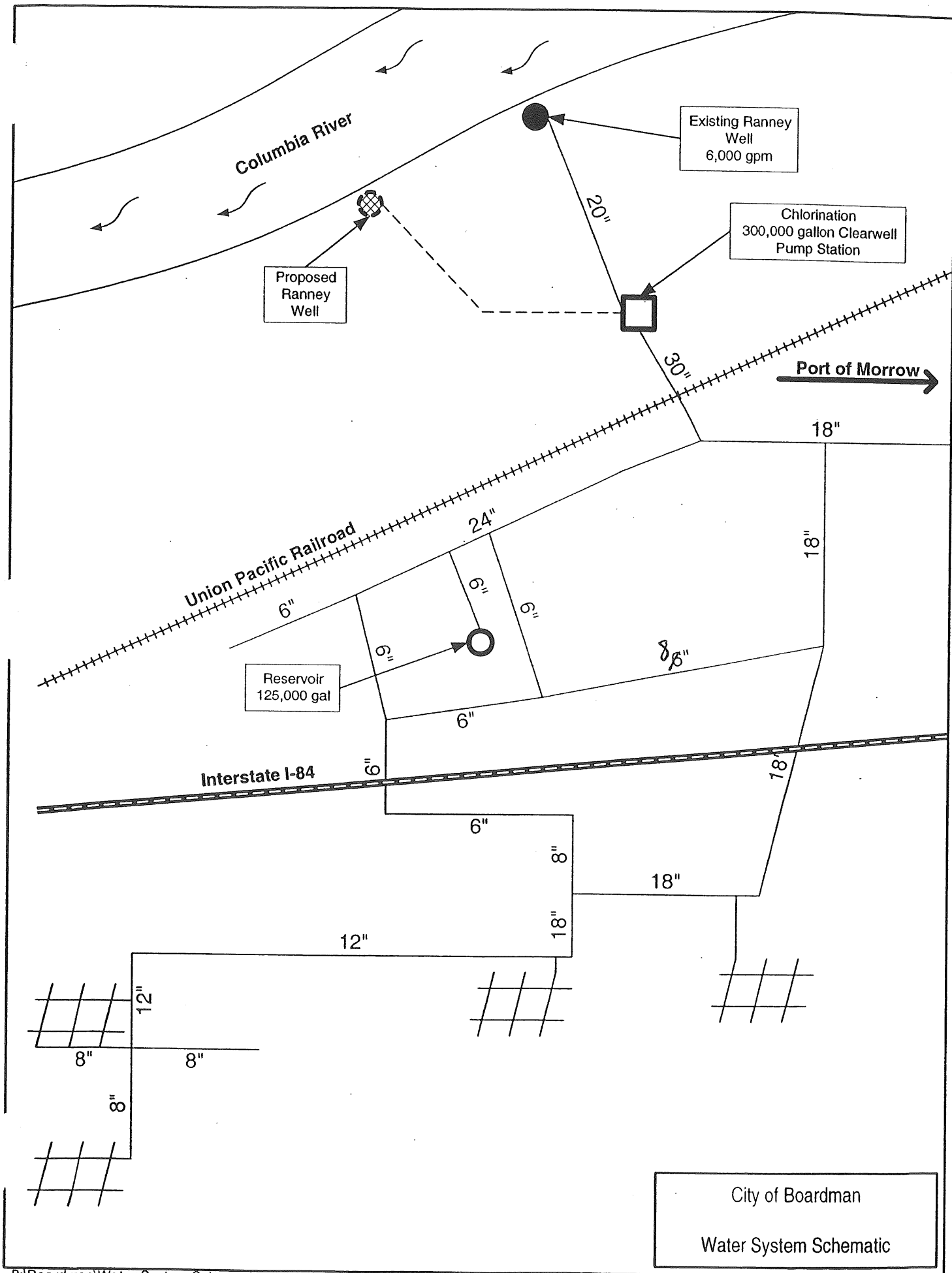
The distribution system operates as a closed end system, meaning that one or more pumps must run continuously to maintain system pressures. Most community water systems operate by pumping to storage reservoirs that are elevated or situated on hills to provide adequate pressure by gravity flow. These gravity reservoirs are drawn down during high demand periods, and refilled during the low demand periods at night. When there is gravity storage, high-service pumps do not need to run continuously. The gravity storage provides water at the desired pressure. In contrast, Boardman's system does not have gravity storage and the pressure immediately falls to unacceptable levels if the pumps are off. This results in a system that is difficult to operate and maintain.

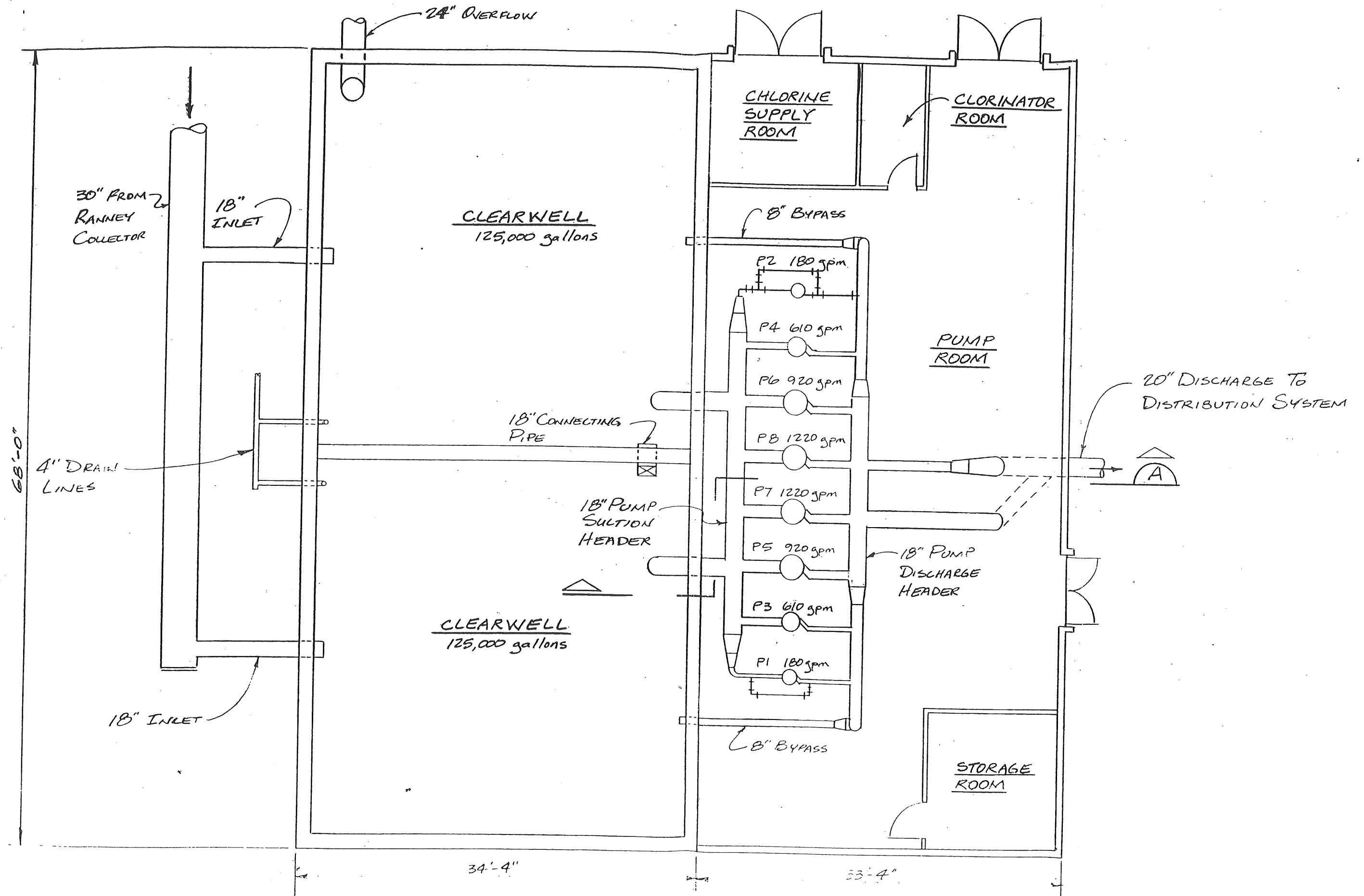
The one distribution system reservoir is an elevated steel tank that holds 137,000 gallons. However, the water surface elevation is below the hydraulic grade line during normal pressures. Water from the tank is only withdrawn during emergencies, when system pressures fall to about 45 psi or less. It cannot function as a gravity storage reservoir because its height is too low compared to the surrounding services.

The city's distribution system consists of about 10 miles of 4- through 30-inch-diameter distribution mains. About 75 percent of the system is comprised of asbestos-cement pipe. The two largest mains, which are 24 inches and 30 inches in diameter, are concrete cylinder pipe. The 18-inch main is ductile iron. Otherwise, polyvinyl chloride has been selected for new pipe installations.

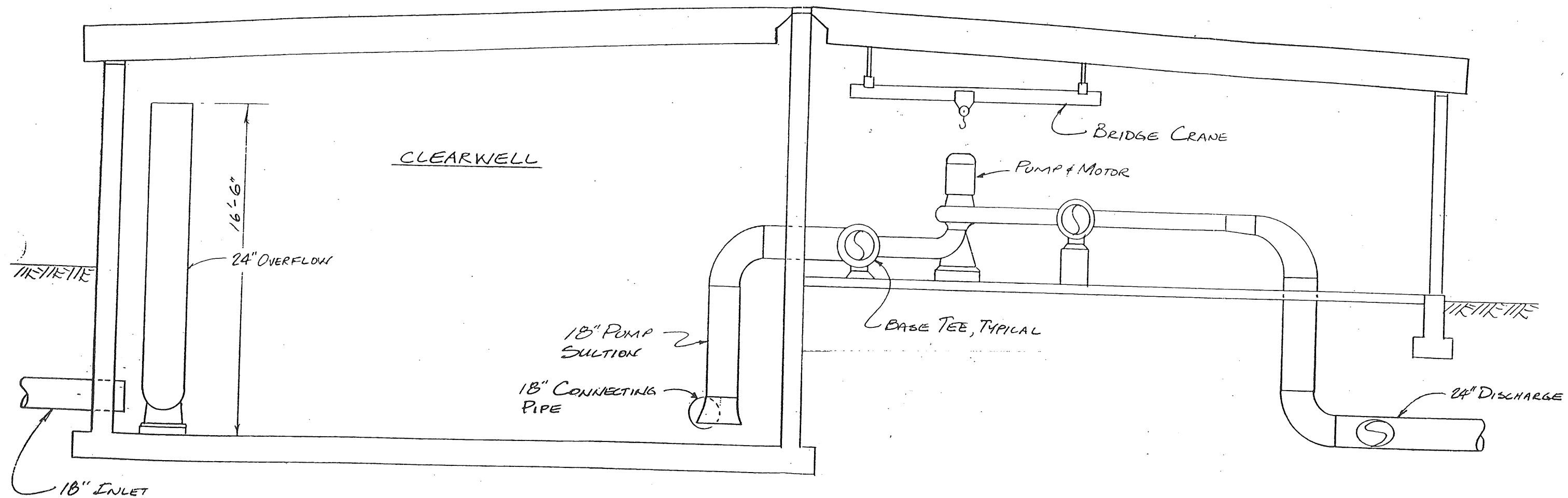
Water Use

The city's system complies with all regulatory standards. As an annual average, the system produces close to two and one-half million gallons per day. The highest production to date was more than eight million gallons in one day in 1998.





PLAN
1" = 8'



SECTION (A)

1"=5'

Chapter 4. Water Demands

Water Demands

This memo discusses water demands for the City of Boardman. Recent demand records are summarized for average and peak water production, and metered water use per individual customer class. Based on these records and growth projections for the community, water needs are estimated through year 2020.

Summary

Boardman's water system currently supplies about 840 million gallons of water per year to its customers. This equates to an average demand of slightly less than 2.5 million gallons per day. The highest daily production to date occurred in August 1998. The city supplied over 8 million gallons in one day, much of it going to the Port of Morrow because the Port's wells were off-line.

The city's water demands have grown by more than 20 percent per year during the past 5 years. During this same period, the population grew at a rate of 6.8 percent per year. Population growth accounted for part of the demand growth, but a large portion of the demand growth was a result of serving more water to the Port of Morrow and to Portland General Electric's co-generation plant.

Based on the only 2 years of available data, it appears that the city has experienced high unaccounted-for water rates. Unaccounted-for water describes the difference between production and metered consumption. Several factors contribute to unaccounted-for water, including meter inaccuracies, hydrant flushing or hydrant flows for fire fighting, unmetered customer use, unmetered public use (for schools, parks, other facilities) and water lost to leakage. This memo includes several recommendations for improving water accounting and reducing unaccounted-for water rates.

The combination of very high recent demand growth rates and high unaccounted-for water rates make it difficult to project future demands. Specific assumptions for residential and industrial growth are described in this memo; based on these, potential water needs through year 2020 have been estimated. It appears that the city's average day demand might grow to about 5 million gallons per day by year 2020, and that the maximum day demand might increase to almost 14 million gallons per day. These represent annual growth rates of about 4 percent.

Terminology

Demand is defined as the total quantity of water supplied (produced) for a given period to meet all system needs. Demand includes all consumption (residential, commercial, public, and industrial) plus unmetered uses (e.g., fire fighting, hydrant flushing, unmetered customer use, and water lost to leakage or evaporation).

Demand Terms

Average Day Demand (ADD): total volume of water delivered in a year divided by 365

Maximum Day Demand (MDD): maximum water delivered in any single day of a calendar year

Peak Hour Demand (PHD): highest hourly use hour during the MDD

The most common units for expressing these demands are million gallons per day (mgd). One mgd is equivalent to 1,000,000 gallons per day (gpd), 695 gallons per minute (gpm), or 1.55 cubic feet per second (cfs).

Totals for water use over longer periods, such as a month or year, are typically given in million gallons (mg).

Peaking factors describe the ratio of maximum day to average day use, or peak hour to maximum day use.

Unaccounted-for water refers to the difference between metered production and metered consumption. Unaccounted-for water includes unmetered customer use, unmetered hydrant use (for fire fighting or flushing), unmetered irrigation use (for some public areas) and water lost to leakage or evaporation. Meter inaccuracies often contribute to unaccounted-for water. Worn meters generally under-register flows. Meter inaccuracies may occur for both production and consumption flows.

Recorded Water Use

Average and Maximum Production Records

City staff provided records for water production from 1994 through 1998. The total production and highest day production were recorded for each month during this 5-year period. The data are summarized on an annual basis in Table 1. Figures 1 and 2 show the monthly average flows and the highest use day of each month for this period. The full set of data is shown in Table 2.

The 1998 average day demand (ADD) was 2.30 mgd (1,600 gpm). This is more than twice the ADD of 1.01 mgd experienced in 1994. The ADD growth rate averaged 23 percent per year from 1994 to 1998.

For maximum day demands (MDDs), the growth rate averaged 33 percent. The MDD increased from 2.58 mgd in 1994 to 8.09 mgd in 1998. City staff report that the 8.09 mgd demand was somewhat of an anomaly, and that the next highest daily demand was much lower. The ratio of MDD to ADD averaged 2.7 during these 5 years.

The growth rates of 23 percent for ADD and 33 percent for MDD are very high. To a large measure, new industrial demands were the cause of this growth. This is further explained in the following section on consumption records.

During this same period, the service population grew from 2,145 to 2,795, as shown in Figure 3. The population growth rate was about 6.8 percent.

Consumption Records

Table 3 lists records for metered water use (consumption) for 1993, 1996, and 1998. The top portion of the table lists all customer classes, and the bottom portion summarizes water consumption in general categories (residential, commercial, public and industrial)

A review of the lower portion of the table identifies significant changes in water consumption patterns among the general customer categories. Commercial use totaled 82 million gallons (mg) in 1993, but dropped to 28 mg in 1996 and 22 mg in 1998. As a percentage of total consumption, commercial use dropped from 26 percent to 5 percent.

Public use (schools, parks) also dropped from 1993 to 1998. It totaled 82 mg in 1993, and was only 22 mg in 1998.

Industrial use grew dramatically from 1993 to 1998. In 1993, it was 4 mg. Industrial use was 224 mg in 1996 and 228 mg in 1998. As a percentage of total consumption, industrial use grew from 1 percent in 1993 to 54 percent in 1998.

Residential use was 155 mg in 1993, dropped to 115 mg in 1996, and increased to 157 mg in 1998.

Unaccounted-for Water

Table 4 compares production to consumption. The difference between the two values is unaccounted-for water. The unaccounted-for water rate for 1996 was 43 percent, and for 1998 was 50 percent. These were the only 2 years with records of both production and consumption.

Discussion of Demand Records

Boardman's demand records indicate (a) the city has experienced an unusually high rate of water demand growth, and (b) the city has a high unaccounted-for water rate.

The demand growth from 1993 to 1998 is primarily related to a very large increase in industrial water use, as shown in Table 3. In 1993, sales of water to the Port of Morrow and the Portland General Electric (PGE) Coyote Springs Co-Generation facility were minimal. By 1996, the city was supplying up to 500 gpm (0.72 mgd) to PGE's facility, and was under contract to supply up to 500 gpm (0.72 mgd) to the Port of Morrow. Neither the Port of Morrow or PGE used 500 gpm continuously throughout the year, but their combined use was most of the 228 mg industrial total for 1998. An annual total of 228 mg represents a daily average use of 620,000 gpd (433 gpm).

The high water use by the Port of Morrow and PGE account for both the growing ADD and the growing MDD. The city's system provides critical redundancy for the Port's own water system, as well as supplementing it on a daily basis. The Port relies on the city to meet its supply needs when it has one or more wells off line for maintenance. This condition resulted in the city's MDD of 8.09 mgd in 1998. On this day in August, the Port's entire supply system was down for an extended period, and the city provided about 4 mgd to the Port.

The city's unaccounted-for water rates of 43 percent in 1996 and 50 percent in 1998 are a concern. Rates for comparable cities range from 5 to 50 percent, but rates of 15 to 20 percent

are typical, and many cities target a maximum level of 10 percent. The city's rates appear to be much higher than desirable.

City staff noted the following points with respect to unaccounted-for water rates:

1. The master production meter is a 10-inch turbine meter that was installed in 1976. Partly because of the design of the installation, the city has not been able to test the meter since it was installed. It is very possible that this meter contributes significant inaccuracy to the measurement of production values. It is not uncommon for a meter of this age to under- or over-read by 20 percent.
2. The city has not made customer meter change-out a high priority. There are probably many services with inaccurate meters. Residential meters typically under-register as they become worn. This would account for some of the unaccounted-for water.
3. The city still has some unmetered customer accounts. While the city has reduced this number, there are still some services as large as 4-inch that are unmetered. These services could contribute significantly to unaccounted-for water rates.
4. The city performed a leak survey for about one-half the distribution system in 1991, and found only two relatively small leaks that were subsequently repaired. Based on this experience, City staff does not believe that leakage is contributing significantly to the unaccounted-for water rate.

Another factor is that only 2 years of data were available. A longer period of record would be helpful, both in confirming the numbers and in determining if there has been an increasing or decreasing trend.

Unaccounted-for water rates of 43 and 50 percent are a concern that needs to receive a high priority from the city. The high rates bring into question the demand records presented in this memo, and the demand projections developed from them. The high unaccounted-for water rates may also represent significant revenue that the city is not collecting. Accurate water accounting is critical, because it allows the city to track unmetered use, unmetered customer accounts, leakage, and to plan for future improvements. In addition, the Water Resources Department may require reductions in unaccounted-for water rates before approving extensions to water right permits or before certificating developed permits.

We recommend the following steps to improve water accounting and, ultimately, to reduce unaccounted-for water rates:

1. The expansion and improvements to the water plant should include replacement of the production meter with a new flow meter, and the installation should allow for future calibration.
2. Daily and monthly flows should be monitored and recorded. These values should be input into a spreadsheet for future use. When the master meter is replaced and other control changes are made at the water plant, the improvements should include a control system that can automatically monitor and record these values. Peak hourly flows should also be monitored, to provide information for pump and reservoir sizing.

3. Modifications should be made to the city's billing software so that the monthly consumption records can be directly compared to the monthly production records.
4. The city should commit staff time to investigate all customer connections. Meters should be inventoried by type and date. Meters should be installed at all unmetered connections. A prioritized list should be developed for replacing or calibrating meters, with a high priority on large meters. Consumption values should be compared to meter sizes to determine if there are significant discrepancies between meter size and typical flows. Where flows are consistently below 15 to 25 percent of the maximum for a given size meter, the meter should either be replaced with a smaller meter, or a smaller parallel meter should be installed.
5. Install meters and track all public water use, even though these accounts may not be billed. This will include tracking water use for schools, parks, wastewater plant, water plant, and City Hall.
6. Keep a running tally of water use estimates for hydrant flushing and fire flow uses, as well as other uses that cannot be metered.
7. A full-system leak survey should be contracted. Although the results from the last survey did not show major problems with leakage, it has now been several years since the last survey and it did not cover the entire system. For a relatively small investment, the city will obtain very useful information regarding the condition of the entire distribution system.
8. The city should summarize ADD, MDD, and peak hour flows for each year, and determine the unaccounted-for water rate. Water use by customer class should also be investigated to determine if there are significant trends or other changes that may affect future system performance.

Water Demand Projections

Boardman's water demands are expected to grow because of population growth and new industrial demands.

Figure 3 presents both historical population values and projected City populations. The growth between 1990 (1,348) and 1998 (2,795) was at a rate of 9.5 percent per year. The city added to its population at an average of 181 persons per year.

The top projection line on Figure 3 demonstrates the impact that a continued 9.5 percent growth rate would have on the city's population. The lower three lines show a continued linear addition of 181 persons per year, and growth rates of 2.6 percent and 3.0 percent. The rates of 2.6 and 3.0 percent were recently developed for the wastewater master plan, based on the city's comprehensive plan. A growth rate between 2.6 and 3.0 percent is considered as the likely rate.

As shown in Table 3, residential use was 30 percent of total use in 1996 and 37 percent in 1998. That portion of the total water demand is expected to grow by approximately the same rate as the population growth. This assumes that per capita water use remains constant.

Since the city has implemented a number of conservation measures during recent years, it is unlikely that per capita use will decrease significantly in coming years.

In addition to residential growth within Boardman, it is possible that the city's system will become a supplier for regional residential needs. The City of Irrigon currently relies on deep wells for its water supply. The static water level is showing long-term decline, and it is possible that Boardman will need to supplement Irrigon's supply in the future. There are also a number of privately owned wells for residential use near Boardman that are experiencing elevated nitrate levels. If nitrate levels continue to climb, it may be the city's role to supply users outside of the city.

Industrial demand growth is difficult to predict. Several factors suggest that industrial demand growth will continue over the next 20 years:

1. It was announced in July 1999 that Tillamook County Creamery Association will build a new cheese and whey plant in Boardman. The water needs of this plant are unknown, but conceivably could be significant.
2. The city has an agreement with the Port of Morrow that the city will supply up to 1,000 gpm to the Port once a second collector is installed. This is an increase from the current agreement of supplying up to 500 gpm.
3. The city has an agreement to supply up to 2,000 gpm to PGE for the Coyote Springs Co-Generation facility, when the facility is expanded to its buildout capacity. The city currently supplies up to 500 gpm to PGE. The timing for buildout of this facility is unknown.
4. Several other new industries have expressed interest in obtaining their water supply from the City of Boardman. These include a potato processor that may have water needs in the range of 1,500 gpm. Other new industries that are seriously considering locating in Boardman include an ethanol plant and a cold storage facility.
5. A major outlet mall has been proposed for a location in Boardman. This might exert commercial water demands in the range of 40 to 200 gpm.

Summary of Demand Projections

Table 5 presents a summary of possible demand growth in Boardman. The same information is displayed graphically in Figure 4. These projections assume:

1. An ADD residential demand growth of 3.0 percent to year 2020.
2. An increased ADD demand of 200 gpm to the Port of Morrow, occurring in 2002.
3. An increased ADD demand of 600 gpm to PGE, occurring in three 200 gpm increments (occurring in years 2005, 2010, and 2015).
4. An ADD increase of 50 gpm for the Tillamook cheese factory in 2001 (demand value needs confirmation).
5. Additional ADD industrial increases of 50 gpm every 2 years beginning in 2006.

6. New ADD to outside City users (individual well users and/or Irrigon) of 20 gpm every 2 years, beginning in 2008.

To project MDDs, the MDD to ADD ratio of 2.7 is used. This is the average ratio for 1993 to 1998, as shown in Table 2. There is some risk that the MDD will exceed the value calculated using this ratio because of emergency supply needs at the Port. This occurred in 1998. However, the ratio of 2.7 will provide a reasonable estimate of peak demands.

It is further assumed that most of the unaccounted-for water is true demand, and not water lost to leakage. Reducing the level of unaccounted-for water will improve the understanding of water use within Boardman and will improve revenue collection (as customers are billed their full amounts), but it will not reduce demands. This is a significant assumption. It will need to be verified as a clearer understanding of the unaccounted-for water is developed.] X

There is a high degree of uncertainty with these projections, primarily because of the uncertainty of future industrial needs, but they do show a reasonable scenario of demand growth in Boardman. Based on these assumptions, Boardman's ADD will increase from 2.30 mgd in 1998 to 5.09 mgd in year 2020. This represents a demand growth of 3.7 percent per year.

Using the MDD to ADD ratio of 2.7, the MDD is projected to grow to 13.75 mgd in year 2020. Supply systems are designed to meet the maximum day demand. Boardman's current supply capacity is approximately 6,000 gpm or 8.6 mgd. To meet these projected demands, an additional 5.2 mgd will be required. Based on the best available information, it appears that the city should plan to supply a MDD of at least 13.75 mgd by year 2020.

It is important that the city tracks actual ADD and MDD each year, and compares those values to these projections. The capital improvements plan will be based in part on these demand projections. By comparing actual rates to the projections, the city can determine if implementation of the capital improvements plan should be accelerated or decelerated.

TABLE 1
City of Boardman
Annual Water Production Records

Year	Annual Average Demand (mgd)	Maximum Day Demand (mgd)	Ratio, Max to Avg.
1994	1.01	2.58	2.5
1995	0.92	2.58	2.8
1996	1.83	4.29	2.3
1997	2.22	5.17	2.3
1998	2.30	8.09	3.5
Average			2.7
Annual growth rate, 1994-1998	23%	33%	

TABLE 4
Unaccounted-for Water

Year	Total Production (mg)	Total Consumption (mg)	Unaccounted-for Water (mg)	Unaccounted-for Water (% of production)
1996	670	384	286	43%
1998	838	422	416	50%

TABLE 2
Water Production Data

Year	Month	Total (mg)	Average (mg)	Maximum day in month (mgd)
1994	Jan	12.73	0.41	0.54
	Feb	9.99	0.36	0.54
	Mar	19.02	0.61	1.10
	Apr	32.43	1.08	1.54
	May	36.97	1.19	1.59
	Jun	44.93	1.50	1.97
	Jul	57.43	1.85	2.58
	Aug	57.85	1.87	2.45
	Sep	44.47	1.48	1.96
	Oct	28.38	0.92	1.34
	Nov	12.82	0.43	0.55
	Dec	13.07	0.42	0.52
1995	Jan	14.71	0.47	0.64
	Feb	12.21	0.44	0.44
	Mar	14.82	0.48	0.89
	Apr	27.50	0.92	1.31
	May	35.94	1.16	1.66
	Jun	43.45	1.45	2.13
	Jul	52.23	1.68	2.58
	Aug	53.17	1.72	2.12
	Sep	41.82	1.39	1.83
	Oct	20.85	0.67	0.98
	Nov	9.79	0.33	0.44
	Dec	9.35	0.30	0.38
1996	Jan	26.45	0.85	1.52
	Feb	29.97	1.07	1.47
	Mar	28.50	0.92	1.27
	Apr	42.35	1.41	1.94
	May	50.51	1.63	2.32
	Jun	62.23	2.07	3.04
	Jul	98.80	3.19	4.29
	Aug	98.89	3.19	3.96
	Sep	77.87	2.60	3.41
	Oct	66.67	2.15	2.81
	Nov	49.54	1.65	2.18
	Dec	36.37	1.17	2.04
1997	Jan	40.40	1.30	2.34
	Feb	42.59	1.52	3.86
	Mar	34.36	1.11	3.94
	Apr	42.46	1.42	1.95
	May	64.47	2.08	2.56
	Jun	74.56	2.49	3.72
	Jul	82.82	2.67	3.66
	Aug	135.85	4.38	5.17
	Sep	95.87	3.20	4.03
	Oct	72.02	2.32	3.14

	Nov	74.31	2.48	3.12
	Dec	50.54	1.63	2.74
1998	Jan	49.23	1.59	2.74
	Feb	44.45	1.59	1.74
	Mar	52.71	1.70	2.17
	Apr	74.42	2.48	3.94
	May	75.62	2.44	5.19
	Jun	78.61	2.62	3.84
	Jul	119.25	3.85	4.80
	Aug	117.33	3.78	6.02
	Sep	78.34	2.61	3.87
	Oct	68.56	2.21	8.09
	Nov	43.82	1.46	1.81
	Dec	35.37	1.14	1.78
1999	Jan	45.81	1.48	2.26
	Feb	35.87	1.28	2.06
	Mar	41.03	1.32	1.82

Figure 1
Average Demand by Month

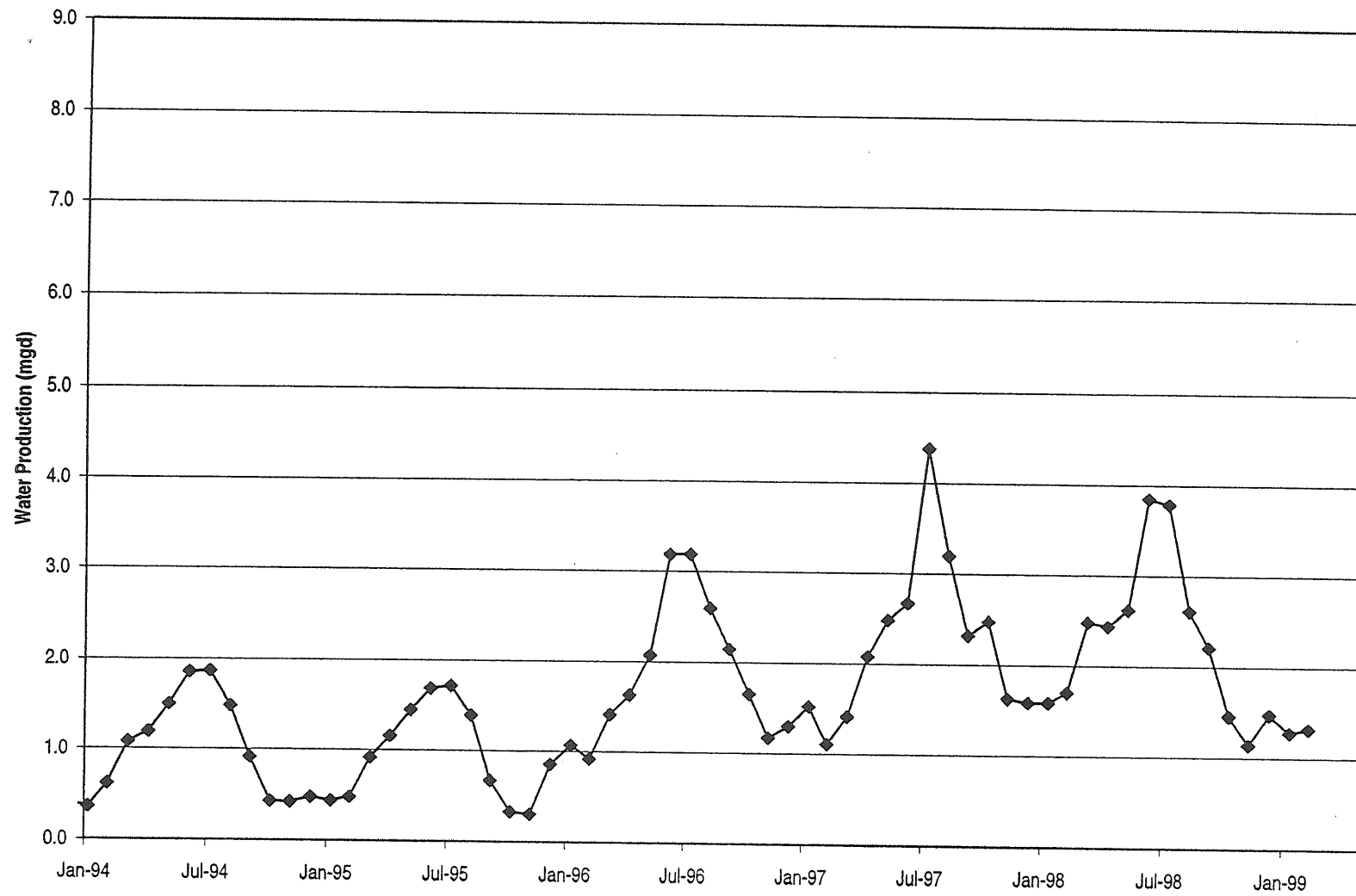


Figure 2
Maximum Day by Month

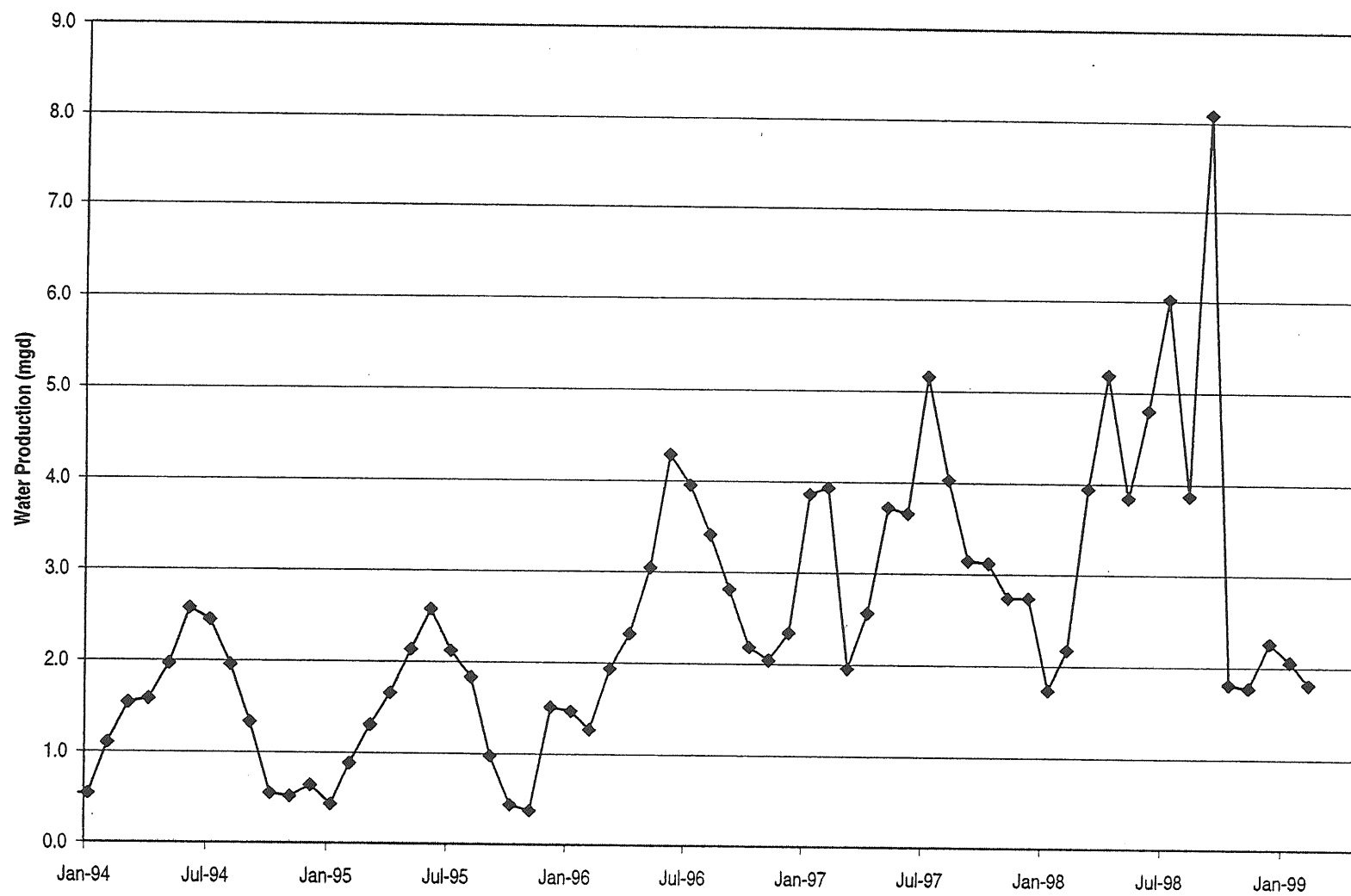


TABLE 3
Water Consumption Records

A. All Customer Classes

Description	Class No.	1993			1996			1998		
		No. of Connections	Total Use (mg)	% of total use	No. of Connections	Total Use (mg)	% of total use	No. of Connections	Total Use (mg)	% of total use
Residential	1	206	48.358	15.0%	247	45.028	11.7%	287	64.870	15.4%
Mobile Home	2	118	22.237	6.9%	152	22.021	5.7%	165	26.204	6.2%
Additional meter	3	2	0.880	0.3%	12	4.089	1.1%	17	5.723	1.4%
Multi-unit residential	4	36	80.675	24.9%	60	18.544	4.8%	60	22.481	5.3%
Outside city limits	5	1	0.113	0.0%	1	0.168	0.0%	2	0.358	0.1%
Trailer park	6	4	2.539	0.8%	5	25.399	6.6%	5	37.060	8.8%
Industrial	7	0	0.000	0.0%	0	0.000	0.0%	0	0.000	0.0%
Tank users	8	0	0.000	0.0%	0	0.000	0.0%	0	0.000	0.0%
	9									
Port industrial	10	1	3.776	1.2%	3	223.689	58.2%	2	227.932	54.0%
Motels	11	4	3.941	1.2%	4	2.677	0.7%	4	3.307	0.8%
Gas stations	12	6	1.767	0.5%	5	1.307	0.3%	4	1.687	0.4%
Food service	13	4	64.614	20.0%	4	5.743	1.5%	4	3.199	0.8%
Other commercial	14	20	12.209	3.8%	22	7.203	1.9%	24	6.927	1.6%
Public facilities (schools, etc.)	15	15	82.333	25.5%	15	28.245	7.4%	15	22.151	5.2%
	16									
	0							1	0.150	0.0%
TOTALS		417	323.442	100.0%	530	384.113	100.0%	590	422.049	100.0%

B. Summary by General Category

Description	Customer Class	1993			1996			1998		
		No. of Connections	Total Use (mg)	% of total use	No. of Connections	Total Use (mg)	% of total use	No. of Connections	Total Use (mg)	% of total use
Residential	1,2,3,4,5,6	367	154.802	47.9%	477	115.249	30.0%	536	156.696	37.1%
Commercial	11,12,13,14	34	82.531	25.5%	35	16.93	4.4%	36	15.12	3.6%
Public	15	15	82.333	25.5%	15	28.245	7.4%	15	22.151	5.2%
Industrial	7,10	1	3.776	1.2%	3	223.689	58.2%	2	227.932	54.0%
TOTALS		417	323.442	100.0%	530	384.113	100.0%	589	421.899	100.0%

TABLE 5

Water Demand Projections for Boardman

Year	Average Day Demand (mgd)	Maximum Day Demand (mgd)	Notes
1998	2.30	6.20	ADD of 2.30 is actual value for 1998. MDD set equal to 2.7 times ADD.
1999	2.74	7.41	Residential growth of 3% annually on base use of 157 mg in 1998
2000	2.76	7.44	
2001	2.84	7.67	Add Tillamook cheese factory ADD of 50 gpm
2002	3.14	8.49	Add Port of Morrow ADD of 200 gpm
2003	3.16	8.53	
2004	3.17	8.57	
2005	3.48	9.39	Add PGE ADD of 200 gpm
2006	3.56	9.63	Add ADD of 50 gpm for other industrial growth
2007	3.58	9.67	
2008	3.70	9.98	Add outside users ADD of 20 gpm; Add 50 gpm industrial
2009	3.72	10.03	
2010	4.12	11.13	Add PGE ADD of 200 gpm + 50 gpm industrial + 20 gpm outside users
2011	4.14	11.18	
2012	4.26	11.50	Add 50 gpm industrial + 20 gpm outside users
2013	4.28	11.56	
2014	4.40	11.88	Add 50 gpm industrial + 20 gpm outside users
2015	4.71	12.72	Add PGE ADD of 200 gpm
2016	4.83	13.05	Add 50 gpm industrial + 20 gpm outside users
2017	4.85	13.11	
2018	4.98	13.44	Add 50 gpm industrial + 20 gpm outside users
2019	5.00	13.50	
2020	5.12	13.84	Add 50 gpm industrial + 20 gpm outside users

Figure 3
Boardman Population, Actual and Projected

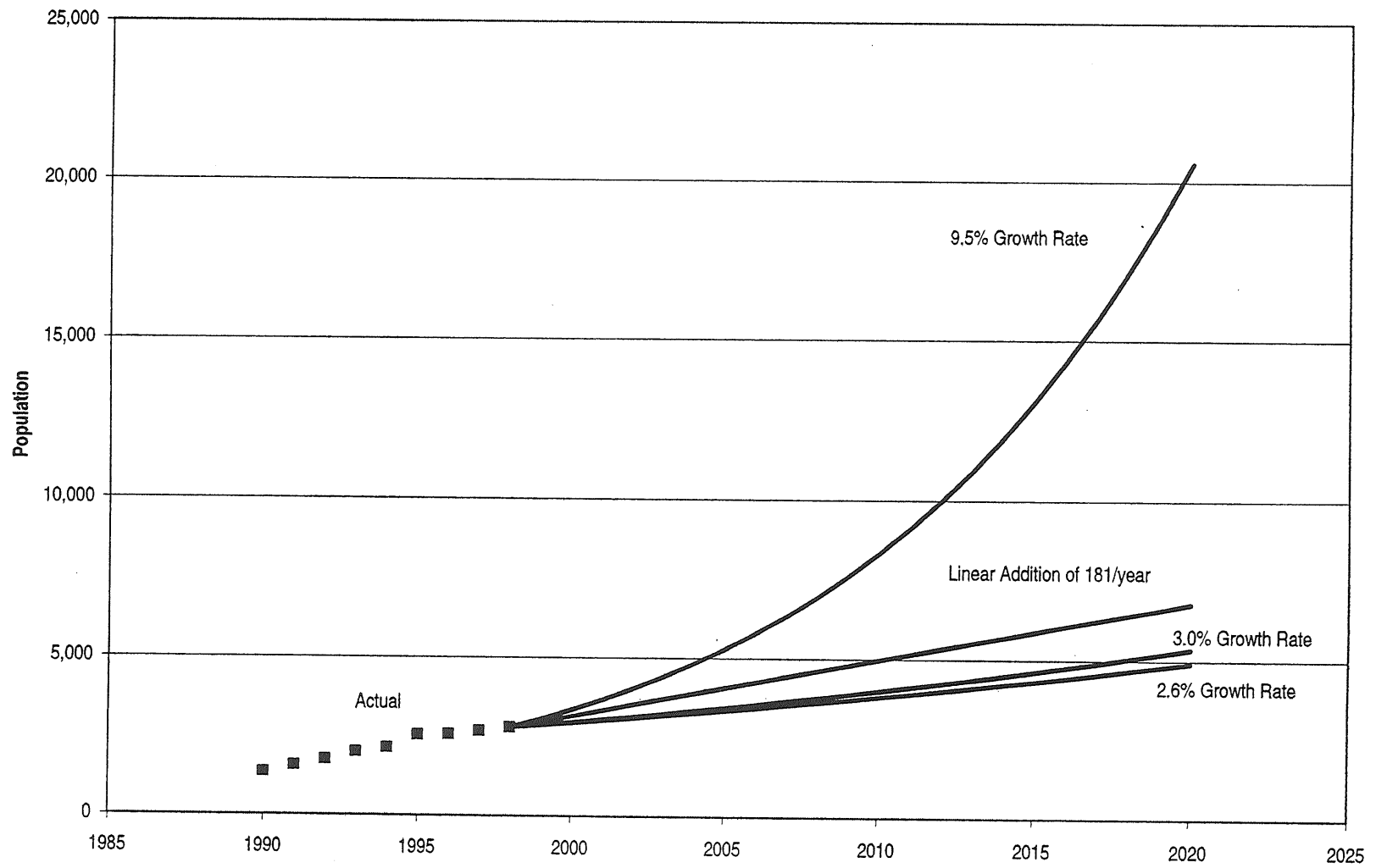
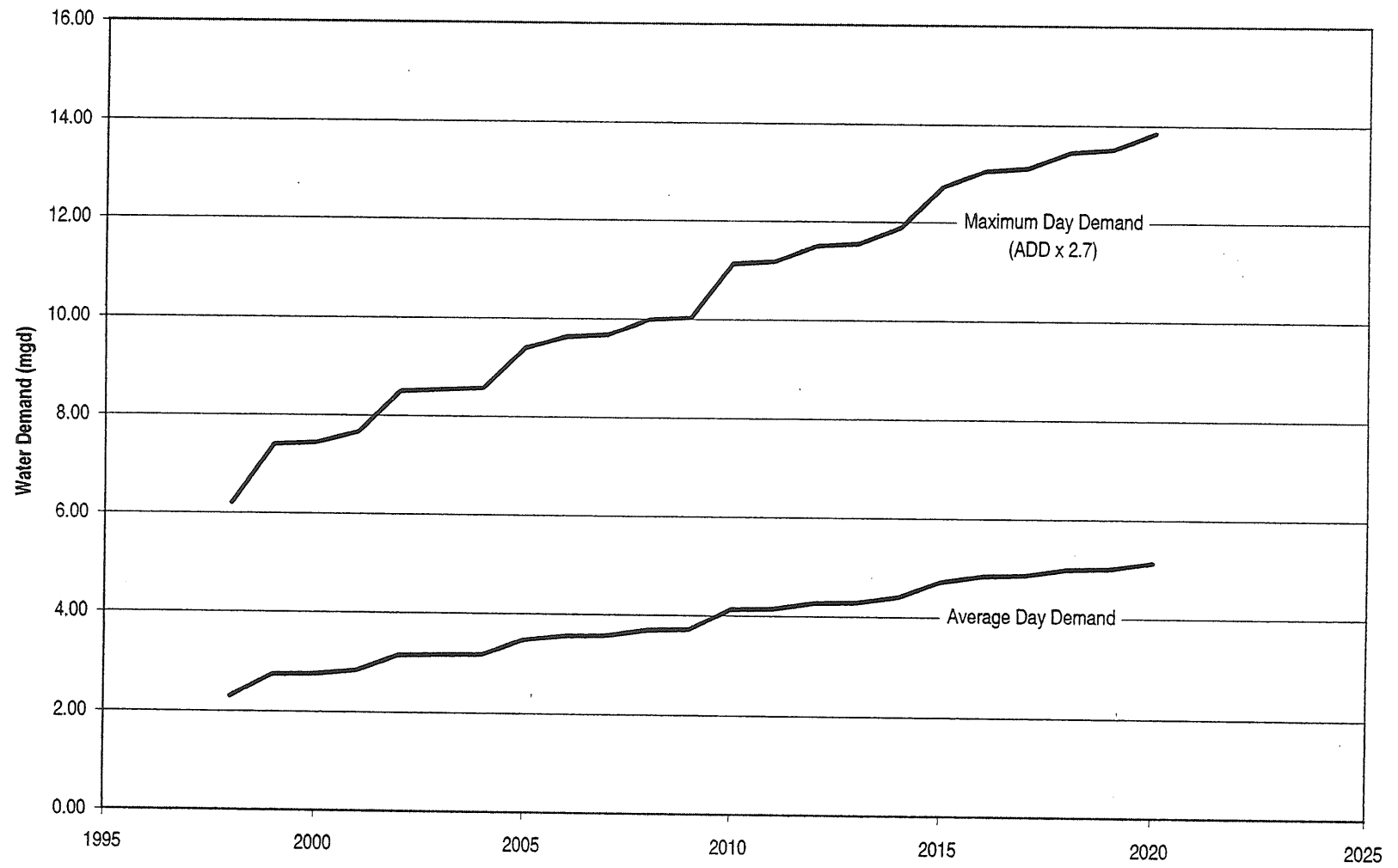


Figure 4
Water Demand Projections



Chapter 5. Supply Alternatives

CHAPTER 5

Supply Alternatives

This chapter reviews supply alternatives and presents a recommended plan for developing new supply.

Summary

The city is faced with the need to increase its water supply to keep pace with growing demands. Based on the demand projections presented in Chapter 4, additional supply should be on-line by year 2004.

The most favorable long-term supply alternative for Boardman appears to be the installation of a second collector well. The city's existing collector well has provided a reliable and economic water supply to the city since 1976. It is expected that a second collector will perform similarly. The two primary uncertainties with a new collector relate to treatment requirements and negative impacts from a lowering of the John Day pool. The water quality from a new collector cannot be determined until after it is installed. The level of required treatment will depend on tests made after completion. Lowering of the river pool will reduce yield and result in a need for higher levels of treatment.

Conservation merits an important place in the city's water supply planning. The costs and benefits of conservation will be explored when the city prepares a Water Management Plan.

Description of Current Supply

The city currently has two water supplies, although only one is used on an ongoing basis.

The primary supply is a Ranney collector well located alongside the Columbia River. It has a current pump capacity of 6,030 gpm. The Oregon Health Division classifies water from this collector as groundwater for the purposes of determining treatment requirements. This is the highest quality rating possible, and means that chlorination-only treatment is the only treatment requirement.

The secondary supply is a 532-foot-deep well located near City Hall. Its capacity is 800 gpm. The water from this well has high levels of hydrogen sulfide, and is generally considered unacceptable by customers.

Water Rights

The City of Boardman holds a permit with a priority date of September 22, 1975, for withdrawal of up to 36 cubic feet per second (cfs) from the Columbia River. This is equal to 23.3 million gallons per day (mgd) or 16,100 gallons per minute (gpm).

With regards to water rights, both current and future collectors are considered by the Water Resources Department to be drawing surface water from the Columbia River. The Oregon Health Division regards the water from the existing collector to be groundwater, but this delineation is based on water quality factors and has no bearing on water rights.

The existing water right permit divides the total withdrawal among the three collector sites, the existing site, and proposed sites No. 2 and 3. Site No. 3 has been recommended for the location of the next collector. The permit assigns a withdrawal maximum of 6,600 gpm to site No. 1, 4,100 gpm to site No. 2, and 5,400 gpm to site No. 3. Although the permit is written in this manner, it is likely that the Water Resources Department will allow a point of diversion transfer so that the remaining permit amount of 10,070 gpm (16,100 gpm – 6,030 gpm) can be withdrawn from site No. 3. (Note that because of the Endangered Species Act or other factors, the city may not be allowed the entire remaining 10,070 gpm. However, such limitation, if imposed, is not expected based on a transfer of point of diversion.)

Once the new collector and other improvements are completed, we recommend that the city submit a final proof survey to the Water Resources Department to certificate the maximum amount possible of the permit. Historically, the department has provided extensions for municipal permits. Primarily because of Endangered Species Act issues, it is more questionable that the department will automatically extend the full amount of municipal permits.

The city also holds a groundwater right for the existing deep well. This right is held as a certificate or permanent right, and is for 500 gpm. The well is used only for emergency purposes, because water from the well is high in hydrogen sulfide and is therefore objectionable to customers.

Supply Needs

Water demands were projected in Chapter 4. Figure 1 shows the projected maximum day demand (MDD) for Boardman. The projected 1999 MDD is 7.4 mgd (5,140 gpm). It is projected to rise to 13.8 mgd (9,610 gpm) in year 2020. Refer to Chapter 4 for background on how the MDD was projected.

Maximum day demand represents the highest water use in a 24-hour period in a calendar year. Supply and treatment systems are typically designed to meet the MDD, plus some additional amount to account for growth and yearly fluctuations in demands. In Boardman's case, since the system has very limited finished water storage, it is critical that the system be capable of supplying the MDD. If it cannot supply this amount, system pressures will quickly drop.

Figure 1 shows the current supply of 6,030 gpm (8.7 mgd) superimposed on the projected MDD curve. This indicates that the city has a 1999 surplus of 1.3 mgd (8.7 mgd – 7.4 mgd = 1.3 mgd). According to the values shown in Figure 1, the city's supply and demand will be nearly equal beginning in year 2002, and the demand will exceed the supply beginning in year 2004. Additional supply is needed by year 2002 to ensure that the city's system can continue to meet customer demands.

Since actual demands vary from the projected MDD, the city may require the source increase earlier or later than illustrated in Figure 1. Factors influencing MDD include population growth, industrial demands (new industries or changes in industrial water use), conservation practices, and weather patterns. A particularly hot and dry summer can result in higher than expected demands.

Description of Alternatives

After consultation with city staff, the following list of potential supply alternatives was developed. One or more of these alternatives should be implemented by year 2002 to meet projected demands.

1. Install a new Ranney collector well. This alternative consists of adding a new collector well, similar to the existing well. The preferred site is No. 3 (CH2M HILL, May 26, 1999). The yield from this source is expected to equal or exceed the yield from the existing collector, which is 6,030 gpm. A new collector may produce up to 10,000 gpm.

It is desirable that the water quality also match that of collector well No. 1. For purposes of treatment requirements, the Oregon Health Division classifies water from the existing collector as groundwater. Chlorination-only treatment is acceptable for a groundwater source. The water from a new collector may or may not match this quality. There is a possibility that the water from a new collector will be classified as groundwater under the direct influence of surface water. The outcome of such classification would be that a high level of disinfection is needed, or that filtration plus a high level of disinfection is needed.

The quality of water from a new collector will not be known until after the collector is constructed and pumped for a period. Until then, the city will not be assured that the treatment requirement will only be chlorination. The installation of a new collector has the inherent risk that future treatment requirements will exceed the current requirement of chlorination only.

A critical factor that will influence the performance of the collectors (both new and existing) is the Columbia River pool level. The elevation of the Columbia River by Boardman is controlled by the John Day Dam, and is referred to as the John Day pool. A lowering of the John Day pool is being considered to improve conditions for salmon by expediting downstream fish migration.

A lower John Day pool may affect collector yield and water quality. A 1995 study prepared for the Corps of Engineers concluded that a John Day pool drawdown of 8 feet or less (from a normal operating level of 265 feet to 257 feet) will allow the collector to retain its yield but would likely affect water quality (CH2M HILL, John Day Pool Drawdown/Water Supply Mitigation Study for the City of Boardman Ranney Collector, December 1995). Improvements to the pumping system would be needed at the lower pool to retain the yield.

A further lowering of the pool would almost certainly reduce available yield and result

in significant water quality degradation. The poorer water quality might necessitate a higher level of chlorination or the addition of filtration.

2. Use existing deep well. The existing well may be usable if treatment is added to produce an acceptable water quality. Treatment might consist of aeration or aeration plus chemical oxidation. Treatment facilities will need to be constructed near the well, or a dedicated pipeline installed to the point where the treatment is provided. Repumping following treatment will probably be needed.

Continuous use of the deep well may result in declining groundwater levels. There are groundwater use restrictions in place by the Water Resources Department in areas to the south and east of Boardman, and lowering of this aquifer may result from long-term use of the well. The existing Ranney collector was installed in 1976 because the groundwater level appeared to be dropping. However, the groundwater level measurement records are incomplete and it is uncertain how the long-term use of this well would affect levels. Further geotechnical evaluation is warranted before implementing this alternative.

Additional water quality testing will also be required prior to bringing this well on line. Monitoring has not been performed for newly regulated contaminants.

3. Purchase water from the Port of Morrow. The neighboring Port of Morrow operates a water system to supply a number of industrial customers. Currently, the city is under contract to be a supplier of water to the Port, so the likelihood of having the Port supply water to the city is considered low. This is particularly the case because the Port's wells and distribution system are designed to serve industrial customers. The system may not meet minimum standards for a municipal system.

The Port issued a Water Management Plan in January 1993. It projected a water demand increase for the Port of 17,900 gpm from 1993 to 2003. The plan indicated that the Port would continue to rely on Boardman for at least 500 gpm of supply. Five new well sites were identified in the plan, but these were projected to leave the Port with a deficit of 6,300 gpm in year 2003. Therefore, it is likely that the Port will look to the City of Boardman for additional water supply in coming years. The needs of the Port were factored into the demand projections made in Chapter 4.

4. Implement an aquifer storage and recovery (ASR) program. An ASR program might consist of withdrawing excess water from the collector during winter months, injecting water in the underground aquifer through the existing well or new wells, and extracting the stored water for use in the summer months when demands are high. The suitability of the aquifer underlying the city for ASR is unknown. This alternative will require further evaluation before its feasibility is known. ASR may not avoid the eventual need for a second collector, but it may delay the need for it by many years.
5. Direct surface water intake on the Columbia River. A direct surface intake on the Columbia, similar to Potlatch Corporation's intake upstream of the city, is an alternative to a Ranney collector. However, it requires a deep section of the river near the shoreline, and no such site adjacent to the city's urban growth boundary has been identified. In addition, it is certain that direct surface withdrawal will mean that full filtration and disinfection treatment is required to meet drinking water standards. The cost of full

treatment would exceed any potential water intake cost advantages, even if a suitable site were available. Therefore, this is not a recommended alternative from a cost standpoint.

6. Increased conservation measures. Conservation measures will enable the current supply to continue to meet the city's needs for a longer duration. Conservation programs include supply side and demand side measures. Supply side measures are those implemented by the city to minimize losses and to better manage the resource. Demand side conservation is related to customer water use practices. Aggressive conservation programs have reduced long-term water use up to 20 percent, although such a reduction requires a large commitment of staff time and resources. A more moderate—but still serious—program might achieve 10 percent long-term reductions in Boardman.

The city Public Works Department has been engaged in public education programs for several years. These programs are an important cornerstone of water conservation. Additional measures (some of which have also been implemented by the city in past years) include leak detection and repair, industrial water audits, rate-based incentives, fixture replacement programs to install low-water using fixtures, and building code revisions to ensure water efficient new construction. These measures, including their likely costs and impacts on water use, should be further examined in a Water Management Plan.

For illustration purposes, a 10-percent reduction in the MDD is shown in Figure 2. This reduction delays the date when demands exceed present capacity by about 4 years. In this figure, the 10 percent reduction in per capita use is shown to be achieved in the first year. In reality, an aggressive conservation program must be implemented over time. It may take several years to achieve the additional 10 percent reduction in water use.

Comparison of Alternatives

The supply alternatives presented above were discussed during a workshop with city staff.

The following alternatives were determined not to be feasible based on cost, ability to satisfy short-term or long-term demands, or other factors: use of the existing deep well, purchasing from the Port of Morrow, and installing a direct river intake with filtration.

The three most favorable alternatives are conservation, installing a second collector, and implementing an ASR program.

Conservation will be further evaluated when the city prepares a Water Management Plan. Although conservation may delay the need for an additional source capacity, conservation cannot replace the eventual need for additional source capacity. However, conservation should be seen as an important component of the city's supply planning.

Although ASR provides an alternative supply approach, there are a number of questions to answer before this can be considered a viable alternative for the city. The feasibility of using ASR in the Boardman vicinity is unknown. The feasibility will need to be determined through a pilot test program, lasting 2 years or more. The pilot program would help answer questions about the number of wells that are needed, the amount of water that can be

stored, and the cost of the program. One concern in particular is whether the alluvial aquifer overlaying the shallow basalt aquifer is leaking downward into the basalt. Because of these questions and the time required to determine the feasibility of ASR, the city has elected not to investigate ASR at this time. ASR may provide a future means to maximize the value of the new and existing collectors by increased withdrawals during the winter months, and decreased withdrawals in the summer.

From the options presented, the city has chosen to construct a second collector. This fits with the city's present water right permit, will meet long-term needs, and represents a continuation of using a source that has effectively met the city's needs for more than 20 years. There are two primary uncertainties associated with a new collector. One relates to water quality, since it is possible that more stringent treatment will be required for water from the new collector. The second uncertainty relates to both yield and water quality, if the John Day pool is drawn down for fish passage. A pool drawdown will impact both the existing and new collectors.

Figure 1
Water Supply Need

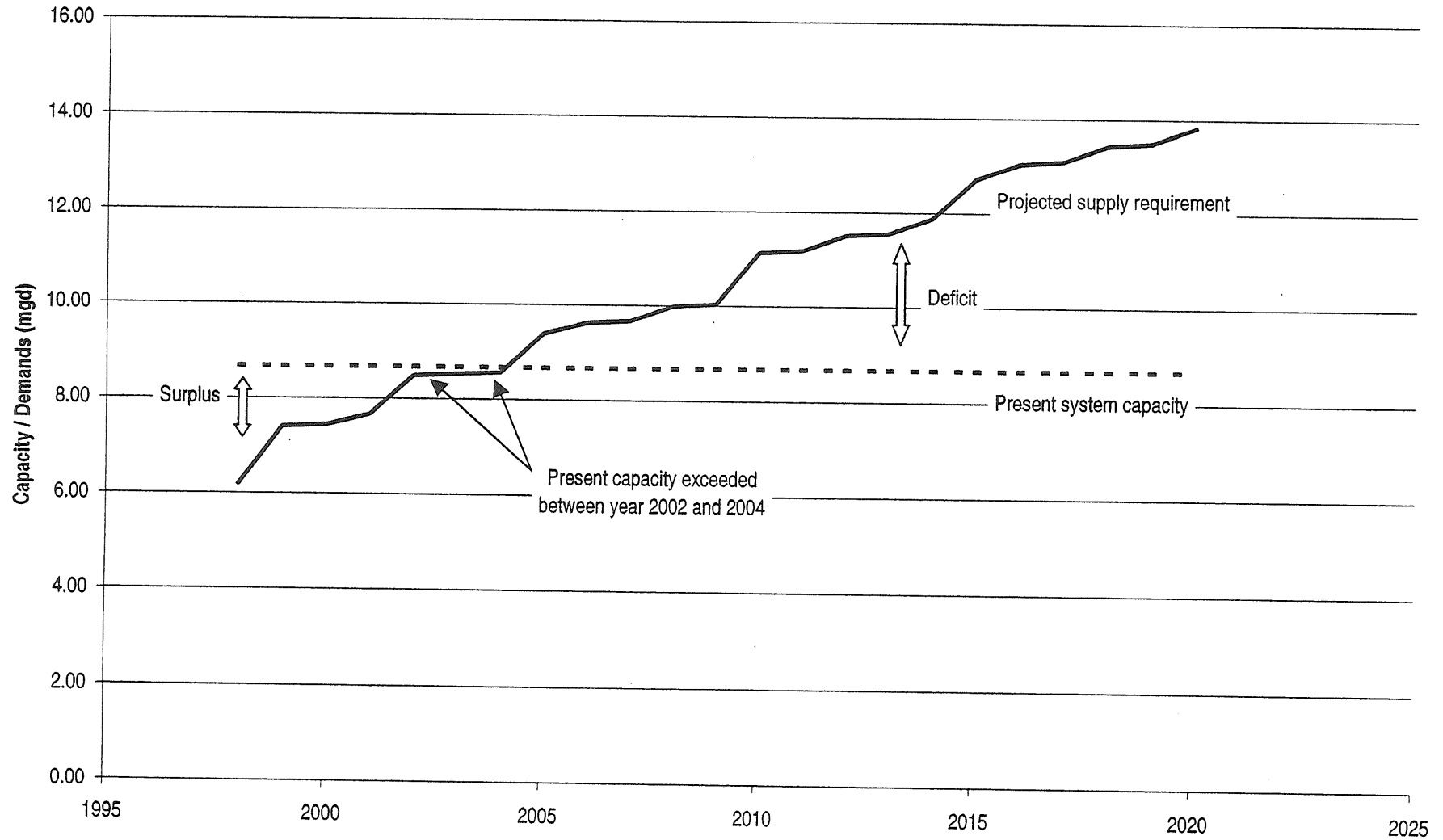
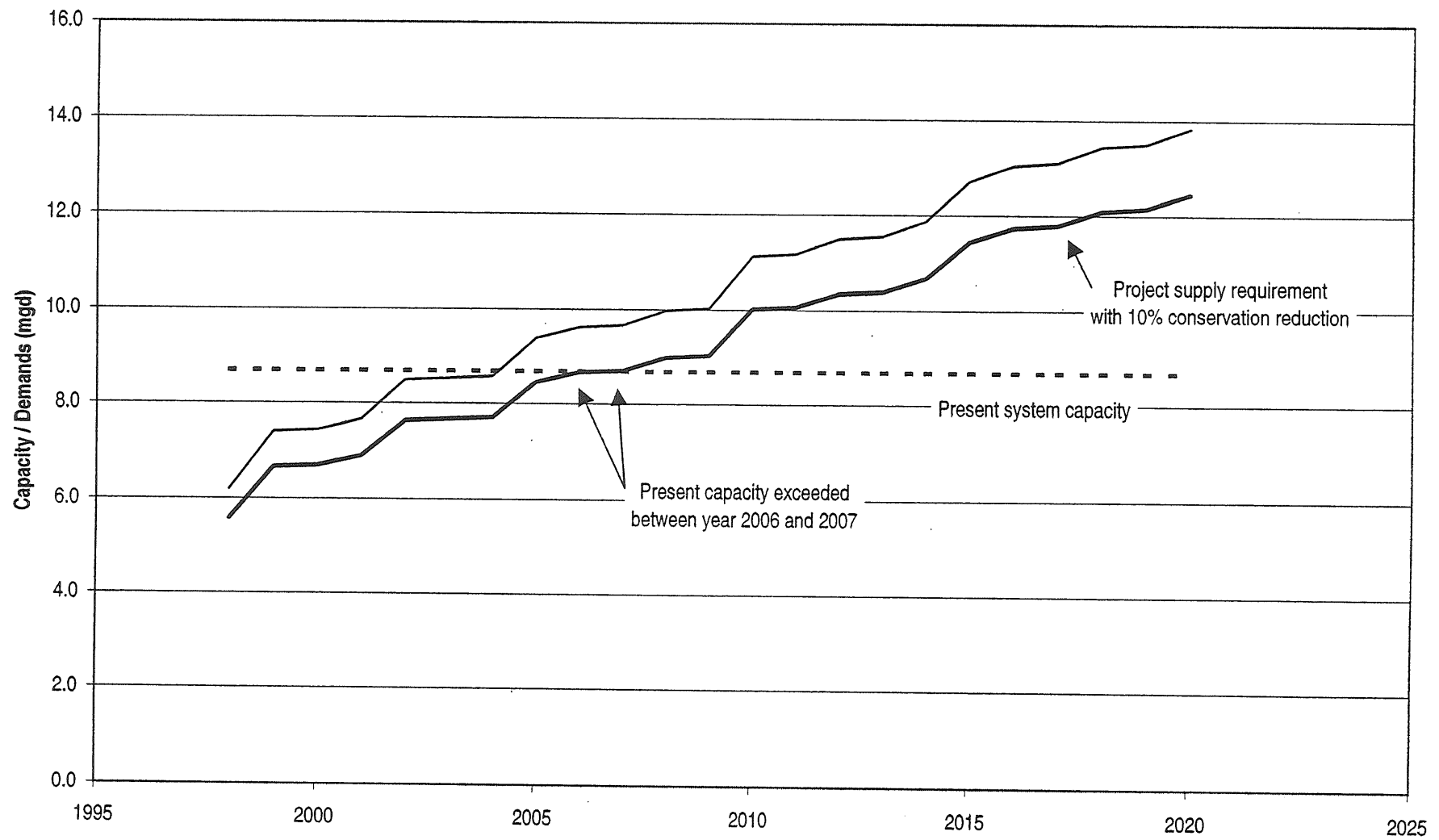


Figure 2
Conservation Impact on Water Supply Need



Appendix A. Evaluation of Alternative Chlorination Systems

APPENDIX A

Evaluation of Alternative Chlorination Systems

Introduction

This appendix presents a comparison of three alternative chlorination systems available to the city. The three rely on different forms of supplying chlorine: ton-cylinders (gas feed), 12-percent bulk liquid solution (sodium hypochlorite), and onsite generation of sodium hypochlorite.

The city has used ton-cylinders and a gas chlorinator for many years. With the proposed expansion of the water system and proposed changes to the clearwell and pumping system, it is appropriate to evaluate alternative systems.

Cost is one factor in selecting the type of chlorination system, but a primary concern is safety. Chlorine gas is a toxic chemical. An uncontrolled or mishandled chlorine gas leak can result in severe respiratory injury or death. The water system operator is primarily at risk. Members of the public within a radius of several thousand feet may also be at risk. The city's chlorination facility is in a public area. A large, uncontrolled leak may result in injury or even death for nearby residents.

The use of other forms of chlorine—liquid solution or onsite generation—reduces the risk of injury to an operator and the public. An alternative is to provide an emergency treatment system to use in conjunction with gas chlorine. The city's gas system is not currently equipped with an emergency treatment system.

Summary and Recommendation

Boardman currently uses gas chlorine for disinfecting its drinking water. The existing gas system lacks many of the safety features now required, and must either be significantly upgraded or replaced with a different chlorine system. The capacity of the existing system must also be expanded to meet the needs of the new collector supply.

In addition to gas chlorine, the city can use liquid hypochlorite or onsite generation of chlorine to disinfect its water. This appendix presents a comparison of the operating costs and characteristics of gas chlorine, liquid hypochlorite, and onsite generation.

We recommend that Boardman replace the existing gas chlorination system with an onsite generation system for chlorination. This recommendation is based on the following reasons:

1. An onsite generation system provides the highest level of operator safety. This is a primary concern for any utility, but especially for smaller utilities that often rely on only one operator to operate and maintain the chlorine system.
2. The onsite system uses a low concentration, stable form of chlorine. This provides better reliability for dosing chlorine into the drinking water. Hypochlorite systems use a concentrated solution, about 15 times stronger, that degrades over time. This

degradation can result in problems for the operators in maintaining a constant residual in the water system.

3. Gas chlorine is not recommended. Gas chlorine feed systems are very reliable, but the handling of gas chlorine is dangerous, even with improved safety features. On a life-cycle basis, gas chlorination is more expensive than either liquid hypochlorite or onsite generation.
4. Capital costs for the hypochlorite system are estimated to be less than for an onsite generation system. The annual cost for chlorine produced by an onsite system is less than the chemical cost for purchasing hypochlorite. Over a 10-year period, the resulting comparison of capital and operating costs indicates that a hypochlorite system has the least cost. The difference is less over a 20-year period, although hypochlorite remains slightly less costly. Although more expensive than hypochlorite, onsite generation uses the safest form of chlorine and is more reliable for dosing into the water supply.

Regulations

The Oregon Health Division (OHD) establishes rules for public water systems in Oregon. There are two aspects of OHD's rules relating to chlorination. One is concerned with ensuring that the level of disinfection is adequate at all times to meet the regulatory minimum. The second is concerned with the safety and reliability of the chlorine feed facilities.

The required level of disinfection is defined in Oregon Administrative Rules (OAR) Chapter 333-61-032 (5) and 333-61-050 (6). In summary:

- The disinfection treatment together with filtration must achieve 99.9 percent inactivation/removal of *Giardia* cysts and 99.99 percent inactivation/removal of viruses
- The chlorination system must include controls so that chlorine is fed proportional to flow
- The chlorine residual for water entering the distribution system cannot be less than 0.2 mg/L
- The chlorine residual must be detectable throughout the distribution system

OAR 333-61-050 (6) requires that the following reliability and safety features be included as part of the chlorination system:

- A low supply of chlorine must be alarmed
- Sample taps for before and after chlorination must be included in the system
- Testing equipment shall be provided to determine the chlorine residual. While not specifically required, we recommend that a continuous chlorine analyzer be installed to fulfill the monitoring and reporting requirements of OHD's rules.
- Provisions shall be made to prevent contamination of the potable water by backflow of untreated water or water having excessive concentrations of chlorine

In addition, OAR 333-61-050 (6) contains several provisions that are specific to safety features of a gas chlorination system. The rules require that chlorine gas feeders and chlorine gas storage areas shall:

- Be enclosed and separated from other operating areas
- Be located in a room with outward opening doors and a proper ventilation system
- Include a scale for measuring the weight of the chlorine cylinders
- Be provided with an approved self-contained breathing apparatus

A chlorine system must also comply with regulations established by the Uniform Fire Code (1989), Federal Occupational Safety and Health Act (August 1992), and EPA Risk Management Program (June 1996).

From a cost standpoint, the Uniform Fire Code requirements are the most significant. To meet these requirements, a gas chlorine system must include a chlorine gas scrubber (an emergency treatment system), which is a system that neutralizes a chlorine gas leak to make it harmless. A package scrubber system for a ton-cylinder will add approximately \$150,000 to the facility cost. Existing gas systems without scrubbers are usually 'grandfathered' and not required to install a scrubber. When a new system is installed a scrubber should be added. CH2M HILL always recommends inclusion of a scrubber for any gas system for safety and liability reasons.

OSHA standards regulate operations within the facility to protect the operators. EPA's risk management program (RMP) is to protect the public against offsite releases. The OSHA and EPA regulations require hazard assessments, safety communication, safety reviews, audits, training, specific operating procedures, and risk management plans. The costs associated with implementing these regulations are significant for a gas system, but do not apply to hypochlorite, or to onsite generation. An allowance for developing a risk management program is included in the cost analysis.

Chlorine Facility Sizing

Currently, the city feeds about 1.2 mg/L of chlorine. This provides sufficient chlorine to maintain a residual of 0.2 to 0.3 mg/L throughout the distribution system. Depending on raw water quality, water temperature, air temperature and demands, the operators adjust the feed rate within a range of about 1.0 to 1.5 mg/L.

The approximate current and future flows are as follows:

- Current low demand = 1,040 gpm (1.5 mgd)
- Year 2010 average day demand = 2,780 gpm (4.0 mgd)
- Ultimate maximum month = 10,000 gpm
- Ultimate peak capacity = 15,970 gpm

Table 1, which presents design flows and chlorine use, has been prepared based on these flows. The chlorine system should be designed to feed a range from a low chlorine dose at the current low winter flow to an average dose at the ultimate peak capacity. This range is from 12 pounds per day (ppd) of chlorine to 230 ppd. This is the ideal range, and equipment that feeds close to these limits may be acceptable.

Chemical storage space is sized for the ultimate maximum month demand. This value is 180 ppd, or 5,400 pounds per month.

Sizing for maximum month demand means that storage for 5,400 pounds of gas chlorine (three ton containers, with space for a fifth for changeout), or 4,500 gallons of 12 percent liquid hypochlorite (5,400 pounds/10 pounds per gallon/12 percent) with additional storage to receive bulk deliveries is needed. An onsite generation system will use 18,900 pounds (9.5 tons) of salt to produce 5,400 pounds of chlorine (3.5 pounds of salt per pound of chlorine).

The year 2010 average day demand at average chlorine dose is used for estimating chemical costs. Year 2010 was selected because the cost comparison is made over a 10- to 20-year period, and demands will increase during this time but probably not reach ultimate projections.

Description of Alternative Chlorination Systems

This section presents a comparison of the three alternative chlorination systems considered for the city: ton-cylinders for gas chlorine, bulk liquid hypochlorite, and onsite generation of weak hypochlorite.

Gas Chlorination

Chlorine gas, which is almost pure chlorine, is supplied in pressurized one-ton cylinders, and metered into the flow using a gas chlorinator. The current cost for gas chlorine is \$0.305 per pound (Great Western Chemical, Pasco, WA).

The capital cost for a gas chlorination system includes the cost for the scrubber (\$150,000) plus costs associated with providing a facility to safely handle four ton-containers (an allowance of \$50,000 to cover overhead crane, ventilation, and other safety features). New vacuum chlorinators are also needed to improve safety and replace aging equipment (\$25,000).

A gas chlorination system has the following disadvantages:

- The city has limited staff and there may be times when only one operator is available to change over the chlorine ton supply. It is not acceptable practice to have only one operator present during this procedure.
- The city will need to invest time and resources to implement the ongoing risk management program needed for chlorine gas.

Bulk Sodium Hypochlorite

Chlorine can be fed from a concentrated liquid solution called sodium hypochlorite or simply, hypochlorite. This is the second most common form of chlorine after gas chlorine. The technology is well known and the chemical is readily available from suppliers in the Tri-Cities or Portland.

Hypochlorite solution is 12 percent chlorine by weight and weighs approximately 10 pounds per gallon. Therefore, each gallon provides 1.2 pounds of chlorine. Hypochlorite can be purchased by tanker truckload (5,000 gallons). Since the projected maximum monthly use

is 4,500 gallons per month, two 6,000-gallon storage tanks are recommended. Each would be capable of receiving a full truckload.

A disadvantage to hypochlorite is the chemical degradation that occurs when hypochlorite is stored. It is generally advisable to store hypochlorite for 90 days or less. When stored longer than 90 days, the chemical strength declines significantly and precipitation of impurities occurs. The main factors that determine storage life are air temperature and the quality of the delivered chemical. It is necessary to air condition the room where the tanks are located or the storage life is much less during hot weather.

The limited storage life and possible degradation in chemical strength require additional operator time. The operators must monitor the quality of chemical and adjust the chemical dose settings if the strength declines significantly. Pump and piping systems for hypochlorite are also maintenance-intensive. It is difficult to maintain a leak-free system.

The cost for liquid hypochlorite, delivered to Boardman, is approximately \$0.85 per gallon (Great Western Chemical, July 1999).

A bulk-delivery, liquid hypochlorite system consists of two storage tanks, two metering pumps (one as standby), and associated isolation, check, and air release valves. The pumps draw directly from the storage tanks. As required by OHD, the system needs to include a control system that paces the chlorine feed from a flow meter. The system also needs online monitoring equipment for chlorine supply and chlorine dose, with output from these devices connected to recording instruments and alarms. A conceptual level cost estimate for this equipment is \$100,000.

Good design and operating practices include the use of protective clothing and eye protection by operators, provision of an eyewash/safety shower station in proximity to the facility, and provision of secondary containment to capture leaked solution. An allowance is included in the capital cost estimate to account for these items. A conceptual design is needed to determine the costs before budgeting for improvements.

Onsite Hypochlorite Generation

A weak solution of sodium hypochlorite can be generated onsite using package equipment available from several suppliers. The process uses sodium chloride (salt), water, and electricity to produce a solution of 0.8 percent hypochlorite. At this strength, hypochlorite is considered non-hazardous and is exempt from OSHA and EPA requirements. Another advantage of the low concentration solution is that the solution does not degrade appreciably when stored.

The generator produces chlorine based on the level in the storage tank. As the tank level drops, the system automatically starts up and replenishes the tank supply. The storage tank is kept at least one-half full at all times for reliability. From the storage tank, the solution is metered into the flow using two metering pumps (one for redundancy) similar to the bulk liquid hypochlorite system.

Onsite chlorine generation systems are becoming common in water utilities (as well as in non-utility applications) because of their safety advantages, although the technology is not as common as liquid sodium hypochlorite. Onsite systems are especially common in

California where the state has led the nation in implementing rules for hazardous materials handling.

A system for the city should produce about 230 ppd of chlorine, the ultimate peak capacity chlorine use. Two locally represented companies supply units for this capacity. One is a 125-ppd unit manufactured by Chemical Services Company, Campbell, California, called the Clor-Tec. The other is also a 125-ppd unit, manufactured by Hermosa Technical Services, Laguna Niguel, California, called Chlor-Right. Two 125-ppd units could be installed to meet the 230 ppd need. Another option is to provide two 100 ppd units. This will meet the city's needs under almost all conditions. A preliminary estimate for a complete system using two 100 ppd units, including metering pumps, discharge piping and valves, and alarms, installed, is approximately \$170,000.

The cost for chlorine is the sum of the costs for purchasing salt and electricity. Based on manufacturers' literature and local costs for electricity (\$0.03 per kWh), the unit cost for producing chlorine is \$0.19 per pound of chlorine produced. It is expected that the equipment will require somewhat higher annual maintenance costs than for a bulk liquid metering system only. A large part of the annual maintenance allowance goes to periodic replacement of the electrodes, which is needed about once every 5 years.

Cost Comparison

Table 2 summarizes comparative costs for chlorine gas, bulk hypochlorite, and onsite generation systems. Annualized costs over either a 10- or 20-year period are shown, based on estimates for capital and operating costs. These are comparative costs only, and do not include some costs that are common to all systems. Further definition is needed to develop budgetary costs for the chlorination system.

The bulk hypochlorite system has the lowest capital cost. The onsite generation system has the lowest annual chemical cost. When both capital and operating costs are figured into an annualized cost for the systems, bulk hypochlorite is favored. For a 10-year comparison, its annualized cost is about 25 percent lower than for onsite generation. As the comparison period is lengthened, the cost difference becomes less because the operating costs become more significant. For the 20-year period, the annualized cost difference is about 17 percent.

TABLE 1
Chlorination Facilities Sizing

Applied chlorine dose (mg/L)

Low 1.0

Average 1.2

High 1.5

Period	Demand Condition	How related to design?	Flow (gpm)	Flow (mgd)	--- Chlorine use (ppd) ---		
					Low	Average	High
Current	Low winter flow	Sets low turndown	1,040	1.5	12	15	19
Year 2010	Average day	Determine chemical costs	2,780	4.5	38	45	56
Ultimate	Maximum month	Size chemical storage	10,000	14.4	120	144	180
Ultimate	Peak Capacity	Maximum feed rate	15,970	23.0	192	230	

TABLE 2**Chlorination Cost Estimate Comparison**

Item	Chlorine Gas (one-ton cylinders)	Liquid Sodium Hypochlorite (bulk delivery)	Onsite Hypochlorite Generation
Capital Equipment cost			
Chlorine feed system	\$25,000	\$30,000	\$30,000
Emergency treatment system	\$150,000	\$0	\$0
On-site generation equipment	\$0	\$0	\$140,000
Liquid storage tanks	\$0	\$70,000	\$0
Equipment installation allowance at 20%	\$35,000	\$20,000	\$34,000
Building additions/modifications	\$50,000	\$50,000	\$50,000
Subtotal, capital cost	\$260,000	\$170,000	\$254,000
Contingency at 20%	\$52,000	\$34,000	\$50,800
Total capital cost	\$312,000	\$204,000	\$304,800
Annual chemical cost			
Annual chemical cost	\$5,000	\$11,600	\$3,103
Annual chemical safety program	\$5,000	\$0	\$0
Annual maintenance allowance (3% of equipment cost)	\$5,250	\$900	\$5,100
Risk Management Plan, initial cost	\$25,000	\$0	\$0
Total annualized cost (over 10 years, i=6%)	\$61,000	\$40,000	\$50,000
Total annualized cost (over 20 years, i=6%)	\$45,000	\$30,000	\$35,000

Notes:

1. Capital costs are relative, and do not include all common costs for the systems. Further evaluation is needed to develop construction cost estimates.
2. Labor costs are not included in the evaluation.
3. Chemical costs based on annual average use of 30 pounds chlorine per day. This is approximate average current use times 20 percent for growth.

APPENDIX F

Water Rights

SM- RECEIVED

SEP 22 1975

Permit No. 4C336

WATER RESOURCES DEPT.
SALEM, OREGON

*APPLICATION FOR PERMIT

To Appropriate the Public Waters of the State of Oregon

I, City of Boardman, Oregon
(Name of applicant)
of City Hall, Boardman, Oregon
(Mailing address) Boardman
(City)
State of Oregon 97818
(Zip Code), 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

1. The source of the proposed appropriation is Columbia River
(Name of stream)
....., a tributary of N.A.
2. The amount of water which the applicant intends to apply to beneficial use is 36
cubic feet per second 6,600 gpm @ Site No. 1; 4,100 gpm @ Site No. 2; 5,400 gpm @ Site No. 3
(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 Regional water supply for the City of
(Irrigation, power, mining, manufacturing, domestic supplies, etc.)
Boardman and surrounding community. (Municipal System)
4. The point of diversion is located ft. and ft. from the
(N. or S.) (E. or W.)
corner of See Exhibit B
(Section or subdivision)
.....
(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 of Sec., Tp.
(Give smallest legal subdivision) (N. or S.)
R., W. M., in the county of
(E. or W.)
5. The proposed water transmission pipelines to be 8400 feet
(Miles or feet)
in length, terminating in the SE 1/4 NE 1/4 of Port of Morrow
(Smallest legal subdivision) for City of Boardman Sec., Tp.
(N. or S.)
R. 25 E, W. M., the proposed location being shown throughout on the accompanying map.
(E. or W.)

DESCRIPTION OF WORKS

Diversion Works—

*See Exhibit C

6. (a) Height of dam feet, length on top feet, length at bottom
..... feet; material to be used and character of construction
(Loose rock, concrete, masonry,
rock and brush, timber crib, etc., wasteway over or around dam)

- (b) Description of headgate
(Timber, concrete, etc., number and size of openings)

- (c) If water is to be pumped give general description Water lifted from each caisson to chlorine
(Size and type of pump)
detention chamber with 2 - 14 inch, 2 stage turbine pumps with vertical 75 HP electric motors (75' T.D.H.)
(Size and type of engine or motor to be used, total head water is to be lifted, etc.)
Water pumped from chlorine detention chamber to existing distribution system with high head pumps.
Pressure regulating device to be used to maintain constant pressure in distribution system.

* A different form of application is provided where storage works are contemplated. Such forms can be secured without charge, together with instructions, by addressing the State Engineer, Salem, Oregon 97310.

3775

RANNEY CONCRETE

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) feet; width on bottom feet; depth of water feet; grade feet fall per one thousand feet.

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

(c) Length of pipe, 8400 ft.; size at intake, 20 in.; size at 2500 ft. from intakes 30 in.; size at place of use 18 in.; difference in elevation between intake and place of use, 65 ft. Is grade uniform? Generally, Yes Estimated capacity, 36 sec. ft.

8. Location of area to be irrigated, or place of use lawn and yard irrigation only

Township North or South	Range E. or W. of Willamette Meridian	Section	Forty-acre Tract	Number Acres To Be Irrigated
		*See Attachment for Item 8		

(If more space required, attach separate sheet)

(a) Character of soil sandy with intermixed gravels

(b) Kind of crops raised lawns - gardens

Power or Mining Purposes—

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 feet.

(Head)

(d) The nature of the works by means of which the power is to be developed

(e) Such works to be located in of Sec.

(Legal subdivision)

Tp., R., W. M.

(No. N. or S.)

(No. E. or W.)

(f) Is water to be returned to any stream?

(Yes or No)

(g) If so, name stream and locate point of return

Sec.

Tp.

R.

W. M.

(No. N. or S.)

(No. E. or W.)

(h) The use to which power is to be applied is

(i) The nature of the mines to be served

Application No. 53657

Permit No. 40336

ATTACHMENT FOR ITEM 8

IRRIGATED AREA IN COMPREHENSIVE PLAN AREALAWNS AND OPEN SPACE ONLY

ALL IN TOWNSHIP 4 N, RANGE 25 E W.M., MORROW COUNTY, OREGON

<u>Section</u>	<u>1/16 Quarter</u>	<u>Acreage</u>	<u>Section</u>	<u>1/16 Quarter</u>	<u>Acreage</u>
4	SESE	23	16	SWSW	32
4	SWSE	20	16	SESW	32
			16	NESE	32
8	SENE	20	16	NWSE	32
8	SWNE	7	16	SWSE	32
8	NESE	25	16	SESE	32
8	NWSE	25			
8	SWSE	24	17	NENE	19
8	SESE	20	17	NWNE	19
			17	SWNE	32
9	NENE	24	17	SENE	32
9	NWNE	25	17	NESE	32
9	SWNE	31	17	NWSE	32
9	SENE	32	17	SWSE	32
9	NENW	27	17	SESE	32
9	NWNW	8			
9	SWNW	23	20	NENE	32
9	SENW	24	20	NWNE	32
9	NESW	32	20	SWNE	20
9	NWSW	32	20	SENE	8
9	SWSW	15			
9	SESW	20	21	NENE	20
9	NESE	27	21	NWNE	32
9	NWSE	30	21	SWNE	4
9	SWSE	25	21	NENW	32
9	SESE	27	21	NWNW	26
			21	SENW	2
16	NENE	22			
16	NWNE	20			
16	SWNE	32	TOTAL		1,470 acres
16	SENE	32			
16	NENW	20			
16	NWNW	20			
16	SWNW	32			
16	SENW	32			
16	NESW	32			
16	NWSW	32			

RECEIVED

SEP 22 1975

WATER RESOURCES DEPT.
SALEM, OREGON

EXHIBIT B

RECEIVED
SEP 22 1975
WATER RESOURCES DEPT.
SALEM, OREGON

The points of construction for each water collector from the Northeast corner of Section 9, Twp. 4 N, Range 25 E W.M. are as follows:

Ground Elevation (MSL)

WATER COLLECTOR SITE NO. 1

S 86° 04' W - 2891 feet

269 ft.

Located in the NE $\frac{1}{4}$ NW $\frac{1}{4}$ of Section 9

WATER COLLECTOR SITE NO. 2

S 78° 38' W - 3926 feet

269 ft.

Located in the NW $\frac{1}{4}$ NW $\frac{1}{4}$ of Section 9

WATER COLLECTOR SITE NO. 3

S 72° 01' W - 4630 feet

269 ft.

Located in the NW $\frac{1}{4}$ NW $\frac{1}{4}$ of Section 9

All of the above sites are located in Section 9, Twp. 4 N, Range 25 E, W.M. in Morrow County, Oregon.

Application No. 53657
Permit No. 40336

Municipal or Domestic Supply—

10. (a) To supply the city of Boardman (Boardman Regional Water Supply)
Morrow County, having a present population of 650
(Name of)
and an estimated population of 4,000 in 1995

(b) If for domestic use state number of families to be supplied

(Answer questions 11, 12, 13, and 14 in all cases)

11. Estimated cost of proposed works, \$ 1,800,000.00
12. Construction work will begin on or before November, 1975
13. Construction work will be completed on or before November, 1976 for initial collector at Site 1, chlorination facility and transmission lines
14. The water will be completely applied to the proposed use on or before January, 1977

James D. Thompson
(Signature of applicant)
City Administrator

Remarks: The three proposed water collectors shall be constructed in three stages with the construction of the first water collector at Site Number 1, chlorination facility and primary transmission lines to begin in the fall of 1975.

The water collectors, chlorination facility and transmission lines shall be constructed of sufficient capacity to provide a Regional Water Supply for the Boardman area, including a municipal supply for the City of Boardman and an industrial and domestic water supply for industrial tenants at the Port of Morrow Industrial Park.

The land on which the water collectors and portions of the transmission lines are located is under the jurisdiction of the U.S. Army Corps of Engineers. The City of Boardman is currently negotiating with the Corps for a long term lease of the required lands.

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, }
County of Marion, } ss.

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 36.0 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 Columbia River

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

If for irrigation, this appropriation shall be limited to _____ of one cubic foot per second or its equivalent for each acre irrigated _____

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

The priority date of this permit is September 22, 1975

Actual construction work shall begin on or before May 17, 1977 and shall

thereafter be prosecuted with reasonable diligence and be completed on or before October 1, 1978.

Complete application of the water to the proposed use shall be made on or before October 1, 1979.

WITNESS my hand this 17th day of May 1976.

James E. Sykes
WATER RESOURCES DIRECTOR

Permit No. 40336

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 22 day of September,
1975, at 8 o'clock A.M.

Returned to applicant:

Approved:

Recorded in book No. _____ of _____
Permits on page 40336

STATE ENGINEER

Drainage Basin No. 7 page 3 D

Fees \$105.00

STATE OF OREGON
COUNTY OF MORROW
CERTIFICATE OF WATER RIGHT

This Is to Certify, That **CITY OF BOARDMAN**
DEWEY W. WEST, JR., MAYOR

of P. O. Box 224, Boardman, 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 Well No. 1-64

a tributary of Columbia River (Pacific Ocean) for the purpose of municipal use

under Permit No. G-2664 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 20, 1964

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 1.50 cubic foot per second

673 gpm

or its equivalent in case of rotation, measured at the point of diversion from the stream. The point of diversion is located in the NW $\frac{1}{4}$ SW $\frac{1}{4}$, Section 9, T. 4 N., R. 25 E., W. M. Well is located North 20° 05' East 2171 feet from the SW Corner, Section 9.

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:

NE $\frac{1}{4}$ SE $\frac{1}{4}$
Section 8

SW $\frac{1}{4}$ NW $\frac{1}{4}$
SW $\frac{1}{4}$

Section 9
T. 4 N., R. 25 E., W. M.

The right to the use of the water for the purposes aforesaid is restricted to the lands or place of use herein described.

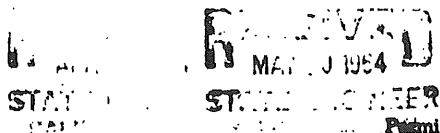
WITNESS the signature of the State Engineer, affixed

this date. September 13, 1967

CHRIS L. WHEELER

State Engineer

BASALT WELL



Permit No. G-2664

APPLICATION FOR A PERMIT

To Appropriate the Ground Waters of the State of Oregon

I, Dewey W. West, Jr., as Mayor of and for the City of Boardman
(Name of applicant)
of Boardman, county of Morrow,
(Postoffice Address)
state of Oregon, do hereby make application for a permit to appropriate the
following described ground waters of the state of Oregon, SUBJECT TO EXISTING RIGHTS:

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

City of Boardman, a municipal corporation, incorporated 1927

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

tributary of Pacific Ocean

2. The amount of water which the applicant intends to apply to beneficial use is 2.0 cubic
feet per second or 900 gallons per minute.

3. The use to which the water is to be applied is domestic, commercial, industrial
use, and incidental lawn and garden irrigation, all as part of general municipal use.

4. The well or other source is located ft. and ft. from the
(N. or S.) (E. or W.)
corner of
(Section or subdivision)

N. 20°05'E. 217.1 feet from the SW corner of Section 9, T4N, R25E, W. M.
(If preferable, give distance and bearing to section corner)

(If there is more than one well, each must be described. Use separate sheet if necessary.)

being within the NW 1/4 SW 1/4 of Sec. 9, Twp. 4N, R. 25E,
W. M., in the county of Morrow

5. The to be miles
(Canal or pipe line)
in length, terminating in the of Sec. , Twp. ,
(Smallest legal subdivision)

R. , W. M., the proposed location being shown throughout on the accompanying map.

6. The name of the well or other works is Well No. 1-64

DESCRIPTION OF WORKS

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

8. The development will consist of 1 well having a
(Give number of wells, tunnels, etc.)
diameter of 10 inches and an estimated depth of 500 feet. It is estimated that 200
feet of the well will require steel casing. Depth to water table is estimated to vary
(Kind) (Feet)
from 40 to 60 feet but expected to be fairly constant at about 30 feet after completion
of the John Day Dam in 1968.

2664

CANAL SYSTEM OR PIPE LINE—

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

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

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

10. If pumps are to be used, give size and type. 8-inch, multi-stage submersible turbine pump.

Give horsepower and type of motor or engine to be used. 40 horsepower, electric submersible.

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

12. Location of area to be irrigated, or place of use (see also Exhibits A, B, and C)

Township N or S.	Range E. or W. of Willamette Meridian	Section	Forty-acre Tract	Number Acres To Be Irrigated
4N	25 E	8	NE 1/4 SE 1/4	30.0 Municipal use
4N	25 E	9	NW 1/4 SW 1/4	40.0 "
4N	25 E	9	NE 1/4 SW 1/4	22.5 "
4N	25 E	9	SW 1/4 SW 1/4	11.7 "
4N	25 E	9	SE 1/4 SW 1/4	5.5 "
4N	25 E	9	SW 1/4 NW 1/4	2.2 "
NOTE: Above describes the area of general municipal use for the initial development of the City.				

(If more space required, attach separate sheet)

Character of soil silty sand.

Kind of crops raised lawns and gardens incidental to general municipal use.

MUNICIPAL SUPPLY—

13. To supply the city of Boardman
 in Morrow county, having a present population of 240
 and an estimated population of 700 in 1977.

ANSWER QUESTIONS 14, 15, 16, 17 AND 18 IN ALL CASES

14. Estimated cost of proposed works, \$ 40,000.00
15. Construction work will begin on or before 1 July 1964
16. Construction work will be completed on or before 1 January 1965
17. The water will be completely applied to the proposed use on or before 1 January 1975
18. If the ground water supply is supplemental to an existing water supply, identify any application for permit, permit, certificate or adjudicated right to appropriate water, made or held by the applicant. _____

Dewey W. Wolf
 (Signature of applicant)

Remarks: See Exhibit A

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

STATE OF OREGON, }
County of Marion, }

PERMIT

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

The right herein granted is limited to the amount of water which can be applied to beneficial use and shall not exceed 1.90 cubic feet per second measured at the point of diversion from the well or source of appropriation, or its equivalent in case of rotation with other water users, from well No. 1-64

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

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

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

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

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

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

The priority date of this permit is May 20, 1964

Actual construction work shall begin on or before July 31, 1965 and shall

thereafter be prosecuted with reasonable diligence and be completed on or before October 1, 1965

Complete application of the water to the proposed use shall be made on or before October 1, 1966

WITNESS my hand this 31st day of July, 1964

Chris L. Wheeler

STATE ENGINEER

Application No. G- 2863
Permit No. G- 3664

PERMIT

TO APPROPRIATE THE GROUND
WATERS OF THE STATE
OF OREGON

This instrument was first received in the
office of the State Engineer at Salem, Oregon,
on the 20th day of May,
1964, at 8:00 o'clock A. M.

Returned to applicant:

Approved:

July 31, 1964

Recorded in book No. 10 of 2864
Ground Water Permits on page

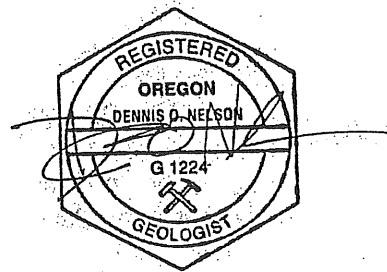
CHRIS L. WHEELER

STATE ENGINEER

Drainage Basin No. 7 page 53

State Printer

APPENDIX G
GSI Water Solutions, Inc.,
March 19, 2012, Memo



Technical Memorandum

To: Barry Beyeler, City of Boardman

From: Dennis Nelson, RG, GSI Water Solutions
Jeff Barry, RG, GSI Water Solutions
Matt Kohlbecker, RG, GSI Water Solutions

Date: March 19, 2012

Re: City of Boardman's Ranney Well 2 GWUDI Evaluation

Introduction

Ranney Well 1 is the primary source of drinking water for the City of Boardman (City). In 2001, the City constructed Ranney Well 2, which has not yet been brought online as a source of drinking water for the City. Both of these collector wells have laterals extending beneath the Columbia River and into the sedimentary aquifer adjacent to the Columbia River. The collector wells are specifically designed to be in hydraulic connection with the Columbia River. River water must pass through the active sediments of the river bed and through the underlying alluvial deposits to reach the collector well laterals. In addition, the river water is mixed with groundwater from the laterals that extend into the sedimentary aquifer. Ranney wells are designed with the intent that as the river water infiltrates through the active and alluvial sediment, pathogenic organisms are removed by natural filtration.

The federal Surface Water Treatment Rule of the Safe Drinking Water Act was enacted to protect public water system supplies from the risk of *Giardia* and *Cryptosporidium*. Its primary focus is water systems that use surface water as a source of drinking water. The rule also addresses, however, those groundwater systems where, because of proximity to surface water, their operational practices, or the characteristics of the aquifer, are in hydraulic connection with, and draw water, at least in part, from a surface water source.

Hydraulically connected groundwater-based public water systems that are determined to be vulnerable to surface water pathogens, specifically *Giardia* and *Cryptosporidium*, are classified as Groundwater Under the Direct Influence of Surface Water (GWUDI) and are subject to the Surface Water Treatment Rule (Oregon Administrative Rule [OAR] 333-061-0032(8)(q)). Determination of whether a public water system is GWUDI is based on microscopic particulate analysis (MPA). Because *Giardia* and *Cryptosporidium* are not always present in the surface water, the MPA method uses surrogate organisms (e.g., algae and diatoms) to evaluate the risk from pathogens. Oregon uses a modified version (OAR 333-061-0032 (8)(p) Table 11) of the U.S. Environmental Protection Agency's (EPA) Consensus Method scoring method (EPA, 1992) for determining the relative risk of surface water "contamination."

The City has conducted MPAs at Ranney Well 1 and Ranney Well 2:

- The City, using MPAs, demonstrated in 1993-1994 that Ranney Well 1, although in hydraulic connection with the river, was not GWUDI and should be classified as groundwater.
- Water produced from Ranney Well 2 was evaluated for GWUDI using MPAs (USEPA, 1992) in 2003 and 2004. Although MPA results from August 2003 and April 2004 indicated low risk, the samples from July 2004 and August 2004 indicated a moderate risk, having relative risk scores of 16 on each occasion. Oregon Health Authority's Drinking Water Program (OHA) rules require that if any single MPA score is greater than 19, or two or more MPA scores are greater than 14, the system be classified as GWUDI (OAR 333-061-0032 (8) (q) (C) (ii)). Therefore, the City's Ranney Well 2 was determined to be GWUDI based on the risk scores measured in the July 2004 and August 2004 MPAs.

The conflicting results from MPA sampling at Ranney Well 2 may have been related to the pumping rate during MPA sampling. Ranney Well 2 is equipped with two aboveground turbine pumps and can be pumped at two rates: 6,000 gallons per minute (gpm) with one pump on, and 10,000 gpm with both pumps on. The sampling during 2004 ("moderate risk" MPAs) was accomplished with both pumps on, yielding ~10,000 gpm, a rate that the City has subsequently determined may not be sustainable. The City received confirmation from OHA that if it provided pumping records for the 2004 sampling event that Ranney Well 2 was pumped at a 10,000 gpm rate the agency would consider a re-evaluation of the system for GWUDI at the lower 6,000 gpm pumping rate.

The City, therefore, is proposing to use only one pump during routine operations, thereby reducing the production rate to 6,000 gpm. The objective of this technical memorandum is to determine if Ranney Well 2 should be classified as GWUDI at 6,000 gpm.

Sampling Strategy

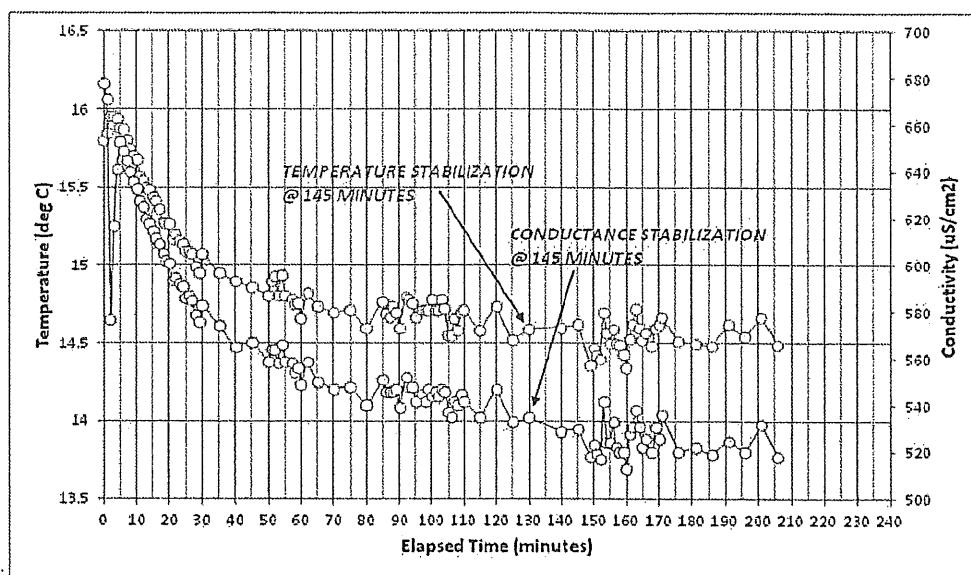
Sampling at Ranney Well 2 was conducted during two events, in April 2010 and August 2010. Each sampling event included (1) determining the time-of-travel (TOT) from the river to the well, and the time required for stabilization of surface water and groundwater mixing proportions; (2) collection of an MPA sample to determine if Ranney Well 2 is GWUDI; and (3) collection of anion and cation samples to determine the mixing proportions of groundwater and surface water in Ranney Well 2.

TOT and Stabilization of Groundwater/Surface Water Mixing Proportions

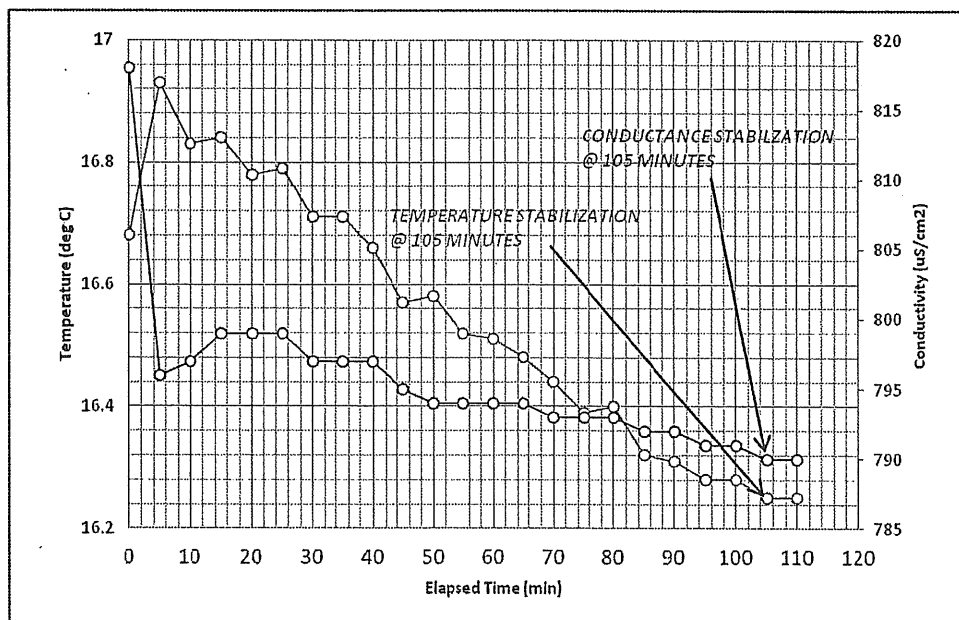
It is also useful to determine the TOT for surface water to arrive at Ranney Well 2, and the time required for stabilization of surface water and groundwater mixing proportions. To determine stabilization and the TOT, GSI Water Solutions, Inc. (GSI), personnel used field parameters for conductivity and temperature of discharge water. Groundwater is characterized by a relatively high conductivity and seasonally consistent temperature (about 16 degrees Celsius at MORR 738). Columbia River water is characterized by a relatively low conductivity (150 micro Siemens per centimeter squared [$\mu\text{S}/\text{cm}^2$] to 400 $\mu\text{S}/\text{cm}^2$) and a seasonally variable temperature (about 9 degrees Celsius during the April 2010 sampling event, and 22 degrees Celsius during the August 2010 sampling event).

Temperature and conductivity were measured with a YSI Meter and flow-through cell. Figure 1 displays a time-elapsd plot for these parameters with both pumps on (~10,000 gpm, Figure 1(a)) in April 2010, and with one pump on (~6,000 gpm, Figure 1(b)) in August 2010. Note that both temperature and conductivity are higher in both sources in August 2010 as a result of warmer ambient temperatures and evaporation.

At 10,000 gpm, river water began to arrive in Ranney Well 2 in less than 20 minutes of pumping and the proportions of surface water and groundwater stabilized in slightly more than 2 hours. The data collected at 6,000 gpm indicate stabilization to within 1 percent during a similar period of time. Differences in temperature and conductance between the two sampling events reflect seasonal changes, especially in the river water.



(a)



(b)

Figure 1. Water temperature and conductivity in the clear well as a function of time elapsed since the pumps were started during the (a) April 2010 and (b) August 2010 sampling events. In (a), pumping rate is ~10,000 gpm. Stabilization of these two parameters, indicating the equilibrium groundwater surface water mixing ratio, occurs after 145 minutes of pumping. Data collection at ~6,000 gpm (b) was terminated early, however, the data appear to be in the early stages of stabilization, suggesting similar times for stabilization at the two separate pumping rates.

MPA Sampling

MPA sampling was conducted after the hydraulic connection equilibrated between groundwater and surface water (i.e., the relative proportions of surface water and groundwater have stabilized at the operational discharge rate). After stabilization, we are “seeing” the maximum amount of river water that would be present in Ranney Well 2 at any one time for the duration of pumping.

All MPA samples collected from the collector well were obtained directly from the clear well (i.e., a small-diameter well completed within the collector well caisson) using a dedicated submersible pump. The collection of the MPAs followed EPA protocol (EPA, 1992). A minimum of 500 gallons of water passed through the filter, which then was shipped to a laboratory where it was examined for *Giardia* surrogates.

Mixing Proportions

For operations purposes, the City chose to determine the relative proportions of Columbia River water and groundwater in the collector at stabilization. This required knowledge of the chemical composition of the groundwater and river water end members, as well as the composition of the mixed water in the collector. To accomplish this task, the chemical composition of all three waters (i.e., groundwater and river water before pumping, and the water from the collector after stabilization occurred) must be measured. The groundwater, river water, and collector water samples were analyzed for anions and cations (i.e., bicarbonate, calcium, chloride, magnesium, potassium, sodium, and sulfate). Obtaining a representative sample of the river was accomplished by collecting a sample approximately 20 feet offshore, above the laterals, and ~1 foot above the bottom. Upgradient groundwater was acquired from a private well (MORR 738) using low flow sampling techniques. MORR 738 was completed in 1972 to a depth of 60 feet in the coarse-grained alluvial aquifer in which the Ranney Well 2 laterals are completed. All samples collected from the collector well were obtained directly from the clear well using a dedicated submersible pump.

Determining the fraction of river water (F_{rw}) in the collector is accomplished by substituting the individual analyses for upgradient groundwater (C_{gw}), river water (C_{rw}), and water from the collector (C_{col}) into the following simple-mixing equation:

$$C_{col} = F_{rw}(C_{rw}) + C_{gw}(1-F_{rw})$$

Solving for F_{rw} yields

$$C_{col} - C_{gw} = F_{rw}(C_{rw}) - C_{gw}(F_{rw}) = F_{rw}(C_{rw} - C_{gw})$$

$$C_{col} - C_{gw} = F_{rw}(C_{rw} - C_{gw})$$

$$F_{rw} = (C_{col} - C_{gw}) / (C_{rw} - C_{gw}) \quad (1)$$

The fraction of groundwater in the collector (F_{gw}) is determined from the equation below:

$$F_{gw} = 1 - F_{rw} \quad (2)$$

Sampling Scheduling and Data Acquisition

Sample scheduling was driven by the need to collect two separate MPA samples. Although the two individual MPA samples must be collected at times separated by at least 1 month, convention is to sample during high-stage and high-demand times, when the gradient from the river to the laterals is the greatest, and when pumping is at its highest.

The City's Ranney wells are located on the McNary Reservoir. Water levels in the reservoir are not driven by typical hydrologic conditions resulting in either high or low runoff. Rather, the pool levels are controlled by the U.S. Army Corps of Engineers, which ensures that adequate water is available for fish flush demands, irrigation needs, and transportation (barge traffic) needs. Pool levels generally are held at elevations varying from 262 to 265 feet. Consequently, sampling was scheduled for the spring (April) and summer (August) months, when the City has the lowest and highest demand for water, respectively. Actual pool elevations varied from 263.00 to 263.80 feet during the April 2010 sampling, and from 263.11 to 263.71 feet during August 2010 sampling (data from U.S. Army Corps of Engineers).

Data Analysis Common Ion Data

Data were derived from two separate sampling events: April 2010 and August 2010. Common ion results are provided in Table 1.

The composition of ambient groundwater as represented by the April 2010 and August 2010 analyses of GW MORR 738 in Table 1 remains fairly constant during the 4-month interval between sampling events. Likewise, the composition of water from Ranney Well 2 under non-stress (no pumping) conditions remains stable between the April 2010 and August 2010 sampling events. The data suggest that the composition of the Columbia River water undergoes moderate variation, on the order of days and months.

Of interest to this investigation are the proportions of water in Ranney Well 2 that originated from the river and ambient groundwater during pumping. The compositions of ambient groundwater and river water represent the two mixing end members from which the water in Ranney Well 2 is derived. The proportions of each were calculated using equations (1) and (2) above for each chemical constituent for each condition shown in Table 1. Average values for the percent surface water are reported in Table 2. The high standard deviations may reflect that other processes also were contributing to component variations.

Table 1. Common Ion Data for Ambient Groundwater, Columbia River Water, and Ranney Well 2 Water, City of Boardman, Oregon. Pumping rates indicated as 0 K, 6 K (6,000 gpm), and 10 K (10,000 gpm).

Sample ID ¹	Sample Type	Date	Anion/Cation Concentration (mg/L)						
			HCO ₃ ⁻	Ca	Cl	Mg	K	Na	SO ₄ ⁼
GW MORR738	GW	April 2010	260	84.9	35.8	32.2	7.14	39.4	63.7
GW MORR738	GW	August 2010	255	80.7	34.7	30.1	6.53	37.2	67.9
River 0 K	CR	April 2010	85.1	22.8	5.76	7.12	1.77	9.52	17.8
River 6 K	CR	April 2010	110	33.1	9.71	9.96	2.53	13.1	24.5
River 0 K	CR	August 2010	64.4	19.3	4	5.44	1.28	6.14	12
Collector 0 K	Mix	April 2010	255	85.1	34.6	27.4	7.21	41.5	64.8
Collector 0 K	Mix	August 2010	254	86.5	32.8	27.7	7.51	43.9	66
Collector 6 K	Mix	April 2010	200	65.7	24.8	20.1	5.35	29.2	47.8
Collector 6 K	Mix	August 2010	243	80.6	29.2	23.7	5.84	35.1	57.9
Collector 10 K	Mix	April 2010	211	70.1	25.6	21.6	5.33	29.3	49.7
Collector 10 K	Mix	August 2010	181	57.3	18.8	17.2	4.71	25.5	40

Notes:

GW = Groundwater

CR = Columbia River water

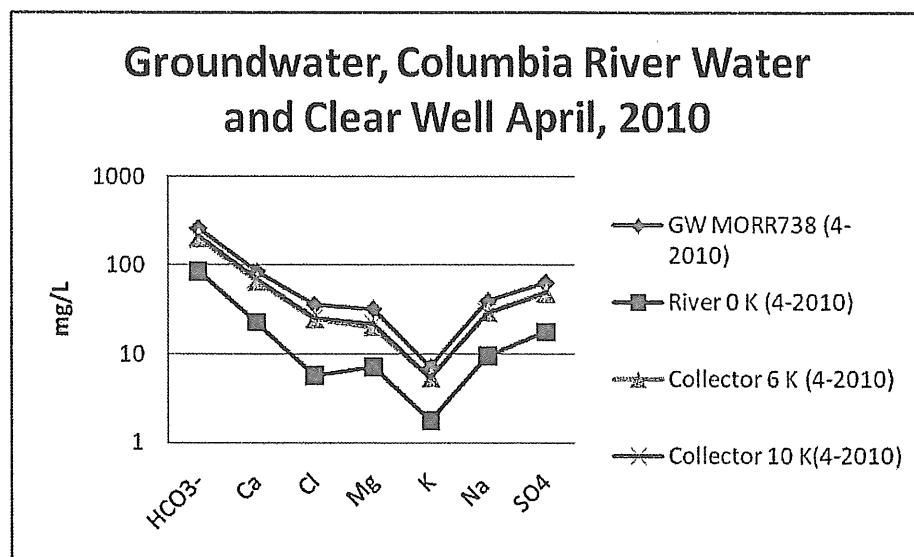
Mix = Mixture between Groundwater and Columbia River water, sample collected from Ranney Well 2

1 "0K", "6K", and "10K" indicate the pumping rate, in gallons per minute, that Ranney Well 2 was pumping during sample collection

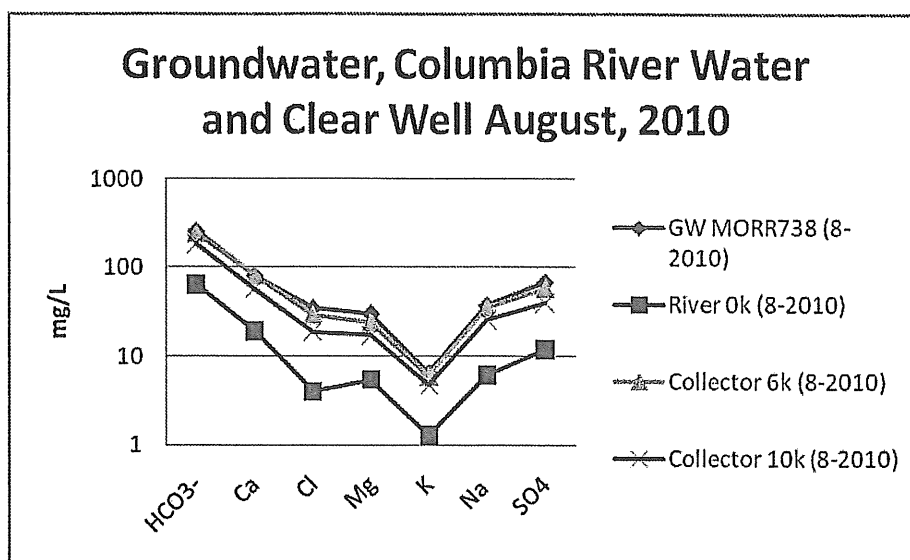
The difference in composition and calculated percentage of river water from the collector between the April 2010 and August 2010 sampling events is significant. This is displayed graphically in Figure 2. The data suggest that under “at rest” conditions, the water in the collector is dominantly groundwater and one would expect that at increasingly higher rates of pumping, the groundwater would be displaced by increasingly higher amounts of surface water above the laterals. Note that during the April 2010 sampling event, the 6,000 gpm plot indicates a higher proportion of river water than during the 10,000 gpm sampling event (see also Table 2).

Table 2. Percent of River Water Within Ranney Well 2 at Different Pumping Rates
City of Boardman, Oregon

Sample Date	Pump Rate (gpm)	Percent River Water Ranney Well 2
4/2010	0	2.3±6
4/2010	6,000	41.7±4
4/2010	10,000	34.9±4
8/2010	0	0.0±10
8/2010	6,000	10.4±7
8/2010	10,000	44.3±7



(a)



(b)

Figure 2. Comparison of chemical composition of groundwater, river water, collector water at 6,000 gpm (6k), and 10,000 gpm (10k) during the April 2010 (a) and August 2010 (b) sampling events. Note the position of the 6k plot relative to the others in (a) and (b).

This apparent anomaly seems to reflect the sequence of sampling during the April 2010 event. Specifically, in April 2010, both pumps were turned on initially, producing water at a rate of 10,000 gpm. Following the 10,000 gpm pumping, the pumps and aquifer were allowed to rest for a week and then sampling was repeated with only one of the pumps running (6,000 gpm). At the time of the subsequent 6,000 gpm sampling, a significant amount of river water may have remained in the aquifer, reflecting the previous 10,000 gpm operation. This is supported by different conductances of Ranney Well 2 water in April 2010 (i.e., initially about 680 $\mu\text{S}/\text{cm}^2$) and August 2010 (i.e., initially about 820 $\mu\text{S}/\text{cm}^2$) because the lower conductance measured in April 2010 indicates a higher proportion of river water. It is apparent that the data from the common ions that the collector water collected at 6,000 gpm, during the April 2010 sampling event, are highly suspect and, therefore, the mixing proportions indicated are probably not reflective of typical 6,000 gpm operating conditions. The reported percentage of river water in the collector during the 6,000 gpm operation in August 2010 is more likely to reflect actual operational conditions.

Note that the percentage of river water present in the collector at 10,000 gpm varies between the April 2010 (34.9 percent) and August 2010 (44.3 percent) sampling events. It is tempting to suggest that, as in April 2010, the 6,000 gpm pumping operation that preceded the 10,000 gpm pumping may have left residual surface water in the aquifer. However, given the uncertainties ($\pm$ values in Table 2) associated with the respective values, the difference may not be significant.

Note that the water in the collector varied with time as a function of the composition of river water above the collectors. Comparing samples from the collector at 10,000 gpm during the

April 2010 and August 2010 sampling events, the change in collector composition merely reflects the change in river water composition present at the time of pumping.

Microscopic Particulate Analyses

Ranney Well 2 has been classified as GWUDI when operating with both pumps on (10,000 gpm) based on MPA samples collected in 2004. Based on the common ion data described above from the August 2010 sampling event, however, it is likely that the fraction of river water in the collector is significantly less at 6,000 gpm. MPA samples were collected during the 6,000 gpm operation during both the April 2010 and August 2010 sampling events. The results of those tests are reported in Table 3 and the lab sheets are provided in Attachment 1.

Note that with respect to the common ion data for the 6,000 gpm operation in April 2010, the collector water reflected residual river water present in the aquifer from the previous 10,000 gpm operation. As a result, the April 2010 MPA at 6,000 gpm appears to represent a worst case scenario with respect to the MPA results, or the proportions of river water and groundwater eventually equilibrated to conditions typical of 6,000 gpm pumping at some time during the 24-hour MPA sampling. That the scores remain low indicates significant natural filtration is occurring between the river and the laterals.

Table 3. Results of April 2010 and August 2010 MPA Sampling Events at Ranney Well 2

<i>City of Boardman, Oregon</i> Indicator Organism	April 20, 2010 (per 100 gallons)	August 18, 2010 (per 100 gallons)	August 20, 2010 (per 100 gallons)
Pumping Rate (gpm)	6,000	6,000	10,000
<i>Giardia</i>	ND	ND	ND
<i>Cryptosporidium</i>	ND	ND	ND
Algae	1	1	99,886
Diatoms	ND	ND	ND
Rotifers	ND	1	1
Flagellates	19	2	ND
Nematodes	1	6	9
Ciliates	ND	2	ND
MPA Risk Score	4 (Low Risk)	5 (Low Risk)	15 (Moderate)

Note: The resulting risk scores for 6,000 gpm are both <10, indicating that under those operating conditions, the water should be classified as groundwater. Scoring based on OAR 333.061.0032 (8)(p) Table 11. Analyses are provided in Attachment 1.

The data for the 10,000 gpm operation yielded an MPA risk score of 15, which is similar to the higher range scores determined in 2003 and 2004, and consistent with the earlier OHA classification of the water from the collector at the 10,000 gpm operation as GWUDI. The MPA results at 6,000 gpm, however, are less than 10 and, therefore, are considered to be of low risk with respect to pathogenic organisms. Therefore, the water from the collector at 6,000 gpm meets the requirement for groundwater classification (OAR 333-61-0032 (8) (q) (A)), and filtration should not be required. A groundwater classification is further justified when

reviewing the common ion results and field parameter data (e.g., temperature, pH, conductivity), which show a strong groundwater signature.

Summary

- The City currently derives its water from Ranney Well 1, the source of which is classified as groundwater.
- The City constructed Ranney Well 2 which, when operating with both pumps running (10,000 gpm) during sampling conducted in 2004, was classified as GWUDI.
- The City received approval from the OHA Drinking Water Program to re-evaluate Ranney Well 2 using MPA with only one pump running (6,000 gpm) for GWUDI.
- Samples for common ions and MPA were collected from the river and Ranney Well 2 in April 2010 and August, 2010, under both 6,000 gpm and 10,000 gpm operational levels.
- The common ion data from both periods indicated that the water in Ranney Well 2 when the pumps were at rest was derived from area groundwater and not from the river.
- During the August 2010 sampling event, it was determined that the amount of river water present in Ranney Well 2 ranged from about 10 percent (operating at 6,000 gpm) to 44 percent (operating at 10,000 gpm). During the April 2010 sampling event it was determined that at 10,000 gpm, the amount of surface water present in the clear well was approximately 40 percent. The percent of surface water present at the 6,000 gpm pumping rate could not be determined because it was discovered that, even after a week's rest, residual surface water from the 10,000 gpm rate remained in the aquifer when the 6,000 gpm operation began.
- MPA results from the April 2010 sampling event at 10,000 gpm pumping was consistent with the GWUDI classification (score = 15) made previously during MPA sampling in 2004. At 6,000 gpm, the MPA results indicated a low risk (score = 4).
- MPA results from the August 2010 sampling event of Ranney Well 2 operating at 6,000 gpm also indicated a low risk (score = 5).
- The combined April 2010 and August 2010 MPA scores for Ranney Well 2, consistent with the common ion data, indicate that the water supplying the collector at 6,000 gpm should be classified as groundwater.

Reference

USEPA, 1992. Consensus Method of Determining Groundwaters Under the Direct Influence of Surface Water Using Microscopic Particulate Analysis (MPA). EPA Environmental Services Division, EPA 910/9-92-029.

Attachment 1

2010 MPA Data Sheets, City of Boardman, Collector 2, April and August, 2010

ANALYSIS FOR WATERBORNE PARTICULATES

CH Diagnostic and Consulting Service, Inc.
512 5th Street, Berthoud, CO 80513
P: (970) 532-2078 F: (970) 532-3358

Invoice 20100281

Customer 930586
City of Boardman
PO Box 229
Boardman, OR 97818

Laboratory Information

Federal Express; 4/21/2010; 1115 Hrs; 1.8°C; Wound
Results submitted by:

[Handwritten signatures]

Sample Identification: Boardman Collector #2

Sample Information: SOURCE: Horizontal Well; Unchlorinated; pH 7.4; 14.3°C; 0.053 NTU

Sample Date & Time: 4/20/2010 04:08 AM —> 4/20/2010 02:25 PM

Sampler: Barry Beyeler

Amount: 1896.285 L (501 gal)

Filter Color: White

Filter Type: Polypropylene wound cartridge

Date/Time Eluted: 4/21/2010 02:02 PM

Centrifugate: <0.001 mL/100 L

RESULTS OF MICROSCOPIC PARTICULATE ANALYSIS

Amount of sample assayed: 760 L

Amorphous Debris	clay (1-2 µm), silt (2-50 µm), inorganic precipitate, aggregates
Algae	1/100 Gal, some Chlorophytes
Diatoms	ND
Plant debris	ND
Rotifers	ND
Nematodes	1/100 Gal
Pollen (pine)	ND
Ameba	ND
Ciliates	ND
Colorless Flagellates	19/100 Gal
Crustaceans	ND
Other Arthropods	ND
Other	ND

Giardia and *Coccidia* are none detected (ND) by MPA unless reported under "Other".

This sample was analyzed for particulates following the Environmental Protection Agency Consensus Method for Determining Groundwaters Under the Direct Influence of Surface Water Using Microscopic Particulate Analysis (MPA). 1992. USEPA, Port Orchard, WA, EPA 910/9-92-029. All limitations stated in the methods apply. If HV capsule or foam filter was received, method was modified by filtering sample through a Pall Envirochek™ HV capsule or IDEXX Filta-Max™ filter at the sample site. If *Giardia* and *Cryptosporidium* Analysis was also performed, particulate extraction was modified.

COMMENTS: Score: 4-Low Risk per EPA Consensus Method referenced above.

ANALYSIS FOR WATERBORNE PARTICULATES

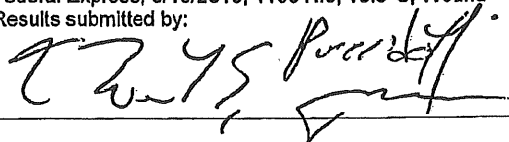
CH Diagnostic and Consulting Service, Inc.
512 5th Street, Berthoud, CO 80513
P: (970) 532-2078 F: (970) 532-3358

Invoice 20100670

Customer 930586
City of Boardman
PO Box 229
Boardman, OR 97818
PWSID# 4100130

Laboratory Information

Federal Express; 8/19/2010; 1100 Hrs; 10.0°C; Wound
Results submitted by:



Sample Identification: Collector #2, Collector @ 6K

Sample Information: SOURCE: Horizontal Well; 45' deep; 45' from surface water; Unchlorinated; pH 7.72 → pH 7.7;
15.9°C → 16.05°C

Sample Date & Time: 8/18/2010 05:26 AM → 8/18/2010 02:45 PM

Sampler: Barry Beyeler

Amount: 1748.67 L (462 gal)

Filter Color: Off white

Filter Type: Polypropylene wound cartridge

Date/Time Eluted: 8/19/2010 01:10 PM

Centrifugate: <0.001 mL/100 L

RESULTS OF MICROSCOPIC PARTICULATE ANALYSIS

Amount of sample assayed: 700 L

Amorphous Debris	clay (1-2 µm), silt (2-50 µm), inorganic precipitate, aggregates
Algae	1/100 Gal, some Cyanophytes, Oscillatoria
Diatoms	ND
Plant debris	ND
Rotifers	1/100 Gal
Nematodes	6/100 Gal
Pollen (pine)	ND
Ameba	2/100 Gal, test
Ciliates	2/100 Gal
Colorless Flagellates	2/100 Gal
Crustaceans	ND
Other Arthropods	1/100 Gal, Water mite
Other	ND

Giardia and *Coccidia* are none detected (ND) by MPA unless reported under "Other".

This sample was analyzed for particulates following the Environmental Protection Agency Consensus Method for Determining Groundwaters Under the Direct Influence of Surface Water Using Microscopic Particulate Analysis (MPA). 1992. USEPA, Port Orchard, WA, EPA 910/9-92-029. All limitations stated in the methods apply. If HV capsule or foam filter was received, method was modified by filtering sample through a Pall Envirochek™ HV capsule or IDEXX Filt-Max™ filter at the sample site. If *Giardia* and *Cryptosporidium* Analysis was also performed, particulate extraction was modified.

COMMENTS: Score: 5-Low Risk per EPA Consensus Method referenced above.

ANALYSIS FOR WATERBORNE PARTICULATES

CH Diagnostic and Consulting Service, Inc.
512 5th Street, Berthoud, CO 80513
P: (970) 532-2078 F: (970) 532-3358

Invoice 20100670

Customer 930586
City of Boardman
PO Box 229
Boardman, OR 97818
PWSID# 4100130

Laboratory Information

Federal Express; 8/20/2010; 1100 Hrs; 11.8°C; Wound
Results submitted by:

T. E. 45 P. 10/10/10

Sample Identification: Collector #2, Collector @ 10K

Sample Information: SOURCE: Horizontal Well; 44' deep; 45' from surface water; Unchlorinated; pH 7.57 —» pH 8.01;
15.9° —» 18.08°

Sample Date & Time: 8/19/2010 03:00 PM —» 8/19/2010 11:52 AM Sampler: Barry Beyeler

Amount: 1911.425 L (505 gal) Filter Color: Off white Filter Type: Polypropylene wound cartridge

Date/Time Eluted: 8/20/2010 02:12 PM Centrifugate: <0.001 mL/100 L

RESULTS OF MICROSCOPIC PARTICULATE ANALYSIS

Amount of sample assayed: 760 L

Amorphous Debris	clay (1-2 µm), silt (2-50 µm), inorganic precipitate, aggregates
Algae	99,886/100 Gal, some Chlorophytes, Chlamydomonas
Diatoms	ND
Plant debris	ND
Rotifers	1/100 Gal
Nematodes	9/100 Gal
Pollen (pine)	ND
Ameba	1/100 Gal, test
Ciliates	ND
Colorless Flagellates	ND
Crustaceans	ND
Other Arthropods	ND
Other	ND

Giardia and *Coccidia* are none detected (ND) by MPA unless reported under "Other".

This sample was analyzed for particulates following the Environmental Protection Agency Consensus Method for Determining Groundwaters Under the Direct Influence of Surface Water Using Microscopic Particulate Analysis (MPA). 1992. USEPA, Port Orchard, WA, EPA 910/9-92-029. All limitations stated in the methods apply. If HV capsule or foam filler was received, method was modified by filtering sample through a Pall Envirocheck™ HV capsule or IDEXX Filta-Max™ filter at the sample site. If *Giardia* and *Cryptosporidium* Analysis was also performed, particulate extraction was modified.

COMMENTS: Score: 15-Moderate Risk per EPA Consensus Method referenced above.

Ground Water Risk Factor Table

From: E.P.A. Consensus Method for Determining Groundwaters Under the Direct Influence of Surface Water Using Microscopic Particulate Analysis (MPA)

Table 1. Numerical range of each primary bio-indicator (Particulate) counted per 100 gallons water.

Indicators of surface water ¹	EH ³	H	M	R	NS
Giardia ²	>30	16-30	6-15	1-5	<1
Coccidia ²	>30	16-30	6-15	1-5	<1
Diatoms ⁴	>150	41-149	11-40	1-10	<1
Other Algae ⁴	>300	96-299	21-95	1-20	<1
Insects/Larvae	>100	31-99	16-30	1-15	<1
Rotifers	>150	61-149	21-60	1-20	<1
Plant Debris ⁴	>200	71-200	26-70	1-25	<1

1. According to EPA "Guidance Manual for Compliance with the Filtration and Disinfection Requirements for Public Water Systems Using Surface Water Sources", March, 1991 ed.
2. If Giardia cysts or coccidian are found in any sample, irrespective of volume, score as above.
3. Key= EH – extremely heavy M – moderate NS – not significant
H – heavy R – rare
4. Chlorophyll containing

Table 2. Relative surface water risk factors associated with scoring of primary bio-indicators (particulate) present during MPA of subsurface water sources.

Indicators of surface water ¹	Relative Risk Factor ³				
	EH ²	H	M	R	NS
Giardia	40	30	25	20	0
Coccidia	35	30	25	20	0
Diatoms	16	13	11	6	0
Other Algae	14	12	9	4	0
Insects/Larvae	9	7	5	3	0
Rotifers	4	3	2	1	0
Plant Debris	3	2	1	0	0

1. According to EPA "Guidance Manual for Compliance with the Filtration and Disinfection Requirements for Public Water Systems Using Surface Water Sources", March, 1991 ed.
2. Refer to Table 1 for range of indicators counted per 100 gallons.
Key= EH – extremely heavy M – moderate NS – not significant
H – heavy R – rare
3. Risk of surface water contamination
≥20 – high risk
10-19 – moderate risk
≤9 – low risk

APPENDIX H
DWS MPA Testing Review,
Ranney Collector No. 2

From: Kazmierczak Russell A <RUSSELL.A.KAZMIERCZAK@dhsosha.state.or.us>
Sent: Tuesday, October 09, 2012 2:19 PM
To: GOSS William H
Subject: City of Boardman - Ranney Well #2 Reclassification Request Review
Attachments: Boardman0001.pdf; Database Records on the Evaluation at Ranney Well.docx

Bill,

I have reviewed the technical memorandum, see attached, regarding *City of Boardman's Ranney Well 2 GWUDI Evaluation*. After reviewing the evaluation, I have several follow-up questions that I will need answered by the City of Boardman or the consultant before I can make a final determination on the reclassification of the Ranney Well #2 source from Groundwater Under the Direct Influence of Surface Water (GWUDI/GU) to Groundwater (GW). See below for my list of questions.

- 1) Figure 1. in the report indicated that the August 2010 pump test at 6,000 gpm pump was terminated early. What was the reason for the early termination?
- 2) As a result of the early termination of the pump test, is the percentage of river water listed in Table 2 accurate or could the percentage of river water actually be higher (i.e., similar to the April 6,000 gpm pump test)?
- 3) In addition to the potential for the percentage of river water to be inaccurate due to early termination of the pump test, is there also a potential for the MPA sample collected at the end of the pump to be inaccurate due to the high percentage of groundwater present at the time of sample collection?
- 4) The Sampling Scheduling and Data Acquisition section of the report indicates that the pool elevations at the time of the two sample events varied from 263.00 to 263.80 feet during the April 2012 sample event, and from 263.11 to 263.71 feet during the August 2012 sample event. The section also mentions that the pool levels are generally held at elevations varying from 262 to 265 feet. What methods, such as historical hydrographs, were used to obtain the pool levels from the U.S. Army Corps of Engineers?
- 5) According to the web site (see <http://www.nwd-wc.usace.army.mil/report/jda.htm>) for John Day Dam and Lake Umatilla, the lake elevation has the potential to vary from a minimum pool at 257.0 feet, to full pool at 268 feet, and maximum pool at 276.5 feet. What are the historic minimum, average, and maximum pool levels for Lake Umatilla since the Ranney Well #2 has been in operation?

In addition to the questions regarding the evaluation of Ranney Well #2, I have a few questions, see below, regarding the evaluation of Ranney Well #1, which was completed back in 1993 and 1994. The reason for the review was to determine how the Ranney Well #1 source ended up being classified as GW since the two sources are similar in construction and are located in close proximity to the Columbia River.

- 1) The 2004 Water System Survey indicates that the maximum pump rate on Ranney Well #1 was 6,700 gpm and the 2009 Survey indicates the rate is now 10,500 gpm. What was the pumping rate when the MPA samples were collected in 1993 and 1994?
- 2) Since the 1993-1994 GWUDI evaluation at Ranney Well #1, have the pumps at Ranney Well #1 been operated at a pumping rate greater than 6,000 gpm, if so, has the water system collected any MPAs at the higher rate?
- 3) The MPA database and records in my file indicate that 4 MPAs were collected back in 1993 and 1994 and out of the four samples, one had a risk score of 16 and the other three were less than 14. According to the Drinking Water Programs scoring methodology for MPAs, a score greater than 14 would require two more samples, but it looks like they were classified as GW based on the four samples, WHP (Well Head Protection?) and HGA (Hydrogeological Assessment ?) (see database screen shots below). Do you happen to know the reasoning for not requiring additional MPA samples with a risk score as high as 16 or did they happen to collect the two additional samples, if so, could the Springfield office get copies of the fifth and sixth MPA results?
- 4) Does the Pendleton office or the City of Boardman have any documentation regarding the evaluation on Ranney Well #1, if so, could the Springfield office get a copy for our files.

Thanks for any input you can provide and if you, the water system or the consultant need any clarification regarding the above questions, please let me know.

Sincerely,

Russell A. Kazmierczak, R.G.
Natural Resource Specialist
Drinking Water Program

Oregon Health Authority
Drinking Water Program
444 A Street
Springfield, OR 97477
Office: 541-726-2587 Ext. 26
Fax: 541-726-2596

email: Russell.A.Kazmierczak@state.or.us
<http://healthoregon.org/dwp>

APPENDIX I
2011 Water Management and Conservation Plan
Update Final Order

**BEFORE THE WATER RESOURCES DEPARTMENT
OF THE
STATE OF OREGON**

In the Matter of the Proposed Water	)	FINAL ORDER APPROVING A
Management and Conservation Plan for the	)	WATER MANAGEMENT AND
City of Boardman, Morrow County	)	CONSERVATION PLAN

Authority

OAR Chapter 690, Division 086, establishes the process and criteria for approving water management and conservation plans required under the conditions of permits, permit extensions and other orders of the Department.

Findings of Fact

1. The City of Boardman submitted a Water Management and Conservation Plan (plan) to the Water Resources Department (Department) on June 29, 2006. The plan was required by a condition set forth under the City's previously approved plan (*Special Order Volume 58, Page 100*) issued on October 21, 2003.
2. The Department published notice of receipt of the plan on July 4, 2006, as required under OAR Chapter 690, Division 086. No comments were received.
3. The Department provided written comments on the plan to the City on November 1, 2006. In response, the City submitted revisions to the plan on October 27, 2011, January 12, 2012 and February 23, 2012, which included updated year-2010 water use, water audit and population data.
4. As specified in the final order approving the City's previous plan (*Special Order Volume 58, Page 100*) issued on October 21, 2003, the City is authorized to divert up to 18.7 cfs under Permit S-40336. The City's revised plan (described in Finding of Fact #3 above) does not request authorization for increased diversion of water beyond 18.7 cfs under Permit S-40336.
5. The Department reviewed the revised plan and finds that it is consistent with the relevant requirements under OAR Chapter 690, Division 086.

Conclusion of Law

The Water Management and Conservation Plan submitted by the City of Boardman is consistent with the criteria in OAR Chapter 690, Division 086.

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 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.

Now, therefore, it is ORDERED:

1. The City of Boardman Water Management and Conservation Plan is approved and shall remain in effect until February 23, 2022, unless this approval is rescinded pursuant to OAR 690-086-0920.
2. The limitation of the diversion of water under Permit S-40336 established by the final order issued on October 21, 2003 approving the City's previous water management and conservation plan (*Special Order Volume 58, Page 100*) remains unchanged. Subject to other limitations or conditions of the permit, therefore, the City of Boardman remains authorized to divert up to 18.7 cfs under Permit S-40336.
3. The City of Boardman shall submit an updated plan meeting the requirements of OAR Chapter 690, Division 086 (effective November 1, 2002) within 10 years and no later than February 23, 2021.
4. The City of Boardman shall submit a progress report containing the information required under OAR 690-086-0120(4) by February 23, 2017.

Dated at Salem, Oregon this 23 day of February, 2012.


Dwight French, Water Right Services Administrator for
PHILLIP C. WARD, DIRECTOR

Mailing date: FEB 28 2012

APPENDIX J
Water Rate Resolution 12-2008 and 8-2011

CITY OF BOARDMAN RESOLUTION NO. 12 -2008

A RESOLUTION REGARDING WATER UTILITY RATES

WHEREAS, the City of Boardman Ordinance No. 47 as amended by Ordinance No. 47A, 116, and 124, provides authority for the City of Boardman to set water rates by resolution; and

WHEREAS, the City needs to create revenue for the Water Reserve Fund due to the cost of providing water and the age and condition of the City's Water System;

NOW, THEREFORE, BE IT RESOLVED, that effective July 1, 2008, the City of Boardman rates for water service is increased monthly for all customers as follows:

Inside City Limits Residential \$15.00 Base (7000 gallons) and \$.44 per 1000 overage
Outside City Limits Residential \$22.50 Base (7000 gallons) and \$.63 per 1000 overage
Commercial \$19.00 Base (8000 gallons) and \$.80 per 1000 overage
Schools remain the same rate at \$9.75 Base (6000 gallons) and \$.26 per 1000 overage

DATED this 6th day of May 2008.

CITY OF BOARDMAN



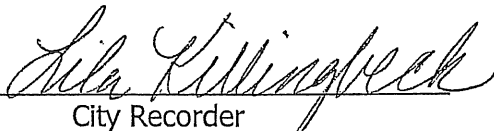
Mayor



Councilor



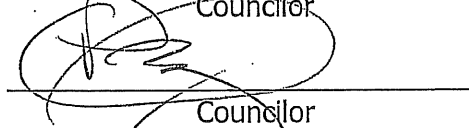
Councilor

ATTEST: 

City Recorder



Councilor



Councilor



Councilor



Councilor

CITY OF BOARDMAN RESOLUTION 8 -2011

**A RESOLUTION CONTINUING TEMPORARY REDUCTION OF COMMERCIAL WATER RATES
FOR WATER USAGE IN EXCESS OF THE 8,000 GALLON BASE
AND AMENDS RESOLUTION NO. 6-2010**

WHEREAS, The City of Boardman Ordinance No. 47, as amended by Ordinance No 47A, 116, and 124, provides authority for the City of Boardman to set water rates by resolution; and,

WHEREAS, The City Council recognizes the current downturn in the local, state and national economies; and,

WHEREAS, The City Council wishes to create a better economic climate for commercial and retail businesses; and,

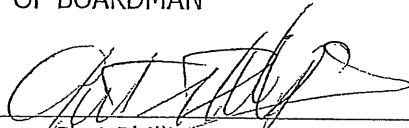
WHEREAS, The City Council believes a temporary reduction in the excess usage water rate for commercial and retail businesses will assist in maintaining this healthier business climate; and,

WHEREAS, The City Council believes this reduction in rates will maintain equitability for all commercial businesses within the City.

NOW, THEREFORE, BE IT RESOLVED: Effective upon passage of this resolution, for a period ending July 1, 2011, commercial excess usage water rates will be reduced from the rate of \$0.80 per 1,000 gallons overage of the 8,000 gallon base rate to a rate of \$ 0.40 per 1,000 gallons of overage of the 8,000 gallon base rate. The base rate of \$19.00 for the first 8,000 gallons of water used remains unchanged.

Passed by the Boardman City Council this 5th day of April, 2011.

CITY OF BOARDMAN



Mayor - Chet Phillips

Abstained

Councilor- Steve Doherty



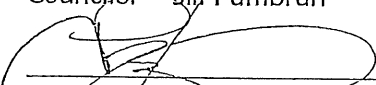
Councilor- F.E. Glenn



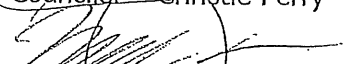
Councilor- Neil Livingston

absent

Councilor- Jill Pambrun

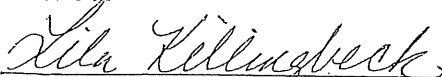


Councilor - Christie Perry



Councilor - Mark Pratt

ATTEST:



City Recorder