final draft update to

Water Management and Conservation Plan

PREPARED FOR

City of Lake Oswego, OR

January 2010

Final Draft

Water Management and Conservation Plan

Prepared for

City of Lake Oswego, Oregon

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CH2MHILL

GSI Water Solutions, Inc.

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Glossary of Terms and Acronyms

Average Day Demand (ADD) - Total annual production divided by 365 days.

CFS - Cubic feet per second.

Connection - Metered connection of a customer to the distribution system.

Demand - Total water production, or the sum of metered consumption (residential, commercial, industrial, and municipal), unmetered uses (for example, fire fighting or hydrant flushing), and water lost to leakage and reservoir overflow. For the City, demand (production) is the total amount of water entering the distribution system.

Evapotranspiration (ET) - Water lost from the surface of soils and plants through evaporation and transpiration, respectively.

Leak Detection - Methods for identifying water leakage from pipes, plumbing fixtures, and fittings.

MGD - Million gallons per day.

Maximum Day Demand (MDD) - Highest daily production during a calendar year.

Maximum Monthly Demand (MMD) - Average daily demand during the calendar month with the highest total demand.

Monthly Demand - The volume of water produced during each of the 12 calendar months. Monthly demand is expressed either as a total volume produced per month or an average daily demand per month by dividing the monthly volume by the number of days in the month.

Non-revenue Water - Water demand for which no revenue was collected. Calculated by taking the difference between the total amount of water produced less the total volume of water metered and sold.

Peak Demand - The highest total water use experienced by a water supply system, measured on an hourly, daily, monthly, or annual basis.

Peaking Factor - A ratio of one demand to another. The most common is MDD to ADD.

Per Capita Use - The amount of water used by one person during a standard period of time; in relation to water use, expressed in gallons per capita per day or GPCD.

Water Conservation - (1) Any beneficial reduction in water loss, waste, or use, (2) reduction in water use accomplished by implementation of water conservation or water-efficiency measures, (3) improved water management practices that reduce or enhance the beneficial use of water.

Executive Summary

On April 11, 2008, the Oregon Water Resources Department issued a Final Order approving the City of Lake Oswego's first Water Management and Conservation Plan (WMCP or "Plan"). The purpose of the Plan is to guide the development, financing and implementation of water management and conservation programs and policies to ensure sustainable use, without waste, of publicly owned water resources while the City plans for its future water needs. In 2008, the cities of Lake Oswego and Tigard entered into an intergovernmental agreement to jointly plan, fund, construct and operate an expanded water supply system for the benefit of their respective communities. This regional approach to meeting the current and future water supply and infrastructure needs of growing communities is the driving force behind the City of Lake Oswego's need to update its Plan. This updated Plan:

- ✓ Reflects community values and the City's sustainability goals;
- ✓ Establishes a prioritized list of conservation measures and practices to pursue to meet regulatory benchmarks and self-imposed performance targets;
- ✓ Guides the City's future investments in conservation programs; and
- ✓ Is a blueprint for the long-term use, sustainability, and development of the City's water supply.

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 management, water conservation, and curtailment programs to guide the wise use and stewardship of the City's water supply.

The Plan is organized into the following sections, as shown in **Exhibit ES-1**, each addressing specific requirements of the rules in OAR Chapter 690, Division 86. Section 2 is a self-evaluation of the City's water supply, water use, water rights and water system. The information developed for Section 2 is the foundation for the sections that follow. The later sections use this information to consider how the City can improve its water conservation and water supply planning efforts.

EXHIBIT ES-1
WMCP Organization

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

Description of Municipal Water Supplier

The City's current service area is the limit of its current urban services boundary (USB), which includes all land within the City limits as well as Forest Highlands, Lake Grove, Rivergrove, Southwood Park, Skylands, Glenmorrie, Alto Park, and portions of the Palatine Hill Water Districts.

The City's system provides water to approximately 13,400 service connections. These connections serve residential areas, commercial establishments, public facilities, schools, irrigation accounts, and wholesale customers. In 2008, the population served on a retail basis within the City limits was approximately 33,800 people. The 2008 population residing in water districts within the urban services boundary (USB) was estimated at approximately 6,800 people. Therefore, the total population within the City's USB was approximately 40,600 people in 2008.

Lake Oswego's water source is the Clackamas River. Raw water is pumped from an intake at River Mile 0.8 on the Clackamas River to the City's water treatment plant located in the City of West Linn. After treatment, the finished water is pumped into the distribution system.

The City holds surface water rights that authorize the use of this water from the Clackamas River: one certificated right for 25 cubic feet per second (cfs), one permit (S-32410) for 25 cfs, and one permit (S-37839) for 9 cfs. The City also holds an undeveloped water use permit for the Willamette River, three groundwater registrations and a water use permit authorizing the use of groundwater for municipal use and irrigation.

Water Conservation

Before development of the City's existing WMCP, the City hired the opinion research firm of Davis, Hibbits & Midghall, Inc. to conduct a telephone survey on behalf of the City. The survey explored the City's water customers' interests and concerns regarding their water supply and water conservation. The City also formed a community-based Water Conservation Committee to provide guidance in the development of water management and conservation measures for that WMCP. Committee members were selected to represent a range of water users, interests, and backgrounds. The committee developed possible five-year benchmarks for both required and optional conservation measures, which City staff refined and expanded.

The resulting required and additional conservation measures required by OAR 690-086-0150 (4) – (6) were included in the previously approved WMCP. In the less-than-two-year period since the WMCP was approved, the City has made significant progress toward its five-year conservation benchmarks and has continued to refine the previous measures, as well as develop new conservation measures.

Five-Year Benchmarks for Conservation Measures

OWRD's WMCP rules require cities to have five-year benchmarks for initiating or expanding conservation measures related to the following required conservation programs. A summary of the five-year benchmarks is provided below.

Annual water audits. The City documents water production and wholesale consumption on a monthly basis in order to monitor and understand its customer's water demands. Retail

consumption is documented on a bi-monthly basis. The City's previously approved WMCP showed a five-year average for non-revenue water (water for which no revenue is received) of 9 percent, but the non-revenue water calculated for this WMCP shows an average of 16 percent. Because the City conducts rigorous leak detection, the City believes that the results of the non-revenue water calculations are due to accounting and billing system practices rather than losses due to system leakage. These calculations have heightened awareness and made these accounting and billing system inconsistencies an area of focus for the City.

Five-year Benchmark:

- The City will continue to conduct annual City water audits.
- The City will undertake an audit of its accounting, billing, meter reading and reporting practices and procedures to identify and resolve inconsistencies and improve the City's ability to accurately account for the sources of non-revenue water. This work will be completed within the next 3 years.

System metering. The City's water system is fully metered except for hydrant flushing and the seasonal filling of water tanks for hand-watering of some landscapes.

Five-year Benchmark:

- The City will continue to require all new development to be metered.

Meter testing and maintenance. The City annually tests 50 percent of all 2-inch and larger meters and replaces the ¾ -inch to 1 ½ -inch meters on a 20-year replacement cycle (approximately 650 meters/year). This represents an increase from the 5-year benchmark proposed in the City's 2007 WMCP, which was a 25-year replacement schedule.

In 2009, the City acquired a meter field-testing device that is used during residential audits if irregularities are found. Meters found to be inaccurate are replaced immediately.

Five-year Benchmark:

- The City will continue to conduct meter testing and replacement on the schedule noted above.
- Within the next 5 years, the City will establish design standards to require all meters 2 inches and larger to be installed with test ports and bypass devices to facilitate testing and repair.
- City staff will continue to use the field-testing device when irregularities are found during water audits.
- Within the next 5 years, the City will implement a pilot study to assess the use of an auto-read meter system.
- Within the next 5 years, the City will develop and implement a regularly-scheduled meter testing and maintenance program for the production meters at its water treatment plant.

Unit-based billing program. Because single-family residential use represents 65 percent of annual metered consumption, the City has focused many conservation activities on residential customers, including changes to its billing program. In December 2008, the City adopted rate increases for all customers and instituted a tiered pricing structure for the single family

customer class. On July 1, 2009, the first of several significant annual rate increases were implemented beginning with a 15.5 percent increase. This rate increase will be followed by a 15.25 percent increase beginning on July 1, 2010. The City's rate structure is comprised of a fixed charge (to cover the fixed operating costs of the utility) and a charge per unit volume of water, which is metered at each customer's point of connection to the public utility. As noted above, for single family customers the unit volume charge increases substantially with increasing consumption.

Five-year Benchmark:

- The City will semi-annually, or more frequently as conditions dictate, conduct Cost of Service Analyses (COSA) to determine the size and timing of future rate increases needed to fully fund capital and operating costs and to achieve other utility objectives like reducing system demand.

Leak detection and repair. As previously described, the City believes a significant portion of the City's apparent non-revenue water is related to accounting and billing system practices rather than losses due to system leakage.

Since 1994, the City has annually budgeted and expended an average of $600,000 for pipeline replacement. Most of the areas of the City with known pipeline problems have been addressed through this program. The City annually conducts a leak detection program and repairs or replaces sections of pipeline as necessary. The City historically has conducted leak detection on 30 miles of its 250-mile pipe network, resulting in a 7-year leak detection cycle. Since submitting its 2007 plan, the City has replaced 14,300 feet of pipeline.

Five-year Benchmark:

- The City will continue to annually fund leak detection and repair or replacement.
- Repairs of all reported and detected leaks will continue to be performed in a timely manner and the City will continue to conduct leak detection at a rate of 30 miles of pipeline annually.
- The City will conduct an audit and analyses of the City's billing and accounting system, and take actions in response to the results of the audit and analyses. If these actions do not reduce the City's annual non-revenue water to less than 15 percent, the City will expand its leak detection program as appropriate to reduce its non-revenue water (including system leakage) to 15 percent and, if feasible, to 10 percent.

Public education. The City continues to be an active member and financial supporter of the Regional Water Providers Consortium (RWPC) and continues local marketing of information about water conservation opportunities and programs including conservation newsletters in the local newspaper 'Hello L.O.', residential water audits (the City views this as a public education opportunity), educational videos on the City's website, and water conservation and sustainability classes and assemblies. The City emphasizes the Clackamas River as the primary source of the City's water; it is now woven into information materials.

Five-year Benchmark:

- The City will continue its membership in the RWPC and will continue with local marketing opportunities, water audits and water conservation classes.

- The City will pursue land and funding to create a native and low-water use demonstration garden.

Technical and financial assistance. The top 20 residential and top 20 commercial water users were identified for the 2007 WMCP and the City's Water Conservation Specialist began conducting water audits for those top water users. To date, water audits have been completed on 5 of the top 20 residential water users (25 percent) and 3 of the top 20 (15 percent) commercial water users. In addition to audits on the top water users, more than 80 outdoor and 30 indoor residential water audits have been conducted in both single-family and multi-family customer classes. Also, the City has dispersed outdoor water conservation equipment, along with information on using the equipment to reduce outdoor water consumption. Additionally, the City offers shower timers and toilet dye tablets to educate customers and reduce indoor water use.

Five-year Benchmark:

- The City will continue to conduct water audits for the top 20 residential and 20 commercial water users to achieve 100 percent auditing within the next 8 years.
- The City Water Conservation Specialist will continue to offer free water audits to any customers that request the service.

Retrofit/replacement of inefficient fixtures. In order to encourage its customers to replace old water fixtures that do not use water efficiently, the City developed a plumbing fixture rebate program. This program gives the City's water users a monetary incentive to replace old, inefficient fixtures with new, more efficient fixtures. To date, the City has had 159 participants in its toilet/urinal rebate program, resulting in replacement of 232 toilets. In addition, the City has given away 325 faucet aerators and 196 low-flow showerheads, which are also intended to reduce its customers' water usage.

Five-year Benchmark:

- The City will implement a clothes washer replacement program within the next 5 years.
- The City will also evaluate offering rebates to customers with large irrigated areas to encourage installation of evapotranspiration (ET) controlled irrigation systems The City will implement the program if actual performance histories confirm the level of published theoretical water savings.
- The City will continue its fixture rebate program and distribution of faucet aerators and low-flow showerheads.

Reuse, recycling, and non-potable water opportunities. The City's water treatment plant recycles all of the backwash water. Further, the City irrigates a city park (Luscher Farm) with water from a well.

Five-year Benchmark:

- The City will investigate the feasibility of using non-potable groundwater and Willamette River water as an alternative source for irrigation water to its large park areas.

- Additionally, the City will explore the feasibility of aquifer storage and recovery (ASR) as a means to reduce demands on surface water supplies during low stream flow periods of late summer and early fall.

Other measures. As further described below, the City already has implemented several other conservation measures contained in its 2007 plan and will continue them as part of this Plan.

- **Water Conservation Specialist.** The City hired a full-time water conservation specialist in 2007. This position supports the City's water conservation goals by developing, coordinating, implementing, monitoring and reporting on City water conservation programs.

- **Annual water use reporting from wholesale water customers.** In December of each year, the City requests annual water reports from all wholesale water customers. These water reports describe the wholesale customer's water use, current retail water rates and rate structure, and any conservation programs specific to the customers receiving City water. These reports assist the City in understanding the water use of its wholesale customers.

- **Outdoor water conservation measures.** The City has increased its outdoor water conservation efforts through numerous measures. The City is also in the process of installing two weather stations in the City that will be used to determine local ET. The ET data will be sent to the City Parks Department to be used to adjust irrigation schedules. The data will also be published on the City's website for customer access and usage.

Five-year Benchmark:

- The City will continue to work with the City Parks Department to collaborate on replacement of existing clock-timed controllers to weather-based controllers and encourage the use of native and low-water use landscapes, and the switch to drip (or alternative) irrigation where appropriate.

- The City will also continue to require annual water use reporting from wholesale water customers.

- Further, the City will determine the feasibility of developing an outdoor water use/water conservation demonstration project.

Water Curtailment

In the event of a water shortage, the City needs a detailed response plan based on predetermined objective criteria. The curtailment plan describes how the City will respond to specific water-shortage conditions. The City's curtailment plan presented in this WMCP has five distinct stages, each of which is triggered by one or more of the events. The five stages, increasing in order of severity, are summarized in **Exhibit ES-2** below. Any of the initiating conditions described in **Exhibit ES-2** will trigger the appropriate curtailment stage. Initiating conditions and response actions are described in detail in Section 4 of this WMCP.

EXHIBIT ES-2
Curtailment Stages 1 through 5

Curtailment Stages	Initiating Conditions
Stage 1: **Water Shortage Alert**	• Forecasts of below-normal summer streamflows • Mechanical or electrical malfunction causing the loss of any two pumps at intake facility • Minor damage to raw or treated water transmission mains (e.g., leaking joint requiring repair)
Stage 2: **Serious Water Shortage** **Demand Reduction Target:** **10 percent of MDD**	• Declaration of drought by Governor pursuant to ORS 536.720 • Continuation of hot dry weather predicted • Declining river levels • Mechanical or electrical malfunction causing the loss of the largest pump at intake • Extensive repairs needed on raw or treated water transmission mains
Stage 3: **Severe Water Shortage** **Demand Reduction Target:** **20 percent of MDD**	• Continuation of hot dry weather predicted • Clackamas River streamflows below 510 cubic feet per second (cfs) between July 1 and September 15 or below 750 cfs between September 16 and June 30[1] • Loss of pump 1, 2, or 3 at water treatment plant (WTP) • Loss of utility electrical service at intake • Multiple failures in the joints of the raw or treated water transmission mains
Stage 4: **Critical Water Shortage** **Demand Reduction Target:** **50 percent of MDD**	• Clackamas River streamflows below 510 cfs between July 1 and September 15 or below 730 cfs between September 16 and June 30 impacting instream water rights[2] • Severe drought conditions • Loss of utility electrical service at water treatment plant or intake • Major mechanical or electrical malfunctions causing loss of multiple pumps at intake or water treatment plant • Transmission main failures • Fire at intake or water treatment plant • Imminent terrorist threat against supply system • Contamination of source of supply
Stage 5: **Emergency Water Shortage**	• Continuation of severe drought conditions • Extensive damage to transmission, pumping, or treatment processes caused by natural disaster • Intentional acts or fire, contamination of source, or any other event resulting in an immediate, sustained deprivation of water supply

[1] The approximate total of estimated current peak day withdrawals for the Clackamas River Water Users (107 cfs) and minimum in-stream flows between July 1 through September 15 (400 cfs) and between September 16 and June 30 (640 cfs), measured at U.S. Geological Survey gauging station 14211010 at the South Fork Water Board's intake.
[2] Same as footnote 1, but reflects a 15 percent reduction in current peak day demands spread across all municipal water providers.

Water Supply

Lake Oswego's current USB includes all land within the city limits as well as Forest Highlands, Lake Grove, Rivergrove, Southwood Park, Skylands, Glenmorrie, Alto Park Water Districts, and portions of the Palatine Hill Water District. In addition, the Cities of Lake Oswego and Tigard have agreed to pursue plans for a joint water system. As a result, the future planning area for this WMCP is the limit of Lake Oswego's current USB and the City of Tigard's USB. Data from Portland Metro Regional Center's *Metroscope Gen 2.3 - Year 2030 Transportation Analysis Zone (TAZ) Allocation Report*, historic population data from PSU's Population Research Center, and account information from water districts served by the City were used to project the service area populations within the City's USB and Tigard's USB (see **Exhibit ES-3**).

EXHIBIT ES-3
Population Projections for the Lake Oswego USB, and the City of Tigard USB

	2019	2030
Lake Oswego City Limits	35,670	37,700
Lake Oswego Outside City Limits and Within USB	8,090	9,580
Subtotal (Lake Oswego USB)	43,760	47,280
City of Tigard USB	60,440	64,050
Total	104,200	111,330

Note: Values rounded to the nearest 10 people.

In order to project the future water demands for the City of Lake Oswego USB and the City of Tigard USB, it was assumed that the following per capita demand factors would remain constant throughout the 20-year projection period:

- Lake Oswego USB average day demand per capita = 171 gallons per capita day
- Lake Oswego USB maximum day demand per capita = 393 gallons per capita day
- Tigard USB average day demand per capita = 118 gallons per capita day
- Tigard USB maximum day demand per capita = 247 gallons per capita day

These per capita demand values were multiplied by the projected future populations for the City of Lake Oswego and the City of Tigard to obtain the future average day demand (ADD) and maximum day demand (MDD) for each city. The resulting ADD and MDD projections for 2019 and 2030 for the Lake Oswego and Tigard water service areas are summarized in **Exhibit ES-4**.

EXHIBIT ES-4
City of Lake Oswego and City of Tigard Water System Demand Projections (mgd)

Service Area	2019		2030	
	ADD	MDD	ADD	MDD
Lake Oswego USB	7.5	17.2	8.1	18.6
Tigard USB	7.1	14.9	7.6	15.8
Total	14.6	32.1	15.7	34.4

The Lake Oswego-Tigard joint water system will supply up to 14 mgd to meet Tigard's water demands described above. This demand, in addition to Lake Oswego's above-described projected water demands will require the Lake Oswego and Tigard joint water system to supply approximately 32.6 mgd to help meet the 34.4 mgd MDD of both communities by 2030.

In order to meet this water demand, the City anticipates using all 25 cfs (16.15 mgd) authorized by its water right permit S-32410, in addition to the 25 cfs authorized by its water right certificate, by approximately 2028. Based on projected population growth and the need to provide water on an emergency basis to other municipal water suppliers, Lake Oswego anticipates developing and beneficially using all 59 cfs (38.1 mgd) under it Clackamas River water rights by approximately 2040.

1. Municipal Water Supplier Plan Elements

This section satisfies the requirements of OAR 690-086-125.

This rule requires a list of affected local government to whom the plan was made available, and a proposed date for submittal of an updated plan.

Introduction

Incorporated in 1910, the town of Oswego has grown and progressed from its early industrial roots to become a city renowned for its beauty, quality of life and most recently environmental stewardship. Central to this evolution has been access to adequate supplies of high-quality water for public health and sanitation, fire protection, recreation and economic development. As Lake Oswego's population grows, so do its demands for water, requiring all residents to ensure that continued use of the City's water supply source is sustainable. Wise water management and sustained implementation of effective conservation measures can reduce water consumption, delay the need for additional water supplies and reduce the volume of new water needed for municipal purposes.

In 2006, the City initiated efforts to develop a Water Management and Conservation Plan (WMCP or the "Plan"). The Plan is a living document that will evolve over time in response to a variety of inputs including aging infrastructure, state water policy, endangered species, local and regional land use policies and changing water quality regulations. On April 11, 2008, the Oregon Water Resources Department (OWRD or the "Department") issued a Final Order approving the City's first Plan. The purpose of the Plan is to guide the development, financing and implementation of water management and conservation programs and policies to ensure sustainable use, without waste, of publicly-owned water resources while the City plans for its future water needs.

In late 2008 after several years of technical analysis and community involvement, the cities of Lake Oswego and Tigard entered into an Intergovernmental Agreement ("IGA") to jointly plan, fund, construct and operate an expanded water supply system for the benefit of their respective communities. This regional approach to meeting current and future water supply and infrastructure needs of growing communities is the driving force behind the City of Lake Oswego's need to update its Plan. This updated Plan:

- ✓ Reflects community values and the City's sustainability goals;
- ✓ Establishes a prioritized list of conservation measures and practices to pursue to meet regulatory benchmarks and self-imposed performance targets;
- ✓ Guides the City's future investments in conservation programs; and
- ✓ Is a blueprint for the long-term use, sustainability, and development of the City's water supply.

Plan Organization

This Water Management and Conservation Plan fulfills the requirements of the Oregon Administrative Rules (OAR) adopted by the Water Resources Commission in November 2002 (OAR Chapter 690, Division 86). This Plan describes water management, water conservation, and curtailment programs to guide the wise use and stewardship of the City's water supply. The City also is submitting this Plan to gain access to water under its extended permits S-32410 and S-37839.

The Plan is organized into the following sections, each addressing specific sections of OAR Chapter 690, Division 86. Section 2 is a self-evaluation of the City's water supply, water use, water rights and water system. The information developed for Section 2 is the foundation for the chapters that follow. The later chapters use this information to consider how the City can improve its water conservation and water supply planning efforts.

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

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

The following governmental agencies may be affected by this WMCP:

- Clackamas County
- City of Portland
- City of Rivergrove
- City of Tigard
- City of Tualatin
- City of Oregon City
- City of West Linn
- Metro

Thirty days before submitting this WMCP to OWRD, the City made the draft plan available for review by each affected local government listed above along with a request for comments relating to consistency with the local government's comprehensive land use plan. The letters requesting comment and any comments received are in **Appendix A**.

In addition, the City provided the following entities with notice of the draft plan as a courtesy:

- Skylands Water Company
- Glenmorrie Water Cooperative
- Lake Grove Water District
- Rivergrove Water District
- Southwood Park Water District

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

The City anticipates submitting an update of this plan within 10 years of the final order approving this plan. As required by OAR Chapter 690, Division 86, a progress report will be submitted within 5 years of the final order.

Time Extension
OAR 690-086-0125(7)

The City is not requesting an extension of time to implement metering or a benchmark established in a previously approved plan.

2. Municipal Water Supplier Description

This section satisfies the requirements of OAR 690-086-0140.

This rule requires descriptions of the City's water sources, service area and population, water rights, and adequacy and reliability of the existing water supply. The rule also requires descriptions of the City's customers and their water use, the water system, interconnections with other water suppliers, and quantification of system leakage.

Water Sources

OAR 690-086-0140(1)

The City's water source is the Clackamas River. The Clackamas River Basin encompasses about 940 square miles, with the upper reaches in the Mt. Hood National Forest. The City's raw water intake is located at RM 0.8 on the Clackamas River, a short distance upstream of the river's confluence with the Willamette River. The City also holds an undeveloped water use permit on the Willamette River, three groundwater registrations for municipal water use, and a groundwater permit for irrigation water use.

Raw water from the Clackamas River is pumped to the City's water treatment plant through a 27-inch-diameter pipeline buried beneath the Willamette River. The plant, located in West Linn, was constructed in 1967 and was expanded to its current capacity of 16 million gallons per day (mgd) in 1980. The treatment steps include coagulation, filtration, and disinfection. Finished water is pumped to the City's distribution system, which consists of approximately 250 miles of pipeline. The City's Public Water System Identification Number is 4100457.

Interconnections with Other Systems

OAR 690-086-0140(7)

The City's drinking water system is interconnected with eight other systems. Within its USB, the City has agreements to provide water to the Lake Grove Water District, Skylands Water Company, and Glenmorrie Water Cooperative, and the Cities of Tigard and Portland. The City also maintains emergency inter-ties with the Cities of Tualatin and West Linn and the Rivergrove Water District.

Intergovernmental Agreements

OAR 690-086-0140(1)

As noted above, the City provides water on a wholesale basis to a number of cities and water districts. A summary of all current intergovernmental agreements for wholesale water supply is located in **Appendix B**.

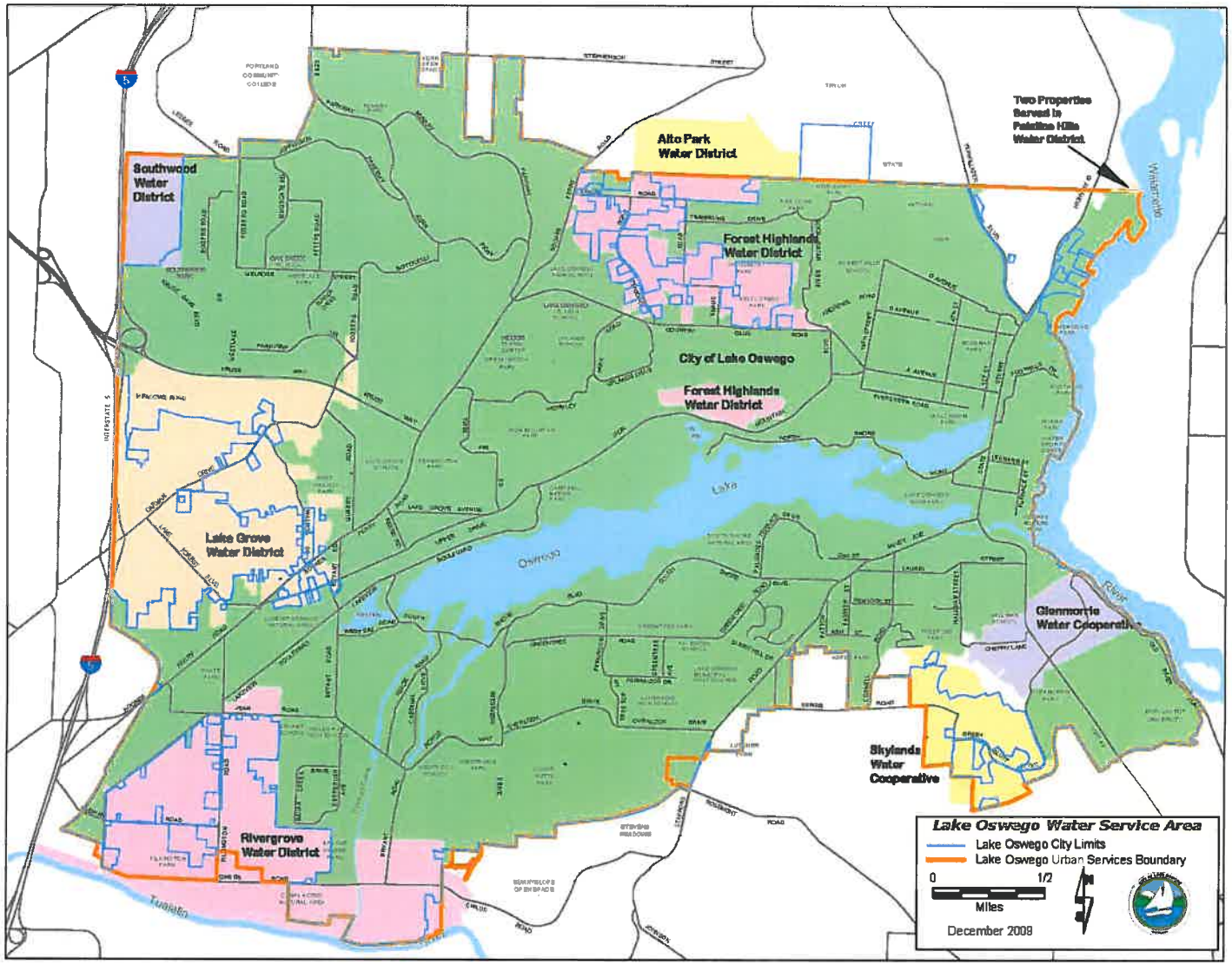
Current Service Area Description

OAR 690-086-0140(2)

The City's current service area, shown in **Exhibit 2-1**, is the limit of the City's current USB, which includes all land within the City limits as well as Forest Highlands, Lake Grove, Rivergrove, Southwood Park, Skylands, Glenmorrie, Alto Park, and portions of the Palatine Hill Water Districts.

The City's system provides water to approximately 13,400 service connections. These connections serve residential areas, commercial establishments, public facilities, schools, irrigation accounts, and wholesale customers. In 2008, the population served on a retail basis within the City limits was approximately 33,800. The 2008 population residing in water districts within the USB was estimated at approximately 6,800 people. Therefore, the total population within the City's USB was approximately 40,600 people in 2008.

EXHIBIT 2-1
Lake Oswego Water Service Area



Records of Water Use

OAR 690-086-0140(4) and (9)

Methodology

The International Water Association (IWA) and the American Water Works Association (AWWA) have published and promoted a water audit method that has been widely recognized and adopted throughout the water industry.[1] This method provides the definitions and classifications for annual water production and consumption shown in **Exhibit 2-2.** Determining the magnitude of each category can help a utility estimate the financial impact of production, billing and leak detection practices.

System input, shown in Column A of **Exhibit 2-2**, refers to the total quantity of water delivered to a distribution system from all sources: for example, water treatment plants, wells, or wholesale purchases from neighboring systems. The quantity of this water is generally measured using large master meters located at key entry points into the distribution system. System input also is known as "production" and "demand." By definition, the system input volume must equal the sum of the authorized consumption and water losses that occur in the system (Column B of **Exhibit 2-2**).

EXHIBIT 2-2
Components of the IWA/AWWA Water Balance, million gallons per year

A	B	C	D	E
System Input Volume = Production = System Demand (measured at Master Meters)	Authorized Consumption	Billed Authorized Consumption	Billed metered consumption (including water exported to another system). Billed unmetered consumption.	Revenue Water
		Unbilled Authorized Consumption	Unbilled metered consumption. Unbilled unmetered consumption.	Non-Revenue Water
	Water Losses	Apparent Losses	Unauthorized consumption. Metering inaccuracies. Data handling error.	
		Real Losses	Leakage from transmission and/or distribution mains. Leakage and overflows at storage tanks. Leakage from service connections up to point of customer metering.	

* AWWA. Manual of Water Supply Practices M36. *Water Audits and Loss Control Programs, Third Edition*, 2009.

Authorized consumption is divided into billed and unbilled categories. Billed authorized consumption is equal to revenue water. Unbilled authorized consumption contributes to a system's non-revenue water. Authorized consumption may be either metered or

[1] AWWA. Manual of Water Supply Practices M36. *Water Audits and Loss Control Programs, Third Edition*, 2009.

unmetered. Unmetered volumes must be estimated based on estimated flow rates and durations of flow. Examples of authorized billed consumption include metered consumption for residential, municipal, commercial, industrial, irrigation, and wholesale water customers. Authorized unbilled consumption may include public uses for firefighting or hydrant flushing.

Water losses include both apparent losses, and real losses. Apparent losses result from meter inaccuracies, error introduced by data entry or manipulation, and unauthorized consumption (illegal connection to the system or use of a fire hydrant). Real losses result when water is lost to leakage, reservoir overflow, and evaporation. All water systems have some degree of real losses. The OWRD's Water Management and Conservation Planning rules set a goal for municipal systems to have "system leakage" (real losses) equal to or less than 15 percent of total system input or demand, and if feasible, less than 10 percent.

Generally, demands and consumption in municipal systems are expressed in units of mgd, but also may be expressed in cubic feet per second (cfs) or gallons per minute (gpm). One mgd is equivalent to 1.55 cfs or 694 gpm. For annual or monthly values, a quantity of water is typically reported in million gallons (MG). Water use per person (per capita use) is expressed in gallons per person per day (gpcd).

Historical Water Demands

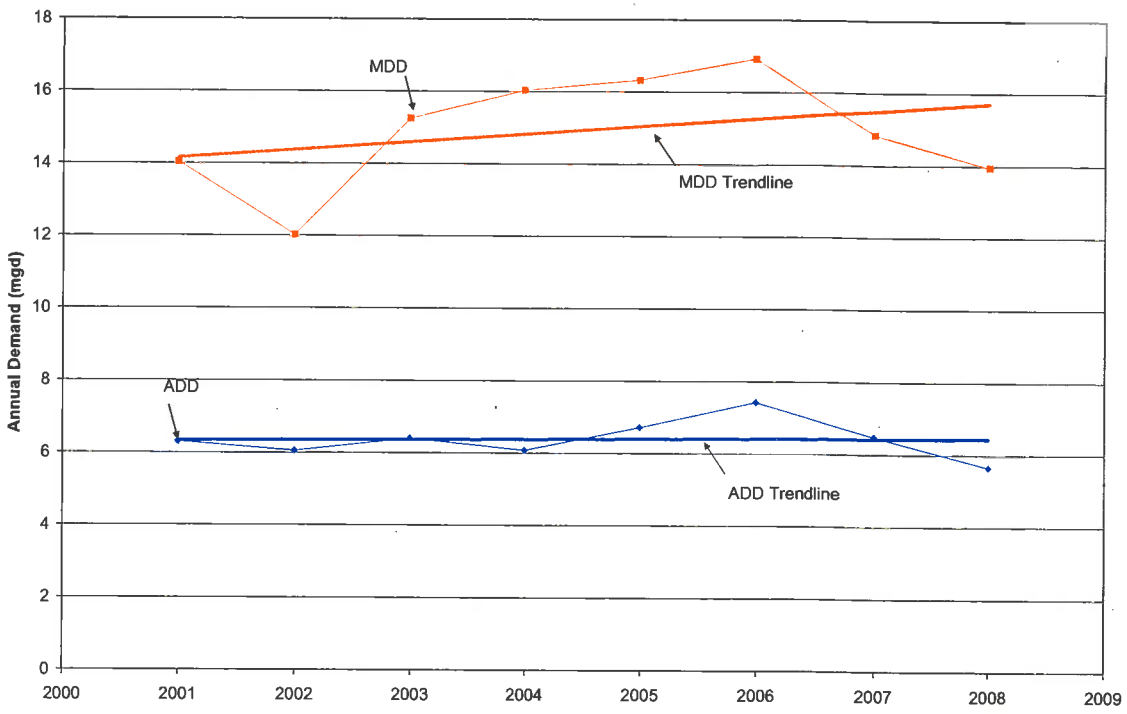
Exhibit 2-3 summarizes demand records for the overall system.

EXHIBIT 2-3
Historical Average Day, Maximum Day, 3-day Maximum Day Demands and Peaking Factors for the City of Lake Oswego Overall System

Year	Annual Volume Produced (MG)	ADD (mgd)	MDD (mgd)	3-d MDD (mgd)	3-d MDD Percentage of MDD	MMD (mgd)	Peaking Factor MMD:ADD
2001	2,300	6.3	14.0	11.4	82%	9.6	2.2
2002	2,211	6.1	12.1	11.2	93%	10.4	2.0
2003	2,335	6.4	15.3	14.2	93%	11.4	2.4
2004	2,219	6.1	16.0	13.6	85%	11.7	2.6
2005	2,450	6.7	16.3	15.6	96%	13.8	2.4
2006	2,704	7.4	16.9	16.6	98%	13.5	2.3
2007	2,365	6.5	14.9	14.0	94%	11.5	2.3
2008	2,067	5.7	14.0	13.4	96%	10.9	2.5
Average	**2,331**	**6.4**	**14.9**	**13.8**	**92%**	**11.6**	**2.3**
Highest	**2,704**	**7.4**	**16.9**	**16.6**	**98%**	**13.8**	**2.6**

Exhibit 2-4 displays historical data and linear trends for overall system ADD and MDD for the period 2001 to 2008.

EXHIBIT 2-4
Overall System Historical and Trend Line ADD and MDD, 2001-2008

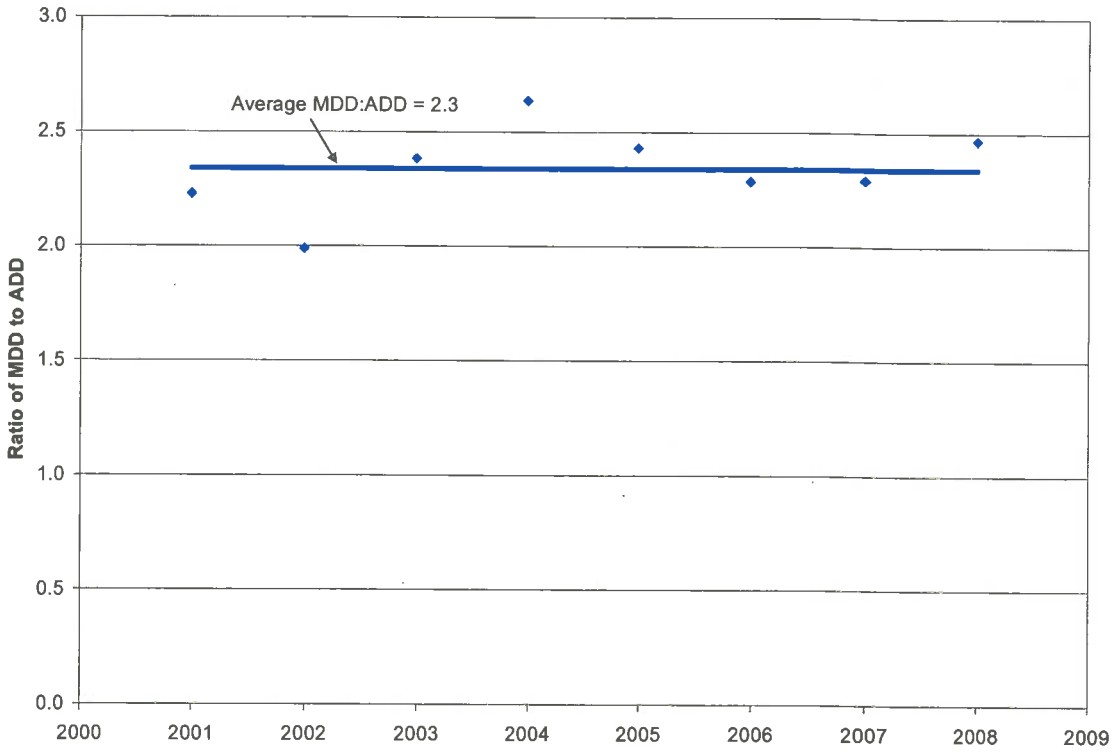


Between 2001 and 2008, the ADD ranged from 6.1 to 7.4 mgd, with an average of 6.4 mgd. The MDD ranged from 12.1 to 16.9 mgd and averaged 14.9 mgd for the same period. Municipal MDDs are generally more variable from year to year than are ADDs because MDDs are sensitive to weather patterns. Unusually hot weather or the combination of hot and dry weather results in more outdoor irrigation, which increases the MDD.

When demand approaches production capacity for a short period (single day), water systems generally can rely on storage to meet demand. If high demand persists for an extended period, however, water shortages may result. The 3-day MDD gives an indication of the duration of periods of maximum demand. Since 2001, the 3-day MDD has ranged from 11.2 to 16.6 mgd, and has averaged approximately 92 percent of the Single Day MDD. This means that if the MDD equals 16 mgd, the City can be expected to experience three consecutive days with an average demand of 14.7 mgd each day.

Exhibit 2-5 graphically depicts the MDD to ADD peaking factors shown in **Exhibit 2-3**. The MDD to ADD ratio ranged from 2.0 to 2.6 for 2001 through 2008. The average ratio was 2.3, which is typical for Willamette Valley water utilities.

EXHIBIT 2-5
Historical MDD to ADD Peaking Factor



Monthly Demand

Exhibit 2-6 shows the monthly production volumes for the period January 2001 to December 2008. As expected, demand peaks in the summer months, when weather is hot and dry and water is used for irrigation, swimming pools, and other outdoor uses, and is lower during the rest of the year.

EXHIBIT 2-6
City of Lake Oswego Monthly Demand Volume (MG); 2001-2008

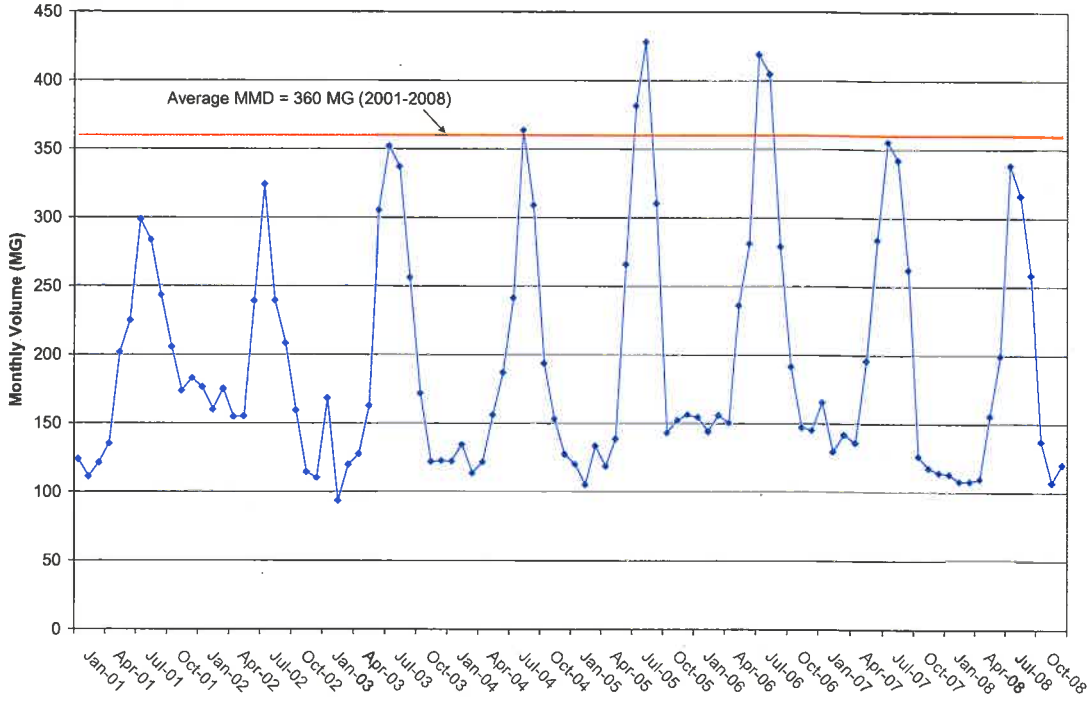
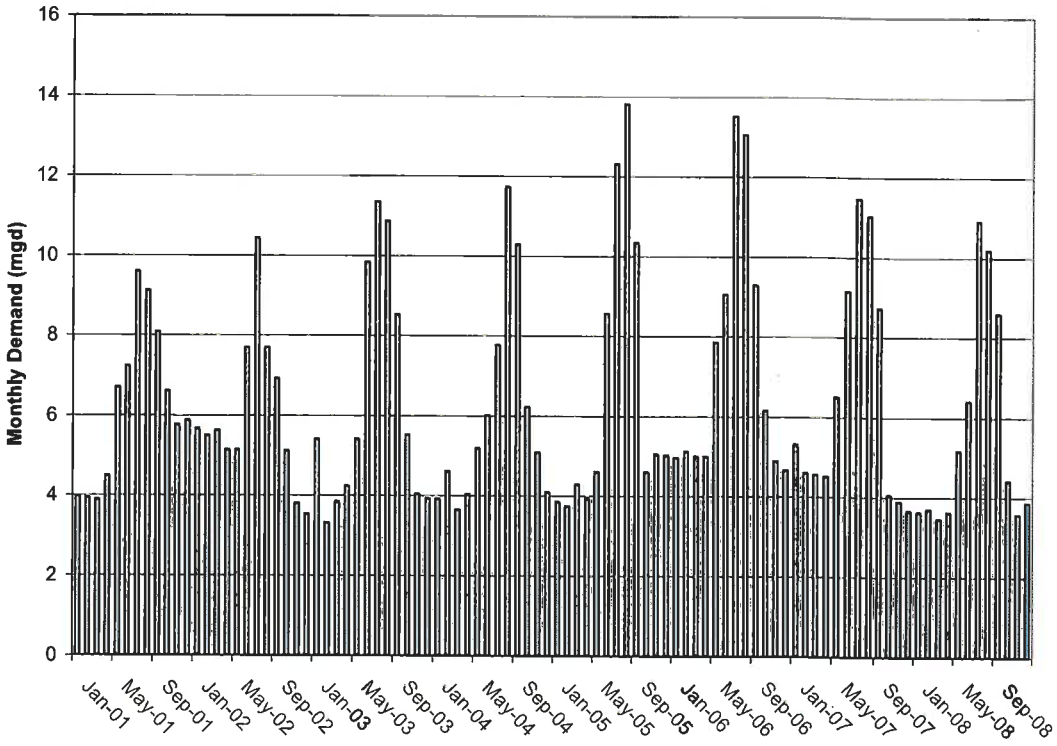


Exhibit 2-7 shows the monthly demand data expressed as a daily demand, with the peak season months of June through September indicated. Maximum month demand averaged 11.6 mgd (360 MG), and occurred during July in 6 years and during August in 2 years of the 8 years considered. The peak demand period accounted for an average of 51 percent of the total annual demand during the 8-year period, with the remaining 49 percent of the demand distributed across the remaining two-thirds (8 months) of the year. The higher MMDs observed in 2005 and 2006 resulted from higher volumes of water sold to wholesale customers in those years.

EXHIBIT 2-7
City of Lake Oswego Average Monthly Demand (mgd), 2001-2008



In City Per Capita Demands

Exhibit 2-8 shows the estimated overall ADD per capita demands for in City ("Retail Customers") within the City limits. These demand values represent use by all customer categories. The retail service area population was estimated by excluding populations associated with water districts within city limits from city population estimates from Portland State University's Population Research Center.[2] For the 8-year period from 2001 through 2008, the average overall ADD per capita was 171 gpcd. A MDD per capita of 393 gpcd was estimated by multiplying the ADD per capita by the annual overall system MDD to ADD peaking factor of 2.3. These per capita demand values were used to estimate future water demands based on population projections within the USB.

EXHIBIT 2-8
Per Capita Demands for the City of Lake Oswego Retail Customers

Year	Estimated Retail ADD (mgd)	Estimated City-Only Retail Service Population1	Retail ADD per Capita (gpcd)
2001	5.4	32,821	165
2002	5.3	32,978	161
2003	5.8	33,080	176
2004	5.7	33,144	172
2005	5.5	33,278	166
2006	6.4	33,532	190
2007	5.8	33,527	174
2008	5.4	33,753	161
Average			**171**

Authorized Consumption

Authorized consumption is equal to the metered and certain unmetered water uses within the system. All customers served by the City are metered. Authorized unmetered water consumption for fire fighting and hydrant flushing currently is not estimated and tracked by the City. The City serves both retail customers within City limits, and wholesale customers including several water districts within the USB.

[2] Values of water district populations within the city limits were estimated by Carollo Engineering for the years 2000 through 2005 for the *City of Lake Oswego and Tigard Water "Service Area Joint Water Supply System Analysis"*. A similar methodology was used to estimate the 2006 through 2008 water district population values shown here.

The City has 18 metered retail customer categories. For simplicity, these categories have been grouped into the broader categories of single-family residential, multi-family residential, commercial, irrigation, school and municipal, as shown in **Exhibit 2-9.** Irrigation accounts are used by both commercial and residential customers, and are not associated with a sewer account. Wholesale customers purchase "bulk water" on an as needed, seasonal basis. The City also rents meters for water use from hydrants for construction. Also shown are the City departments responsible for monitoring the various water uses.

EXHIBIT 2-9
Summary of Water Use Categories

Water Consumption Data Source	Category	Sub-Category
Utility Billing System	Single-Family Residential	Single-Family Residential
	Multi-Family	Multi-Family Duplex[1]
		Apartment/Condo
	Commercial	Church
		Gas Station
		Hotel
		Manufacturing Warehouse
		Misc. Commercial
		Multi-Use Commercial
		Office
		Rec. Facility Apt./Condo
		Restaurant
		Retail Store
		Theatre
	Irrigation	Sprinkler
	School	School[2]
	Municipal	City Facilities
		Rec. Facility City
Maintenance Department staff record duration of use and read meters monthly.	Hydrant Meters	
Water Department staff read master meters monthly.	Bulk Water Sales	
West Linn staff maintains daily flow record.	Authorized but unbilled to West Linn for pipeline flushing	

[1] This category includes both single duplexes and multiple duplexes using a single meter.
[2] This category includes K-12 schools and Marylhurst College.

Customer Characteristics and Water Use Patterns

OAR 690-086-0140(6)

Customer characteristics impact water usage. Understanding these characteristics is helpful when analyzing current consumption data and forecasting future consumption patterns. To facilitate this analysis, the City began using new software to track water consumption and billing data in 2004. **Exhibit 2-10** shows the number of accounts by customer category for 2004 through 2008. **Exhibit 2-11** shows the annual metered consumption by retail customer category for the same period. **Exhibit 2-12** presents a pie chart that indicates the percentage of water used by each retail customer category in 2008. Single-family water use represented 65 percent and multi-family water use represented 16 percent of total metered retail consumption, for a total residential use of 82 percent of total metered retail consumption. Commercial water use accounted for 11 percent of annual metered consumption.

The following information does not reflect water used for irrigation by residential properties abutting the shores of Oswego Lake, which divert water from the lake for outdoor irrigation purposes. This water is initially stored in Scoggins Reservoir and then conveyed to Oswego Lake under the Lake Oswego Corporation's contract with the Bureau of Reclamation.

EXHIBIT 2-10
Number of Accounts by Customer Category, 2004-2008

	2004	2005	2006	2007	2008
Single-Family	11,887	11,988	12,043	11,977	11,996
Multi-Family	542	526	583	557	559
Commercial	456	450	457	453	460
Irrigation	235	272	286	281	321
School	30	31	31	31	32
Municipal	21	20	21	22	24
Total	**13,171**	**13,287**	**13,421**	**13,321**	**13,392**

EXHIBIT 2-11

City of Lake Oswego's Annual Retail Metered Consumption by Customer Category (MG), 2004-2008

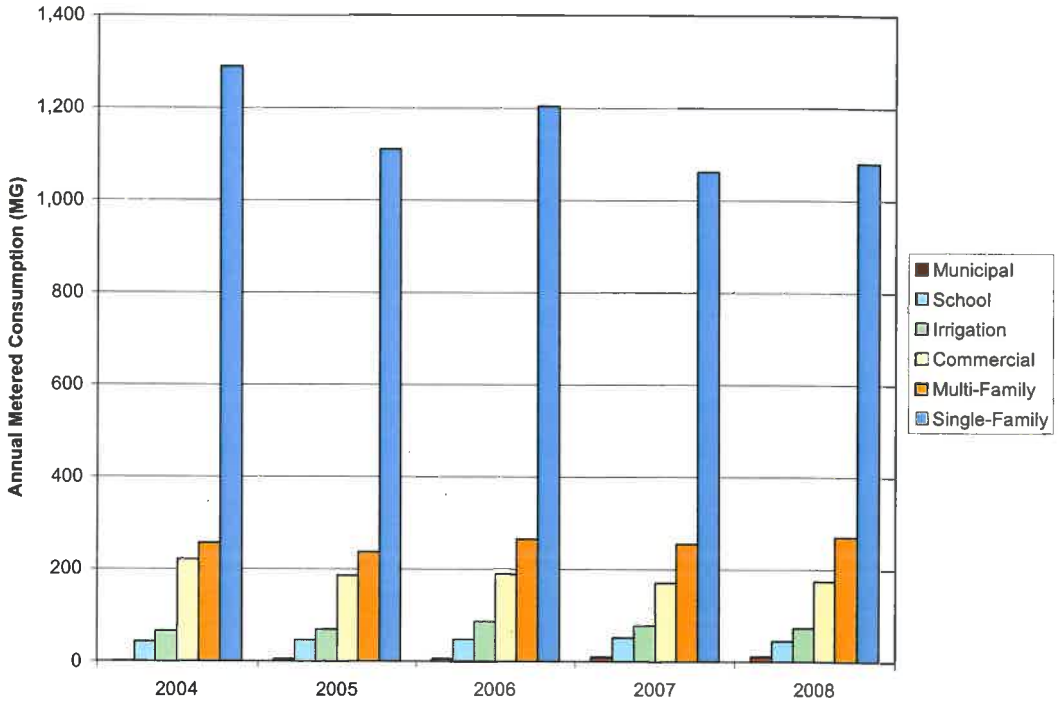
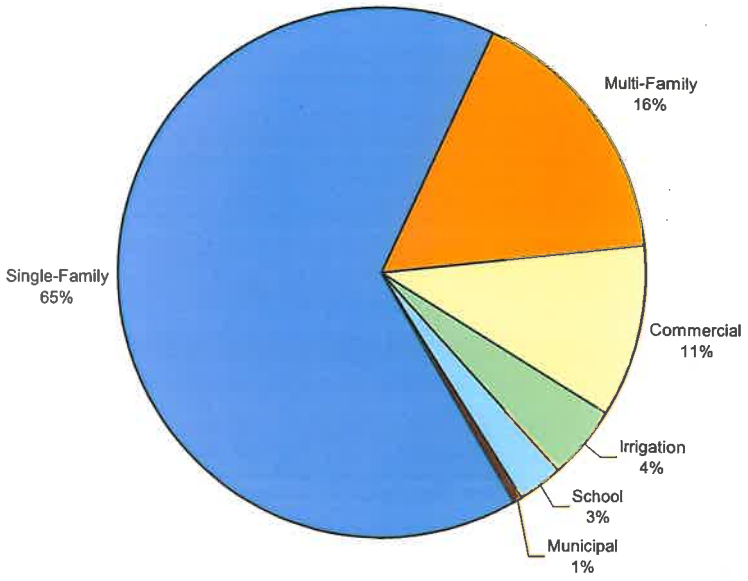


EXHIBIT 2-12
Percentage of Annual Water Use by Retail Customer Category, 2008



The City reads meters and bills customers on a bi-monthly schedule, with some meters read in the odd months and some meters read in the even months of the year. Bi-monthly billed consumption for odd and even months were divided between months of each billing cycle, and assigned to the appropriate calendar month. **Exhibit 2-13** shows the estimated monthly retail consumption by customer category for the years 2004 through 2008, and indicates a use pattern typical of western Oregon.

EXHIBIT 2-13
City of Lake Oswego Monthly Retail Water Consumption, 2008

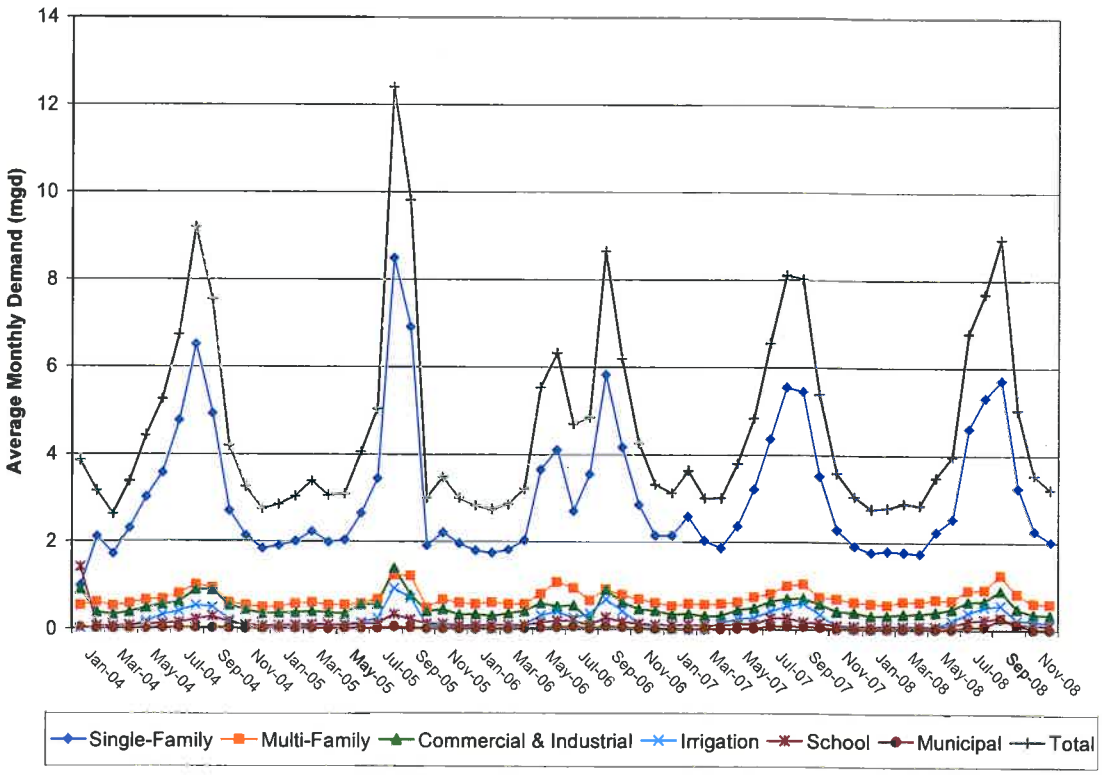
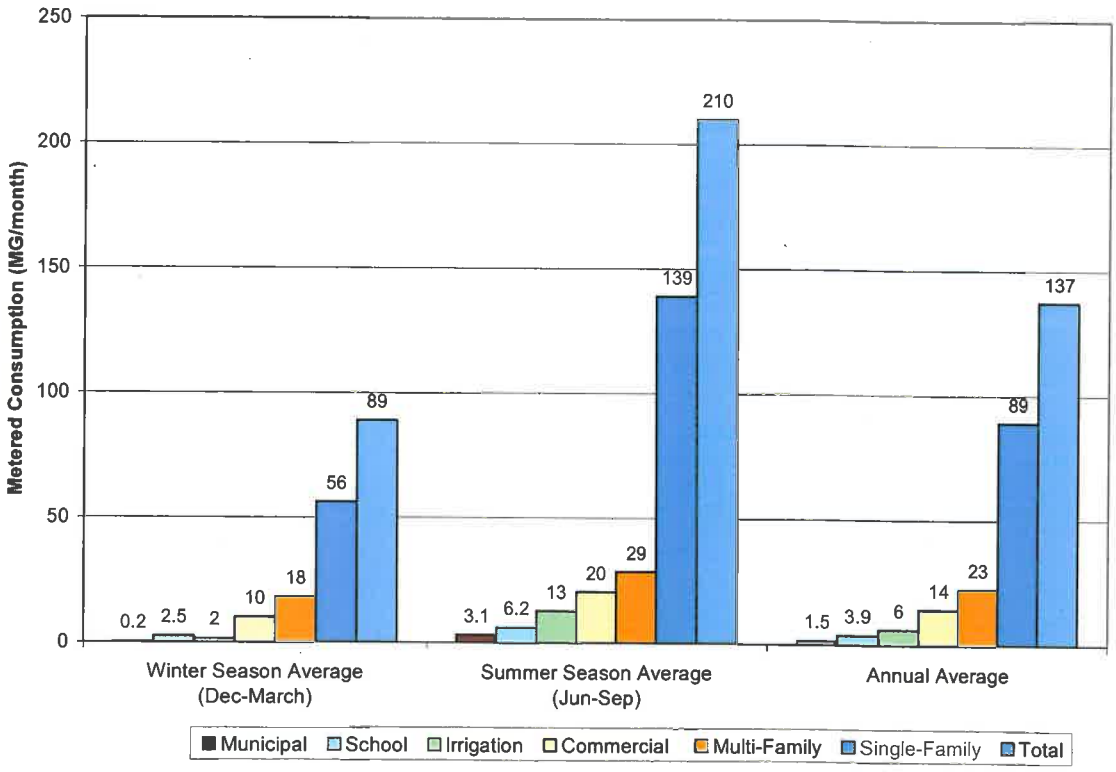


Exhibit 2-14 presents the average monthly consumption for residential and non-residential accounts by season for 2008. For the purposes of this WMCP, the summer months are defined as June through September, and winter months are defined as December through March. The total average monthly consumption for the summer months was 210 MG per month (6.8 mgd), compared to an annual average of 137 MG per month (4.5 mgd) and a winter month average of 89 MG per month (2.9 mgd). The City's summer season use to winter season use ratio of 2.4 (210/89 = 2.4) is typical for Willamette Valley water utilities.

Monthly single-family residential and school water consumption rates were approximately 2.5 times greater during the summer than during the winter. Rates of water use for multi-family residential accounts and commercial accounts also increased during the summer, but to lesser extents at 1.6 and 2.0 times winter rates, respectively.

EXHIBIT 2-14
City of Lake Oswego's Average Monthly Consumption by Season and Customer Category, 2008

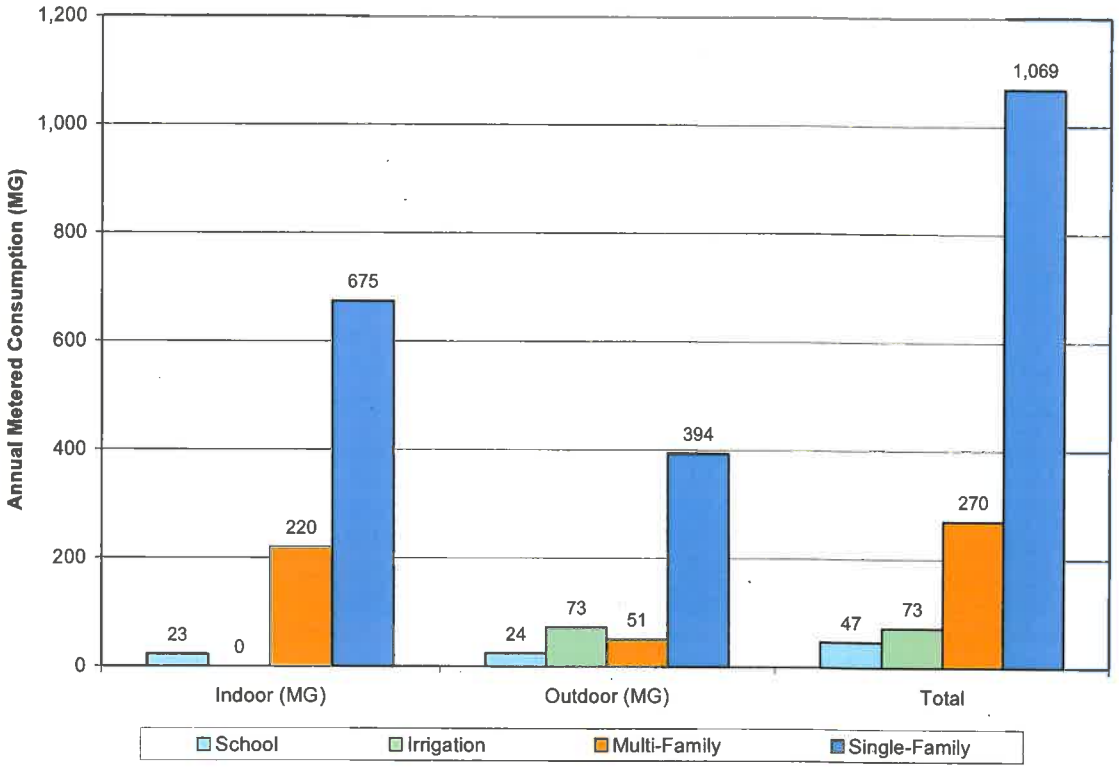


Indoor and Outdoor Water Use

Exhibit 2-15 presents the average annual indoor and outdoor use by select customer categories in 2008. Use by commercial customers was not included in this analysis because of the varied types of customers included in the commercial category. Wintertime consumption was assumed to be representative of annual indoor water use (or at least to exclude outdoor irrigation) for residential customers and schools. All irrigation use was assumed to be outdoor use, even though some irrigation usage was recorded between December and March. The winter season average rates of 56 MG per month for single-family residential customers, 18 MG per month for multi-family residential customers were applied to a 12-month period to determine the average annual indoor use by these customers. Similarly, wintertime consumption for schools was multiplied by a 9-month school year to estimate the indoor water use for schools. Water used for irrigation by schools and residences was calculated as the difference between total use and indoor use.

Indoor water use represented approximately 63 percent of annual water use by single family residential customers, 81 percent of annual multi-family use, and 48 percent of annual school use. Conservation efforts focused on reducing outdoor use by single-family homes, schools, and irrigation accounts would address peak season demand. Conservation efforts targeting indoor water consumption by residential customers may prove beneficial for reducing average demands.

EXHIBIT 2-15
City of Lake Oswego Estimated Annual Indoor and Outdoor Use, 2008



Largest Water Customers

The City's top 17 water consumers for 2008, identified by their customer type, are listed in **Exhibit 2-16**. These 17 customers were responsible for approximately 7 percent of the total 2008 metered consumption. Customers who use large amounts of water may benefit from water audits that identify customer-specific conservation measures.

EXHIBIT 2-16
Lake Oswego Largest Water System Accounts, 2008

Customer Type	Annual Volume Used (MG)
Multi-family Duplex	18.88
School	9.09
Manufacturing Warehouse	7.52
Church	6.99
Sprinkler	6.47
School	6.41
School	5.96
Apartment/Condo	5.79
Retail Store	5.55
Apartment/Condo	5.15
Apartment/Condo	5.08
Restaurant	4.93
School	4.78
Single-family Resident	4.66
Multi-family Duplex	4.42
Apartment/Condo	4.06
Retail Store	3.83
Total	**109.57**

Water Losses and Non-Revenue Water

The difference between production and authorized consumption is equal to a system's apparent and real water losses. These losses are often expressed as a percentage of system production. Non-revenue water is equal to system losses plus any authorized but un-billed, water use within a system.

Exhibit 2-17 lists annual total production and wholesale and retail consumption, and percent of water losses for the years 2004 through 2008. Because the volume of authorized non-revenue water is relatively small, water losses are approximately equal to non-revenue water. This percentage ranged from approximately 9 percent to 23 percent, with an average of 16 percent.

The proportion of apparent versus real water loss is unknown. The City's bi-monthly billing practice, and the accounting system used for billing contributes to apparent water losses. Independent queries of the water consumption database provided annual consumption volumes that varied between plus and minus 6 percent. Meter inaccuracies in both production and consumption meters also may contribute to apparent water losses.

The City annually conducts a leak detection program and repairs or replaces sections of pipeline as necessary. The City is not aware of any leaks or significant losses and believes the apparent loss is related to accounting. Historically, leak detection has occurred on approximately 30 miles of the 250-mile system network annually. Since 2007, the City has replaced 14,300 feet of pipeline because of age or detected leaks. City staff responds to all detected and reported leaks in a timely manner, and makes any necessary repairs.

EXHIBIT 2-17
Historical Annual Non-Revenue Water

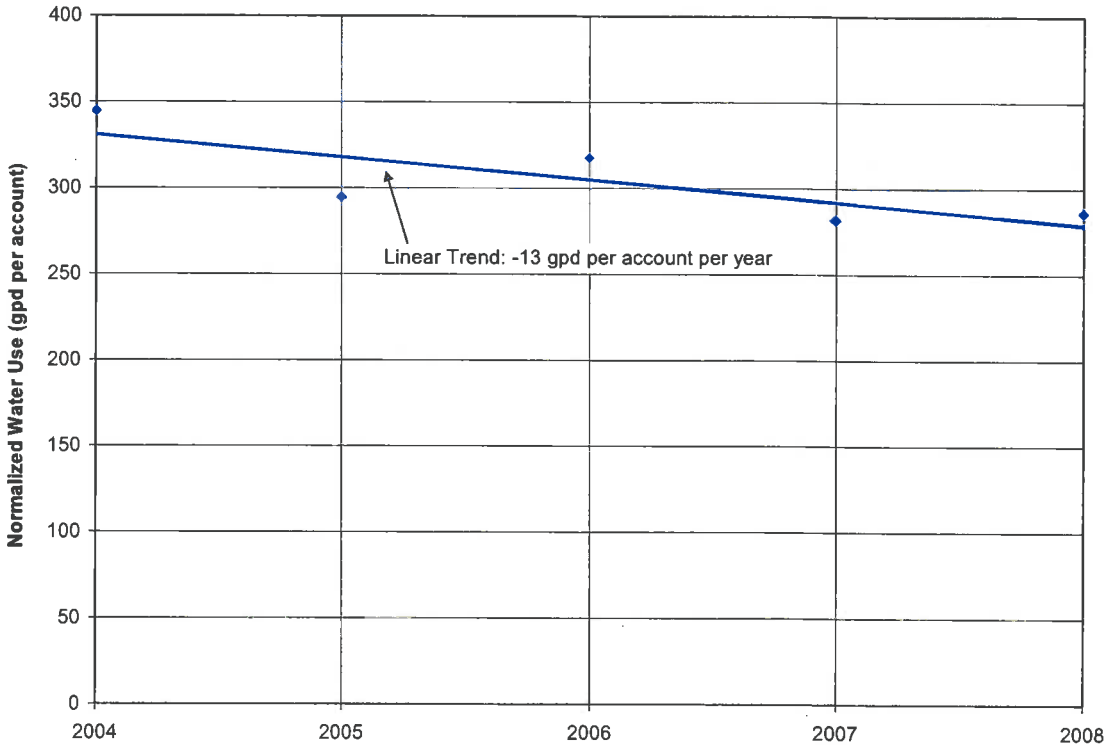
		Revenue Water			Non-Revenue Water		
	System Input = Demand	Authorized Consumption				Water Losses	
Year	Production (MG)	Retail Metered Consumption (MG)	Wholesale Metered Consumption[1] (MG)	Hydrant Meters (MG)	West Linn Authorized Non-Revenue[2] (MG)	(MG)	Percent
2004	2,219	1,876	135	ND	1.28	208	9%
2005	2,450	1,675	432	1.54	1.03	341	14%
2006	2,704	1,700	381	1.00	0.78	621	23%
2007	2,365	1,709	238	0.47	1.77	415	18%
2008	2,067	1,654	80	0.26	0.69	331	16%
Average						**383**	**16%**

ND = Data unavailable
[1] Wholesale Consumption is also called Bulk Water Sales.
[2] West Linn uses this water to maintain the water quality in an intertie between systems.

Normalized Single-Family Residential Demand

Exhibit 2-18 shows the estimated ADD attributed to the single-family residential customer category normalized by the number of single family accounts. Between 2004 and 2008, water use by customers in this category decreased at a rate of approximately 13 gallons per day (gpd) per account per year. Assuming a ratio of 2.25 people per account,[3] the average single-family residential per capita demand for 2008 was approximately 120 gpcd. Indoor water use represented approximately 80 gpcd. This value is in the typical indoor water use range of 60 to 80 gpcd.[4]

EXHIBIT 2-18
City of Lake Oswego Single-Family Residential ADD per Account, 2004-2008



City Water Rights

OAR 690-086-0140(5)

The City holds three surface water rights that authorize the use of water for municipal purposes: two for use of the Clackamas River and one for use of the Willamette River. In addition, the City holds three groundwater registrations that authorize a total use of up to 1.63 mgd (2.54 cfs) of groundwater for municipal use and a permit that authorizes the use of groundwater for irrigation of 22.43 acres.

[3] Metro 2005 estimate of persons per household for Lake Oswego.

[4] AWWA. Manual of Water Supply Practices M52. *Water Conservation Programs--A Planning Manual, First Edition*, Page 41.

The City's most senior municipal surface water right is permit S-32410, which authorizes the use of up to 32.32 mgd (50 cfs) from the Clackamas River at RM 0.8. The priority date of this water right is March 14, 1967. In November 2001, the OWRD issued water right certificate 78332 confirming the City's development (perfection) of a 16.16 mgd (25.0 cfs) portion of permit S-32410. The other half of permit S-32140 (16.16 mgd) continues to be in the water right development process as a permit. The City has submitted a permit extension application to OWRD requesting more time to develop permit S-32410. On November 20, 2007, OWRD issued a proposed final order (PFO) proposing to extend the permit until 2040, with conditions, but the PFO was protested and has been referred to a contested case hearing.

The City also holds municipal water use permit S-37839, which authorizes the use of up to 5.82 mgd (9.0 cfs) from the Clackamas River. The authorized point of diversion is also at RM 0.8. The priority date of this water right is July 5, 1973. This water use permit currently is not used by the City. Similar to permit S-32410, the City has a pending permit extension application with OWRD, and the PFO, which proposed to extend the permit timeline to 2040, has also been protested and referred to a contested case hearing.

In addition to the Clackamas River source, the City holds a water use permit for municipal water use from the Willamette River at approximately RM 24.0. The City's permit S-43246 authorizes the use of up to 3.88 mgd (6.0 cfs) with a priority date of March 24, 1977. This water use permit continues to be in the water right development process. An application for an extension of time to develop permit S-43246 is pending with OWRD.

The City also holds three groundwater registrations and a groundwater use permit. A groundwater registration is a claim for the use of groundwater before Oregon's enactment of its groundwater code in 1955. According to GR 3819, 3820, and 3821, this water use was developed in 1935, 1948, and 1947, respectively, for municipal use in what was then the City of Oswego. OWRD must conduct an adjudication of the claims and the circuit court must issue a decree before OWRD can issue water right certificates confirming the groundwater uses claimed in these groundwater registrations. A groundwater adjudication for this area has not yet been initiated. Meanwhile, GR 3819, 3820, and 3821 provide the City with the legal authorization to use up to 1.63 mgd of groundwater for municipal use. According to City staff, GR 3819 is used only sparingly, in the hottest part of dry summers, to meet peak demands. This is largely because of issues associated with the construction of the well and potential water quality concerns. GR 3820 and 3821 currently are not in use because of water quality concerns.

The City's irrigation water use permit authorizes the use of groundwater for irrigation. The permit authorizes irrigation of 22.43 acres and domestic use, and is located on City property known as Luscher Farm, which contains restored historic farm structures and an extensive community garden. None of the City's groundwater rights is in a critical groundwater area or a groundwater limited area. **Exhibit 2-19** provides a summary of the City's water rights and its groundwater registrations.

EXHIBIT 2-19

City of Lake Oswego Water Rights

Source	Priority Date	Certificate/ Permit/ Application Numbers	Quantity (cfs)	Quantity (mgd)	Type of Beneficial Use	Maximum Withdrawal to Date		2008 Average Withdrawal		Five-Year Average Withdrawal	Authorized Date for Completion	Listed Fish and Water Quality Limitations
						Daily (MG)	Annually (MG)	Monthly (MG)	Daily (MG)	Monthly (MG)		
Clackamas River[1]	March 14, 1967	Cert: 78332 Permit: S-32410 App: S-43365	25.0	16.16	Municipal	16.3	3,542 (in 1995)	172	5.6	197	Partial perfection of permit S-32410	The Clackamas River is 303(d) listed for mulitple parameters. See Section 2 -Aquatic Resource Concerns. The Clackamas River supports the following fish species that are listed as either threatened, endangered or sensitive: Pacific lamprey, Western brook lamprey, Chum salmon, Coho salmon, Chinook salmon, coastal cutthroat trout and steelhead trout.
Clackamas River	March 14, 1967	Permit: S-32410 App: S-43365	25.0	16.16	Municipal						10/1/2000 Permit extension pending	
Clackamas River	July 5, 1973	Permit: S-37839 App: S-50819	9.0	5.82	Municipal	0.0	0.0	0.0	0.0	0.0	10/1/2000 Permit extension pending	
Total Clackamas River Quantity			59	38.14								
Willamette River[3]	March 24, 1977	Permit: S-43246 App: S-55550	6.0	3.88	Municipal	0.0	0.0	0.0	0.0	0.0	10/1/2000 Permit extension pending	The Willamette River is 303(d) listed for mulitple parameters. See Section 2 -Aquatic Resource Concerns The Willamette River supports the following fish species that are listed as either threatened, endangered or sensitive: Pacific lamprey, Western brook lamprey, Chum salmon, Coho salmon, Chinook salmon, coastal cutthroat trout and steelhead trout.
Total municipal surface water supply			65.0	42.02								
Groundwater	April 1, 1935	GR-3819	0.78	0.50	Municipal	-	-	-	-	-	-	None
Groundwater	Sept. 30, 1948	GR-3820	0.98	0.63	Municipal	-	-	-		-	-	
Groundwater	February 1, 1947	GR-3821	0.78	0.50	Municipal	-	-	-		-	-	
Groundwater	January 31, 2002	Permit: G-15222 App: G-15696	0.29	N/A	Irrigation of 22.43 acres and domestic use	-	-	-		-	10/01/2012	

Aquatic Resource Concerns

The City's Clackamas River water rights authorize diversion at RM 0.8. The Clackamas River is on the Oregon Department of Environmental Quality's (DEQ) 303(d) list of water quality limited streams because of several parameters. The Clackamas River (below RM 22.9) is listed for multiple water quality impairments, such as: alkalinity, Bis (2Ethylhexl) phthalate, Chlorophyll a, chromium (hex), dissolved oxygen, E. coli, PCB, pH, and temperature. A full list of water quality impairments in the Clackamas River can be found on DEQ's web page at http://www.deq.state.or.us/wq/assessment/rpt0406/search.asp#db.

The Willamette River at RM 24.0, the approximate location of the authorized diversion for the City's water use permit S-43246, is on DEQ's 303(d) list of water quality limited streams for several parameters. For example, the Willamette River below RM 24.0 is listed for the following parameters, among others: aldrin, barium, cadmium, Chlorophyll a, DDT, dissolved oxygen, E. coli, fecal coliform, lead, mercury, nickel, PCB, pH, selenium, temperature, and zinc. A full list of water quality impairments in the Willamette River can be found on DEQ's web page at http://www.deq.state.or.us/wq/assessment/rpt0406/search.asp#db.

The Clackamas and Willamette Rivers support several fish species that are listed as threatened, endangered, or sensitive under state and federal laws. The listed fish species that occur in the Clackamas and Willamette Rivers are summarized in **Exhibit 2-20.**

EXHIBIT 2-20
Native Fish Species that Occur Within the Clackamas River Basin that are Listed as Sensitive, Threatened, or Endangered Under the Oregon State or Federal Endangered Species Acts

Species	Evolutionarily Significant Unit (ESU)	Federal Listing	State Listing	*Notes*
Coho salmon (*Oncorhynchus kisutch*)	Lower Columbia River	Threatened	Endangered	
Fall-run Chinook salmon (*O. tshawytscha*)	Lower Columbia River	Threatened	Sensitive-Critical	
Spring-run Chinook salmon (*O. tshawytscha*)	Lower Columbia River and Upper Willamette River	Threatened	Sensitive - Critical	
Coastal cutthroat trout (*O. clarkii clarkii*)	Lower Columbia River	Sensitive	Sensitive - Vulnerable	
Steelhead trout (*O. mykiss*)	Lower Columbia River	Threatened	Sensitive - Critical	*State listed winter runs, federal did not list runs*
Chum salmon (*O. keta*)	Columbia River	Threatened	N/A	
Western brook lamprey (*Lampetra richardsoni*)	*No ESU listed*	N/A	Sensitive - Vulnerable	
Pacific lamprey (*L. tridentate*)	*No ESU listed*	N/A	Sensitive - Vulnerable	

- Federal ESA listed species (T&E) were obtained from www.nmfs.noaa.gov/pr/species/esa/fish.htm
- Federal Sensitive species were obtained from the Interagency Special Status/Sensitive Species Program (Oregon and Washington) at www.fs.fed.us/r6/sfpnw/issssp/agency-policy/
- State ESA listed species (T&E) were obtained from www.dfw.state.or.us/wildlife/diversity/species/threatened_endangered_candidate_list.asp
- State Sensitive species were found at www.dfw.state.or.us/wildlife/diversity/species/docs/SSL-by-taxon.pdf

Evaluation of Water Rights/Supply

OAR 690-086-0140(3)

The City holds water rights authorizing use of approximately 59 cfs (38 mgd) of water from the Clackamas River and 6.0 cfs (3.9 mgd) of water from the Willamette River. The City's current water supply system capacity is, however, limited by the production capacity of its water treatment facility, which is approximately 25 cfs (16 mgd). The City may ultimately

increase its water treatment plant capacity up to 59 cfs (38 mgd) as part of its joint water supply project with Tigard.

The amount of water available to satisfy the City's water rights is a function of water right priority date (seniority) and stream flow. The relative priority of its Clackamas River water rights is a key factor in water availability and reliability.

The Clackamas River Basin produces a significant quantity of water even during the driest months of the year. According to long-term stream flow records on the Clackamas River at Estacada (U.S. Geological Survey [USGS] gauge #14210000), approximately 22 miles upstream from the City's authorized point of diversion), approximately 95 percent of the time flows at Estacada are greater than 746 cfs in July, 643 cfs in August, 610 cfs in September, and 614 cfs in October. Moreover, in the 22 miles between the Estacada gauge and the City's point of diversion at RM 0.8, there are several tributaries including Eagle Creek, Deep Creek, Richardson Creek, Clear Creek, and Rock Creek, that feed the mainstem Clackamas River, resulting in stream flows at the City's point of diversion considerably greater than those recorded at the Estacada gauge. According to stream flow records on the Clackamas River at Oregon City (USGS gauge #14211010) for 2001 through 2007, the mean of daily mean flows exceeded 750 cfs.

The instream water right on the Clackamas River in the reach where the City's point of diversion is located is evidenced by certificate 59491, which has a priority date of August 26, 1968. The instream right protects flows in the amount of 400 cfs from July 1 through September 15 and 640 cfs during the remainder of the year for the purpose of supporting aquatic life. The instream right protects flows above USGS gauge #142095, near Three Lynx, to the mouth of the Clackamas River.

Based on priority date and abundant stream flow, Lake Oswego's permit S-32410 and certificate 78332 are highly reliable. The City's access to Clackamas River water under permit S-32410 and certificate 78332 is not affected by instream water right certificate 59491 because of its March 14, 1967, priority date, which is senior to the instream right. The permit and certificate are not, therefore, subject to regulation by priority date if the stream flows fall below the protected levels. Moreover, while there are other senior consumptive water users on the system,[5] their cumulative consumptive use (compared to long-term stream flow records) is negligible.

Despite this reliability based on regulation by priority date, the City's ability to obtain additional water under permit S-32410 is subject to proposed permit extension conditions. The most recent date by which the City was to complete development of this permit was October 1, 2000. The City filed an application for an extension of time requesting to extend this date. On November 20, 2007, OWRD issued a PFO proposing to extend the permit to 2040 with conditions, but the PFO was protested and has been referred to a contested case hearing.

Access to Clackamas River water under the City's permit S-37839 also is not likely to be regulated in favor of senior consumptive water users; however, the reliability of this water

[5] Clackamas River Water has one certificate and South Fork Water Board has three permits that are upstream from and senior to the City's permit.

use permit is compromised because it is junior in priority to instream water right certificate 59491. Daily stream flow records for USGS gauge #142100, at Estacada, indicate that daily stream flows in the dry years of 1987, 1992, and 1994 dropped below 640 cfs (the protected flows from September 16 to June 30) in late September and in October. Daily stream flow records for USGS gauge #14211010, at Oregon City, did not indicate any minimum flows below 640 cfs from September 16 to June 30 since the time its records began in October 2001. The potential for low flows in early fall, coupled with the continued development of upstream senior municipal water uses makes it likely that this permit would be subject to regulation in favor of instream water right certificate 59491. This regulation would not, however, preclude the City from using permit S-37839 for domestic use. Instream water right certificate 59491 is conditioned to not have priority over domestic use, which is defined by OWRD as the use of water for human consumption, household purposes, and domestic animal consumption related to residential use of the property.

Similar to permit S-32410, the most recent date by which the City was to complete development of this permit was October 1, 2000. On July 1, 2003, the City filed an application for an extension of time requesting to extend this date. On November 20, 2007, OWRD issued an order proposing to extend the permit with conditions acceptable to the City, but the PFO was protested by third parties and has been referred to a contested case hearing.

As currently proposed, the extensions of time for the City's Clackamas River permits will condition the use of the undeveloped portion of the water rights to maintain the persistence of listed fish species. The conditions in the PFOs for these extensions were based on fish protection flows of 650 cfs from the first Monday in September to September 15, 800 cfs from September 16 to May 31, and 650 cfs from June 1 through June 30. Modeling done by Portland State University shows that under some river flow and Timothy Lake release scenarios, these fish-protection flows may not be met during some portion of the fall months.[6] Consequently, as currently proposed, access to water under the undeveloped portions of these permits may be reduced during this time period.

There is ample water available in the Willamette River to satisfy the City's permit S-43246. After considering all existing consumptive use and non-consumptive use water rights (including instream water rights), OWRD's online water availability database indicates that water is available for new appropriations every month of the year above the confluence of the Molalla River based on an 80 percent exceedance probability. Development of this source, however, would require a large capital investment to construct a diversion structure, pumping facilities and pipelines needed to convey this water to the City's WTP and it is not known to what extent existing treatment processes at the WTP would need to be modified to treat water from this alternate source to a similar level of quality as that diverted from the Clackamas. Also, the City has no easement or property rights upon which the needed facilities would be sited and it is believed acquisition of such rights would involve a lengthy and costly legal effort.

[6] Lower Clackamas River Model, Predictive Flow Model and Management Scenarios, Technical Report EWR-07-08, Water Quality Research Group, Department of Civil and Environmental Engineering, Maseeh College of Engineering and Computer Science, Portland State University, November 2008. (Research was partially funded by an Oregon Water Supply and Conservation Initiative grant from OWRD.)

System Description

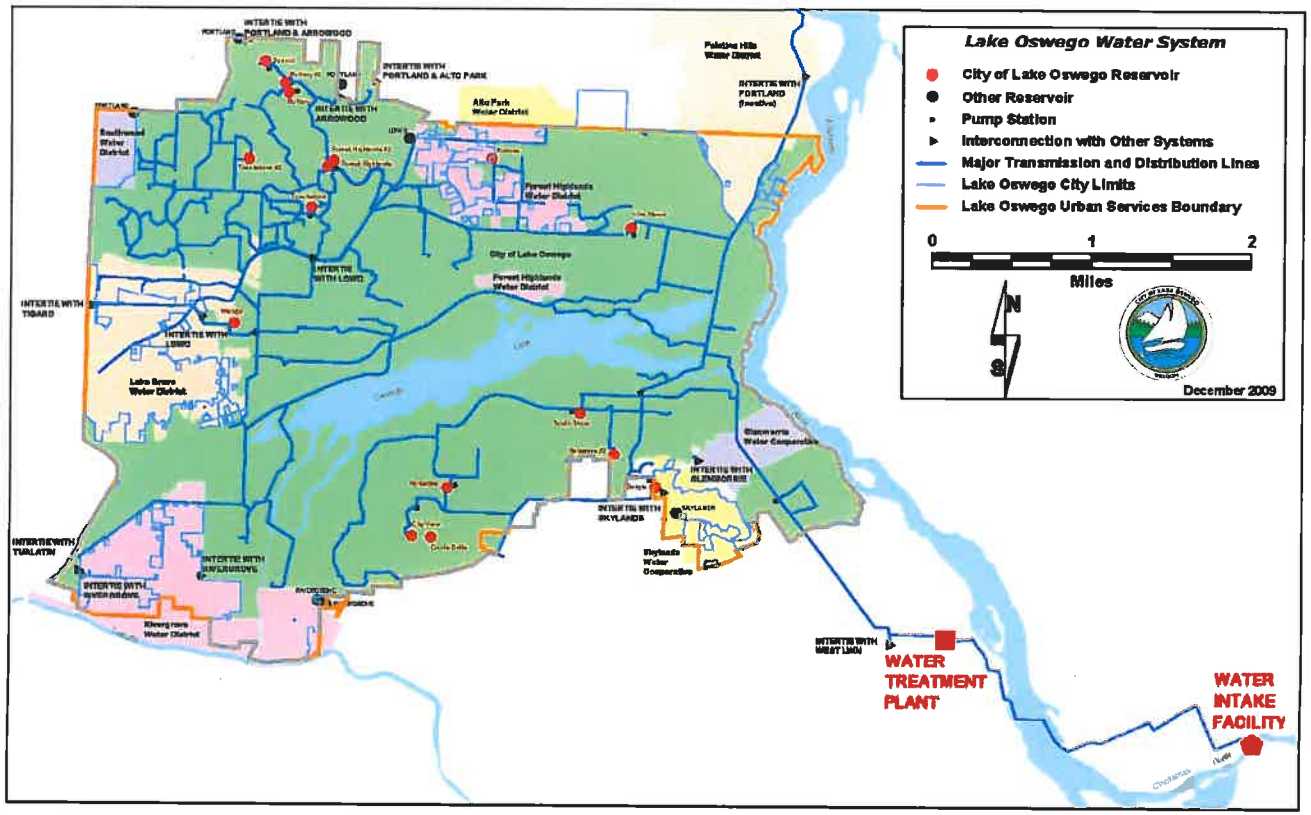
OAR 690-086-0140(8)

The City operates a public drinking water system (Public Water System Identification Number 4100457). **Exhibit 2-21** is a schematic of the City's existing distribution system. The City's raw water intake is on the Clackamas River at RM 0.8, a short distance upstream of the river's confluence with the Willamette River. The firm capacity of the intake (raw water) pump station, with the largest pump out of service, is 13.5 mgd (20.88 cfs). With all four pumps operating, the raw water pumping capacity is greater than the water treatment plant capacity of 16 mgd (24.75 cfs).

The raw water is pumped to the City's water treatment plant through a 27-inch-diameter pipeline buried beneath the Willamette River. The plant, located in West Linn, was constructed in 1967 and was expanded to its current capacity of 16 mgd in 1980. The treatment steps include coagulation, filtration, and disinfection. Finished water is pumped to the City's distribution system.

The City's system provides water to approximately 13,400 service connections. These connections provide water to a retail population of approximately 33,800 people, as well as many commercial establishments, irrigation accounts, public facilities such as schools, and wholesale customers.

Exhibit 2-21
Schematic of Lake Oswego Water System



The service to these customers is accomplished through a system comprised of 1,333,127 feet (more than 250 miles) of pipelines, 16 reservoir tanks, and 13 pump stations. Summaries of the pipelines, reservoirs, and pump stations are presented in **Exhibits 2-22, 2-23,** and **2-24.** The distribution system is divided into 11 separate pressure zones to maintain acceptable pressures to all customers.

EXHIBIT 2-22
Summary of Pipeline Sizes

Pipe Diameter (in)	Total Length (ft)	Percent of Total Pipeline
< 4	42,283	3.2
4	89,577	6.7
6	326,051	24.5
8	474,254	35.6
10	87,004	6.5
12	151,480	11.4
14	7,076	0.5
16	78,518	5.9
18	16,271	1.2
24	43,468	3.3
27	15,198	1.1
30	160	0.0
36	980	0.1
42	807	0.1
Total	**1,333,127**	**100**

EXHIBIT 2-23
System Reservoir Inventory

Name	Volume (MG)	Overflow Elevation (ft)	Height	Year Constructed
Bergis	0.5	649	20.0	1960
City View	1.2	656	27.0	1983
Cook's Butte	0.2	726	18.0	1981
Palisades #1	1.0	464	32.0	1968
Palisades #2	2.5	465	31.0	2003
Southside	1.0	318	15.0	1969
Knaus	1.1	475	22.5	1982
Tenth Street	0.5	312	65.0	1925
Summit	1.5	968	19.0	1974
McNary #1	1.0	800	15.5	1969
McNary #2	4.0	800	20.0	2000
Forest Highlands #1	0.5	608	17.9	1960
Forest Highlands #2	2.0	610	26.4	1982
Touchstone #1	1.0	485	22.5	1982
Touchstone #2	5.0	485	22.5	1996
Waluga	4.0	320	20.5	1981

EXHIBIT 2-24
Summary of Existing Pump Stations

Name	Location	No. of Pumps	Rated Capacity (gpm)	Total Installed Capacity (gpm	Nominal Firm Capacity (gpm)
Cook's Butte	Hillside Dr. near Hillside Ln.	**2**	**100**	**200**	**100**
Bergis	Near Upper Cherry Ln. and SW Bergis Rd.	1*	1,500	1,500	0
		3	**90**	**270**	**90**
Palisades	Between Cloverleaf Rd. and Treetop Ln.	**3**	**1,000**	**3,000**	**2,000**
Southside	South Shore Blvd. near Fern Pl.	2	750	1,500	1,500
		1	1,000	1,000	0
		3		**2,500**	**1,500**
McVey	Cornell St. between McVey Ave. and Oak St.	**2**	**415**	**830**	**415**
Tenth Street	10th St. between C Ave. and D Ave.	**2**	**650**	**1,300**	**650**
Summit	Nansen Summit	1	110	110	0
		1	40	40	40
		2		**150**	**40**
McNary	McNary Pkwy. and Kerr Rd.	**3**	**1,200**	**3,600**	**2,400**
Kerr Road	Between Kerr Pkwy. and Independence Ave.	**3**	**1,600**	**4,800**	**3,200**
Touchstone	Near Brush Ln. and Orchard Way	**3**	**1,500**	**4,500**	**3,000**
Waluga	Quarry Rd. Near Douglas Way	1	3,000	3,000	0
		2	3,600	7,200	6,600
		3		**10,200**	**6,600**
WTP Clearwell	Kenthorpe Way	1	6,000	6,000	0
		3	4,300	12,900	8,600
		4		**18,900**	**8,600**
Clackamas River Intake	Near Windham Oaks Ct.	1	6,000	6,000	0
		3	3,500	10,500	10,500
		4		**16,500**	**10,500**

* Dedicated fire flow pump.

3. Municipal Water Conservation Element

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

This rule requires a progress report on conservation measures in the City's existing Plan, and a description of any additional conservation measures. The rule also requires descriptions of specific required conservation measures and benchmarks.

Current Conservation Measures

OAR 690-086-0150(1) and (3)

The City submitted a WMCP in 2007 that was approved by the OWRD on April 8, 2008 (Vol. 74, Pg. 511). Before development of that WMCP, the City hired the opinion research firm of Davis, Hibbits & Midghall, Inc., to conduct a telephone survey on behalf of the City. The survey explored the City's water customers' interests and concerns regarding their water supply and water conservation. The City Council also appointed a community-based Water Conservation Committee to provide guidance in the development of water management and conservation measures for that WMCP. Committee members were selected to represent a range of water users, interests, and backgrounds. The committee developed possible 5-year benchmarks for both required and optional conservation measures, which City staff refined and expanded.

The resulting required and additional conservation measures required by OAR 690-086-0150(4) – (6) were included in the previously-approved WMCP. In the less-than-2-year period since the WMCP was approved, the City has made significant progress toward its 5-year conservation benchmarks and has continued to refine the previous measures, as well as develop new conservation measures. **Exhibit 3-1** shows the previously approved 5-year benchmarks and provides a progress report for each measure.

EXHIBIT 3-1
City of Lake Oswego Previously-Approved Five-Year Benchmarks

Conservation Measure	2007 5-Year Benchmark	Progress Report
System metering	System is fully metered. Continue to require meters for all development within the City.	The City continues to require meters for all new development.
Meter testing and maintenance	Continue annual testing and repair or replacement of 50 percent of 2-inch and larger meters. Increase the number of ¾-inch to 1 ½-inch meters replaced annually to achieve a 25-year replacement cycle. Establish a design standard to ensure all meters 2 inches and larger are installed with test ports and bypass to facilitate testing and repair.	The City continues to test 50 percent of all meters 2 inches or greater annually. The 25-year replacement target for ¾-inch to 1 ½ inches has been exceeded and is now on a 20-year schedule (approximately 650 meters per year). Design standards for installing test ports and bypasses on all meters 2 inches and larger have not yet been promulgated.
Annual water audit	Continue to conduct annual water audits and evaluate production and consumption data to observe trends in non-revenue water. Work with the Utility Billing Department to streamline the	The City continues to perform annual water audits and evaluate production and consumption data to observe trends. Streamlining the retrieval of data from the

	retrieval of water consumption data by date, volume, and customer class to assist in tracking water use trends. Develop and implement administrative policies and procedures to document consumption of authorized unmetered use. This could consist of developing report forms and reporting requirements for such uses. The City should consider developing a permit system for construction uses.	Utility Billing Department is still in progress. The City has not yet developed new administrative policies and procedures regarding authorized unmetered use, the most significant of which is the filling of portable water tanks to water hanging baskets. The City has a permitting system for construction water uses.
Leak detection and repair or line replacement	Periodically audit the City's construction standards to ensure that they remain current relative to industry best practices. Continue to respond to all calls related to possible system leaks in a timely manner, and repair any detected leaks. Continue annual water main replacement as necessary based on the age of system components, field observations, leak reports, maintenance history, and other data sources.	All the lines within the service area have been checked for leaks during the past 14 years and the City continues to fund leak detection, and where necessary repairs and/or replaces water mains. In 2007 and 2008, the City replaced 14,300 feet of pipe. The City is a long-time active member of the American Water Works Association (AWWA) and maintains a current reference library of industry standards regarding construction of water supply infrastructure. When updated construction standards are disseminated by the AWWA, City staff conducts a review of existing practices and implements updates as necessary to be consistent with current industry standards.
Rate structure and billing practices	Within the fiscal year (FY) 2007 to 2009 biennium, the City utility will fund an analysis of alternate rate structures that encourage conservation. Undertake steps to gain acceptance from the community and adoption by the City Council.	The City completed a Cost of Service Analysis and as a result implemented a series of rate increases for all customers and established a tiered rate structure for the single-family customer class, which constitutes 65 percent of the City's water use, on July 1, 2009.
Public education	Continue involvement with the Regional Water Providers Consortium (RWPC), and increase local messaging to disseminate information about water conservation opportunities and programs. Develop simple targeted messages that emphasize the Clackamas River as the source of the City's water. Explore the feasibility of developing an outdoor water use/conservation demonstration project.	The City has continued its involvement with RWPC and has increased its dissemination of water conservation information. The following is a summary of its local messages: providing conservation assemblies for school districts; installing a kiosk at City Hall for conservation literature; presentations to developers, property managers, landscape architects and landscape contractors; staffing booths at community events; emphasizing the Clackamas River as the primary water supply source; and expanding the City's water conservation information on its website. To date, the City has not yet created a low-water use demonstration garden, but continues to work toward this goal. The City currently is looking for funding and land to develop a demonstration garden.
Technical and financial assistance programs	Identify the top 20 residential and top 20 commercial water users and provide free water audits for two customers from each category (four audits) each year so that all 40 customers will have an audit within 10 years. Track consumption for audited users to evaluate whether more efficient water use results from the audit service. Beginning in 2007, the City will receive 25 outdoor conservation kits from RWPC. An additional 50	The City has conducted three commercial and five residential audits of the top 20 water users. Post-audit water use is being tracked by City staff and the data will be evaluated annually. The City has purchased 50 outdoor water conservation kits from RWPC since the 2007 WMCP was approved.

	outdoor conservation kits will be purchased at a cost of approximately $500.	
Retrofit /Replacement assistance	Develop rebate programs for clothes washers, toilets, and restaurant rinse heads.	The City implemented a toilet/urinal rebate program as of May 1, 2009, with a retroactive date of January 1, 2009. To date, the City has given approximately 159 rebates (for $75 to $125, depending on toilet type). The restaurant rinse head and clothes washer rebate programs have not yet been initiated, but these programs are still being pursued.
Water reuse, recycling, and non-potable water opportunities	In addition to current recycling and reuse, the City will continue its efforts to identify and evaluate the feasibility of future reuse, recycling and non-potable water opportunities. These may include increased recycling of backwash water, increased use of non-potable groundwater for irrigation through modifications to existing groundwater registrations (GR-3819, GR-3820, and GR-3821) and use of untreated Willamette River water for open space irrigation under the City's water right permit S-43246.	Currently, operations at the City's water treatment plant (WTP) allow for all the backwash water to be recycled. City staff continues to discuss and evaluate the possibility of using non-potable groundwater and Willamette River water to irrigate parks as well as the possibility of using reclaimed water on City parks that are located near the Tyron Creek WTP.
Other measures	Fund a position for a dedicated water conservation coordinator working as full-time employee.	In 2007, the City hired a full-time Water Conservation Specialist.
	By December 31 of each year, require all wholesale customers receiving water from the City during the preceding 12-month period to submit an annual water use report.	In December 2008, the City mailed annual water use reporting forms to all wholesale water purchasers to report on their 2008 water use. Eighty percent of the reporting forms were returned and filled in.
	Collaborate with the City Parks Department on the replacement of existing clock-timed controllers to weather-based controllers for the City's large turf areas.	The City collaborated with the City Parks Department to install weather-based irrigation controllers.
	Require the use of native and drought-tolerant landscaping and drip irrigation where appropriate.	The City Parks Department installs new or replaces inefficient sprinklers with drip irrigation, or alternative low-water use irrigation technology, in appropriate areas (shrubs and perennial plantings) and is using more drought tolerant plants in park sites.

Use and Reporting Program

OAR 690-086-0150(2)

The City has a water use measurement and reporting program that complies with the measurement standards in OAR Chapter 690, Division 85. The City's water use records can be found on the OWRD webpage (http://apps.wrd.state.or.us/apps/wr/wateruse.) The City measures the water it diverts from the Clackamas River using an in-line flow meter on the influent line entering its water treatment plant.

Additional Conservation Measures
OAR 690-086-0150(3)

In addition to the above-described conservation measures, the City has implemented numerous other conservation measures. The conservation measures are summarized below.

- The City is collaborating with the City's Parks Department to install weather-based irrigation controllers used to increase outdoor irrigation efficiency.
- The City recently installed an innovative subsurface irrigation system that originated in Australia and is piloting this system relative to more conventional, high efficiency systems. The City will be evaluating its performance over the next few years to determine whether this is a viable irrigation technology to employ in the future.
- The City is standardizing irrigation system design and construction on City projects to require the use of high efficiency irrigation heads and weather based controllers.
- A prominently-located large turf area was allowed to go dormant this year and the City is evaluating savings and public reaction as it considers reducing watering schedules on other large, municipally-owned turf areas.
- The City has given away approximately 196 low-flow showerheads and 325 aerators.
- The City subsidizes 70% of the cost of rain sensors that have been sold for $5 each to automatically shut off clock-timed irrigation controllers when rainfall occurs. To date, over 100 of these sensors have been sold.
- The City is conducting indoor and outdoor water audits. To date, the City has conducted 24 indoor and 81 outdoor audits.
- The City spent $130,000 replacing inefficient plumbing fixtures in the restrooms at City public buildings and parks, which included installation of dual-flush toilets, 1/8 gallon per flush urinals, and metered faucets.

Required Conservation Programs
OAR 690-086-0150(4)

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

Five-Year Benchmarks for Required Existing or Expanded Conservation Measures

The City currently addresses all of the required conservation measures. A summary of the 5-year benchmarks for required and additional conservation measures is provided below. During the next 5 years, the City plans to continue or expand the following existing conservation measures that are required of all municipalities:

1. **Annual water audits.** The City documents water production and wholesale consumption on a monthly basis. Retail consumption is documented on a bi-monthly basis. There are a few authorized, but unmetered, uses of water (see system metering benchmark below); however, the annual volume of water for these uses is insignificant. The City's previously approved WMCP showed a 5-year average for non-revenue water of 9 percent, but the non-revenue water calculated for this WMCP shows an average of 16 percent. Because the City conducts rigorous leak detection, the City believes that the results of the non-revenue water calculations result from account and billing system inconsistencies rather than losses due to system leakage. This new information is cause for concern and has made accounting and billing system processes an area of focus for the City.

   Five-year Benchmark: The City will continue to conduct annual City water audits. City water audits include evaluating the production and consumption data to observe trends in non-revenue water. To better account for unmetered authorized and unauthorized water uses, the City will develop and implement administrative policies and procedures to document such consumption. This may include reporting forms and reporting requirements for authorized unmetered uses.

   The City will undertake an audit of its accounting, billing, meter reading and reporting practices and procedures to identify and resolve inconsistencies and improve the City's ability to accurately account for the sources of non-revenue water. Activities are expected to include working with the Utility Billing Department to streamline the retrieval of water consumption data by date, volume and customer class to better track water use trends and eliminate accounting errors that are believed to be the cause of a significant portion of the City's non-revenue water. This work will be completed within the next 3 years.

2. **System-wide metering.** The City's water system is fully metered except for hydrant flushing and the seasonal filling of water tanks for hand-watering of some landscapes.

   Five-year Benchmark: The City will continue to require all new development to be metered.

3. **Meter testing and maintenance.** The City annually tests 50 percent of all 2-inch and larger meters and replaces the ¾ -inch to 1 ½ -inch meters on a 20-year replacement cycle (approximately 650 meters/year). This represents an increase from the 5-year benchmark proposed in the City's 2007 WMCP, which was a 25-year replacement schedule.

   In 2009, the City acquired a meter field-testing device that is used during residential audits if irregularities are found. Meters found to be inaccurate are replaced immediately.

   Five-year Benchmark: The City will conduct meter testing and replacement on the schedule noted above. Within the next 5 years, the City will establish design standards to require all meters 2 inches and larger to be installed with test ports and bypass devices to facilitate testing and repair. City staff will continue to use the field-testing device when irregularities are found during water audits. Within the next 5 years, the City will implement a pilot study to assess the use of an auto-read meter system. Within the next 5 years, the City will develop and implement a regularly-scheduled meter testing and maintenance program for the production meters at its water treatment plant.

4. **Unit-based billing program.** Because single-family residential use represents 65 percent of annual metered consumption, the City has focused many conservation activities on residential customers, including changes to its billing program. In December 2008, the City adopted rate increases for all customers and instituted a tiered pricing structure for the single-family customer class. On July 1, 2009, the first of several significant annual rate increases were implemented beginning with a 15.5 percent increase. This rate increase will be followed by a 15.25 percent increase beginning on July 1, 2010. The City's rate structure is comprised of a fixed charge (to cover the fixed operating costs of the utility) and a charge per unit volume of water, which is metered at each customer's point of connection to the public utility. As noted above, for single-family customers the unit volume charge increases substantially with increasing consumption.

   Five-year Benchmark: The City will semi-annually, or more frequently as conditions dictate, conduct Cost of Service Analyses (COSA) to determine the size and timing of future rate increases needed to fully fund capital and operating costs and to achieve other utility objectives like reducing system demand.

5. **Leak detection and repair.** The City's water use data (2004-2008) demonstrates non-revenue water ranges from 9 to 23 percent, with an average of 16 percent. As discussed in Section 2, the City believes that a significant portion of its apparent non-revenue water is due to accounting and billing system practices rather than losses due to system leakage.

   Since 1994, the City has annually budgeted and expended an average of $600,000 for pipeline replacement. Most of the areas of the City with known pipeline problems have been addressed through this program. The City annually conducts a leak detection program and repairs or replaces sections of pipeline as necessary. The City historically has conducted leak detection on 30 miles of its 250-mile pipe network, resulting in a 7-year leak detection cycle. Since submitting its 2007 Plan, the City has replaced 14,300 feet of pipeline. Currently, the City is a long-time active member of the AWWA and maintains a current reference library of industry standards regarding construction of water supply infrastructure. When updated construction standards are disseminated by the AWWA, the City staff conducts a review of existing standards and implements updates, as necessary, to maintain consistency with current industry standards.

   Five-year Benchmark: Leak detection and repair or replacement will continue to be funded annually. Repairs of all reported and detected leaks will continue to be performed in a timely manner and the City will continue to conduct leak detection at a rate of 30 miles of pipeline annually. The City will conduct an audit and analyses of the City's billing and account system, and take actions in response to the results of the audit and analyses. If these actions do not reduce the City's annual non-revenue water to less than 15 percent, the City will expand its leak detection program, as appropriate, to reduce its non-revenue water (including system leakage) to 15 percent and, if feasible, to 10 percent.

6. **Public education.** The City continues to be an active member and financial supporter of the Regional Water Providers Consortium (RWPC) and continues local marketing of information about water conservation opportunities and programs including conservation newsletters in the local newspaper 'Hello L.O.', residential water audits (the City views this as a public education opportunity), and water conservation and sustainability classes and

assemblies. The City emphasizes the Clackamas River as the primary source of the City's water; it is now woven into information materials.

Five-year Benchmark: The City will continue its membership in the RWPC and will continue with local marketing opportunities, water audits, and water conservation classes. Land and funding to create a native and low-water use demonstration garden will be pursued.

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

Because the City plans to develop water rights associated with extended permits S-32410 and S-37839, which are in OWRD's permit extension process, and because this entails diverting water from areas with resource issues (the Clackamas River), the City is required to develop a leak repair and line replacement program within 5 years that will reduce system-wide leakage to less than 15 percent. The City's 5-year average unaccounted for water for 2004 through 2008 was 16 percent. As described in Section 2, the City believes a significant portion of its apparent non-revenue water is related to accounting and billing system practices rather than losses due to system leakage.

As previously stated, the City will undertake a comprehensive audit of its meter reading, accounting and billing practices and procedures to identify and resolve issues related to apparent water losses. The activities are expected to include working with the Utility Billing Department to streamline the retrieval of water consumption data by date, volume and customer class to better track water use trends and eliminate accounting errors that are believed to be the cause of a significant portion of the City's non-revenue water. This work will be completed within the next 3 years.

The current system-wide leak repair measures include annual pipeline replacement, as necessary (approximately 14,300 feet were replaced in 2007 and 2008), based on infrastructure age, field observations, leak reports, maintenance history, and other data sources. The City historically has conducted leak detection on 30 miles of its 250-mile pipe network, resulting in a 7-year leak detection cycle. The City plans to continue the current leak repair and line replacement measures unless the actions taken in response to the results of the audit and analyses of the City's billing and accounting system do not reduce the City's annual non-revenue water to less than 15 percent. If that occurs, the City will expand its leak detection program, as appropriate, to reduce its non-revenue water (including system leakage) to 15 percent and, if feasible, to 10 percent.

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

Under OAR 690-086-0150(6), a water provider that serves a population greater than 1,000 and intends to expand use under extended permits for which resource issues have been identified shall establish 5-year benchmarks for implementing a number of listed conservation measures or document that the measures are neither feasible nor appropriate. A summary of the 5-year benchmarks for additional conservation measures is provided below.

Five-Year Benchmarks for Additional Conservation Measures

1. **Leak detection and repair and line replacement.** As previously described, the City's current system-wide leak repair measures include annual pipeline replacement, as necessary (approximately 14,300 feet were replaced in 2007 and 2008), based on infrastructure age, field observations, leak reports, maintenance history and other data sources. The City historically has conducted leak detection on 30 miles of its 250-mile pipe network, resulting in a 7-year leak detection cycle. Currently, the City is a long-time active member of the AWWA and maintains a current reference library of industry standards regarding construction of water supply infrastructure. When updated construction standards are disseminated by the AWWA, City staff conducts a review of existing practices and implements updates as necessary to be consistent with current industry standards.

   Five-year Benchmark: The City will continue its annual main replacement program as necessary based on age of system components, field observations, leak reports, maintenance history, and other data sources, and will continue to repair all reported and detected leaks in a timely manner. The City historically has conducted leak detection on 30 miles of its 250-mile pipe network, resulting in a 7-year leak detection cycle. The City will also continue to update construction standards based on current industry updates.

   The City will conduct an audit and analyses of the City's billing and accounting system, and will take actions in response to the results of the audit and analyses. If the improvements made to the City's billing and accounting system do not result in reductions in the City's annual non-revenue water to less than 15 percent, and 10 percent if feasible, the City will expand its leak detection program as appropriate to reduce non-revenue water (including system leakage) to 15 percent and 10 percent, if feasible.

2. **Technical and financial assistance.** The top 20 residential and top 20 commercial water users were identified for the 2007 WMCP and the City's Water Conservation Specialist began conducting water audits for those top water users. To date, water audits have been completed on 5 of the top 20 residential water users (25 percent) and 3 of the top 20 (15 percent) commercial water users. In addition to audits on the top water users, more than 80 outdoor and 30 indoor residential water audits have been conducted in both single-family and multi-family customer classes. Also, the City disperses outdoor water conservation equipment, such as irrigation watering gages for free and rain sensors for $5, along with information on using the equipment to reduce outdoor water consumption. More than 100 rain sensors have been sold to City customers. Additionally, the City offers shower timers and toilet dye tablets to educate customers and reduce indoor water use.

   Five-year Benchmark: The City will continue to conduct water audits for the top 20 residential and 20 commercial water users to achieve 100 percent auditing within the next 8 years. The City Water Conservation Specialist will continue to offer free water audits to any customers that request the service.

3. **Retrofit/replacement of inefficient fixtures.** As of May 1, 2009, and retroactive to January 1, 2009, the City implemented a toilet/urinal rebate program. To date, the City has given approximately 159 rebates of $75 to $125, depending on the efficiency of the

toilet or urinal. The City provides faucet aerators and low-flow showerheads at no cost to water customers. To date, the City has given away 325 faucet aerators and 196 low-flow showerheads. The previous benchmark for the restaurant sprayer retrofit program has been put on-hold; there are few restaurants in the Lake Oswego area and money on retrofit/replacement spent elsewhere may yield greater water savings.

Five-year Benchmark: The City will implement a clothes washer replacement program within the next 5 years. The City will also evaluate offering rebates to customers with large irrigated areas to encourage installation of ET controlled irrigation systems. The City will implement the program if actual performance histories confirm the level of published theoretical water savings. The City will continue its fixture rebate program and distribution of faucet aerators and low-flow showerheads to water customers

4. **Water rate structure and billing schedule.** The City completed a Water Cost of Service Analysis in late 2008. Recommendations from that work included increasing water rates charged to all customers and implementation of a tiered pricing structure on single-family customers in order to achieve the City's water conservation objectives. Other recommendations included revamping the City's utility bill format to include graphical consumption data for the current and prior year billing period and undertaking an analysis of the costs and benefits of increasing the billing frequency from bi-monthly to monthly. In December 2008, the City accepted the study's recommendations to adopt a series of rate increases, establish a tiered pricing structure for single-family customers and revamp the City's utility bills. On July 1, 2009, the City implemented a tiered-rate billing structure for the single-family customer class. A 15.5 percent rate increase for all customer classes for fiscal year 2009-2010 and a 15.25 percent increase for fiscal year 2010-2011 was authorized. The City currently also provides information about water audits in each bill and intermittently provides conservation messaging.

   Five-year Benchmark: The City will undertake a review and update to its water utility cost of service model in late 2010 in anticipation of further rate increases beginning July 1, 2011. The tiered-rate billing will continue for the single-family customer class, which in 2008 accounted for 65 percent of the City's overall water use.

   The City will continue to provide information about water audits in its water bills and will increase the frequency of its conservation messages to provide conservation messages in all water bills. As part of the City's annual budget process, further analysis of alternative billing frequencies will be conducted to more accurately assess the efficacy of shorter billing cycles.

5. **Reuse, recycling, and non-potable water opportunities.** The City's water treatment plant recycles all of the backwash water. Further, the City irrigates a city park (Luscher Farm) with water from a well.

   Five-year Benchmark: The City has three groundwater registrations for municipal use and one groundwater permit for irrigation. City staff will investigate the feasibility of using non-potable groundwater and Willamette River water as an alternative source of irrigation water for certain of its larger parks. Additionally, City staff will explore the feasibility of aquifer storage and recovery (ASR) as a means to reduce demands on surface water supplies during low stream flows period of late summer and early fall.

6. **Other measures.** As noted elsewhere in this document, the City already has implemented several other conservation measures contained in its 2007 Plan and will continue such programs and practices as part of this Plan.

    - **Full-time Water Conservation Specialist.** The City hired a full-time water conservation specialist in 2007. This position supports the City's water conservation goals by developing, coordinating, implementing, monitoring and reporting on City water conservation programs. The position also oversees planning and implementation of programs and events, compiling and analyzing data regarding the City's conservation programs as well as leading the marketing of water management and conservation programs for residential, commercial and industrial customers.

    - **Annual water use reporting from wholesale water customers.** In December of each year, the City requests annual water use reports from all wholesale water customers. For the 2008 season, 3 out of 5 wholesale customers returned completed reporting forms. These water reports describe the total number of service connections within the wholesale customer's service area, including a break-down of connections by customer class, total metered consumption and metered consumption by customer class, estimates and sources for unaccounted for water, current retail water rates and rate structure, and any conservation programs specific to the customers receiving City water.

    - **Outdoor water conservation measures.** The City has increased its outdoor water conservation efforts through the following measures:

        ✓Installing one evapotranspiration (ET) controlled irrigation system;

        ✓Installing an innovative subsurface irrigation system;

        ✓Standardizing irrigation system design and construction on City projects to require use of high-efficiency irrigation heads and weather-based controllers; and

        ✓Allowing a large turf area to go dormant, and considering reduced watering schedules for additional lands owned by the City.

    - The City is also in the process of installing two weather stations in the City that will be used to determine local ET. The ET data will be sent to the City Parks Department to be used to adjust irrigation schedules. The data will also be published on the City's website for customer access and usage.

Five-year Benchmark: Continue to work with the City Parks Department to collaborate on replacement of existing clock-timed controllers to weather-based controllers and encourage the use of native and low-water use landscapes, and switching to drip (or alternative) irrigation where appropriate. Continue to require annual water use reporting from wholesale water customers. Determine the feasibility of developing an outdoor water use/water conservation demonstration project.

4. Municipal Water Curtailment Element

This section satisfies the requirements of OAR 690-086-0160.

This rule requires a description of past supply deficiencies and current capacity limitation. It also requires inclusion of stages of alert and the associated triggers and curtailment actions for each stage.

Introduction

Curtailment planning is the development of proactive measures to reduce demand during supply shortages as the result of prolonged drought or system failure from unanticipated events including catastrophic events (flooding, landslides, earthquakes and contamination), mechanical or electrical equipment failure, or events not under control of the City (e.g., localized or area-wide power outages and intentional malevolent acts).

The curtailment plan presented in this section is based on City Ordinance No. 2517, contained in **Appendix** C.

History of System Curtailment Episodes

OAR 690-086-0160(1)

Within the last decade, the City has not experienced water shortages resulting from a constrained source of supply. The City has experienced short duration interruptions to normal service delivery as a result of mechanical or electrical malfunction of pumps and related electrical equipment at its intake and water treatment plant, and local electric utility outages. The City also has experienced interruption of treated water supply because of a blocked intake screen and a localized joint failure in a treated water transmission main. When these events occurred, the City issued press releases to local media outlets, posted alerts on its web page and contacted its wholesale customers to inform them of the situation and ask that nonessential water use be reduced until repairs were made and normal water service delivery was restored. These service disruptions have been short-lived and have not required sustained curtailment measures because the City has adequate distribution system storage volumes.

Curtailment Event Triggers

OAR 690-086-0160(3)

Between 2001 and 2008, the City's ADD ranged from 6.1 to 7.4 mgd, with an average of 6.4 mgd. The City's MDD ranged from 12.1 to 16.9 mgd, and averaged 14.9 mgd, during the same period. Since 2001, the 3-day MDD has ranged from 11.2 to 16.6 mgd, and has averaged approximately 92 percent of the one-day MDD. This means that if the MDD equals 16 mgd, the City can be expected to experience 3 consecutive days with an average demand of 14.7 mgd each day.

The City's critical water system facilities include its water supply intake on the Clackamas River (located approximately 0.8 miles upstream of the confluence with the Willamette River), its water treatment plant located in the neighboring City of West Linn, and its raw and finished water transmission mains. These systems are now more than 40 years old. During the peak season, these critical facilities operate 24 hours per day, 7 days per week at maximum capacity. Analysis of these systems during an update of the City's water master plan conducted in 2001 indicates that to meet peak demands, all systems must operate at maximum installed capacity. This analysis also showed that firm capacity (i.e., actual delivery capacity with the largest pump out of service) was at or below peak demands as follows:

- The firm pumping capacity of the raw water intake is 13.5 mgd.
- The firm pumping capacity of the treated water pump station is 12.2 mgd.
- The water treatment plant cannot meet regulatory disinfection contact time requirements in the plant and must rely on portions of the treated water transmission main to achieve compliance.
- When water temperatures fall below 10° C., which is typical of winter conditions, the WTP cannot meet the contact time requirements at its full capacity of 16 mgd and must be operated at a reduced capacity.
- Both the raw and finished water transmission mains transmit water during peak demand periods at higher than an optimal, 5 feet per second, velocity.

During non-peak demand periods, curtailment triggers are unlikely to be met unless a catastrophic natural disaster impacts multiple elements of the City's source of supply. Absent a trigger of this magnitude, the City is well-positioned to meet its non-peak season customer demands for the following reasons:

- The City has seismically hardened its water intake structure to current *Uniform Building Code* (UBC) design codes.
- The City has seismically hardened its water treatment plant to remain operational after a seismic event exceeding current UBC design codes.
- The City has 27 MG of distribution system storage: enough to meet ADDs for 3 to 4 days. Enacting curtailment measures could extend this supply further.
- Of the City's 27 MG of storage, all but 1.7 MG is fully or partially buried, providing resistance to seismic events and deterring sabotage. In the last decade, the City has added an additional 11.5 MG of new, buried storage reservoirs designed to withstand seismic forces exceeding current UBC design codes.
- If the Clackamas River becomes unusable, the City maintains intersystem connections with the Cities of Portland, Tigard, and Tualatin.
- Existing firm pumping capacity in its intake and WTP exceed annual ADDs.

During the peak summer demand period from June through September, when the system is operating at or near its maximum capacity, interruption of supply because of a natural disaster, mechanical failure, terrorist act, or loss of source could present significant challenges to the

City. Therefore, the triggers and related curtailment stages in this curtailment plan are based primarily on events occurring during this time period.

Curtailment Stages

OAR 690-086-0160(2)

Depending on the nature of the event that results in a water supply shortage and considering predecessor and successor conditions, this curtailment plan for the City is designed to be initiated and implemented in progressive stages.

Events causing this plan to be activated would include, but not be limited to, the following:

- Abnormal weather conditions preceding the peak summer supply season that present a high likelihood for below normal summer streamflows in the Clackamas River
- Declaration of a drought for Clackamas County by the Governor pursuant to ORS 536.720
- Catastrophic natural disaster that damages individual critical facilities or extensive portions of the City's distribution system
- Mechanical or electrical malfunction of critical pumping facilities at the City's intake or water treatment plant
- Interruption of local utility electrical service
- Terrorist act perpetrated on any of the City's critical facilities or storage reservoirs, or contamination of source water

The City's curtailment plan has five distinct stages, each of which is triggered by one or more of the events listed above and is grouped as shown in **Exhibit 4-1**.

EXHIBIT 4-1
Curtailment Stages 1 through 5

Curtailment Stages	Initiating Conditions
Stage 1: **Water Shortage Alert**	• Forecasts of below-normal summer streamflows • Mechanical or electrical malfunction causing the loss of any two pumps at intake facility • Minor damage to raw or treated water transmission mains (e.g., leaking joint requiring repair)
Stage 2: **Serious Water Shortage** **Demand Reduction Target:** **10 percent of MDD**	• Declaration of drought by Governor pursuant to ORS 536.720 • Continuation of hot dry weather predicted • Declining river levels • Mechanical or electrical malfunction causing the loss of the largest pump at intake • Extensive repairs needed on raw or treated water transmission mains
Stage 3: **Severe Water Shortage** **Demand Reduction Target:** **20 percent of MDD**	• Continuation of hot dry weather predicted • Clackamas River streamflows below 510 cubic feet per second (cfs) between July 1 and September 15 or below 750 cfs between September 16 and June 30[1] • Loss of pump 1, 2, or 3 at water treatment plant (WTP) • Loss of utility electrical service at intake • Multiple failures in the joints of the raw or treated water transmission mains
Stage 4: **Critical Water Shortage** **Demand Reduction Target:** **50 percent of MDD**	• Clackamas River streamflows below 510 cfs between July 1 and September 15 or below 730 cfs between September 16 and June 30 impacting instream water rights[2] • Severe drought conditions • Loss of utility electrical service at water treatment plant or intake • Major mechanical or electrical malfunctions causing loss of multiple pumps at intake or water treatment plant • Transmission main failures • Fire at intake or water treatment plant • Imminent terrorist threat against supply system • Contamination of source of supply
Stage 5: **Emergency Water Shortage**	• Continuation of severe drought conditions • Extensive damage to transmission, pumping, or treatment processes caused by natural disaster • Intentional acts or fire, contamination of source, or any other event resulting in an immediate, sustained deprivation of water supply

[1] The approximate total of estimated current peak day withdrawals for the Clackamas River Water Users (107 cfs) and minimum in-stream flows between July 1 through September 15 (400 cfs) and between September 16 and June 30 (640 cfs), measured at U.S. Geological Survey gauging station 14211010 at the South Fork Water Board's intake.

[2] Same as footnote 1, but reflects a 15 percent reduction in current peak day demands spread across all municipal water providers.

Authority

The City Manager or City Engineer is authorized to declare a Water Curtailment Stage 1. Actions under Water Curtailment Stages 2 and 3 can be initiated only after the City Manager declares an emergency. Actions under Water Curtailment Stages 4 and 5 can be initiated only after the City Council declares an emergency.

Plan provisions will remain in effect until the emergency is declared ended by the initiating party, provided that the City Council may rescind an emergency declaration issued by the City Engineer or the City Manger upon a finding that demonstrates the emergency no longer exists, or that the original declaration was made in error.

Actions may be applied to the entire system, or only to those water use sectors, or in those geographic areas that are directly affected by any water supply shortage.

The City Manager is responsible for execution of the curtailment plan provisions after an emergency has been declared.

Curtailment Plan Implementation and Enforcement

OAR 690-086-0160(4)

In implementing this curtailment plan, the City will work closely with the Clackamas River Water Providers to ensure consistent approaches to dealing with water shortages by coordinating stage designations, public notices, press releases, and other outreach activities.

Under the City's code, a violation of any provision of the City's code to implement its WMCP (38.08.110) is a civil violation and subject to fine. Upon request of the City Manger, the City Attorney may institute an appropriate action in court to enjoin any continuing violation of any provision of this section.

Stage 1: Water Shortage Alert

Stage 1 status will activate a program to inform customers of the potential for drought or the need for temporary reductions in consumption because of reasons other than drought where there is potential for the system supply capacity to fall below the 3-day MDD. The City Manager will issue a general request for voluntary reductions in water use by all water users. The request will include a summary of the current water situation, the reasons for the requested reductions, and a warning that mandatory cutbacks will be required if voluntary measures do not sufficiently reduce water usage. Stage 1 public information program elements would include the following:

1. Contact local media outlets and request that the public be informed about the potential for summer water shortages or temporary interruptions to normal service delivery.
2. Post prepared public service announcements on the City's web page and in the City's Hello LO newsletter and LOdown Weekly News. Include prepared information regarding conservation tips.
3. Provide notice on water bills or through utility bill inserts.

4. Activate the water conservation hotline in the City's Citizens Information Center. Include pre-recorded message providing conservation tips. Update recording weekly to maintain current status of event trigger.

5. Initiate contact with senior operations staff at Cities of West Linn and Tigard regarding the potential need to activate intersystem connections for temporary water supply to Lake Oswego.

6. Contact wholesale customers notifying them of the existence or potential for water shortages. In certain circumstances it may be necessary to "lock-out" interties with wholesale customers as a means of reducing demand on the City's system.

Stage 2: Serious Water Shortage

Stage 2 status is similar to Stage 1 except that certain water uses will be prohibited. There will be more emphasis on the reduction of nonessential water use. Stage 2 is intended to respond to a Governor's drought declaration, equipment failures reducing system supply capacity below the 3-day MDD, continued hot dry weather, and a continued decline in streamflows in the Clackamas River. A demand reduction target of 10 percent of MDD will be communicated to the general public. In addition to Stage 1 voluntary measures, Stage 2 elements include:

1. Provide handouts to field personnel with direction to remind customers of voluntary measures and shortage status.

2. Encourage, through public service announcements, voluntary restrictions on outdoor irrigation and limit irrigation times to between the hours of 8 p.m. and 10 a.m.

3. Encourage customers to refrain from washing cars except at commercial washing establishments that recycle or reuse water. Offer free single-wash coupons to encourage compliance.

4. Prohibit filling of swimming pools and ponds.

5. Prohibit pressure washing roofs, decks, or home siding unless such uses were contracted before implementation of this curtailment action and are demonstrated to the City Manager's satisfaction to be necessary for painting, repair, remodeling, or reconstruction.

6. Prohibit using water to wash/clean sidewalks, driveways, and patios.

7. Prohibit using water for dust control unless it is shown to the City Manager's satisfaction that water used for dust control is needed to meet public health or safety requirements including, but not limited to, abatement of fire or sanitation hazards or to meet air quality standards mandated by the Oregon Department of Environmental Quality.

Stage 3: Severe Water Shortage

In addition to the actions included in Stage 2, Stage 3 will impose an expanded suite of mandatory prohibitions on nonessential water use with the goal of achieving reductions of 20 percent of MDD. Under Stage 3, the City would introduce the following mandatory water reduction measures:

1. Restrict outdoor landscape irrigation for residential customers to the following:
   a. 8 p.m. Sundays until 10 a.m. Mondays
   b. 8 p.m. Wednesdays until 10 a.m. Thursdays
   c. 8 p.m. Fridays until 10 a.m. Saturdays
2. Restrict outdoor landscape irrigation for nonresidential customers to the following:
   a. 8 p.m. Saturdays until 8 a.m. Sundays
   b. 8 p.m. Mondays until 8 a.m. Tuesdays
   c. 8 p.m. Tuesdays until 8 a.m. Wednesdays
   d. 8 p.m. Thursdays until 8 a.m. Fridays
3. The following exemptions apply to the restrictions in measures 1 and 2 above:
   a. Grass, turf, or landscaping is less than 1-year old.
   b. Grass or turf is part of a commercial sod farm.
   c. Grass or turf areas are within a "high use" athletic field used for organized play.
   d. Grass or turf areas are used for golf tees or greens.
   e. Grass or turf areas are part of a park or recreation area declared by the City Council by resolution to be of particular significance and value to the City.

   Notwithstanding the exceptions and prohibitions noted above, any landscape irrigation will be limited to only that necessary to maintain plant health.
4. Prohibit hosing or washing of paved surfaces.
5. Prohibit applying water in a manner, rate, or quantity that it runs onto adjacent property, parking lots, or public rights-of-way, including streets, sidewalks, and pathways.
6. Prohibit washing of vehicles other than at a car washing facility that recycles water used in the car washing process.
7. Prohibit filling or adding any water to pools, ponds, fountains, or water features.
8. Prohibit persons to permit water leaks after reasonable opportunity to discover, investigate, and repair.
9. Prohibit operation of fountains except those using re-circulated water.
10. Prohibit washing of roofs, decks, or home siding unless such uses are solely to abate a fire hazard.
11. Activate intersystem connection with the Cities of Tigard or West Linn. If the severe water shortage was the result of an event not related to a shortage in the Clackamas River, either alternate system could be used. If the Clackamas River system is

constrained, the Tigard connection could be used to provide temporary supply from Portland's Bull Run or from the Joint Water Commission.

In addition, City staff would work with local industrial and commercial large water users to minimize their water use.

Stage 4: Critical Water Shortage

Conditions causing Stage 4 curtailment measures are severe enough in terms of extent and duration that significant reductions in water use must be achieved as quickly as possible. Stage 4 builds on measures enacted in the previous stages. In Stage 4 curtailment, all landscape irrigation is prohibited and any exceptions noted above for outdoor water uses are rescinded. Stage 4 measures attempt to achieve reductions in residential and commercial demands of up to 50 percent of MDD. If water loss is the result of major damage to critical supply system facilities or local electrical utility systems, it may be necessary to go directly to Stage 5.

In addition to all requirements in Stages 2 and 3, Stage 4 will include:

1. Prohibit landscape irrigation.
2. Prohibit washing, wetting down, or sweeping sidewalks, walkways, driveways, parking lots, open ground, or other hard-surfaced areas with water.
3. Prohibit washing any vehicle, unless the City Council finds that the public health, safety, and welfare are contingent on frequent vehicle cleaning, such as solid waste transfer vehicles, vehicles that transport food and other perishables, or as otherwise required by law.

If such a critical water shortage takes place in the Clackamas Basin, (that is, plant power failures, transmission line breaks), additional restrictions and exemptions may be passed as necessary.

Stage 5: Emergency Water Shortage

Stage 5 responds to events causing an immediate and sustained loss of the source of supply or major damage to critical treatment, transmission, and pumping systems. Examples include failure of a main transmission line, failure of the intake or water treatment plant, a chemical spill into the Clackamas River upstream of the intake, or a malevolent attack on the system that introduces a contaminant at some point in the system.

Under Stage 5, all water use may be prohibited, except uses necessary for human consumption and sanitation needs.

The City Council or City Manager also may activate the City's Emergency Operations Center (EOC) to mobilize sufficient resources to respond to the event(s) causing the need for Stage 5 action.

If the event renders water in the system unsafe to drink (e.g., chemical spill or intentional act against the system), the EOC will be activated and the Incident Commander will assume command and control of the City's response to the event. As the cause and severity of the event dictates, the Incident Commander will:

1. Implement the appropriate response protocols of the City's Emergency Response Plan

for the Lake Oswego Water System.

2. Activate the Code Red communications system.
3. Contact the Oregon Drinking Water Program, Department of Human Services, and request its assistance in response actions.
4. Notify the local news media, to solicit their assistance in notifying customers.
5. Contact county, state, and federal law enforcement officials, as appropriate.
6. Contact the County Public Health Officer and local hospitals, as appropriate for the nature of the event.
7. Contact the Regional Water Providers Consortium staff and seek use of portable water distribution systems as available.

The City will continue to investigate and develop specific back-up plans for a Stage 5 emergency. These plans may include purchasing water from the City of Portland via the City of Tigard, purchasing water from the South Fork Water Board (assuming this source is available), directing residents to a pre-designated water distribution location, and supplying bottled water.

5. Municipal Water Supply Element

This section satisfies the requirements of OAR 690-086-0170.

This rule requires descriptions of the City's current and future service area and population projections, demand projections for 10 and 20 years, and the schedule for when the City expects to fully exercise its water rights. The rule also requires comparison of the City's projected water needs and the available sources of supply, an analysis of alternative sources of water, and a description of required mitigation actions.

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

Because the Cities of Lake Oswego and Tigard have agreed to pursue plans for a joint water system, the future planning area for this WMCP is the limit of Lake Oswego's current USB, shown in **Exhibit 5-1**, and the City of Tigard's USB, shown in **Exhibit 5-2**. (The intergovernmental agreement (IGA) between the Cities of Lake Oswego and Tigard is presented in **Appendix D**.) Lake Oswego's current USB includes all land within the city limits as well as Forest Highlands, Lake Grove, Rivergrove, Southwood Park, Skylands, Glennmorrie, and Alto Park Water Districts, and portions of the Palatine Hill Water District. Tigard's USB includes approximately two-thirds of the City of Tigard, and the Cities of Durham and King City, as well as the remnant portion of the Tigard Water District within unincorporated Washington County commonly referred to as the Bull Mountain area.

EXHIBIT 5-1
City of Lake Oswego Service Area

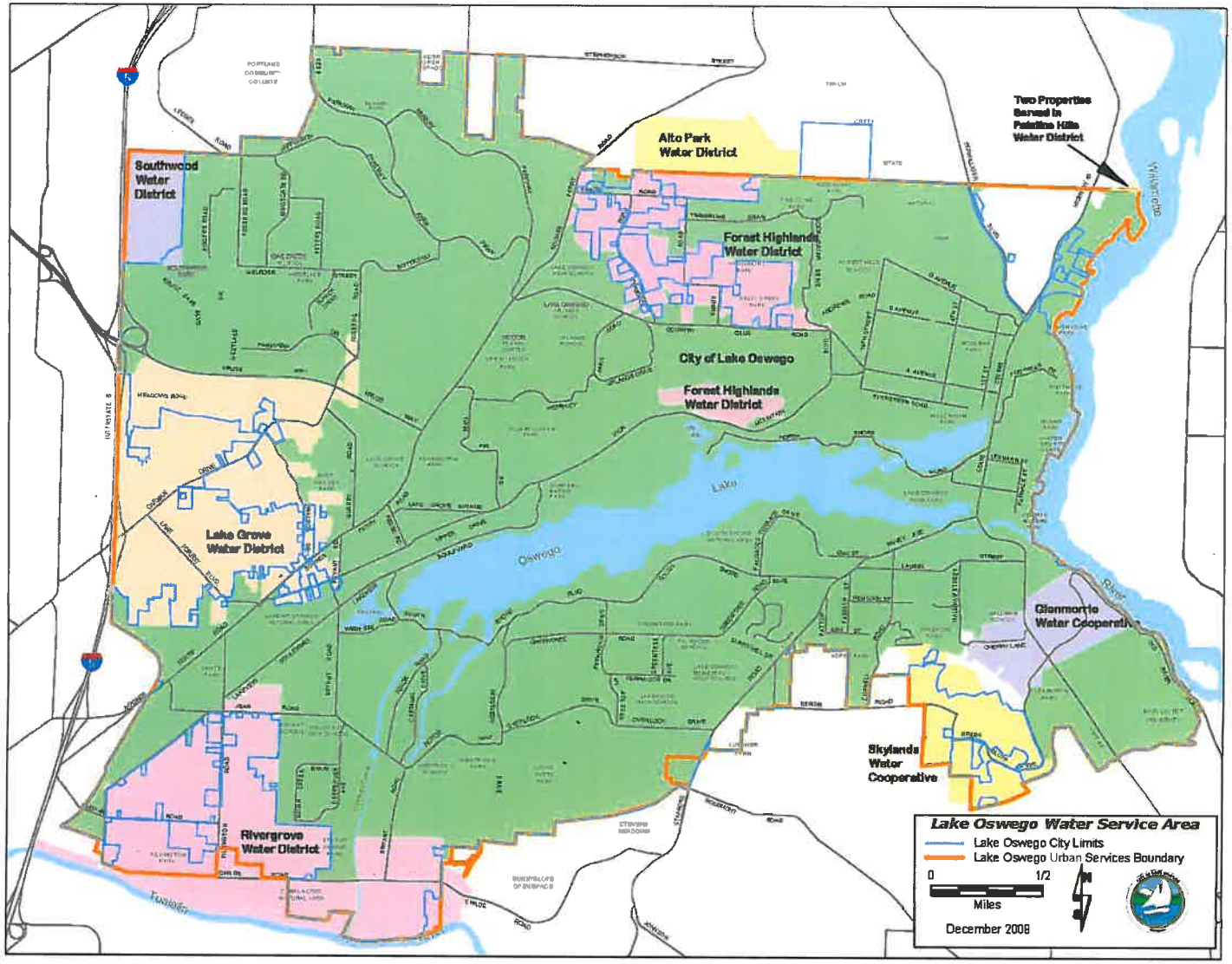
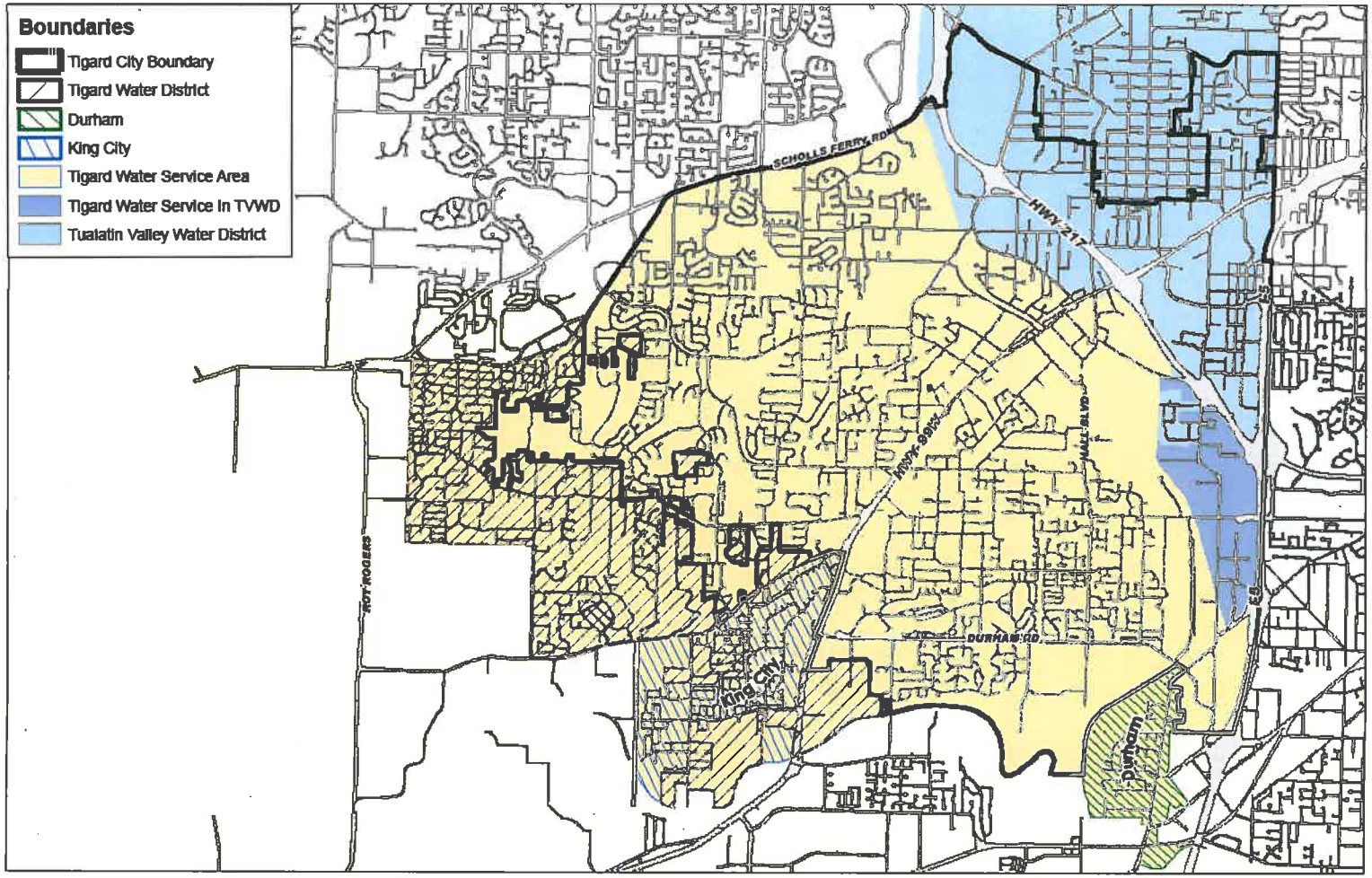


EXHIBIT 5-2
City of Tigard Service Area



Population Projections
OAR 690-086-0170(1)

Data from Portland Metro Regional Center's *Metroscope Gen 2.3 - Year 2030 Transportation Analysis Zone (TAZ) Allocation Report*, historic population data from PSU's Population Research Center, and account information from water districts served by the City were used to project the service area populations within the City's USB and Tigard's USB. These populations ultimately will merge to become the service area population for the Lake Oswego and Tigard joint water system.

Lake Oswego USB Service Population

According to recent population data compiled by PSU's Population Research Center, the City's population has grown at an annual rate somewhat less than 0.5 percent. This rate was used to project the water service population within city limits through 2030.

Two City wholesale customers, the Southwood Park Water District and Skylands Water Company, are fully developed with a total population estimated at 711. This population was held constant through 2030. An annual average growth rate of 1.69 percent, obtained from the *Year 2030 Transportation Analysis Zone (TAZ) Allocation Report* 2030, was used to forecast populations within the remaining water district areas, outside of city limits, but within the USB.

Tigard USB Service Population

TAZ population allocations were used to estimate the 2005 service population and to project the 2030 service population within the City of Tigard's USB. An intersecting polygon method was used to determine the percentages of the TAZ jurisdictions and associated populations within the City of Tigard's USB. The service area population estimate for 2019 was obtained by interpolation.

Exhibit 5-3 summarizes the projected populations for 2019 and 2030.

EXHIBIT 5-3
Population Projections for the Lake Oswego USB, and the City of Tigard USB

	2019	2030
Lake Oswego City LImits	35,670	37,700
Lake Oswego Outside City Limits and Within USB	8,090	9,580
Subtotal (Lake Oswego USB)	43,760	47,280
City of Tigard USB	60,440	64,050
Total	104,200	111,330

Note: Values rounded to the nearest 10 people.

Demand Forecast

OAR 690-086-0170(3)

Future demands for the City of Lake Oswego USB and City of Tigard USB were projected using a constant per capita demand approach. This method of projecting demand assumes that per capita demand factors remain constant throughout the 20-year projection period.

Historical demand and population estimates were used to determine representative average day per capita demands and maximum day per capita demands for the City of Lake Oswego retail customer population and the City of Tigard water service population. The per capita demand values presented in **Exhibit 5-4** represent all types of water use within the respective areas, and were assumed to remain constant through 2030.

EXHIBIT 5-4
Per Capita Demand Factors for the Lake Oswego and Tigard USBs, gpcd

Service Area	ADD per capita	MDD per capita
Lake Oswego USB[1]	171	393
Tigard USB[2]	118	247

1. MDD per capita was estimated by multiplying ADD per capita by an MDD: ADD peaking factor of 2.3.
2. Average ADD and MDD per capita for the period 2000 to 2005, as provided by the City of Tigard.

Demand Projection Summary

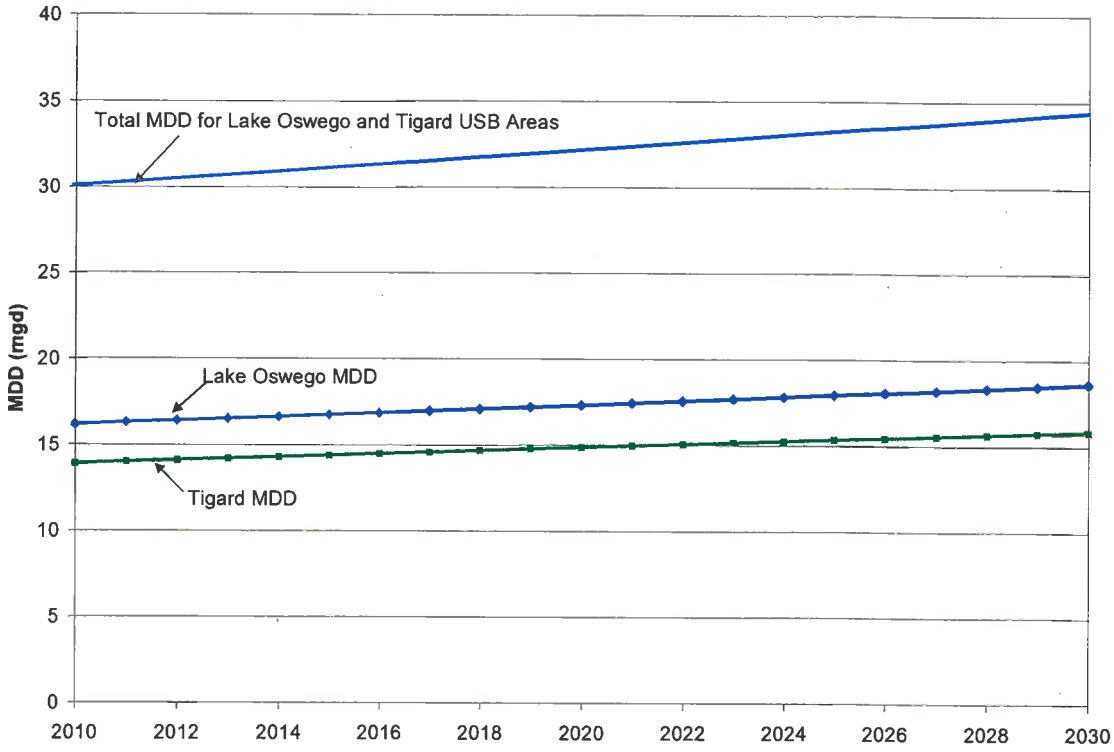
The per capita demand values presented in **Exhibit 5-4** were multiplied by the respective projected USB populations to determine future ADD and MDD in each USB. The resulting ADD and MDD projections for 2019 and 2030 for the Lake Oswego and Tigard water service areas are summarized in **Exhibit 5-5**. The Lake Oswego and Tigard Joint Water System is expected to supply up to 14 mgd of these demands shown for the City of Tigard.

EXHIBIT 5-5
City of Lake Oswego and City of Tigard Water System Demand Projections (mgd)

Service Area	2019		2030	
	ADD	MDD	ADD	MDD
Lake Oswego USB	7.5	17.2	8.1	18.6
Tigard USB	7.1	14.9	7.6	15.8
Total	14.6	32.1	15.7	34.4

Exhibit 5-6 shows the MDD projections graphically. Although smooth demand curves are shown in **Exhibit 5-6**, the actual pattern of demand increase will vary depending on when expansion of water service within the two USBs occurs. By 2030, the City of Lake Oswego anticipates that the water districts within its USB will be disbanded and incorporated into the Lake Oswego water service area.

EXHIBIT 5-6
Projected Maximum Day Demands for the Lake Oswego and Tigard Service Areas



Schedule to Exercise Permits and Comparison of Projected Need to Available Sources

OAR 690-086-0170(2) and (4)

The City holds water rights authorizing use of 59 cfs (38 mgd) of water from the Clackamas River and 6.0 cfs (3.9 mgd) of water from the Willamette River. However, the City's current water supply system capacity is limited by the production capacity of its water treatment facility to approximately 25 cfs (16 mgd).

The City is a member of the Clackamas River Water Providers (CRWP), which is working through the Clackamas Watershed Management Group (CWMG) to conserve natural resources and ensure clean, affordable drinking water for current and future supplies. The CWMG's activities in the Clackamas Basin include modeling future demands, pesticide

studies with USGS, working with the Clackamas River Basin Council on the Clackamas Watershed Assessments and Action Plan, and monitoring water quality and stream flows.

In addition, the CRWP negotiated an agreement with Portland General Electric for water storage capacity and water releases from Timothy Lake for stream flow augmentation in the lower river. Released water from Timothy Lake will preserve minimum instream flows and enhance instream flows. Finally, the CRWP partnered with PSU to update a model to assess the impact of increased municipal demands on flows in the lower Clackamas River.

The Cities of Lake Oswego and Tigard have explored options to become a joint water system. Details of this process are contained in *The City of Lake Oswego and the Tigard Water Service Area Joint Water Supply System Analysis Draft Report*, Carollo Engineers, P.C., July 2007. This study recommended that a joint water system be pursued, and that the Lake Oswego water supply capacity from the Clackamas River ultimately be expanded to 59 cfs (38 mgd).

An IGA between the cities of Lake Oswego and Tigard (August 6, 2008) stipulates that Lake Oswego will provide Tigard with up to 14 mgd (21.7 cfs) by 2016 to help meet Tigard's projected MDD. Tigard's peak supply needs beyond 14 mgd will be provided by Tigard's ASR system and other sources. During the winter months, it is expected that Lake Oswego will supply the City of Tigard with up to 12 mgd (18.6 cfs). This supply will provide 6 mgd to meet Tigard's winter water demands, and 6 mgd for recharging Tigard's ASR system.

The water rights held by the City of Tigard are insufficient to meet its existing ADD. Tigard's municipal groundwater rights and groundwater registrations authorize the use of up to approximately 3.6 cfs (2.4 mgd) (GR-615, GR-616, T-9866, Certificates 85870 and 85871, and Permit S-49240). In addition to its "native" groundwater rights, during the peak water-use season, Tigard uses stored groundwater under its ASR limited license. Tigard's current production capacity is 3.5 mgd (5.4 cfs). The current maximum production capacity of Tigard's groundwater system is approximately 4.2 mgd (6.4 cfs), which is not adequate to meet Tigard's current demands. Tigard must rely on its IGAs and water supply interconnections with other water providers to meet a significant part of its existing and future water needs.

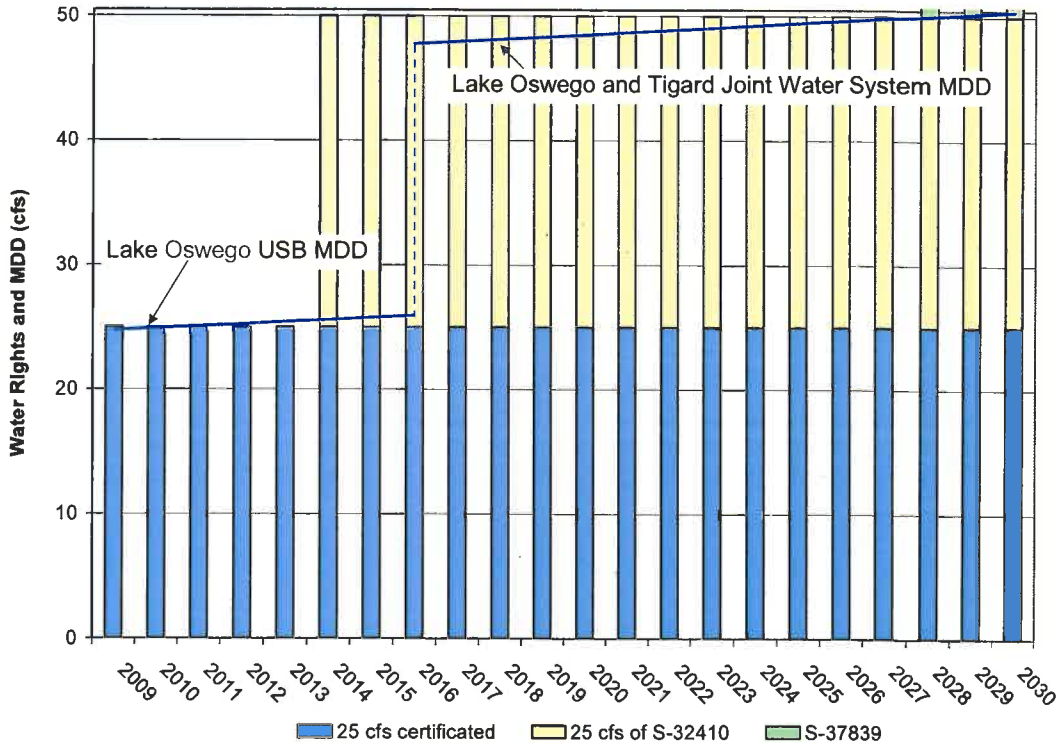
In the past, Tigard purchased most of its water supply (approximately 78 percent) from the Portland Water Bureau (PWB). The remaining portion of Tigard's water supply primarily came from its ASR program, native groundwater, the Joint Water Commission (JWC), and the City of Lake Oswego. The first renewal of Tigard's contract with the PWB will occur in 2016 (unless either party gives a 5-year notice of non-renewal on or after July 1, 2011). Tigard currently plans to use its connection with the PWB only as a back-up or emergency water supply after July 1, 2016. Further, Tigard recently withdrew as a partner in the JWC. Tigard is likely to establish some type of preferred wholesale customer agreement with the JWC, and will receive JWC water only on an emergency or temporary basis in the future.

In summary, Tigard plans to meet its future water needs using a two-pronged approach. First, Tigard plans to obtain up to 14 mgd (21.7 cfs) from Lake Oswego by 2016 (the date of Tigard's contract renewal with PWB). Second, over the long term, during the winter months, Tigard plans to use up to 6 mgd (9.28 cfs) from Lake Oswego for storage in its ASR

program. Tigard plans to meet its water demands beyond 2030 with a combination of water from Lake Oswego and its ASR program, as available, and existing water supply agreements and memberships in joint supply groups.

Exhibit 5-7 shows Lake Oswego's Clackamas River water rights superimposed on projected MDD. The City of Tigard's 14 mgd (21.7 cfs) demand is shown as a step function occurring in 2016, although the actual transition to a joint supply may occur differently. As shown in **Exhibit 5-7**, the Lake Oswego and Tigard joint water system will need to supply approximately 50.5 cfs (32.6 mgd) to help meet the 53.2 cfs (34.4 mgd) MDD of both communities by 2030. This includes 18.6 mgd (28.8 cfs) for Lake Oswego and 14.0 mgd (21.7 cfs) for Tigard.

EXHIBIT 5-7
Projected Maximum Day Demands, and Lake Oswego Water Rights on the Clackamas River



Based on projected population growth, wholesale water supply contract opportunities, and the need to provide water on an emergency basis to other municipal water suppliers (see **Appendix B**), Lake Oswego anticipates developing and beneficially using all 59 cfs under Permits S-32410 and S-37839 by approximately 2040.

The City is requesting access to the full 25 cfs under extended permit S-32410 and 0.5 cfs of extended permit S-37839.

Alternative Sources

OAR 690-086-170(5)

OAR 690-086-0170(5) requires an analysis of alternative sources of water if any expansion or initial diversion of water allocated under existing permits is necessary to meet future water demand. The City will expand diversion of water under permit S-32410 and permit S-37839 to meet future water demands described above.

During the past several years, the City has spent significant resources evaluating its water supply alternatives. The City evaluated alternatives for meeting its future water supply needs through the conduct of an engineering and financial analysis of water supply options. The findings of that analysis are contained in a report titled "*City of Lake Oswego and Tigard Water Service Area Joint Water Supply System Analysis Draft Report*", *Carollo Engineers, P.C., July 2007 (JWSSA).* The analysis compared supply alternatives including conservation, interconnections with other municipal water suppliers, and the availability, reliability, and feasibility of these alternate sources. The analysis also considered the legal agreements and regulatory permits and conditions likely required to satisfy standards of approval and mitigation.

The City is making significant efforts to increase water conservation both for its own municipal use and water use by the City's customers. The City recently implemented a tiered rate structure for its residential customers. These customers account for 65 percent of the City's metered water use. Based on the conclusions in the JWSSA, the City has determined that conservation measures may delay, but cannot eliminate, the need for additional water use under existing permits S-32410 and S-37839. Increased water use under these permits, in addition to conservation, will be required to provide the water needed to meet the projected MDD of the Lake Oswego and Tigard joint water system during the next 20 years.

As described in Section 2 of this WMCP, the City has eight interconnections and water supply agreements with other municipal supply systems, and is participating in cooperative regional water management. The City has fully considered these municipal supply system interconnections in planning for future water demands. One interconnection and agreement allows the City of Portland to provide water to 14 connections in the Blackhawk subdivision. The remaining interconnections and agreements allow the City to provide water to other municipal water suppliers.

The JWSSA also evaluated the opportunity to obtain future water supplies from the City of Portland via the Washington County Supply Line (WCSL) and from the South Fork Water Board (SFWB). The draft report determined that no excess peak capacity will be available for Lake Oswego from the WCSL after 2010. The draft report also concluded that using water from SFWB would require significant upgrades to the City of West Linn's transmission system capacity and a new water supply agreement. The City of Lake Oswego has concluded that meeting its future water supply needs through either of these supply alternatives does not compare favorably in terms of life cycle cost, environmental impact, reliability and governance with the alternative of expanding its existing supply system in partnership with the City of Tigard.

The City also holds permit S-43246 for 6.0 cfs (3.88 mgd) on the Willamette River. Development of this source will require a large capital investment to construct a diversion structure, pumping facilities and pipelines needed to convey this water to the City's WTP and it is not known to what extent existing treatment processes at the WTP would need to be modified to treat water from this alternate source to a similar level of quality as that diverted from the Clackamas. Also, the City has no easement or property rights upon which the needed facilities would be sited and it is believed acquisition of such rights would involve a lengthy and costly legal effort.

The City holds three groundwater registrations and a groundwater use permit. The future of the City's groundwater registrations is uncertain, however, because OWRD must conduct an adjudication of the claims and the circuit court must issue a decree before OWRD can issue water right certificates confirming the groundwater uses claimed in these groundwater registrations. A groundwater adjudication for this area has not yet been initiated and the results of such an adjudication cannot be predicted in advance. Moreover, the City has a limited ability to pump groundwater and the groundwater has water quality problems. GR 3819 is used only sparingly because of issues associated with the construction of the well and potential water quality concerns. GR 3820 and 3821 currently are not in use because of water quality concerns. The City's groundwater use permit authorizes the use of up to 0.29 cfs for irrigation of 22.43 acres.

The City's existing permits S-32410 and S-37839 are in OWRD's permit extension process. The City anticipates that the permits will be conditioned to maintain the persistence of listed fish species. Permit S-37839 is junior in priority to instream water right certificate 59491. As described in more detail in Section 2, a review of streamflows and other factors indicates that at times permit S-37839 will be regulated in favor of instream water right certificate 59491.

Quantification of Maximum Rate and Monthly Volume
OAR 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. The City is projected to require the entire second half of permit S-32410 (25 cfs) and 0.5 cfs of permit S-37839 within the next 20 years to meet the projected water demands of the Lake Oswego and Tigard joint water supply system. Assuming that these permits are used at the maximum rate 24 hours per day for 30 days during the maximum month, the maximum monthly volume for permit S-32410 would be approximately 485 million gallons and the maximum monthly volume for permit S-37839 would be approximately 8 million gallons.

Mitigation Actions under State and Federal Law
OAR 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, Clean Water Act, and other applicable state or federal environmental regulation. The City currently is not required to take any mitigation actions under state or federal law. The City understands that increased withdrawals through an expanded or new diversion structure on the Clackamas River will require state and federal permits, and that permit approvals will likely be conditioned to require mitigation.

New Water Rights
OAR 690-086-0170(8)

Under OAR 690-086-0170(8), an analysis of alternative sources of additional water is required if acquisition of new water rights will be necessary within the next 20 years to meet the projected water demands. At this time, the City does not intend to acquire new water rights to meet demands within the next 20 years, so the provisions of this section are not applicable.

APPENDIX A

Local Government Letter

December 30, 2009

Addressee, Title
Organization Name
Mailing Address
City, State Zip Code

Re: Water Management and Conservation Plan for the City of Lake Oswego

Dear Mr./Ms. xxxxxx:

Transmitted herewith is a copy of the City of Lake Oswego's Final Draft Water Management and Conservation Plan for your review and comment as it pertains to your agency's Comprehensive Land Use Plan.

The City has prepared this plan to fulfill the requirements of Oregon Administrative Rule (OAR) Chapter 690, Division 86 of the Oregon Water Resources Department (OWRD). As you review our draft plan, I want to bring to your attention one of the plan elements planned for implementation once the plan is approved by OWRD. It is described on page 3-10 and requires wholesale customers receiving water from the City or special water service districts providing water to Lake Oswego citizens to submit an annual water use report. As described, the information asked for in each annual report will assist the City in better understanding the water use characteristics of "non-city customers" who receive some portion of their annual water supply from Lake Oswego and those City customers who receive their water service from a provider other than the City. I welcome your thoughts and concerns on this particular aspect of our draft plan.

Please provide written comments to me within 30 days from the date of this letter. If the plan appears consistent with your agency's Comprehensive Land Use Plan and acceptable as written, a letter response to that effect would be appreciated. You may send your comments to me at the address on this letterhead or email them to me directly at: jkomarek@ci.oswego.or.us.

If you have any questions, please feel free to contact me at 503.697.6588.

Thank you,

Joel B. Komarek, P.E.
Project Director

C: Conservation Plan Project File

/jbk

APPENDIX B

Intergovernmental Agreements for Wholesale Water Supply

Appendix B

INTERGOVERNMENTAL AGREEMENTS FOR WHOLESALE WATER SUPPLY

Contract Supplier	Supply Source	Contract Purchaser	Date Contract Executed	Duration of Contract	Termination Provisions	Rate Adjustment Provisions	Supply Terms	Current Contract Price/ccf	Notes:	Emergency Contacts
City of Lake Oswego	Clackamas River	City of Portland/Arrowood (Stephenson High Zone)	1/8/1985	Perpetual: 5-year initial term, subsequent 5-year periods.	Written notice to either party by 1/30 after initial term. Effective 6/30 of same year.	60-day written notice of rate adjustment required.	Surplus supply to max. 70 connections at Pt. 'A' + emergency supply only to Pt. 'B'.	$0.93 (Non-Peak), $1.00 (Peak).	Pt. 'A' located south of terminus of 34th Ave. and Arrowood Dr. Pt. 'B' located at intersection of Hidalgo and Bolivar. (See water atlas pgs. 1 and 3).	Anne Conway Principal Financial Analyst Portland Water Bureau 503-823-7468
City of Lake Oswego	Clackamas River	City of Portland/ Alto Park	4/12/1971	Perpetual. 5-year initial term, subsequent 5-year periods.	Written notice to either party after initial term 1-year notice by City, 60-day notice by purchaser.	60-day written notice of rate adjustment required.	Surplus supply only. 14,000 cf minimum purchase/month.	$0.88 (Non-Peak), $0.95 (Peak).	Intertie is located behind the Park Place Condominiums approximately 500 feet west of 29th Ave. Alto Park Water District assigned original water supply contract to City of Portland on March 1, 1973.	Anne Conway Principal Financial Analyst Portland Water Bureau 503-823-7468
City of Lake Oswego	Clackamas River	City of Rivergrove/Rivergrove Water District.	2/8/1984	Perpetual	Written notice to either party by 1/30. Effective 6/30 of same year.	Amendment of terms by mutual consent only.	Emergency supply only.	$0.62 per cef.	Annual water use report required for City residents served by District. Interties: SW 65th Ave./McEwan Rd. and Centerwood St. at District/City boundary.	D.J. Ezell General Manager - 503-635-6041;dj@rivergrovewater.com; Jim Helton, (MSA): District Engineer 503-225-9010
City of Lake Oswego	Clackamas River	Skylands Water Company	4/5/1960	Perpetual	none	Written notice of rate adjustment required. Effective upon receipt of notice by purchaser.	None.	$0.81 (Non-Peak), $0.85 (Peak).	Connection point/supply at Bergis Reservoir. Pumps controlled from Skylands reservoir level.	Dick Dechaine: Supt. 503-636-0424(H); 503-310-1245 (M); Don Murray District Engineer 503-670-9007
City of Lake Oswego	Clackamas River	City of Tigard	7/1/1983	Perpetual: 10-year. Initial term. 5-year. Periods thereafter.	Written notice by either party by 7/30 of year before effective date.	90-day written notice of rate adjustment required.	Surplus supply. Minimum annual purchase of $75,000.	$0.87 (Non-Peak), $0.92 (Peak).	Bi-directional intertie at Tigard's Bonita Rd. PS. 16-inch supply to Tigard/10-inch supply to LO from Tigard 410' service level. Metered both directions.	Dennis Koellermier: PW Dir. 503-718-2596; Richard Sattler PW 503-718-2609(w); 503-920-1968(m)
City of Lake Oswego	Clackamas River	City of Tualatin	8/22/1988. Amended payment provision on 2/15/2000	Perpetual: 1-year terms (8/1-7/31).	Written notice by either party 2 years before effective date.	n/a	Emergency supply only.	Repayment at current rate charged in-city customers. ($0.83/ccf - 7/1/00 to 6/30/04)	Hydraulic constraints don't allow Tualatin supply to LO. Intertie at SW 65th and McEwan Rd.	Mike McKillup: City Engineer 503.692.2000; Dan Boss: Operations Director 503.691.3090
City of Lake Oswego	Clackamas River	Glenmorrie Water District.	2/8/1984	Perpetual:	Written notice by 1/30. Effective 6/30 of same year.	Written notice of rate adjustment required. Effective upon receipt of notice by purchaser.	Surplus supply only.	$0.81 (Non-Peak), $0.85 (Peak).	Supplied from Bergis system through one-way intersystem connection and 6-inch turbine meter located near Cherry Lane and Chapin Way.	Dick Dechaine: Supt. 503-636-0424 (H); 503-310-1245 (M); Don Murray: District Engineer 503-670-9007
City of Lake Oswego	Clackamas River	Lake Grove Water District	7/25/1975	Perpetual: 2- year initial term. Subsequent 2-year terms.	Written notice to either party 6 months in advance of termination date.	60-day written notice of rate adjustment required.	Surplus supply only.	$0.81 (Non-Peak), $0.85 (Peak).	Supplied from Touchstone system through 8-inch intersystem connection at Carmen Drive/Davis Lane intersection. 50% of annual LGWD demand supplied by LO.	John Goodwin: Distribution; 503-636-1617; Christine Toops, Billing Department.
City of Lake Oswego	Clackamas River	City of West Linn/South Fork Water Board	12/3/2003	Perpetual	Written notice to either party 36 months in advance of termination date.	As necessary and mutually agreed.	Emergency Supply - mutual consent of exec. Officer; Non-emergency < 2wks by mutual consent of exec. Officer; Non-emergency > 2 wks requires 30-day notice to West Linn.	$0.58	Bi-directional intertie. Supply to LO via O.C. 490' service level. Supply to West Linn via LO WTP and West Linn intertie PS located on Old River Rd. S. of Kenthorpe.	Jim Whynot: PW 503-880-9196 (m); 503-656-6081 (w)
City of Portland via LGWD	Bull Run	City of Lake Oswego/Blackhawk Subdivision (14 connections)	6/21/89; Amended 8/7/89	Perpetual	12-month advance notice by either party prior to termination.	Written notice of rate adjustment required. Effective upon receipt of notice by purchaser.	LGWD supply to LO for Blackhawk Subdivision through 8-inch and 2-inch combo turbine meter.	COP supply: $0.68/ccf; LO supply. $0.83/ccf	Either supply incurs transport fee of $0.03/ccf. Interconnect off Waluga Dr. west of Hartford Pl.	

APPENDIX C

Curtailment Ordinance

ORDINANCE NO. 2517

AN ORDINANCE OF THE LAKE OSWEGO CITY COUNCIL AMENDING THE LAKE OSWEGO CODE TO IMPLEMENT THE CITY'S WATER MANAGEMENT AND CONSERVATION PLAN.

Whereas, the City of Lake Oswego owns and operates a municipal water supply system; and

Whereas, Oregon Administrative Rule 690-086-0125 and ORS 537.230(2) requires the City to adopt and implement a Water Management and Conservation Plan as a condition of the extension of water permits held by the City; and

Whereas, OAR 690-086-0130 and 690-086-0150 address the requirements of the Water Management and Conversation Plan; and

Whereas, LOC 38.08.109(2) currently authorizes the City Council to enact a resolution to institute a program of water rationing or conservation,

Whereas, Resolution No. 08-27 adopts a Water Management and Conservation Plan, and

Whereas, the City Council elects to comply with the requirements of OAR 690-086-0125 by enacting an ordinance;

Now Therefore, the City of Lake Oswego ordains as follows:

Section 1. Subsection (2) of LOC 38.08.109 is hereby stricken in its entirety.

Section 2. Article 38.08 of the Lake Oswego Code is hereby amended by adding Section 38.08.110 as follows:

Section 38.08.110

1. Purpose. The purpose of this Section is to establish water curtailment measures that shall be implemented by the City at such time as necessary to reduce demand during water supply shortages. Such shortages may be caused by prolonged drought, system failure from unanticipated events (flooding, landslides, earthquakes and contamination), or mechanical or electrical equipment failure, or other events.
2. Definitions: For the purposes of this Section, certain terms and words are defined as follows: words used in the present tense include the future, the singular tense includes the plural and vice-versa; the word "shall" is always mandatory; the word "may" is discretionary. The definition of the term shall be as defined below, unless the context of the term indicates otherwise. The following terms shall mean:

a. Residential Customer: water utility service provided by the City of Lake Oswego to dwellings (single-family, multi-family).

b. City Manager: The duly appointed City Manager of the City of Lake Oswego, or the City Manager's designee.

c. Non-residential Customer: water service provided for use other than to Residential Customers.

3. Declaration of Water Shortage and Curtailment Stages.

a. The City Council hereby declares the necessity to implement the water curtailment measures by the stages described in subsection 4 below when the initiating conditions for each stage exist, as described in the Lake Oswego Water Curtailment Plan The City Manager or City Engineer is authorized to declare a Water Curtailment Stage 1. The City Manager is authorized to declare an emergency, initiating Water Curtailment Stage 2 or Stage 3. The City Council is authorized to declare an emergency, initiating Water Curtailment Stage 4 or Stage 5.

b. Once a water curtailment stage is in effect, the measures required under the declared water curtailment stage shall remain in effect until either the party that declared the emergency initiating the Curtailment Stage declares that the emergency is ended, or the City Council may rescind an emergency Water Curtailment Stage declaration issued by the City Engineer or the City Manager upon a finding that demonstrates the emergency no longer exists, or that the original declaration was made in error.

4. Water Curtailment Stages; Water Curtailment Measures Required. Upon the declaration of an emergency, initiating a Water Curtailment stage pursuant to Subsection (3), all persons, including Residential and Non-residential Customers of the City's Water Utility, shall comply with the following requirements:

a. Stage 1 – Water Shortage Alert.

(i). Voluntary reduction of water consumption; no prohibited actions.

b. Stage 2 – Serious Water Shortage.

(i). Swimming pools and ponds shall not be filled or refilled.

(ii). No pressure washing of roofs, decks, or home siding unless such uses were contracted for prior to implementation of this Stage 2 and it is demonstrated to the City Manager's satisfaction that it is necessary for painting, repair, remodeling, or reconstruction of residences or accessory structures.

(iii). No hosing or washing of sidewalks, driveways, or patios.

(iv). Dust control shall not utilize water (spraying of water over dirt) unless it is shown to the City Manager's satisfaction that water used for dust control is needed to meet public health or safety requirements, i.e., fire, sanitation hazards, or air quality standards mandated by the Oregon Dept. of Environmental Quality.

c. Stage 3- Severe Water Shortage.

(i). All requirements of Stage 2 above.

(ii). Unless exempt below and as limited below, landscape irrigation, is permitted only as follows:

(A) Residential Customers

(1). 8 p.m. Sunday until 10 a.m. Monday;

(2). 8 p.m. Wednesdays until 10 a.m. Thursdays; and

(3). 8 p.m. Fridays until 10 a.m. Saturdays.

(B). Non-Residential Customers

(1). 8 p.m. Saturday until 8 a.m. Sunday;

(2). 8 p.m. Monday until 8 a.m. Tuesdays; and

(3). 8 p.m. Tuesday until 8 a.m. Wednesday.

(4). 8 p.m. Thursday until 8 a.m. Friday.

Exemptions:

1. Grass, turf or landscaping less than 1-year old.
2. Grass or turf is part of a commercial sod farm.
3. Grass or turf area are within a "high use" athletic field used for organized play.
4. Grass or turf areas are used for golf tees or greens.
5. Grass or turf areas are part of a part or recreation area declared by the Council by resolution to be of particular significance and value to Lake Oswego.

Notwithstanding the exceptions and prohibitions above, any landscape irrigation shall be limited to only that necessary to maintain plant health.

(iii). No hosing or washing of paved surfaces.

(iv). No water shall be applied on the premises in such a manner, rate, and quantity such that it runs onto adjacent property, parking lots, or public rights-of-way (including streets, sidewalks, pathways).

(v). No washing of vehicles other than at a car wash that recycles water used in the car wash process.

(vi). No filling or adding any water to pools, ponds, fountains or water features.

(vii). No person shall suffer or permit water leaks after reasonable opportunity to discover, investigate, and repair. Each day that that a leak is suffered or permitted shall constitute a separate violation.

(viii). No operation of fountains except those using re-circulated water.

(ix). No washing of roofs, decks, or home siding unless such uses are solely to abate a fire hazard.

d. Stage 4 - Critical Water Shortage.

(i). All requirements of Stage 2 and Stage 3, above, except as further limited or prohibited below.

(ii). No landscape irrigation.

(iii). No washing, wetting down, or sweeping sidewalk, walkways, driveways, parking lots, open ground or other hard-surfaced areas with water.

(iv). No washing of any vehicle, unless the City Council finds that the public health, safety, and welfare is contingent upon frequent vehicle cleaning, such as solid waste transfer vehicles, vehicles that transport food and other perishables, or as otherwise required by law.

e. Stage 5 – Emergency Water Shortage

(i). All water use is prohibited, except as necessary for human consumption and sanitation needs.

6. Enforcement.

a. A violation of any provision of this Code is a civil violation and subject to fine.

b. Enforcement of this Section may be pursuant to the provisions of LOC 34.04.101 to 34.04.145.

c. Upon request of the City Manager, the City Attorney may institute an appropriate action in any court to enjoin any continuing violation of any provision of this Section.

d. Failure to pay a fine assessed by a court of competent jurisdiction shall result in discontinuance of service.

e. The rights, remedies and penalties provided in this subsection are cumulative, are not mutually exclusive, and are in addition to any other rights, remedies and penalties available to the City under any other provisions of law.

Section 3. Severability. The provisions of this ordinance are severable. If any portion of this ordinance is for any reason held to be invalid, such decision shall not affect the validity of the remaining portions of this ordinance.

Read by title only and enacted at the regular meeting of the City Council of the City of Lake Oswego held on the 16th day of September, 2008.

AYES: Mayor Hammerstad, Turchi, McPeak, Groznik, Hennagin, Jordan, Johnson

NOES: none

ABSTAIN: none

EXCUSED: none

Judie Hammerstad

Judie Hammerstad, Mayor

Dated: September 16, 2008

ATTEST:

Robyn Christie, City Recorder

APPROVED AS TO FORM:

David D. Powell
City Attorney

APPENDIX D

Tigard-Lake Oswego Intergovernmental Agreement

INTERGOVERNMENTAL AGREEMENT REGARDING WATER SUPPLY FACILITIES, DESIGN, CONSTRUCTION, AND OPERATION

DATED August 6, 2008

BETWEEN

THE CITY OF LAKE OSWEGO

AND

THE CITY OF TIGARD

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LIST OF EXHIBITS

This Intergovernmental Agreement Regarding Water Supply Facilities, Design, Construction, And Operation is dated _____, 2008 (the "Agreement"), by and between the City of Lake Oswego ("Lake Oswego"), an Oregon municipal corporation and the City of Tigard ("Tigard"), an Oregon municipal corporation. Lake Oswego and Tigard may also be referred to individually herein as a "Party" and collectively as the "Parties."

RECITALS

WHEREAS, the City of Tigard operates a municipal water supply utility under ORS 225, with transmission, storage and distribution facilities to deliver potable water to Customers within the area of the Cities of Tigard, King City, Durham, and the remainder of the Tigard Water District;

WHEREAS, the City of Lake Oswego operates a municipal water supply utility under ORS 225, which treats and distributes potable water to Retail Customers and sells water at wholesale to the Lake Grove Water District, the River Grove Water District, Skylands Water Company, Glenmorrie Cooperative Association and Alto Park Water District (the "Existing Wholesale Customers");

WHEREAS, Lake Oswego has existing water intake and water treatment facilities, transmission, storage facilities (hereinafter "Supply Facilities") together with distribution facilities and water rights;

WHEREAS, the Supply Facilities require capital improvements to repair and replace existing assets and to construct new improvements, all at a significant cost;

WHEREAS, Tigard desires to acquire an ownership interest in the Supply Facilities to obtain a permanent source of raw water and treatment facilities for potable

water and also needs to make capital improvements for storage and transmission facilities; and

WHEREAS, the Parties jointly funded a study by Carollo Engineers known as the Lake Oswego and Tigard Joint Water Supply System Analysis dated July, 2007 ("Carollo Report"); and

WHEREAS, the Parties agree that, based upon the Carollo Report, there are significant benefits by jointly taking action to perfect existing water rights, construct, repair, replace, expand and otherwise improve the Supply Facilities infrastructure necessary to supply that water to the Parties and to realize or mitigate potential environmental impacts and benefits; and

WHEREAS, prior to the execution of this Agreement, the Parties worked in a collaborative, open, and participative manner to select an operating framework that best serves the needs of the Parties, and this Agreement incorporates those precepts;

WHEREAS, the Parties agree that creation of this Intergovernmental Agreement and investment by the Parties shall provide the Parties with stability and local control over the source of supply, build ownership equity in the Clackamas River System, provide for flexibility in the use and allocation of water, provide for flexibility for management of water resources for enhanced costs and operation efficiency, create opportunities to share and trade staff resources, expertise and technological capabilities, and being fully advised,

NOW, THEREFORE, in consideration of the mutual covenants and agreements contained herein, the Parties agree as follows:

ARTICLE I
DEFINITIONS

1.1 Definitions

As used in this Agreement, the following terms when capitalized shall have the following meanings:

1.1.1 *Agreement* – this Agreement

1.1.2 *Book Depreciation Life* – the years used to depreciate an asset in accordance with Generally Accepted Accounting Principles.

1.1.3 *Capacity* – capability from the various components of the Supply Facilities to produce or deliver water; measured in cubic feet per second (cfs), gallons, gallons per day (gpd), gallons per minute (gpm), million gallons per day (mgd), or other comparable measurement and available based on current operating conditions consistent with generally accepted engineering and operating practices.

1.1.4 *City of Lake Oswego* – an Oregon Municipal Corporation in Clackamas, Multnomah, and Washington Counties, Oregon.

1.1.5 *City of Tigard* – an Oregon municipal corporation in Washington County, Oregon.

1.1.6 *Clackamas River Intake Pump Station* – an existing structure comprised of a reinforced concrete building and all equipment and materials contained therein or any future expansion, modification or replacement thereof that allows water to be withdrawn from the Clackamas River and pumped through the raw water transmission line to the Water Treatment Plant Facilities. The Clackamas River Intake Pump Station ownership and its

agreed value are more fully described in Exhibit 1 which, exhibit may be updated and revised by resolution of the Parties.

1.1.7 *Curtailment Plan* – A written plan developed for curtailment of water service in accordance with OAR Chapter 690 Division 86 rules.

1.1.8 *Demand* – the amount of water used or projected to be used by a Party and imposed on the Supply Facilities to serve a Party's Retail Customers its Existing Wholesale Customers and ultimate service area measured in cfs, gallons, gpd, gpm, mgd, or other appropriate measurement. The basis for determining Demand may be waived or modified by the Parties due to unusual circumstances such as a fire, emergency, etc.

1.1.9 *Depreciated Replacement Cost Value* – the value calculated in the current year by multiplying the original cost of the asset times the index in the Engineering News Record Construction Cost Index 20-City Average, 1913=100 as published in the Engineering News Record for the year of evaluation. The products shall be divided by Engineering News Record Construction Cost Index 20-City Average, 1913=100 as published in the Engineering News Record for the year placed in service. The result shall then be depreciated from the year placed in service to the year of evaluation using the Book Depreciation Life. The formula* is expressed as follows:

$$DRC = (CC*ENR^{e} / ENR^{o}) *(1-(Y^{e}-Y^{o})/BDL))$$

Where:

DRC = Depreciated Replacement Cost Value.

CC = Construction cost.

ENR^e = Engineering News Record Construction Cost Index for the year of evaluation.

ENR^o = Engineering News Record Construction Cost Index for the year placed in service.

Y^e = Year of evaluation.

Y^o = Year placed in service.

BDL = Book Depreciation Life.

1.1.10 *Existing Wholesale Customers* – the Lake Grove Water District, River Grove Water District, Skylands Water Company, Glenmorrie Cooperative Association, and Alto Park Water District who are served at wholesale by Lake Oswego as if they were a Retail Customer of LO under the terms and conditions of this Agreement. The Cities of King City and Durham and the Tigard Water District are contractually served by Tigard and for purposes of this Agreement shall be defined as existing wholesale customers. The parties recognize that the status of these entities are contractual and may change over time as determined by the affected Party to this agreement and the existing wholesale customer.

1.1.11 *Fiscal Year* – the time period as defined under ORS 294.311(17).

1.1.12 *Local Government Investment Pool (LGIP)* – The Oregon State Treasurer's Local Government Investment Pool, subject to regulatory oversight by the Oregon Secretary of State and administered by the Oregon State Treasury.

1.1.13 *Municipal Bond Index* – The rate as published by the State of Oregon Treasury Department entitled "Oregon Bond Index – Oregon A Rated 20 Year" for the first date after the beginning of the fiscal year. Should said rate cease to be published, then the Parties shall determine another comparable index. The date used for determination of the rate may be modified by the Parties in the event of unusual market circumstances (such as declaration of war by the United States).

1.1.14 *Planning Forecast* – the document submitted by the Parties in accordance with Article 8.2 which shows the Demands of each Party to be imposed on the Supply Facilities and the Capacity owned or leased by each Party in such facilities.

1.1.15 *Project* – The design, permitting and construction of new and expanded Supply Facilities, as generally described in the City of Lake Oswego and Tigard Water Service Area Joint Water Supply System Analysis dated July, 2007 by Carollo Engineers ("Carollo Report") to provide 32 million gallons per day capacity by 2016 (the Initial Expansion) with the capability to further expand up to 38 million gallons (Longterm Expansion) per day when it appears the water demands of the Parties will exceed 32 mgd. At the completion of Initial Expansion, the Lake Oswego allocation shall be 18 million gallons per day and the Tigard allocation shall be 14 million gallons per day.

1.1.16 *Property* – Property shall be parcels of real property owned in fee simple, by easement or other interest over, under or upon which the supply

Facilities are or will be located as part of the Initial Expansion or Long Term Expansion. Property currently held by Lake Oswego will remain in the name of Lake Oswego until completion of the Initial Expansion. Until completion of the Initial Expansion, Tigard shall have an equitable interest as if it were a vendee under a land sale contract. Additional properties acquired as part of the Initial Expansion or the Long Term Expansion shall be acquired as tenants in common in proportion to the Parties' allocation of capacity.

1.1.17 *Retail Customers* – A user within the Party's service area boundary to which users may be added from time to time by annexation, extra-territorial extension of service, merger and/or consolidation or by intergovernmental agreement among the Parties pursuant to ORS 190. A municipal corporation or other entity, which purchases water for resale, shall not be considered a Retail Customer.

1.1.18 *Service Area* – The existing and future service area for each Party as identified in the Carollo Report, as set forth on Exhibit 2, and as may be modified by the Parties or pursuant to Section 17.8.3 of this Agreement.

1.1.19 *Summer Period* – June 1 through October 31.

1.1.20 *Supply Facilities* – the facilities utilized by the Parties identified in the Carollo Report consisting of Water Treatment Plant Facilities, Transmission Facilities, Water Storage Facilities, and other facilities necessary for treatment and conveyance of potable water to the Parties. A map of the Supply Facility components is provided in Exhibit 3, which

exhibit may be updated and revised by resolution of the Parties. The map is for illustrative purposes only and shall not be considered a legal description of the Supply Facilities

1.1.21 *Surface Water Rights* – those water rights held by Lake Oswego registered with the State of Oregon Water Resources Department, which allow for diversion of water for use at the Water Treatment Plant Facilities. The Surface Water Rights are more fully described in Exhibit 4, which exhibit may be updated and revised by resolution of the Parties.

1.1.22 *Transmission Facilities* – the raw water transmission line connecting the Clackamas River Intake Pump Station to the Water Treatment Plant Facilities and the finished water transmission line connecting the Water Treatment Plant Facilities to Lake Oswego's Waluga Reservoir as identified in the Carollo Report. The Transmission Facilities, ownership and their agreed value are more fully described in Exhibit 1 which, exhibit shall be updated and revised by resolution of the Parties.

1.1.23 *Water Treatment Plant Facilities* – the pumping stations and treatment plant, which treat raw water and produce potable water for conveyance by the Transmission Facilities. The Water Treatment Plant Facilities, ownership, and their agreed value are more fully described in Exhibit 1, which exhibit shall be updated and revised by resolution of the Parties within 30 days after the execution of this Agreement, following completion of an updated appraisal.

1.1.24 *Water Storage Facilities* – the existing Waluga Reservoir which receives potable water from the Water Treatment Plant Facilities as conveyed through the Finished Water Transmission Facilities and any future expansion, modification or replacement thereof. The Water Storage Facilities, ownership, and their agreed value are more fully described in Exhibit 1, which exhibit shall be updated and revised by resolution of the Parties.

1.1.25 *Winter Period* – November 1 through May 31.

1.2 Interpretation

In this Agreement, unless a clear contrary intention appears: (a) reference to any person includes such person's successors and assigns but, if applicable, only if such successors and assigns are permitted by this Agreement, and reference to a person in a particular capacity excludes such person in any other capacity; (b) reference to any gender includes each other gender; (c) reference to any agreement (including this Agreement), document or instrument means such agreement, document or instrument as amended or modified and in effect from time to time in accordance with the terms thereof and, if applicable, the terms hereof; (d) reference to any Article, Section, Schedule or Exhibit means such Article, Section, Schedule or Exhibit to this Agreement, and references in any Article, Section, Schedule, Exhibit or definition to any clause means such clause of such Article, Section, Schedule, Exhibit or definition; (e) "hereunder," "hereof," "hereto," "herein," and words of similar import are references to this Agreement as a whole and not to any particular Section or other provision hereof;

(f) relative to the determination of any period of time, "from" means "from and including," "to" means "to but excluding" and "through" means "through and including"; (g)"including" (and with correlative meaning "include") means including without limiting the generality of any description preceding such term; (h) reference to any law (including statutes and ordinances) means such law as amended, modified, codified or reenacted, in whole or in part, and in effect from time to time, including rules and regulations promulgated hereunder; and (i) "will" and "shall" are mandatory terms.

ARTICLE II
WARRANTIES AND REPRESENTATIONS OF THE PARTIES

2.1 Warranties of the Parties

The Parties hereto warrant and represent that they have the legal authority to enter into this Agreement.

2.2 Approval of the Governing Bodies

The Parties to this Agreement hereby certify that they have undertaken the necessary public procedures to approve and authorize the signatories to this Agreement to act on behalf of the Party executing this Agreement.

2.3 Obligation of Good Faith and Fair Dealing

The Parties each covenant to deal fairly and in good faith with the other to fulfill the covenants and requirements of this Agreement. Tigard has an existing water supply contract with the City of Portland that expires on July 1, 2016 unless extended. Costs of water will increase after July 1, 2016, because Portland is expected to embark on a large-scale capital improvement program and the rate to wholesale customers will increase to account for this capital construction. Also, the timing and method of withdrawal after July 1, 2016 will leave Tigard with less flexibility in extricating itself from the Portland contract. For these reasons, having the initial expansion project complete by July 1, 2016 is of paramount importance to Tigard. Lake Oswego recognizes Tigard's circumstances and agrees it will undertake its best efforts in good faith to meet this schedule for the initial expansion project.

ARTICLE III
MANAGEMENT

3.1 Managing Agency

Lake Oswego shall be the Managing Agency to manage the operation, maintenance, repair and replacement of the existing Supply Facilities and to manage the planning, design and construction of the Initial Expansion of the Project. Lake Oswego shall be the contracting agency with consultants and contractors, and the named party on permits required from local, state, and federal regulatory agencies. Lake Oswego shall have the power to a) approve contracts and change orders subject to its purchasing rules, b) take such actions reasonably necessary during an emergency and c) other such powers as may be granted by the Parties from time to time. Lake Oswego shall be responsible for conducting the day-to-day business affairs including: payment of invoices, accounting, budgeting, operation and maintenance of the Supply Facilities, planning, project management, maintaining records, and other such duties as required. Tigard shall pay its share of costs in accord with the terms and conditions of this Agreement.

3.2 Technical Committee

Each Party shall appoint two technical representatives to meet at intervals deemed appropriate for communication and coordination, and to keep the Project on schedule. The Technical Committee shall review all methods of contracting, requests for proposals, contracts, value engineering, designs, permit applications and costs. The Technical Committee will endeavor in good faith to make recommendations to the Managing Agency or Oversight Committee as the Technical Committee deems appropriate or where required by this Agreement. If

the Technical Committee cannot agree on a recommendation and is at impasse, the matter will be referred to the Oversight Committee. The Technical Committee must review and recommend to the Oversight Committee any proposal by Lake Oswego to retain an outside project manager.

3.3 Oversight Committee

Lake Oswego and Tigard shall each appoint two persons to the Oversight Committee. The members shall serve at the pleasure of the appointing Council. The Committee shall meet as deemed necessary by the Managing Agency or Technical Committee to keep the Project on schedule, but in no event less often than quarterly. The Oversight Committee shall review and the individual members of the committee shall present to their respective Councils proposed projects as identified in the Carollo Report or other proposed projects and related matters and budgets or funding requests. The Oversight Committee will endeavor in good faith to make recommendations to the Managing Agency or to the City Councils as the Oversight Committee deems appropriate or where required by this Agreement. If the Oversight Committee cannot agree by majority, then the tie vote shall be deemed a no vote so that no recommendation is made. The respective City Councils will then consider and vote on the matter. The Oversight Committee must review and approve any proposal to retain an outside project manager. Nothing herein shall be deemed a waiver of a Party's right to submit these matters to Dispute Resolution under Article XIV. The Managing Agency shall be responsible to staff and assist the Oversight Committee to comply with public meetings law and notice requirements as necessary.

3.4 Budgeting and Accounting

The Managing Agency shall prepare a budget specific to the capital and operating needs of the Supply Facilities for each Fiscal Year. The budget shall include an estimate of direct and indirect costs of personnel from either Party who are anticipated to provide services as part of the ultimately approved budget. A draft budget shall be prepared and distributed to the Technical Committee by March 1st for comment. A draft budget shall be prepared and distributed by the Managing Agency to the Oversight Committee by April 30th. The final budget must receive approval by each Party by June 30th. If any Party uses a biennial budget cycle, the dates above shall remain the same for the applicable budget preparation year and that Party shall update the budget amounts anticipated for the off year for the benefit of the other Party's budget process.

Each Party's proportionate share of the expenses of operation and maintenance of the Supply Facilities, including reserves for repair and replacements, permitting, design and construction and other expenses as may be incurred, shall be estimated, and set forth in the annual budget, and the amount estimated shall be recommended to be included as operating expenses, in each Party's individual adopted budget. If the budget includes accumulation of funds designated for a particular purpose or future use, such amounts shall be accumulated in a restricted or earmarked fund. The Managing Agency shall maintain an independent budget control procedure and provide budget reports at least quarterly to each of the Parties not later than 30 days after the end of each quarter. This report shall show

expenditures and receipts by budget item for each transaction through the last working day of the preceding quarter.

3.5 Asset Management Program

Within one year following substantial completion of the Initial Expansion, the Managing Agency shall create a thorough inventory all of the assets associated with the Supply Facilities, including physical facilities and real estate holdings. The inventory shall describe the current conditions of these Supply Facilities, their current value (replacement cost less depreciation), and repairs and replacements that may be necessary. The inventory shall include a schedule for repairs and replacement. The Technical Committee may propose policies to the Oversight Committee that guide, schedule and fund the repair and replacement of the assets and suggest amendments to the Supply Facilities Capital Improvement Program. The Oversight Committee shall then forward the draft inventory, any proposed policies and amendments to the Supply Facilities Capital Improvement Program to the Council of each Party for its approval. The program and policies shall be based on prudent utility practices and industry standards. Annually, the inventory shall be reviewed for additions and deletions.

3.6 Council Decisions

Approval by the Councils of each Party is required for:

3.6.1 Any sale, transfer, lease, exchange, or other disposition of any Property over, under, or upon Supply Facilities are located;

3.6.2 Entry to any mortgage, pledge, encumbrance or refinance of the Property or Supply Facilities;

3.6.3 Approval of any budget;

3.6.4 Approval of any nonemergency expenditure by the Managing Agency that has not previously been approved and budgeted and that exceeds the Managing Agency's authority under its purchasing rules to make the expenditure without the approval of its Council, or a capital improvement project not listed on the Supply Facilities Capital Improvement Program. If a capital improvement project has been budgeted and is part of the supply Facilities Capital Improvement Program, the Managing Agency shall be authorized to contract for all work necessarily related to deliver a complete and functioning project;

3.6.5 Approval of any decision to burden the Property or Supply Facilities with additional easements, licenses, or other encumbrances or to use the property for non-water related purposes.

3.6.6 Approval of any decision to change the use or the operation of the Property or Supply Facilities beyond adopted operational protocols;

3.6.7 Approval of the Initial Expansion or Long Term Expansion;

3.6.8 Approval of amendment of the Agreement to allow a new Party to join;

3.6.9 Approval of modification, alteration or dissolution of this Agreement;

3.6.10 Approval of a Supply Facilities Capital Improvement Program and amendments. When adopted, it will become Exhibit 5 and made part of this Agreement.

3.7 Use of Employees

To the extent that any Party uses its own employees in the performance of its duties under this Agreement, that entity shall be responsible for complying with all applicable state and federal laws and for all employment related benefits and deductions, workers' compensation premiums and pension contributions. Decisions regarding employees shall be the sole responsibility of the Party who employs him or her.

3.8 Audit, Record Keeping; Access to Records

The Managing Agency shall cause an annual audit to be conducted pursuant to the requirements of ORS 207.425, 297.455, 297.465 and 297.466. The Managing Agency shall maintain its books and records in such manner that the Supply Facilities and expenditures related thereto are separately stated and capable of review without being combined or mixed with the nonsupply facility assets.

The Managing Agency shall maintain all fiscal records relating to the Supply Facilities and Project in accordance with generally accepted accounting principles. In addition, the Managing Agency shall maintain any other records pertinent to the Supply Facilities and Project in such a manner as to clearly document the Managing Agency's performance hereunder. All such fiscal records, books, documents, papers, plans, and writings shall be retained by the Managing Agency and kept accessible as required by law.

The Managing Agency agrees that the other Party and its authorized representatives shall have access to all books, documents, papers and records of the Managing Agency which are directly related to the Supply Facilities and

Project for the purpose of making any audit, examination, copies, excerpts and transcripts.

ARTICLE IV
SYSTEM OWNERSHIP; ALLOCATION OF CAPACITY

4.1 System Ownership

Upon execution of this Agreement, Tigard shall pay Two Million twenty five Thousand, Three Hundred Sixty-One Dollars ($2,025,361.00) or such amount based on the valuation analysis set forth in Exhibits 1 and 6 to Lake Oswego, which Lake Oswego agrees to dedicate as working capital to the Project. Upon payment, Tigard shall be granted by this Agreement an equitable interest in the Supply Facilities as if it were a vendee under a land sale contract. Title shall transfer upon completion of the Initial Expansion of the existing Supply Facilities. The Parties shall each then own undivided interests in the Supply Facilities and Property. Such ownership shall be a percentage ownership in the Supply Facilities component as set forth in the exhibits in this Agreement. At the time of execution of this Agreement, the existing assets shall be valued as shown on Exhibit 1 and the contributing partner shall receive a credit for the asset value. If the current appraisals of the assets are not available at the time of execution of this Agreement, the Councils shall approve amendments to the exhibits to reflect updated valuation information when received and Tigard shall pay the difference to Lake Oswego as provided above. If the Initial Expansion is not constructed, Lake Oswego shall refund the amount of Tigard's payment to Lake Oswego plus interest at the LGIP rate within 30 days of the decision to abandon the Project and Tigard shall have no further ownership or equitable interest in the Lake Oswego Supply Facilities and Property. Tigard will execute any document required by

Lake Oswego to convey any interest Tigard may have in Lake Oswego Supply Facilities and Property.

Tigard's purchase of its percentage share of the Supply Facility assets shall be by capital contribution, mutually approved in kind contributions or payment of design, permitting and construction costs for the system expansion so that upon completion of the Initial Expansion, Tigard's contribution shall equal its percentage ownership as shown in Exhibit 7. Lake Oswego's percentage as shown in Exhibit 7 is based on its contributed assets, financial contribution to the Initial Expansion, mutually approved in kind contributions and other mutually agreed factors.

4.2 Anticipated Ownership

At the completion of the Initial Expansion, the Parties' percentage ownership shall be allocated as set forth on Exhibit7, attached hereto and incorporated by reference.

4.3 Allocation of Capacity

At the completion of the Initial Expansion, Tigard's allocation of Capacity shall be 14 million gallons of water per day, and Lake Oswego's allocation of Capacity shall be 18 million gallons per day.

ARTICLE V
PROPERTY; CREATION OF TENANCY IN COMMON

5.1 Creation of Common Ownership

Title to or easement rights to all properties over, under or upon which Supply Facilities are or shall be located (Property) shall remain in the name of Lake Oswego until the completion of the Initial Expansion. Tigard shall have an equitable interest as if it were a vendee under a land sale contract. Within 90 days following completion of the Initial Expansion, Lake Oswego will, by Warranty Deed, convey to Tigard an undivided proportionate interest as tenant in common in the Property as set forth on Exhibit 7, attached hereto and incorporated by reference. The Parties agree the Property owned by Lake Oswego as of the date of this Agreement shall be valued in 2008 dollars. Property acquired after the date of this Agreement shall be acquired proportional to the Parties' respective allocations of Capacity, according to the purchase price paid. Closing costs for the Lake Oswego transfer to Tigard shall be shared equally.

5.2 Ownership Interest/Use

5.2.1 Title to the Property held in the name of Lake Oswego until transfer shall be held in part for the use and benefit of Tigard to the extent of Tigard's interest as set forth in this Agreement. Lake Oswego water rights shall not be transferred under any of the real property transfers. Upon transfer, title to the Property shall be held in the name of each of the Parties in their respective undivided interest. The Parties agree that except as provided herein, the Property is dedicated for water supply purposes. The Parties intend that their relationship, with respect to the Property, be a tenancy in

common. A Tenancy in Common Agreement shall be executed and recorded at the time of transfer.

5.2.2 The Parties' responsibility for all maintenance, insurance and other land costs, shall be:

5.2.2.1 Until completion of the Initial Expansion and transfer of an undivided interest to Tigard, the existing Supply Facilities shall be used by Lake Oswego at its sole risk and cost to accommodate water supply uses.

5.2.2.2 Following transfer, Lake Oswego and Tigard shall be responsible for all costs related to the Property in proportion to their respective interests as set forth on Exhibit 7. Such costs shall be included in the monthly invoices under Section 7.1.4.

5.3 Covenant

The Parties declare that the Property is and shall be held, conveyed, hypothecated, encumbered, leased, rented, occupied and improved subject to the limitations, restrictions, covenants and conditions set forth in this Agreement, all of which are declared to be in furtherance of a plan established for the purpose of constructing and operating the Supply Facilities. All such limitations, restrictions, covenants and conditions are intended to run with the Property, and to inure to the benefit of and be binding upon all parties having or acquiring any right, title, interest or estate therein. Other incidental uses shall be limited or restricted to the extent they conflict with water supply purposes.

5.4 Partition

Following transfer and so long as this Agreement is in effect, no Party shall seek

or obtain through any legal proceedings a judicial partition of the Property or sale of the Property in lieu of partition, without the prior written consent of the other Party.

ARTICLE VI
DESIGN AND CONSTRUCTION OF SUPPLY FACILITIES

6.1 Preliminary Planning and Design

Tigard and Lake Oswego, by this Agreement, commit to design and construct the Initial Expansion, which shall include initially Water Treatment Plant, Clackamas River Intake Pump Station and Transmission Facilities with a design capacity of 32 mgd as generally described in the plan prepared by Carollo Engineers ("Carollo") dated July, 2007, and to achieve completion by July 1, 2016, immediately commence:

6.1.1 Participation in necessary joint planning sessions for the Supply Facilities;

6.1.2 Contribution of their proportionate share of costs of preliminary design, preliminary engineering, permitting, and other fees as necessary and as set forth on Exhibit 7, attached hereto and incorporated by reference. The Supply Facilities shall accommodate subsequent expansion up to 38 mgd (Long Term Expansion). The general configuration map of the Property attached to the Agreement as Exhibit 3 shall allow the Parties to expand the treatment plant in the future. Lake Oswego shall retain a project team for permitting, design, and construction management of the Initial Expansion of the Supply Facilities.

6.2 Permit Applications

Lake Oswego, as the Managing Agency, shall be the lead agency in negotiating required permits for construction of the Supply Facilities.

6.2.1 Lake Oswego shall be responsible to obtain all other permits such as:

6.2.1.1 Section 404 Permits under the Clean Water Act through the Division of State Lands and the Corps of Engineers;

6.2.1.2 Any permit necessary from the Oregon Division of State Lands for use of submerged or submersible lands for intake and transmission, if that is in addition to the 404 Permit;

6.2.1.3 Any permit with the Water Resources Department regarding permit extension, amendment of a Water Management and Conservation Plan, or application of water to beneficial use in the Service Areas identified in the Carollo Report;

6.2.1.4 Any permit necessary from the Oregon Department of Fish & Wildlife, the United States Department of Fish & Wildlife or the National Marine Fisheries Service through consultation; and

6.2.1.5 Any other permit required for the project.

6.2.2 Lake Oswego shall be responsible for obtaining necessary land development permits. The Parties agree that improvements imposed by the land use permitting body shall be a Project cost. Additional amenities not required by the land use permitting body shall be paid for at the sole expense of the party requesting them. Lake Oswego, in its proprietary capacity, further agrees to, in good faith, assist and support Tigard in its efforts to secure the issuance of all permits for pumping and transmission facilities from locations within the Lake Oswego City limits and to enable Tigard to provide water from the Supply Facilities to Tigard users. The Parties acknowledge, however, that this Agreement cannot bind Lake

Oswego with relation to acts or decisions occurring in its regulatory authority, including, without limitation, the exercise of its regulatory authority to issue permits.

6.3 Construction

6.3.1 *Project Management.* During construction, Lake Oswego will, as Managing Agency, convene the Technical Committee at least bi-weekly to review project schedules and performance, progress payment requests, change orders and punch list items. Tigard may attend all contractor and consultant meetings.

6.3.2 *Progress Payments.* Progress payments, during design and construction, shall be billed monthly by Lake Oswego according to the proportionate allocation of system improvement costs for individual components of the Supply Facilities as set forth on Exhibit 7. For a construction contract or contract that materially includes construction within its scope that is included in the Supply Facilities Capital Improvement Program and approved budget, the Managing Agency may award such agreements after giving prior notice to each Council of the Project Engineer's estimate. Contracts not within the foregoing description or where the bid or proposed price exceeds the Engineer's estimate by 10% may not proceed unless each Council has approved. Within 30 days of invoice from Lake Oswego, Tigard shall remit the amount due, unless disputed. Any disputed amount shall be resolved in accordance with the Dispute Resolution Procedures of Article 14 below. However, notwithstanding the

foregoing, during construction no dispute between the Parties shall cause cessation or delay of work by the contractor. If the contractor threatens to suspend or terminate work because of a dispute over nonpayment, the Parties hereto agree to make such payments to Lake Oswego to resolve contractor issues and shall expressly reserve all rights regarding the ultimate allocation of costs or obligations paid to the contractor which shall be resolved by dispute resolution.

6.3.3 *Post Construction.* Following construction, the Technical Committee shall meet as needed to review and recommend to the governing bodies on matters related to warranty or other contract performance issues.

ARTICLE VII
OPERATION AND MANAGEMENT

7.1 Supply Facilities

7.1.1 *Management.* Lake Oswego shall have responsibility as Managing Agency to manage, operate, repair and replace the Supply Facilities until such time as the Parties agree otherwise. The Managing Agency may perform work with its own forces and charge the other Party therefore or by contract with another party. Additional work or charges outside the approved budget shall require unanimous consent of the Parties.

7.1.2 *Operation and Maintenance Costs.* The costs of operation and maintenance shall be allocated between the Parties according to water delivered from the water treatment plant to each Party's connection point to their distribution systems measured in hundred cubic feet (ccf) imposed on the Supply Facilities multiplied by the operations and maintenance expense rate in $/ccf. The method for calculating the rate and water use determination of payment shall be agreed to by the Councils based on the budget and anticipated water use considering the previous 12 months' water use.

For the first year when Tigard draws water, the Parties will not have prior usage data from Tigard's use of the Supply Facilities. Therefore, the Parties agree that an estimated cost per ccf shall be determined based upon the budget and applied to all Tigard volumes with invoice on a monthly basis. At the end of the first year, actual unit costs will be calculated and reconciled as set forth in 7.1.4.

7.1.3 *Renewal, Repair and Replacement Costs.* The Parties shall budget for renewal, repair and replacement costs as provided in Section 3.4. The Parties shall make those payments as required for renewals, repair and replacement proportional to that Party's ownership interest in the Supply Facility component.

7.1.4 *Billing and Payment.* Each Party shall receive an invoice monthly from the Managing Agency representing one-twelfth of the allocated operations and maintenance budget amount for that Party. The invoice may also include required payments for renewal, repair, and replacement under Section 7.1.3 or the Managing Agency may send a separate invoice. Payment is due to the Managing Agency within 30 days of receipt of the invoice. On March 1st of each year, the Managing Agency will send an invoice calculating actual water usage as compared to estimated annualized expenditures in the budget and reconcile them. The respective Parties will pay (or receive credit for overpayment toward the next invoice) based upon this reconciliation. As soon as reasonably possible after June 30th of each year, the Managing Agency will conduct a similar reconciliation and the Parties will pay or receive credit for overpayment as appropriate on the next invoice in the new fiscal year.

7.2 Property Management.

The Parties agree that the property over, under, or upon which the Supply Facilities are constructed shall be operated and managed as follows:

7.2.1 *Duties of the Managing Agency.* The Managing Agency shall have the responsibility and authority to perform the following functions and may make decisions with respect to such matters as to the Property unless otherwise provided in this Agreement,

7.2.1.1 *Operation, Maintenance, Repair, and Replacement.* To contract for maintenance, repair and cleaning of the Property pursuant to an approved budget, contract, or other approval of the Parties as may be required by the terms of the Agreement.

7.2.1.2 *Insurance.* To obtain or renew a policy of property insurance insuring the Property against loss or damage by fire and other hazards covered by a standard policy of fire insurance with extended coverage endorsements written for the full replacement value of the Property. The Parties shall also obtain or renew a policy or policies of public liability and property damage insurance with a single limit of not less than $2,000,000. The policies shall name the Parties as co-insureds.

7.2.1.3 *Assessments.* To collect and deposit the assessments and other charges due from the Parties into an account established for the Property; to mail written notice to any Party who is more than 30 days delinquent in payment of any assessments or charges; and to mail written notice to the Parties for additional assessments whenever it appears that the funds on hand shall be insufficient to cover future expenses.

7.2.1.4 *Payment of Expenses.* To pay when due the expenses of the Property, and all other expenses or payments duly authorized by the Parties.

7.2.1.5 *Records.* To maintain complete and accurate records of all receipts and expenditures for the Parties.

7.2.1.6 *Reimbursement of Expenses.* Unless approved in writing by the Oversight Committee, no Party shall be compensated for services related to nonbudgeted matters where contingency or other funds in the approved budget are available. Otherwise, approval by each Council is required. However, a Party shall be reimbursed for out-of-pocket expenses.

7.2.1.7 *Payment of Costs.* Amounts owed by each Party for expenses related to the Property shall be invoiced as provided in Section 7.1.4.

ARTICLE VIII
SUPPLY FACILITIES

8.1 Use of Supply Facilities

The Parties shall each use the Supply Facilities in a manner consistent with prudent water utility practices and to minimize interference with each other's use of its respective share of Capacity to meet its demands. Prudent practices shall include a mutual commitment to conservation and use of water without waste implemented in each Party's Water Management and Conservation Plan. When the Initial Expansion is completed and the Parties are using the Supply Facilities, the Parties anticipate that instances of overuse of Capacity by a Party will be rare and the Parties shall resolve such instances on a case-by-case basis. If a new member is added or if a third party is supplied by the Supply Facilities so that additional demands or capacity are placed thereon, then, unless caused by system operation conditions not caused by the overusing party, any use of 10% or greater by either Party (or third party user) than its share of Capacity for two consecutive years or three out of five years shall be overuse. The overusing Party (or third party user) shall compensate the other party at a lease rate as may be fairly and equitably agreed upon by the parties. In lieu of the above lease rate or in combination with it, the Parties may agree to construct the Long Term Expansion of the Project or reduce demand so that overuse shall cease to occur.

8.2 Mutual Forecast Submittal

In order to make timely, reasonable and prudent judgments concerning meeting respective demands for capacity, the need to lease capacity, the ability to lease capacity, and the terms and conditions of any such Lease, the Parties shall each

submit to the other commencing February 1, 2016 and February 1 of each fifth year thereafter, a 10-year planning forecast. The planning forecast shall set forth the respective projected water demands, capacity to serve that demand, and identify any deficiencies in capacity by year for the 10-year period. Demand shall include any sale of water from capacity agreed to or reasonably anticipated within the ten-year time frame. The capacity requirement for the Supply Facilities shall consist of the average of five consecutive days containing the highest average peak day demands (mgd) imposed by the Parties, for the summer period of May 15 to October 31. The Parties shall agree on an appropriate course of action as they deem reasonably available and prudent, under the forecasted circumstances, including, but not limited to, leasing capacity from one to the other, both within and without the timeframe of such planning forecasts.

8.3 Surface Water Rights

Surface Water Rights shall remain in the name of Lake Oswego. By execution of this Agreement, Lake Oswego agrees to hold these permits or certificates for the benefit of Tigard and Lake Oswego to the extent of the rights of each under this Agreement. Development and beneficial use by the Parties of water authorized in the Surface Water Rights of Lake Oswego, but undeveloped as of the date of this Agreement, shall accrue to the benefit of all Parties, to the extent of their rights under this Agreement, without regard to ownership.

8.4 Water Treatment Plant Facilities

Except during a curtailment event for any reason, each Party shall have or obtain Capacity in the Water Treatment Plant Facilities, to serve the Demand of the Party

during the Summer Period and the Winter Period up to the respective allocations. The Capacity requirement for Water Treatment Plant Facilities shall consist of the average of the five (5) consecutive days containing the peak day demand (mgd) imposed on the Supply Facilities by the Party for each Summer Period and Winter Period. Capacity in the Water Treatment Plant Facilities may be obtained by purchase of excess existing Capacity, capacity expansion of the Water Treatment Plant Facilities and/or leasing of Capacity from another Party.

8.5 Transmission System

The Parties agree to maximize the use of the existing Transmission System for the benefit of the Parties before construction of new transmission facilities.

The Parties have agreed on connection points for delivery of water from the Transmission System as set forth in Exhibit 3, which exhibit may be updated and revised by resolution of each Party's Council. To the extent that a Party needs additional Capacity in the Transmission System, the Parties agree to sell or lease available Capacity in the Transmission System prior to construction of new transmission facilities. When expansion of the Transmission System is required, the Parties shall follow the procedures as set forth in Article 9.

8.6 Finished Water Storage

The Parties agree to construct shared storage facilities where efficient and economic for both Parties. Notwithstanding this provision, each Party shall construct and operate separate adequate finished water storage within its distribution system to meet their respective operating and emergency conditions as set forth in the Operations Manual as required under Article 12. To the extent

that a Party cannot do so, it may make a request to the other Party for supplemental storage. If the Party providing supplemental storage agrees to provide such storage, then the Party receiving such supplemental storage shall compensate the other Party as mutually agreed.

ARTICLE IX
EXPANSION RIGHTS AND REQUIREMENTS

9.1 Expansion Requirements

The Parties agree that use of the Supply Facilities by the Parties should be accomplished first by utilizing the Capacity in the Supply Facilities to serve the needs of the Parties. The Supply Facilities should be expanded only after the Parties are projected to be using all Capacity, within a reasonable planning horizon or at such other times as the Parties deem appropriate. In determining the appropriate time to begin expansion of the Supply Facilities, the Parties shall consider the time required to provide for environmental reviews, design, permits and construction. Therefore, the Parties agree to lease Capacity to another Party as provided for in Article 10 to reasonably and prudently defer capital improvements and costs thereof.

9.2 New Surface Water Rights and Expansion

The Parties agree that finding opportunities to acquire new water rights (surface or ground) may be of great significance to their long range needs. This may include the purchase of existing Surface or Ground Water Rights or application for permits for surface, ground or stored water rights. The Parties agree that new sources shall be acquired jointly in proportion to the Party's ownership interest in the Supply Facilities. If a Party elects not to participate in the acquisition of additional water, the other Party may proceed individually.

9.3 Expansion Rights in the Supply Facilities

The Parties shall use reasonable and prudent utility standards in determining as to when and to what size the Supply Facilities should be expanded. Such

determination shall take into consideration the Demand requested by the Parties, the Capacity of the Water Supply Facilities, prudent utility planning standards and the available Surface Water Rights, and Transmission System owned or capable of being leased or expanded by the Parties. Based on the Planning Forecast of Section 8.2, a Party shall provide written notice to the other Party of its desire to expand the Supply Facilities. The Parties shall place the proposed project on the Capital Improvement Program. The intent of the Parties is to place the proposed project on the CIP for a period of five years. In the third year of the CIP, the Parties shall each decide whether to accept or reject participation in the expansion. Notice by a Party to participate in an expansion shall be in writing and specify the percent participation in the expansion. Each Party shall have the right to participate in the expansion in at least the same percentage level as the Party's percent ownership in the Supply Facilities at the time of the proposed expansion. A party may proceed individually if the other elects not to participate so long as the non-participating Party is held harmless from financial obligation.

9.3.1 *Long Term Expansion of Water Treatment Plant.* Notwithstanding Section 9.3 on expansion of the Supply Facilities, the Parties recognize that Lake Oswego has or will contribute to design and construction of Supply Facility components to achieve capacity of up to 38 mgd. If either Party proposes such Long Term Expansion of the Treatment Plant, Lake Oswego will determine if it wishes to participate and the amount of Capacity it desires, which may be the entire expansion amount. Lake Oswego will notify Tigard of its decision, which shall be conclusive. Depending upon Lake Oswego's

decision, the Parties will then negotiate a Project Agreement for the Long Term Expansion, which shall specify, among other things,

a. whether all or any portion of the expanded capacity is sold to Tigard; or

b. whether Lake Oswego builds the expanded capacity with its funds and leases the capacity to Tigard upon such terms and conditions as the Parties agree; or

c. whether Tigard builds the expanded capacity with its funds subject to Lake Oswego's option to buy back all or part of the expanded capacity upon three years' written notice at the depreciated replacement cost of the expansion plus interest at the Municipal Bond Index from the date of substantial completion; and

d. Such other mutually agreeable terms including adjustment of ownership interests in other Supply Facility components to match treatment plant capacity allocations of the Parties.

9.4 Other Assets

There may arise other improvements which do not directly in and of themselves, provide for expansion of the Supply Facilities. In such circumstances, the Parties shall mutually determine the appropriate financial participation by each of the Parties. They shall consider the purpose for the construction of the asset and the benefits to be received by each of the Parties from the asset in determining the financial participation requirement of each. A party may proceed individually if the other elects not to participate so long as the non-participating Party is held

harmless from financial obligation.

9.5 Bonita Road Pump Station

Tigard's Bonita Road Pump Station is or will be capable of providing water from Tigard to Lake Oswego if necessary. The Parties acknowledge this is beneficial to Lake Oswego in those circumstances, but the frequency is difficult to predict. If this Pump Station is used for the benefit of Lake Oswego as the Parties agree, Lake Oswego shall pay Tigard's costs to supply water, including Tigard's costs to purchase water from other entities, as if it were a short-term lease. Tigard will invoice Lake Oswego on a monthly basis in such circumstances.

ARTICLE X
LEASING

10.1 Leasing

As provided for in Article 8, the Parties shall lease to the other Capacity in the Surface Water Rights and Supply Facilities to the extent available according to the planning forecast.

10.2 Purpose

The purpose of this Article is to acknowledge the rights of the Parties to lease from each other the unused portion of their respective 14 mgd and 18 mgd allocations of the total 32 mgd Capacity of Initial Expansion to be constructed, to establish the conditions under which such leasing may occur and to acknowledge the right to lease future capacity from each other based on future expansion of the Supply Facilities depending upon conditions and circumstances then and there existing and when future shares of capacities are known. This section is not intended to limit the Parties from otherwise agreeing on leasing of supply capacity to each other. If the Supply Facilities are expanded to 38 mgd, these lease provisions shall apply to the second increment of capital improvement.

10.3 Right to Lease

Lake Oswego shall have the right to lease to Tigard and Tigard to lease from Lake Oswego such unused capacity of its 18 mgd as may be determined by Lake Oswego to be reasonably available and prudent to be leased to Tigard pursuant to section 8.2 or as they may otherwise agree. Tigard shall have the right to lease to Lake Oswego and Lake Oswego to lease from Tigard the unused capacity portion of its 14 mgd capacity as may be determined by Tigard to be reasonably available

and prudent to be leased to Lake Oswego pursuant to section 8.2 or as they may otherwise agree.

10.4 Term

The term of any lease for Supply Facilities shall be for a minimum of one (1) year and a maximum of ten (10) years and upon such conditions for renewal as the Parties determine. A lease shall be a short-term measure that allows the Parties to defer expansion or new construction of Supply Facility components and to provide Parties with a near-term stable planning horizon. The Parties do not intend to have perpetual renewal terms.

10.5 Lease Payments

The lease payment for Supply Facilities shall be determined by utilizing the Depreciated Replacement Cost Value of the asset amortized over the remaining Book Depreciation Life of the asset at an interest rate equal to the Municipal Bond Index rate plus 200 Basis Points at the year of the lease payment or a comparable index. The lease payment shall be fixed for lease terms of five (5) years or less. For lease terms of greater than five (5) years, the lease payment shall be recalculated every five (5) years in accordance with this Section 10.4.

10.6 Effective Date of Leases

The effective date for leases set forth in this Article 10 shall be on April 1, following the adoption of this Agreement and every April 1, thereafter.

10.7 Curtailment of Leasing Capacity

The Parties agree that a condition of any lease shall be that the lessee Party shall be provided Capacity to the same extent that Capacity is available to serve the

lessor Party's Demand. Curtailment of Capacity resulting from reduced availability of water for all new water supplies developed after the effective date of this Agreement shall be shared equally among the parties.

ARTICLE XI
SALES TO OTHERS

Except for the Existing Wholesale Customers, existing mutual aid agreement, or extension of service to service areas identified in the Carollo Report, neither Party may contract for the sale or use of the Supply Facilities to any other entity or person who is not a Retail Customer of any Party without the approval of the other Party and compliance with the terms of this Agreement. Any revenues derived from the sale of water to another entity shall be paid to the Managing Agency. Net proceeds from such sales shall be credited back to the Parties based on a method as mutually agreed. Net proceeds shall be those proceeds remaining after expenses, renewals and replacements and contingencies are paid.

ARTICLE XII
OPERATIONS MANUAL

12.1 Operations Manual

Not later than 180 days from the date of Substantial Completion of the Initial Expansion, the Parties shall adopt an Operations Manual for the Supply Facilities, which shall include, but not be limited to, agreed protocols and methodology to provide for water quality, treatment standards and protocols, and for the equitable, effective and efficient operation of the Supply Facilities in accordance with generally accepted utility practices regarding the operation, management, capital improvements, and expansion of all aspects of the Supply Facilities. The Operations Manual may be updated as required. The Operations Manual shall also provide for an Operations Committee ("Operations Committee"), which shall consist of one designee of each of the Parties, as set forth in Section 12.2 below. Not more than 30 days after substantial completion of the Initial Expansion each Party shall appoint one person to develop the Operations Manual.

12.2 Operations Committee

Each Party shall appoint at least one person technically knowledgeable in utility system operations or engineering to the Operations Committee. A Party may allow other attendees, but in no event shall a Party have more than one vote in making a recommendation to the Oversight Committee created under Section 3.3. The Operations Committee shall report to the Oversight Committee not less often than quarterly. The Parties may choose to designate the Technical Committee as the Operations Committee.

12.3 Curtailment

The Operations Manual shall reference each Party's Water Management and Conservation Plan. The Parties agree that if an emergency or water shortage requires restriction on the deliverable supply of new Capacity developed after the effective date of this Agreement , the reduction in available water shall be shared equally among the Parties.

ARTICLE XIII
WITHDRAWAL, TERMINATION OF MEMBERSHIP, SALE OF ASSETS AND DISSOLUTION

13.1 Complete or Partial Termination of Interest

Any Party may elect to terminate all or part of its participation in this Agreement and withdraw from the Supply Facilities as designated (full or partial) by giving written notice of its desire to terminate to the remaining Party(ies), and stating a date for termination which shall be not less than two (2) years from the date of notice. The remaining Party receiving notice of termination shall have the first option to purchase the terminating interest. If Tigard terminates in whole or in part, the purchase price shall not include any value for water as those water rights remain with Lake Oswego. If Tigard completely terminates from this Agreement, it shall not receive water unless Lake Oswego agrees in writing. If Tigard partially terminates, its 14 mgd capacity shall be adjusted to reflect its retained, proportionate interest. The Parties shall meet for the purpose of establishing the price for the terminated interest. The meeting shall be held within 90 days following receipt of notice of termination.

Notice to the selling Party of the other Party's intent to buy all or a portion of the terminating interest shall be given no later than three (3) months after receipt of the written notice of the Party's desire to terminate. If the remaining Party purchases less than the full portion of the terminating interest, the Parties also agree that any unpurchased interest may be sold to another local government party so long as that other local government party becomes subject to all terms and conditions of this Agreement. The terminating Party shall use best efforts to find

another local government partner to buy the remaining unpurchased interest or to assign or lease capacity so as not to unduly burden the remaining party. Consent by the remaining Party for another local government party to purchase, take assignment or lease the Supply Facilities to this Agreement shall not be unreasonably withheld. Any assignment or lease of an unpurchased interest to another local government shall not relieve the Party from its obligations under this Agreement. Negotiations of the terms of sale, assignment or lease to another local government Party shall include the non-terminating Party as to those terms which directly impact its operational and financial interest.

13.2 Sale of Assets

A Party may offer to sell to the other Party its ownership interest in an identified portion of the Supply Facilities (e.g., a percent of the Transmission System). Notice of the proposed sale shall be given to the other Party by the Party wishing to sell. Such notice shall specify the material terms and conditions of the sale. The terms and conditions of Section 13.1 shall apply. The Party may also assign or lease the unpurchased interest to another local government Party. Consent to such assignment or lease shall not be unreasonably withheld or relieve the Party from its obligations under this Agreement.

13.3 Valuation of Interest

The Parties shall meet to agree upon a price within 90 days of the receipt of notice under Sections 13.1 or 13.2. The price shall be fixed by determining the terminating/selling Party's interest in the subject assets using the Depreciated Replacement Cost Value. Nothing herein shall prevent the Parties from agreeing

upon a price through negotiation and unanimous consent. Sales, assignments or leases to third parties are not subject to the valuation formula of this Section.

13.4 Payment

The payment price for the subject interest shall be paid in full on the date of termination set forth in the notice of intent to terminate/sell or award of arbitration or court. Interest shall commence to accrue from the date of agreement arbitration or judgment at the Local Government Investment Pool rate. If a Party fails to pay the purchase price in full at the date of termination, then the terminating/selling Party shall have the right to sell or transfer or assign the subject interest to any other government entity as provided in Section 13.1 or 13.2.

13.5 Default and For Cause Termination

The failure of a Party to perform any duty imposed upon it by this Agreement shall constitute a default. The non-defaulting Party shall have the right to give the defaulting Party a written notice of default, which shall describe the default in reasonable detail and state the date by which the default must be cured, which date shall be at least 60 days after receipt of the notice of default, except in the case of a failure to advance funds, in which case the date shall be 30 days after receipt of the notice of default.

13.5.1 Opportunity to Cure. If within the applicable period described in Section 13.5 the defaulting Party cures the default, or if the failure is one (other than the failure to make payments) that cannot in good faith be corrected within such period and the defaulting Party begins to correct the default within the applicable period and continues corrective efforts with reasonable diligence

until a cure is effected, the notice of default shall be inoperative, and the defaulting Party shall lose no rights under this Agreement. If, within the specified period, the defaulting Party does not cure the default or begin to cure the default as provided above, the non-defaulting Parties at the expiration of the applicable period shall have the rights specified in Section 13.5.2.

13.5.2 Rights Upon Default. If the defaulting Party has not cured the default as provided in Section 13.5.1, it shall have no voting rights under this Agreement until the default has been cured. In addition, the non-defaulting Party may pursue any other remedy available at law or in equity against the defaulting Party, including but not limited to, an action for damages, costs of obtaining substitute water or other performance.

13.6 Dissolution of the Agreement

This Agreement may be dissolved by mutual agreement. Upon dissolution, the Parties shall agree on a Dissolution Plan and schedule to wind down and dissolve the business affairs. Unless modified by the Dissolution Plan, the dissolution shall be effective only after all debts and obligations are paid or provision for payment is made. Each Party shall assume a share of the debts and obligations in proportion to their ownership in the Supply Facilities unless the instrument or transaction that created the debt or obligation specified otherwise. The Parties shall execute those documents necessary to vest proportionate ownership of the Supply Facilities and Property in each Party and execute a post dissolution water supply agreement and a management agreement for the Supply Facilities and Property. Nothing herein shall prevent a Party from accepting cash or other

consideration in lieu of continued proportionate ownership in the Supply Facilities and Property. The cost of dissolution shall be treated as an operation and maintenance expense.

13.7 Post Initial Expansion Water for Tigard.

After substantial completion of the Initial Expansion, if Lake Oswego elects to terminate this Agreement, or if the Parties mutually agree to dissolve this Agreement, Lake Oswego agrees to provide Tigard with treated water sufficient to supply 14 million gallons per day so that Tigard is always assured of having sufficient source to supply its capacity share and usage of the Supply Facilities. If Tigard is allocated additional capacity in the Supply Facilities by the Long Term Expansion, the provisions of this section shall apply to that increment of water. Negotiation of a mutually agreeable water supply agreement shall be a condition precedent to any termination of this Agreement by Lake Oswego or Dissolution Plan.

13.8 Unreasonable Withholding of Consent.

Unreasonable withholding of consent shall be those reasons other than financial considerations, availability of alternate water sources, water usage characteristics, water service territory, water demand forecasts, technical or operational expertise, history as a recognized local government water service provider, ownership, control or operation by or for a private entity or person, and other relevant matters considered in reasonable and prudent utility management.

ARTICLE XIV
DISPUTE RESOLUTION

14.1 Dispute Resolution

The Parties hereby agree that resolution of any disputes shall follow the steps as set forth in Section 14.2. However, nothing shall prevent the disputing parties (Disputing Parties) from waiving any of the steps by mutual consent.

14.2 Dispute Resolution Steps

Step One: (Negotiation)

The City Manager or other persons designated by each of the Disputing Parties shall negotiate on behalf of the Party they represent and attempt to resolve the issue. If the dispute is resolved at this step, there shall be a written determination of such resolution, signed by each City Manager or other designated persons and ratified by the governing bodies, which shall be binding upon the Disputing Parties.

Step Two: (Mediation)

If the dispute cannot be resolved within thirty (30) days at Step One, the Disputing Parties shall submit the matter to non-binding mediation. The Disputing Parties shall attempt to agree on a mediator. If they cannot agree, the Disputing Parties shall request a list of five (5) mediators from an entity or firm providing mediation services.. The Disputing Parties shall mutually agree on a mediator from the list provided. Any common costs of mediation shall be borne equally by the Disputing Parties. If the issue is resolved at this step, a written determination of such resolution shall be signed by each City Manager or other

designated persons, and ratified by the governing bodies, which shall be binding on the Disputing Parties.

Step Three (Arbitration)

After exhaustion of the preceding processes, all disputes or claims arising out of this Agreement shall be submitted to binding arbitration under the rules and processes of U. S. Arbitration and Mediation of Portland, Oregon or similar mutually agreed process. Each Disputing Party shall select an arbitrator and the two shall appoint a third arbitrator. All costs of arbitration shall be borne equally. The Oregon Rules of Civil Procedure relating to discovery and the Oregon Evidence code shall apply. The decision of the panel shall be binding. Nothing herein shall prevent the Disputing Parties from selecting a single arbitrator by agreement.

14.3 Legal Fees

Each Disputing Party shall bear its own legal and expert witness fees at all stages of proceedings, including any appeals.

ARTICLE XV
COMPLETION OF INITIAL EXPANSION OF THE SUPPLY FACILITIES

15.1 Modification to Agreement

Within three years after completion of the Initial Expansion, the Oversight Committee shall undertake a review of all agreements and operations and to consider the need for any modification to the terms and conditions of this Agreement. At the recommendation of the Oversight Committee, the Councils for the Parties may consider:

15.1.1 Modification to the existing Agreement(s);

15.1.2 Replacement of existing Agreement(s) with a new Agreement;

15.1.3 Creation of a Supply Agency under ORS Chapter 190.

ARTICLE XVI
NOTICES

Any notice herein required or permitted to be given shall be given in writing and effective when actually received by hand delivery or by the United States mail, first class postage prepaid, addressed to the Parties as set forth below. The Parties shall notify the Managing Agency of any change of address or title for receipt of notices under this Agreement.

LAKE OSWEGO:

The City of Lake Oswego
Attention: City Manager
380 A Avenue
P.O. Box 369
Lake Oswego, OR 97034

TIGARD

City of Tigard
Attention: City Manager
13125 SW Hall Blvd.
Tigard, OR 97223

ARTICLE XVII
GENERAL PROVISIONS

17.1 Instruments of Further Assurance

From time to time, at the request of a Party, each Party shall, without further consideration, execute and deliver such further instruments, and shall take such further action as may be reasonably required to fully effectuate the purposes of this Agreement.

17.2 Entire Agreement

This Agreement embodies the entire agreement and understanding between the Parties hereto with respect to the Supply Facilities and supersedes all previous agreements and understandings relating to the Supply Facilities except as provided herein. The Parties agree that the existing Agreement for Water Service effective July 1, 1983 shall terminate as of the date Initial Expansion is substantially complete.

17.3 Assignment, Sale or Transfer

No Party shall have the right to sell, transfer or assign its interest in this Agreement (or any portion thereof) or asset(s), without the prior written consent of the other in accordance with requirements of this Agreement. No Party may sell, transfer, assign its interest or sell water to an existing wholesale customer in the other Party's service area as set forth on Exhibit 2 without the prior written consent of the other Party in accordance with the requirements of this Agreement.

17.4 Severability

In case any one or more of the provisions contained in this Agreement shall be invalid, illegal, or unenforceable in any respect, the validity, legality and

enforceability of the remaining provisions contained herein shall not in any way be affected or impaired thereby.

17.5 Counterparts

This Agreement may be executed in any number of counterparts and by the Parties or separate counterparts, any one of which shall constitute an Agreement between and among the Parties.

17.6 Headings

The Article, section and subsection headings contained in this Agreement are for reference purposes only and shall not in any way affect the meaning or interpretation of this Agreement.

17.7 Force Majeure

No Party shall be considered in default in the performance of its obligations under this Agreement to the extent that the performance of any such obligation is prevented or delayed by any cause, existing or in the future, which is beyond the reasonable control of the affected Party, including, but not limited to, Acts of God, earthquake, labor disputes, civil commotion, war events beyond the reasonable control of the Parties, such as regulatory restrictions or requirements, permit issuance, and the like. In the event a Party claims that performance of its obligations was prevented or delayed by any such cause, that Party shall promptly notify the other Parties of that fact and of the circumstance preventing or delaying performance. Such Party so claiming a cause of delayed performance shall endeavor to the extent reasonable to remove the obstacles which preclude performance.

17.8 Consolidation, Merger, Annexation

17.8.1 Change of organization is defined as the consolidation or merger of a Party with another city under ORS 222.610 *et seq*.

17.8.2 Any new entity created by change of organization involving a Party to this Agreement shall require prior consent of the other Party as to the successor or surviving entity's entitlement to be an owner of the Supply Facilities, based on the entity's legal, financial and technical ability to assume the original Party's obligations under this Agreement. Such consent shall not be unreasonably withheld. If the surviving or successor entity is approved, the original Party/Parties' obligations and rights hereunder shall be binding upon and inure to the benefit of the surviving or successor entity, and that entity shall be subject to all obligations of this Agreement.

17.8.3 Annexation of or provision of service to an area beyond that area identified for each party in the Carollo Report, and any transfer of a Party's territory to a Water Authority formed by one or more cities, water districts, or both, shall require the prior consent of the other Party, which shall not be unreasonably withheld considering capacity and demands and other system factors. Annexations or service to identified areas shall not require consent.

17.9 Survival of Covenants

Any provision of this Agreement which, by its terms has or may have application after the expiration or earlier termination of this Agreement, including all

covenants, agreements, and warranties, shall be deemed to the extent of such application to survive the expiration or termination of this agreement.

17.10 Indemnity

To the extent permitted by the Constitution and laws of Oregon, each Party agrees to defend, indemnify and hold harmless the other from and against any and all actual or alleged claims, damages, expenses, costs, fees, including but not limited to attorney, account, paralegal, expert and escrow fees, fines, environmental costs and/or penalty (collectively "costs"), which may be imposed upon, claimed against, or incurred or suffered by the Party, unless and to the extent it was resulting from an individual Party's negligence or willful misconduct.

17.11 No Third Party Beneficiaries

The Parties hereto are the only Parties to this Agreement and the only persons or entities entitled to enforce its terms.

IN WITNESS WHEREOF the Parties have dated and signed this Agreement.

CITY OF LAKE OSWEGO

Judie Hammerstad
Mayor

August 6, 2008
Dated

Robyn Christie
City Recorder

8-19-08
Dated

City Attorney

CITY OF TIGARD

Mayor

August 6, 2008
Dated

Attest Catherine Wheatley
City Recorder

August 12, 2008
Dated

City Attorney

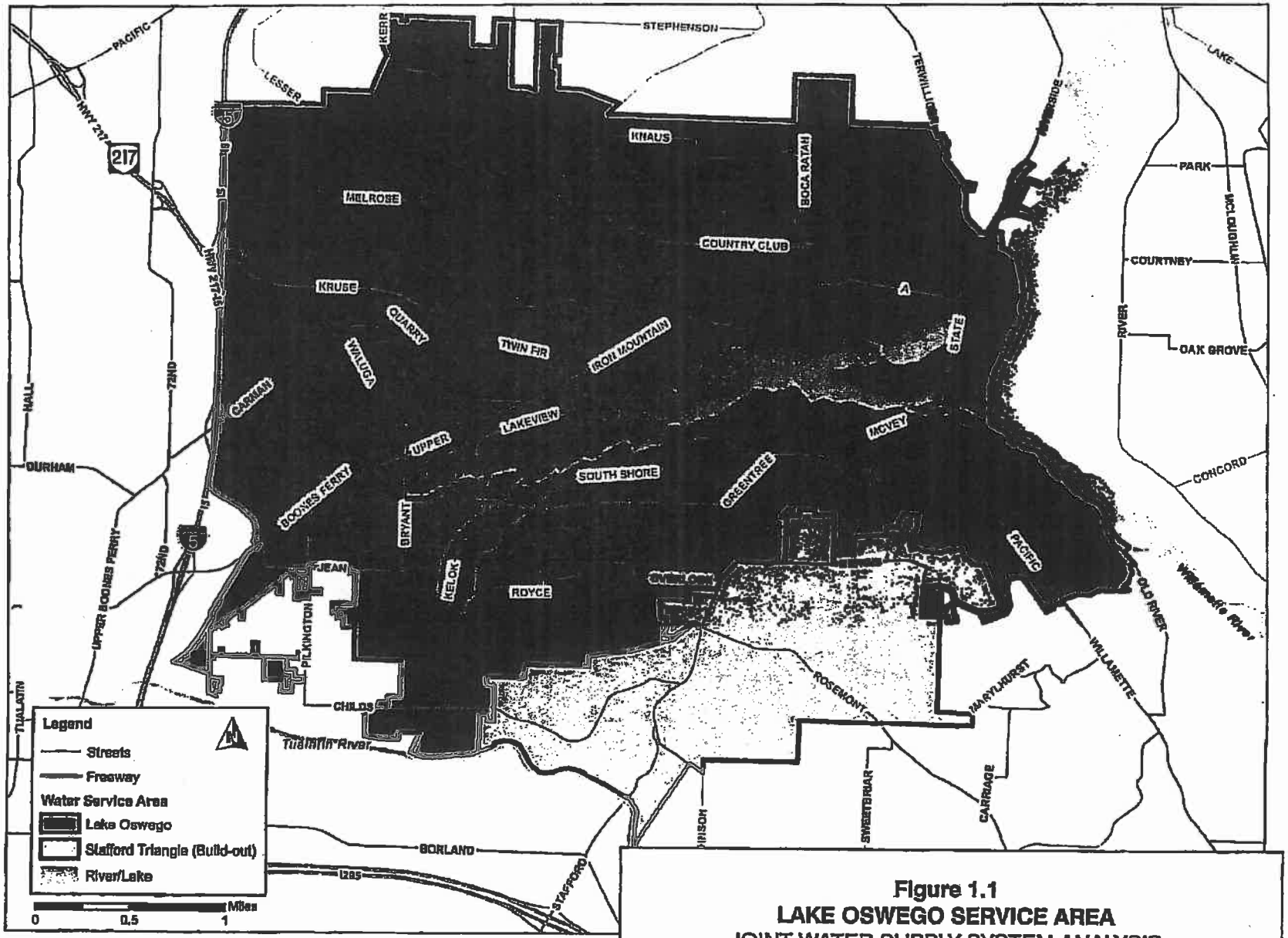
1 Interim Supply to Lake Oswego (not allocated)
2 Raw Water Intake (not allocated)
3 Raw Water Transmission
4 Water Treatment Plant: Land
5 Water Treatment Plant: Structures & Equipment (not allocated)
6 Finished Transmission Main (not allocated)
7 Waluga Reservoir: Land (Reservoir Property)
8 Waluga Reservoir: Structures & Equipment (not allocated)
9 Bonita Pump Station (not allocated)
10 Computer System/Software
11 General Plant

Exhibit 1
Existing Real Property, Supply Facility Components and Valuation

Current Year 2008 | Assumed Escalation [illegible]
May 2008 ENR CCI 8140 | Projected July 2008 ENR CCI 8,208

Allocation	Asset Description	Acquisition Date	Acquisition Amount	Original ENR CCI	July 2008 CCI	Today Acquisition Amount	Useful Life (in years)	Depreciation Amount	Value Today
	Water Treatment Plant Land			1,155	8,208				
4	Plant Site	6/30/1968	$ 83,787			$ 595,491	Land	$ -	$ 595,491
	Sub Total		$ 83,787			$ 595,491		$ -	$ 595,491
	Raw Water Transmission			1,269	8,208				
3	Raw Water Transmission	6/30/1969	$ 500,137			$ 3,816,979	100	$ 1,488,622	$ 2,328,357
3	Pipeline Easements	6/30/1969	$ 22,000			$ 142,296	100	$ 55,496	$ 86,800
	Sub Total		$ 612,137			$ 3,959,274		$ 1,544,117	$ 2,415,157
	Distribution Storage								
7	Reservoir Property	6/29/1980	$ 8,416	3,237	8,208	$ 21,340	Land	$ -	$ 21,340
	Waluga Reservoir	6/30/1959	$ 1,291,427	4,066	8,208	$ 2,588,753	100	$ 648,668	$ 1,940,085
	Sub Total		$ 1,299,843			$ 2,608,093		$ 648,688	$ 1,961,405
	Computer Systems/Software								
10	SCADA System Upgrade	6/30/1991	$ 180,722	4,835	8,208	$ 306,791	20	$ 260,773	$ 46,018
10	Scada Software Upgrade	6/30/1999	$ 33,500	6,059	8,208	$ 45,381	20	$ 20,421	$ 24,959
	Sub Total		$ 214,222			$ 352,172		$ 281,194	$ 70,978
	General Plant								
11	Other	6/6/1982	$ 17,000	3,825	8,208	$ 36,479	20	$ 36,479	$ -
11	Vehicles	6/6/1985	$ 24,000	4,295	8,208	$ 45,864	20	$ 45,884	$ -
11	Vehicles	6/30/1999	$ 20,500	6,059	8,208	$ 27,770	20	$ 12,497	$ 15,274
	Sub Total		$ 61,500			$ 110,114		$ 94,840	$ 15,274
	Land Additions					2008 RMV (land Only)			
7	Waluga Res #1	1976				$ 329,841	Land	$ -	$ 329,841
7	3800 Carman Dr	1992				$ 237,348	Land	$ -	$ 237,346
7	Vacant Parcel	1992				$ 253,485	Land	$ -	$ 253,485
4	4260 Kenthorpe Way	1985				$ 880,014	Land	$ -	$ 880,014
4	WTP Property	1979				$ 132,632	Land	$ -	$ 132,632
4	4295 Mapleton Dr	1989				$ 258,916	Land	$ -	$ 258,916
4	4305 Mapleton Dr	1985				$ 258,916	Land	$ -	$ 258,916
4	4315 Mapleton Dr	1989				$ 258,916	Land	$ -	$ 258,916
4	South of Plant Site	1989				$ 47,430	Land	$ -	$ 47,450
	Clackamas River Intake & Pump Station								
	Structure	6/30/1969	$ 121,850	1,269	8,208	$ 788,981	60	$ 512,836	$ 276,138
	Pumps & Equipment	6/30/1969	$ 50,825	1,269	8,208	$ 328,734	40	$ 320,515	$ 8,218
	Piping and Valves	6/30/1969	$ 20,350	1,269	8,208	$ 131,494	60	$ 85,471	$ 46,023
	Electrical/I&C/HVAC	6/30/1969	$ 10,165	1,269	8,208	$ 65,747	40	$ 64,103	$ 1,644
	Seismic Upgrades	1980	$ 191,000	9,538	8,208	$ 164,458	60	$ 76,747	$ 87,711
	Pumps	1980	$ 40,000	3,237	8,208	$ 101,426	40	$ 70,998	$ 30,428
	Pumps-New	2002	$ 165,639	6,538	8,208	$ 193,123	40	$ 28,968	$ 164,154
	Intake Fish Screens	2002	$ 1,352,800	6,538	8,208	$ 1,696,050	20	$ 509,415	$ 1,188,642
	Piping and Valves	1980	$ 10,000	3,237	8,208	$ 25,356	60	$ 11,833	$ 13,623
	Electrical and HVAC	1980	$ 21,000	3,237	8,208	$ 53,248	40	$ 37,274	$ 15,974
	Intake Land								
	Water Treatment Plant								
	Site Work	6/30/1969	$ 155,918	1,269	8,208	$ 1,008,451	60	$ 655,493	$ 352,958
	Concrete and Buildings	6/30/1969	$ 479,789	1,269	8,208	$ 3,102,930	80	$ 2,016,904	$ 1,086,026
	Pumps	6/30/1969	$ 4,197	1,269	8,208	$ 27,146	40	$ 26,467	$ 679
	Mechanical Equipment	6/30/1969	$ 125,881	1,269	8,208	$ 814,516	40	$ 794,153	$ 20,363
	Piping and Valves	6/30/1969	$ 191,885	1,269	8,208	$ 1,241,168	60	$ 806,759	$ 434,409
	Electrical/I&C/HVAC	6/30/1969	$ 191,885	1,269	8,208	$ 1,241,168	40	$ 1,210,139	$ 31,029
	Filter Media and Underdrains	6/30/1969		1,269	8,208	$ -	40	$ -	$ -
	Chemical Addition	6/30/1969		1,269	8,208	$ -	40	$ -	$ -
	Clearwell	6/30/1969		1,269	8,208	$ -	60	$ -	$ -
	Solids Dewatering Facilities	6/30/1969		1,269	8,208	$ -	60	$ -	$ -
	Miscellaneous	6/30/1969	$ 11,988	1,269	8,208	$ 77,570	20	$ 77,570	$ -
	Engineering	6/30/1969		1,269	8,208	$ -	60	$ -	$ -
	Expansion	1980	$ 80,221	3,237	8,208	$ 203,411	60	$ 94,925	$ 108,486
	Site Work	1999	$ 510,000	5,920	8,208	$ 707,094	60	$ 117,849	$ 589,245
	Expansion	1980	$ 333,224	3,237	8,208	$ 844,933	60	$ 394,302	$ 450,631
	Seismic/ADA/Code	2000	$ 496,498	6,221	8,208	$ 657,706	60	$ 87,694	$ 570,012
	Expansion	1980	$ 86,391	3,237	8,208	$ 219,056	60	$ 102,225	$ 116,830
	Pumps and Equipment	1999	$ 507,925	6,059	8,208	$ 688,061	40	$ 154,814	$ 533,248
	Expansion	1980	$ 67,879	3,237	8,208	$ 172,116	60	$ 80,321	$ 91,795
	Mechanical	2001	$ 641,120	6,343	8,208	$ 829,616	40	$ 145,183	$ 684,433
	Expansion	1980	$ 357,908	3,237	8,208	$ 907,517	50	$ 423,508	$ 484,009
	Expansion	1980	$ 178,964	3,237	8,208	$ 453,761	60	$ 211,755	$ 242,006
	Electrical	1999	$ 69,247	6,059	8,208	$ 93,742	40	$ 30,182	$ 66,560
	Electrical & Instrumentation	2001	$ 568,564	6,343	8,208	$ 735,721	40	$ 128,751	$ 606,970
	Expansion	1980	$ 83,925	3,237	8,208	$ 212,799	80	$ 99,308	$ 113,492
	Filters & Structural Work	2001	$ 416,899	6,343	8,208	$ 539,460	40	$ 94,404	$ 445,049
	Sodium Hypochlorite System	1998	$ 202,799	5,920	8,208	$ 282,031	40	$ 88,020	$ 234,061
	Lime Storage/Feed System	1998	$ 1,000,155	5,920	8,208	$ 1,386,677	40	$ 346,669	$ 1,040,008
	CO2 Storage/Feed System	1998	$ 238,657	5,920	8,208	$ 330,472	40	$ 82,618	$ 247,854
	Alum Storage/Feed System	1998	$ 522,700	5,920	8,208	$ 724,840	40	$ 181,210	$ 543,630
	Clear Well Baffle	1998	$ 107,293	5,622	8,208	$ 156,642	40	$ 46,963	$ 109,680
	Solids Dewatering Lagoons	1999	$ 1,084,519	6,059	8,208	$ 1,469,144	40	$ 330,557	$ 1,138,587
	Expansion	1980	$ 45,864	3,237	8,208	$ 115,787	60	$ 54,034	$ 61,753
	Engineering	1998	$ 314,460	5,920	8,208	$ 431,826	60	$ 71,971	$ 359,856
	Engineering	1999	$ 120,000	6,059	8,208	$ 152,559	60	$ 24,384	$ 136,174
	Engineering	2000	$ 126,683	6,221	8,208	$ 167,103	60	$ 22,280	$ 144,822
	Engineering	2001	$ 232,000	6,343	8,208	$ 426,608	60	$ 50,121	$ 376,487
	Finished Water Transmission								
	24-inch Finished Water Main	6/30/1969	$ 475,455	1,269	8,208	$ 3,082,292	100	$ 1,194,294	$ 1,887,998
	WTP Transmission Main	6/30/1969	$ 42,616	1,269	8,208	$ 275,651	100	$ 107,504	$ 168,147
	North Shore-Iron Mtn. Pipeline	6/30/1970	$ 534,142	1,381	8,208	$ 3,174,619	100	$ 1,208,355	$ 1,966,264
	Upper Dr.-Iron Mtn. 24 inch Pipeline	6/30/1985	$ 575,568	4,195	8,206	$ 1,125,610	100	$ 269,935	$ 855,673
	Cathodic Protection System	4/1/2000	$ 486,087	6,221	8,206	$ 641,344	40	$ 128,269	$ 513,075
			$ 2,111,711						$ 5,384,358
	Sub Total		$ 15,856,158			$ 34,828,504		$ 13,888,082	$ 20,547,750
			Acquisition Value			2008 Value		Calculated Depreciation	Total Current Value
	TOTAL ASSETS		$ 18,127,658			$ 42,453,849		$ 16,231,822	$ 31,608,685

Exhibit 2



Lo70711.1-7525.ai

Figure 1.1
LAKE OSWEGO SERVICE AREA
JOINT WATER SUPPLY SYSTEM ANALYSIS
CITY OF LAKE OSWEGO AND TIGARD WATER SERVICE AREA

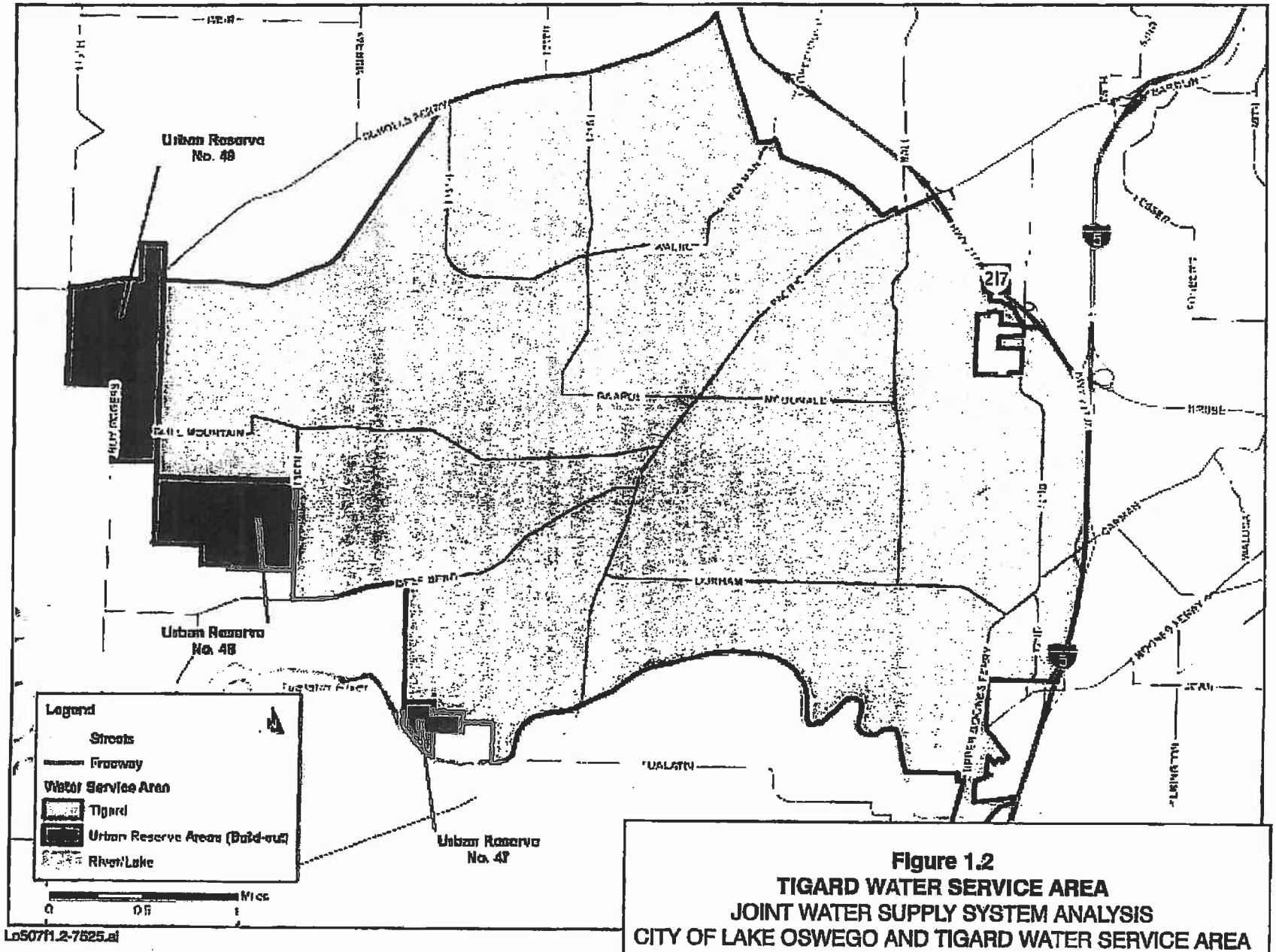


Figure 1.2
TIGARD WATER SERVICE AREA
JOINT WATER SUPPLY SYSTEM ANALYSIS
CITY OF LAKE OSWEGO AND TIGARD WATER SERVICE AREA

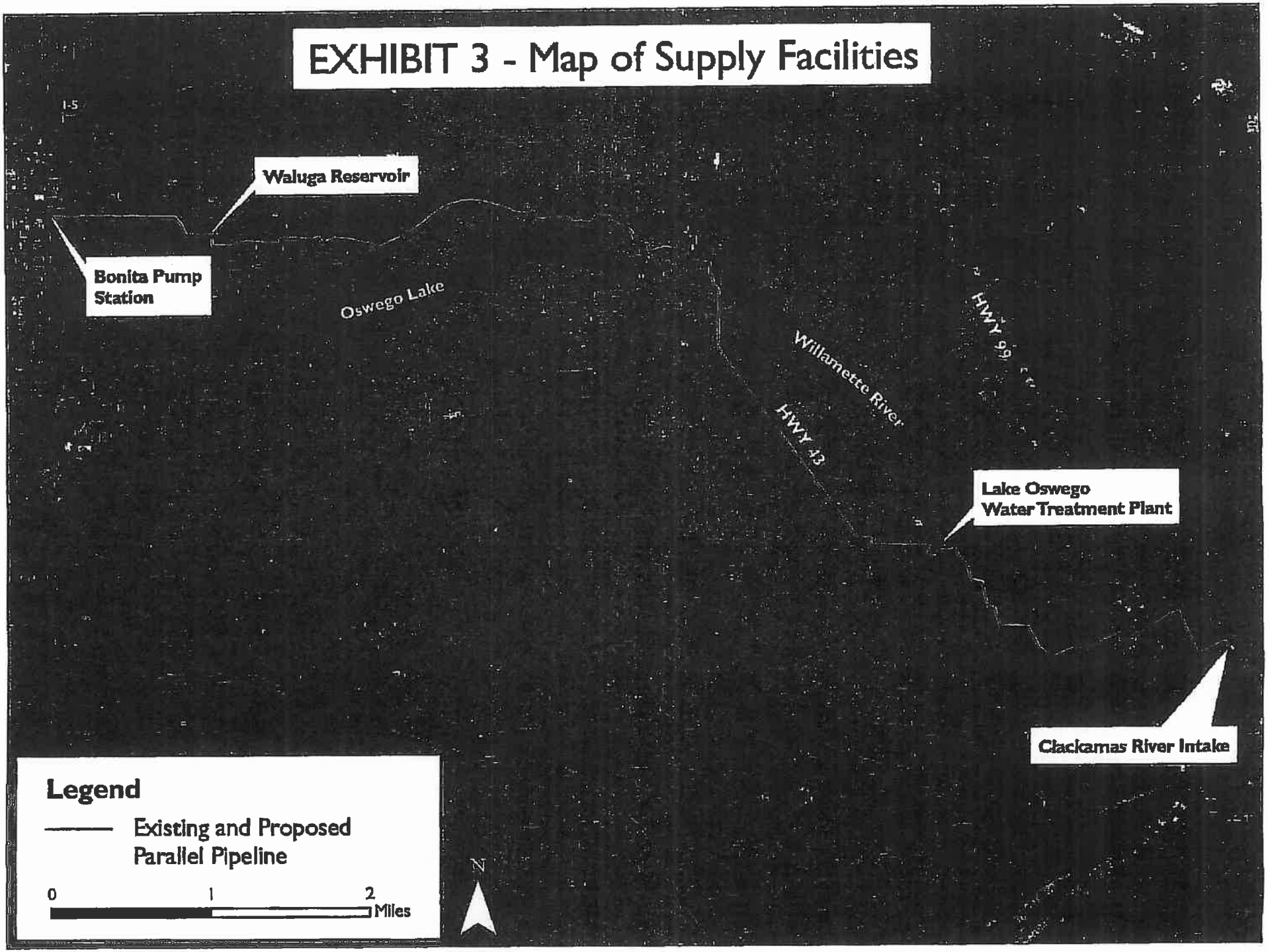


EXHIBIT 3 - Map of Supply Facilities
I-5
Waluga Reservoir
Bonita Pump Station
Oswego Lake
Willamette River
HWY 99
HWY 43
Lake Oswego Water Treatment Plant
Clackamas River Intake
Legend
Existing and Proposed Parallel Pipeline
0
1
2
Miles
N

Exhibit __4__.

City of Lake Oswego Water Rights Summary

Permitee	Application/Permit#	Authorized amount (cfs/mgd)	Authorized place of use	Amount developed/certificate# (cfs/mgd)	Amount undeveloped (cfs/mgd)	Priority Date	Source water
City of Lake Oswego	S43365/S32410	50/32.32	City of Lake Oswego and City of Tigard[1]	25/16.16/C78332	25/16.16	3/14/1967	Clackamas River
City of Lake Oswego	S50819/S37839	9/5.81	City of Tualatin and Tigard Water District[2]	0	9/5.81	7/5/1973	Clackamas River

Notes: 1. The City of Lake Oswego is currently seeking extensions of time to fully use all water authorized under permit Nos. S32410, S37839 and S43246. Proposed Final Orders (PFO) approving the City's request are pending at Water Resources Department (WRD) in Salem. It is expected protests will be filed on the PFO's once they are issued for public comment.

2. The City has submitted its water management and conservation plan to WRD and no public comments on the plan were filed during the 30-day public comment period. An approved WMCP is required before the City can access any portion of undeveloped water noted above.

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[1] Permit Amendment T-8358 amended Permits S32410 and S37839 to include the City of Tigard as authorized places of use.

[2] Permit S37839 was granted to the City of Lake Oswego for the benefit of the Cities of Tualatin and the Tigard Water District.

Exhibit 5

Supply Facilities Capital Improvement Program

(To be added following adoption by each Council)

EXHIBIT _6_
DETERMINATION OF TIGARD BUY-IN

Asset	Tax Map	Tax Lot	Clackamas Co. Deed	Original Cost	Net Reproduction Cost	Tigard Allocation %	Tigard Share
Clackamas River Intake & Pump Station	2 2E 20CA	15001	Bk 173, Pg 900-902	$ 1,911,733	$ 1,832,454	0.00%	$ -
Clackamas River Intake Land*				$	$	14/38	$
Computer System/Software				$ 214,222	$ 70,978	14/38	$ 26,150
Finished Water Transmission				$ 2,111,711	$ 5,384,358	0.00%	$ -
General Plant				$ 61,500	$ 15,274	14/38	$ 5,627
Raw Water Transmission				$ 612,137	$ 2,415,157	14/38	$ 889,795
Waluga Reservoir				$ 1,281,427	$ 1,940,065	0.00%	$ -
Waluga Reservoir: Land							
Reservoir Property	2 1E 07 AD	03100	Doc 72-06414	$ 8,416	$ 21,340	14/38	$ 7,862
Waluga Res #1*	2 1E 07AD	00700	Doc 76-36977	n/a	$ 329,841	14/38	$ 121,520
4800 Carmen Dr*	2 1E 07AD	00900	Doc 92-063461	n/a	$ 237,346	14/38	$ 87,443
Vacant Parcel*	2 1E 07AD	01000	Doc 92-063461*	n/a	$ 253,485	14/38	$ 93,389
Water Treatment Plant				$ 9,731,005	$ 11,489,095	0.00%	$ -
Water Treatment Plant Land							
4260 Kenthorpe Way - parcel 1*	2 1E 24BD	00300	Bk 688, Pg 581	$ 83,797	$ 595,491	14/38	$ 219,391
4260 Kenthorpe Way - parcel 2*	2 1E 24BD	00401	Doc 79-35248	n/a	$ 601,670	14/38	$ 221,668
xxxx Mapleton Dr*	2 1E 24BD	01200	Doc 89-10200	n/a	$ 132,652	14/38	$ 48,872
4245 Mapleton Dr*	2 1E 24BD	01400	Doc 89-13210	n/a	$ 258,916	14/38	$ 95,390
4305 Mapleton Dr*	2 1E 24BD	01300	Doc 95-33429	n/a	$ 306,346	14/38	$ 112,864
4315 Mapleton Dr*	2 1E 24BD	01500	Doc 89-13210	n/a	$ 258,916	14/38	$ 95,390
Totals			* less 2006-108190	$ 16,015,948	$ 26,143,384		$ 2,025,361

*Net reproduction cost for these properties are based on tax assessor's 2006 real market value (RMV). These costs are not included in the total original cost.

Tigard and LO will need to complete an updated appraisal of land values, and resolve which parcels are material to this agreement before determining the final buy-in cost.

Allocation % based on 14 mgd of 38 mgd capacity allocated to Tigard.

Net Reproduction Cost includes escalation by ENR less depreciation.

EXHIBIT _7__
ALLOCATION OF SYSTEM IMPROVEMENT COSTS TO THE PARTIES

	Cost of Improvement (in 2006 $) *	Lake Oswego		Tigard	
		Allocation (%)	Share ($)	Allocation (%)	Share ($)
Water Treatment Plant					
- Existing Plant	n/a	100.00%	n/a	0.00%	$ -
- 32 mgd Expansion	$ 39,430,000	2/16	$ 4,928,750	14/16	$ 34,501,250
- 38 mgd Expansion	n/a	100% **	n/a	0.00%	$ -
Raw Water Intake and Pump Station	$ 4,440,000	24/38	$ 2,804,210	14/38	$ 1,635,789
Raw Water Transmission Main	$ 23,920,000	24/38	$ 15,107,368	14/38	$ 8,812,633
Finished Water Transmission Main					
-Reaches 7-10	$ 38,220,000	24/38	$ 24,138,947	14/38	$ 14,081,053
-Reaches 11-12	$ 17,020,000	8/22	$ 6,189,091	14/22	$ 10,830,909
Storage (MG)	$ 4,010,000	1.0/2.5	$ 1,604,000	1.5/2.5	$ 2,406,000
Bonita Road Pumping Station	$ 1,700,000	0.00%	$ -	100.00%	$ 1,700,000
Total Costs	$ 128,740,000	42.54%	$ 54,772,366	57.46%	$ 73,967,634

* - Project costs are presented in 2006 dollars. Actual cost will depend on project start and completion dates.

** - Second (6 mgd) expansion is currently assigned to Lake Oswego. Contract provides for potential reallocation by agreement.