2007
CITY OF NEWBERG
Water Management and Conservation Plan

PREPARED FOR

City of Newberg

PREPARED BY

CH2MHILL

JULY 2007

WB032007012PDX 331365.A1.WR 7/12/07 kw

City of Newberg Water Management and Conservation Plan

Prepared for

City of Newberg, Oregon

July 2007

CH2MHILL

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Exhibits

Executive Summary

The City of Newberg is submitting this Water Management and Conservation Plan (WMCP) for review and approval by the Oregon Water Resources Department (OWRD).

The City of Newberg is located in Yamhill County and operates a public community water system that supplies drinking water to approximately 20,570 people in northwestern Oregon.

This WMCP satisfies the requirements of Oregon Administrative Rules (OAR) Chapter 690, Division 86 adopted by the Water Resources Commission in November 2002. It includes each of the required elements under OAR 690-086-0125 Municipal Water Supplier Plan Elements.

This WMCP also presents the City's water conservation and curtailment programs. These include a combination of existing programs that the City will continue, and new programs that will be initiated in coming years.

The plan is organized into the sections shown in Exhibit ES-1, each addressing specific sections of OAR Chapter 690, Division 86:

EXHIBIT ES-1
Plan Organization
2007 City of Newberg Water Management and Conservation Plan

Section	Requirement
Section 1: Introduction	*OAR 690-086-0125*
Section 2: Water Supplier Description	*OAR 690-086-0140*
Section 3: Water Conservation	*OAR 690-086-0150*
Section 4: Curtailment	*OAR 690-086-0160*
Section 5: Water Supply	*OAR 690-086-0170*

Description of Municipal Water Supplier

The City of Newberg has the second largest population in Yamhill County and serves as the commerce center for the eastern portion of the county's primarily agricultural economy. Over the past couple of decades, the City has been transitioning into a city with more urban characteristics. The City of Newberg's economic base has become more diversified, including some of its home-grown industries that have evolved into national and international leaders in their respective fields. This trend toward urbanization is likely to continue as the growth of the Portland metropolitan area increasingly influences the character of the City.

The City of Newberg operates a public community water system (Public Water System Identification No. 00557), supplying water to approximately 20,570 City residents through approximately 6,316 connections in three separate but interconnected distribution systems.

The City currently has ten operating groundwater sources of supply, including seven wells and three springs. Water from two of the three springs located north of the City—Skelton Spring and Snider Spring—supplies the Riparian Distribution System and flows directly to 49 connections after the addition of chlorine for disinfection. Water from the Riparian Distribution System in excess of consumer demand flows into a natural drainage swale and then percolates back into the ground. The Riparian Distribution System is separated by a series of normally closed valves from the main Newberg Water Distribution System that is primarily supplied by the groundwater wells. The City intends to maintain the separation between these two distribution systems.

Water from Oliver Spring supplies water to 19 connections in the Oliver Spring Water Distribution System after the addition of chlorine for disinfection. The Oliver Spring Water Distribution System is connected to the Newberg Water Distribution System by an altitude valve that allows excess water to flow into the Newberg Water Distribution System. Water from the Newberg Water Distribution System does not flow into the Oliver Spring Water Distribution System.

The seven operating groundwater wells are located in a well field on the south side of the Willamette River across from City and the water treatment plant. All water from the groundwater wells is treated at the water treatment plant before being delivered to customers.

Exhibit ES-2 compares the increasing population growth in the City of Newberg with the generally declining per capita use of water. This relationship is further illustrated by the fact that water production rates have remained relatively flat over the same period, and have increased at a much smaller rate of increase than that exhibited by population growth.

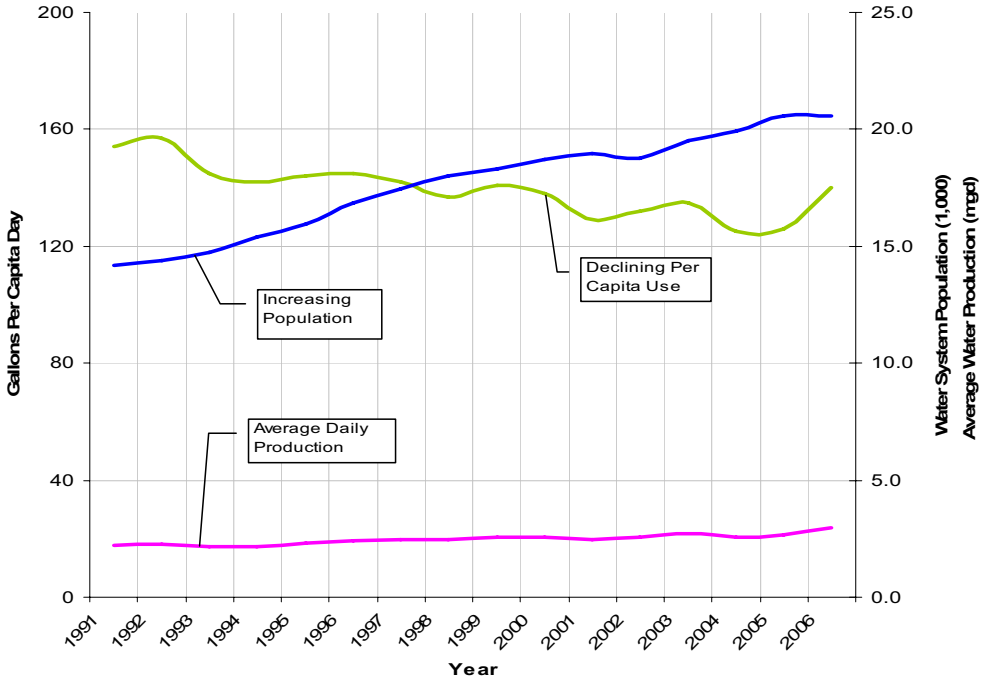


EXHIBIT ES-2
Historical per Capita Production
2007 City of Newberg Water Management and Conservation Plan

Water Conservation Element

Current Conservation Measures

The City has an approved WMCP that was last submitted to the OWRD on February 22, 2002. This WMCP is an updated version of that document.

The City has implemented the following conservation programs:

1. **Public Information.** The City's Water Conservation Coordinator has worked to provide information to the public that will educate them on the value of and means to conserve water.

2. **Rates.** The City has a uniform rate structure that is based on the quantity of water metered. Irrigation customers have special irrigation meters and are charged at a higher rate than domestic customers.

3. **Leak Detection and Repair.** Approximately 7.1 percent of the water in the larger Newberg Water Distribution System is unaccounted for, and the City quickly responds to any leaks reported by customers or water department staff. The City does not have a systematic leak detection program for the distribution system at this time because of the low level of unaccounted-for water. However, in 1995 a leak detection survey was conducted and four small leaks were detected and repaired. The city currently uses leak

detection on an as-needed basis in the maintenance and operation of the distribution system. The much smaller Riparian Distribution System has approximately 75 percent unaccounted-for water due to deficient accounting and monitoring practices. The City is aware of this shortfall and has implemented a plan to bring the Riparian Distribution System up to the standard of the larger Newberg Water Distribution System. When both systems' data are combined for analysis, the unaccounted-for water is about 10.1 percent.

4. **Water Audit.** Beginning in 2006 the City accounts for annual average, maximum day, and per capita water use, total production and consumption, and unaccounted-for water in its two distribution systems.

5. **System-Wide Metering.** The City of Newberg serves more than 20,570 water customers. Almost all of its 6,316 connections are metered. A few connections in the Riparian Water Distribution System may be unmetered and the City will meter these connections when they are identified. All new connections have meters.

6. **Fixture Replacements.** Since 1992, the City has offered free water-efficient showerheads, faucet aerators, and hose nozzles to its water customers. Approximately 200 replacements are made each year.

7. **Technical Assistance to Large-volume Users.** The City's Water Conservation Coordinator provides advice, information, and resources on request by any of the City's water customers. This service includes large volume customers both as requested and as unusual trends in their consumption are noted.

8. **Water Meter Replacements.** The City's meter replacement program from 2001 to 2004 resulted in the replacement of almost all residential and commercial water meters. The new meters are expected to be problem-free until at least 2011, at which time the City will begin to investigate their accuracy and explore the need for another replacement cycle. Meters are repaired and replaced as required to produce accurate readings of the water actually consumed at a metered location. The City has assessed to a water meter fee that funds the maintenance and replacement of meters, and meters are replaced as they fail or are damaged.

9. **Improvements to the Water Treatment Plant.** The City of Newberg's Water Treatment Plant (WTP) has been in operation since it was originally built in 1949. The WTP has been expanded and upgraded through the years to increase its instantaneous peak capacity to 9.5 million gallons per day (mgd), and sustained capacity of 8.6 mgd. In 2002, the City began the Phase I construction of the WTP to ensure continued optimal treatment at a WTP capacity of 5.63 mgd. Phase II construction, which began in 2005, upgraded and expanded the existing treatment facilities to ensure optimal treatment at instantaneous peak operation of 9.5 mgd and sustained capacity of 8.6 mgd. These improvements to the City's WTP have resulted in significant water conservation from reduced filter backwash water consumption, and are due in part to improved settling basin hydraulics and automatic solids removal system, filter air scour, reliable accurate electric actuated valves, two additional filters, Leopold underdrains and pilot plant testing data that specified specific media sizes and ratios all of which allowed backwash cycle programming specific to ideal performance with minimal backwash water loss. A

new onsite chlorine generation system for oxidation and disinfection was also constructed and is in operation at the facility.

10. **Use of Non-Potable water for Irrigation.** Otis Spring will supply approximately 0.35 mgd of non-potable water for golf course irrigation in 2007 and beyond, thereby reducing demand on the well supply and WTP system.

11. **Water Reuse Project.** The City of Newberg's wastewater treatment plant will produce up to 1.0 mgd of non-potable water for irrigation purposes when it is put into operation in 2008, thereby reducing demand on the well supply and water treatment plant system. The reuse facility is being designed for future expansion to 2.0 mgd.

Summary of Ongoing and Proposed Conservation Programs

The City will continue or implement the following conservation measures:

1. **Public Information.** Continue membership in the Regional Water Providers Consortium and public education programs.

2. **Rates. C**ontinue the current uniform rate structure that links the amount of water used to the amount billed, because this encourages water conservation.

3. **Water Audit**. Perform annual water audits that record annual average, maximum day, per capita water use, and unaccounted-for water rates.

4. **Leak Detection.** Maintain the City's water pipe maintenance program that has resulted in less than 10 percent system-wide leakage in the Newberg Water Distribution System.

5. **Water Accounting:** Upgrade the measurement and accounting procedures used to track water distribution and consumption in the smaller Riparian Water Distribution System to obtain an accurate account of water actually consumed, water discharged to the natural swale for recharging groundwater supplies, and unaccounted-for water.

6. **Production Meter Calibration**. Accurate metering is essential for achieving reliable accounting of water use. To achieve this goal, the City installed two new master meters at the water treatment plant and will periodically calibrate and check them every 5 years, or more frequently if conditions warrant. There is one meter dedicated to measuring the output through each of two treatment trains. Prior to 2006, well production was measured by individual well meters and settling basin influent meters and these were used to calculate WTP water production. The new master meters are an improvement on the old system.

7. **Large Meter Calibration.** The City supports an ongoing recalibration program for water meters 3" and larger, and calibrates these meters on a biennial basis (every two years), with half of the meters being calibrated in a given year.

8. **Meter Installations**. Continue to install meters for all new customers, and on any existing connections that are identified as unmetered.

9. **Pipe Looping.** Continue to complete pipe loops to reduce flushing water requirements.

5-Year Benchmarks

In keeping with OAR 690-086-0150(4) and (6), the City will implement the following conservation benchmark measures over the next 5 years:

- **Annual Water Audits.** The City of Newberg plans to conduct annual water audits to measure unaccounted-for water and estimate leakage rates. The City is now tracking production against billed consumption on a monthly basis to generate a rolling 12-month average that is used to calculate unaccounted-for water. By this means the City will be able to determine more quickly deviations from the trend that could indicate potential problems in the system.
- **System Metering.** The City will install a meter at any unmetered connection when identified. The City will continue to require meters for all new development within the City.
- **Riparian Water Distribution System Accounting.** The City of Newberg will implement a program to accurately monitor water flowing into and out of the Riparian Distribution System to obtain an accurate representation of unaccounted-for water in this system.
- **Oliver Spring Water Distribution System Accounting.** The City of Newberg will implement a program to accurately monitor water flowing into and out of the Oliver Spring Water Distribution System to obtain an accurate representation of unaccounted-for water in this system.
- **Meter Testing and Maintenance**. The City will track the performance of new and existing meters installed throughout the distribution system and maintain records of their performance. The City intends to develop a residential meter evaluation program after 2011 to assess meter accuracy and candidacy for replacement. The meter evaluation program will most likely begin during 2016.
- **Rate Structure**. The City will continue to support a conservation-oriented water rate structure.
- **Leak Detection**. The City has an ongoing water line replacement program with a $45,000 annual budget. The goal is to replace leaking and undersized pipes, and those pipes that are most prone to failure. New pipes are also added to complete looping in the system to eliminate dead-end sections. The result of this program is a reduction in leakage and a reduced need for flushing because dead-end sections are eliminated. Also, the City is implementing a program that compares water production, demand, and billable consumption for the previous year to gain insight into unaccounted-for water.
- **Public Education**. The City is planning to build an approximately 2,500 square foot Xeriscape™ demonstration garden during the next 5 years that will contain native, drought tolerant, water wise, wildlife friendly vegetation. Although the types of vegetation have yet to be finalized, there will most probably be some mountain hemlock, blue blossom, Oregon grape, flowering currant, aster, Oregon iris, and California fescue. The garden will be designed around plant varieties that will give it year-round beauty. Additionally, signage and kiosks will provide plant identification and resources for visitors. The City will continue to provide public education to highlight the importance

of water conservation through community business meetings, open houses, and other community functions.

- **Water Reuse, Recycling, and Non-potable Water Opportunities**. The City will look for additional reuse and recycling opportunities.

Water Curtailment Element

The City adopted a curtailment ordinance in 1998. This ordinance outlines four stages of severity of water shortages, and the actions to be initiated at each stage. Proposed minor variations to the established ordinance are presented in this plan, specifically the addition of a drought emergency declared by the Governor. These changes are provided for the City's consideration, but the City's actual plan remains in force as adopted in 1998. Exhibit ES-3 summarizes the proposed, revised curtailment plan.

EXHIBIT ES-3
Newberg Curtailment Plan
2007 City of Newberg Water Management and Conservation Plan

Stage	Initiating Conditions	Water Use Reduction Goal
1. Water Alert Status	Daily water demand is ≥ 90% of the instantaneous production capacity of the system for 3 or more days in a row, or a Drought Emergency is declared by the Governor.	Reduce demands by 5%
2. Serious Water Shortage	Daily water demand is ≥ 95% of the instantaneous production capacity of the system, for 3 or more days in a row, or the Drought Emergency continues.	Reduce demands by 10%
3. Critical Water Shortage	The City cannot completely refill reservoirs during the nighttime for 2 or more days in a row (demands are ≥ 100% of instantaneous production capacity).	Reduce demands by 20%
4. Emergency Water Shortage (Minimum Fire Protection Level)	Water system failure due to natural or human-made disasters: 1. Reservoirs remain at 50% full or less after nighttime refill period and conditions suggest that the shortfall will continue. 2. One or more of the primary transmission lines from the groundwater wells or from the water treatment plant break. 3. A natural or human-made disaster occurs that disrupts production.	Reduce demands by 35% or more

Water Supply Element

The per capita method was used to project the City of Newberg's demands. This method assumes: (1) per capita use will remain unchanged compared to recent years, and (2) the mix of commercial versus residential water use will remain unchanged compared to recent years. The City will periodically monitor both factors to determine their validity.

Based on the available records, the following values were used to project future demands:

- 2006 service population = 20,570
- 2006 annualized average daily water demand = 3.0 mgd
- Annual residential growth rate = 2.5 percent
- Maximum daily demand to average daily demand (MDD/ADD) ratio = 2.1

Population growth, based on an average annual increase of 2.5 percent, is expected to continue during the 20-year period of this report. The projected population in 2027 is predicted to approach 40,000.

Based on a per capita demand of 140 gallons per day (gpd) in 2006, a 2.5 percent growth rate, and an MDD/ADD ratio of 2.1, the City's sustained maximum 8.6 mgd WTP capacity with every unit running and no redundancy will be unable to meet the system's MDD before 2020. A new WTP expansion is planned in this time frame to replace the existing treatment plant.

The City is creating this plan for two reasons. The first reason is to meet new requirements Oregon Administration Rules and the second is to provide justification for receiving legal access to the maximum amount of water available under its extended permit G-13876. The following two paragraphs summarize the current situation and describe future needs.

The City of Newberg has water rights for a total of 43.6 cfs (28.2 mgd), of which 15.4 cfs (9.95 mgd) is currently available for potable water use by the City to supply its three water distribution systems. A considerable portion of the water that is legally accessible for use by the City (8.15 cfs [5.2 mgd]) is assigned to six springs, of which only three with a total production of 0.28 cfs (0.18 mgd) are producing potable water. In addition, a substantial portion of the legally available water is inaccessible during the summer months when the maximum daily demand (MDD) is the greatest. During the summer of 2006, for example, the City had access to only 9.7 cfs (6.3 mgd) from all of its water sources. The City's current MDD 10.7 cfs (6.9 mgd) exceeds available supply by 1.0 cfs (0.65 mgd). Although the City has the necessary resources to produce sufficient additional quantities of water to meet its current MDD from Well 8 (which can pump 5.1 cfs [3.3 mgd]), the amount of water legally available from this well field currently limits Well 8's production to 2.2 cfs (1.4 mgd) when Well 7 is in operation. Other system resources, including groundwater wells and springs, have reduced output in the summer when the water is most needed. It is typical for a Phase I water shortage alert to be issued during the summer months to reduce water use and manage the shortfall. This situation is expected to become more critical as the population increases and water resources are strained even further.

The City of Newberg received an extension of time for permit G-13876 that allows use of up to 6.22 cfs of the 20 cfs authorized under the permit. The existing 1.0 cfs (0.65 mgd) deficit between the City's maximum daily demand and legally available water is expected to increase to 7.9 cfs (5.1 mgd) during the 20 year period of this plan. This represents a 45 percent deficit when compared to the projected MDD of 17.64 cfs (11.4 mgd). The data suggest that an increase in legal access to the existing water rights will be required to meet water system demand over the next 20 years, and this increase will be needed for specific water resources within the City's water supply system. The City is requesting legal access to the entire 20 cfs (12.9 mgd) allocated to existing Wells 7 and 8 and future Wells 9, 10, and 11.

This will provide the City with the necessary water resources to meet expected demand, to operate its other water resources more efficiently, and will eliminate the need to activate water curtailment measures due to a shortfall in legally available water.

List of Affected Local Governments

This plan may affect Yamhill County where the City of Newberg is located and Marian County where the well field is located. Thirty days before submitting this plan to OWRD, Yamhill County and Marian County were invited to review this plan and provide comments relating to its consistency with their comprehensive land use plans.

Plan Update Schedule

The City anticipates submitting an update of this plan within 10 years, or by June 2017. As required by OAR 690-86, a progress report will be submitted in 5 years, or by June 2012.

SECTION 1

Introduction

This section satisfies the requirements of Oregon Administrative Rule (OAR) 690-086-0125.

Municipal Water Supply Plan Elements OAR 690-086-0125

Overview

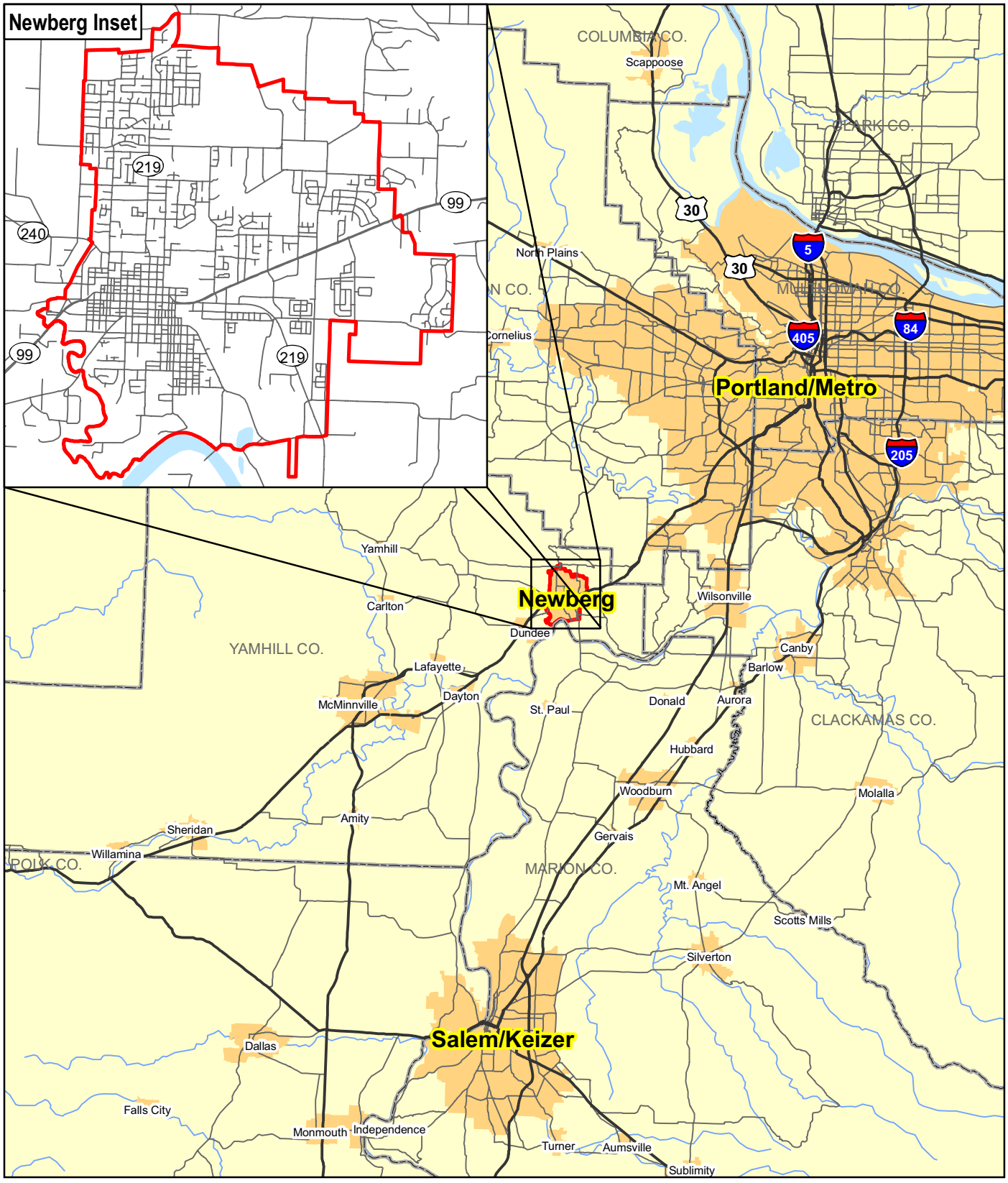
The City of Newberg had a 2006 service population of approximately 20,570 people served through approximately 6,316 service connections in three separate distribution systems. Exhibit 1-1 shows the City location and its surroundings. The City currently has ten operating groundwater sources of supply, including seven wells and three springs that provide potable water for its water distribution systems. The following is an overview of the three water distribution systems:

- **Newberg Water Distribution System:** Seven wells and Oliver Spring currently supply the larger Newberg Water Distribution System. Approximately 99 percent of the water in this system comes from seven operating groundwater wells located in a well field on the south side of the Willamette River across from City and the water treatment plant. All water from the groundwater wells is treated at the water treatment plant before being delivered to consumers. Oliver Spring supplies water to 19 dedicated connections after the addition of chlorine, and excess water then flows through an altitude valve into the Newberg Water Distribution System. The City of Newberg supplies on average about 93.7 percent of its total water demand through this large system.

- **Riparian Water Distribution System.** Skelton Spring and Snider Spring supply water to 49 connections in the Riparian Water Distribution System after disinfection with chlorine. Excess water from this system flows into a natural swale where it percolates into the ground. The Riparian Water Distribution System is interconnected to the Newberg Water Distribution System by way of normally closed valves on the south side of the North Valley Reservoirs. Water from the Newberg Water Distribution System does not flow into the Riparian Water Distribution System. The City of Newberg derives on average about 4.5 percent of its water supply from these two springs.

- **Oliver Spring Water Distribution System.** Oliver Spring supplies water to 19 connections in a small distribution system after disinfection with chlorine. Excess water from this spring flows through an altitude valve and supplements the Newberg Water Distribution System. Water from the Newberg Water Distribution System does not flow into the Oliver Spring Water Distribution System. The City of Newberg derives on average about 1.8 percent of its water supply from Oliver Spring.

The City's water sources are mapped in Exhibit 1-2.



LEGEND

- Newberg City Limits
- Other Urban Areas
- County Boundaries
- Highways
- Other Roads

N

0 4 8

Miles

Exhibit 1-1

Newberg, Oregon and Vicinity

CH2MHILL

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City of Newberg

Snyder Springs (700 ft. MSL)

Skeleton Springs (890 ft. MSL)

North Valley Rd. Reservoirs

Oliver Springs (650 ft. MSL)

Highest Point in URA (580 ft)

Oak Knoll Booster (Ivy Dr.) Pump Station

Otis Spring Non-potable Water Irrigation Source

Corral Creek Rd. Reservoir (overflow elevation 402.6 ft. MSL)

Water Treatment Plant

Well Field

NORTH VALLEY RD
STATE HWY 219
BELL RD
SPRINGBROOK RD
MOUNTAINVIEW DR
COLLEGE ST
CRESTVIEW DR
SOUTHERN PACIFIC RR
MAIN ST
VILLA RD
STATE HWY 99W
WWNOOSKI ST
9TH ST
Willamette River

LEGEND

- City Limits
- Urban Growth Boundary (UGB)
- Urban Reserve Area (URA)
- Tax Lots
- Large Waterbodies

Existing Water System Pipe Diameter (inches)

- 24"
- 20"
- 18"
- 16"
- 14"
- 12"
- 10"
- 8"
- <= 6"
- Size Unknown

N

0 2,400 4,800
Feet

Exhibit 1-2

Water System Schematic

2007 City of Newberg Water Management and Conservation Plan

CH2MHILL

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Plan Organization OAR 690-086-0125 (1), (2), (3), and (4)

This WMCP fulfills the requirements of the Oregon Administrative Rules adopted by the Water Resources Commission in November 2002 (OAR Chapter 690, Division 86). It describes water conservation and curtailment programs to guide planning and operation of the City's system. As outlined in Exhibit 1-3, the plan is organized into sections that address specific sections of OAR Chapter 690, Division 86.

EXHIBIT 1-3
Plan Organization
2007 City of Newberg Water Management and Conservation Plan

Section	Requirement
Section 1: Introduction	OAR 690-086-0125
Section 2: Water Supplier Description	OAR 690-086-0140
Section 3: Water Conservation	OAR 690-086-0150
Section 4: Curtailment	OAR 690-086-0160
Section 5: Water Supply	OAR 690-086-0170

Affected Local Governments OAR 690-086-0125 (5)

This plan may affect Yamhill County where the City of Newberg is located and Marian County where the well field is located. Thirty days before submitting this plan to OWRD, Yamhill County and Marian County were invited to review this plan and provide comments relating to its consistency with their comprehensive land use plans. The letters requesting this input and the corresponding input received, are provided in Appendix A.

Plan Update Schedule OAR 690-086-0125 (6)

The City of Newberg anticipates submitting an update of this plan within 10 years of plan approval. As required by the Commission's rules, a progress report will be submitted within 5 years from the approval of this plan.

Time Extension OAR 690-086-0125 (7)

No extension of time to implement metering is required or requested.

SECTION 2

Water Supplier Description

This section satisfies the requirements of Oregon Administrative Rule (OAR) 690-086-0140.

Source 690-086-0140(1)

Founded in 1869, the City of Newberg (City) was formally incorporated in 1893. The town soon became the active service center for surrounding agricultural areas. The local Quaker community founded the Friends Church in 1884, and, 1 year later established the Pacific Academy, which is now George Fox University.

The City owns and operates the public drinking water system that serves City residents and a small number of customers located outside the City limits through three separate but interconnected water distribution systems that are supplied by ten groundwater sources. The three water distribution systems are:

- **Newberg Water Distribution System:** Seven wells and Oliver Spring currently supply the larger Newberg Water Distribution System. Approximately 99 percent of the water in this system comes from seven operating groundwater wells located in a well field on the south side of the Willamette River across from City and the water treatment plant. All water from the groundwater wells is treated at the water treatment plant before being delivered to consumers. Oliver Spring supplies water to 19 dedicated connections after the addition of chlorine, and excess water then flows through an altitude valve into the Newberg Water Distribution System. The City of Newberg supplies on average about 93.7 percent of its total water demand through this large system.

- **Riparian Water Distribution System.** Skelton Spring and Snider Spring supply water to 49 connections in the Riparian Water Distribution System after disinfection with chlorine. Excess water from this system flows into a natural swale where it recharges the groundwater. The Riparian Water Distribution System is interconnected to the Newberg Water Distribution System by way of normally closed valves on the south side of the North Valley Reservoirs. Water from the Newberg Water Distribution System does not flow into the Riparian Water Distribution System. The City of Newberg derives on average about 4.5 percent of its water supply from these two springs.

- **Oliver Spring Water Distribution System.** Oliver Spring supplies water to 19 connections in a small distribution system after disinfection with chlorine. Excess water from this spring flows through an altitude valve to supplement the Newberg Water Distribution System. Water from the Newberg Water Distribution System does not flow into the Oliver Spring Water Distribution System. The City of Newberg derives on average about 1.8 percent of its water supply from Oliver Spring.

The first components of the system were constructed in 1894, and the system has been owned and operated by the City since that time. Originally, water came primarily from the Columbia River Basalt formation springs on the southwest flank of the Chehalem

Mountains. Oliver Spring was the first to be developed in 1894, then Otis Springs in 1911, Skelton Springs in 1919, Atkinson/Reynolds Springs in 1923, and Snider Springs in 1905.[1] In recent times the majority of water supplied to the City's system comes from groundwater wells located south of the City. The City continues to use Oliver, Skelton, and Snider Springs.

Wells in young alluvium formations on the south side of the Willamette River serve as the primary source of water. The City constructed the first well in 1948, another in 1951, two in 1970, two in 1980, one in 2001, and one in 2005. This well water contains high levels of iron and is treated at the nearby City of Newberg Water Treatment Plant (WTP).

The WTP has been in operation since it was originally built in 1949. Over the years, the WTP has been expanded and upgraded so that the current instantaneous capacity is 9.5 million gallons per day (mgd) with a sustained capacity of 8.6 mgd. The treatment processes at the plant include pre-oxidation and disinfection using onsite generated sodium hypochlorite, contact basins, filtration, and pH adjustment using sodium hydroxide.

In 2002, the City began the Phase I improvements of the WTP to retain its capacity, improve performance and ensure continued optimal treatment at a plant capacity of 5.63 mgd. Components of this project included:

- Filter rehabilitation to replace filter media and underdrains
- Auxiliary air scour cleaning system for filters
- Backwash flow control improvements
- Permanent sodium hydroxide storage and feed system
- Instrumentation and control improvements

Phase II improvements of the WTP project in 2006 upgraded and expanded the existing treatment facilities to ensure continued optimal treatment at the expanded plant capacity to an instantaneous capacity of 9.5 mgd and a sustained capacity of 8.6 mgd. Components of this project included:

- Contact Basin repair and improvements
- Filter expansion and improvements
- Clearwell expansion and improvements
- Finished Water expansion and improvements
- Chlorine system replacement and expansion
- Sodium hydroxide system improvements
- Backwash lagoon pump station and pipeline to wastewater treatment plant (WWTP)
- Site development improvements
- Site electrical expansion and improvements
- Site instrumentation and control (I&C) expansion and improvements
- Access and safety improvements

Recent improvements to the City's WTP have resulted in the efficient utilization of process water side streams. From 2003 through 2006 an average of 3 percent of water produced by

[1] *Water Management and Conservation Plan for the City of Newberg*. December 2004.

the well field was used in the WTP as process water. During the same period, an average of 4 percent of water produced by the well field was used in the WTP to backwash the filters.

The system identification number provided by the Oregon Department of Human Services Drinking Water Program is Public Water Supply No. 41-00557. It is listed as the Newberg Water District.

Intergovernmental Agreements 690-086-0140(1)

The City of Newberg currently has no interconnections with other municipal supply systems or cooperative regional water management systems.

Service Area Description 690-086-0140(2)

Exhibit 1-2 is service area map of the City's existing water system. Exhibit 2-1 provides service population for 1991 through 2006. As of 2006, the City's water system served a population of approximately 20,570. Based on U.S. Census data, and population estimates from Portland State University's Population Research Center, the historical annual rate of population growth in Yamhill County from 1990 through 2005 was 3.7 percent. The average population growth rate for the City of Newberg from 1991 through 2006 is 2.5 percent.

The service area populations listed in Exhibit 2-1 include customers within and outside City limits. According to the Oregon Department of Human Services Drinking Water Program web site (http://oregon.gov/DHS/ph/dwp/index.shtml, accessed February 2007), the City's water distribution systems serve approximately 20,570 people through 6,316 connections.

EXHIBIT 2-1
Population Data
2007 City of Newberg Water Management and Conservation Plan

Year	Water System Population	Percent Change
1991	14,166	
1992	14,406	1.69%
1993	14,735	2.28%
1994	15,371	4.32%
1995	15,956	3.81%
1996	16,831	5.48%
1997	17,436	3.59%
1998	18,029	3.40%
1999	18,321	1.62%
2000	18,735	2.26%
2001	18,951	1.15%
2002	19,421	2.48%

EXHIBIT 2-1
Population Data
2007 City of Newberg Water Management and Conservation Plan

Year	Water System Population	Percent Change
2003	19,530	0.56%
2004	19,910	1.95%
2005	20,565	3.29%
2006	20,570	0.02%
Average	-	2.5%
Low	-	0.02%
High	-	5.5%

As can be seen in Exhibit 2-2, the City's population grew at an increasing rate through the 1970s when it achieved a growth rate of almost 60 percent, and then the growth rate tapered off to an estimated 35 percent for decade that will end in 2010. The City expects that its growth rate will continue to decline, although it is expected to achieve a healthy 25–37 percent through 2040.

EXHIBIT 2-2
Population Data by Decade
2007 City of Newberg Water Management and Conservation Plan

Decade	Population	Increase
1960	4,208	–
1970	6,507	54.8%
1980	10,394	59.7%
1990	13,086	25.9%
2000	18,064	38.0%
2010	24,497	35.6%
2020	33,683	37.5%
2030	42,870	27.3%
2040	54,097	26.2%

The City of Newberg future population projections are shown graphically in Exhibit 2-3; these data are extrapolated from the average percent change calculated from the data contained in Exhibit 2-1

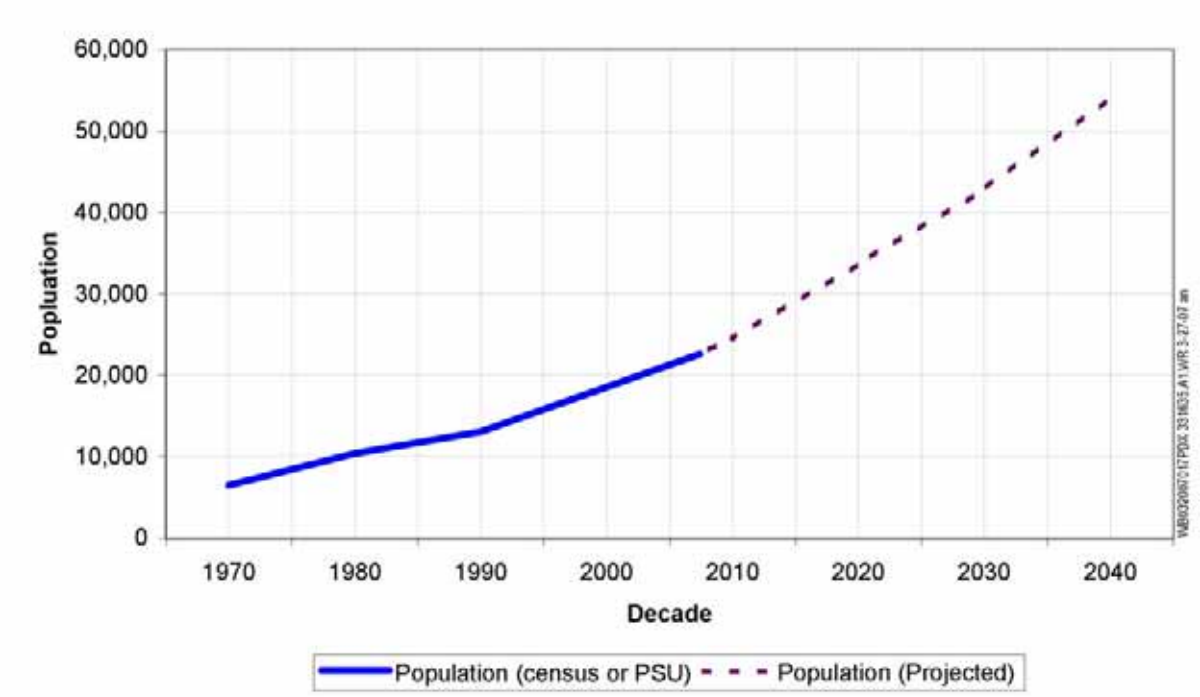

EXHIBIT 2-3
City of Newberg Population Projection to 2040
2007 City of Newberg Water Management and Conservation Plan

Reliability of Water Supply 690-086-0140(3)

The City's potable water supply currently comes from ten groundwater sources: Oliver Spring, Skelton Spring, Snider Spring, and seven groundwater wells. These water sources serve three separate but interconnected distribution systems as described earlier in this section in the subsection entitled Source 690-086-0140(1). Currently, during the summer months, the City is unable to meet its maximum daily demand of 6.9 mgd (10.7 cfs) due to water supply capacity constraints. Under these conditions, the MDD exceeds the production capacity of 6.3 mgd, and this has caused the City to activate its curtailment plan, Phase 1—Water Alert Status on a regular basis. Exhibit 2-4 provides details about the water resources actually available to the City in the summer when it must meet its MDD. The City has been able to meet the seasonal system demands in excess of system capacity by reducing this demand through its curtailment efforts. Exhibit 5-7 depicts this shortfall and illustrates how the deficit between the existing water right and maximum daily demand will continue to increase.

The Riparian Water Distribution System supplies 49 connections and is supplied by Snider and Skelton springs. At all times, excess water not consumed in this distribution system flows into a natural drainage swale. During the peak demand months of summer, this source of supply is almost entirely consumed by demand within the system.

Oliver Spring supplies water to 19 customers located in the Oliver Spring Water Distribution System which is at a higher elevation than the larger Newberg Water Distribution System. During the fall, winter, and spring months, excess water from Oliver

Spring flows into the Newberg Water Distribution System through an altitude valve. During the summer, when water production from Oliver Spring declines to a level that is only sufficient to provide water to the 19 Oliver Spring Water Distribution System customers, no water flows into the Newberg Water Distribution System from this source.

Seven groundwater wells and Oliver Spring currently supply the larger Newberg Water Distribution System. Approximately 99 percent of the water in this system comes from seven operating groundwater wells located in a well field on the south side of the Willamette River across from City and the water treatment plant. The well field production is limited by both water supply capacity and water rights permit constraints. The water supply capacity constraints include seasonal variations in aquifer levels that affect specific wells, limits on access to water rights, and water source production limitations. The following examples are given to provide further understanding of the limitations the City currently encounters:

- Seasonally, during the summer, the aquifer serving Well 5 drops to a level that renders it non-operational. Oliver Spring also has reduced flow, and no water from this source is available to supply the Newberg Water Distribution System.
- Well 8 operates at a maximum production rate of 1.44 mgd due to water rights limitations, although it has the tested capability to produce approximately 5.8 mgd. As currently configured, its pump can produce 3.3 mgd. However, the current water rights limitations for Wells 7–11 limits production from Well 8 to 1.44 mgd.
- The production limitations result from the management of well output to prevent iron fouling in the aquifer and around the well screens, which could result in a permanent reduction of well capacity.
- During the summer months, the pumping capacity of Wells 1–6 is reduced from an observed maximum of 5.9 mgd in the winter (2006 data) down to 2.8 mgd (2006 data).

EXHIBIT 2-4
Seasonal Access to Water Resources
2007 City of Newberg Water Management and Conservation Plan

Source	Supported System	WRD Status	Water Right (mgd)	Potable Water Production Capability (mgd)	Summer Production Capacity (mgd)	Remarks
Gardner Spring	N/A	Non- Cancelled	2.6	N/A	N/A	Out-of-service
Otis Spring	Non-potable Irrigation	Non- Cancelled	2.6	N/A	N/A	Used for non-potable irrigation
Oliver Spring	Oliver	Non- Cancelled	0.05	0.050	0.002	The City has exclusive rights to this water, which serves 19 domestic customers in the Oliver Spring Water Distribution System before excess water is allowed to feed the Newberg Water Distribution System.
Atkinson Spring	Riparian	Non- Cancelled	1.3	N/A	N/A	Not connected to the system due to excessive sediment.
Skelton Spring	Riparian	Non- Cancelled	1.3	0.030	0.030	Serves 49 domestic customers in the Riparian Water Distribution System before excess water is allowed to go to natural drainage.
Snyder Spring	Riparian	Pending w/ OWRD	0.3	0.100	0.010	
SPRINGS TOTAL:			8.15	0.18	0.042	
POTABLE SPRINGS TOTAL:			1.65	0.18	0.042	
Well # 1	Newberg	Non- Cancelled	1.4	0.900	0.504	
Well # 2	Newberg	Non- Cancelled	1.4	0.300	0.230	
Well # 3	Newberg	Cancelled	N/A	N/A	N/A	Water right for 1.9 mgd transferred to Well # 5
Well # 4	Newberg	Non- Cancelled	1.7	0.500	0.319	
Well # 5	Newberg	Non- Cancelled	2.6	1.600	0.0	Original 0.7 mgd plus 1.9 mgd from Well # 3
Well # 6	Newberg	Non- Cancelled	2.6	2.2	1.6	

EXHIBIT 2-4
Seasonal Access to Water Resources
2007 City of Newberg Water Management and Conservation Plan

Source	Supported System	WRD Status	Water Right (mgd)	Potable Water Production Capability (mgd)	Summer Production Capacity (mgd)	Remarks
Well # 7	Newberg	Non- Cancelled	2.7	2.6	2.3	Currently shares 4.0 mgd with Well # 8
Well # 8	Newberg	Non- Cancelled	1.3	3.3	2.9	Currently shares 4.0 mgd with Well # 7
Wells 9, 10, & 11 (future)	Newberg	Non- Cancelled	See Remarks	N/A	N/A	Potential to share a total of 12.9 mgd (20 cfs) with Wells 7-11, which has been applied for. This includes the 4.0 mgd listed in the notes for Wells 7 and 8 above.
WELLS TOTAL:			13.7	11.0	7.8	
Total Water Available for MDD in Summer			**6.3**	**mgd**		

Exhibit 2-5 details the seasonal access to water resources by the distribution system they serve.

EXHIBIT 2-5
Seasonal Access to Water Resources by Distribution System Served
2007 City of Newberg Water Management and Conservation Plan

MDD Water Resources (Summer)	Summer (mgd)	Winter (mgd)	Water Rights in Use (mgd)
Newberg Water Distribution System	6.25	11.00	13.70
Riparian Water Distribution System	0.04	0.13	1.60
Oliver Spring Water Distribution System	0.002	0.05	0.05
Total Available Water:	6.3	11.2	15.35

The above limitations result in a total summertime production capacity of 6.3 mgd, which is 0.6 mgd less than the current MDD of 6.9 mgd. The expansion of legally available water for Wells 7–11 to the water rights limit of 12.9 mgd (20 cfs) under permit G-13876 will allow the City to produce water sufficient to meet its MDD through 2027, the period covered by this report, while providing the flexibility to manage its water resources intelligently for long-term use.

Records of Water Use 690-086-0140(4)

Production and Demands

Production refers to the quantity of potable water delivered to the distribution system. For the City of Newberg, total production equals the amount of water pumped from the WTP and added to the amount discharged from the springs into the distribution system. Production is equal to system demand minus any excess water sent to the City's recharge swales. System demand is all the water used within the system, including metered consumption (residential, commercial/ industrial, and wholesale), unmetered public uses (fire fighting, hydrant flushing, other), and water lost to leakage, reservoir overflow, and evaporation.

Exhibit 2-6 contains data from the 2004 City of Newberg Water Distribution System Plan to develop the following three different demand levels:

- **Average Day Demand (ADD)**: The total volume of water delivered to the system in a calendar year, divided by 365 days. ADD is the same as average annual demand.
- **Maximum Day Demand (MDD):** The maximum volume of water delivered to the system in any single day of the year.
- **Peak Hour Demand (PHD)**: The maximum volume of water delivered to the system in any single hour of the year.

EXHIBIT 2-6
Newberg Average Peaking Factors
2007 City of Newberg Water Management and Conservation Plan

Flow Rate Condition	Factor*
MDD/ADD	2.09
PHD/MDD	1.58
PHD/ADD	3.30

*2004 City of Newberg Water Distribution System Plan.

The factors depicted in Exhibit 2-6 provide insight into the relationship of the maximum daily demand and peak hourly demand to the average daily demand. These relationships are used to develop insights into what water resources the distribution system will require to meet these demands in the future. For the most part, peak hourly demands are managed by distribution system storage facilities, which also contain water reserves for fire fighting and emergency purposes. Maximum day demands must be met by water supply and system storage capacities so the emergency reserves will be available at all times and the reservoirs are able to be filled in time to meet the next day's demand.

Annual daily water production data from 1991 through 2006 are tabulated in Exhibit 2-7. These data include water produced by both well and spring sources, and exclude process and backwash water utilized by the water treatment plant to produce treated water. In other words, the total amount of water utilized to produce the amounts of water sent to the distribution system is greater than the amounts shown in the exhibit.

EXHIBIT 2-7
Annual Average Daily Water Production (Gallons per Day)
2007 City of Newberg Water Management and Conservation Plan

Year	Water Treatment Plant	Oliver Spring	Snider Springs	Skelton Springs	Atkinson Springs	Total
1991	1,877,000	67,500	128,700	57,300	57,300	2,187,800
1992	1,969,000	61,000	123,600	48,500	53,800	2,255,900
1993	1,813,000	60,700	159,900	26,316	81,500	2,141,416
1994	1,900,000	59,300	126,100	22,600	75,100	2,183,100
1995	1,906,000	62,400	156,500	31,400	143,700	2,300,000
1996	2,037,000	64,400	144,700	34,200	152,700	2,433,000
1997	2,170,000	65,500	119,100	44,000	79,800	2,478,400
1998	2,153,000	62,000	138,700	42,200	79,400	2,475,300
1999	2,315,000	57,500	103,900	37,100	72,000	2,585,500
2000	2,369,000	56,800	71,500	37,900	57,900	2,593,100
2001	2,231,000	61,000	60,000	34,300	53,800	2,440,100
2002	2,403,000	66,000	46,300	31,900	22,600	2,569,800
2003	2,524,485	72,000	71,000	23,000	13,000	2,703,485
2004	2,389,526	67,000	95,000	11,000	12,000	2,574,526
2005	2,501,471	57,000	95,000	16,000	10,000	2,679,471
2006	2,832,762	51,000	106,000	26,000	0	3,015,762

An important metric that the City uses for planning purposes, to meet the water demand of increasing population growth, is per capita production. This is the average amount of water used by each person served by the system in a specified time frame. Exhibit 2-8 shows a general decline in the City's per capita water use since 1991, due in part to water conservation measures and public education programs sponsored by the City. The average per capita water use for the period of 1991 to 2006 is 140 gallons, which is also the per capita use in 2006.

EXHIBIT 2-8
Historical Per Capita Production
2007 City of Newberg Water Management and Conservation Plan

Year	Water System Population	Average Daily Production (mgd)	Gallons per Capita per Day (gpcd)
1991	14,166	2.2	154
1992	14,406	2.3	157
1993	14,735	2.1	145
1994	15,371	2.2	142
1995	15,956	2.3	144
1996	16,831	2.4	145
1997	17,436	2.5	142
1998	18,029	2.5	137
1999	18,321	2.6	141
2000	18,735	2.6	138
2001	18,951	2.4	129
2002	19,421	2.6	132
2003	20,201	2.7	135
2004	20,581	2.6	125
2005	21,236	2.7	126
2006	21,241	3.0	140

Source: *2004 City of Newberg Water Distribution System Plan*, updated through 2006 with population data from Portland State University's Population Research Center.

Exhibit 2-9 compares the increasing population growth in the City of Newberg with the generally declining per capita use of water. This relationship is further illustrated by the fact that water production rates have remained relatively flat over the same period, and have increased at a much smaller rate of increase than exhibited by population growth.

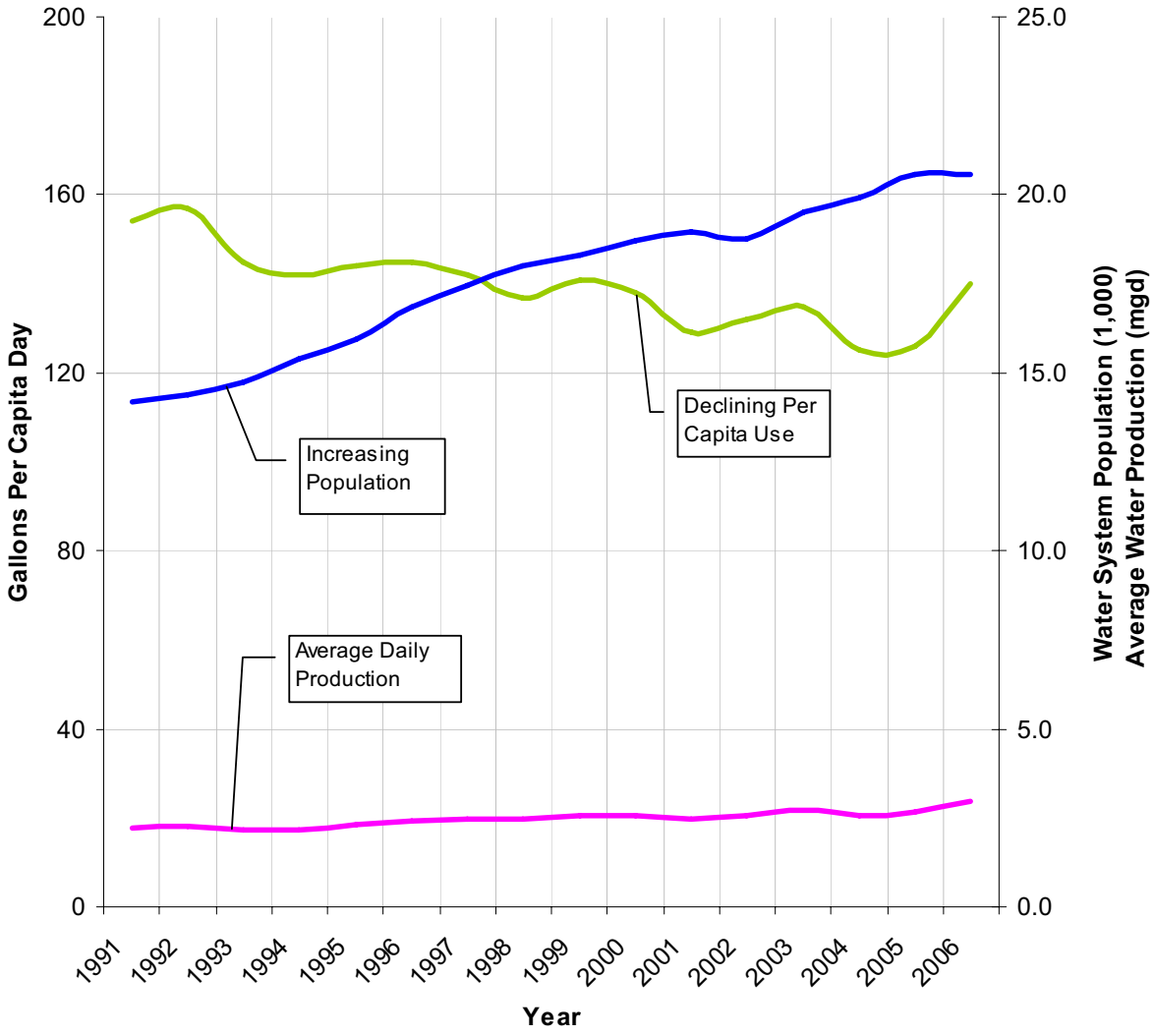

EXHIBIT 2-9
Historical Per Capita Production
2007 City of Newberg Water Management and Conservation Plan

City Water Rights 690-140(5)

Exhibit 2-10 is a table of the City's water rights, which provide for up to 28.1 mgd.

EXHIBIT 2-10
City Water Rights Summary
2007 City of Newberg Water Management and Conservation Plan

	Location								Permitted Amount					
Name	**T**	**R**	**S**	**Application No.**	**Permit No.**	**Certificate No.**	**Priority Date**	**Certificate Date**	**cfs**	**mgd**	**gpm**	**Type**	**WRD Status**	**Comments**
Springs														
Gardner Spring	3S	2W	15	S-1646	S-915	2389	8/23/1911	8/1/1919	4	2.6	1795	Primary	Non-cancelled	Out of Service
Otis Spring	3S	2W	15	S-1646	S-915	2389	8/23/1911	8/1/1919	4	2.6	1795	Alternate	Non-cancelled	Used for Irrigation Only
Skeleton Spring	3S	2W	20	S-6604	S-5977	5456	6/24/1919	9/1/1925	2	1.3	898	Primary	Non-cancelled	
Atkinson Spring	3S	2W	20	S-9065	S-6530	5456	7/10/1923	9/1/1925	2	1.3	898	Primary	Non-cancelled	Out of Service
Oliver Spring	3S	2W	19		D-6829	6829	12/31/1894	12/20/1926				Primary	Non-cancelled	Exclusive rights to the spring
Snider Spring	3S	2W	36	S-1345	SWR-641		11/30/1905		0.5	0.3	224	Primary		Water right is pending with OWRD.
					Springs Total (not including Otis (alternate) spring)				8.5	5.5	3815			
Wells														
Well 1	3S	2W	29	GR-63	GR-54		9/30/1951		2.2	1.4	1000	Primary	Non-cancelled	Groundwater Registration
Well 2	3S	2W	29	GR-63	GR-54		5/31/1948		2.2	1.4	1000	Primary	Non-cancelled	Groundwater Registration
Well 3	3S	2W	29	G-5277	G-5277	48101	8/6/1970	5/25/1979	3	1.9	1346	Primary	Cancelled	Transferred to Well No. 5

EXHIBIT 2-10
City Water Rights Summary
2007 City of Newberg Water Management and Conservation Plan

	Location								Permitted Amount					
Name	**T**	**R**	**S**	**Application No.**	**Permit No.**	**Certificate No.**	**Priority Date**	**Certificate Date**	**cfs**	**mgd**	**gpm**	**Type**	**WRD Status**	**Comments**
Well 4	3S	2W	29	G-5254	G-5276	48100	7/20/1970	5/25/1979	2.7	1.7	1203	Primary	Non-cancelled	
Well 5	3S	2W	29	G-9638	G-10067		3/28/1980		1	0.7	453	Primary	Non-cancelled	Original Permit
Well 5	3S	2W	29	T-4547	G-5277	68620	8/6/1970	5/25/1979	3	1.9	1346	Primary	Non-cancelled	Transferred from Well No. 3
Well 6	3S	2W	29	G-9805	G-10068		6/23/1980		4	2.6	1800	Primary	Non-cancelled	
Collector Well and existing Wells 7 & 8 (Future Wells 9, 10, and 11 to be constructed)	3S	2W	29	G-12515	G-13876		5/3/1991		20	12.9	8976	Primary	Non-cancelled	
							Well Total		35.1	22.6	15,750			
							Well and Springs Total		43.6	28.2	19,569			

Water Use Characteristics 690-086-140(6)

Exhibit 2-11 lists customer categories served by the City of Newberg's water distribution systems. These values are net of process water used in the water treatment plant.

EXHIBIT 2-11
Annual Consumption (in million gallons) (Source City of Newberg)
2007 City of Newberg Water Management and Conservation Plan

Category	2000	2001	2002	2003	2004	2005	2006
Single Family	171	166	236	201	252	327	404
Multi Family	72	90	119	125	109	127	138
Commercial	66	84	98	104	82	103	122
Industrial	16	22	28	24	20	23	27
University	3	2	9	10	8	9	10
Outside City	24	29	27	40	38	42	49
Other Government	14	17	31	22	21	49	28
Irrigation	18	23	57	45	36	66	137
Riparian	3	4	4	5	4	0	8
Grand Total	**386**	**438**	**609**	**574**	**570**	**746**	**924**

Exhibit 2-12 lists the top users of water supplied by the City of Newberg. The City does not supply water to other water suppliers and does not receive water from other water suppliers.

EXHIBIT 2-12
Largest Water Consumers 2006
2007 City of Newberg Water Management and Conservation Plan

Customer	2006 Consumption (cf/yr)	2006 Consumption (mgd)	Category
CHEHALEM PARK & #38; REC Total	6,688,800	0.14	City
NEWBERG SCHOOL DIST 29J Total	4,767,300	0.10	Education
GEORGE FOX UNIVERSITY Total	4,275,400	0.09	Education
CITY OF NEWBERG Total	2,829,600	0.06	City
A-DEC Total	1,889,400	0.04	Industry
OAKS @ SPRINGBROOK H.O.A Total	1,826,500	0.04	Residential
FRIENDSVIEW MANOR Total	1,783,100	0.04	Retirement Center
BAUER WILBUR Total	1,554,000	0.03	Industry

EXHIBIT 2-12
Largest Water Consumers 2006
2007 City of Newberg Water Management and Conservation Plan

Customer	2006 Consumption (cf/yr)	2006 Consumption (mgd)	Category
SP NEWSPRINT CO Total	1,408,000	0.03	Industry
SPRINGBROOK ESTATES Total	1,202,400	0.02	Residential
PROVIDENCE HEALTH SYSTEM PHS Attn: Jill Total	1,037,700	0.02	Health
WOODSIDE PARK APARTMENTS Total	901,800	0.02	Residential
VIKING PROP/CANYON RIDGE Total	900,200	0.02	Residential
BAKER ROCK Total	876,800	0.02	Industry
CHEHALEM VALLEY WATER ASSOC. Total	870,500	0.02	Residential
NBG RETIREMENT RESIDENCE, LLC Total	813,800	0.02	Retirement Center
WINERY REX HILL Total	799,300	0.02	Industry
NW NEWBERG WATER ASSN. Total	711,700	0.01	Residential
SP NEWSPRINT CO. Total	646,900	0.01	Industry
PROVIDENCE HEALTH SYSTEM PHS Attn: Jill Total	620,500	0.01	Health
NUT TREE RANCH Total	612,800	0.01	Agriculture
AVAMERE HEALTH SERVICES Total	599,800	0.01	Health
HAZELDEN SPRINGBROOK Total	565,600	0.01	Health
SUNTRON Total	529,400	0.01	Industry
SUNNY ACRES W.D. Total	508,000	0.01	Residential
USHIO AMERICA, INC Total	504,200	0.01	Industry
Total:	**39,723,500**	**0.81**	

As explained in Consumption and Unaccounted-for Water 690-086-0140(9) below, problems with accounting, data collection, and data management have made the task of providing a meaningful comparison between the data shown in this Water Management and Conservation Plan and those data depicted in the previous Water Management and Conservation Plan difficult. The City is taking steps to resolve these problems in time to make a meaningful comparison between this report and subsequent updates.

Interconnections with Other Systems 690-086-0140(7)

The City does not have regular or emergency interconnections with other public or private water systems.

Water System Description 690-086-140(8)

The City of Newberg's water distribution system has three 4-million-gallon finished water storage reservoirs with a total storage capacity of 12 million gallons, enough to provide the system with water for more than three days at an average daily demand flow for the foreseeable future. Exhibit 2-13 describes the water reservoirs in the system.

EXHIBIT 2-13
Inventory of Water Distribution System Reservoirs
2007 City of Newberg Water Management and Conservation Plan

Name	Volume (gallons)	Overflow Elevation (ft)	Shape/Material
North Valley Road Reservoir East	4,000,000	402.60	Circular prestressed concrete reservoir
North Valley Road Reservoir West	4,000,000	402.69	Circular prestressed concrete reservoir
Corral Creek Road	4,000,000	402.55	Circular prestressed concrete reservoir

The Newberg Water Distribution System has a distribution system pump station located at the WTP and one pressure zone booster pump station in the system.

A schematic of the City of Newberg water supply system is shown in Exhibit 2-14.

The distribution system supply pump station is located in the WTP. The pumping system at the WTP has four vertical turbine pumps with a total rated firm capacity of about 9.5 mgd with three pumps in operation. This pump station has a backup power generator.

Existing pumping facilities are described in Exhibit 2-15. The Oak Knoll closed-loop booster pump station was constructed in 2000 and is located at 3613 Ivy Drive. The purpose of this pump station is to augment low pressures to 40 homes in the area.

Snider Spring
El=900'
Cl_2

Residential Connection (4 Users)

Skelton Spring
El=950'
Cl_2

Residential Connection (3 Users)

Residential Connection (5 Users)

Altitude Valve
El=370'

Overflow discharged to natural swales for ground infiltration

Original City Water Source

Oliver Spring
El=650'
Cl_2 El=575'

Residential Connection (19 Users)

Altitude Valve
El=360'

Pressure Reducing Valve

Residential Connection (6 Users)

(2) - 4.0 Mil. Gal.
North Valley Rd. Reservoirs
Overflow elevation= 402'

Residential Connection (39 users)

2" PVC C-900
Installed 1990's

Pressure Reducing Valve

18"

Water Booster Pump Station (40 Users)

Otis Spring
280 GPM
Elevation 190'

Used for non-potable irrigation only

10"

NEWBERG

18"

Water Treatment Plant

24"

4.0 Mil. Gal.
Corral Creek Rd. Reservoir
Overflow elevation= 402'

Willamette River

24" water main

24" water main (underground and under the river)

Well Field
7 active wells
Elevation 93'

Cl_2 Aquaward Tablet Chlorinators

Newberg water system facts:
Miles of Waterline: ±100
Number of Hydrants: ±700
Number of Water Meters: ±5,300
Oldest waterline in service: built early 1920's, 10" cast iron
Largest waterline: 24" ductile iron
Public waterline material types:
cast iron, copper, ductile iron, steel, PVC, reinforced concrete.

Not to scale

EXHIBIT 2-14

WATER SYSTEM SCHEMATIC

City of Newberg

Updated March 2007 by CH2M HILL.

WB032007012PDX 331635.A1.WR 4/17/07 an kw

EXHIBIT 2-15
Existing Pumping Facilities
2007 City of Newberg Water Management and Conservation Plan

Pump	Installation	Make	Model	Capacity
WTP Clearwell Pump 1	2005	Flowserve	15EHM Vertical Turbine	2,800 gpm
WTP Clearwell Pump 2	2005	Flowserve	15EHM Vertical Turbine	2,800 gpm
WTP Clearwell Pump 3	1980	Byron Jackson	12MQH 5 Stage Vertical Turbine	1,440 gpm
WTP Clearwell Pump 4	2005	Flowserve	15EHM Vertical Turbine	2,800 gpm
Oak Knoll Booster Pump Station	2000	Triangle 3 pump system	"Pressurite" series 320 triplex system	Low flow: 10 gpm Peak flow: 250 gpm Fire flow: 1,000 gpm

gpm = gallons per minute.

The City of Newberg's water distribution systems have approximately 100 miles of pipe in three systems. The larger Newberg Water Distribution System has about 90 miles of pipe and serves most of the City. The two smaller distribution systems have approximately 10 miles of pipe and are supplied by three springs. Exhibit 2-16 is a current inventory of water distribution system pipe by type and size.

EXHIBIT 2-16
Inventory of Water Distribution System Pipe
2007 City of Newberg Water Management and Conservation Plan

Pipe Material	Pipe Size	Main System Quantity (linear feet)	Springs System Quantity (linear feet)	Total Pipe in the Distribution System (linear feet)
Black Poly	3/4"	0	826	826
	1"	108	3,539	3,648
Cast Iron	Unknown	122	0	122
	1"	193	0	193
	2"	188	0	188
	4"	7,136	7,356	14,491
	6"	64,517	4,749	69,265
	8"	27,292	0	27,292
	10"	9,084	0	9,084
	12"	11,252	0	11,252
	16"	97	0	97
	18"	4,919	0	4,919

EXHIBIT 2-16
Inventory of Water Distribution System Pipe
2007 City of Newberg Water Management and Conservation Plan

Pipe Material	Pipe Size	Main System Quantity (linear feet)	Springs System Quantity (linear feet)	Total Pipe in the Distribution System (linear feet)
Copper	3/4"	0	1,022	1,022
	1"	4,356	1,214	5,569
	2"	2,502	64	2,566
	4"	26	0	26
	8"	8	0	8
Ductile Iron	Unknown	15	0	15
	1"	600	0	600
	2"	47	0	47
	4"	19,276	851	20,127
	6"	59,134	0	59,134
	8"	154,375	0	154,375
	10"	20,361	0	20,361
	12"	36,793	0	36,793
	14"	3,146	0	3,146
	16"	19	0	19
	18"	7,395	0	7,395
	24"	8,251	0	8,251
Galvanized Steel	1"	624	0	624
	2"	1,971	704	2,676
PVC	Unknown	0	3,504	3,504
	1"	163	3,063	3,226
	2"	6,284	15,871	22,155
	3"	0	1,728	1,728
	6"	2	0	2
Reinforced Cement Concrete (rcc)	1"	176	0	176
	4"	34	0	34
	12"	17	0	17
	16"	2,599	0	2,599
	18"	9,029	0	9,029

EXHIBIT 2-16
Inventory of Water Distribution System Pipe
2007 City of Newberg Water Management and Conservation Plan

Pipe Material	Pipe Size	Main System Quantity (linear feet)	Springs System Quantity (linear feet)	Total Pipe in the Distribution System (linear feet)
	24"	946	0	946
Steel	3"	0	1,931	1,931
	4"	0	2,625	2,625
	6"	0	156	156
Sand Cast Iron	4"	12	0	12
Wrought Iron	5"	819	0	819
	5"	340	0	340
Unknown	Unknown	1,365	2,247	3,612
	1"	262	0	262
	4"	104	698	801
	6"	2,054	44	2,098
	8"	375	0	375
	10"	9,061	0	9,061
	18"	103	0	103
Total Linear Feet of Pipe in the System:		477,545	52,191	529,737
Total Miles of Pipe in the System:		90.4	9.9	100.3

Consumption and Unaccounted-for Water 690-086-0140(9)

Consumption is equal to the metered water use within the system and other identified and tracked but unmetered uses such as intentional tank drainage. Unaccounted-for water in the City of Newberg water systems is the difference between the total amount of water produced at the WTP and by the springs plus the identified unmetered uses and the total quantity of water billed to customers. Currently, unaccounted-for water is attributed to accounting system errors, system leakage losses, meter discrepancies and inaccuracies, unmetered hydrant and main flushing, street sweeping, unmetered WTP operation and maintenance uses, fire flow uses, unauthorized connections, and unmetered miscellaneous uses. Water used from hydrant connections for construction purposes is metered and recorded, but is not included in the billing records.

The total annual consumption for temporary hydrant meters is shown in Exhibit 2-17. The difference in the magnitude of annual hydrant consumption recorded for the years prior to

2003 and those recorded afterwards is due to a change in the City's process for tracking these flows. The City is implementing an accounting process that will provide consistency going forward from this report.

EXHIBIT 2-17
Annual Hydrant Meter Consumption 1998-2006
2007 City of Newberg Water Management and Conservation Plan

Year	Use (gallons)
1998	390,300
1999	522,800
2000	786,316
2001	961,300
2002	739,800
2003	38,297
2004	76,218
2005	22,902
2006	34,313

The water treatment plant uses water to backwash filters, for various process purposes, and to conduct routine maintenance tasks. Water produced by the groundwater wells serving the WTP minus the water delivered through the master meters serving the system equals the amount of process water used in the WTP for normal operations. Approximately 7.6 percent of well water pumped to the WTP on an annual basis is used for various operational purposes. During peak summer months as much as 250,000 gallons per day is used to backwash filters to remove sediment and iron coming from the larger producing wells. Two new master meters were installed at the water treatment plant in June 2006, and, as a result of this installation, future numbers are expected to be accurate.

Annual WTP process water use is shown in Exhibit 2-18.

EXHIBIT 2-18
Annual WTP Process Water Use 2001-2006
2007 City of Newberg Water Management and Conservation Plan

Year	Annual WTP Process Water Use (mg)	Percent of Wellfield Production
2001	98	10%
2002	95	10%
2003	74	7%
2004	59	6%
2005	81	8%
2006	91	8%

Exhibit 2-19 lists production, consumption, and unaccounted-for water rates from January 2006 until April 2007 in the larger Newberg Water Distribution System. As listed in the exhibit, the unaccounted-for water loss rate is calculated to be 7.1 percent for the most recent twelve months when reliable data are available. Due to accounting, data collection, and data management problems in the City, this is the most recent information available for making the required calculation to determine unaccounted-for water. The contributing problems leading to this situation have been identified and will soon be resolved.

EXHIBIT 2-19
Water Production, Consumption, and Unaccounted-for Water in the Newberg Distribution System (Wells & Oliver Spring Only)
2007 City of Newberg Water Management and Conservation Plan

Month	Total Water Billed[1] (CF)	Total Water Billed[1] (MG)	Meter Adjusted Factor[2]	WTP Water Production[3] (MG)	Oliver Spring Water[3] (MG)	Total Water Production[3] (MG)	Unaccounted-for Water (%)
Jan-06	5,892,000	44.1	44.7	63.1	1.7	64.7	30.9%
Feb-06	6,223,400	46.6	47.3	56.8	1.5	58.3	18.9%
Mar-06	6,189,300	46.3	47.0	68.4	1.6	70.1	32.9%
Apr-06	6,632,200	49.6	50.4	67.4	1.5	69.0	27.0%
May-06	8,123,100	60.8	61.7	91.1	1.5	92.6	33.4%
Jun-06	10,407,700	77.8	79.0	96.0	1.5	97.5	19.0%
Jul-06	17,223,100	128.8	130.8	151.0	1.6	152.6	14.3%
Aug-06	16,372,600	122.5	124.3	143.9	1.6	145.5	14.5%
Sep-06	18,710,900	140.0	142.1	108.2	1.5	109.8	-29.4%
Oct-06	11,079,200	82.9	84.1	78.0	1.5	79.6	-5.7%
Nov-06	8,483,400	63.5	64.4	54.0	1.5	55.5	-16.0%
Dec-06	5,954,602	44.5	45.2	55.9	1.6	57.5	21.4%
Jan-07	6,504,597	48.7	49.4	58.8	1.6	60.4	18.3%
Feb-07	6,327,100	47.3	48.0	50.1	1.4	51.5	6.7%
Mar-07	5,596,800	41.9	42.5	55.1	1.7	56.7	25.1%
Apr-07	6,500,600	48.6	49.4	55.6	1.6	57.2	13.7%
May-07	6,868,600	51.4	52.2	55.6	1.6	57.2	8.8%
Rolling 12-Month Values		**897.8**	**911.5**	**962.3**	**18.8**	**981.0**	**7.1%**

[1] Source is Newberg Finance Office
[2] AWWA Meter Accuracy is 96-101%, assumed Newberg meters read at 98.5%
[3] Source is Newberg Water Treatment Operations Section (Dan Wilson)

Exhibit 2-20 lists production, consumption, and unaccounted-for water rates from January 2006 until April 2007 in the Riparian Water Distribution System that serves 49 connections, of the 6,316 total in both systems. As listed in the exhibit, the unaccounted-for water loss rate is calculated to be 74 percent for the most recent twelve months when reliable data are available. Due to accounting, data collection and data management problems, this is the most recent information available for making the required calculation to determine unaccounted-for water. The actual loss in the Riparian Distribution System is estimated to be much less than the amount shown, and this will be corrected in the first update to this Water Management and Conservation Plan.

EXHIBIT 2-20
Water Production, Consumption, and Unaccounted-for Water in the Riparian Distribution System (Skelton and Snider Springs)
2007 City of Newberg Water Management and Conservation Plan

Month	Total Water Billed[1] (CF)	Total Water Billed[1] (MG)	Meter Adjustment Factor[2]	Snider & Skelton Springs Production[3] (MG)			Simple Unaccounted-for Water %
				Snider	Skelton	Total	
Jan-06	38,300	0.29	0.29	3.40	0.96	4.36	93%
Feb-06	33,900	0.25	0.26	2.80	0.71	3.51	93%
Mar-06	41,900	0.31	0.32	3.10	0.50	3.60	91%
Apr-06	46,500	0.35	0.35	2.98	0.68	3.66	90%
May-06	47,300	0.35	0.36	3.59	0.78	4.37	92%
Jun-06	68,900	0.52	0.52	3.71	0.71	4.42	88%
Jul-06	102,900	0.77	0.78	3.80	0.71	4.51	83%
Aug-06	90,000	0.67	0.68	3.75	0.79	4.54	85%
Sep-06	124,000	0.93	0.94	3.58	0.76	4.34	78%
Oct-06	135,900	1.02	1.03	3.08	0.92	4.00	74%
Nov-06	214,000	1.60	1.63	2.34	1.02	3.36	52%
Dec-06	151,700	1.13	1.15	2.47	1.13	3.60	68%
Jan-07	314,100	2.35	2.39	2.31	1.08	3.39	30%
Feb-07	245,500	1.84	1.86	2.04	0.96	3.00	38%
Mar-07	21,100	0.16	0.16	2.65	1.05	3.70	96%
Apr-07	24,600	0.18	0.19	2.74	1.02	3.76	95%
May-07	67,700	0.51	0.51	2.74	1.02	3.76	86%
Rolling 12 Month Values		**11.7**	**11.8**	**35.2**	**11.2**	**46.4**	**74%**

[1] Source is Newberg Finance Office
[2] AWWA Meter Accuracy is 96-101%, assumed Newberg meters read at 98.5%
[3] Source is Newberg Water Treatment Operations Section (Dan Wilson)

The *2004 Water Distribution System Plan (WDSP)* (CH2M HILL, 2004) reported that the average unaccounted-for water in the Newberg water system averaged 8.5 percent between 1998 and 2001. Fluctuation in unaccounted-for water can be affected by operation and maintenance activities associated with hydrant and main flushing as well as other uses. In a year when there are aggressive maintenance activities, unaccounted-for water would be expected to increase. This is not to indicate that these types of maintenance activities should not be performed; rather, Newberg should continue its current water system maintenance program and attempt to meter and record all water use to continue its excellent reputation for maintaining a low unaccounted-for water volume.

The amount of unaccounted water in the Riparian Water Distribution System is excessive and has caused Newberg staff to examine its processes for collecting and analyzing water quantity data. The amount of unaccounted water seems to be caused not by leaks in the system (which should be clearly visible to the distribution system operators in many cases), but rather a result of a chronic under-estimating of the quantity of water used in the production of finished water at the WTP and over-estimating of the water produced by the Newberg wells. Another cause results from inaccurate meters, which were replaced in 2004. Compounding the error in these figures is a lack of a systematic effort to document the amount of excess water allowed to discharge to a recharge swale from the Riparian Water Distribution System.

In June 2006 as part of the WTP upgrade project new accurate meters were installed in the plant to replace chronically inaccurate meters. Further evaluation has shown that the Newberg Water Distribution System (supplied by the wells and Oliver Spring) has only 7.1 percent unaccounted-for water. In contrast, the Riparian Water Distribution System, which is supplied by Snider and Skelton Springs has 74 percent unaccounted-for water. This high rate of unaccounted water is most probably due to the lack of data on the quantity of water allowed to overflow out of the system, and the possibility that unknown water users exist on the Riparian Water Distribution System. The older Riparian Water Distribution System may have several customers that were not originally metered because they were allowed all the water they could use through a specific service pipe diameter for no charge as part of the original agreements with the City regarding use of the springs. The City meters these unmetered connections as they are identified.

Newberg is now doing a monthly audit of both billed and production water from the WTP. Events such as major fires, water line ruptures, flushing events, discovery of unauthorized users, and other unmetered uses will be identified, estimated, and categorized. This process should result in a reasonably accurate monthly establishment of critical water quantity data and to identify the unaccounted water component. This summer the City of Newberg is also in the process of designing and contracting a project to refurbish and upgrade the three operational springs (Skelton, Snider & Oliver). In addition, a detailed investigation of the Riparian Water Distribution System and its customers will be accomplished using Newberg staff over the course of the next year.

Exhibit 2-21 lists production, consumption, and unaccounted-for water rates from January 2006 until April 2007 in the Riparian Water Distribution System that serves 49 connections, the Oliver Spring Water Distribution System that serves 19 connections, and the larger Newberg Water Distribution System that serves the remainder of the City's connections. As listed in the exhibit, the unaccounted-for water loss rate is calculated to be 10.1 percent for the most recent twelve months when reliable data are available. Due to accounting, data collection, and data management problems, this is the most recent information available for making the required calculation to determine unaccounted-for water. The actual loss in the Riparian Water Distribution System is estimated to be much less than the amount shown in Exhibit 2-20 above, and this value will be corrected in the first subsequent update to this Water Management and Conservation Plan.

EXHIBIT 2-21
Water Production, Consumption, and Unaccounted-for Water in both the smaller Riparian Distribution System (Skelton and Snider Springs) and the larger Newberg Water Distribution System
2007 City of Newberg Water Management and Conservation Plan

Month	Total Water Billed[1] (CF)	Total Water Billed[1] (MG)	Meter Adjustment Factor[2]	Water Production[3] (MG)	Simple Unaccounted-for Water (%)
Jan-06	5,930,300	44.36	45.03	64.74	30.44%
Feb-06	6,257,300	46.80	47.52	58.31	18.50%
Mar-06	6,231,200	46.61	47.32	70.05	32.45%
Apr-06	6,678,700	49.96	50.72	70.72	28.29%
May-06	8,170,400	61.11	62.05	97.01	36.04%
Jun-06	10,476,600	78.36	79.56	101.95	21.97%
Jul-06	17,326,000	129.60	131.57	157.12	16.26%
Aug-06	16,462,600	123.14	125.02	150.03	16.67%
Sep-06	18,834,900	140.89	143.03	114.11	-25.34%
Oct-06	11,215,100	83.89	85.17	83.59	-1.89%
Nov-06	8,697,400	65.06	66.05	58.88	-12.17%
Dec-06	6,106,302	45.68	46.37	61.11	24.12%
Jan-07	6,818,697	51.00	51.78	63.83	18.87%
Feb-07	6,572,600	49.16	49.91	54.49	8.41%
Mar-07	5,617,900	42.02	42.66	60.43	29.40%
Apr-07	6,525,200	48.81	49.55	60.95	18.70%
May-07	6,936,300	51.88	52.67	60.95	13.58%
Rolling 12 Month Values		**909.5**	**923.3**	**1,027.4**	**10.1%**

[1] Source is Newberg Finance Office
[2] AWWA Meter Accuracy is 96-101%, assumed Newberg meters read at 98.5%
[3] Source is Newberg Water Treatment Operations Section (Dan Wilson)

SECTION 3

Water Conservation

This section addresses the requirements of Oregon Administrative Rule (OAR) 690-086-0150 (1)–(6).

Current Conservation Measures 690-086-0150 (1)

The City of Newberg is committed to and has invested heavily in water conservation. In support of this ethic, the City proposed the following conservation measures when it published its most recent 2002 City of Newberg Water Management and Conservation Plan.

Public Education

The City has continued its funding of a Water Conservation Coordinator at 0.25 full time equivalent (FTE). The City actively educates water users on conservation through an ongoing water conservation education program. In addition, the City has established a water conservation program for irrigation users. Examples of the education program include:

- Displays at public events
- Free plumbing fixture check-up kits
- School presentations
- Donations of books on conservation to local libraries
- Landscape audits
- Demonstration Xeriscape™ Park

Leak Detection

The City of Newberg's rate of unaccounted-for water has averaged approximately 10.1 percent through 2006 when water from both the larger Newberg Water Distribution System and the smaller Riparian Water Distribution System are considered together. The larger Newberg Water Distribution System has an estimated 7.1 percent unaccounted-for water while the much smaller Riparian Water Distribution System has about 74 percent unaccounted-for water. The OARs require that cities with unaccounted-for water rates above 10 percent adopt a leak detection program. The City's accounting, data collection, and data management practices are undergoing improvements and the actual unaccounted-for water rate is estimated to be closer to 9.0 percent. The difference is primarily due to a steady flow of excess water from the two springs in the Riparian Water Distribution System into a natural recharge swale. For this reason, a leak detection program will not be initiated before the next Water Management and Conservation Plan update. The City has not budgeted for additional leak detection and repair in the next few years, and does expect to repeat its leak detection evaluation in 5 to 10 years, depending on the annual rate of unaccounted-for

water. Instead, the City is putting all its efforts into accounting for known water consumption.

Water-Efficient Landscaping Workshops

The City's Water Conservation Coordinator at 0.25 FTE is charged with educating the public on the benefits of water conservation measures and water efficient landscape methods. The City has developed plans to build an approximately 2,500 square foot Xeriscape™ demonstration garden during the next 5 years that will contain native, drought tolerant, water wise, wildlife friendly vegetation. Although the types of plants have yet to be finalized, there will most probably be some mountain hemlock, blue blossom, Oregon grape, flowering currant, aster, Oregon iris, and California fescue. The garden will be designed around plant varieties that will give it year-round beauty. Additionally, signage and kiosks will provide plant identification and educational resources for visitors.

Incentive Programs

In its 2002 Water Management and Conservation Plan, the City of Newberg proposed a Landscape Incentive Program, a Clothes Washing Machine Rebate Program, and an Ultra Low-Flush Toilet Rebate Program. However, the City has not implemented these incentive programs because fiscal resources have not been available to do so. In lieu of these programs, the City conducts an active and continuing water conservation education program to assist water users with reducing their consumption.

Rate Structure

The City of Newberg has a flat rate structure that charges customers based on the type of use, size of meter, and quantity of water consumed. This rate structure encourages conservation by not providing a discount to customers that use large amounts of water. Customers with secondary irrigation meters pay a surcharge for use of the water. Exhibit 3-1 lists monthly and volume charges for water.

EXHIBIT 3-1
Monthly Water Service Charges
2007 City of Newberg Water Management and Conservation Plan

Item	July 1, 2006	July 1, 2007
Service Charge ($/month):	$1.30	$1.30
Meter Charge Inside & Outside City ($/month):		
3/4"	$ 2.56	$2.56
1"	$4.35	$4.35
1 1/2"	$8.45	$8.45
2"	$13.57	$13.57
3"	$25.60	$25.60
4"	$42.75	$42.75
6"	$85.25	$85.25

EXHIBIT 3-1
Monthly Water Service Charges
2007 City of Newberg Water Management and Conservation Plan

Item	July 1, 2006	July 1, 2007
8”	$136.45	$136.45
10”	$213.25	$213.25
Volume Charge ($/hundred cubic feet):		
Single Family Residential	$2.40	$2.60
Multi-family Residential	$2.03	$2.17
Commercial	$2.60	$2.75
Industrial	$2.27	$2.51
University	$1.52	$1.33
Outside City	$3.60	$3.89
Public Agency	$2.29	$2.50
Irrigation	$3.98	$4.18

Water Reuse and Water Treatment Plant Backwash Improvements

The City of Newberg is reducing demand for treated potable water in its distribution system by increasing the use of non-potable irrigation water from other sources. These include revitalizing the previously decommissioned spring water source of Otis Spring. This had been a potable water source until 1990, when it was considered to possibly be "under the influence of surface waters." The City has just completed renovating Otis Spring and connecting it by pipeline to the Chehalem Glens Golf Course, where beginning in the summer of 2007 it will provide 0.35 mgd for irrigation to the existing 9-hole golf course.

The City is designing and will construct a membrane filter process to deliver up to 1.0 mgd of wastewater treatment plant treated to Level IV reuse standards to the Chehalem Glens Golf Course for use on their next 18 hole course. This project should be completed and in operation by summer 2008 and the facility will be designed for future expansion to 2.0 mgd as conditions warrant.

The use of production water in the water treatment plant varies seasonally. The larger production wells have more dissolved iron than the lower producing wells which results in an increase in the amount of water used to backwash the filters in the summer. This amounts to as much as 250,000 gallons per day of backwash water. On an averaged annual basis, approximately 7.5 percent of water produced by the well field and sent to the water treatment plant is used for production purposes. Operational process water use is summarized in Exhibit 3-2.

EXHIBIT 3-2
Overview of Annual Water Treatment Plant Water Use 2003–2006
2007 City of Newberg Water Management and Conservation Plan

Time Period	Influent Water from the Well Field to the WTP (mgd)	WTP Effluent Water to the Distribution System (mgd)	Total Water Utilization at the WTP (mgd)	WTP Water Utilization as % of Influent
2003	2,726,359	2,524,485	201,874	7%
2004	2,551,756	2,389,526	162,230	6%
2005	2,722,819	2,501,471	221,348	8%
2006	3,083,233	2,832,762	250,471	8%

Within the water treatment plant, water from the well field is utilized to backwash the filters and for process side streams that serve water treatment effort. Exhibit 3-3 tabulates these uses. On average, filter backwash water consumes 57 percent of the production water utilized to support the treatment process, while process water consumes about 43 percent.

EXHIBIT 3-3
Detail of Annual Water Treatment Plant Water Use 2003–2006
2007 City of Newberg Water Management and Conservation Plan

Time Period	Effluent Water to the Distribution System (mgd)	Filter Backwash Water (mgd)	Process Water (mgd)	Total WTP Water Utilization (mgd)	Filter Backwash Water as %of WTP Utilization	Process Water as % of WTP Utilization
2003	2,524,485	132,871	69,003	201,874	66%	34%
2004	2,389,526	92,622	69,608	162,230	57%	43%
2005	2,501,471	104,811	116,537	221,348	47%	53%
2006	2,832,762	149,142	101,329	250,471	60%	40%

Decline in Per Capita Water Usage

Coupled with the influence of regional programs (those carried out by Portland, Beaverton, Hillsboro, and other cities near the City of Newberg), the City has realized measurable declines in per capita water use. This decline is illustrated in Exhibit 3-4.

EXHIBIT 3-4
Historical Per Capita Production
2007 City of Newberg Water Management and Conservation Plan

Year	Water System Population	Average Daily Production (mgd)	Gallons per Capita per Day (gpcd)
1991	14,166	2.19	154
1992	14,406	2.26	157
1993	14,735	2.14	145
1994	15,371	2.18	142
1995	15,956	2.30	144
1996	16,831	2.43	145
1997	17,436	2.48	142
1998	18,029	2.48	137
1999	18,321	2.59	141
2000	18,735	2.59	138
2001	18,951	2.44	129
2002	19,421	2.57	132
2003	19,530	2.73	135
2004	19,910	2.57	125
2005	20,565	2.68	126
2006	20,570	2.98	140

Note: Water System Population includes 671 customers outside the City.

The data in Exhibit 3-4 are shown graphically in Exhibit 3-5.

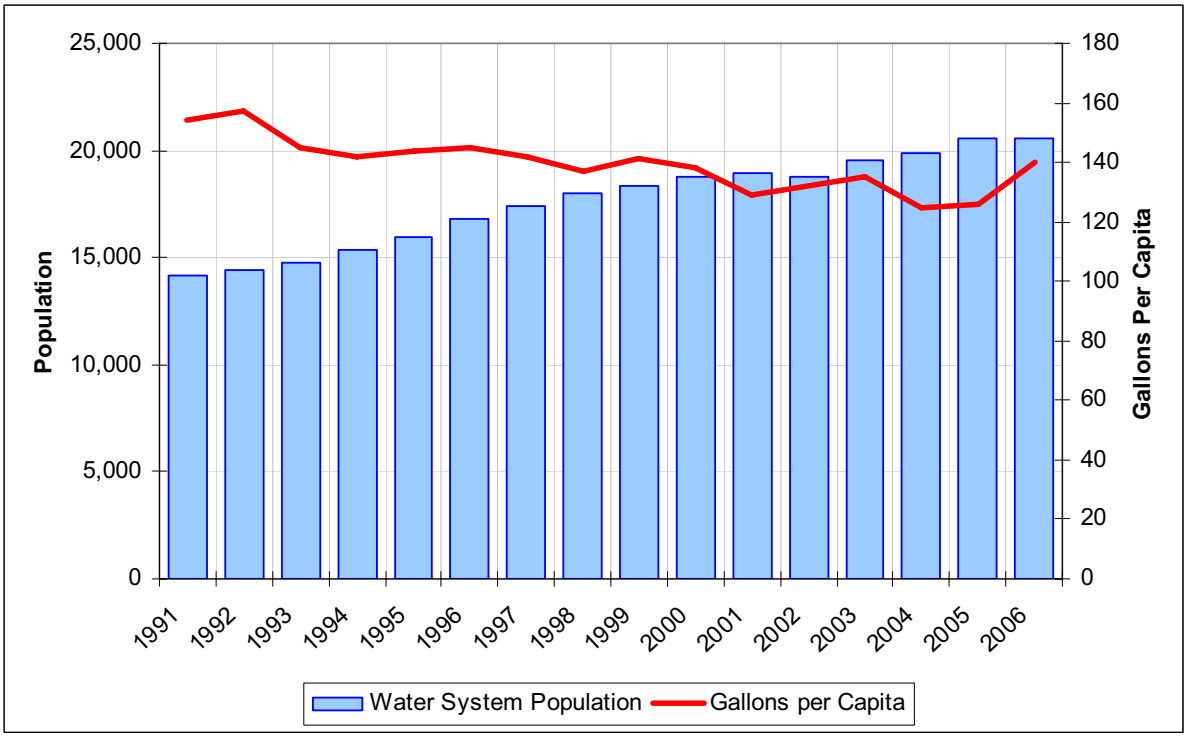

EXHIBIT 3-5
Declining Per Capita Demand
2007 City of Newberg Water Management and Conservation Plan

Use and Reporting Program 690-086-0150(2)

The City of Newberg has a water use measurement and reporting program that complies with the measurement standards in OAR 690-85.

Other Conservation Measures 690-086-0150 (3)

Public Information

The City is a member of the Regional Water Providers Consortium (RWPC). The RWPC serves as a collaborative and coordinating organization to improve the planning and management of municipal water supplies in the Portland metropolitan region. The membership costs the City $5,200 per year, and provides the City with benefits from region wide conservation activities. RWPC programs include a variety of public outreach efforts. For example, the RWPC:

- Maintains a web site, www.conserveh2o.org that has indoor and outdoor water conservation information and suggestions.
- Sponsors a summer media campaign that includes TV and radio advertisements and news interviews on local stations.

- Provides workshops for developers and landscapers that focus on water–efficient landscape design and installation and using water-efficient irrigation equipment.
- Develops conservation displays available to consortium members for use at local events.
- Produces brochures containing conservation information.
- Conducts outreach at large regional events such as the Yard, Garden, and Patio Show and the Salmon Festival.
- Promotes cost-efficient use of water resources and wise stewardship and protection of those resources to meet the values of its collective members and the needs of future generations.

Customer and Staff Education

The City of Newberg has continued to promote water conservation through many public venues, including displays at public events, free plumbing fixture check-up kits, school presentations, donations of books on conservation to local libraries, and landscape audits. The City has also made conservation education for City employees a high priority.

Non-Potable Water for Irrigation

During the 2006/2007 budget year the City will expend approximately $33,500 for staffing and other annual water conservation expenses, plus another $365,000, on a capital improvement project to reduce potable water consumption by providing 0.35 mgd of non-potable irrigation water from Otis Spring. When completed in the summer of 2007, this project will reduce system dependence on the City's existing groundwater well field.

In addition, the City of Newberg has budgeted $7 million for the design and construction of a water reuse facility at its wastewater treatment plant to produce up to 1.0 mgd of non-potable water for irrigation purposes. It is scheduled to be put into operation in 2008, and will reduce demand on the well supply and water treatment plant system. The reuse facility will be designed for future expansion to 2.0 mgd as conditions warrant.

Alternating Irrigation Schedules

The City has recommended an alternate day (odd/even) water schedule for summer irrigation to reduce maximum day withdrawals. The City has found this means of curtailing water consumption to be very effective.

Rate Structure

The City of Newberg uses a flat rate structure, meaning that the volume charge for water remains constant whether a customer uses small or great quantities of water. Customers with irrigation meters are charged a higher volume rate than domestic consumers. The City sends monthly water bills so that customers can see their water use and the cost on a regular basis and then make adjustments accordingly. Exhibit 3-6 provides a summary of the City's current rate structure.

EXHIBIT 3-6
Monthly Water Service Charges
2007 City of Newberg Water Management and Conservation Plan

Item	July 1, 2006	July 1, 2007
Service Charge ($/month):	$1.30	$1.30
Meter Charge Inside & Outside City ($/month):		
3/4"	$ 2.56	$2.56
1"	$4.35	$4.35
1 1/2"	$8.45	$8.45
2"	$13.57	$13.57
3"	$25.60	$25.60
4"	$42.75	$42.75
6"	$85.25	$85.25
8"	$136.45	$136.45
10"	$213.25	$213.25
Volume Charge ($/hundred cubic feet):		
Single Family Residential	$2.40	$2.60
Multi-family Residential	$2.03	$2.17
Commercial	$2.60	$2.75
Industrial	$2.27	$2.51
University	$1.52	$1.33
Outside City	$3.60	$3.89
Public Agency	$2.29	$2.50
Irrigation	$3.98	$4.18

Leak Detection

The City of Newberg's rate of unaccounted-for water has averaged approximately 10.1 percent through 2006 when water from both the larger Newberg Water Distribution System and the smaller Riparian Water Distribution System are considered together. The larger Newberg Water Distribution System has an estimated 7.1 percent unaccounted-for water while the much smaller Riparian Water Distribution System has about 74 percent unaccounted-for water. The OARs require that cities with unaccounted-for water rates above 10 percent adopt a leak detection program. The City's accounting, data collection and data management practices are undergoing improvements and the actual unaccounted-for water rate is estimated to be closer to 9.0 percent. The difference is primarily due to a steady flow of excess water from the two springs in the Riparian Water Distribution System into a

natural recharge swale. For this reason, a leak detection program will not be initiated before the next Water Management and Conservation Plan update. The City has not budgeted for additional leak detection and repair in the next few years. Instead, it is putting all its efforts into accounting for known water consumption. If the findings of this effort indicate greater than anticipated unaccounted-for water, the city will repeat its leak detection evaluation in 5 to 10 years, or sooner if warranted.

The City last performed a leak detection survey in 1995. An outside firm was hired and spent one day surveying the city's system. The firm was unable to locate any leaks. Because the firm failed to locate any leaks, it provided a second day of leak detection services at no charge later that year, and successfully located four small leaks. The firm concluded that the Newberg system was in good condition, and reported that their equipment was generally more appropriate for larger mains than were surveyed in Newberg. Exhibit 2-12 summarizes the quantities of distribution mains in the Newberg system by type of pipe and size. The vast majority of pipe is cast iron or ductile iron, which contributes to the low leakage and failure rates.

Water Line Replacement Program

The City has an ongoing water line replacement program with a $45,000 annual budget. The goal is to replace leaking and undersized lines, and those lines that are most prone to failure. New lines are also added to complete looping of the pipes to eliminate dead-end sections. The result of this program is a reduction in leakage and a reduced need for flushing because dead-end sections are eliminated

Water Audit

The City of Newberg now tracks annual average, maximum day, and per capita water use, total production and consumption, and unaccounted-for water.

System-Wide Metering

The City of Newberg has approximately 6,316 metered customers who are served by the City's water distribution systems. The policy of the City is to meter all customers. The City recently completed a program from 2001 through 2004 that replaced or upgraded all the existing meters. This replacement program has provided greater accuracy and efficiency in reading all customer water meters.

Almost all water customers served by the City of Newberg's water system are metered; when discovered, unmetered customers are required to obtain a meter. It is possible that a few customers served by the springs are unmetered. The Riparian Water Distribution System is a separate system supplied by Skelton and Snider springs that is not physically connected to the Newberg Water Distribution System, which is supplied by the groundwater wells and Oliver Spring. All of the residents on the Riparian Water Distribution System are outside of the city limits, as are the 19 customers supplied exclusively by Oliver Spring. The City intends to meter any unmetered service at the earliest opportunity. Greater than 99 percent of the City's services are metered. All new connections are required to have meters.

Water Meter Testing

The City tests all 3-inch diameter and larger water meters (37 total) on a biennial basis, with 50 percent completed each year. The meters are tested at various flow rates and repaired as needed to comply with American Water Works Association (AWWA) standards. Generally, the meters are averaging 98 percent accuracy. This reflects what is believed to be the accuracy of the smaller meters throughout the system.

Water Conservation Tools

The City continues to offer a wide variety of free water conservation items to its residents including low-flow showerheads, faucet aerators, toilet tank bladders, toilet leak detectors, hose shut off handles, and lawn watering gauges.

Required Conservation Programs 690-086-0150(4)

Introduction

OAR 690-086-0150(4) requires that all water suppliers establish 5-year benchmarks for implementing the following required conservation measures:

- Annual water audit
- System-wide metering
- Meter testing and maintenance
- Unit-based billing program
- Leak detection and repair (if system leakage exceeds 10 percent)
- Public education

As described in the preceding subsections, the City of Newberg already has ongoing programs to implement many of the above conservation measures. Specifically, the City conducts annual water audits, has meters on nearly every service connection, installs meters for all new connections, uses a unit-based rate structure, and conducts public outreach through monthly bills and consumer confidence reports.

5-Year Benchmarks for Required Conservation Measures

Over the next 5 years the City of Newberg intends to continue the programs described above and to expand measures related to annual water audits, meter installation, meter testing and maintenance, leak detection and repair, and public education. Exhibit 3-7 shows specific OAR 690-086-0150 water conservation activities and 5-Year benchmarks that the City of Newberg plans on implementing.

EXHIBIT 3-7
OAR 690-086-0150 (4) Specific Water Conservation Activities and 5-Year Benchmarks
2007 City of Newberg Water Management and Conservation Plan

OWRD Requirement	City of Newberg: Current Measures	Suggested 5-Year Benchmarks
(4) A description of the specific activities, along with a schedule that establishes 5-year benchmarks, for implementation of each of the following conservation measures that are required of all municipal water suppliers:		
(a) An annual water audit that includes a systematic and documented methodology for estimating any unmetered authorized and unauthorized uses.	This utility is unaware of any unmetered unauthorized uses. If any are discovered, City Ordinance establishes that such uses are subject to citation and civil penalties.	The City will continue to be watchful for unauthorized, unmetered water users. The City plans to conduct annual water audits to measure unaccounted-for water and estimate leakage rates.
(b) If the system s not fully metered, a program to install meters on all unmetered water service connections. The program shall start immediately after the plan is approved and shall identify the number of meters to be installed each year with full metering completed within 5 years of approval of the water management and conservation plan.	The City's water utility is fully metered except for those uses noted above. As discussed in Section 1, the City of Newberg occasionally finds unmetered connections in its water system. Generally, these connections are served by the springs source of supply to the north of the City and were established as part of an agreement when the City began operating the springs as a water supply source.	The City will meter any unmetered connections as they are identified. The City will continue to require meters for all development within the City.
(c) A meter testing and maintenance program	The City tests all 3-inch diameter and larger water meters (37 total) on a biannual basis, with 50 percent completed each year. The meters are tested at various flow rates and repaired as needed IAW AWWA standards. Generally, the meters are averaging 98 percent accuracy. This reflects what is believed to be the accuracy of the smaller meters throughout the system.	The City will track the performance of new meters installed throughout the system and maintain records on meters that are removed from service. The City will develop a sampling program for residential meters to assess their accuracy and age, so that their optimum life and a cost-effective replacement program can be determined. The data can also be statistically analyzed to identify collective biases in the residential meters and adjust customer use accordingly in annual water audits.

EXHIBIT 3-7
OAR 690-086-0150 (4) Specific Water Conservation Activities and 5-Year Benchmarks
2007 City of Newberg Water Management and Conservation Plan

OWRD Requirement	City of Newberg: Current Measures	Suggested 5-Year Benchmarks
(d) A rate structure under which customers' bills are based, at least in part, on the quantity of water metered at the service connections.	The City of Newberg has a flat rate structure that discourages excessive water use. The most recent version of City Resolution No. 2006-2641 was made effective July 1, 2006 (contained in Appendix B). In addition, the City's rate structure charges more to customers with irrigation meters than to domestic users. Exhibit 3-1 details the various water rate classes and charges for the City.	Continue to support a conservation oriented water rate structure.
(e) If the annual water audit indicates that system leakage exceeds 10 percent, a regularly scheduled and systematic program to detect leaks in the transmission and distribution system using methods and technology appropriate to the size and capabilities of the municipal water supplier; and,	The City of Newberg's unaccounted-for water is estimated to be approximately 7.1% percent in its larger Newberg Water Distribution System and 75% in its much smaller Riparian Water Distribution System. Together, the two systems have a total of about 10.1% unaccounted-for water. The City's Leak Detection Program is response-based because of the relatively small percentage of unaccounted-for water. When a portion of the distribution system is suspected of leaking, the City hires a contractor to quickly find and resolve the problem. The most recent instance was in August of 2006, when a leak was suspected due to noise heard on the pipe. The leak was found and repaired after which a second leak detection was performed to confirm that there were no other leaks in the 1,600 linear feet of distribution system in and around the area of the leak. This example is typical of the way the City addresses leaks when they are suspected or discovered.	The City is implementing accounting, data collection, and data management procedures that will significantly reduce the amount of unaccounted-for water in the Riparian Water Distribution System. The City has an ongoing water line replacement program with a $45,000 annual budget. The goal is to replace leaking and undersized lines, and those lines that are most prone to failure. New lines are also added to complete looping of the pipes to eliminate dead-end sections. The result of this program is a reduction in leakage and a reduced need for flushing because dead-end sections are eliminated. Maintain and continue this program. Also, the City is implementing a monthly program to track water production, demand, and billable consumption to gain insight into unaccounted-for water.

EXHIBIT 3-7
OAR 690-086-0150 (4) Specific Water Conservation Activities and 5-Year Benchmarks
2007 City of Newberg Water Management and Conservation Plan

OWRD Requirement	City of Newberg: Current Measures	Suggested 5-Year Benchmarks
(f) A public education program to encourage efficient water use and the use of low water use landscaping that includes regular communication of the supplier's water conservation activities and schedule to customers.	The City of Newberg meets with the public at least annually during the Newberg Community Night, provides support to school programs, information with the annual consumer confidence report, and periodic flyers in the water billing. Several water pamphlets are available at City Hall and elsewhere encouraging water conservation, the most popular being "Water-Efficient Plants of the Willamette Valley."	The City is planning to build an approximately 2,500 square foot Xeriscape™ demonstration garden during the next 5 years that will contain native, drought tolerant, water wise, wildlife friendly vegetation. Although the types have yet to be finalized, there will most probably be some mountain hemlock, blue blossom, Oregon grape, flowering currant, aster, Oregon iris, and California fescue. The garden will be designed around plant varieties that will give it year-round beauty. Additionally, signage and kiosks will provide plant identification and resources for visitors.

Expanded Use under Extended Permits 690-086-0150 (5)

The City of Newberg intends to expand diversion of water under extended permit G-13876; however, this is a groundwater appropriation and there are no resource issues under OAR 690-086-0140(5)(i). OAR 690-086-0150(5) is not applicable in this case; moreover, the City's unaccounted-for water is currently estimated to be less than 10 percent.

Expanded Use under Extended Permits 690-086-0150 (6)

Under this rule requirement, if a municipal water supplier serves a population of greater than 7,500, it must describe the specific activities it will perform, along with a schedule that establishes 5-year benchmarks. This is provided for the City of Newberg in Exhibit 3-8.

EXHIBIT 3-8
OAR 690-086-0150 (6) Specific Water Conservation Activities and 5-Year Benchmarks
2007 City of Newberg Water Management and Conservation Plan

OWRD Requirement	City of Newberg: Current Measures	Suggested 5-Year Benchmarks
(6) If the municipal water supplier serves a population greater than 1,000 and proposes to expand or initiate diversion of water under an extended permit for which resource issues have been identified under OAR 690-086-0140(5)(i), or if the municipal water supplier serves a population greater than 7,500, a description of the specific activities, along with a schedule that establishes 5-year benchmarks, for implementation of each of the following measures; or documentation showing that implementation of the measures is neither feasible nor appropriate for ensuring the efficient use of water and the prevention of waste:		
(a) A system-wide leak repair program or line replacement to reduce leakage to 15 percent, and if the reduction of system leakage to 15 percent is found to be feasible and appropriate, then to reduce system leakage to 10 percent,	The City of Newberg's rate of unaccounted-for water has averaged approximately 10.1 percent through 2006 when water from both the larger Newberg Water Distribution System and the smaller Riparian Water Distribution System are considered together. The larger Newberg Water Distribution System has an estimated 7.1% unaccounted-for water while the much smaller Riparian Water Distribution System has about 74% unaccounted-for water. The OARs require that cities with unaccounted-for water rates above 10 percent adopt a leak detection program. The City's accounting, data collection, and data management practices are undergoing improvements and the actual unaccounted-for water rate is estimated to be closer to 9.0%. The difference is primarily due to a steady flow of excess water from the two springs in the Riparian Water Distribution System into a natural recharge swale. For this reason, a leak detection program will not be initiated before the next Water Management and Conservation Plan update. The City has not budgeted for additional leak detection and repair in the next few years. Instead, it is putting all its efforts into accounting for known water consumption. If the findings of this effort indicate greater than anticipated unaccounted-for water, the city will repeat its leak detection evaluation in 5 to 10 years, or sooner if warranted.	The City is implementing accounting, data collection, and data management procedures that will significantly reduce the amount of unaccounted-for water in the Riparian Water Distribution System. Continue to monitor the difference between water distributed to the system and water billings, and take steps to identify new leaks when an increasing difference indicates they exist.
(b) Technical and financial assistance programs to encourage and aid residential, commercial, and industrial customers in the implementation of conservation measures,	The City of Newberg currently offers no technical or financial assistance to aid in the implementation of conservation measures.	Continue to provide public education to highlight the importance of water conservation.

EXHIBIT 3-8
OAR 690-086-0150 (6) Specific Water Conservation Activities and 5-Year Benchmarks
2007 City of Newberg Water Management and Conservation Plan

OWRD Requirement	City of Newberg: Current Measures	Suggested 5-Year Benchmarks
(c) Supplier financed retrofitting or replacement of existing inefficient water using fixtures, including distribution of residential conservation kits and rebates for customer investments in water conservation,	Currently, the City does not offer rebate or incentive programs.	None contemplated for this item.
(d) Adoption of rate structures, billing schedules, and other associated programs that support and encourage water conservation,	The City currently bills on a monthly cycle. Water rates are uniform across all customer classes irrespective of volume consumed.	Continue current billing practices.
(e) Water reuse, recycling, and non-potable water opportunities; and,	The City will utilize non-potable water from Otis Spring (0.35 mgd) in 2007 and wastewater reuse (1.0 mgd, expandable to 2.0 mgd) in 2008 for irrigation purposes, thereby reducing demand on the potable water supply.	The City will look for additional reuse and recycling opportunities.
(f) Any other conservation measures identified by the water supplier that would improve water use efficiency.	The City of Newberg is currently funding water efficient landscape demonstrations & workshops.	The City is planning an approximately 2,500 square foot Xeriscape garden, with native, drought tolerant, water wise, wildlife friendly vegetation. While the types have yet to be finalized there will most probably be some Mountain Hemlock, Blue Blossom, Oregon Grape, Flowering Currant, Aster, Oregon Iris, California Fescue. The garden will be design around plant varieties that will give it year-round beauty. Additionally signage and kiosks will provide plant identification and resources for visitors.

SECTION 4

Curtailment

This section fulfills the requirements of Oregon Administrative Rule (OAR) 690-086-0160.

Curtailment planning is the development of proactive measures to reduce demand during supply shortages due to prolonged drought, landslides, earthquakes, or contamination.

The goal of this curtailment plan is to provide objective criteria that trigger actions to ensure sufficient water is available to meet the water demands of the water supply system without jeopardizing the health, safety, or welfare of the community.

History of Curtailment Episodes 690-086-0160 (1)

The City of Newberg continues to experience water shortage and curtailment events. These have been caused by a variety of several different conditions, including steady increases in seasonal (summer) irrigation demands, a growing population, and reduced precipitation that causes local drought-like conditions.

The following actions have been taken to increase the ability of the system to meet demand and reduce the incidence of curtailment events:

- Construction of wells 7 and 8 with a combined capacity of 5.8 million gallons per day (mgd) (9.0 cfs).
- Addition of a second 24-inch diameter delivery pipeline to convey water from the City's well field into the distribution system.
- Expansion of the City of Newberg Water Treatment Plant (WTP) from 5.63 mgd to 8.6 mgd to provide a 53 percent increase in sustained capacity.
- Utilization of non-potable water from Otis Spring (non-potable 0.35 mgd) in the summer of 2007 and non-potable wastewater reuse (1.0 mgd, expandable to 2.0 mgd) in 2008 for irrigation purposes, thereby reducing demand on the potable water supply by 1.35 mgd.

Curtailment Program 690-086-0160 (2)

The City's existing curtailment plan was adopted in 1998 as an ordinance (Water Crisis Emergency Ordinance 98-2495) and then updated in 2005. The policy of the City is to curtail water use during drought conditions to ensure that the City has adequate fire flow and supply for essential service requirements. The purpose of its Curtailment Plan is to curtail water use during times of critical water shortages due to severe droughts, reduction in treatment or pumping capability, equipment malfunctions, or other emergency situations where there may be an insufficient water supply. The Mayor or City Manager is empowered to declare a water crisis state of emergency if in the opinion of the Mayor or City Manager, the adequacy of the water supply for the City of Newberg is sufficiently endangered to

create a risk of danger to the health, safety, and welfare of the people of the City of Newberg.

The City of Newberg Curtailment Plan, presented here, has four stages increasing in severity:

1. Water Alert Status
2. Serious Water Shortage
3. Critical Water Shortage
4. Emergency Water Shortage (Minimum Fire Protection Level)

Curtailment Triggers 690-086-0160 (3)

The curtailment stages described above will be triggered by the criteria presented in Exhibit 4-1.

Exhibit 4-1 summarizes the four-stage curtailment plan for the City of Newberg. The authority to declare a curtailment stage is limited to the City Manager or Mayor.

EXHIBIT 4-1
Newberg Curtailment Plan
2007 City of Newberg Water Management and Conservation Plan

Stage	Initiating Conditions	Water Use Reduction Goal
1. Water Alert	Daily water demand is ≥ 90% of the production capacity of the system for 3 or more days in a row, or a Drought Emergency is declared by the Governor.	Reduce demands by 5%
2. Serious Water Shortage	Daily water demand is ≥ 95% of the production capacity of the system, for 3 or more days in a row, or the Drought Emergency continues.	Reduce demands by 10%
3. Critical Water Shortage	City cannot completely refill reservoirs during the nighttime for 2 or more days in succession (demands are ≥ 100% of production capacity) for any reason.	Reduce demands by 20%
4. Emergency Water Shortage (Minimum Fire Protection Level)	Water system failure due to natural or human-made disasters: 1. Reservoirs remain at 50% full or less after nighttime refill period and conditions suggest that the shortfall will continue. 2. One or more of the primary transmission lines from the groundwater wells or from the water treatment plant break. 3. A natural or human-made disaster occurs that disrupts production.	Reduce demands by 35% or more

Curtailment Actions 690-086-0160 (4)

Stage 1—Water Alert Status

The Stage 1—Water Alert Status is activated whenever system demands reach 90 percent of the instantaneous production capacity for 3 or more consecutive days or whenever a Drought Emergency is declared by the Governor. The current instantaneous system capacity is approximately 9.5 mgd. Therefore, this stage of curtailment is activated when demands reach 8.6 mgd, the sustained WTP capacity. The water curtailment goal at this stage is to reduce water demand by 5 percent or more.

The City has very little reserve capacity when greater than 90 percent system demand conditions exist and a slight reduction in production capacity (due to mechanical failures or other mishaps) or an increase in demand (because of hot, dry weather or a series of fires) will result in the system not being able to keep pace with demand.

Under Stage 1—Water Alert Status, the City of Newberg will issue a notice requesting voluntary reduction in water use by all customers. The notice will include a description of the current water situation, the reason for the requested conservation measures, and a warning that mandatory restrictions will be implemented if voluntary measures are not sufficient to achieve water use reduction goals. The notice also will direct customers to the Regional Water Providers Consortium web site (www.conserveh2o.org) for conservation information and tips. A similar notice could be issued through local media (newspaper, radio, or TV). However, if the drought is regional, the media may already be alerting users of water shortage concerns. Therefore, the City's Stage 1 plan does not automatically involve press releases or paid media announcements.

When Stage 1 is triggered, the City will also ask customers to voluntarily comply with the following:

1. Minimize landscape watering between 10:00 am and 6:00 pm, the period of highest water loss due to evaporation.
2. Water landscapes on alternate days (even numbered addresses water on even numbered days and odd numbered addresses on odd numbered days).
3. Implement other conservation measures such as those suggested by the Regional Water Providers Consortium web site and their brochures, *H20utdoor* and *H20 indoor*.
4. Provide notice on water bills. Beginning with the first water bill following issuance of the curtailment stage and continuing until curtailment is cancelled, add a sentence or two describing the need to curtail use on each monthly water bill. This brief note is an effective means to keep customers aware of the curtailment status.
5. Contact potential partners in water conservation, including local businesses that are the most affected (e.g., commercial car wash businesses, nurseries, etc.).
6. Use City web page to keep public informed of curtailment need and actions they can take to reduce water use.

Stage 2—Serious Water Shortage Status

The Stage 2—Serious Water Shortage Status is activated when system demands reach 95 percent of the instantaneous production capacity for 3 or more consecutive days, or a declared Drought Emergency continues with no relief in sight. The current system capacity is approximately 9.5 mgd (6,600 gpm). Therefore, this stage of curtailment is activated when demands reach 9.0 mgd (6,250 gpm).

Under these conditions, the City has very little reserve capacity. A slight reduction in production capacity (because of mechanical failures or other occurrences) or an increase in demand (because of hot, dry weather or a series of fires) will result in the system not being able to keep pace with demand. The water curtailment goal at this stage is to reduce water demand by 10 percent or more.

Under Stage 2—Serious Water Shortage Status, City customers will be notified of the following mandatory water restrictions:

1. Water landscapes only between 6:00 pm and 10:00 am, and not during daylight hours between 10:00 am and 6:00 pm.
2. Water landscapes only when allowed by the odd/even schedule.
3. No water for washing motorbikes, motor vehicles, boat trailers, or other vehicles except at a commercial washing facility that practices wash water recycling. (Exceptions include vehicles that must be cleaned to maintain public health and welfare such as food carriers and solid waste transfer vehicles.)
4. Limit City uses of water. Discontinue hydrant flushing, reduce nonessential cleaning that uses water, and curtail temporary access to water at hydrants.
5. No water to wash sidewalks, walkways, driveways, parking lots, tennis court, and other hard-surfaced areas.
6. No water to wash buildings and structures, except as needed for painting or construction.
7. No water for a fountain or pond for aesthetic or scenic purposes, except for recalculating systems and where necessary to support fish life.
8. Discourage the serving water to customers in restaurants unless water is requested by the customer. This action does not provide significant water savings, but is useful for generating awareness of the need to curtail water use.
9. Water only tees and greens and not other golf course areas.
10. No water for dust control unless absolutely necessary.
11. No water for gutter cleaning.

In addition to the above mandatory water use restrictions, during a summertime Stage 2—Serious Water Storage Status, the City will ask the top ten irrigators to limit watering to 3 days per week. The Water Conservation Coordinator keeps a list of large irrigators, and will initiate contact with them.

Stage 3—Critical Water Shortage Status

The Stage 3—Critical Water Shortage Status is activated by the City when the reservoirs cannot be completely refilled during the nighttime for 3 or more days in a row. This occurs when system demands are 100 percent or greater of the instantaneous production capacity. The current system capacity is approximately 9.5 mgd (6,600 gpm). Therefore, this stage of curtailment is activated when demands reach 9.5 mgd (6,600 gpm).

Under these conditions, the City has no reserve capacity. It is necessary to achieve reductions in demand immediately. The system is at risk because a day with slightly higher demand or lower production could result in the system running out of water.

The goal at this stage is to reduce water demand by 20 percent as quickly as possible. A delay in demand reduction could result in a serious shortage—one that affects water quality (because of a loss in pressure) or one that reduces fire-fighting capacity.

Stage 3—Critical Water Shortage Status includes the following measures:

1. Perform the actions indicated for Stage 1.
2. Perform the actions indicated for Stage 2.
3. Replace the restriction of odd/even watering from Stage 2 with a prohibition on all outdoor watering (exceptions include new lawn, grass or turf planted after March 1st of the calendar year in which restrictions are imposed, sod farms, high-use athletic fields, golf tees and greens, or park and recreation areas specifically designated by the City Council).
4. No water to fill, refill, or add to any indoor or outdoor swimming pools or hot tubs, except if one of the following conditions is met: the pool is used for a neighborhood fire control supply, the pool has a recycling water system, the pool has an evaporative cover, or the pool's use is required by a medical doctor's prescription.
5. No water from hydrants for construction purposes (except on a case-by case basis), fire drills, or any purpose other than fire fighting.
6. Implement limitations on commercial uses of water, depending on the severity of the shortage.
7. Issue public service announcements to notify customers of the severity of the conditions.
8. Provide reminders to violators, using door hangers. Keep records of violations and the fines that are collected.

Stage 4—Emergency Water Shortage Status (Minimum Fire Protection Level)

The Stage 4—Emergency Water Shortage Status is activated when one of the following three conditions is encountered:

1. Reservoirs remain at 50 percent full or less following the nighttime refill period, and conditions suggest that the shortfall will continue.

2. One or more of the primary transmission lines from the groundwater wells or from the water treatment plant break. A natural or human-made disaster occurs that disrupts production.

Stage 4 is the most severe curtailment status. It represents the minimum system performance needed to provide sufficient fire protection for the community. If the shortage becomes more severe, the system will not have the capability to meet fire protection needs.

The goal at this stage is to reduce water demand by 35 percent or more as quickly as possible. A delay in demand reduction could result in a serious health and safety emergency. The activities are to include all of the actions for Stages 1, 2, and 3, as well as the following:

1. Prohibit all outside water use. The only exceptions will be those specifically identified by the City Manager.
2. Prohibit all nonessential water use. Only exceptions will be those specifically identified by the City Manager.
3. Prohibit nonessential water use by all industrial and commercial customers.
4. Contact the Oregon Drinking Water Program, Department of Human Services, and request their assistance in responding to the problem.
5. Notify the local news media, if appropriate, to ask for their assistance in notifying customers.

The City will continue to investigate and develop specific backup plans for a Stage 4—Emergency Water Shortage Status situation. These plans may include renting a water hauling truck, purchasing water from neighboring communities, or sending water customers to a pre-designated water distribution location, and supplying them with bottled water.

SECTION 5

Water Supply

This section addresses the requirements of Oregon Administrative Rule (OAR) 690-086-0170.

Delineation of Service Areas OAR 690-086-0170(1)

The City of Newberg has experienced and continues to experience a trend of increased residential development and population growth. Exhibit 5-1 is a map that shows City limits, the urban growth boundary, urban reserve area, tax lots and large bodies of surface water. The City currently serves all residents within the City limits as well as a small population located outside City limits.

Population Projections for Service Areas OAR 690-086-0170(1)

Based on water system population values from 1991 through 2005, the City of Newberg grew at an average rate of 2.5 percent per year, with a high value of 5.5 percent in 1996 and a low value of 0.2 percent in 2006. These data, which are shown in Exhibit 5-2, suggest an increasing trend of growth that will result in a population of about 40,000 in 20 years, or 2027. Exhibit 5-3 shows this trend graphically.

EXHIBIT 5-2
Population Data
2007 City of Newberg Water Management and Conservation Plan

Year	Water System Population	Percent Change
1991	14,166	-
1992	14,406	1.69%
1993	14,735	2.28%
1994	15,371	4.32%
1995	15,956	3.81%
1996	16,831	5.48%
1997	17,436	3.59%
1998	18,029	3.40%
1999	18,321	1.62%
2000	18,735	2.26%
2001	18,951	1.15%
2002	19,421	2.48%
2003	19,530	0.56%
2004	19,910	1.95%

EXHIBIT 5-2
Population Data
2007 City of Newberg Water Management and Conservation Plan

Year	Water System Population	Percent Change
2005	20,565	3.29%
2006	20,570	0.02%
Average		2.53%
Low		0.02%
High		5.48%

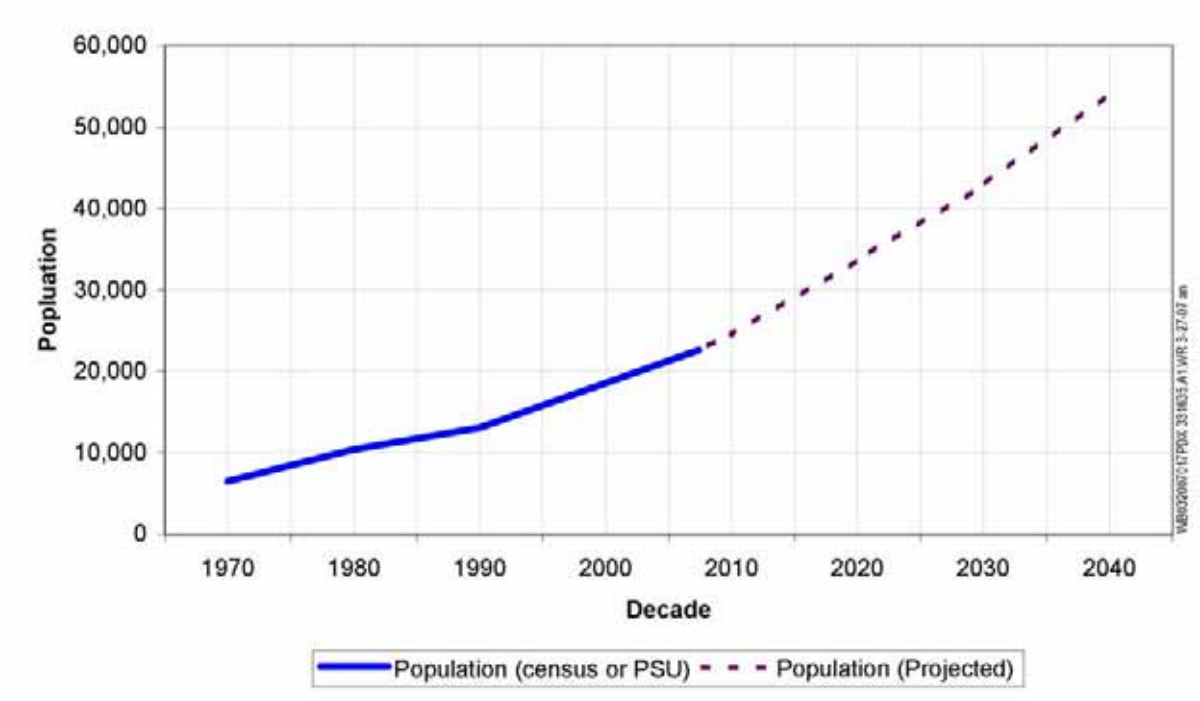

EXHIBIT 5-3
City of Newberg Population Projection
2007 City of Newberg Water Management and Conservation Plan

City of Newberg

Snyder Springs (700 ft. MSL)

Skeleton Springs (890 ft. MSL)

North Valley Rd. Reservoirs

Oliver Springs (650 ft. MSL)

Highest Point in URA (580 ft)

Oak Knoll Booster (Ivy Dr.) Pump Station

Otis Spring Non-potable Water Irrigation Source

Corral Creek Rd. Reservoir (overflow elevation 402.6 ft. MSL)

Water Treatment Plant

Well Field

NORTH VALLEY RD

STATE HWY 219

BELL RD

SPRINGBROOK RD

MOUNTAINVIEW DR

COLLEGE ST

CRESTVIEW DR

SOUTHERN PACIFIC RR

MAIN ST

VILLA RD

STATE HWY 99W

9TH ST

WWNOOSKI ST

Willamette River

LEGEND

- City Limits
- Urban Growth Boundary (UGB)
- Urban Reserve Area (URA)
- Tax Lots
- Large Waterbodies

Existing Water System Pipe Diameter (inches)

- 24"
- 20"
- 18"
- 16"
- 14"
- 12"
- 10"
- 8"
- <= 6"
- Size Unknown

N

0 2,400 4,800

Feet

Exhibit 5-1

Water System Schematic

2007 City of Newberg Water Management and Conservation Plan

CH2MHILL

File Path: \\rosa\proj\NewbergORCityOf\3316352007WMCP\GIS\MapDocuments\Exhibit1-2_WaterSystemSchematic.mxd, Date: April 24, 2007

Schedule to Exercise Water Use Permits 690-086-0170(2)

The City's water rights are shown in Exhibit 5-4. The exhibit is divided into two parts, one for the springs and one for the groundwater wells.

The City has primary or alternate water rights to six springs. Two of the six springs (Gardner and Atkinson) are out of service, one spring (Otis) produces non-potable water that is used exclusively for irrigation purposes, two springs (Skelton and Snider) provide potable water to 49 connections in the City's Riparian Water Distribution System, and one spring (Oliver) provides water to 19 connections in the Oliver Spring Water Distribution System before sending the remaining flow to the Newberg Water Distribution System. The three springs now in operation produce approximately 0.2 mgd of potable water. Excess water from Skelton and Snider springs that is not consumed in the Riparian Water Distribution System is discharged through an altitude valve into natural swales on the south side of the North Valley Reservoir site, where the water then infiltrates into the ground. The total water rights allocated to the three operating water sources, not including Otis spring (an alternate source), is 0.3 mgd.

The following list details the status of the six springs:

- Gardner Spring (Primary, out of service)
- Otis Spring (Alternate, non-potable, used for irrigation water)
- Skelton Spring (Primary, Riparian Water Distribution System, in service, 46 gpm)
- Atkinson Spring (Primary, out of service)
- Oliver Spring (Primary, Oliver Spring Water Distribution System, in service, 51 gpm)
- Snider Spring (Primary, Riparian Water Distribution System, in service, 32 gpm)

The City has eight groundwater wells, seven of which are currently in operation (Well 3 has had its water right transferred to Well 5). The seven wells are the primary sources of water for the water treatment plant. On an average daily basis in 2006, the wells delivered 3.2 mgd to the water treatment plant. Exhibit 5-5 tabulates well production data from 2001 to 2006.

EXHIBIT 5-4
City Water Rights Summary
2007 City of Newberg Water Management and Conservation Plan

	Location								Permitted Amount					
Name	**T**	**R**	**S**	**Application No.**	**Permit No.**	**Certificate No.**	**Priority Date**	**Certificate Date**	**cfs**	**mgd**	**gpm**	**Type**	**WRD Status**	**Comments**
Springs														
Gardner Spring	3S	2W	15	S-1646	S-915	2389	8/23/1911	8/1/1919	4	2.6	1795	Primary	Non-cancelled	Out of Service
Otis Spring	3S	2W	15	S-1646	S-915	2389	8/23/1911	8/1/1919	4	2.6	1795	Alternate	Non-cancelled	Used for Irrigation Only
Skeleton Spring	3S	2W	20	S-6604	S-5977	5456	6/24/1919	9/1/1925	2	1.3	898	Primary	Non-cancelled	
Atkinson Spring	3S	2W	20	S-9065	S-6530	5456	7/10/1923	9/1/1925	2	1.3	898	Primary	Non-cancelled	Out of Service
Oliver Spring	3S	2W	19		D-6829	6829	12/31/1894	12/20/1926				Primary	Non-cancelled	Exclusive rights to the spring
Snider Spring	3S	2W	36	S-1345	SWR-641		11/30/1905		0.5	0.3	224	Primary		Water right is pending with OWRD.
					Springs Total (not including Otis (alternate) spring)				8.5	5.5	3815			
Wells														
Well 1	3S	2W	29	GR-63	GR-54		9/30/1951		2.2	1.4	1000	Primary	Non-cancelled	Groundwater Registration
Well 2	3S	2W	29	GR-63	GR-54		5/31/1948		2.2	1.4	1000	Primary	Non-cancelled	Groundwater Registration
Well 3	3S	2W	29	G-5277	G-5277	48101	8/6/1970	5/25/1979	3	1.9	1346	Primary	Cancelled	Transferred to Well No. 5

EXHIBIT 5-4
City Water Rights Summary
2007 City of Newberg Water Management and Conservation Plan

	Location								Permitted Amount					
Name	**T**	**R**	**S**	**Application No.**	**Permit No.**	**Certificate No.**	**Priority Date**	**Certificate Date**	**cfs**	**mgd**	**gpm**	**Type**	**WRD Status**	**Comments**
Well 4	3S	2W	29	G-5254	G-5276	48100	7/20/1970	5/25/1979	2.7	1.7	1203	Primary	Non-cancelled	
Well 5	3S	2W	29	G-9638	G-10067		3/28/1980		1	0.7	453	Primary	Non-cancelled	Original Permit
Well 5	3S	2W	29	T-4547	G-5277	68620	8/6/1970	5/25/1979	3	1.9	1346	Primary	Non-cancelled	Transferred from Well No. 3
Well 6	3S	2W	29	G-9805	G-10068		6/23/1980		4	2.6	1800	Primary	Non-cancelled	
Collector Well and existing Wells 7 & 8 (Future Wells 9, 10, and 11 to be constructed)	3S	2W	29	G-12515	G-13876		5/3/1991		20	12.9	8976	Primary	Non-cancelled	
							Well Total		35.1	22.6	15,750			
							Wells and Springs Total		43.6	28.2	19,569			

EXHIBIT 5-5
Well Production Data
2007 City of Newberg Water Management and Conservation Plan

Year	Well 1	Well 2	Well 4	Well 5	Well 6	Well 7	Well 8	Average Daily Total to WTP (mgd)
2001	0.7	0.1	0.3	0.7	0.5	0.3	0.0	2.6
2002	0.3	0.1	0.2	0.8	1.0	0.3	0.0	2.7
2003	0.2	0.0	0.1	0.5	1.5	0.4	0.0	2.8
2004	0.3	0.0	0.1	0.5	1.3	0.3	0.0	2.5
2005	0.3	0.0	0.1	0.6	1.1	0.5	0.0	2.7
2006	0.5	0.0	0.1	0.6	1.0	0.6	0.4	3.2

Note: Data provided by the City of Newberg from historical data.

The City has created this plan for two reasons. The first reason is to meet new requirements Oregon Administration Rules and the second is to provide justification for receiving legal access to the maximum amount of water available under its extended permit G-13876. The following two paragraphs summarize the current situation and describe future needs.

The City of Newberg has water rights for a total of 43.6 cfs (28.2 mgd), of which 15.4 cfs (9.95 mgd) is currently available for potable water use by the City to supply its three water distribution systems. A considerable portion of the water that is legally accessible for use by the City (8.15 cfs [5.2 mgd]) is assigned to six springs, of which only three with a total production of 0.28 cfs (0.18 mgd) are producing potable water. In addition, a substantial portion of the legally available water is inaccessible during the summer months when the maximum daily demand (MDD) is the greatest. During the summer of 2006, for example, the City had access to only 9.7 cfs (6.3 mgd) from all of its water sources. The City's current MDD 10.7 cfs (6.9 mgd) exceeds available supply by 1.0 cfs (0.65 mgd). Although the City has the necessary resources to produce sufficient additional quantities of water to meet its current MDD from Well 8 (which can pump 5.1 cfs [3.3 mgd]), the amount of water legally available from this well field currently limits Well 8's production to 2.2 cfs (1.4 mgd) when Well 7 is in operation. Other system resources, including groundwater wells and springs, have reduced output in the summer when the water is most needed. It is typical for a Phase I water shortage alert to be issued during the summer months to reduce water use and manage the shortfall. This situation is expected to become more critical as the population increases and water resources are strained even further.

The existing 1.0 cfs (0.65 mgd) deficit between the City's maximum daily demand and legally available water is expected to increase to 7.9 cfs (5.1 mgd) during the 20 year period of this plan. This represents a 45 percent deficit when compared to the projected MDD of 17.64 cfs (11.4 mgd). The data suggest that an increase in access to the existing water rights held by the City will be required to meet water system demand over the next 20 years, and this increase will be needed for specific water resources within the City's water supply

system. The City is requesting legal access to the entire 20 cfs (12.9 mgd) allocated to existing Wells 7 and 8 and future Wells 9, 10, and 11 under permit G-13876. This will provide the City with the necessary water resources to meet expected demand, to operate its other water resources more efficiently, and will eliminate the need to activate water curtailment measures due to a shortfall in legally available water.

Demand Forecast OAR 690-086-0170(3)

Exhibit 5-6 contains data from the 2004 City of Newberg Water Distribution System Plan to develop the following three different demand levels:

- **Average Day Demand (ADD)**: The total volume of water delivered to the system in a calendar year, divided by 365 days. ADD is the same as average annual demand.
- **Maximum Day Demand (MDD):** The maximum volume of water delivered to the system in any single day of the year.
- **Peak Hour Demand (PHD)**: The maximum volume of water delivered to the system in any single hour of the year.

EXHIBIT 5-6
Newberg Average Peaking Factors
2007 City of Newberg Water Management and Conservation Plan

Flow Rate Condition	Factor
MDD/ADD*	2.09
PHD/MDD*	1.58
PHD/ADD	3.30

*2004 City of Newberg Water Distribution System Plan.

The factors depicted in Exhibit 5-6 provide insight into the relationship of the maximum daily demand and peak hourly demand to the average daily demand. These relationships are used to develop insights into what water resources the distribution system will require to meet these demands in the future. For the most part, peak hourly demands are managed by distribution system storage facilities, which also contain water reserves for fire fighting and emergency purposes. Maximum day demands must be met by water supply and system storage capacities so the emergency reserves will be available at all times and the reservoirs are able to be filled in time to meet the next day's demand.

Comparison of Projected Need and Available Sources OAR 690-086-0170(4)

Exhibit 5-7 displays the City's worst-case projected maximum daily demand and a graphical representation of the shortfall that is expected to exist between the MDD and current water sources to which the City has access.

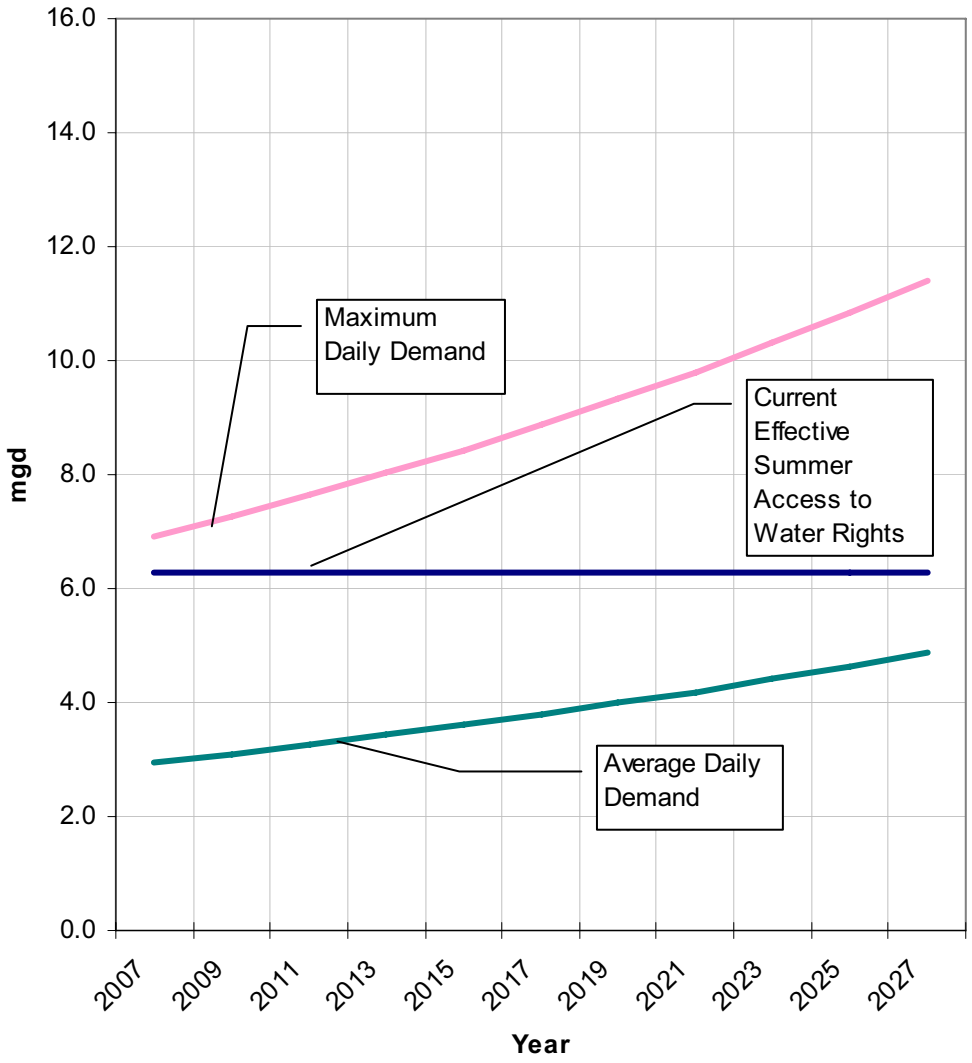

EXHIBIT 5-7
Demand versus Current Access to Water Rights
2007 City of Newberg Water Management and Conservation Plan

Exhibit 5-8 illustrates the existing shortfall in water. Access to additional water rights will allow the City to meet the MDD without having to apply curtailment measures. The graph shows that the existing deficit of 0.6 mgd increases to 5.1 mgd during the 20 year period of this study.

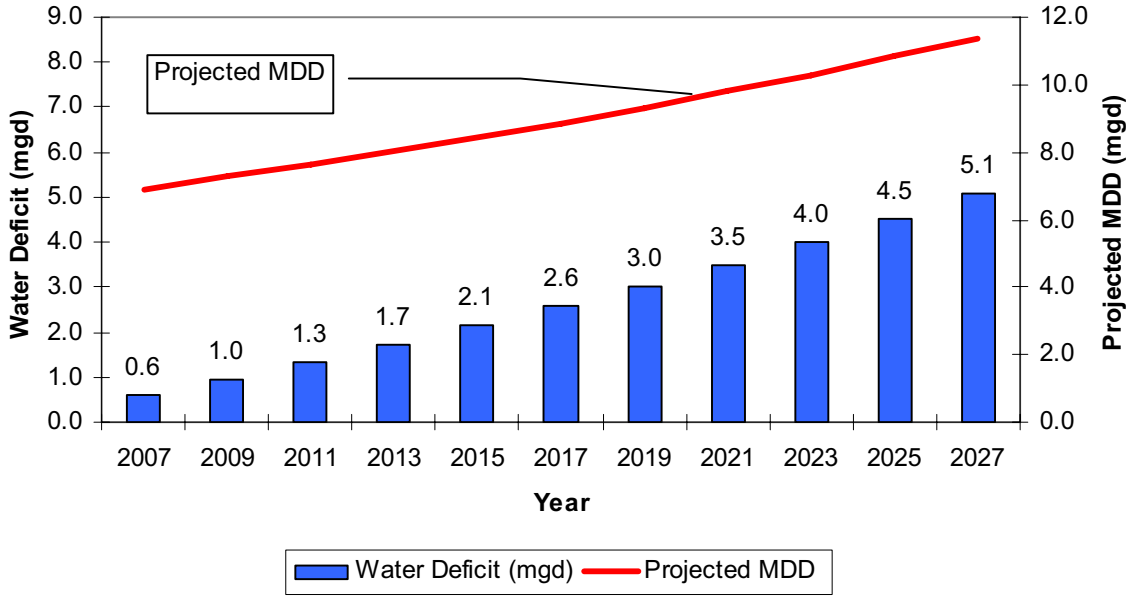

EXHIBIT 5-8
Water Deficit Compared to Maximum Daily Demand through 2027
2007 City of Newberg Water Management and Conservation Plan

This increase in water deficit directly tracks the increase in projected MDD. As shown in Exhibit 5-9, this quantity of water represents a 9 to 45 percent deficit when compared to the 6.3 mgd of water that is available when the MDD occurs.

EXHIBIT 5-9
Water Deficit Relative to the Existing and Legally Available Water
2007 City of Newberg Water Management and Conservation Plan

Year	Projected MDD (mgd)	Difference Between MDD and Legally Available Water (mgd)	Water Deficit as Percent of MDD
2007	6.9	0.6	9%
2009	7.3	1.0	13%
2011	7.6	1.3	18%
2013	8.0	1.7	22%
2015	8.4	2.1	25%
2017	8.9	2.6	29%
2019	9.3	3.0	32%
2021	9.8	3.5	36%
2023	10.3	4.0	39%
2025	10.8	4.5	42%
2027	11.4	5.1	45%

Alternative Sources 690-086-0170 (5)

The City's ongoing water conservation program coupled with the influence of regional conservation programs (those carried out by Portland, Beaverton, Hillsboro, and other cities near the City of Newberg) has resulted in a general decrease in per capita water use and a relatively stable average daily demand as the population continues to increase. Exhibit 5-10 graphically illustrates these facts.

The City of Newberg currently has no interconnections with other municipal supply systems or cooperative regional water management systems.

Permit G-13876, modified by Permit Amendment 9098, authorizes the municipal use of water up to 20 cfs (12.9 mgd) from wells 7, 8, 9, 10, and 11. Wells 7 and 8 are legally able to produce a total of 4.0 mgd. Well 7 currently has a summer peak production of 2.3 mgd. Well 8 is currently configured to produce a total of 3.3 mgd. Together, Wells 7 and 8 are capable of producing 5.6 mgd in the summer. Future Wells 9, 10, and 11 will expand the existing well field serving the water treatment plant and provide additional water resources to serve the water distribution system and meet water demands with some redundancy. Costs for this future expansion are expected to be equivalent to ongoing costs for operating the existing wells.

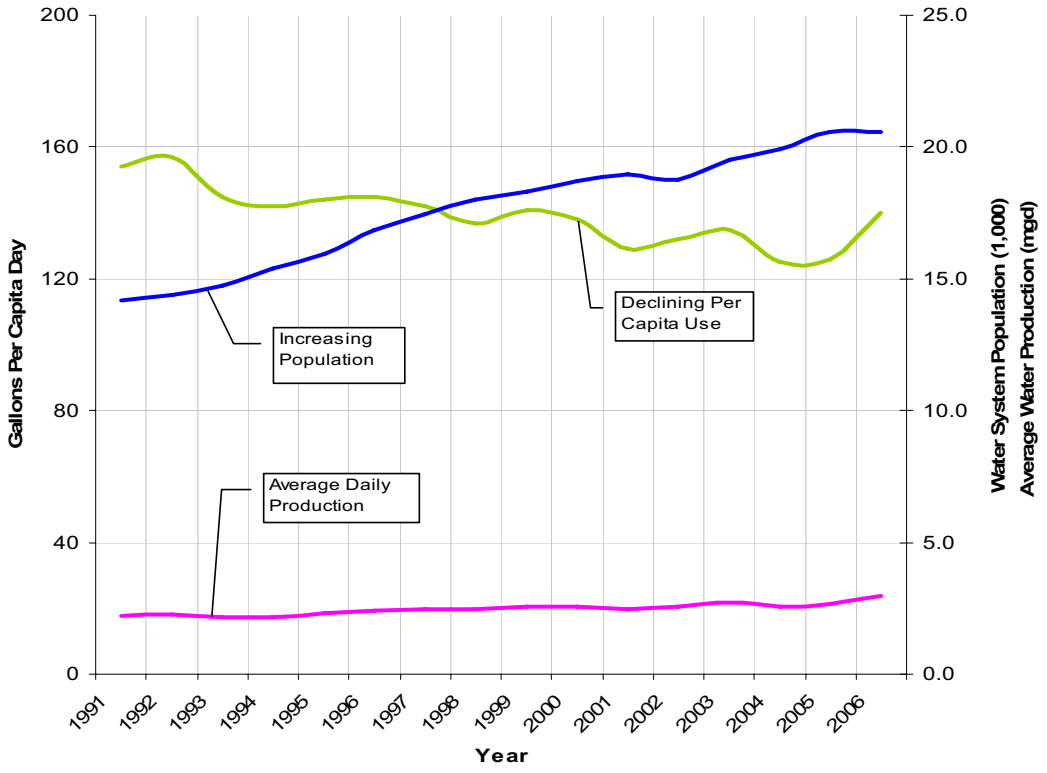

EXHIBIT 5-10
Historical per Capita Production and Average Daily Production
2007 City of Newberg Water Management and Conservation Plan

Quantification of Maximum Rate and Monthly Volume 690-086-0170(6)

OAR 690-086-0170(6) requires a quantification of the maximum rate of withdrawal and maximum monthly use if initial diversion of water allocated under an existing permit is necessary to meet demands in the 20-year planning horizon. As described above and illustrated in Exhibit 5-8, the City's water demand by 2027 could exceed an MDD of 11.4 mgd or approximately 17.64 cfs. Therefore, in addition to the firm supply of 4.0 mgd from wells and springs, an additional 11.4 mgd or 17.6 cfs will be needed from the City's water right permits.

Mitigation Actions under State and Federal Law 690-086-0170(7)

Under OAR 690-086-0170(7), for expanded or initial diversion of water under an existing permit, the water supplier is to describe mitigation actions it is taking to comply with legal requirements of the Endangered Species Act (ESA), Clean Water Act and other applicable state or federal environmental regulations. The City will obtain all required permits prior to its initial diversion of water under its water right permit should it decide to develop a water diversion requiring state and federal permitting.

Acquisition of New Water Rights 690-086-0170(8)

The City does not anticipate needing to acquire new water rights in the next 20 years.

APPENDIX A

Letters Requesting Local Government Comments and Input Received

CH2M HILL
2020 SW 4th Avenue
3rd Floor
Portland, Oregon 97201
Tel 503.736.4122
Fax 503.736.2000

June 4, 2007

331635.A1.WR

Sterling Anderson
Marion County Planning Department Manager
PO Box 14500
555 Court St. NE
Salem, Oregon 97309
(503) 588-5038

Subject: 2007 City of Newberg Water Management and Conservation Plan for Review

Dear Mr. Anderson:

We have attached a draft copy of the 2007 City of Newberg Water Management and Conservation Plan for your review and comment regarding its consistency with demand projections in your comprehensive land use plan.

The City of Newberg has prepared this plan to fulfill the requirements of Oregon Administrative Rule Chapter 690, Division 86, of the Oregon Water Resources Department. Please provide written comments to me within 30 days of the date of this letter.

If the plan appears acceptable to you as written, a comment to that effect would be appreciated. You may either send your comments to me at the address on the letterhead or e-mail them to me at James.Lee@CH2M.com.

You are welcome to call me at (503) 736-4122 or contact Lawrence Fain, the City of Newberg's project manager for this project at (503) 554-8881 if you have questions about this plan. Thank you for your interest in this project.

Sincerely,

CH2M HILL

James Lee

James Lee
As Representative of the City of Newberg

Marion County Response

From: Brandon Reich [mailto:BREICH@co.marion.or.us]
Sent: Tuesday, June 05, 2007 3:02 PM
To: Lee, James/PDX
Subject: Newberg Water Management Plan

Dear Mr. Lee:

I received your request to comment on the City of Newberg Water Management and Conservation Plan. The city has previously received permits from Marion County Planning to expand the wellfield in Marion County (Administrative Review Case #00-32) and to construct a new pipeline in the river (Administrative Review Case #06-10). The plan appears consistent with the development that has already been approved. If any additional developments are proposed, the city must apply for applicable permits from Marion County. Regarding demand protections, the county has no comment because the City of Newberg is not in Marion County.

Please contact me if you have any questions, (503) 588-5038.

Sincerely,

Brandon Reich
Associate Planner
Marion County Planning

CH2M HILL
2020 SW 4th Avenue
3rd Floor
Portland, Oregon 97201
Tel 503.736.4122
Fax 503.736.2000

June 1, 2007

331635.A1.WR

Mike Brandt
Yamhill County Planning Director
525 NE 4th Street
McMinnville, OR 97128
(503) 434-7516

Subject: 2007 City of Newberg Water Management and Conservation Plan for Review

Dear Mr. Brandt:

We have attached a draft copy of the 2007 City of Newberg Water Management and Conservation Plan for your review and comment regarding its consistency with demand projections in your comprehensive land use plan.

The City of Newberg has prepared this plan to fulfill the requirements of Oregon Administrative Rule Chapter 690, Division 86, of the Oregon Water Resources Department. Please provide written comments to me within 30 days of the date of this letter.

If the plan appears acceptable to you as written, a comment to that effect would be appreciated. You may either send your comments to me at the address on the letterhead or e-mail them to me at James.Lee@CH2M.com.

You are welcome to call me at (503) 736-4122 or contact Lawrence Fain, the City of Newberg's project manager for this project at (503) 554-8881 if you have questions about this plan. Thank you for your interest in this project.

Sincerely,

CH2M HILL

James Lee

James Lee
As Representative of the City of Newberg

Yamhill County Response

No comments were received for Yamhill County within the 30-day comment period or as of July 12, 2007.

APPENDIX B

Rate Structure Resolution

RESOLUTION NO. 2006-2641

A RESOLUTION ADOPTING MONTHLY WATER RATES FOR THE CITY OF NEWBERG, EFFECTIVE JULY 1, 2006

RECITALS:

1. City Code Section 50.48 governs the adoption of water rates for the City of Newberg and Chapter 50 governs the City of Newberg water system.

2. The Citizens' Rate Review Committee ("Rate Committee") reviewed water system characteristics and requirements, including the capital improvement plan and operating/maintenance costs, and recommends changes to the monthly water charges based on an analysis of current and near-term future anticipated water fund needs.

3. The Rate Committee met three times between January 25, 2006 and February 22, 2006 to discuss water rates.

4. The Rate Committee held a public hearing on the proposed monthly charges on May 3, 2006 and the City Council held a public hearing on May 15, 2006 and June 5, 2006.

THE CITY OF NEWBERG RESOLVES AS FOLLOWS:

1. Effective July 1, 2006, the monthly water service rates shall consist of charges as shown on the attached Exhibit "A."

2. Each customer applying for connection to the City water system shall pay to the City a water connection charge and water systems development charge which shall be due and payable at the time of issuance of a permit to proceed with each service connection. The water connection charge shall be calculated based on the estimate of the actual costs incurred by the City in conjunction with the connection of the service and shall be payable with the application for service. Costs in excess shall be due upon completion. Failure to pay the additional costs will cause the water meter to be removed. Any excess payment shall be refunded to the applicant.

3. A turn-on charge of twenty dollars ($20.00) shall be applied to all customer accounts to recover the cost of setting up the new account and turning the service on.

4. A charge of fifteen dollars ($15.00) shall be imposed on each delinquent account which receives a late payment notice and an additional turn-on charge of fifteen dollars ($15.00) shall be imposed on any account whose service has been terminated for failure to pay for the service and subsequently must be turned back on.

5. Builders or contractors wishing to purchase water from the City through a hydrant, which shall be served by a meter obtained from the City, shall be charged a $10.00 billing charge, $25.00 for the meter, and the appropriate commercial volume charge. There shall be a non-refundable deposit of $150.00, for the first 10,000 gallons. The cost of any damage to the meter or hydrant shall be reimbursed to the City in addition to the above charges and may be collected through the City's regular collection procedures.

6. Rates for any other water use, not explicitly provided for in this resolution, shall be established by the Public Works Director and Finance Director so as to conform as closely as practicable to the charges established herein. Such charges will be reviewed by the Finance Committee.

7. The cost of any damage by a customer to the City's portion of the water system, including locks and meters, will be charged to the customer's account in the utility billing system and collected in the usual manner.

8. The Rate Committee shall review the water system requirements and water rates at least every two years.

- **EFFECTIVE DATE** of this resolution is the day after the adoption date, which is: June 6, 2006.

ADOPTED by the City Council of the City of Newberg, Oregon, this 5th day of June 2006.

James H. Bennett, City Recorder

ATTEST by the Mayor this 9th day of June 2006.

Bob Stewart, Mayor

LEGISLATIVE HISTORY

By and through the Citizens' Rate Review Committee at their May 3, 2006 meeting.

EXHIBIT "A"

MONTHLY WATER SERVICE CHARGES
Effective July 1, 2006

	July 1, 2006	July 1, 2007
Service Charge ($/month):	$1.30	$1.30
Meter Charge ($/month):		
Inside & Outside City		
3/4" meter	$ 2.56	$2.56
1"	4.35	4.35
1 1/2"	8.45	8.45
2"	13.57	13.57
3"	25.60	25.60
4"	42.75	42.75
6"	85.25	85.25
8"	136.45	136.45
10"	213.25	213.25
Volume Charge ($/hundred cubic feet (ccf)):		
Single Family Residential	$2.40	$2.60
Multi-family Residential	2.03	2.17
Commercial	2.60	2.75
Industrial	2.27	2.51
University	1.52	1.33
Outside City	3.60	3.89
Public Agency	2.29	2.50
Irrigation	3.98	4.18

LEGISLATIVE HISTORY

By and through Citizens' Rate Review Committee at February 22, 2006 meeting.

APPENDIX C

Conservation and Curtailment Ordinance

ORDINANCE NO. 98-2495

AN ORDINANCE ESTABLISHING REGULATIONS RELATIVE TO WATER CRISIS EMERGENCIES; REGULATING THE USE OF WATER; PROHIBITING CERTAIN USES OF WATER FROM THE CITY OF NEWBERG'S WATER SYSTEM NOT ESSENTIAL TO PUBLIC WELL-BEING; DESIGNATING THE CREATION OF WATER CRISIS STATE OF EMERGENCY; AUTHORIZING CITY TO TERMINATE WATER SERVICE FOR VIOLATION; PRESCRIBING PENALTIES FOR THE VIOLATION OF ITS PROVISIONS; AND REPEALING ORDINANCE NUMBER 2029.

NOW, THEREFORE, THE CITY OF NEWBERG, OREGON, ORDAINS AS FOLLOWS:

Section 1. Definitions. For the purpose of this ordinance, the following terms, words, phrases and derivations shall have the meaning given herein. When not inconsistent with the context, the words used in the present tense include the future words and the plural number include the singular and words in the singular number include the plural number.

a. City - the City of Newberg.
b. Conservation - the careful preservation, planned management of the City's water supply in order to preserve the resource.
c. Curtailment - the cutting off of supply or reducing the supply by some amount or through some effort.
d. Person - any firm, partnership, association, corporation, including municipal corporation and a subdivision of the State of Oregon, company or other organization of any kind.
e. Water - water from the City's water supply system.

Section 2. Application of Regulations. Provisions of this ordinance shall apply to all persons using water both in and outside the City regardless of whether any person using water shall have a contract for water service with the City.

Section 3. Conservation Policy. The policy of the City is to encourage water conservation which is the careful preservation and planned management of the City's water supply in order to preserve the resource. This means careful use of water in order to protect the City's water resources without creating an undo hardship on water users. Implementation of this policy shall include the following actions:

A. The City of Newberg shall establish a water conservation program and periodically increase public awareness of the benefits of water conservation including encouraging some or all of the following conservation measures on water use:

1. Landscape sprinkling for each landscaped area (i.e. sprinkler zone) shall be limited to 20 minutes per day. This requirement is waived for new landscaping within 180 days of occupancy of facility.

2. No landscape sprinkling shall be allowed between 9:00 AM and 5:00 PM if the outside temperature exceeds 80° Fahrenheit. This requirement is waived for new landscaping within 180 days of occupancy of a facility.

3. Residential and commercial landscape sprinkling on an alternate-day basis is encouraged. Even numbered addresses may water on even numbered days and odd numbered addresses on odd numbered days.

4. All water use with a hand-held hose is exempt from restrictions, however, water users are encouraged to monitor hand-held hose use.

5. All new construction and all repair and/or replacement of fixtures, shall comply with the Energy Conservation Provisions of the Oregon Specialty Codes.

B. The City shall actively educate the City utility water users on conservation through an on-going water conservation education program.

C. The City Manager or a designee shall annually establish a definitive conservation program with the major irrigation water users, (based on Summer water use), to include an alternate-day irrigation schedule and a compliance monitoring program. Water audits will be encouraged.

D. The City shall continue the ongoing water conservation efforts, including water line leak detection and repair, replacement of deteriorating pipe, and replacement/repair of older and under-registering water meters, providing water users with educational materials, and connecting lines which are dead end lines in order to increase water circulation in the system.

Section 4. Curtailment Policy. The policy of the City is to curtail water use during drought conditions to insure that the City has adequate fire flow and supply for essential service requirements. The purpose of this section is to curtail water use during times of critical water shortages due to severe droughts, reduction in treatment or pumping capability, equipment malfunctions, or other emergency situations where there may be an insufficient water supply. The Mayor or City Manager is empowered to declare a water crisis state of emergency if in the opinion of the Mayor or City Manager, the adequacy of the water supply for the City of Newberg is sufficiently endangered to create a risk of danger to the health, safety and welfare of the people of the City of Newberg. Implementation of this policy shall include the following actions and such

other actions are deemed to be necessary subject to the judgement of the Mayor or City Manager:

A. The City shall restrict water use by all customer classes by using some or all of the following methods subject to the severity of the water shortage as determined by the City Manager or a designee, and subject to the approval of the Mayor or City Manager and notification as provided for in Section 5 of this ordinance. Curtailing water use shall include some or all of the following activities:

1. Sprinkling, watering or irrigation of shrubbery, trees, lawns, grass, ground covers, plants, vines, gardens, vegetables, flowers or any other vegetation. On request, the Community Development Director may approve exceptions for new landscaping that previously has been planted, but not established.

2. Washing automobiles, trucks, trailers, trailer houses, motorbikes, boats, or any other type of mobile equipment.

3. Washing sidewalks, driveways, parking lots, tennis courts, filling station aprons, porches and other hard surface areas.

4. Washing the exteriors of dwellings; washing the exteriors or interiors of office buildings.

5. Operating any ornamental fountain, scenic or recreational pond or lake or other structure using water similarly, except for the minimum quantity necessary to support fish life.

6. Filling, refilling or adding water to any swimming or wading pool or hot tub not employing a filter and recirculating system nor evaporation covers, except where the use of the pool or hot tub is required by a doctor.

7. Permitting the escape of water through defective plumbing.

8. Using water for construction projects.

9. Serving customers water in a restaurant unless requested.

Section 5. Emergency Powers. As provided in Ordinance No. 1040, Section 9, the City expressly reserves the right to discontinue furnishing water to any and all water users, and consumers outside the corporate limits of the said City, in the event of water shortage or other public emergency or catastrophe. Any water saving measures that in the opinion of the Mayor or City Manager are reasonable and necessary to protect the health, safety and welfare of the people of the City of Newberg may be implemented to address the emergency. These measures shall be

in writing, and shall state the effective time and date of such measure.

Section 6. Notification. If a water shortage is anticipated to occur or actually occurs, the Community Development Director or Utilities Manager shall inform the Mayor or City Manager when water consumption exceeds production and available water storage is approaching the minimum quantity required by the City to meet fire protection and other essential demands. Upon notification, the Mayor or City Manager shall see that the following actions are taken:

A. On receipt of this notification, the Mayor or City Manager may impose the water curtailment measures deemed necessary to address the situation pursuant to Section 4 of this Ordinance, effective immediately or at such date and time indicated in the notice. The water curtailment measures shall be in writing and prepared for general release to the City water utility customers, City Council and other interested parties. Notification in accordance with this Ordinance shall then commence as follows:

1. The Mayor or City Manager, or a designee, shall notify each City Council member by telephone, with a written statement to follow, or in writing of the curtailment measures within six (6) hours.

2. The curtailment measures shall be publicly announced by any means reasonably necessary to give notice to the City water utility customers.

3. Each announcement shall state the action taken by the Mayor or City Manager including the time the curtailment measures became or will become effective and the announcement shall specify the particular curtailment measures to be imposed. Any water user aggrieved by the proposed curtailment shall immediately, upon notice, contact the Mayor or City Manager to discuss and resolve the grievance.

4. Whenever the Mayor or City Manger finds that the conditions which gave rise to the water curtailment measures no longer exist, the Mayor or City Manager may declare the curtailment measures terminated in whole or in part, effective immediately on announcement. The announcement shall be in writing. The Mayor or City Manager shall notify the City Council pursuant to this Ordinance and take whatever actions are necessary to give notice to the City water utility customers.

Section 7. Penalties. Violation of a duly written and noticed water curtailment measure or this ordinance shall be a City Class 3 civil infraction and shall be processed in accordance with the procedure set forth in the "Uniform Civil Infraction Procedure Ordinance" of the City. Each day in which any such violation shall continue shall be deemed a separate offense.

Section 8. Exception to Maintain Sanitation. The City Community Development Director or a designee, after written notice to the Mayor or City Manager, shall have the authority to permit

a reasonable use of water in any case necessary to maintain adequate health, safety and sanitation standards.

Section 9. Length of the Curtailment Measures. The length of curtailment measures established by the Mayor or City Manager shall remain in effect until terminated by announcement of the Mayor or City Manager in accordance with this ordinance.

Section 10. Authority of Officer. Any police officer or other employee of the City of Newberg may enter upon the premises of any person for the purpose of reducing the flow of any water used contrary to the provisions of this ordinance, providing that such measures shall not be taken until the following have occurred:

A. The person in violation has been cited once for a violation of this ordinance.

B. The person has had served upon them written notice to cease and desist any further violation of any measures imposed under this ordinance.

Section 11. Severability. If any section, subsection, sentence, clause, phrase or portion of this ordinance is for any reason held invalid or unconstitutional by any court of competent jurisdiction, such portion shall be deemed to be a separate, distinct and independent provision and such holding shall not affect the validity of the remaining portions thereof.

Section 12. Repeal. Ordinance No. 2029 are hereby repealed by the City Council of the City of Newberg.

ADOPTED by the Newberg City Council this 18th day of May, 1998 by the following votes:

AYES: 6 **NAYS: 0** **ABSENT:1**

Duane R. Cole

Duane R. Cole, City Recorder

ATTEST by the Mayor this 22nd day of May, 1998:

Donna Proctor

Donna Proctor, Mayor

NOTE: Clerical error corrected on August 26, 1998 and resigned on that date.