

January 7, 2013

Please include this document in the materials given to the West Linn City Council in preparation for CUP-12-02/DR-12-04 (water plant) and CUP-12-04/DR 12-14 (water transmission line) to be heard at the next City Council meeting which will begin on January 14, 2013.

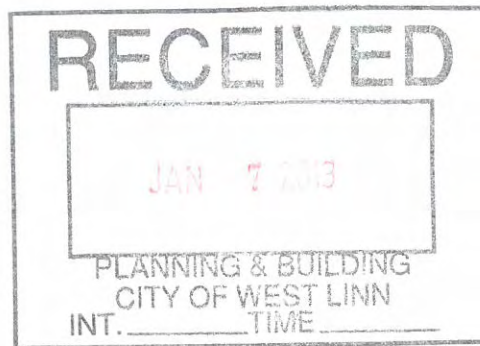
To the West Linn City Council:

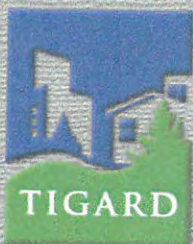
I am submitting for your information the entire Carollo Report which was requested originally by Lake Oswego to determine what that city should do to prepare for its future water needs. This document provided the foundation for many of the decisions subsequently made by Lake Oswego and Tigard regarding the two applications referenced above, namely CUP-12-02 and CUP-12-04.

Additional testimony referencing this document will be coming from myself or others at the hearing scheduled for January 14, 2013. I am presenting the entire document now so city staff has time to properly reproduce it for each member of the City Council.

Thank you for entering this document into the record.

Gwen Sieben  
4950 Mapleton Drive  
West Linn, OR 97068



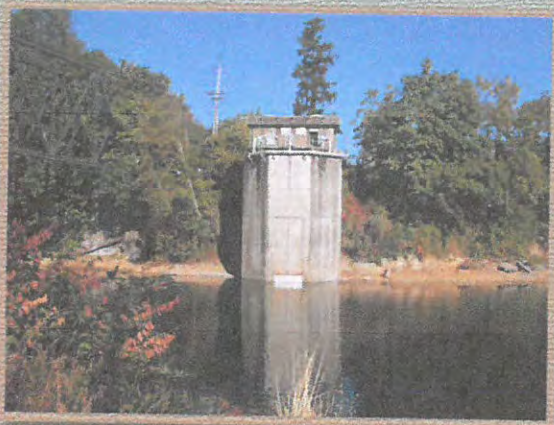


*City of Lake Oswego and the  
Tigard Water Service Area*

# Joint Water Supply System Analysis

## DRAFT REPORT

*July 2007*



**carollo**

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City of Lake Oswego and Tigard Water Service Area

**DRAFT SUMMARY REPORT**

**JOINT WATER SUPPLY SYSTEM ANALYSIS**

July 2007



City of Lake Oswego and Tigard Water Service Area

SUMMARY REPORT

JOINT WATER SUPPLY SYSTEM ANALYSIS

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## JOINT WATER SUPPLY SYSTEM ANALYSIS

### ES.1 BACKGROUND

The Cities of Lake Oswego and Tigard (Cities) retained Carollo Engineers in June 2006 to develop and evaluate options for the possible formation of a joint water supply system for the two communities. This report, which summarizes the results of the Joint Water Supply System Analysis (JWSSA), presents a range of supply alternatives, and addresses the design, financing, permitting, governance, and public outreach issues associated with implementing the proposed joint water supply system, as well as the potential impacts of conservation and interim supply alternatives.

### ES.2 SUPPLY SCENARIOS

The City of Lake Oswego's (City, Lake Oswego) existing water supply system is essentially at capacity. The capacity of the existing system is 16 million gallons per day (mgd), existing demands are over 15 mgd, and projected build-out demands are 24 mgd. Therefore, Lake Oswego needs to expand their supply capacity or reduce per capita water demands substantially in the near future. The water service areas for Lake Oswego and Tigard are presented in Figures ES.1 and ES.2, respectively.

Four supply scenarios were developed to address the needs of Lake Oswego and Tigard. These scenarios are as follows:

1. Scenario 1: Existing Capacity (16 mgd)

This scenario represents the existing demands and capacity of the Lake Oswego infrastructure.

2. Scenario 2: Future Capacity (24 mgd)

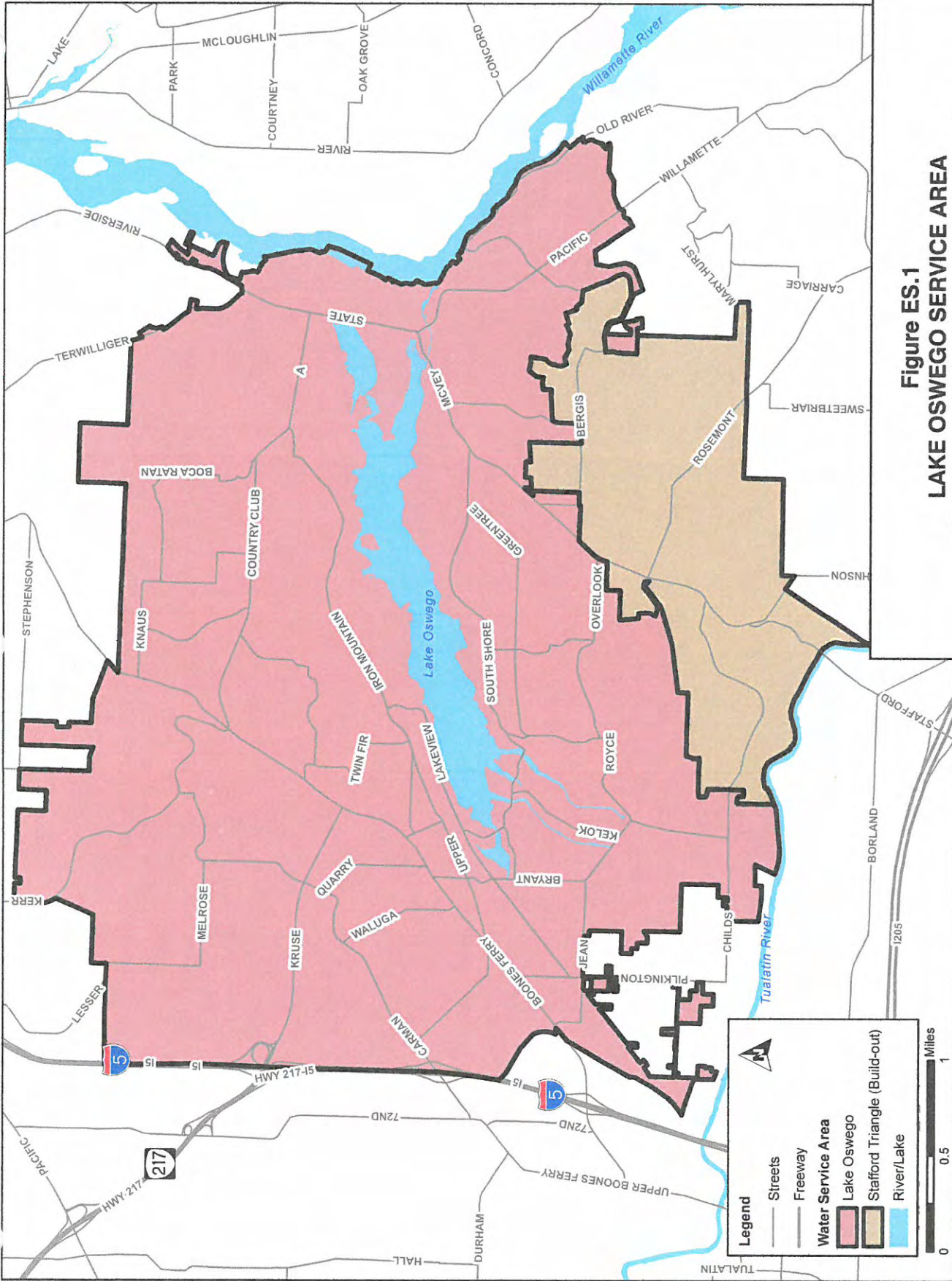
This scenario represents the required capacity to treat the build-out demands of the Lake Oswego water service area.

3. Scenario 3: Senior Water Right Capacity (32 mgd)

This scenario represents the capacity needed to convey the senior water rights that Lake Oswego has been permitted to withdraw from the Clackamas River.

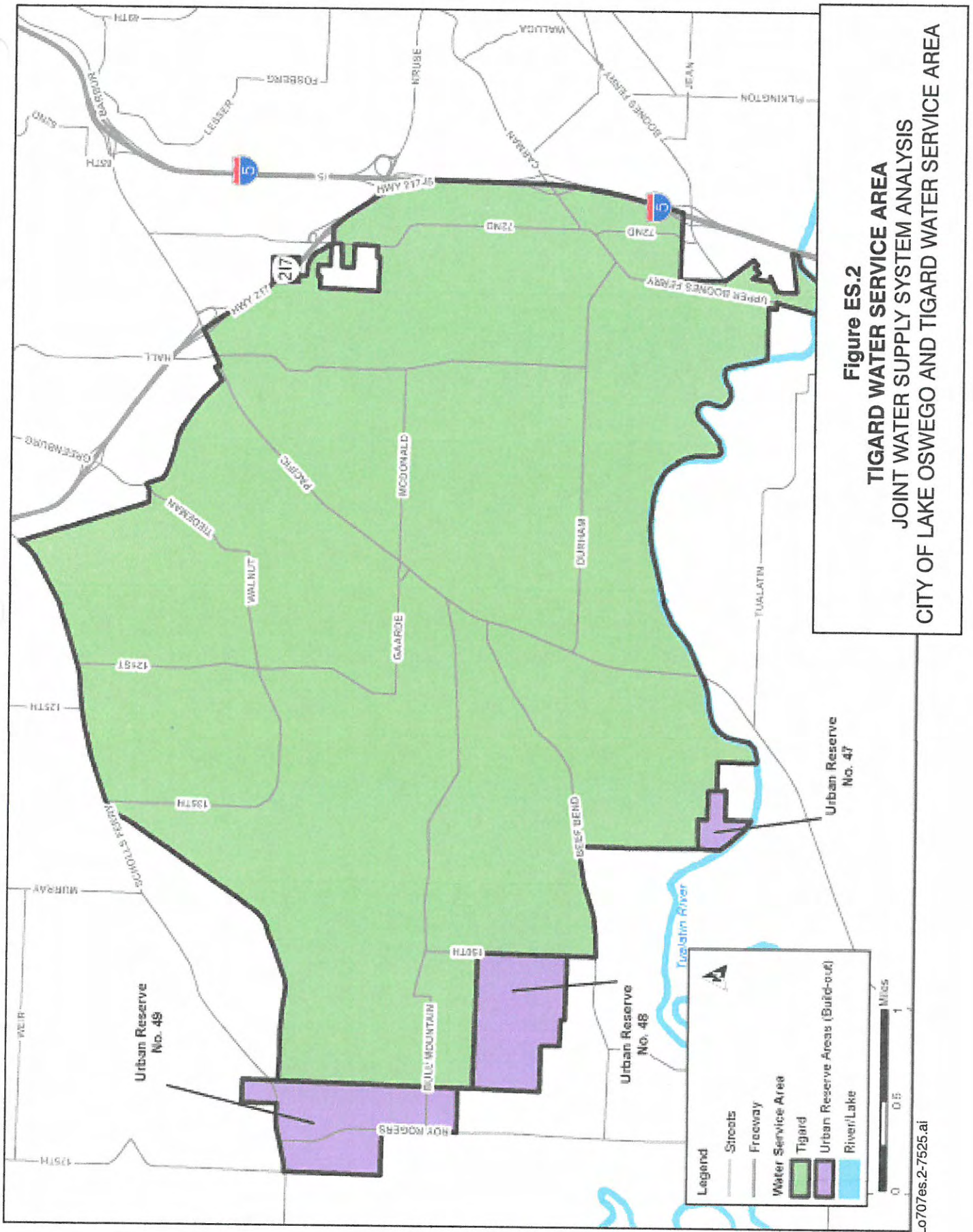
4. Scenario 4: Combined Junior and Senior Water Right Capacity (38 mgd)

This scenario represents the capacity needed to convey the combined junior and senior water rights that Lake Oswego has been permitted to withdraw from the Clackamas River.



**Figure ES.1**  
**LAKE OSWEGO SERVICE AREA**  
**JOINT WATER SUPPLY SYSTEM ANALYSIS**  
**CITY OF LAKE OSWEGO AND TIGARD WATER SERVICE AREA**

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**Figure ES.2**  
**TIGARD WATER SERVICE AREA**  
 JOINT WATER SUPPLY SYSTEM ANALYSIS  
 CITY OF LAKE OSWEGO AND TIGARD WATER SERVICE AREA

## ES.2.1 Capital Cost of Infrastructure Improvements

Lake Oswego's existing infrastructure is comprised of a raw water intake, treatment facility, conveyance, storage, and pumping. The capital costs for each of the supply scenarios are provided in Table ES.1.

<b>Table ES.1 Conceptual Cost Estimate – Capital Cost<sup>1</sup> Joint Water Supply System Analysis City of Lake Oswego and Tigard Water Service Area</b>				
<b>System Component</b>	<b>Scenario 1 16 mgd</b>	<b>Scenario 2 24 mgd</b>	<b>Scenario 3 32 mgd</b>	<b>Scenario 4 38 mgd</b>
Clackamas River Intake	\$2,000,000	\$2,100,000	\$4,440,000	\$4,670,000
Raw Water Transmission Main	N/A	\$19,890,000	\$23,920,000	\$23,920,000
Lake Oswego Water Treatment Plant	\$3,000,000	\$28,840,000	\$39,430,000	\$44,990,000
Finished Water Transmission Main	N/A	\$25,290,000	\$44,300,000	\$55,240,000
Waluga Reservoir	N/A	\$2,470,000	\$3,820,000	\$4,010,000
Bonita Pump Station	N/A	N/A	\$1,480,000	\$1,700,000
<b>Total</b>	<b>\$5,000,000</b>	<b>\$78,590,000</b>	<b>\$117,390,000</b>	<b>\$134,530,000</b>
Notes:				
1. Presented in November 2006 dollars.				

## ES.2.2 Implementation Timing

The following assumptions were applied to development of implementation timing of component improvements for each scenario: 1) Tigard will begin using its share of the water supply infrastructure in 2016, and 2) the components of the infrastructure that are already at their maximum capacity will be improved immediately to meet the needs of Lake Oswego.

For scenarios 3 and 4, component improvements were phased to provide incremental capacity additions over time to defer costs.

<b>Table ES.2 Implementation Capital Costs by Scenario<sup>1</sup></b> <b>Joint Water Supply System Analysis</b> <b>City of Lake Oswego and Tigard Water Service Area</b>			
<b>Scenario</b>	<b>Project Completion Date</b>		
	<b>Immediate<sup>2</sup></b>	<b>2016</b>	<b>2020</b>
1 (16 mgd)	\$5,000,000	--	--
2 (24 mgd)	\$76,120,000	--	\$2,470,000
3 (32 mgd)	\$88,360,000	\$29,030,000	--
4 (38 mgd)	\$91,450,000	\$43,080,000	--

Notes:

1. Presented in November 2006 dollars.
2. Immediate improvements should be made by 2009.

Throughout the report, capital costs are presented in November 2006 dollars to facilitate comparison of scenarios. However, actual costs will be subject to construction cost escalation up to the time the improvements are actually constructed. This construction cost escalation, based on the anticipated implementation schedule for each scenario, is included in the financial evaluation of alternative scenarios. It should be further noted that because construction cost escalation is projected to occur at a rate greater than the general inflation rate<sup>1</sup>, scenarios that are delayed beyond the anticipated implementation schedule will likely have a higher cost than the costs shown in the report. Further evaluation of the financial implications associated with delaying implementation of the proposed improvements should be conducted before final decisions are made regarding the timing of implementing Scenarios 2-4.

### **ES.2.3 Financial Evaluation**

A financial evaluation of the supply scenarios was conducted, which presents a comparison of the economic impact of the scenarios for each City. Additionally, for the City of Tigard, an evaluation of three other water supply alternatives was developed: 1) partnership with the Joint Water Commission (JWC), 2) partnership with other regional suppliers for development of the Willamette River Project, and 3) Tigard-only development of the Willamette River Project.

A summary of the net present value of the scenarios over a 25-year timeframe is presented for Lake Oswego and Tigard, in Tables ES.3 and ES.4, respectively. The details, limitations, and assumptions for the net present value analysis are presented in Chapter 6 and Appendix D of this Summary Report. The cost sharing allocation between Tigard and Lake Oswego, the JWC, or other regional suppliers is based on a percent capacity proportion, and may need to be revised based on the terms of the institutional arrangement agreed upon between the two governments.

<sup>1</sup> "Inflation is Set for a Strong Rebound; Steel and Rebar Prices Lead Resurgence in Construction Costs," McGraw Hill Construction, June 2007.

<b>Table ES.3 Net Present Value of Lake Oswego's Supply Options (25 Year Outlook) Joint Water Supply System Analysis City of Lake Oswego and Tigard Water Service Area</b>			
<b>Cost Components</b>	<b>Lake Oswego "Go it Alone"</b>	<b>Partner with Tigard</b>	<b>Partner with Tigard</b>
	<b>Scenario 2 (24 mgd)</b>	<b>Scenario 3 (32 mgd)</b>	<b>Scenario 4 (38 mgd)</b>
Capital Costs	\$76,500,000	\$61,500,000	\$52,100,000
O&M Costs	\$41,300,000	\$33,200,000	\$31,000,000
<b>Total Costs</b>	<b>\$117,800,000</b>	<b>\$94,700,000</b>	<b>\$83,100,000</b>
<b>Notes</b>			
1. Net Present Values are based on a 25-Year Outlook and include a discount factor of 5%, construction escalation rate of 6%, and a general escalation rate of 3.5%.			

<b>Table ES.4 Net Present Value of Tigard's Supply Options (25 Year Outlook) Joint Water Supply System Analysis City of Lake Oswego and Tigard Water Service Area</b>					
<b>Cost Components</b>	<b>Partner with JWC</b>	<b>Willamette With Partners</b>	<b>Willamette Without Partners</b>	<b>Partner with Lake Oswego</b>	<b>Purchase from Portland</b>
	<b>Scenario 2A</b>	<b>Scenario 2B</b>	<b>Scenario 2C</b>	<b>Scenario 4</b>	<b>Scenario 6B</b>
Capital Costs	\$145,800,000	\$77,900,000	\$183,100,000	\$80,600,000	\$1,400,000
O&M Costs	\$17,400,000	\$11,700,000	\$14,600,000	\$32,500,000	--
Purchased Water Costs	\$33,600,000	\$33,600,000	\$33,600,000	\$27,800,000	\$97,200,000
<b>Total Costs</b>	<b>\$196,800,000</b>	<b>\$123,200,000</b>	<b>\$231,300,000</b>	<b>\$140,900,000</b>	<b>\$98,600,000</b>
<b>Notes</b>					
1. Net Present Values are based on a 25-Year Outlook and include a discount factor of 5%, construction escalation rate of 6%, and a general escalation rate of 3.5%.					

For Lake Oswego, the lowest cost option is to develop a joint supply with Tigard at a 38 mgd capacity (Scenario 4). Tigard's lowest cost option is to purchase water from Portland via the new gravity connection with the WCSL-Tualatin Line (see Chapter 5) for nine months of the year, and to purchase water from Portland via the existing water transmission main during the peak summer months. Tigard's second lowest cost option is to partner with other regional suppliers in the development of the Willamette River Project.

However, without the economies of scale associated with group development at the regional level, costs increase considerably. Therefore, the next the lowest cost option for Tigard is to develop a joint supply with Lake Oswego for 38 mgd (Scenario 4).



### ES.3 CONSERVATION IMPACTS

As part of the JWSSA, the impacts of water conservation in Lake Oswego on the overall capacity, cost, and timing of the supply scenarios was assessed. Three scenarios were considered:

1. 5% Reduction Target, resulting in 0.5% reduction in per capita demands per year for eleven years,
2. 10% Reduction Target, resulting in 1.0% reduction in per capita demands per year for eleven years,
3. 25% Reduction Target, resulting in 2.5% reduction in per capita demands per year for eleven years.

Successful implementation of any of the proposed conservation strategies would enable Lake Oswego to defer the timing of the expansion of their water supply infrastructure; however, no conservation strategy will eliminate the need entirely. Therefore, Lake Oswego must still plan for the capacity expansion of their intake, raw water transmission main, treatment plant, storage, and distribution system. Depending on the conservation strategy adopted, Lake Oswego would be able to defer the timing of the expansion of supply capacity from 2017 to 2037. If supply capacity expansion is deferred beyond 2009, it is recommended that Lake Oswego implement near term reliability improvements (as identified in Scenario 1). A summary of the capital costs and timing for each of the proposed conservation strategies is presented in Table ES.5.

<b>Table ES.5 Summary of Conservation on Supply Expansion Costs and Timing Joint Water Supply System Analysis City of Lake Oswego and Tigard Water Service Area</b>				
<b>Conservation Strategy</b>	<b>Capital Cost Savings<sup>1</sup></b>		<b>Implementation Timing</b>	
	<b>Amount</b>	<b>Percentage</b>	<b>Year</b>	<b>No. of Years Deferred</b>
5% Target	N/A	N/A	2017	8
10% Target	N/A	N/A	2025	16
25% Target	\$13.4M	17%	2037	28
Notes:				
1. Presented in November 2006 dollars.				

### ES.4 INTERIM WATER SUPPLY

Lake Oswego's existing emergency intertie with the City of West Linn and a possible intertie to the City of Portland's Washington County Supply Line (WCSL-Tualatin Line) in Tigard were evaluated as possible interim peak season supplies that would allow Lake Oswego to defer near-term expansion of their existing supply system. In both cases, demands on

these alternative sources are such that peak season capacity would not be available to meet Lake Oswego's projected peak day needs (in excess of Lake Oswego's existing capacity); thus, they are not feasible means of deferring expansion of the Lake Oswego supply system.

However, the proposed connection from the WCSL-Tualatin Line would potentially provide near-term benefits to the City of Tigard by decreasing Tigard's costs for non-peak season water purchases from Portland. If Tigard were able to purchase approximately 50% of its annual average supply from Portland through the new gravity connection, the total operating savings would be approximately 14 percent per year (actual savings will depend on required agreements with Portland and WCSL owners), resulting in a potential net savings (less construction cost) during the nine years remaining on Tigard's existing contract with Portland of approximately \$1 million.

In addition, Lake Oswego, Tigard and other water providers in the region would benefit by having this connection available as an emergency intertie between the Portland and Lake Oswego supply systems.

Also considered as a potential source of interim supply was purchase of additional capacity from the South Fork Water Board (SFWB). As an alternative to constructing a new Lake Oswego intake, conceptual-level cost estimates were developed for purchasing raw water capacity from SFWB's existing intake on the Clackamas River.

The cost for purchasing raw water intake capacity from the SFWB ranges from approximately \$13 million to \$16 million for Scenarios 3 and 4, respectively. This cost is dominated by the relatively large cost of the transmission pipeline and river crossing required to convey water from the SFWB intake to the Lake Oswego intake. In comparison, the cost of constructing a new Lake Oswego raw water intake for Scenarios 3 and 4 is approximately \$4.4 million to \$4.7 million, respectively (see Chapter 2). Given the large cost difference between the SFWB option and construction of a new intake, it is recommended that the option for purchasing raw water capacity from the South Fork Water Board be dropped from further consideration in the Joint Water Supply System Analysis.

## **ES.5 WATER RIGHTS**

The State of Oregon's water rights laws are based on the prior appropriation doctrine: the first person to obtain a water right on a stream is the last to be shut-off during times of drought. Therefore, Lake Oswego's water rights on the Clackamas River have relatively high priority as compared to most other municipal water rights holders. Lake Oswego's senior water rights are the second largest on the river, at 32 mgd, and their junior water rights (6 mgd) are senior to 109 mgd of other holders rights.

Recently, new regulatory requirements promulgated under House Bill 3038 (HB 3038) have modified the requirements for municipal water right extensions and the Oregon Water Resources Department's policy for perfection of municipal water rights. Under HB 3038, it is

expected that instream flows will be increased 20%-60% over the existing instream rights on the Clackamas River. To address the potential impacts of HB 3038, Portland State University conducted extensive modeling<sup>2</sup> of the lower Clackamas River. This modeling indicates that in general, in typical weather years, the availability of Lake Oswego's water rights will not be impacted. This is due to two factors: 1) The timing of the City's peak demands, which typically occur in July or August, as compared to the timing of typical low stream flow, which occurs in September, and 2) Flow releases from Timothy Lake, based on existing agreements between other water rights holders and Portland General Electric. It should be noted that under the most extreme low flow conditions (based on the lowest flows on record), it is possible that Lake Oswego would need to reduce their supply by about 3.5 mgd over a two week period in the low flow season.

Specifically, under average conditions (average river flows from 2000-2005 and existing withdrawals by water rights holders on the Clackamas), the PSU modeling indicates that Lake Oswego would need to reduce their withdrawals from the river by about two percent (0.5 mgd) for approximately one day per year. In extreme conditions, based on flows from 2000-2005 and assuming future demands such that all holders are fully utilizing all of their available water rights (and with releases from Timothy Lake), it is possible that Lake Oswego would need to reduce their withdrawals by about 12 percent. This would result in an average reduction for Lake Oswego of 2.6 mgd in supply over a period of 40 days. Within this 40-day shortfall period, a maximum one-day reduction of up to 18 percent (4 mgd) could occur. However, it should be noted that this very conservative condition does not consider the priority of water rights. Additionally, the total existing build-out demand projections for municipal water right holders comprise only 60 percent<sup>3</sup> of the total existing maximum municipal rights on the Clackamas River.

## ES.6 ORGANIZATION AND GOVERNANCE OPTIONS

As the City of Lake Oswego and the Tigard Water Service Area consider long-term water supply improvements, governance becomes a key consideration. The nature and complexity of the proposed Joint Water Supply project, and the associated significant capital investments, requires discussion and adoption of a service delivery model beyond the existing surplus water supply contract.

There are five alternative governance structures for a joint water supply that could be used by the Cities:

1. An intergovernmental agreement ("IGA")

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<sup>2</sup> "Lower Clackamas River Model: Model Development, Calibration, Scenarios, Executive Summary, and Hydrodynamics," Water Quality Research Group, Department of Civil and Environmental Engineering, Technical Report EWR-01-06-ES, October 2006.

<sup>3</sup> It should be noted that if the current CRW applications for 96 mgd are not permitted, the build-out demand projections will be 90 percent of the maximum municipal water rights on the Clackamas River.

2. People's Utility District ("PUD")
3. Domestic water supply district ("Water District")
4. County Service District ("Service District")
5. Water Authority ("Water Authority").

The details on each governance structure is provided in Chapter 8. A summary and comparison of utility service delivery models is presented in Appendix G.

Based on discussions with staff from both Cities, the preferred governance structure, should a joint water supply be developed, is an IGA, which is formed under ORS Chapter 190 by a written agreement between local governments, and approved by ordinances of each party's Council. An IGA is the simplest form of structure for water supply. Although there are some limitations, an IGA provides the most flexibility regarding the relationship between the participating entities. An IGA may be formed without a vote by the electors, the governing body of an IGA may be appointed by the participating cities, the participating entities may retain ownership in the facilities like a partnership agreement, and the agreement between the parties defines the powers of the new entity. It is also easier to withdraw from or dissolve an IGA, or to add new partners or make an amendment, than with the other governance structures. It should be noted that an IGA is limited by the inability to levy taxes or issue general obligation bonds. However, these factors are not usually major drivers in utility settings because of the ability of the entity and its underlying partners to charge utility fees and charges and system development charges.

If Lake Oswego and Tigard agree to use an IGA as the basis of a joint water supply system, it is further recommended that the parties engage in a process of developing the anticipated terms of such an agreement. The list of issues identified in Appendix I of this report is intended to serve as a starting point for further discussion between the Cities. It is recommended that the financial terms of such an agreement, including fiscal authority, system ownership, and fiscal standards, be an initial priority since these terms will establish the basis for subsequent financial evaluation of the proposed joint supply system.

## **ES.7 BENEFITS OF JOINT SUPPLY**

The benefits of a potential joint water supply between Lake Oswego and Tigard are presented below:

### **COST SAVINGS**

**Partnering with Tigard would provide Lake Oswego significant financial benefits.** By jointly constructing a 38 mgd water supply system with Tigard, Lake Oswego and its ratepayers could save about \$63 million in equivalent annual costs over the next 25 years, including about \$23 million in one-time capital savings.

**Partnering will minimize and smooth future rate increases for Lake Oswego.** By jointly constructing a 38 mgd water supply system with Tigard and assuming a 24mgd/14mgd (Lake Oswego/Tigard) allocation of new supply capacity, rate increases for Lake Oswego are forecasted to be increase cumulatively 56% over the next 25 years, as compared to cumulative increases of almost three times as much (148%) for the "Lake Oswego go it alone" scenario.

Based on a capacity share cost allocation, the least cost options for Tigard are to purchase water from Portland via a new intertie with the WCSL-Tualatin Line or to partner with TVWD to develop a supply on the Willamette River (\$98 and \$123 million, respectively). However, **Tigard's third lowest cost option is to partner with Lake Oswego for 38 mgd (\$141 million), and would provide a supply on the Clackamas River.**

Although purchasing water from Portland is the least cost scenario for Tigard in the 25-year timeframe, the rate impacts of this scenario do not exhibit the same results. While the other scenarios include capital projects that can be offset with a supply SDC revenue stream, purchased wholesale water costs cannot be offset with any additional revenue source. Therefore, **the resulting annual rate impacts of Tigard's water supply options** are a cumulative increase of about 113% over the next 25 years to partner with Lake Oswego, 128% to partner with other regional providers on the Willamette River, or 169% to purchase water from Portland.

**Partnering can be the first step in a multi-step process.** An agreement to form a partnership means preliminary work related to cost sharing, operating protocols, form of governance, and allocation scenarios can be initiated without burdening either City with the need to immediately finance a large capital project.

### **WATER RIGHTS**

**Partnering would help secure Lake Oswego's rights.** Lake Oswego holds senior water rights (32 mgd) and junior water rights (6 mgd) on the Clackamas River. These rights are of relatively high priority compared with other municipal users of the river, but rights in excess of future demands may be at risk from recent increases in instream rights. Partnership with Tigard would enable Lake Oswego to secure the unused portion of their existing water rights.

### **CONSERVATION**

**Partnering plus water conservation would provide significant benefits to both Cities.** A successful conservation program in Lake Oswego would shift a greater capacity share to Tigard. Depending on conservation savings, Tigard's share could be sufficient to completely meet its long-term build-out demands. This would result in Tigard's cost share increasing to about 70% of the cost of the supply expansion needed to meet both cities' future water demands.

## REGIONAL RELIABILITY

**Constructing an intertie** between Tigard and the Washington County Supply Line **would save Tigard approximately \$300,000 in annual operating costs** and would pay for itself in about 5 years.

**Partnering would provide regional benefits.** Lake Oswego, Tigard, and other water suppliers would benefit from connections to other regional systems for emergency backup, improved reliability and source optimization, and is consistent with the goals of the Regional Water Supply Plan.

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## WATER SUPPLY SYSTEM EVALUATION

### 1.1 BACKGROUND

The City of Lake Oswego operates a raw water intake on the Clackamas River with water rights to appropriate a maximum of 38 million gallons per day (mgd). The water is treated at the Lake Oswego Water Treatment Plant (WTP), which has a current capacity of approximately 16 mgd. The water is then distributed to retail users within the Lake Oswego service area, as well as to several wholesale customers, including the City of Tigard.

In recent years, the City of Lake Oswego has been providing between one and three mgd of drinking water to the City of Tigard. Tigard's primary supplies of drinking water are provided by the City of Portland, the Joint Water Commission (JWC), and the City of Lake Oswego. In addition, Tigard has two Aquifer Storage and Recovery (ASR) wells that are used to help meet peak seasonal demands.

#### 1.1.1 Joint Water Supply System Analysis

Because Tigard currently does not have an ownership position in a primary source of water supply, it has limited leverage to control the increasing cost of water or the availability of the water supply. Therefore, Tigard is limited in its ability to ensure a reliable water supply for the present and the future.

Conversely, the City of Lake Oswego has water rights on the Clackamas River, which provides a reliable supply of high quality water, with existing water rights in excess of the current projections for Lake Oswego's build-out maximum day demand. With increasing pressure on water rights in Oregon, Lake Oswego faces the potential loss of the excess water rights and the associated value of that water.

To address these issues, the Cities of Lake Oswego and Tigard have initiated a comprehensive study to develop and evaluate options for the possible formation of a joint water supply system to serve the communities of Lake Oswego and Tigard. This Joint Water Supply System Analysis (JWSSA) is intended to identify a preferred supply scenario as well as the permitting, governance, design, financing, and construction related issues associated with implementing the proposed joint water supply system.

### 1.2 PURPOSE

The purpose of this chapter is to present the findings and recommendations of the water supply system evaluation conducted for the Cities of Lake Oswego and Tigard (Cities) as part of the Joint Water Supply System Analysis. This effort includes an evaluation of the capacity of the existing water supply system infrastructure, development of population and demand forecasts for the two service areas, and identification of various water supply scenarios for the Cities.

## 1.3 SUPPLY INFRASTRUCTURE

### 1.3.1 Existing

A brief evaluation of the major components of the existing infrastructure was conducted to identify any issues which may influence the feasibility of developing a joint water supply for the service areas of Lake Oswego and Tigard. Additionally, the potential system improvements which may be required as part of the joint water supply were also identified. A description of the existing facilities is provided below.

The Lake Oswego water supply infrastructure consists of a raw water intake and pump station, a raw water transmission main, the water treatment plant, and a finished water distribution system that includes over 200 miles of pipeline, 15 storage reservoirs, 13 water pump stations, and 25 pressure reducing stations. Also included in the evaluation is the City of Tigard's Bonita Road Pump Station, which is the point of transfer from the Lake Oswego service area to the Tigard water service area.

#### 1.3.1.1 Clackamas River Intake

Lake Oswego's existing raw water intake is located along the northern bank of the Clackamas River in the City of Gladstone. The intake was constructed in 1968 and delivers raw water via the raw water transmission main to the WTP. The intake structure is comprised of three fish screens, three screen cleaners, and four vertical turbine raw water pumps.

The intake structure was modified in 2002 to meet juvenile fish protection requirements. As part of these modifications, the fish screens and a screen cleaning system were installed, and the foundation of the intake structure was anchored to the underlying bedrock to protect the structure against catastrophic damage during a seismic event.

The intake structure was determined to have a significant risk of catastrophic damage due to the low friction and adhesion coefficients between the floor slab and the underlying soil. Therefore, the structure was modified in 2002 to update the seismic reinforcement and meet 1997 Uniform Building Code requirements for a Zone 3 seismic event.

Following these modifications, structural defects in the floor slab were observed. A structural inspection and evaluation was conducted in 2004<sup>1</sup>, which noted the following observations:

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<sup>1</sup> City of Lake Oswego Clackamas River Intake Structural Evaluation and Finite Element Analysis, MWH, 2005.



- The concrete floor slab is not uniform in strength and quality.
- Aggregate-silica reactivity (ASR) is likely occurring which causes delamination and spalling in the concrete.
- Settling has occurred (1.25-1.5 inches) since the installation of the anchors, resulting in 40%-45% decrease in the tension of the anchor bolts.

Because of the recent spalling of the concrete around the anchors, the capacity of the floor slab to withstand a significant seismic event has likely been compromised.

The results of the seismic inspection and testing resulted in a further analysis from which four scenarios were presented:

- No improvements, but continued monitoring of the structure.
- Add steel plates to the floor slab and grout the spalled areas, which offers limited structural benefits but would likely reduce ASR initiated spalling from worsening.
- Install a new cast-in-place concrete slab over the existing floor slab to increase the structural integrity but which may reduce pumping capacity due to loss of submergence.
- Construct a new intake structure if it is determined that the existing intake has reached the end of its useful life, or if the City identifies a need for additional water supply that cannot be met by the existing intake.

The City has not made a decision regarding implementation of these scenarios; a further evaluation of the raw water intake is being conducted as part of this Joint Water Supply System Analysis. The results of this evaluation will be presented as part of Chapter 2.

The existing maximum capacity of the raw water intake is 16.5 mgd (with all four pumps in service). However, the reliable capacity of the intake (defined as the capacity of the intake with the largest pump out of service) is only 11.7 mgd. Therefore, the existing demands of the service area are being met not by reliable capacity, but by the maximum capacity of the intake. By operating the intake at maximum capacity, rather than reliable capacity, the City is assuming a much higher risk of operation; namely, the inability to meet demands should the largest pump fail.

In addition to concerns regarding the reliable capacity of the intake pumps and the intake structural issues, concerns regarding sedimentation accumulation around the intake screens and decreasing river levels will be addressed as part of Chapter 2. These issues may ultimately impact the capacity of the raw water intake needed to serve both water service areas.

### **1.3.1.2 Raw Water Transmission Main**

The existing raw water transmission main was constructed in 1968 and is a 27-inch diameter concrete cylinder pipe that conveys raw water from the intake structure to the

WTP. The condition of the transmission main is uncertain, although the pipeline does have a cathodic protection (CP) system to minimize corrosion of the pipeline's steel shell. The CP system was constructed in four phases from 1999 to early 2003. During Phases 2 and 4, it was determined that certain areas had become discontinuous since the original installation of the CP system. The discontinuous areas were caused by the breakdown of the existing corrosion on the exterior of the pipeline and were discovered during the installation of the CP system. Once the areas were identified, the steel bond straps and the associated discontinuous areas were repaired.<sup>2</sup>

The existing CP system has recently been tested again; the section of pipe from the intake to the west side of the Willamette River has been shown to be continuous, however, from this point on to the WTP, discontinuities exist. To better evaluate the remaining useful life of the pipeline, it is recommended that the pipeline be inspected to determine the condition of the pipe and identify areas to be repaired.

A single new replacement pipeline, or a second, parallel raw water transmission pipeline will need to be constructed to meet the projected water demands for Lake Oswego alone, as well as the combined demands of the Lake Oswego and Tigard Water Service Areas, should a joint water supply system be implemented.

#### **1.3.1.3 Water Treatment Plant**

The Lake Oswego WTP was constructed in 1967 and was expanded in 1980 to reach its current capacity of 16 mgd. In 1999 and 2000, modifications were made to the chemical storage and feed system, and engineered concrete sludge lagoons were constructed to replace the original earthen ponds.

The current facility is sited within a residential neighborhood within the City of West Linn and occupies approximately six acres. An adjacent 3.30 acres south of the existing property was acquired by Lake Oswego to accommodate future facility expansions. To maintain a healthy relationship with the surrounding community of West Linn, Lake Oswego has elected to preserve the natural condition of the adjacent property. Therefore, the expansion strategy for the Lake Oswego WTP must be reassessed.

The existing infrastructure of the WTP is overall in good condition, however, the maximum current capacity of the WTP is 16 mgd with one filter out of service. Additionally, the sludge drying lagoons are currently undersized to manage the entirety of the existing solids load. Therefore, the WTP will need to be expanded to treat the ultimate demand of the Lake Oswego water service area, as well as the combined demand with the Tigard water service area. The four finished water pumps have a theoretical maximum capacity of 24 mgd. However, because the #4 finished water pump is a low head pump, and the #1-#3 finished water pumps are high head pumps, hydraulic constraints prevent all four pumps from being operated in combination. Therefore, the realistic maximum capacity of the finished water

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<sup>2</sup> Cathodic Protection of Raw and Finished Water Transmission Mains - Work Order 1133, Cascade Corrosion Consulting Services, Inc., 2003.

pumps is 16 mgd. The reliable capacity of the pumps (in this case, with the second largest pump out of service) is only 12 mgd.

It should be noted that a recent leak was discovered at the WTP in a 14-inch pipe which conveys water from the surge tank to the High Service Pump "B" header. A subsequent hydraulic analysis<sup>3</sup> of the Lake Oswego distribution system identified that the surge tank is undersized by 50 percent. A new surge tank, with a capacity of 30,000 gallons, is recommended to be constructed to meet the existing capacity of the Lake Oswego water infrastructure.

Further discussion regarding the necessary expansion of the WTP will be presented as part of Chapter 2.

#### **1.3.1.4 Transmission and Storage**

The Lake Oswego transmission system is comprised of over 200 miles of pipeline in ten pressure zones throughout the water service area. The pipelines range in diameter from one to 42 inches, and include steel, ductile iron, cast iron, galvanized iron, polyvinyl chloride, and asbestos cement pipe. The system also includes 13 water pump stations and 16 treated water storage reservoirs with a combined storage capacity of 27 million gallons.

The transmission and storage system was constructed over several decades. The Tenth Street Reservoir was constructed in 1925, and the Aspen Street Reservoir was recently constructed in 2004, although the majority of the transmission system was constructed from the 1960s through the 1980s.

The finished water transmission main has an existing cathodic protection system, which indicates that the finished water transmission main is predominantly continuous. However, discontinuities have been shown to exist in the area near Kenthorpe Road, on which the WTP is located. In early 2007, maintenance staff installed additional cathodic protection stations along this section of the finished water transmission main. It is recommended that this section of pipeline be re-assessed to determine whether the discontinuous areas were rectified as part of the installation of the new cathodic protection stations.

The hydraulic capacity of the distribution system will be evaluated to determine whether expansions will be needed to accommodate the additional capacity associated with the joint water supply system. Further description of the distribution system and the results of the hydraulic evaluation will be presented in Chapter 2.

#### **1.3.1.5 Bonita Pump Station**

The Lake Oswego distribution system connects to the Tigard water service area through Tigard's Bonita Road Pump Station. The Bonita Pump Station was constructed in 1973, and is located just west of I-5 at Bonita Road and Sequoia Parkway. The pump station is

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<sup>3</sup> City of Lake Oswego Finished Water Pumping Surge Control System Review, Murray Smith & Associates, February 2006.

comprised of a below grade prefabricated steel structure which houses three vertical mounted end suction centrifugal pumps with a reliable capacity of 5.3 mgd and a maximum capacity of 8 mgd. The pump station is located on a constrained site consisting of existing public right-of-way for Bonita Road; the total fenced area is approximately 900 square feet, bounded by Bonita Road to the north, Sequoia Parkway to the west, and a commercial parking lot to the south and east. The limited size of the property may pose difficulties in increasing capacity of the pump station in the future. The pump station is currently fed from parallel 16-inch and 24-inch pipelines (part of Lake Oswego's infrastructure) and discharges to existing 16-inch and 24-inch pipelines to serve the 410-foot pressure zone of Tigard's distribution system. The hydraulic evaluation of this existing piping configuration will be presented in Chapter 2.

#### **1.3.1.6 Aquifer Storage and Recovery**

The City of Tigard constructed its first aquifer storage and recovery (ASR) well in 2001. In 2005, Tigard injected nearly 115 million gallons into the storage and is therefore able to reliably recover between 1.0 and 1.4 mgd when necessary. The system is in its fourth year of operation and the water is continually tested to verify safe storage conditions. The city recently completed construction of a second ASR well which will provide an estimated storage capacity of 160 million gallons by 2007. It is anticipated that the ASR system will provide a reliable 3.5 mgd capacity for supplemental supply during times of peak demand.

#### **1.3.2 Anticipated Improvements**

The anticipated supply infrastructure improvements are necessary based on meeting either 1) the ultimate Lake Oswego water service demands or 2) the combined Lake Oswego and Tigard ultimate water service demands. Table 1.1 presents the basis for the proposed supply improvements.

<b>Table 1.1 Required Supply Improvements Joint Water Supply System Analysis City of Lake Oswego and Tigard Water Service Area</b>					
	<b>Raw Water Intake Structure</b>	<b>Raw Water Transmission Main</b>	<b>Water Treatment Plant</b>	<b>Transmission and Storage</b>	<b>Bonita Pump Station</b>
Lake Oswego Build-out Demand	✓	✓	✓	✓	
Combined Lake Oswego / Tigard Build-out Demand	✓	✓	✓	✓	✓

### **1.3.2.1 Raw Water Intake**

The Lake Oswego raw water intake will need to be upgraded to increase the capacity of the existing influent pumps to handle the Lake Oswego and Tigard ultimate demands. Additionally, the structural integrity of the intake needs to be addressed, as well as the impacts of the decreasing river levels and sediment accumulation.

Regardless of whether the joint water supply system is implemented, the capacity, structural integrity, and impacts of the river levels and sediment accumulation need to be addressed to ensure that the raw water intake infrastructure is capable of meeting the ultimate Lake Oswego service area demands. Recommendations regarding these issues will be presented as part of Chapter 2 "Evaluation of Water Supply Facility Alternatives."

### **1.3.2.2 Raw Water Transmission Main**

The raw water transmission main can currently convey approximately 16 mgd to the WTP, although only 13 mgd can be conveyed at the standard design velocity of 5 feet per second. Additionally, the projected demands of the Lake Oswego water service area will require an expansion of the capacity of the existing raw water transmission main. Therefore, to increase the raw water transmission capacity necessary to meet the ultimate demands of the two water service areas, the existing transmission main should be replaced with a larger capacity pipeline, or an additional, parallel pipeline should be constructed. Additionally, it is recommended that annual testing of the new pipeline should be conducted to determine the pipe to soil potentials and/or the continuity of the pipeline. The recommended size, material, and location of the pipeline will be presented in Chapter 2.

### **1.3.2.3 Water Treatment Plant**

The WTP capacity, including solids handling, will need to be expanded in the future to meet the ultimate demands of the Lake Oswego and Tigard water service areas. The capacity increase can be obtained through conventional treatment, high rate conventional treatment, or membrane filtration. Further analysis regarding the advantages and disadvantages of

each type of treatment, as well as the associated infrastructure, will be addressed as part of Chapter 2.

#### **1.3.2.4 Transmission and Storage**

Based on the results of the hydraulic evaluation, elements of the transmission system infrastructure will likely need to be expanded to meet the ultimate demands of the two water service areas. Recommendations regarding the expansion of the existing infrastructure will be presented in Chapter 2.

#### **1.3.2.5 Bonita Pump Station**

Lake Oswego currently has only one significant water supply source: the Clackamas River. By relocating the Bonita Pump Station one block further west along Bonita Road (at the intersection with SW 72nd Avenue) a connection could be made to Tigard's existing 36-inch pipeline, which conveys raw water from Bull Run, an acknowledged high quality water source. This would provide a redundant water source for Lake Oswego, and would create the flexibility needed to increase reliability to both water service areas.

### **1.4 DEMAND PROJECTIONS**

The demand projections are based on historical per capita demands and projected population growth for the water service area. The Lake Oswego per capita demands are based on historical demands from 2000-2005. Per direction from Lake Oswego staff, the demand projections for the Lake Oswego wholesale customers and the Stafford Triangle are based on the Lake Oswego per capita demands. The Tigard demand projections are based on the per capita demands identified in the "Water Distribution System Hydraulic Study" (MSA, May 2000). Population projections for Lake Oswego and Tigard service areas are based on data provided by the Metro Regional Center for the year 2030.

A summary of the basis used to determine the historical population, per capita demands, and projected population for each water service area is presented in Table 1.2.

<b>Table 1.2 Basis for Per Capita Demands and Historical and Projected Population Joint Water Supply System Analysis City of Lake Oswego and Tigard Water Service Area</b>			
<b>Factor</b>	<b>Lake Oswego Service Area</b>	<b>Stafford Triangle</b>	<b>Tigard Service Area</b>
Historical Population	Portland State University and Metro Regional Center	Metro Regional Center	U.S. Census Bureau
Per Capita Demands	Lake Oswego Water Treatment Plant Data 2000-2005 <sup>1</sup>	N/A	City of Tigard Data 2000-2005
Projected Population	Saturation Build-out Analysis <sup>2</sup>	Metro Regional Center <sup>3</sup>	Metro Regional Center
Notes:			
1. The three-day peak demand was used to determine the “Peak-Day” per capita demands for the Lake Oswego City Only service area. Definitions for the peak day demands, etc. are provided in Section 1.4.3.			
2. “City of Lake Oswego Water Management and Conservation Plan,” CH2M Hill, 2007.			
3. The Lake Oswego Water Service Area in 2030 will include both the Stafford triangle and the water districts currently located within the Urban Services Boundary.			

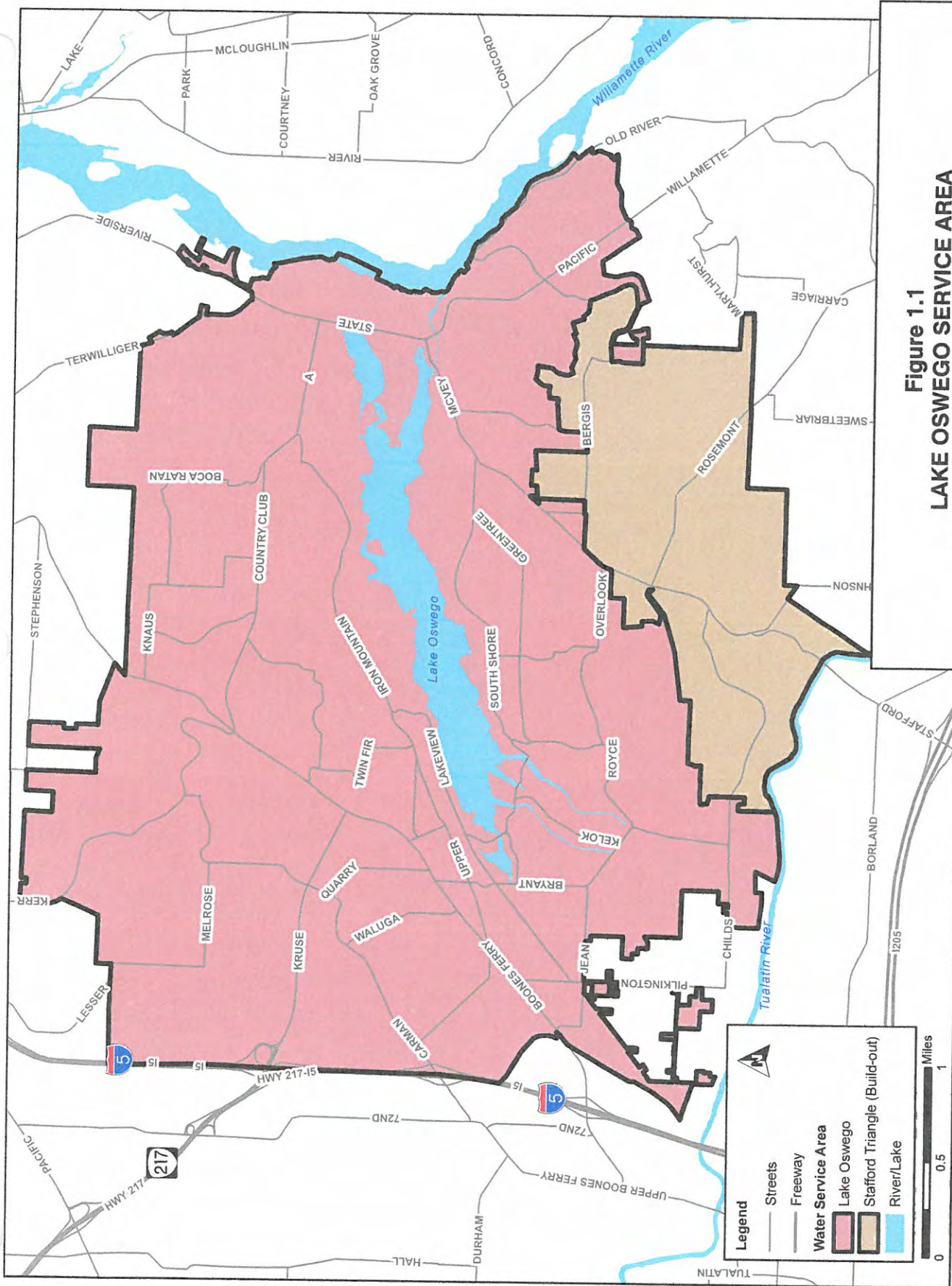
## 1.4.1 Service Areas

### 1.4.1.1 Lake Oswego Water Service Area

For the purposes of this study, the Lake Oswego Water Service Area is defined as the area within or adjacent to the current Urban Services Boundary (USB). The water service area includes Lake Oswego City Only, as well as Alto Park, Forest Highlands, Glenmorrie, Lake Grove, portions of Palatine Hill, Rivergrove, Southwood Park, and Skylands water districts.

Lake Oswego City Only is defined as the Lake Oswego city limits, less the existing wholesale areas within the city limits. This area was defined in order to provide an accurate correlation between population and water demand. Further explanation for the use of this area is contained in section 1.4.2.1.1.

The Stafford Triangle comprises approximately 925 acres north of the Tualatin River, as shown in Figure 1.1. The Stafford Triangle, which although currently not within the USB, is expected to be served by the City of Lake Oswego in the future and be included in the water service area. It is assumed that the City of Lake Oswego will be responsible for providing water to all customers (including existing wholesalers and the Stafford Triangle) by build-out. The Lake Oswego Water Service Area is presented in Figure 1.1.



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

**Legend**

- Streets
- Freeway
- Water Service Area**
- Lake Oswego
- Stafford Triangle (Build-out)
- River/Lake

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#### **1.4.1.2 Tigard Water Service Area**

The Tigard Water Service Area includes the majority of the City of Tigard, the City of King City, the City of Durham, a portion of the Tualatin Valley Water District, and unincorporated areas of Washington County. Also included in the build-out service area are Urban Reserve Areas Nos. 47-79. Figure 1.2 presents the Tigard Water Service Area.

### **1.4.2 Population**

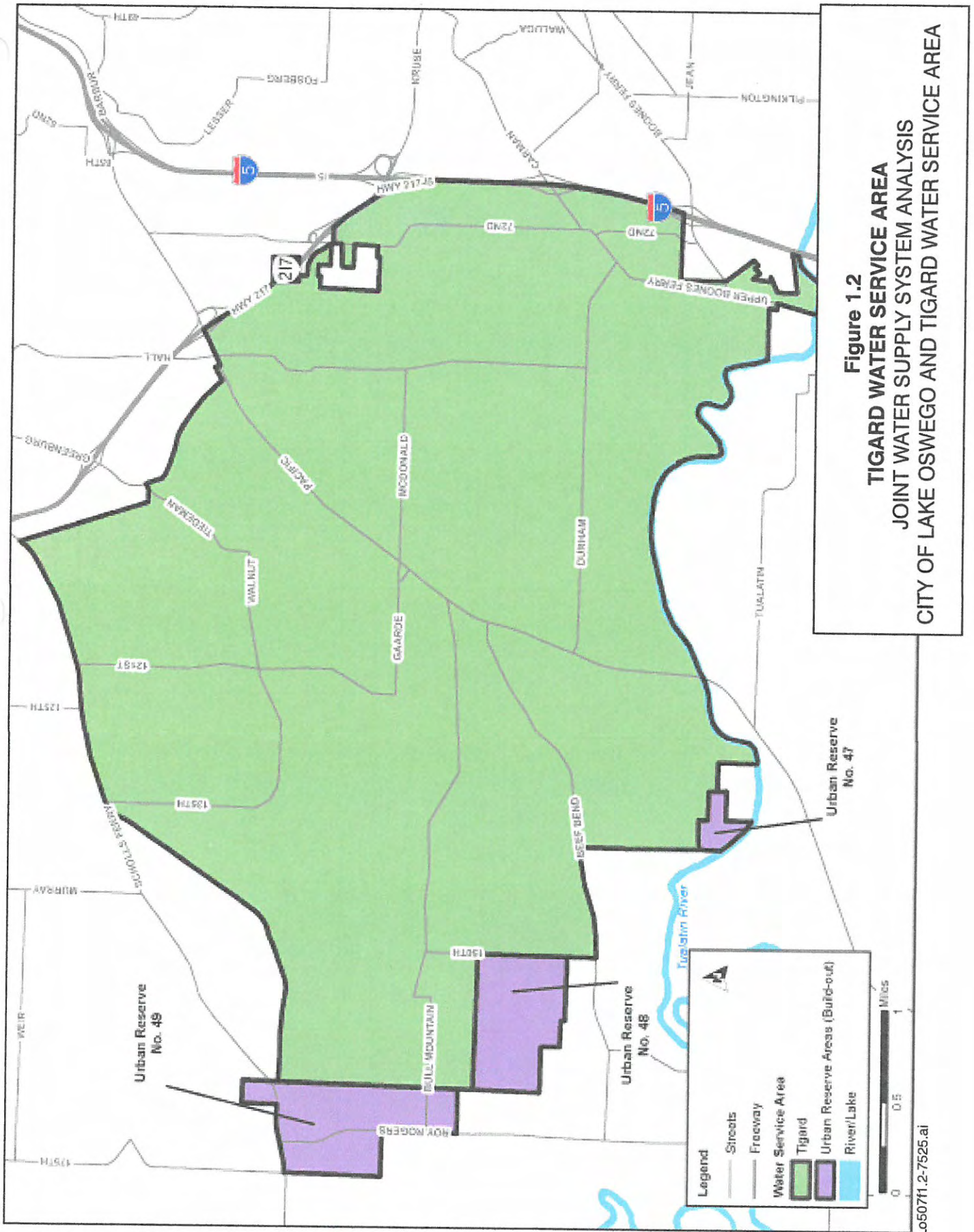
#### **1.4.2.1 Historical Population**

##### **1.4.2.1.1 *Lake Oswego City Only***

The historical population estimates from 2000-2005 were obtained from Portland State University Population Research Center (PSU). In order to obtain an accurate estimate for per capita demands, the 2005 population was developed for Lake Oswego City Only. These estimates were obtained using the PSU historical population data for the City of Lake Oswego, and subtracting out the populations of the wholesaler water districts within LO city limits. Estimates for the wholesaler populations were developed by calculating the percent of a given wholesaler Metro TAZ block within the city limits, and multiplying that percentage by the corresponding Metro TAZ block population. The wholesaler populations for 2000-2004 were determined by adjusting the 2005 wholesaler population by the PSU population growth rates. The Lake Oswego City Only population was then determined by subtracting the adjusted wholesaler population from the published PSU population estimates.

The Lake Oswego City Only population, in conjunction with the Lake Oswego City Only water demand, provides the most accurate correlation between the water demand and the population served. This approach was used for several reasons:

- Historic demand data was not available for the portion of wholesaler population that received water from LO because these wholesalers also have other sources
- Some wholesaler populations include areas inside and outside of city limits.
- By excluding wholesaler population, LO only demand data corresponds directly with the Lake Oswego City Only population.



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

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The Lake Oswego City Only population for the years 2000-2005 is provided in Table 1.3.

<b>Table 1.3 Lake Oswego City Only Population Estimates from 2000-2005 Joint Water Supply System Analysis City of Lake Oswego and Tigard Water Service Area</b>						
<b>Year</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>
Population	32,669	32,822	32,978	33,080	33,145	33,278

#### **1.4.2.1.2 Tigard Water Service Area**

The Tigard historical population estimates from 2000-2005 were obtained from the United States Census Bureau. The estimates encompass the area within the Tigard water service boundary, and are escalated from the published estimates for the Tigard city limits based on census block data for the surrounding areas from the decennial census in 2000. The Tigard service area population estimates are provided in Table 1.4.

<b>Table 1.4 Tigard Population Estimates from 2000-2005 Joint Water Supply System Analysis City of Lake Oswego and Tigard Water Service Area</b>						
<b>Year</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>
Population	49,954	51,468	52,700	53,286	54,395	55,850

Note: The Tigard water service area boundary used in this study differs slightly from that used in the 2000 master plan "Water Distribution System and Hydraulic Study" (MSA, 2000) and includes an area in the eastern portion of the Tigard city limits which is part of the Tualatin Valley Water District but is served by Tigard. Therefore, a direct comparison of the population estimates in this study and that of the master plan cannot be made. However, it should be noted that the population estimate for 2005 (based on the revised service area and the US Census Bureau data) is very similar to the population estimate that is currently being used by Tigard staff (55,900 persons) to determine per capita demands.

#### **1.4.2.2 Population Forecasts**

##### **1.4.2.2.1 Lake Oswego Water Service Area**

The Lake Oswego water service area 2030 population forecast was developed by escalating the 2005 population estimate by the following rates<sup>4</sup>:

- Lake Oswego City Only: 0.5%
- Outside Lake Oswego City Limits<sup>5</sup> and Stafford Triangle: 1.69%

<sup>4</sup> Per direction from Lake Oswego staff based on historical growth rates and Metro projected growth rates.

<sup>5</sup> 2005 population estimates for Lake Oswego water service area outside the City Limits (6,543) indicate that build-out conditions have been attained for 711 persons. The remaining population (5,832) is projected to grow at 1.69% (per Metro growth rate).

To fully evaluate the potential build-out population forecast, a saturation analysis was conducted. The saturation analysis-based population forecast predicts a total of 54,098 people within the Lake Oswego water service area. Further explanation of this analysis can be found within the CH2M Hill report, "City of Lake Oswego Water Management and Conservation Plan," to be finalized in 2007.

A summary of the population forecasts is provided in Table 1.5.

#### 1.4.2.2.2 *Stafford Triangle*

The 2030 population forecast for the Stafford Triangle was determined by escalating the Metro 2005 population estimate of 1,707 people at a 1.69% growth rate over 25 years.

The build-out population forecasts for the Stafford Triangle were evaluated based on two methodologies: a low estimate based on zoning capacity (2,633 people), and a high estimate based on Metro forecasts (6,918 people). It is recommended that the build-out Stafford Triangle population be based on the more conservative Metro estimate, and an available 782 net developable acres at 8.85 persons/acre.

#### 1.4.2.2.3 *Tigard Water Service Area*

The population forecasts for the year 2030 are based on data provided by the Metro Regional Center. The population projection for the Tigard Water Service Area was determined using an intersecting polygon method to determine the percentages of the TAZ jurisdictions (and associated populations) within the service area.

<b>Table 1.5 Summary of Population Forecasts Joint Water Supply System Analysis City of Lake Oswego and Tigard Water Service Area</b>			
<b>Service Area</b>	<b>2005</b>	<b>2030</b>	<b>Build-Out</b>
Lake Oswego <sup>1</sup>	39,821	47,275	54,098
Stafford Triangle <sup>2</sup>	1,707	2,595	6,918
Tigard	55,850	64,045	85,560 <sup>3</sup>

Notes:

1. The Lake Oswego Population includes Lake Oswego City Only and current wholesalers within the Urban Service Boundary.
2. The Stafford Triangle is located within the build-out Lake Oswego water service area boundary. This area is not currently served water by the Lake Oswego WTP.
3. The Tigard Build-out population is based on a service area which includes all of Urban Reserve Areas Nos. 47-49. These areas are not included in the 2005 population estimate or the 2030 population projection.

### 1.4.3 Historical Water Demand Data

The production data was provided by the Lake Oswego WTP staff and presents the Finished Water Production, the Reservoir Storage, and the System Demand on a daily basis from January 1, 2000 through December 31, 2005. The Finished Water Production and Reservoir Storage are direct inputs from the Lake Oswego SCADA system. The System Demand is hand entered by WTP staff.

Because the hand-entered System Demand values were subject to human error (typos, incorrect readings, readings not taken at exactly midnight), a Calculated System Demand was determined for each day.

$$\text{Calculated System Demand} = \text{Finished Water Production} \pm \text{Change in Storage}$$

It should be noted that the 2002 production and demand data is incomplete, resulting in annual average flow for 2002 that is significantly lower than that of the surrounding years. Therefore, the data for 2002 was not included in the determination of the average day flow, peak day flow, average day per capita demand, or peak day per capita demands for the Lake Oswego service area.

The ultimate demands on the system were developed based on the average historical peaking factor from 2000-2001 and 2003-2005. This methodology predicts the most conservative (i.e. highest) demands on the system. However, recognizing that the ultimate demand on the water infrastructure realistically arises from a three-day maximum, rather than a one-day peak, the three-day maximum is also presented. The three-day maximum (or 3-day Peak Demand) was determined by identifying the maximum demand on the system over a consecutive three-day period, and averaging this demand over three days.

A summary of the average day and peak day demands, as well as their respective peaking factors, is provided in Table 1.6. Definitions of the acronyms presented in Tables 6-11 are presented below:

- Average Day Demand (ADD): The average day demand is the total annual demand divided by 365 days.
- Peak Day Demand (PDD): The peak day demand is the highest demand that occurs on any single day within the calendar year.
- 3-Day Peak Demand (3DPD): The three day peak demand is the maximum consecutive three day demand occurring within the calendar year. The three day peak demand does not necessarily include the peak day demand.
- Peaking Factor (PF): The peaking factor is the ratio of the peak day demand to the average day demand.
- 3-Day Peaking Factor (3DPF): The three day peaking factor is the ratio of the three day peak demand to the average day demand.

<b>Table 1.6 Summary of Lake Oswego City Only Demands and Peaking Factors<sup>1</sup> Joint Water Supply System Analysis City of Lake Oswego and Tigard Water Service Area</b>					
<b>Year</b>	<b>ADD (mgd)</b>	<b>Maximum Demands (mgd)</b>		<b>Peaking Factor</b>	
		<b>PDD</b>	<b>3DPD</b>	<b>PF</b>	<b>3D PF</b>
2000	5.66	12.58	12.54	2.22	2.22
2001	5.39	13.63	12.79	2.53	2.37
2003	5.68	12.22	11.74	2.15	2.07
2004	5.75	13.86	11.70	2.41	2.03
2005	5.62	12.25	10.90	2.18	1.94
Average	5.62	12.91	11.93	2.30	2.12

Notes:

1. The demands presented in this table include only the demands of the Lake Oswego City Only and not the demands of the wholesalers located within the Lake Oswego water service area or Tigard.

The Tigard water service area average day demands, peak day demands, and 3-day peak demands were provided by Tigard staff. A summary of the historical demands and associated peaking factors for the Tigard water service area are presented in Table 1.7.

<b>Table 1.7 Summary of Tigard Demands and Peaking Factors Joint Water Supply System Analysis City of Lake Oswego and Tigard Water Service Area</b>					
<b>Year</b>	<b>ADD (mgd)</b>	<b>Maximum Demands (mgd)</b>		<b>Peaking Factor</b>	
		<b>PDD</b>	<b>3DPD</b>	<b>PF</b>	<b>3D PF</b>
2000	6.23	13.1	12.7	2.10	2.03
2001	5.88	11.6	10.9	1.97	1.85
2002	6.29	12.7	12.4	2.02	1.98
2003	6.60	14.3	14.1	2.17	2.13
2004	6.53	13.2	13.0	2.02	1.99
2005	6.04	13.4	12.3	2.22	2.03
Average	6.26	13.1	12.6	2.08	2.00

#### 1.4.4 Per Capita Demands

The historical average of the average day per capita demand over the five year timeframe (2000-2001 and 2003-2005), as well as the average of the peak day per capita demand, were used to determine the average and peak day per capita demand for Lake Oswego City Only. The Lake Oswego City Only per capita demands are summarized in Table 1.8.

These per capita demands were applied to the entire Lake Oswego USB and the Stafford Triangle, per direction from Lake Oswego staff.

<b>Year</b>	<b>Population</b>	<b>Average Day Per Capita Demand (gpcd)</b>	<b>Peak Day Per Capita Demand (gpcd)</b>	<b>3-Day Peak Per Capita Demand (gpcd)</b>
2000	32,669	173	385	384
2001	32,822	164	415	390
2003	33,080	172	369	355
2004	33,145	173	418	353
2005	33,278	169	368	328
Average	32,999	170	391	362

The historical average of the average day per capita demand over the six year timeframe (2000-2005), as well as the average of the peak day per capita demand, was used to determine the average and peak day per capita demand for the Tigard Water Service Area. The Tigard service area per capita demands are summarized in Table 1.9.

<b>Year</b>	<b>Population</b>	<b>Average Day Per Capita Demand (gpcd)</b>	<b>Peak Day Per Capita Demand (gpcd)</b>	<b>3-Day Peak Per Capita Demand (gpcd)</b>
2000	49,954	125	262	253
2001	51,468	114	225	211
2002	52,700	119	241	236
2003	53,286	124	268	264
2004	54,395	120	243	239
2005	55,850	108	240	220
Average	52,942	118	247	237

The recommended per capita demands for the Lake Oswego City Only and Tigard service area are provided in Table 1.10.

	<b>Average Day Demand (mgd)</b>	<b>Peak Demand (mgd)</b>	<b>Average Day Per Capita Demand (gpcd)</b>	<b>Peak Demand (gpcd)</b>
Lake Oswego Service Area <sup>1</sup>	5.62	12.91	170	391
Tigard Service Area	6.26	13.05	118	247

Notes:

- Per Lake Oswego staff, the Stafford Triangle (which lies within the build-out Lake Oswego service area) is assumed to have the same average day per capita and 3-day maximum per capita demands as the City of Lake Oswego.

#### **1.4.5 Demands Projections**

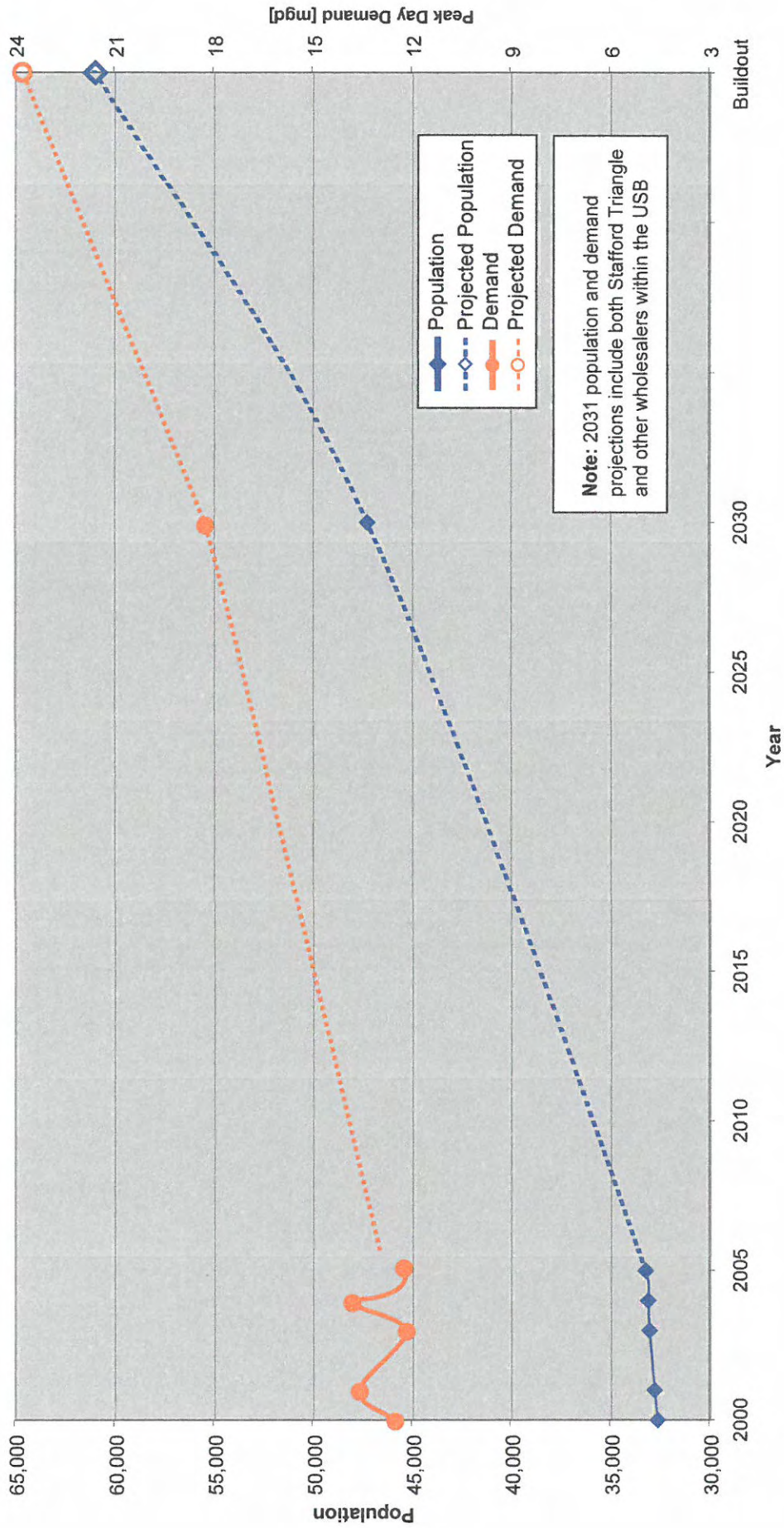
Based on the per capita demands presented in Table 1.10, and the population forecasts in Table 1.5, the projected water demands for the Lake Oswego and Tigard service areas were calculated. These demand projections are presented in Figures 1.3 and 1.4, as well as in Table 1.11. It should be noted that the demand projections presented in Figures 1.3 and 1.4 are based on the average historical demands for each water service area from 2000-2005.



	Current and Projected Demands for Lake Oswego and Tigard Joint Water Supply System Analysis City of Lake Oswego and Tigard Water Service Area											
	2005					2030					Build-out	
	Average Day Demand (mgd)	Peak Day Demand (mgd)	3-Day Peak Demand (mgd)	Average Day Demand (mgd)	Peak Day Demand (mgd)	3-Day Peak Demand (mgd)	Average Day Demand (mgd)	Peak Day Demand (mgd)	3-Day Peak Demand (mgd)	Average Day Demand (mgd)	Peak Day Demand (mgd)	3-Day Peak Demand (mgd)
Lake Oswego <sup>1</sup>	5.6	12.3	10.9	8.1	18.5	17.1	9.2	21.2	19.6			
Stafford Triangle	N/A <sup>2</sup>	N/A <sup>2</sup>	N/A <sup>2</sup>	0.4	1.0	0.9	1.2	2.7	2.5			
Subtotal of Lake Oswego Water Service Area	5.6	12.3	10.9	8.5	19.5	18.0	10.4	23.9	22.1			
Tigard	6.0	13.4	12.3	7.6	15.8	15.2	10.1	21.1	20.3			
Total	11.6	25.7	23.2	16.1	35.3	33.2	20.5	45.0	42.4			

Notes: N/A: Not applicable

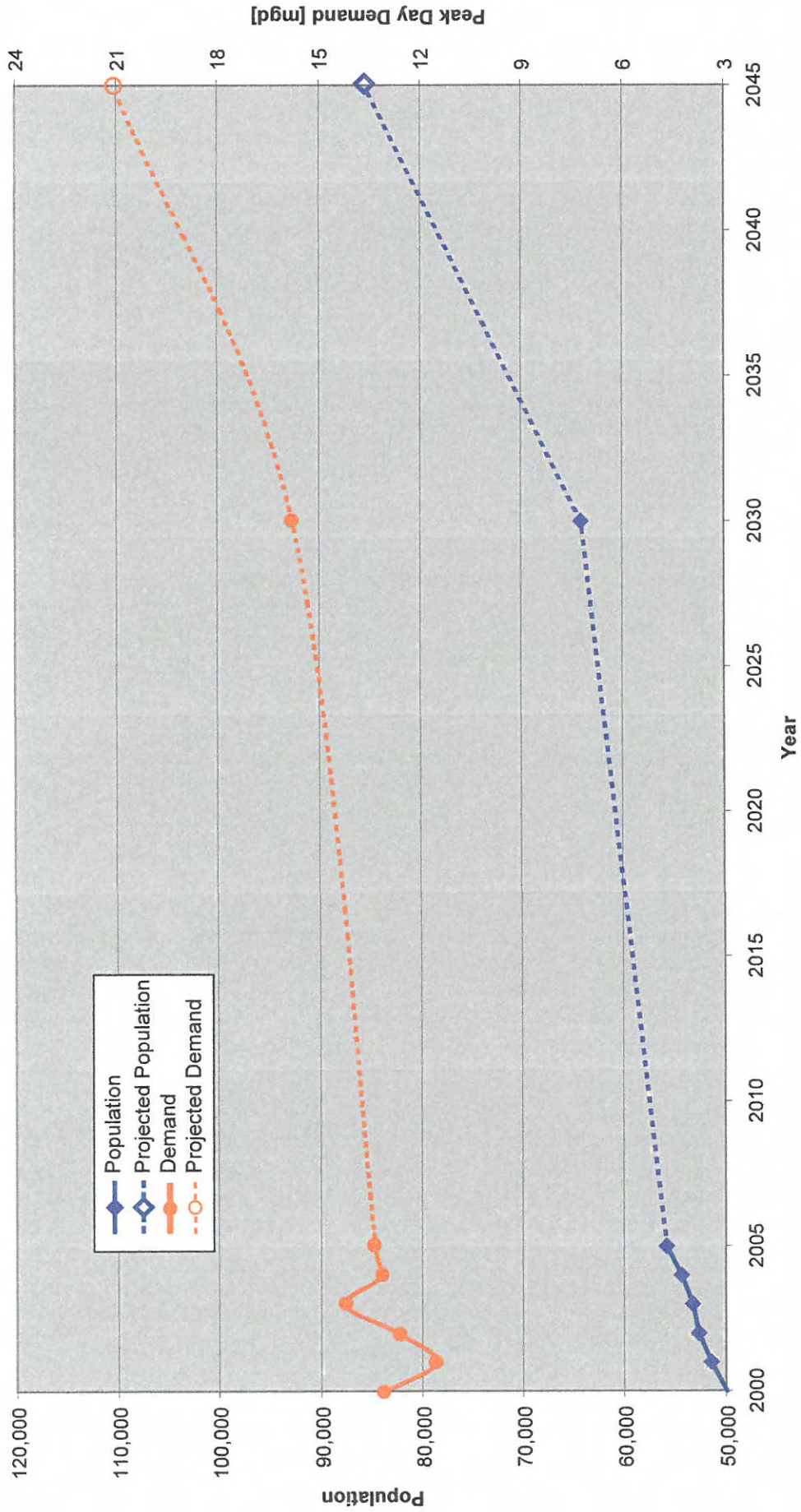
- The Lake Oswego demands for 2030 and build-out include the Other Wholesaler demands within the Lake Oswego water service area.
- The Stafford Triangle is not currently provided water by Lake Oswego.



**Figure 1.3**  
**LAKE OSWEGO POPULATION AND DEMAND**  
 JOINT WATER SUPPLY SYSTEM ANALYSIS  
 CITY OF LAKE OSWEGO AND TIGARD WATER SERVICE AREA

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**Figure 1.4**  
**TIGARD POPULATION AND**  
**DEMAND PROJECTIONS**  
 JOINT WATER SUPPLY SYSTEM ANALYSIS  
 CITIES OF LAKE OSWEGO AND TIGARD WATER SERVICE AREA

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The maximum Build-out demand (45.0 mgd) for Lake Oswego, the Stafford Triangle, and Tigard is the ultimate capacity the Lake Oswego water supply system would need to accommodate. However, as discussed in Section 1.3.1.6, Tigard has the ability to obtain a reliable 3.5 mgd of supply via Aquifer Storage and Recovery. Therefore, the maximum, build-out demand for Lake Oswego, the Stafford Triangle, and Tigard will be considered as 41.5 mgd. The combined junior and senior water rights capacity for Lake Oswego and Tigard is 38 mgd. Because it is unlikely that Lake Oswego will be permitted to withdraw more than the 38 mgd for which they have existing rights, it is assumed that Tigard will obtain the remaining 3.5 mgd peak day demand from another supplier.

The combined junior and senior water rights capacity of 38 mgd will be used as the basis for sizing the raw water intake, raw water transmission main, water treatment plant, and distribution system which serves the Lake Oswego water service area. The Joint Water Supply System Analysis will address the capacity of the existing infrastructure and will develop scenarios regarding implementation of a joint water supply for the Cities of Lake Oswego and Tigard.

## 1.5 SUPPLY SCENARIOS

As part of the Joint Water Supply System Analysis, an evaluation of various water supply scenarios will be conducted. The scenarios range from the existing capacity of the LO WTP to the ultimate demand scenario for serving water to both the Lake Oswego and Tigard water service areas at build-out. Table 1.12 presents one description of the available capacities to each service area based on the proposed supply scenarios and the assumption that the Lake Oswego water service area demand has priority in receiving available capacity. This assumption is subject to change based on the governance agreement developed for the two service areas as part of the Joint Water Supply System Analysis (see Chapter 7 for further description of the potential governance agreements).

As seen in Table 1.12, Scenario No. 2, "Go It Alone" is entirely a Lake Oswego only scenario (including Stafford and wholesale customers within the USB). Because of the inherent advantage of increasing capacity in multiples (such as basin sizing, multiple pump capacity, and overall treatment configuration), it was determined that for this scenario the Lake Oswego demand of 23.9 mgd should be considered as 24 mgd. In this scenario, at build-out, no remaining capacity would be available to other wholesalers during peak flows. However, before build-out is reached, and during periods of off-peak water use, the opportunity would exist to lease unused water rights to other entities for their use.

<b>Table 1.12 Summary of Supply Scenarios Joint Water Supply System Analysis City of Lake Oswego and Tigard Water Service Area</b>				
<b>Scenario No.</b>	<b>Description</b>	<b>Ultimate Lake Oswego Service Area Demand (mgd)</b>	<b>Capacity Available to Tigard<sup>1</sup> (mgd)</b>	<b>Scenario Capacity (mgd)</b>
1	Existing Capacity <sup>2</sup>	15.4 <sup>3</sup>	0.6	16
2	Lake Oswego "Go It Alone"	24	0	24
3	Senior Water Right Capacity	24	8	32
4	Combined Junior and Senior Water Right Capacity	24	14	38

Notes:

1. The capacity available to Tigard shown in this table are based on the assumption that the Lake Oswego water service area demands have priority in receiving any available capacity. This assumption is subject to change based on the governance agreement developed for the two service areas as part of the Joint Water Supply System Analysis.
2. The existing capacity of the WTP is 16 mgd, of which a maximum of 2.5 mgd is provided to Tigard, and the remainder is provided to the Lake Oswego service area *including* wholesale customers other than Tigard. Should a joint water supply be developed for Lake Oswego and Tigard, the Lake Oswego retail customers and Tigard will have precedence over the other wholesale customers in using water from the WTP.
3. Per direction from Lake Oswego staff, the maximum historical (2000-2005) demand is presented, including a peak day demand from Other Wholesalers of 2.3 mgd. The average historical demand of the Lake Oswego service area (including a demand of 2.3 from Other Wholesalers) is 14.2 mgd.

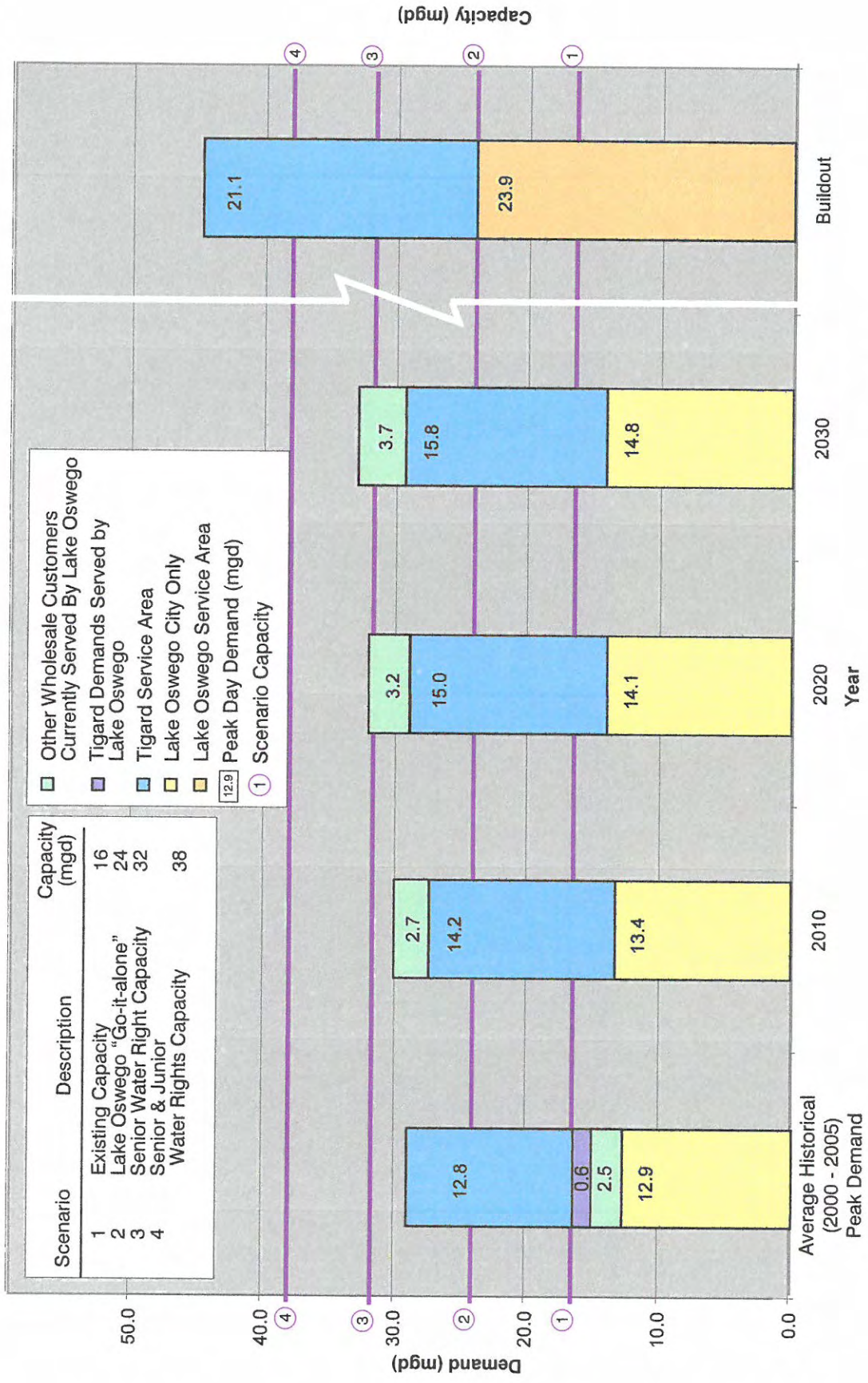
Figure 1.5 presents the estimated timing during which the supply scenario capacities are sufficient to meet the projected demands of the Lake Oswego and Tigard water service areas. Figure 1.5 incorporates the average historical Lake Oswego City Only demand (12.9 mgd) with the estimated peak day Other Wholesaler demand (2.5 mgd) as the total present demand on the LO water infrastructure (15.4 mgd). It should also be noted that the demands presented in Figure 1.5 are based on the conservative assumption that the City of Lake Oswego will continue to provide water to the Other Wholesalers through build-out of the USB. This assumption should be confirmed or revised based on future governance agreements developed between Lake Oswego, Tigard and the Other Wholesalers. A description of the service area demands (as shown in Figure 1.5) and the timing of the necessary increases are presented below. The available capacity descriptions included in these descriptions are based on the assumption that the Lake Oswego water service area demands have priority in receiving any available capacity. This assumption is subject to change based on the governance agreement developed for the two service areas as part of the Joint Water Supply System Analysis (see Chapter 7 for further description of the potential governance agreements).

#### **Scenario 1: Existing Capacity (16 mgd)**

Scenario 1 represents the existing demands and capacity of the Lake Oswego infrastructure. As seen in Figure 1.5, the average historical (2000-2005) Lake Oswego maximum day demand is 12.9 mgd, the projected maximum demand from wholesalers other than Tigard (Other Wholesalers) is 2.5 mgd, and the average historical (2000-2005) Tigard maximum day demand is 13.1 mgd. However, the capacity of the existing infrastructure is limited to 16 mgd. Therefore, only 0.6 mgd of the current maximum Tigard demand is served by the Lake Oswego infrastructure. The existing infrastructure is expected to provide enough capacity to Lake Oswego City Only through 2041. If Lake Oswego continues to provide water to the Other Wholesalers, the existing infrastructure is expected to provide enough capacity for Lake Oswego and Other Wholesalers through 2009.

#### **Scenario 2: Lake Oswego “Go-It-Alone” (24 mgd)**

Scenario 2 represents the required capacity to treat the build-out demands of the Lake Oswego water service area. Expansion to 24 mgd would also allow the Tigard and Other Wholesaler demands to be met up to 10.6 mgd in 2010, 9.9 mgd in 2020, and 9.2 mgd in 2030, but would not meet any portion of the Tigard demand at build-out.



**Figure 1.5**  
**PROPOSED SCENARIO CAPACITIES VS.**  
**SERVICE AREA 3 DAY PEAK DEMANDS**  
**JOINT WATER SUPPLY SYSTEM ANALYSIS**  
**CITY OF LAKE OSWEGO AND TIGARD WATER SERVICE AREA**

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### **Scenario 3: Senior Water Right Capacity (32 mgd)**

Scenario 3 represents the capacity needed to convey the 32 mgd of Clackamas senior water rights that Lake Oswego has been permitted. This capacity exceeds the build-out demands of the Lake Oswego water service area. Therefore, this scenario would allow the Tigard and Other Wholesaler demands to be met up to 18.6 mgd in 2010, 17.9 mgd in 2020, 17.2 mgd in 2030, and 8.1 mgd of the Tigard demand at build-out.

### **Scenario 4: Combined Junior and Senior Water Right Capacity (38 mgd)**

Scenario 4 represents the capacity needed to convey the combined junior and senior water rights that Lake Oswego has been permitted to withdraw from the Clackamas River. This capacity exceeds the build-out demands of the Lake Oswego water service area. However, 38 mgd is the maximum build-out demand of the Lake Oswego, Stafford Triangle, and Tigard water service areas. Therefore, expansion to 38 mgd would allow the Tigard and Other Wholesaler demand to be met up to 24.6 mgd in 2010, 23.9 mgd in 2020, 23.2 mgd in 2030, and 14.1 mgd of the Tigard demand at build-out.



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## EVALUATION OF WATER SUPPLY FACILITY ALTERNATIVES

### 2.1 INTRODUCTION

The purpose of this chapter is to present the findings and recommendations of the water supply facilities alternatives conducted for the City of Lake Oswego and the Tigard Water Service Area as part of the Joint Water Supply System Analysis. This effort includes an evaluation of, and facility alternatives for, the Clackamas River raw water intake, the raw water transmission main, the Lake Oswego water treatment plant, and the finished water transmission system, including transmission main, storage, and pumping improvements.

#### 2.1.1 Demand Scenarios

Improvements were developed based on three of the four demand scenarios which are described in detail as part of Chapter 1. These scenarios are described below:

- Scenario 1: Existing Capacity (16 mgd). The existing capacity of the Lake Oswego water infrastructure.
- Scenario 2: Lake Oswego "Go It Alone" (24 mgd). The required capacity to treat the build-out demands of the Lake Oswego water service area.
- Scenario 3: Senior Water Right Capacity (32 mgd). The capacity needed to convey the 32 mgd of Clackamas senior water rights that Lake Oswego has been permitted. This capacity exceeds the build-out demands of the Lake Oswego water service area.
- Scenario 4: Senior and Junior Water Right Capacity (38 mgd). The capacity needed to convey the combined junior and senior water rights that Lake Oswego has been permitted to withdraw from the Clackamas River. 38 mgd is also the maximum build-out demand of the Lake Oswego, Stafford Triangle, and Tigard water service areas.

It should be noted that demand Scenario 1 was not included in the evaluation of proposed system improvements.

#### 2.1.2 Cost Estimates

Project costs are presented in September 2006 dollars based on the Engineering News Record (ENR) Twenty-City Average construction cost index of 7763. Project costs include construction costs with a 30%-40% construction contingency and a 20% contingency for engineering, legal, and administrative costs. The construction contingency for the intake, treatment plant, reservoir, and pump station was allocated at 30% based on standard preliminary cost estimating guidelines. The construction contingency for the raw and finished water pipelines was increased to 40% to account for the additional unknowns related to geotechnical considerations, final pipeline alignment, and impacts of delays in timing of project implementation. Operations and maintenance (O&M) costs are also presented in September 2006 dollars and include labor and supply costs (including power)

for operations and maintenance of the system components. Annual O&M costs are based on the assumed annual average demand of the given scenario.

## **2.2 RIVER INTAKE**

The evaluation of the Clackamas River intake was conducted to determine the existing hydraulic conditions surrounding the intake and suggests two alternatives for the location and cost of a new intake on the Clackamas River. Analysis of the existing intake and development of conceptual alternatives for intake improvements was prepared by Eugene Yaremko of Northwest Hydraulic Consultants.

### **2.2.1 Existing Intake Structure and Pumping Facility**

The existing intake structure is a bank-type intake situated on the north bank of the Clackamas River, approximately 0.8 miles upstream from its confluence with the Willamette River. The intake structure and pump station supply raw water to the Lake Oswego water treatment plant, which currently furnishes finished water to Lake Oswego and its wholesale customers.

Originally designed by CH2M Hill and constructed in 1968, the intake was expanded in 1980 to provide a capacity of 16 mgd (24.7 cfs). Originally, river water passed through a single port fitted with a conventional traveling screen where the intake opening measured 7-feet, 9-inches wide by 9-feet high (69.8 square feet). The top of opening was at about elevation 13.0 feet, compared to a design low river level of elevation 9.30 feet, so the screen area available below this level was 41 square feet. This screen installation had no special provision for collection and return of fish to the river. The port was located within a concrete wall relatively parallel to the adjacent bank.

During the summer of 2002, the screen system was revamped to comply with current fish screening standards. The changes designed by Montgomery Watson Harza involved:

- Removal of the traveling front screen and replacement with a fish screen 6 feet high by 9.8 feet wide (it is assumed that the screen bottom has been set at elevation 4.0 feet, the sill level within the opening).
- Addition of two fish screens measuring 6 feet high by 8 feet wide located on the upstream and downstream angled concrete walls of the intake structure (it is assumed that the screen bottom is at the floor level; elevation 3.0 feet).

The top of the front screen is at elevation 10.0 feet, or 0.7 feet above low river level; the top level of the two smaller screens is at elevation 9.0 feet. The screens consist of stainless steel material and a flat profile wedgewire screen with a bar spacing of 1.75 mm with a minimum percent opening of 27 percent. The total screen area is 154.8 square feet, with 147.9 square feet below the original design low river level of 9.3 feet. Screen backwash is provided by a system of water jets set up behind the screens.

### **2.2.1.1 Minimum River Level**

Clackamas River flows at the intake site are affected considerably by storage developments within the upstream river basin. Five dams have been constructed; four are located directly on the Clackamas River, and the fifth is located on Oak Grove Fork, a tributary of the Clackamas. The last and furthest downstream dam, constructed in late 1959, is the Rivermill Dam, located 22.6 miles upstream of the intake. Drainage area upstream of the dam is in the order of 671 square miles, compared to a drainage area at the intake of about 900 square miles. A USGS hydrometric gage located on the Clackamas River close to and downstream of the Rivermill Dam (no.14210000, Estacada) has been recording discharges for over 80 years. Thus, flows upstream of this gage have been influenced by operation of the storage facilities, while inflow downstream is natural, except for licensed withdrawals.

A USGS gage was operated from 1962 to 1983 at Clackamas, four miles downstream of Rivermill Dam. It is expected that discharge would increase downstream in response to tributary inflow. An assessment of these data for the low flow season June through October by MWH<sup>1</sup> determined this to be the case. A comparison of Estacada and Clackamas data found that the increase, on average, was in the range of 10 to 15 percent. However, it is important to note that in some years there was little or no increase in flow.

Fundamental to design of a river intake is an estimate of potential minimum river level. A level of elevation 9.30 feet has been labeled Low Water Level for design of the 2002 intake modification project, along with a suggested lower level of elevation 8.0 feet based on anecdotal information. No information was found that stated a particular discharge that applied to either level. Standard practice is to utilize recorded annual minimum daily discharges as a data set and apply it to a frequency analysis, adjust it to the intake site and then conduct a channel hydraulic analysis to establish the corresponding river level for the selected design risk level. However, because flow data for the Clackamas River are greatly influenced by upstream hydro releases, discrete discharges such as annual minimum daily flow cannot be considered as a set of independent variables, so therefore should not be subjected to a frequency analysis. Furthermore, river cross-section data are not available for this site so a channel hydraulic analysis to develop a rating curve is not possible at this time.

In 1998, a pressure transducer was installed within the intake structure to record water levels. The recorded daily water level data for the period of record provided by the City of Oswego identify the levels as river elevation above sea level. Considering only the low flow period August through October, the record shows a minimum level of elevation 7.70 feet during the initial ten-day start-up period. This is considered to be erroneous data - the adopted lowest recorded level for 1998 was elevation 8.0 feet. A level of elevation 8.8 feet was recorded August 9, 2005. A discharge cannot be assigned at this time to either of these levels. It is noted again that elevation 8.0 feet is the level identified as being an "anecdotal" historic low level.

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<sup>1</sup>*"Biological Assessment for the City of Lake Oswego, Clackamas River Water Intake Modifications"*  
MWH, February 2002

For this study, the approach to establishing the design minimum river level was as follows:

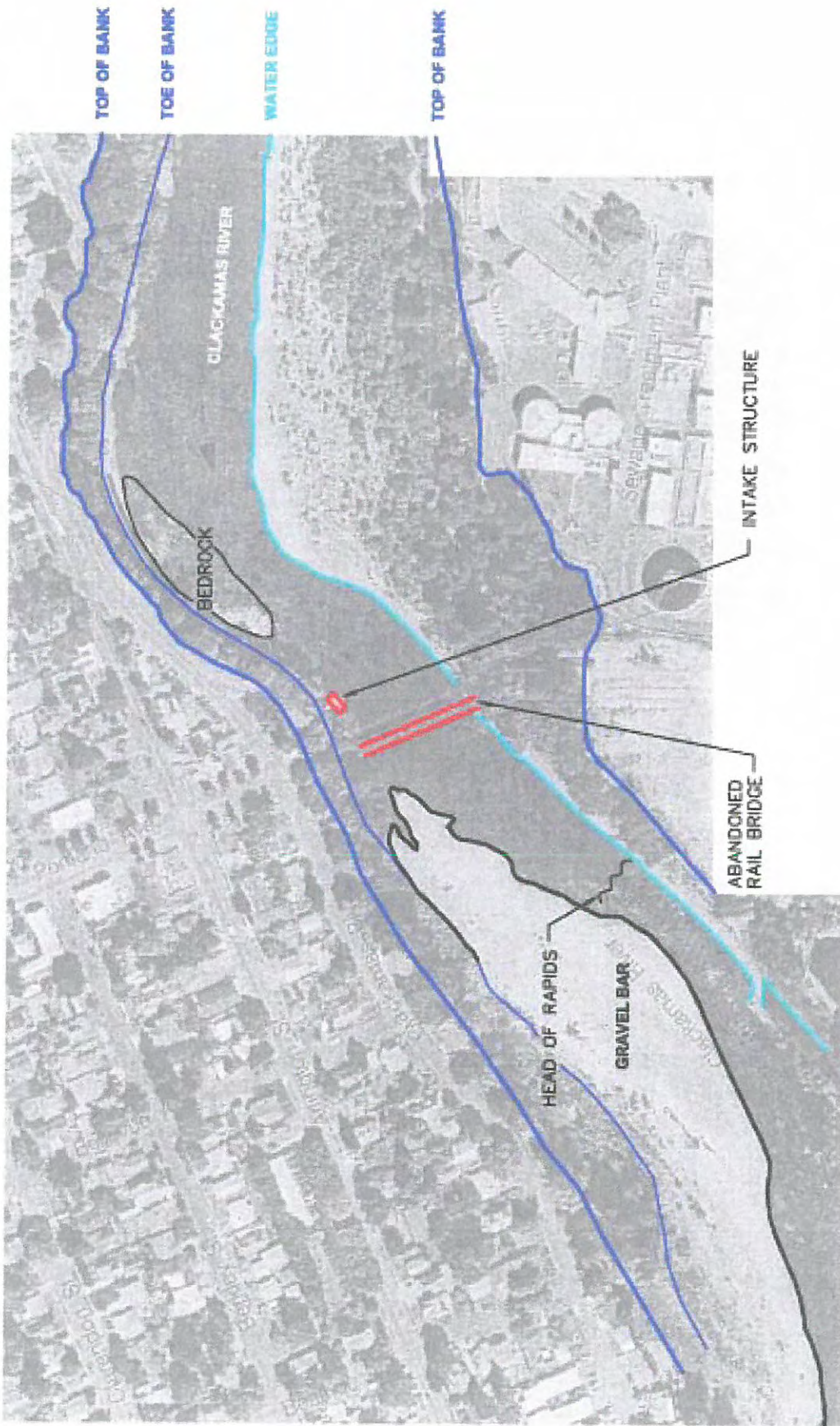
- **Impacts of Downstream Control.** A low flow control in the form of a set of rapids is present approximately 100 feet downstream of the intake. These rapids have formed at the south edge of the channel (see Figure 2.1); a large gravel bar extends from the edge of the rapids to the north bank. An assumed average bed level of elevation 6.0 feet within the rapids control section and a flow depth of 2-feet would produce an estimated discharge of close to 400 cubic feet per second. A 3-foot depth would produce a discharge of about 850 cubic feet per second. At higher flow levels the effect of the control section would become drowned out. The important point to note is that within the lower range of discharges, water levels are somewhat insensitive to discharge. A river survey would be required to enable confirmation and quantification of this downstream hydraulic control.

It is also important to note that the potential for these rapids to wash out represents a risk to the minimum water level at the intake, so a detailed assessment of the character of the rapids versus the hydraulic regime is recommended. At a minimum, establishment of a formal monitoring plan is recommended to detect and mitigate any deterioration of the control in a timely manner.

The minimum discharge recorded at the Estacada gage (approximately 400 cfs) in 1965 was adopted as the minimum discharge that could occur at the intake. This is confirmed by Figure 2.2, which is a plot of daily discharges for the Clackamas gage for the period of record. A discharge of nearly 400 cfs was recorded during August of 1965, compared to a discharge of 400 cfs recorded August 16, 1965 at the Estacada gage. 400 cfs is also the prescribed Instream Water Rights discharge for July 1 - September 15 (which then increases to 640 cfs ). The recommended intake design minimum discharge is therefore 400 cfs, which correlates with an elevation due to the downstream control of 8.0 feet.

- **Historical Minimum River Levels.** As previously discussed, the historical minimum river level was determined to be 8.0 feet above sea level.

Based on these two approaches, the recommended design minimum river level is at elevation 8.0 feet.



**Figure 2.1**  
**LOCATION PLAN**  
 JOINT WATER SUPPLY SYSTEM ANALYSIS  
 CITY OF LAKE OSWEGO AND TIGARD WATER SERVICE AREA

USGS 14211000 CLACKAMAS RIVER NEAR CLACKAMAS, OREGON

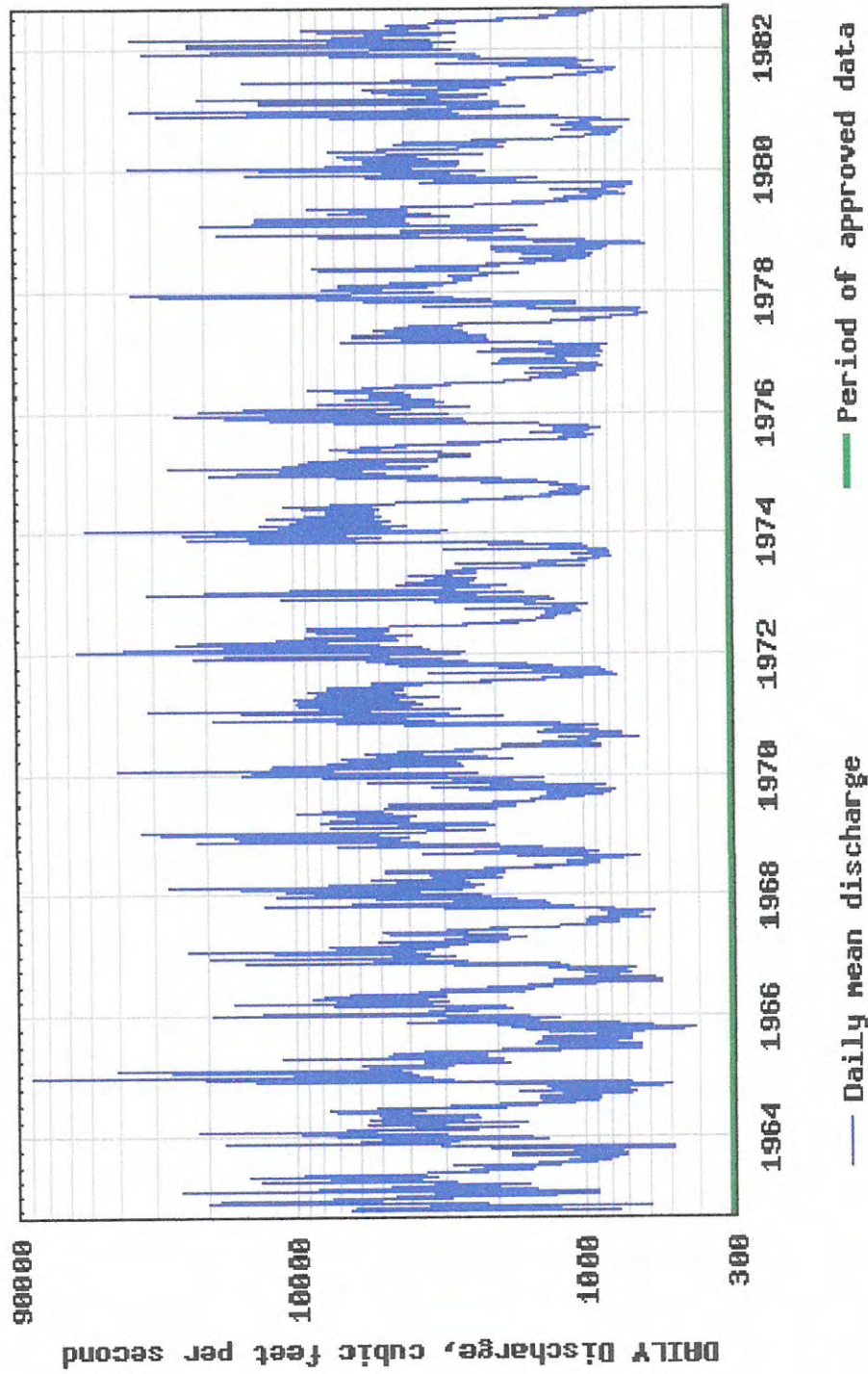


Figure 2.2  
DAILY MEAN DISCHARGE RECORD 1964-1982  
CLACKAMAS RIVER NEAR CLACKAMAS  
JOINT WATER SUPPLY SYSTEM ANALYSIS  
CITY OF LAKE OSWEGO AND TIGARD WATER SERVICE AREA

### **2.2.1.2 River Regime and Riverbed Morphology**

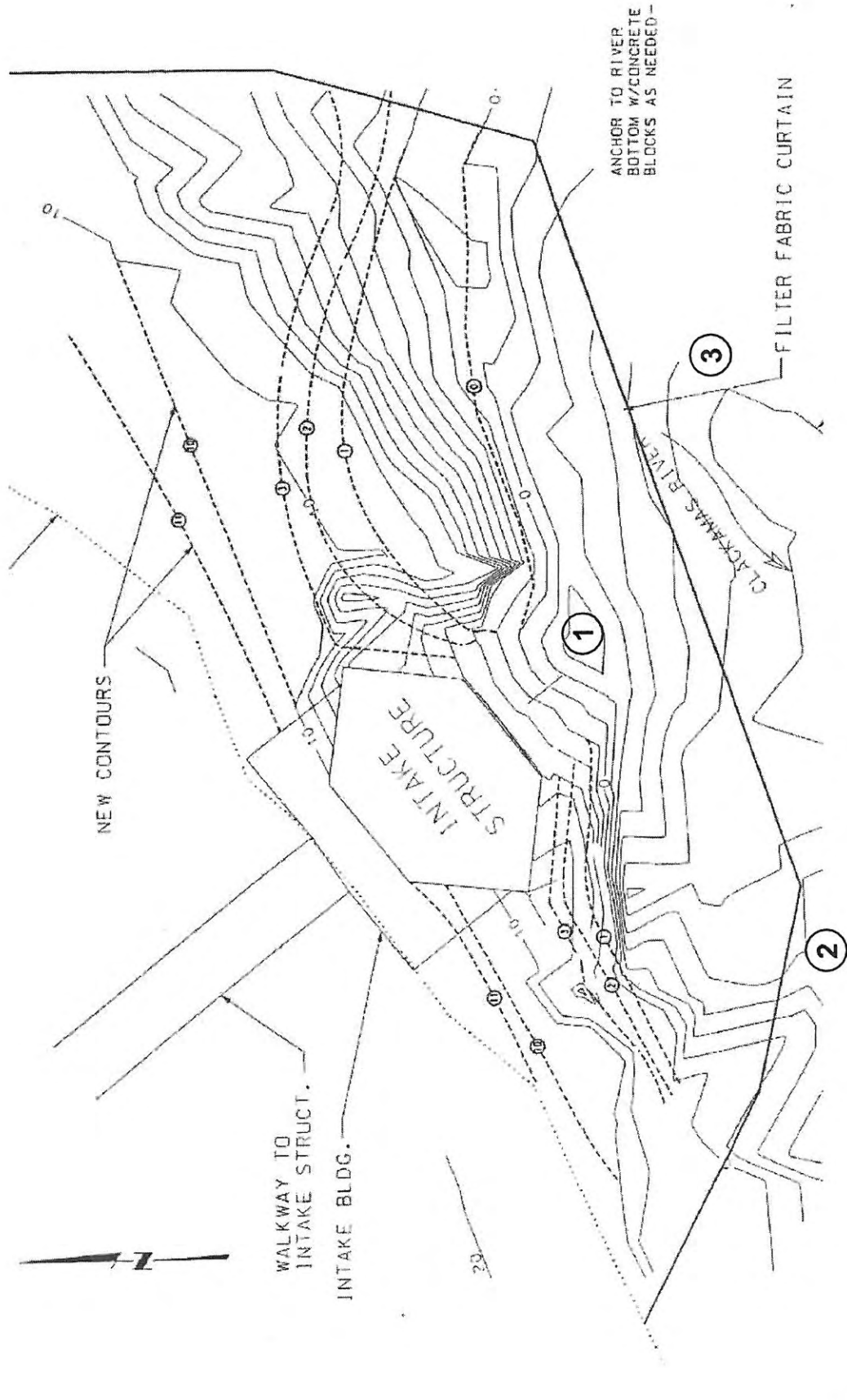
Figure 2.3 provides a sketch that displays primary features of the river reach centered by the existing intake structure. Note that:

- The intake is located at the downstream end of a nearly 90 degree bend of the river.
- The intake is located within a constricted section of the river; the channel upstream and downstream of the intake broadens considerably.
- The north bank is high and well above any flood level; the south bank is lower and may occasionally overtop.
- The thalweg entering the upstream bend appears to be adjacent to the north bank but is forced to the channel's center approaching the intake section; it appears that this is in response to the presence of what appears to be a bedrock outcrop that takes up a large portion of the bed area adjacent to the north bank upstream of the intake.
- The thalweg crosses over to the south bank beginning at the intake section; as indicated previously, the thalweg downstream of the intake is confined by a large gravel/boulder bar that extends out from the north bank, with a set of rapids formed along the south bank.
- The straightness of the south bank beginning at the intake section suggests bank armoring, or possibly the presence of bedrock.
- The north bank upstream, along the beginning of the sharp bend, is being actively eroded, but at a slow rate – the bank through the intake reach is nearly vertical and largely stable.

From available riverbed topography, there are three scoured holes visible near the intake. Their locations are shown in Figure 2.3, where:

- Scour hole 1 has a bottom level of elevation -2.0 feet - this scoured hole sits directly in front of the intake and it is important to note that the intake floor level and the two side intake port sills are at elevation 3.0 feet.
- Scour hole 2 has a bottom level of elevation -3.0 feet.
- Scour hole 3 has a bottom level of elevation -6.0 feet.

Similar scour features were observed upstream of the intake along the outside edge of what appears to be bedrock outcrops located along the north bank. It is recommended that a geotechnical evaluation of the soil characteristics of the north and south banks of the Clackamas River be conducted during pre-design or final siting of any new intake construction.



**Figure 2.3**  
**EXISTING INTAKE AND SCOUR HOLE LOCATIONS**  
 JOINT WATER SUPPLY SYSTEM ANALYSIS  
 CITY OF LAKE OSWEGO AND TIGARD WATER SERVICE AREA

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The form of these scoured areas is interesting in that they have been formed within what appears to be basalt zones. Scoured holes have steep boundaries, suggesting that material removal has been in the form of blocks being plucked. Coarse bed material transport does occur along the bed of the Clackamas River, but visual evidence suggests that it is at relatively small amounts and not likely at rates that would significantly infill these scoured areas.

Ideally, an intake must be situated where minimum flow depths are adequate and unlikely to change in response to a shifting channel. As well, the bank and bed morphology should set up a flow pattern that establishes parallel or somewhat impinging flow across the intake ports. In consideration of the existing intake and intake ports, the following is observed:

- A constricted section and nearby scour holes are positive features.
- Stable banks are also a positive feature.
- Minimum depth relative to the scour hole directly in front of the intake and below the recommended river level of elevation 8.0 feet is 10 feet, which provides ample vertical room in which to establish intake ports and pump well floor levels having proper clearances.
- At low discharges, low velocity flow alignment is influenced greatly by the presence of what appears to be upstream bedrock protruding above the general bed level. The flow pattern would be more-or-less parallel to the front wall and port of the existing intake structure, there would be impingement on the upstream diagonally orientated wall and port and clockwise eddy flow past the downstream diagonally orientated intake wall and port. The flow pattern past the downstream port of the existing intake is therefore not ideal, but low suspended loads and flow velocities will unlikely affect intake operation or fish safety.
- As river discharge increases, the flow pattern approaching the intake will be less influenced by the upstream protrusion and more by the north bank alignment, in which case the flow pattern will increasingly be less parallel to the front wall and port, and more parallel to the upstream wall and port. The downstream port will be subjected to an increasingly strong clockwise eddy and a potential for screen clogging and fish impingement by debris.

In conclusion, the intake location is satisfactory in terms of river characteristics: deep and stable scour hole close to north bank; stable north bank; more than adequate minimum flow depth; reasonable distance to thalweg and strong flow; and the ability to have access to intake ports/screens at all times.

The existing intake configuration and orientation of ports to approaching river flow is not ideal in all cases. Least problematic will be the upstream port, as it will have good sweeping velocities. The front (center) port may experience a flow pattern that at times reduces its diversion ability in the upstream area of the port. The downstream port will not experience good flow characteristics, as a clockwise eddy will tend to form in front of the port, thereby

inviting accumulation of debris and suspended sediment, and possibly impingement of fish on the screen if it becomes increasingly clogged.

Intake capacity related to screen performance would be compromised if the screen water backwash system was shown to be ineffective or if screen cleaning was not implemented at proper intervals.

#### **2.2.1.3 Sediment**

Approximately 75 percent of the Clackamas River basin upstream of the intake site is controlled by five reservoirs. Essentially all of the gravels, sands and silts will be trapped within these reservoirs – perhaps clay sizes may pass through. Therefore, the majority of suspended sediments carried by the river approaching the intake will be derived from the 229 square mile tributary area downstream of the Rivermill Dam. Thus, the overall sediment load has been significantly reduced in response to reservoir developments.

The time available for sediment to travel from the intake ports to the pump well is a function of the length of travel, flow depth, cross section width and discharge – this determines the potential for various sediment sizes to deposit. At minimum river level, for a discharge of 16 mgd, the retention time would be about one hour; for 19 mgd, two hours. At average flood level, the corresponding retention times might be three to four times greater.

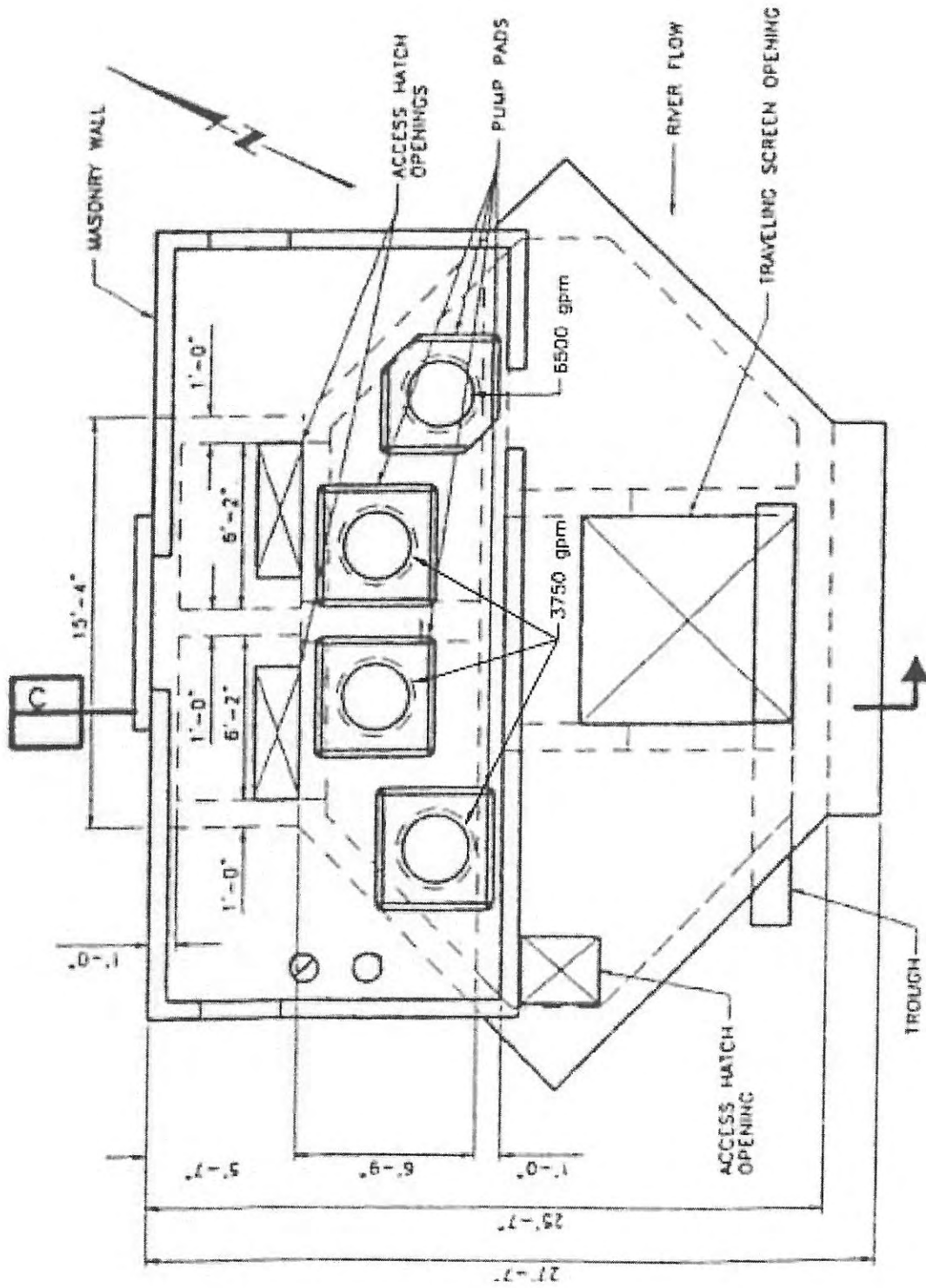
Operations staff have identified that approximately 1.5 - 2 feet of sediment accumulates annually within the wet well. To dispose of the accumulated sediment, divers are retained to clean the wet well each year. Implementation of a backwash or pumping system to remove this accumulation is not justifiable for the existing intake; however, it is recommended that during preliminary design of modifications to the existing intake, or construction of a new intake, the issue of reducing sediment deposition within the wet well be revisited.

#### **2.2.1.4 Existing Pumping Capacity**

The existing intake pump station arrangement is as shown in Figure 2.4.

Water depth within the wet well below minimum river level is 5 feet. Clearance between well floor and bottom of pump bowls varies from one to two feet, so pump bell submergence could be as little as three feet.

The capacity of the three constant speed pumps is rated at 3,750 gpm (5.4 mgd), and the fourth variable speed pump is rated at 6,500 gpm (9.4 mgd). However, when run in combination, the capacity of the three constant speed pumps is reduced to 2,750 gpm each (3.9 mgd) and the variable speed pump is reduced to 3,400 gpm (4.8 mgd), resulting in a total installed pumping capacity of 16.5 mgd. Operational strategy is to utilize the variable-speed pump supplemented by one or more of the fixed-speed pumps to meet a particular demand.



**Figure 2.4**  
**INTAKE STRUCTURE PLAN VIEW**  
 JOINT WATER SUPPLY SYSTEM ANALYSIS  
 CITY OF LAKE OSWEGO AND TIGARD WATER SERVICE AREA

Operating experience has shown that pump operation problems arise at high demand and low water conditions. For the given configuration and the recommended design minimum river level, intake capacity could be further limited by pump performance. The following are possible reasons why problems arise with pump performance:

- Hydraulic Institute guidelines suggest that the minimum bell submergence for the 6500 gpm pump should be in the order of 5 feet; 3.5 feet for the 3750 gpm pumps. Presumably, pump operation may experience vortexing problems when river levels approach elevation 10.0 feet. A review of the river level record collected in the intake since 1998 shows that this has occurred in several years during the low flow season.
- Plugging off of one of the screens by woody debris or algae may be creating an unbalanced (skewed) flow pattern approaching the pumps.
- The two ends of the two side ports have been placed in close proximity to the two outside pumps – uneven flow approaching the pumps may be the result.
- The approach of utilizing the largest pump at all times in conjunction with one or more of the other three may create unfavorable flow patterns.

To establish whether changes can be made to the existing intake/pump well configuration that would result in better pump performance and increased pump capacity, common practice is to conduct physical model tests. The original intake design included a single intake port configuration that was more likely to produce a uniform approach of flow to the pumps. The addition of two side ports may have introduced a less favorable flow environment within the intake wet well.

#### **2.2.1.5 Existing Fish Screening Capacity**

The existing three-screen configuration has about 35.6 square feet above the design minimum river level of elevation 8.0 feet. This reduces the allowable capacity of the existing intake configuration to approximately 30 mgd at minimum river level.

#### **2.2.2 Intake Alternatives**

Four alternatives were evaluated to meet the projected supply needs of the Lake Oswego and Tigard water service areas. These alternatives are as follows:

- **Expand existing intake capacity.** Expansion of the existing intake would make use of the present structure, although significant structural modifications would be needed. Because the fish screen capacity of the existing intake is limited to 30 mgd, this alternative would provide only enough capacity to meet Scenarios 1 and 2 (16 mgd and 24 mgd, respectively) of the Joint Water Supply Scenarios.

- **Construct a new bank intake structure.** Due to the condition and capacity of the existing intake structure, a new riverbank intake was considered as an alternative.
- **Construct a river bottom infiltration intake.** A river bottom infiltration intake would allow river water to percolate through the bottom of the riverbed, would not require fish screens, and would not be at risk of functional failure due to low river levels.
- **Construct a riverbank infiltration intake.** A river bank infiltration intake would allow water to percolate through the river bank, and would not require fish screens.

As discussed in Chapter 1, the projected build-out demands of the Lake Oswego water service area are 24 mgd (Scenario 2). This is the “Lake Oswego Go-it-Alone” scenario for which it is understood that no joint water supply would be developed. To meet the Lake Oswego demands for this scenario, it is likely that the most economically feasible intake alternative would consist of expanding the existing raw water intake structure, rather than constructing a new intake. Therefore, the remaining three intake alternatives, which include construction of a new intake, have been developed to meet Scenarios 3 and 4 exclusively (at 32 mgd and 38 mgd, respectively).

Further description regarding each of the four proposed intake alternatives is provided below:

#### **2.2.2.1 Expand Existing Intake**

To increase the capacity of the existing intake structure, the wet well floor would need to be lowered by several feet to ensure adequate pump bell submergence at all times.

In addition to considering expansion of the existing intake capacity, it is important to consider the existing condition of the concrete intake structure itself. As discussed in Chapter 1, recent observations of the intake structure indicate that the concrete floor slab is delaminating and spalling (likely due to aggregate-silica reactivity) and has settled since the 2002 upgrade, resulting in 40%-45% decrease in the tension of the anchor bolts. Because of the recent spalling of the concrete around the anchors, the capacity of the floor slab to withstand a significant seismic event has likely been compromised. Should the existing intake capacity be increased by lowering the wet well floor and reorienting the fish screens, it is recommended that additional structural modifications be made to increase the seismic reliability of the structure.

#### **2.2.2.2 New Riverbank Intake**

Construction of a new bank intake would provide the opportunity to better orient the fish screens and establish a deeper wet well while taking advantage of the river morphology of this area. Figure 2.5 presents a potential location for the proposed new intake. The alignment and location of the thalweg and likely presence of bedrock abutting the north bank upstream of the existing intake, and a large bar abutting this bank downstream, preclude the ability to install a north bank intake in these areas. There is no site available for a south bank intake within this reach. The observation of bedrock on the north bank of

the Clackamas River should be confirmed by a geotechnical evaluation of the area. If bedrock is indeed present in these areas, it is possible that the only feasible location for constructing a new intake is at, or just downstream of, the existing intake structure.

Figure 2.6 presents a cross section of the intake structure, and identifies proposed design criteria to meet a capacity of 32 mgd for the backfill area, fish screens, and the wet well. As seen in Figure 2.6, to obtain a capacity of 38 mgd, the fish screen length would be increased by 3.4 feet for a total of approximately 170 square feet. Additionally, the conductor pipes would be increased to a diameter of 42 inches.

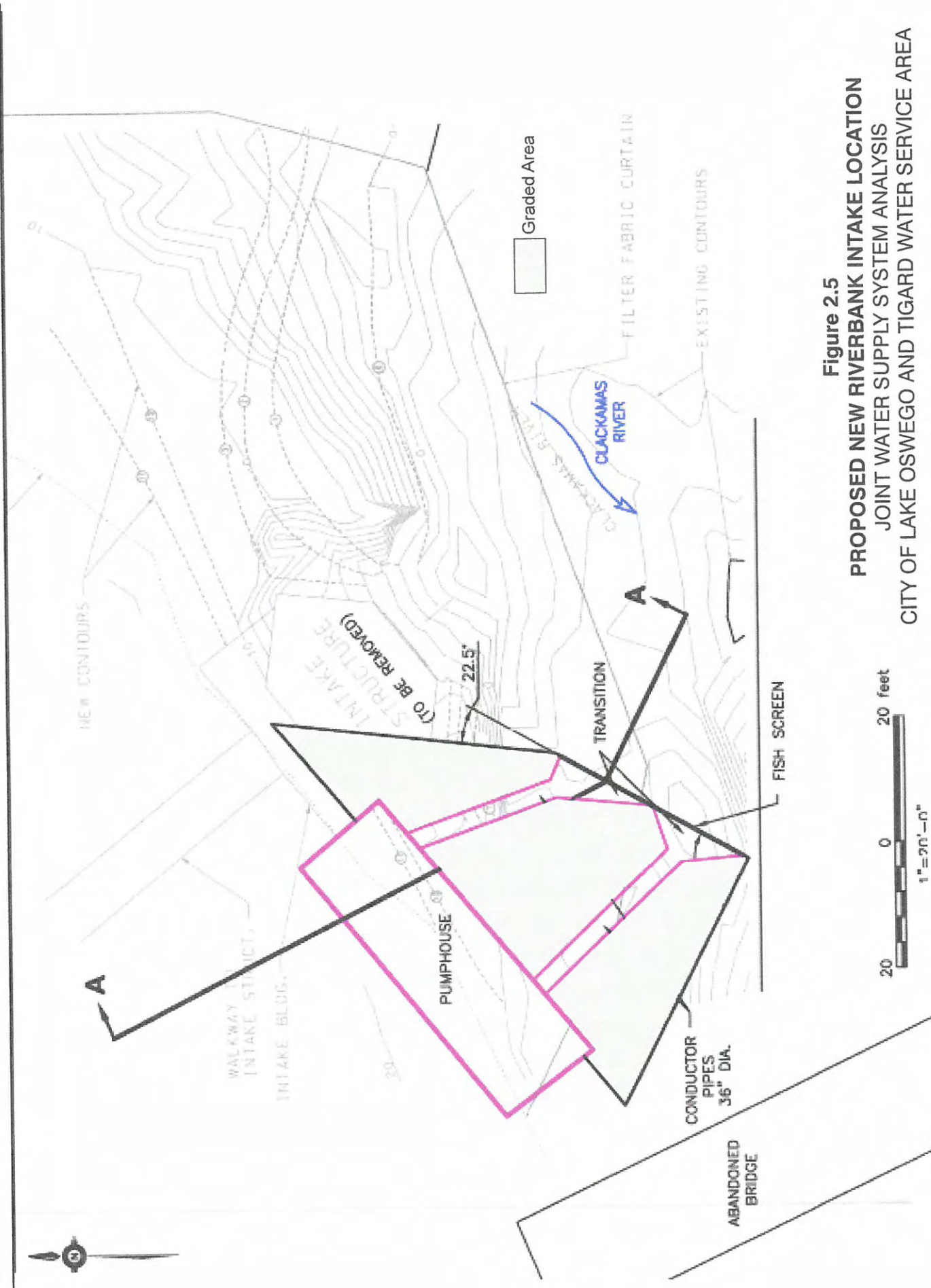
### **2.2.2.3 River Bottom Infiltration Intake**

The proposed river bottom infiltration intake is presented in Figure 2.7. The dimensions of the intake are shown for a 32 mgd capacity. To meet a capacity of 38 mgd, the overall length of the gallery would be extended by 20 feet and the width would be extended by 10 feet, for a total infiltration gallery area of 22,000 square feet. The conductor pipes and infiltration pipe diameters would not need to be increased. The main advantages of such an intake configuration are the 1) lack of fish screens and 2) the intake is not adversely impacted by low river levels. However, the river bottom intake would require some type of backwash system to prevent blockage of the infiltration piping, which would then resuspend the sediments within the river.

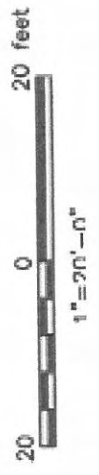
Prior to implementation of this type of intake, it is recommended that a hydraulic analysis of the river be conducted to quantify the risk of intake blockage based on the type and mobility of suspended solids within the Clackamas River. This evaluation could further identify the maintenance requirements for this type of intake.

### **2.2.2.4 Riverbank Infiltration Intake**

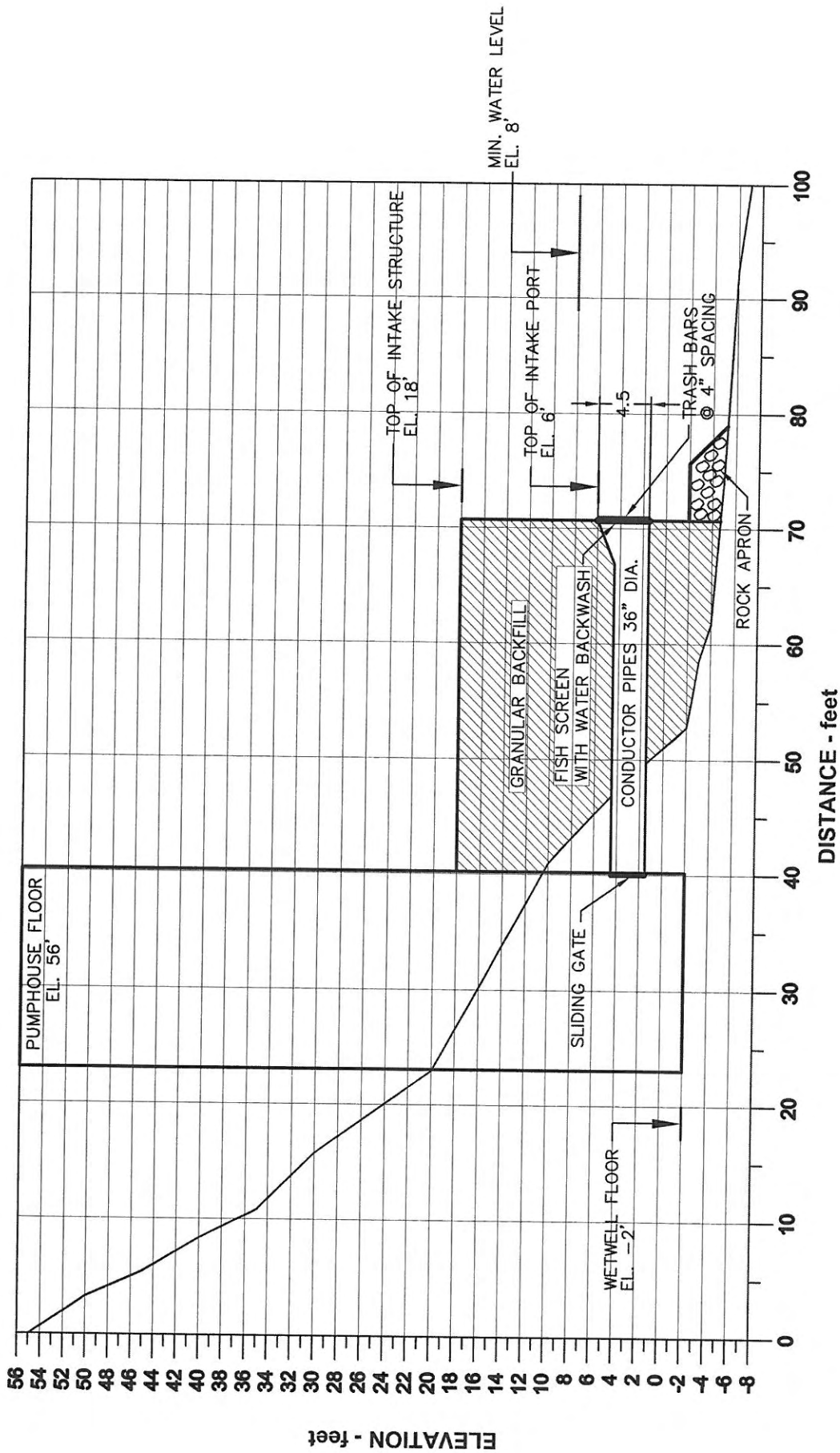
The proposed riverbank infiltration intake has been sized for a capacity of 32 mgd, and is presented in Figure 2.8. A cross section of the intake is presented in Figure 2.9. The area of the open port at 32 mgd is 230 square feet (five feet high by 46 feet long). As seen in Figure 2.9, to achieve a capacity of 38 mgd, the open port height would need to be increased to six feet and the length increased to 50 feet, for a total area of 300 square feet of open port. The primary advantages of such an intake are the 1) lack of fish screens and 2) the simple design. However, due to the sedimentation concerns identified for the river bottom infiltration intake, it is recommended that a backwash system be implemented to prevent blockage of the overlying riprap armor. The backwash system would need to be configured such that equivalent pressure is released at each point in the filter backfill, otherwise only a small portion of the backfill would be flushed, resulting in a loss of capacity.



**Figure 2.5**  
**PROPOSED NEW RIVERBANK INTAKE LOCATION**  
 JOINT WATER SUPPLY SYSTEM ANALYSIS  
 CITY OF LAKE OSWEGO AND TIGARD WATER SERVICE AREA



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**NOTE:**

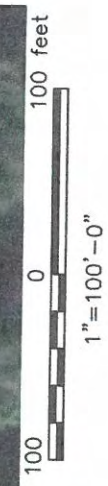
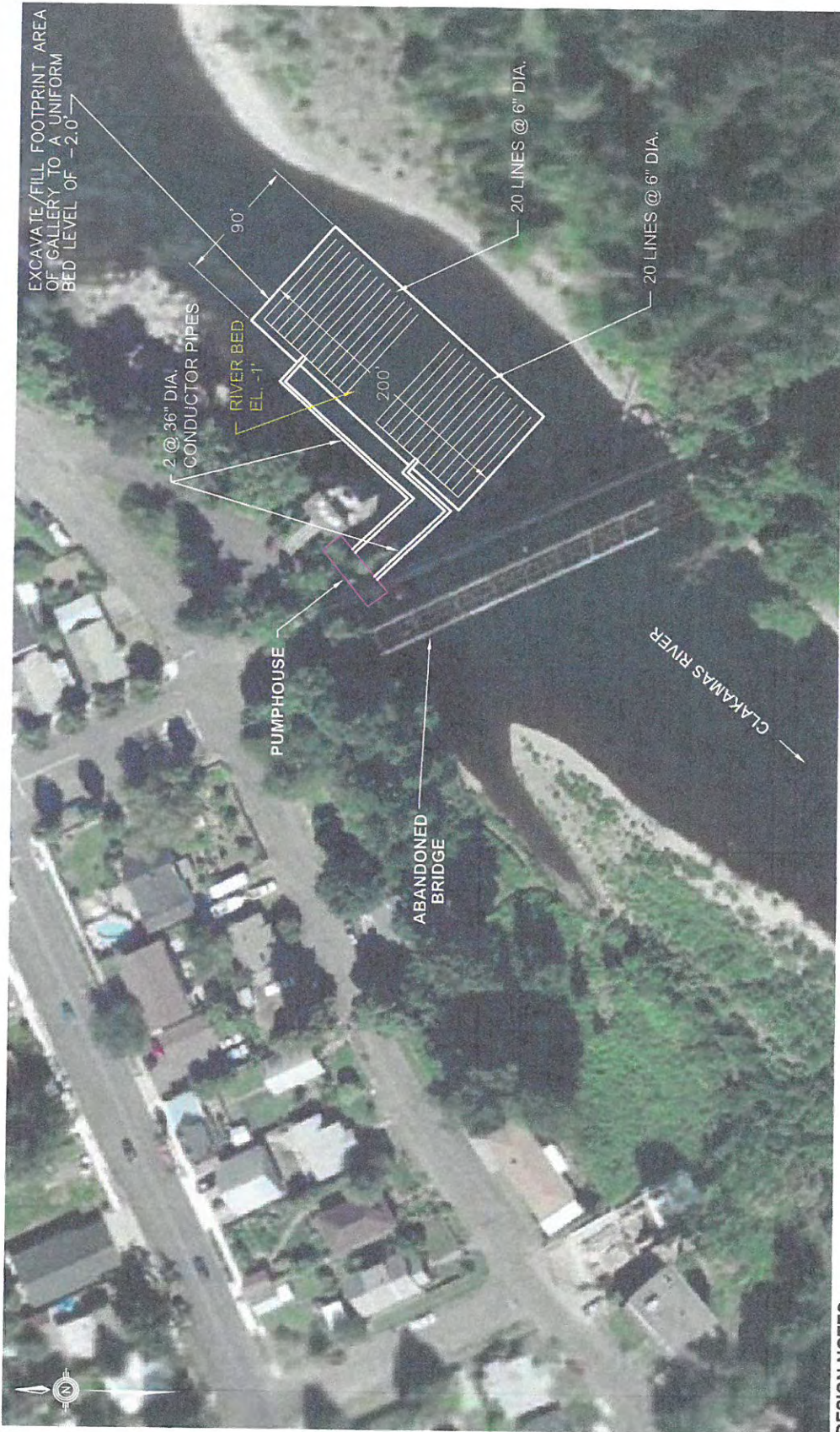
1. FOR A Q=38 MGD SCREEN LENGTH WOULD BE 3.4 FEET LONGER THAN SHOWN.
2. FOR A Q=38 CONDUCTOR PIPES WOULD BE 42" DIA.

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**Figure 2.6**  
**PROPOSED NEW RIVERBANK INTAKE CROSS-SECTION**  
 JOINT WATER SUPPLY SYSTEM ANALYSIS  
 CITY OF LAKE OSWEGO AND TIGARD WATER SERVICE AREA

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**DESIGN NOTES:**

1. Gallery area based on 1 GPM per sq. foot of bed area.
2. Gallery shall consist of two separate sections, each having a capacity of 16 MGD.
3. 32 MGD conductor pipe: 36" diameter.
4. 38 MGD conductor pipe: 42" diameter.

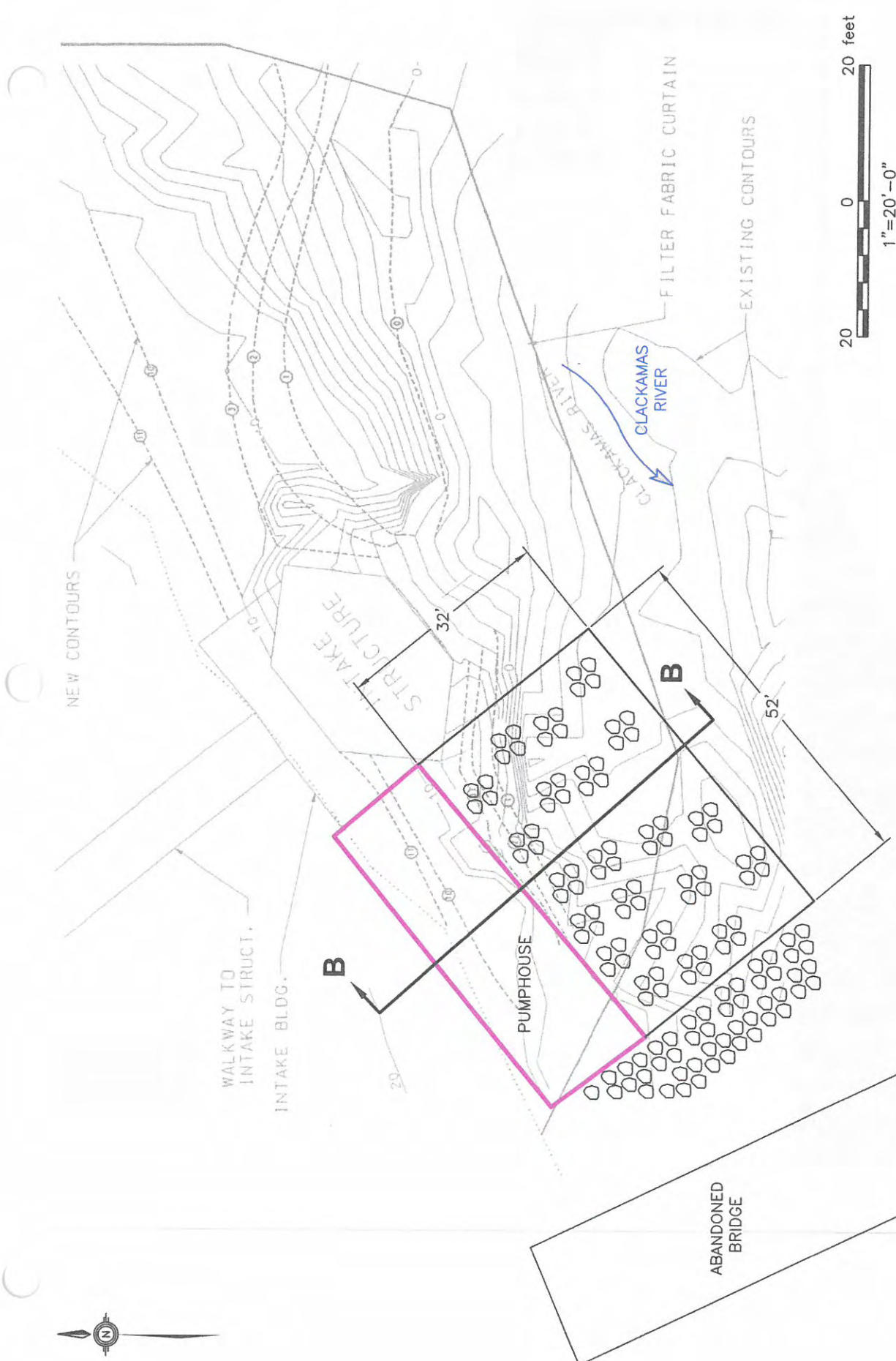
**COMMENTS:**

1. No fish screening required
2. Water or air backflush system must be installed.

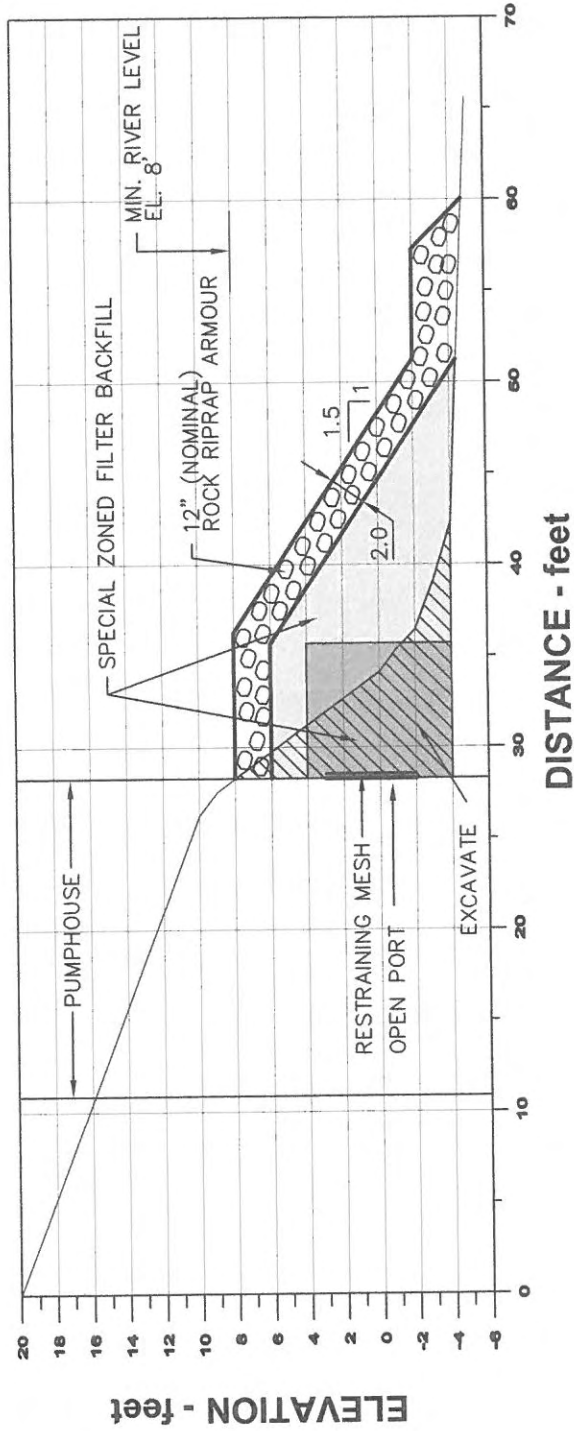
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**Figure 2.7**  
**PROPOSED NEW RIVER BOTTOM UNFILTRATION INTAKE**  
**JOINT WATER SUPPLY SYSTEM ANALYSIS**  
**CITY OF LAKE OSWEGO AND TIGARD WATER SERVICE AREA**

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**Figure 2.8**  
**PROPOSED NEW RIVERBANK INFILTRATION**  
**INTAKE LOCATION**  
 JOINT WATER SUPPLY SYSTEM ANALYSIS  
 CITY OF LAKE OSWEGO AND TIGARD WATER SERVICE AREA



**NOTE:**

1. Q=38 MGD. INCREASE LENGTH AND HEIGHT OF OPEN PORT TO 50 FEET AND 6 FEET

**LEGEND:**

- 1/4"-1" GRAVEL
- 1/2"-2" GRAVEL

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**Figure 2.9**  
**PROPOSED NEW RIVERBANK INFILTRATION**  
**INTAKE CROSS-SECTION**

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

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### 2.2.2.5 Required Pumping Capacity

The reliable pumping capacity of the chosen intake alternative for each supply scenario is summarized in Table 2.1. To achieve a reliable water supply, the intake pumps were sized to produce the peak day demand with the largest pump out of service. To size the pumps, a pump efficiency of 85% and a motor efficiency of 90% were assumed.

<b>Table 2.1 Intake Pump Expansion Joint Water Supply System Analysis City of Lake Oswego and Tigard Water Service Area</b>					
<b>Supply Scenario</b>	<b>Pump 1 (hp)</b>	<b>Pump 2 (hp)</b>	<b>Pump 3 (hp)</b>	<b>Pump 4 (hp)</b>	<b>Firm Capacity (mgd)</b>
2	350	325	325	500	24
3	325	475	475	475	32
4	500	500	575	575	38

### 2.2.2.6 Intake Options and Capital Costs

Costs for a new Clackamas River Intake are assumed to include an auxiliary power generator inside the new intake pump building with a 24-hour fuel storage tank located outside. It is further assumed that the existing intake structure would be demolished without salvage of the existing building or equipment. Costs below are based on Scenario 3, with 32 mgd capacity. Pump sizes would be increased or decreased, as needed, to achieve the capacity of demand scenarios 2 or 4. Since the difference in pump prices for the scenarios is negligible in comparison to the total cost, only one cost estimate was given for the three demand scenarios. For the purpose of cost estimating, an average pump size of 500 horsepower was assumed.

#### 2.2.2.6.1 Capital Costs

The conceptual level capital costs developed for each of the four proposed intake alternatives are presented in Table 2.2.

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<b>Table 2.2 Raw Water Intake Capital Costs<sup>1</sup></b>			
<b>Joint Water Supply System Analysis</b>			
<b>City of Lake Oswego and Tigard Water Service Area</b>			
<b>Intake Alternative</b>	<b>Capacity</b>		
	<b>Scenario 2 (24 mgd)</b>	<b>Scenario 3 (32 mgd)</b>	<b>Scenario 4 (38 mgd)</b>
Expand Existing Intake	\$2,510,000	--	--
New Riverbank Intake	--	\$4,440,000	\$4,670,000
New River Bottom Infiltration Intake	--	\$5,280,000	\$5,520,000
New Riverbank Infiltration Intake	--	\$4,400,000	\$4,530,000

Note:  
1. Capital costs are total project costs and are presented in 2006 dollars.

**2.2.2.6.2 Operations and Maintenance Costs**

Because the ultimate demand on the water infrastructure realistically arises from a sustained, three-day maximum demand, the Operations and Maintenance costs were developed based on the maximum 3-day peaking factor of 2.1. Annual operations and maintenance costs for the Clackamas River Intake, including estimated annual pumping costs, are calculated based on assumed average annual demands of 11.4, 15.2, and 18.1 mgd for their respective scenarios. The O&M costs for the proposed intake options for each supply scenario are presented in Table 2.3.

<b>Table 2.3 Raw Water Intake O&amp;M Costs</b>				
<b>Joint Water Supply System Analysis</b>				
<b>City of Lake Oswego and Tigard Water Service Area</b>				
<b>Parameter</b>	<b>Units</b>	<b>Scenario 2 (24 mgd)</b>	<b>Scenario 3 (32 mgd)</b>	<b>Scenario 4 (38 mgd)</b>
Annual O & M costs	\$/yr	\$231,000	\$352,000	\$429,000
O&M cost	\$/million gallons-yr	\$55.52	\$63.45	\$64.94

Note:  
1. O&M costs are based on the recommended options for each scenario, as presented in Section 2.2.2.6.3.

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**2.2.2.6.3 Intake Options Summary & Recommendation**

A comparison of the relative advantages and limitations of options for a new Clackamas River Intake is presented in Table 2.4.

<b>Table 2.4 Comparison of Intake Options Joint Water Supply System Analysis City of Lake Oswego and Tigard Water Service Area</b>			
<b>Option</b>	<b>Description</b>	<b>Advantages</b>	<b>Limitations</b>
1	Expand Existing Intake (24 mgd)	<ul style="list-style-type: none"> <li>- Limits in-water construction to bank area.</li> <li>- Easy access to fish screens.</li> <li>- Minimal interference with boat traffic.</li> </ul>	<ul style="list-style-type: none"> <li>- Requires significant structural rehabilitation.</li> <li>- Would not satisfy 32 mgd or 38 mgd demand scenarios.</li> </ul>
2	New Riverbank Intake (32 mgd/38 mgd)	<ul style="list-style-type: none"> <li>- Can be constructed while operating existing intake.</li> <li>- Limits in-water construction to bank area.</li> <li>- Easy access to fish screens.</li> <li>- Minimal interference with boat traffic.</li> </ul>	<ul style="list-style-type: none"> <li>- Fish screens are vulnerable to debris impact.</li> </ul>
3	New River Bottom Infiltration Intake (32 mgd/38 mgd)	<ul style="list-style-type: none"> <li>- Does not require fish screens.</li> <li>- Is not affected by low river flows.</li> <li>- Minimal interference with boat traffic.</li> <li>- Can be constructed while operating existing intake.</li> </ul>	<ul style="list-style-type: none"> <li>- Requires in-river construction.</li> <li>- Requires more mechanical equipment and electrical/instrumentation control</li> <li>- Reduced flow during backwash cycle.</li> </ul>
4	New Riverbank Infiltration Intake (32 mgd/38 mgd)	<ul style="list-style-type: none"> <li>- Does not require fish screens.</li> <li>- Is not affected by low river flows.</li> <li>- Can be constructed while operating existing intake.</li> </ul>	<ul style="list-style-type: none"> <li>- Requires in-river construction.</li> <li>- Requires more mechanical equipment and electrical/instrumentation control</li> <li>- Reduced flow during backwash cycle.</li> </ul>

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Considering the advantages, disadvantages, and capital and O&M costs for each alternative, it is recommended that to reach a capacity of 24 mgd, the existing intake be expanded (Option 1), and to reach a capacity of 32 or 38 mgd, a new riverbank intake (Option 2) be constructed to increase the capacity of the Clackamas River intake.

## **2.3 RAW WATER TRANSMISSION ALTERNATIVES**

### **2.3.1 Existing Transmission Main Alignment**

Lake Oswego's current raw water transmission main serves to convey raw water from the Clackamas River source to the Lake Oswego water treatment plant (WTP) in West Linn. The transmission main begins at the Clackamas River Intake Pumping Facility near the intersection of Clackamas Boulevard and Portland Avenue in Gladstone. The main crosses underneath the Willamette River near Meldrum Bar Park in Gladstone, and terminates at the Lake Oswego WTP in West Linn. The entire transmission main is 27-inch diameter welded steel pipe, and is approximately 13,800 feet in length.

An aerial view of the existing alignment is presented in Appendix A of this report. Pipeline details and alignment information were obtained from as-built drawings provided by Lake Oswego staff.

### **2.3.2 Transmission Main Hydraulics**

#### **2.3.2.1 Existing System Hydraulics**

The Lake Oswego water treatment plant currently treats a peak demand of up to 16 mgd. According to Lake Oswego WTP staff, all four of the existing intake pumps must be operational to meet peak demand. No pump redundancy exists.

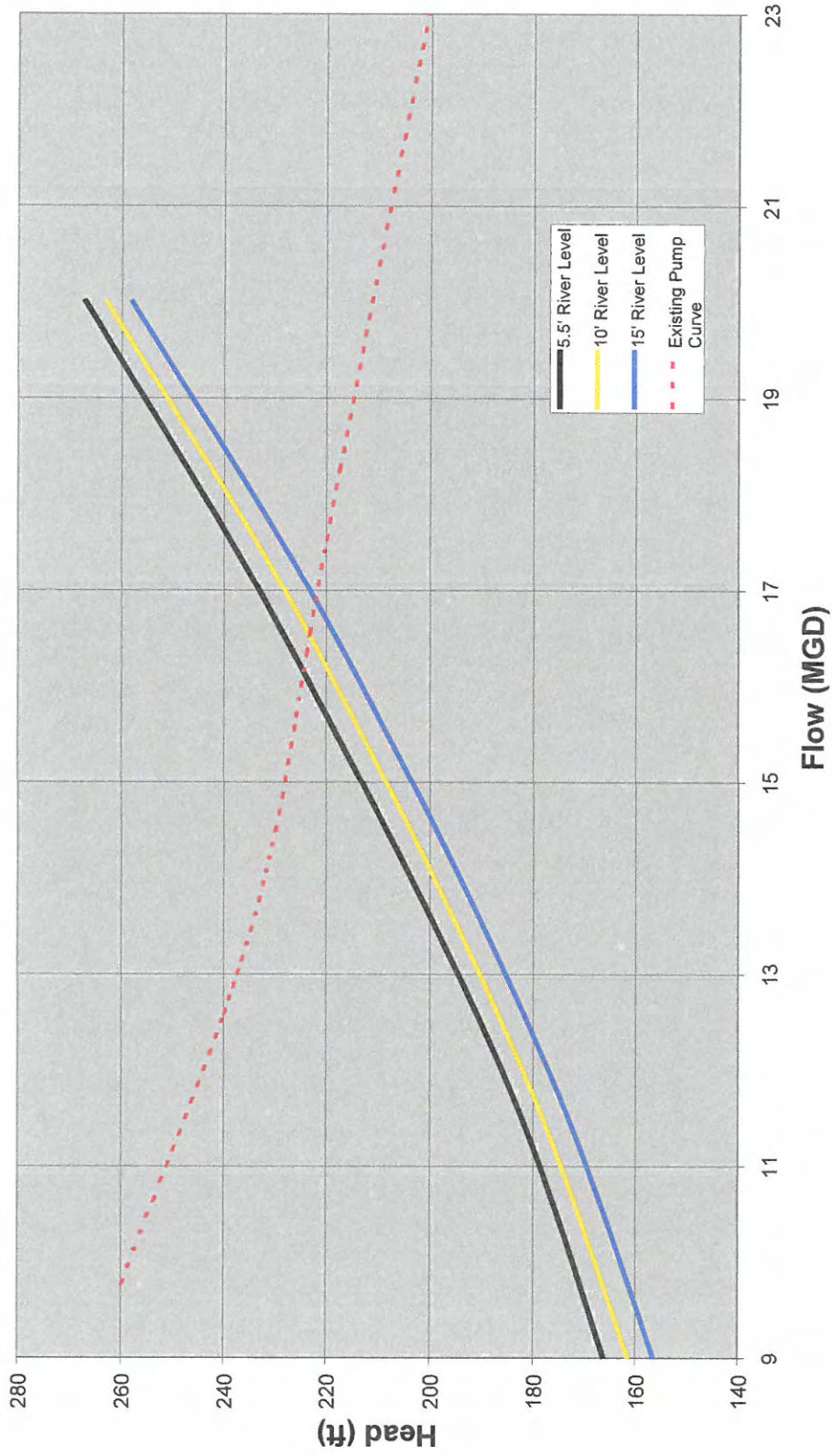
The head loss of the existing transmission conveyance system was modeled based on flow, the existing intake pump curves, and a low mean river level of 8.5 feet above sea level. Figure 2.10 shows a combined pump curve and system curves for the transmission main at various river levels.

Figure 2.10 confirms that the intake pumps are at maximum capacity to produce approximately 16 mgd at the dry weather river level of 8.5 feet above sea level. This capacity is based on all intake pumps running at full speed without redundancy. The firm capacity of the intake with the largest pump out of service is approximately 12 mgd. The capacity of the existing 27-inch diameter raw water pipeline is also approximately 16 mgd, based on a maximum velocity of approximately 6 feet per second.

#### **2.3.2.2 Future Water Supply Scenario System Hydraulics**

To assure a reliable water supply to Lake Oswego, capacity of the Clackamas River Intake and the raw water transmission line must be increased. As described in Chapter 1, the capacity alternatives for the future water supply scenarios are 24 mgd, 32 mgd, and 38 mgd. Each of these future scenarios requires that the existing transmission main capacity be increased.

# Raw Water Transmission Main System and Pump Curve 27" Diameter, C=120



**Figure 2.10**  
**RAW WATER TRANSMISSION MAIN SYSTEM**  
**AND PUMP CURVE**  
 JOINT WATER SUPPLY SYSTEM ANALYSIS  
 CITY OF LAKE OSWEGO AND TIGARD WATER SERVICE AREA

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Within each scenario, there are two options for increasing transmission main capacity. These are: (a) provide a new main to replace the existing main, or (b) provide a second transmission main to parallel and supplement the existing main capacity. Option (a) involves constructing a new main sized to accommodate the full capacity of the proposed demand scenario. The existing main would serve as a back up conveyance system. Option (b) involves construction of a smaller new pipeline that would parallel the existing main, with the combined capacity of the two pipelines (existing and new parallel pipeline) providing sufficient conveyance capacity to meet capacity requirements of the given demand scenario.

A new carbon steel transmission main was selected for each supply scenario and sized to convey the peak day demand with a maximum line velocity of less than 6 fps in both the existing and new pipes. Table 2.5 summarizes the new pipe sizes required and additional hydraulic information for both replacement and parallel transmission main options.

<b>Supply Scenario</b>	<b>New Pipe Diameter (inches)</b>	<b>Capacity (mgd)</b>	<b>Head Loss (feet)</b>
2a	36	24	172
2b	24	11	194
3a	42	32	165
3b	30	19	193
4a	42	38	177
4b	36	27	181

The operational pumping costs were developed only for Option (a) of each scenario. This methodology is based on the conservative assumption that the incremental capital costs of the larger pipeline will be offset by the savings in long-term energy costs, as well as the decreased risk of operation associated with the increased reliability of the system.

### **2.3.3 Proposed Transmission Main Improvements**

#### **2.3.3.1 Alignment**

The proposed raw water transmission main alignment is composed of six connected reaches. A description of each of the reaches, including general location and relevant characteristics, is presented in Figure 2.11.

In general, the proposed alignment for the replacement transmission main follows that of existing alignment. However, potential alternate alignments for each reach were noted, where applicable. Aerial views of the existing alignment are presented in Appendix A.

Reach No.	Description	Length	Comparable Alternative Alignment	Existing Utilities or Rural Conditions (1)	Street Width	Curbs/Sidewalks	Traffic Conditions	Overall Reach Class
1	Intake pump station near intersection of Clackams Blvd. and Portland Ave. in Gladstone. Continues NW along Portland Ave., SW along Arlington St., NW along Beatrice Ave. until intersection of Beatrice and Gloucester St.	2878'	YES. Grid pattern of residential streets offers many options	Cable Television, City of Gladstone Utilities, Electric Utilities, Natural Gas, Telephone Lines	≤ 24'	NO	Medium Use Residential	1
2	Intersection of Beatrice Ave. and Gloucester St. along Gloucester to the intersection of Gloucester and River Road. Reach crosses 99E which will require 160' of bore and jack process to cross underneath the highway.	1621'	YES. Possible to continue on Arlington, cross 99E, and N on River Rd.	Cable Television, City of Gladstone Utilities, Electric Utilities, Natural Gas, Telephone Lines	> 24'	YES	Heavy Use Residential	2
3	Intersection of Gloucester St. and River Road, N along River Road, SW along Meldrum Bar Park Rd. terminating at Meldrum Bar Park. Pre-existing construction easement for narrow Meldrum Bar Park Rd.	3404'	NO. Alternate alignment would add significant length and private property/ easement acquisition.	Cable Television, City of Gladstone Utilities, Electric Utilities, Natural Gas, Telephone Lines	≤ 24'	NO	Medium Use / Parking Lot	1
4	Meldrum Bar Park, underneath Willamette River, terminating in Mary S. Young State Park. Willamette undercrossing will require approx. 2000' of tunneling.	± 2600'	NO. May not be exactly parallel to existing alignment, but will have to cross river in same general location	NONE		NO	Pedestrian/ Recreation	1,S
5	NW through Mary S. Young State Park ending at start of Nixon Dr./ Mapleton Dr.	1687'	YES. Directional drilling to Nixon Ave. to avoid surface disruption associated with open trench construction	Densely wooded area. Assume 24" trees every 10' on center.	N/A	NO	NONE	R
6	Nixon Dr./ Mapleton Dr. at Mary S. Young State Park along Nixon to point aligned west of LOWTP. Heads up steep embankment, along a private drive, across Kenthorpe?, terminating at LOWTP. Pre-existing construction easement for private drive.	1640'	NO. Alternate alignment would require private property acquisition.	Cable Television, City of West Linn Utilities, Electric Utilities, Natural Gas, Telephone Lines	≤ 24'	NO	Light Use Residential	3

Figure 2.11  
REACH DESCRIPTIONS  
RAW WATER TRANSMISSION MAIN  
JOINT WATER SUPPLY SYSTEM ANALYSIS  
CITY OF LAKE OSWEGO AND TIGARD WATER SERVICE AREA

### **2.3.3.2 Cost Criteria**

Five separate reach classes were developed to account for varying installation requirements along the length of the raw transmission pipeline. Descriptions of the individual reach classes are presented in Figure 2.12.

These five classes do not include reaches where the main must be installed by specialized trenchless techniques, such as horizontal directional drilling, tunneling, or bore and jack. A sixth class, S, was assigned to represent either reaches, or sections of reaches, which require these special trenchless techniques. These reaches include crossings of water bodies, railroads, highway, and freeways. Due to the unique nature of each class S reach, a cost per linear foot is not assigned to the overall class. Individual cost criteria for these special reach scenarios are described in Section 2.3.3.3.

General installation criteria and assumptions for the 5 standard reach classes include:

- Project is in residential area, or in a densely wooded rural area. Rural areas are denoted as R class.
- Minimum 6 feet of cover over the top of the pipeline in urban areas, 3 feet in rural areas.
- Good soils conditions, requiring medium excavation effort.
- Imported pipe bedding & pipe zone material.
- Native material from trench excavation to be used for pipe backfill above pipe zone, when possible (i.e. in Dahl Park).
- Disposal of trench spoils within 10 mile round trip.
- No severe groundwater, rock, hazardous material, or archaeologically significant conditions exist.
- A trench box will be sufficient in lieu of solid set sheeting or shoring in urban areas.
- Open-cut trenching without shoring in rural areas.

The residential neighborhoods through which the pipeline passes contain a large number of underground utilities, including existing storm and sanitary sewers, power, natural gas, and communications lines. To account for underground utility adjustments the recommended 3 feet of cover has been adjusted to a conservative 6 feet. This average considers areas where conditions will be normal, and other areas where avoiding existing utilities will involve digging further underground.

Reach Class	Street Type	Street Width	Reach Construction Conditions	Repaving Depth	Traffic Control
1	Residential	≤ 24'	No or Few Curbs/ Sidewalks No Pavement Cuts Full Street Width Replacement	3"	Available Detours Road Closure Signage
2	Busy Residential	> 24'	Curbs and Sidewalks 2 Pavement Cuts Half Street Width Replacement	3"	Signage Flaggers
3	Residential	≤ 24'	No or Few Curbs/ Sidewalks No Pavement Cuts Full Street Width Replacement	3"	No Detour Option Signage Flaggers
4	Busy Highways Local Thoroughfares	> 24'	Curbs or Sidewalks Pavement Cuts Half Street Width Replacement	4"	Electronic Signage Flaggers
R	Rural Densely Wooded	N/A	Cleaning and Grubbing Tree Removal Guaranteed Tree Replacement	N/A	None Required
S	River or Creek Crossing Railroad Crossing Highway/ Freeway Crossing	N/A	Bore and Jack Process or Micro-Tunneling	N/A	Possible Park Closure Signage

Figure 2.12  
**REACH CLASS DESCRIPTIONS FOR TRANSMISSION MAIN**  
 JOINT WATER SUPPLY SYSTEM ANALYSIS  
 CITY OF LAKE OSWEGO AND TIGARD WATER SERVICE AREA

The class S reaches will be traversed by either directional drilling or boring and jacking. It is assumed all crossings of waterways, including the Willamette River, will use directional drilling as the preferred construction method.

### **2.3.3.3 Noise mitigation and control. Class S reaches**

#### ***2.3.3.3.1 HWY 99E***

Reach 2 of the raw water transmission main includes the 160-foot HWY 99E crossing. The heavy traffic in this area will require boring and jacking underneath the roadway to minimize disruption. Construction will require launching and receiving pits to be excavated 30 feet back on either side of the roadway as well as the installation of 52-inch diameter casing pipe. Good soil conditions are assumed in this area.

#### ***2.3.3.3.2 Willamette River***

Reach 4 of the raw water transmission includes the nearly 2000 feet of crossing under the Willamette River. Launching and receiving pits will be excavated a minimum of 100 feet back from the water. The pits will be deep enough to allow installation of the pipe 40 feet below the riverbed. Good soil conditions are assumed in this area.

#### **2.3.3.4 Capital Costs**

For the purposes of this study, and as a conservative estimate, it is assumed that a replacement pipe will be installed to provide the required increased capacity for raw transmission main system.

A conceptual project cost estimate by reach for the raw water transmission main based on new replacement pipe is shown below in Table 2.6.

<b>Table 2.6 Conceptual Project Cost Estimate - Raw Water Transmission Main<sup>1</sup> Joint Water Supply System Analysis City of Lake Oswego and Tigard Water Service Area</b>					
<b>Reach</b>	<b>Type</b>	<b>Length (feet)</b>	<b>Scenario 2a 24 mgd 36-inch pipe</b>	<b>Scenario 3a 32 mgd 42-inch pipe</b>	<b>Scenario 4a 38 mgd 42-inch pipe</b>
1	1	2,878	\$2,630,000	\$3,160,000	\$3,160,000
2	2,S	1,621	\$1,860,000	\$2,160,000	\$2,160,000
3	1	3,404	\$3,110,000	\$3,730,000	\$3,730,000
4	1,S	2,600	\$5,720,000	\$7,180,000	\$7,180,000
5	R	1,687	\$4,930,000	\$5,720,000	\$5,720,000
6	3	1,640	\$1,640,000	\$1,970,000	\$1,970,000
<b>Total</b>		<b>13,830</b>	<b>\$19,890,000</b>	<b>\$23,920,000</b>	<b>\$23,920,000</b>
<b>Note:</b>					
1. Conceptual costs are based on cement lined and coated carbon steel pipe; cathodic protection is not included.					

### **2.3.3.5 Operations and Maintenance**

Operations and Maintenance Costs for the pipeline are assumed negligible in comparison to the overall cost of the project, and within the error of overall project cost estimates. It should be noted that the costs for pumping through the raw and finished water treatment mains are included in the O&M costs associated with the Clackamas River Intake and the Water Treatment Plant, respectively.

## **2.4 WATER TREATMENT ALTERNATIVES**

### **2.4.1 Water Treatment Plant Sites**

#### **2.4.1.1 Existing Site**

The Lake Oswego WTP was constructed in 1967 and expanded to its current capacity of 16-mgd in 1980. From 1998 to 2000, modifications were made to chemical storage and feed and engineered concrete sludge lagoons were constructed to replace the original earthen ponds. The current facility is sited within a residential neighborhood and currently occupies property totaling 6.05 acres with frontage on Kenthorpe Way.

An additional 3.30 acres south of the existing property, with frontage on Mapleton Drive, was acquired by the City to accommodate future facility expansions. The City has elected to preserve the existing condition of this parcel, to help maintain a positive relationship with the surrounding neighborhood. With this property no longer available for future facilities, the expansion strategy for the Lake Oswego WTP must be revisited, particularly with respect to sludge management.

**2.4.1.2 Alternatives Sites**

The City has identified an alternative WTP site in unincorporated Clackamas County. The Luscher Farms area along Rosemont Road has available area for a new treatment facility. The alternative site is remote and is located at an elevation that places it in the upper zone of the distribution system. Table 2.7 lists the advantages and disadvantages of developing a new WTP site.

Although there are legitimate advantages to constructing a new facility, abandoning the existing site and the required expansion of raw and finished water infrastructure are significant disadvantages. Therefore, the recommended concept for expansion is to further develop the existing Lake Oswego WTP site.

<b>Table 2.7 Alternative Site Assessment Joint Water Supply System Analysis City of Lake Oswego and Tigard Water Service Area</b>	
<b>Advantages</b>	<b>Disadvantages</b>
Remote location away from residential communities	Loss of investment in existing facilities
Ability to construct the new facility without disrupting the existing facility	Capability of the existing site to accommodate the expansion to 38-mgd
Potential for gravity flow into the lower zones of the distribution system	Requirement to pump the entire plant flowrate to the highest level in the distribution system
	The Luscher Farm is outside the existing USB and is currently zoned as Exclusive Farm Use
	No guarantee that future development will not surround the site
	New pipeline required from intake to new facility

**2.4.2 Process Requirements**

**2.4.2.1 Water Quality**

The available water quality of the source (raw water) and the quality objectives for the treated water (finished water) determine the appropriate treatment process. The objective in process selection is to determine the most economical process that can treat the available raw water quality to the finished water objectives in a manner that meets the goals set for process reliability, flexibility, and “operator friendliness”.

Our recommendations for these goals are as follows:

- Reliability should be high because Lake Oswego relies on the water treatment plant as its sole source of supply with a limited backup (intertie) to the South Fork Water Board system. The Lake Oswego WTP also serves as a backup supply to the City of West Linn.
- Flexibility should be high because the Clackamas River raw water supply has a wide range of water quality characteristics; for example, river turbidity can rapidly climb from 1 to 4 NTU to over 270 NTU because of rainfall and spring runoff from snowmelt.
- “Operator friendliness” should be high because of the limited operations staff; selection should be made to avoid processes requiring high maintenance or intensive operator attention.

The existing raw water supply for the Lake Oswego WTP is the Clackamas River. The point of diversion is a free standing inlet with mechanical screens and vertical turbine pumps located on the north bank of the Clackamas River approximately 3/4 of a mile upstream of its confluence with the Willamette River. Lake Oswego has permits to appropriate up to 38 mgd from the Clackamas River. As stated in the Water Supply Feasibility Project (2005), an option for supplying the additional raw water would be to obtain additional points of diversion for the South Fork Water Board water right to the Lake Oswego intake. Due to the operational recovery limitations of membrane plants, additional raw water (up to 1-mgd) may be required to produce the design capacity at the buildout scenario (38-mgd).

The Clackamas River raw water quality has been characterized in the *Regional Water Supply Plan* (1995) as “generally good compared to other regional source options, and ... very good compared to sources nationwide.” Currently the Clackamas River is used as a raw water supply for five water treatment plants:

- Lake Oswego WTP.
- North Clackamas Water Commission WTP (slow sand and membranes).
- Clackamas River Water.
- South Fork Water Board WTP.
- City of Estacada

Under EPA guidelines, the raw water exceeds primary (health related) drinking water standards for turbidity and microorganisms and requires filtration. The raw water supply also requires treatment for constituents exceeding secondary (aesthetic) standards including color, algae, and tastes and odors.

The water quality in the Clackamas River varies significantly throughout the seasons. Storm events and spring runoff can increase the turbidity and decrease the alkalinity rapidly. Based on conversations with the WTP operations staff and a review of operational data, the



Clackamas River raw water quality characteristics were established and are shown in Table 2.8.

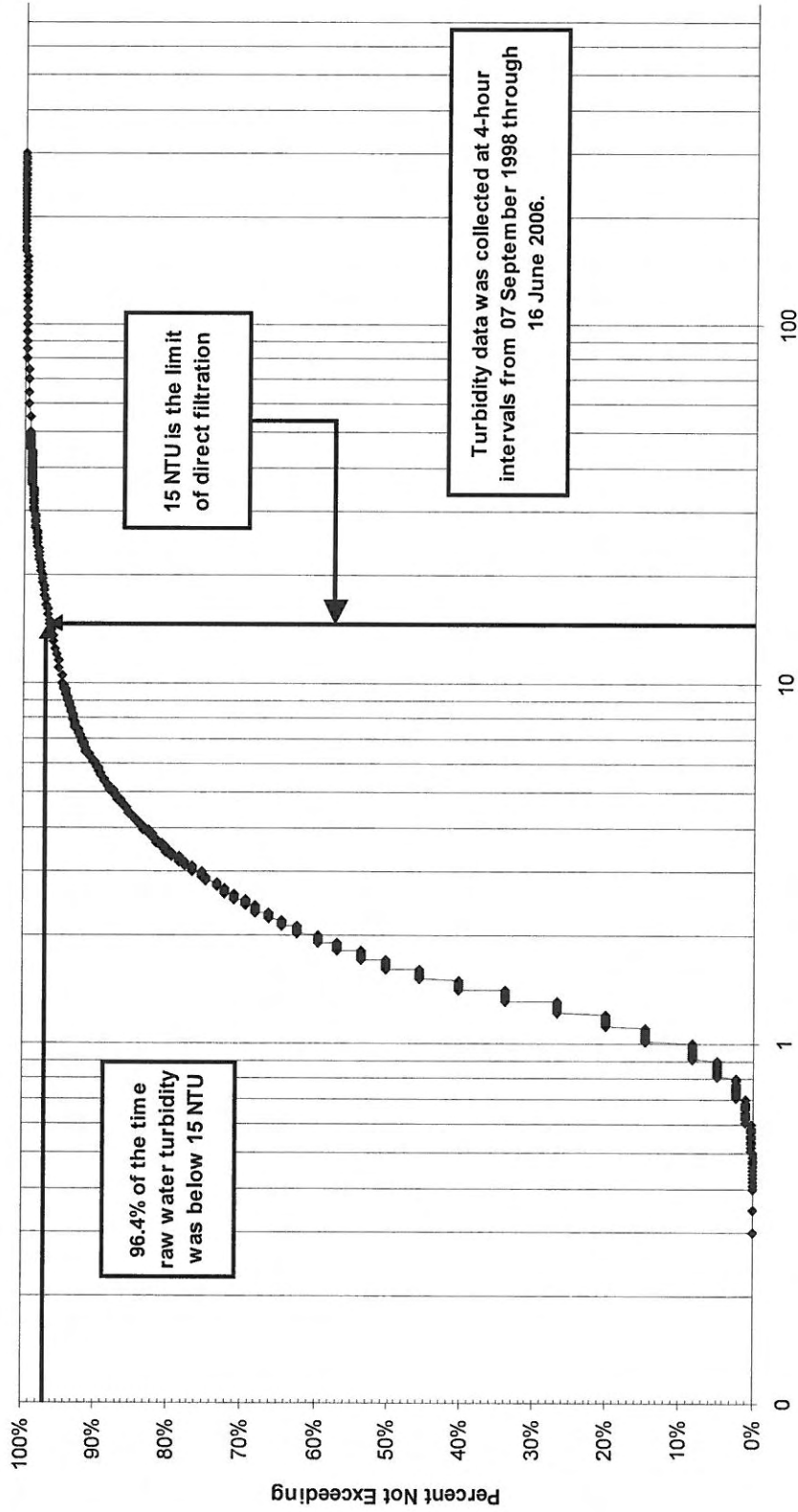
A frequency analysis was performed on the operational data from 7 September through 16 June 2006 to establish the required level of treatment that reliably accomplishes the treatment goals. A frequency distribution plot showing Clackamas River raw water turbidity samples collected every four hours over an eight-year period is shown in Figure 2.13. The data indicate that during this period the raw water turbidity exceeded the 15 NTU limitation of the existing direct filtration process approximately four percent of the time. Significantly, the raw water turbidity occasionally exceeded the limitation of the direct filtration project by nearly an order of magnitude. This data demonstrates that conventional treatment is required to provide reliable performance.

<b>Table 2.8 Clackamas River Raw Water Quality Joint Water Supply System Analysis City of Lake Oswego and Tigard Water Service Area</b>				
<b>Parameter</b>	<b>Units</b>	<b>Minimum</b>	<b>Average</b>	<b>Maximum</b>
Turbidity <sup>1</sup>	NTU	0.4	3.7	270
PH <sup>1</sup>	Units	6.04	7.3	8.99
Alkalinity <sup>1</sup>	mg/L as CaCO <sub>3</sub>	10	23.7	44
Color <sup>1</sup>	A.C.U	0	30.1	1010
TOC <sup>2</sup>	mg/L	Not Available	0.72	2.76 <sup>3</sup>
Algae, Taste & Odor <sup>4</sup>	-			

Notes: Algae blooms have occurred that contribute to earthy, swampy and musty taste and odor problems.

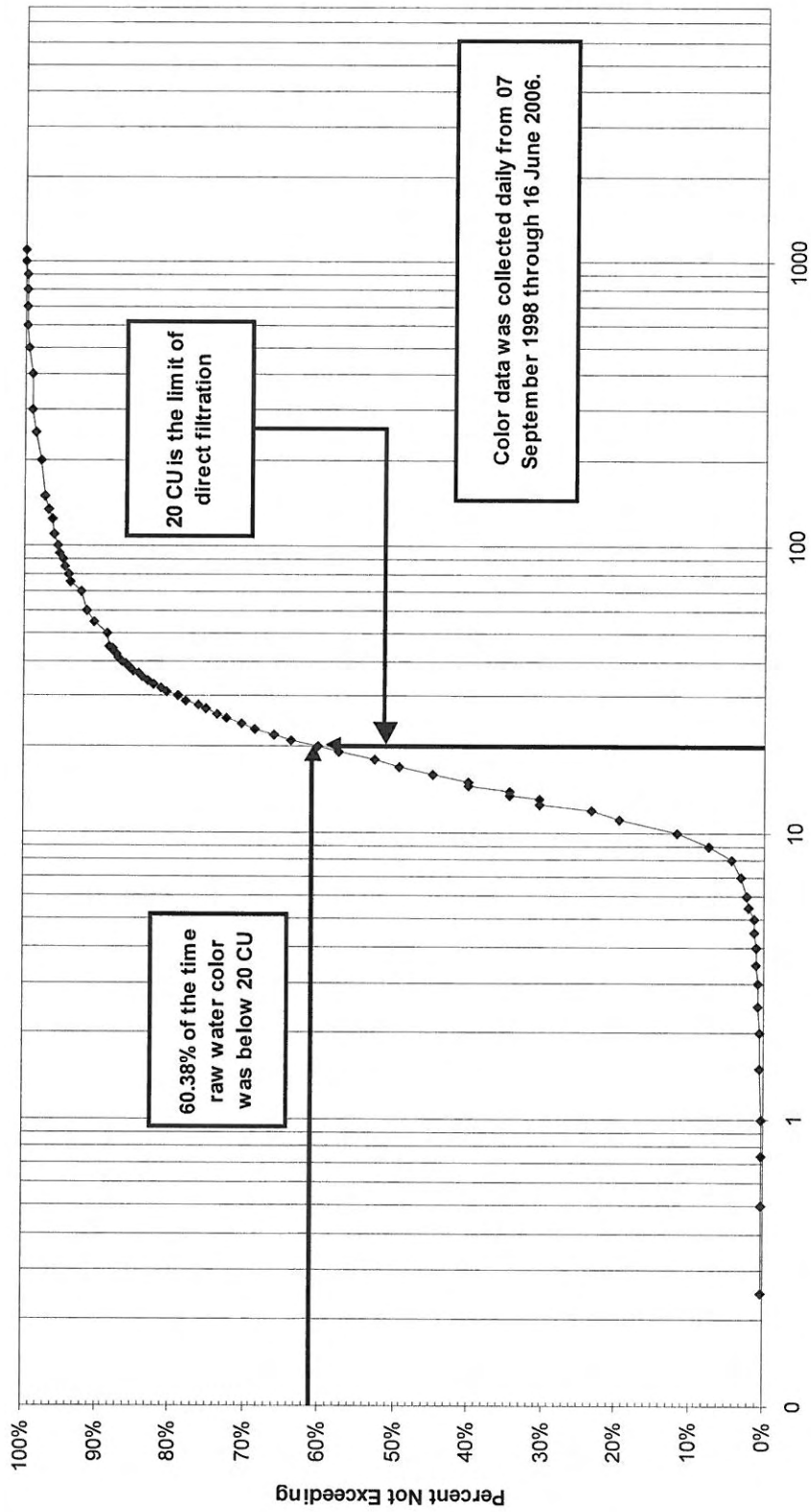
1. Data based on 4 hour operational logs from 7 September through 16 June 2006.
2. Data collected from 23 March 2000 through 16 October 2001.
3. Past data has reported TOC concentrations as high as 7 mg/L.
4. Based on conversations with operations staff.

The levels of color and, at times, algae and algal tastes and odors in Clackamas River raw water also exceed the process limitations of direct filtration and require a conventional treatment process. Color, algae, and taste and odors are secondary water quality standards and relate to the aesthetic quality rather than the health risk of the water supply. Nevertheless, the public perception of quality of service and safety of the water supply is often based on aesthetic considerations such as tastes, odors, or color. No quantitative data on algae and tastes and odors are available; however, data for raw water color exist and are presented in Figure 2.14. The data show that 40 percent of the time the raw water color exceeds the limit of the direct filtration process and requires conventional treatment.



**Figure 2.13**  
**RAW WATER TURBIDITY FREQUENCY DISTRIBUTION**  
 JOINT WATER SUPPLY SYSTEM ANALYSIS  
 CITY OF LAKE OSWEGO AND TIGARD WATER SERVICE AREA

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**Figure 2.14**  
**RAW WATER COLOR FREQUENCY DISTRIBUTION**  
 JOINT WATER SUPPLY SYSTEM ANALYSIS  
 CITY OF LAKE OSWEGO AND TIGARD WATER SERVICE AREA

Lo507SRf2.14-7525.ai

**2.4.2.2 Labor**

The Lake Oswego WTP operations staff consists of six operators and one supervisor. WTP operations are accomplished in two shifts, one day shift and one swing shift. Table 2.9 shows the hours and number of operators for each shift and the seasonal variation. Currently, a total of 210 operator hours per week are utilized at the Lake Oswego WTP.

<b>Table 2.9 Operator Shifts<sup>1</sup> Joint Water Supply System Analysis City of Lake Oswego and Tigard Water Service Area</b>				
<b>Shift</b>	<b>Shift Hours</b>		<b>Number of Operators</b>	<b>Weekly Shift Schedule</b>
	<b>Summer</b>	<b>Winter</b>		
Day	5am - 3pm	6am - 4pm	2	Sunday - Wednesday Wednesday - Saturday
Swing	3pm - 1am	2pm - 12am	1	Sunday - Wednesday Wednesday - Saturday
<b>Note:</b>				
1. Vacation and sick days are covered through overtime hours by operations staff.				

Currently, the Lake Oswego WTP does not operate from the end of the swing shift until the start of the day shift. Around the clock operation does occur, but only when demand warrants, in order to reduce overtime operation. For safety reasons, maintenance is only performed during the day shift when two operators are present.

Operations activities include operations and distribution system monitoring, water quality sampling and reporting, equipment repair and maintenance, and instrumentation service and calibration. Table 2.10 details the current operator-hours required per week to perform each of the operations tasks.

The availability of experienced and qualified operations staff is becoming problematic nationwide. These national issues have not escaped the City of Lake Oswego. While the current staff at the Lake Oswego WTP is comprised of experienced veteran operators, over half will be eligible to retire within the next five years. This, combined with the proposed expansion of the WTP, requires that the expansion evaluation place a high priority on reducing operations and maintenance efforts.

<b>Table 2.10 Operations Labor Breakdown Per Activity<sup>1</sup> Joint Water Supply System Analysis City of Lake Oswego and Tigard Water Service Area</b>				
<b>Activity</b>	<b>Hours per Week<sup>1</sup></b>		<b>Percent of Available Operator Hours</b>	
	<b>Min</b>	<b>Max</b>	<b>Min</b>	<b>Max</b>
General Operation	140	170	66%	80%
Maintenance	20	30	10%	14%
Instrumentation	10	20	5%	10%
Water Quality Sampling	10	20	5%	10%

Note:

1. Weekly work distribution provided by Bob Blezinski, WTP operator. Hours for general operation were assumed to be equivalent to the hours remaining after other tasks were completed.

### **2.4.3 Treatment Alternatives**

#### **2.4.3.1 Process Selection**

The basic water treatment objectives are to provide removal of contaminants and disinfection of microorganisms. The contaminant removal process for most water supplies involves the addition of chemicals to destabilize particulates (coagulation) followed by the addition of sufficient energy (flocculation) to allow formation of settleable or filterable particulates (floc). The water treatment industry has developed a number of alternative processes that can be applied to different qualities of raw water. Basic process alternatives, which include chemical coagulation and filtration, are:

- Conventional (complete) treatment, consisting of:
  - Coagulation
  - Flocculation
  - Sedimentation (solids removal)
  - Filtration (final solids removal)
- Two stage filtration, consisting of:
  - Coagulation
  - Roughing filter (flocculation and partial solids removal)
  - Filtration (final solids removal)
- Direct filtration, consisting of:
  - Coagulation
  - Flocculation
  - Filtration (solids removal)

- Inline (contact) filtration, consisting of:
  - Coagulation
  - Filtration (flocculation and solids removal)

In general, the cost of water treatment (both capital and O&M) increases with the ability of the process to handle more severe raw water quality. The objective in process selection is to choose the least expensive process which is capable of treating the raw water quality available with the appropriate level of reliability, flexibility and operator friendliness.” Table 2.11 shows treatment process selection criteria for six different parameters. This table reflects years of experience in plant operation and represents a high level of reliability in treatment.

<b>Table 2.11 Process Selection Criteria            Joint Water Supply System Analysis            City of Lake Oswego and Tigard Water Service Area</b>				
Parameter	Conventional Complete	Two-Stage Filtration	Direct <sup>1</sup> Filtration	In-Line Filtration
Turbidity (NTU)	<5000 <sup>2</sup>	<50	<15	<5
Color (apparent)	<3000	<50	<20	<15
Coliform (#/mL)	<10 <sup>7</sup>	<10 <sup>5</sup>	<10 <sup>3</sup>	<10 <sup>3</sup>
Algae (ASU/mL)	<10 <sup>5</sup>	<5 x 10 <sup>3</sup>	<5 x 10 <sup>2</sup>	<10 <sup>2</sup>
Taste and Odor (TON)	<30	<10	<3	<3
Notes: 1. Slow sand filtration is applicable in cases where the raw water quality is acceptable for direct filtration. 2. If the raw water turbidity exceeds 1000 NTU, a pre-sedimentation process is required for all conventional complete treatment processes.				

The EPA Surface Water Treatment Rule Guidance Manual<sup>6</sup> divides the processes shown in Table 2.11 into two categories:

- **Direct filtration** includes those processes, which remove all solids on the filter.
- **Conventional treatment** includes those processes, which remove some solids through pretreatment prior to filtration.

In accordance with EPA guidelines, the Oregon Department of Health Services (DHS) has designated the Lake Oswego WTP as a direct filtration plant. Although the Lake Oswego WTP has contact basins upstream of the filters, it is appropriate to classify the plant as direct filtration because the lack of flocculation and solids removal equipment limits the use of the basins for pretreatment for solids removal. The DHS classification is important because a direct filtration plant must provide a higher level of disinfection than a conventional water treatment plant. Typically, this results in a requirement for more extensive chlorination facilities (for example, larger chlorine contact basins) at a direct filtration plant.

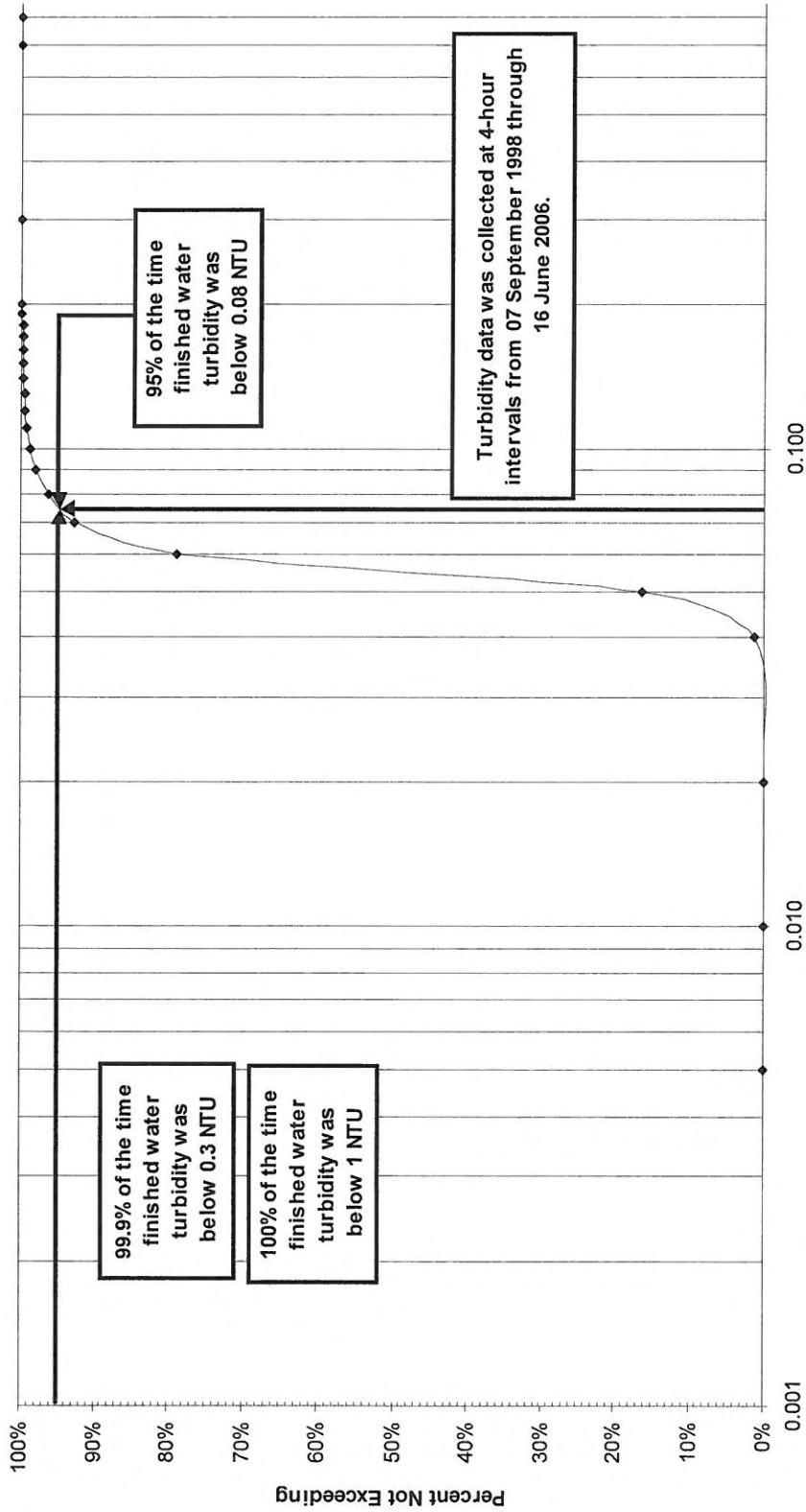
A comparison of raw water quality data for the Clackamas River and the process selection criteria shown in Table 2.11 leads to the following observations:

- The Clackamas River exceeds the direct filtration criteria for turbidity (15 NTU) approximately 4 percent of the time and would require conventional treatment for reliable treatment of raw water.
- The Clackamas River typically exceeds the direct filtration criteria for color (20 ACU) approximately 40 percent of the time and would frequently require conventional treatment for color removal.
- The Clackamas River probably exceeds the direct filtration criteria for algae and may occasionally require conventional treatment for algae removal.
- The Clackamas River probably exceeds the direct filtration criteria for tastes and odors (3 TON) and occasionally would require conventional treatment for odor removal.

Of these parameters, turbidity is the most critical. Turbidity removal represents the efficiency of the treatment plant as a barrier against the passage of microorganisms into the distribution system. In addition, turbidity can shield pathogenic microorganisms and interfere with the disinfection process. For these reasons, there are stringent Federal and State standards regulating treated water turbidity levels.

Recent studies on removal of chlorine resistant pathogens such as *Cryptosporidium* have resulted in recommendations of an association of water utility and regulatory agency groups (The Partnership for Safe Water) for an operating goal that individual filter finished water turbidity should be less than 0.1 NTU. From Figure 2.15, it can be seen that approximately 5 percent of the time the combined finished water turbidity exceeded 0.1 NTU. The majority of combined finished water turbidity readings were less than 0.1 NTU, which demonstrates that the raw water turbidity can normally be treated by the direct filtration process. However, finished water turbidity above this level reflects the lack of process reliability when the raw water turbidity exceeds the limitations of the direct filtration process.

It should be noted that the direct filtration process was selected for the Lake Oswego WTP more than 40 years ago, at a time when water quality standards were much less stringent than current requirements. Within the current context of the Long Term 1 Enhanced Treatment Rule (LT1) and the Long Term 2 Enhanced Treatment Rule (LT2), and the necessary future expansion of the treatment facility, the direct filtration process is no longer adequate to provide treatment of Clackamas River raw water. Recent regulatory requirements to remove chlorine resistant pathogens such as *Cryptosporidium* have driven the LT1 and LT2 to even more stringent finished water turbidity standards. Additionally, it is likely that potential future regulatory requirements will not be able to be met by direct filtration treatment.



**Figure 2.15**  
**FINISHED WATER TURBIDITY FREQUENCY DISTRIBUTION**  
 JOINT WATER SUPPLY SYSTEM ANALYSIS  
 CITY OF LAKE OSWEGO AND TIGARD WATER SERVICE AREA

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Although color is a secondary (aesthetic) standard it is also an indicator of the level of natural organic material (NOM) in the raw water supply. NOM and the related parameter total organic carbon (TOC) are of concern because of the potential for natural organic compounds to react with chlorine during the disinfection process to form disinfection by-products (DBPs) which are regulated under current water quality standards.

In order to achieve reliable treatment of Clackamas River raw water at the Lake Oswego WTP, it will be necessary to upgrade the facilities from a direct filtration process to conventional treatment. Candidate processes that provide conventional treatment are:

- Conventional - coagulation, flocculation, sedimentation, media filtration.
- High Rate Conventional - coagulation, flocculation, high rate sedimentation, media filtration.
- Membrane - coagulation, flocculation, membrane filtration.

Each of these options provides:

- The ability to reliably treat turbidity, algae, color, and tastes and odors in the raw water supply at full plant capacity.
- The flexibility to respond to changes in water quality.
- An increase in capacity without a significant increase in operator labor requirements.

The following sections provide a discussion of each of the process alternatives, including:

- A general overview of the process alternative.
- Description of the selected process option, including required facilities and design criteria for expansion to 24, 32, and 38 mgd.
- An assessment of process reliability.
- Operational impacts.
- Site requirements and the reuse of existing facilities.
- Constructability issues.

#### **2.4.3.2 Conventional**

Conventional treatment is a robust, time-tested process that involves coagulation, flocculation, sedimentation, and filtration. Conventional treatment provides a high level of removal of turbidity, color, and TOC, with the capability to treat algae on an intermittent basis. Conventional treatment, specifically the sedimentation process, operates at low loading rates, which increases the reliability of treatment and consistency of the finished water quality, but increases the site requirements for treatment.

In the *Water Treatment Plant Facilities Plan* (1997), conventional treatment was recommended because it satisfied the criteria for reliability, flexibility, and "operator friendliness", and has the ability to meet existing and future drinking water standards. This

recommendation is still accurate, and thus, conventional treatment warrants consideration as the expansion process for the Lake Oswego WTP.

#### **2.4.3.2.1 Process Description**

The conventional process consists of four steps:

1. Coagulation
2. Flocculation
3. Sedimentation
4. Filtration

Coagulation, sometimes referred to as flash mixing or rapid mixing, is the process by which chemicals are added to the raw water supply to destabilize particulates and dissolved contaminants. The existing flash mix at the Lake Oswego WTP utilizes a pump diffusion flash mix system, which will remain the mixing method for the proposed expansion.

Flocculation, sometimes called slow mixing, involves the addition of energy through gentle agitation of the coagulated water to allow the formation of aggregated particles that can be removed through sedimentation or filtration. The recommended flocculation process for this water supply is three-stage tapered flocculation with an energy input ranging from 60 to 20  $\text{sec}^{-1}$  and a minimum detention time of 30 minutes at the design flow.

Sedimentation refers to removal of floc by gravity settling. By creating a quiescent environment, the floc particles are allowed to settle as the clarified water overflows and is directed to the filters. In order to increase the capacity of the sedimentation basins, plate settlers are installed in a portion of the basin to increase the effective sedimentation surface area. Settled sludge is collected by chain and flight mechanisms or an underwater traveling siphon system and is sent to gravity thickeners and eventually to the sludge dewatering facility. Sedimentation basins with plate settlers are designed with a hydraulic loading rate of approximately 1.5 gpm/sf (total basin area) and a minimum detention time of 60 minutes.

Filtration in this context refers to the passage of chemically conditioned water through a granular media to allow removal of solids. Currently, nearly all solids removal occurs within the filter; the existing contact basins are not designed for significant solids removal. When a filter accumulates solids it must be cleaned by backwashing. Water used in backwashing must be recycled for retreatment thereby reducing the net production of finished water and reducing the plant capacity.

The existing six filters are equipped with dual media (anthracite, sand) and have been upgraded with Leopold Type S underdrains with permeable media-retaining caps. Filters of this design are typically operated at loading rates from 3 to 8 gpm/sf. Filter aid and chlorine may be added upstream of the filters to improve removal of unsettled solids and prevent algae growth in the basin and on the media.

The filtered water is stabilized using lime and carbon dioxide, and disinfected with sodium hypochlorite.

Figure 2.16 shows the detailed process flow diagram for the conventional process alternative.

#### **2.4.3.2.2 Required Facilities**

Expansion of the Lake Oswego WTP using a conventional treatment process will require the following modifications:

- Modification of the existing contact basins to include flocculation tanks, plate settlers, and sludge removal equipments
- New flocculation and sedimentation tanks
- Expansion of the filter gallery
- Gravity thickeners and sludge dewatering facilities

Table 2.12 presents the conventional treatment design criteria and required facilities for the three capacity scenarios for the Lake Oswego WTP.

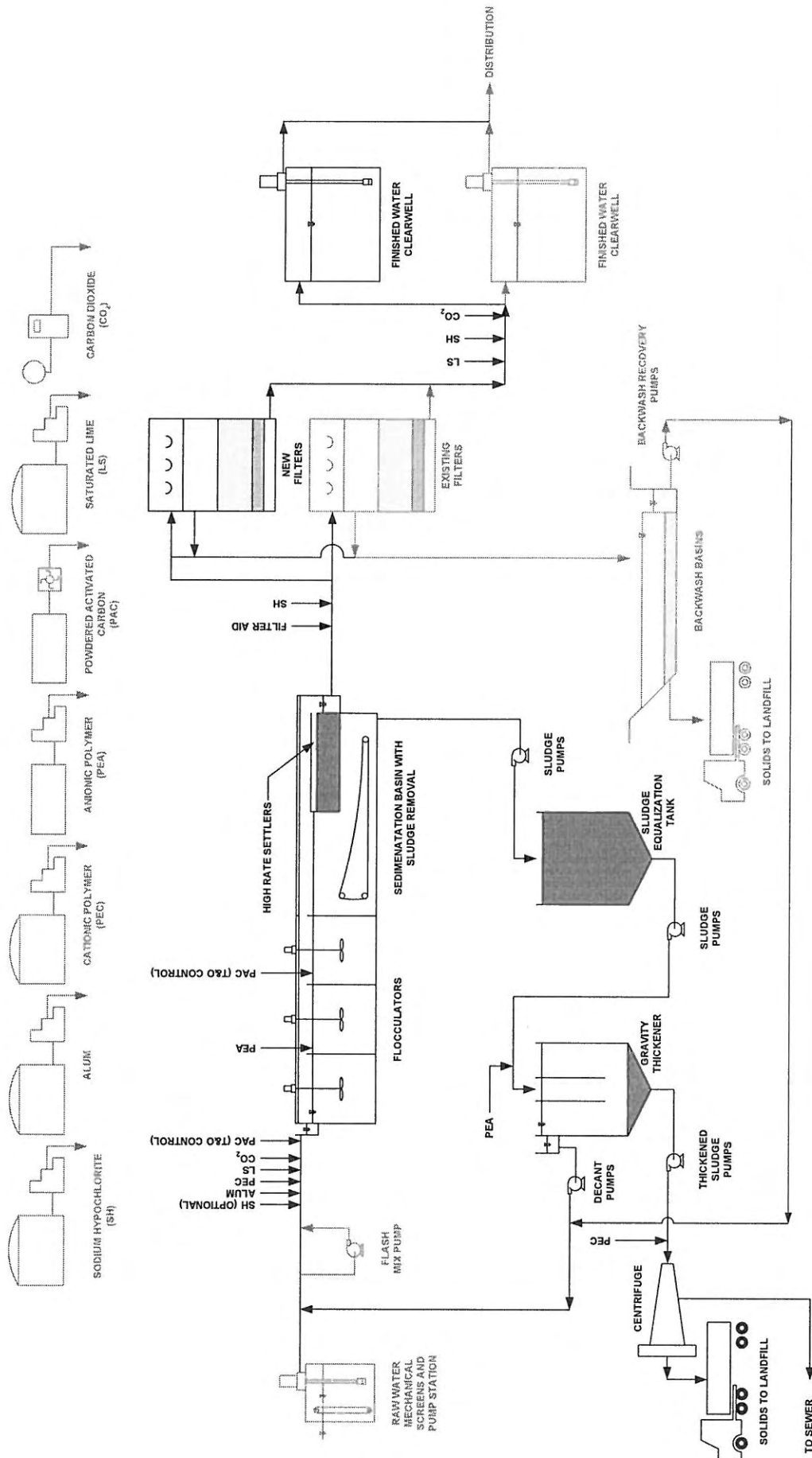


Figure 2.16  
 CONVENTIONAL TREATMENT OPTION  
 PROCESS FLOW DIAGRAM  
 JOINT WATER SUPPLY SYSTEM ANALYSIS  
 CITY OF LAKE OSWEGO AND TIGARD WATER SERVICE AREA

<b>Table 2.12 Design Criteria - Conventional Treatment Alternative Joint Water Supply System Analysis City of Lake Oswego and Tigard Water Service Area</b>				
<b>Parameter</b>	<b>Units</b>	<b>WTP Capacity</b>		
		<b>24 mgd</b>	<b>32 mgd</b>	<b>38 mgd</b>
Number of New Treatment Trains	No.	3	5	6
Total Number of Treatment Trains	No.	6	8	9
Capacity Per New Treatment Train	mgd	4.0	4.0	4.3
<b>Flocculation Basins</b>				
Detention Time at Plant Capacity	min	34.9	34.9	32.2
Volume Per Train	gal	97,000	97,000	97,000
Volume Per Stage	gal	32,300	32,300	32,300
Number of Stages	No.	3	3	3
Water Depth	ft	14	14	14
Length	ft	16	16	16
Width	ft	20	20	20
Number of Flocculators	No.	9	15	18
<b>Sedimentation Basins</b>				
Type: Rectangular, horizontal flow with mechanical solids removal and high-rate settlers (tubes or plates).				
Number of New Basins	No	3	5	6
Total Number of Basins	No.	6	8	9
Basin Length	ft	92	92	92
Basin Width	ft	20	20	20
Water Depth	ft	14	14	14
Basin Length to Width Ratio		5	5:1	5:1
Volume Per Train	gal	185,800	185,800	185,800
Total Volume	gal	1,115,000	1,486,500	1,672,200
Surface Loading Rate	gpm/sf	1.51	1.51	1.64
Detention Time at Plant Capacity	min	67	67	62

**Table 2.12 Design Criteria - Conventional Treatment Alternative, continued**  
**Joint Water Supply System Analysis**  
**City of Lake Oswego and Tigard Water Service Area**

Parameter	Units	WTP Capacity		
		24 mgd	32 mgd	38 mgd
<b>Filters</b>				
Type: Dual Media, 36" Anthracite, 10" Sand				
Number of New Filters	No.	2	6	8
Total Number of Filters	No.	8	12	14
Area Per Filter	sf	360	360	360
Flowrate Per Filter, All Units On-Line	gpm	2,080	1,850	1,890
Flowrate Per Filter, One Unit in Backwash	gpm	2,380	2,020	2,030
Loading Rate, All Units On-Line	gpm/sf	5.79	5.14	5.24
Loading Rate, One Unit in Backwash	gpm/sf	6.61	5.61	5.64
Depth of Water Above Media	ft	6.0	6.0	6.0
Headloss Available for Solids	ft	8.9	8.9	8.9
<b>Filter Media</b>				
Anthracite Depth	in	36	36	36
Sand Depth	in	10	10	10
<b>Backwash System</b>				
Type: Rotating arm surface wash with water backwash				
Underdrain: Leopold Type S with permeable cap				
Surface Wash Water Supply: Surface Wash Pump (existing)				
Wash Rate (assumed)	gpm/sf	1	1	1
Duration	min	3	3	3
Volume	gal	756	756	756
Backwash Water Supply: Backwash Pumps				
Number of Pumps	No.	2	2	2
Pump Capacity	gpm	7,500	7,500	7,500
Backwash Rate	gpm/sf	20	20	20
Duration	min	8	8	8
Volume Per Backwash (max)	gal	57,600	57,600	57,600
Filter Drawdown Volume Per Filter	gal	16,200	16,200	16,200
Filter to Waste Volume Per Filter	gal	27,000	27,000	27,000
Total Backwash Waste Volume Per Filter Per Backwash	gal	101,600	101,600	101,600
Backwash Cycles per Day	No.	1	1	1

<b>Table 2.12 Design Criteria - Conventional Treatment Alternative, continued</b>				
<b>Joint Water Supply System Analysis</b>				
<b>City of Lake Oswego and Tigard Water Service Area</b>				
<b>Parameter</b>	<b>Units</b>	<b>WTP Capacity</b>		
		<b>24 mgd</b>	<b>32 mgd</b>	<b>38 mgd</b>
<b>Backwash/Thickening Water Recovery</b>				
Total Backwash Volume Per Day (max)	gal	812,500	1,218,800	1,422,000
Backwash Water Recovery Volume	gal	810,000	1,215,000	1,417,400
Gravity Thickener Recovery Volume	gal	38,400	51,200	60,800
Recovered Water Percent of Influent Flow	%	3.5	4.0	3.9
<b>Filter Washwater Lagoons</b>				
Type: Concrete Lined				
Number of Lagoons:	No.	4	4	4
Depth of Solids Zone	ft	3.0	3.0	3.0
Water Surface (min)	ft	3.5	3.5	3.5
Water Surface (max)	ft	5.5	5.5	5.5
Total Depth	ft	6.0	6.0	6.0
Lagoon Length - Top	ft	174	174	174
Lagoon Width - Top	ft	58	58	58
Lagoon Length - Bottom	ft	126	126	126
Lagoon Width - Bottom	ft	58	58	58
One Lagoon In Service	gal	139,000	139,000	139,000
Two Lagoons In Service	gal	278,000	278,000	278,000
Volume Per Backwash	gal	102,000	102,000	102,000
Consecutive Backwash Storage (2 Ponds)	No.	2.73	2.73	2.73
Daily Solids Captured By Filters	lbs	316	316	376
Volume Available for Solids Storage	gal	180,000	180,000	180,000
Backwash Settled Solids Concentration	mg/L	10,000	10,000	10,000
Volume of Storage Used Per Day	gal/day	2,800	3,800	4,500
Days of Solid Storage Per Basin	days	63	47	40
Total Storage Available	days	253	189	160
Solids Drying Time Available Per Basin	days	189	142	120

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**Table 2.12 Design Criteria - Conventional Treatment Alternative, continued  
Joint Water Supply System Analysis  
City of Lake Oswego and Tigard Water Service Area**

Parameter	Units	WTP Capacity		
		24 mgd	32 mgd	38 mgd
<b>Solids Production</b>				
Alum Dose	mg/L	15	15	15
Influent Turbidity	NTU	3.5	3.5	3.5
Solids From Aluminum Hydroxide	lbs/day	1,300	1,800	2,100
Solids From Turbidity	lbs/day	1,100	1,400	1,700
Total Solids Production	lbs/day	2,400	3,200	3,800
Solids Captured By Filters	lbs/day	240	320	380
Solids in Sedimentation Basin	lbs/day	2,100	2,900	3,400
Sedimentation Basin Percent Solids	%	0.50	0.50	0.50
Sludge Blowdown Volume Per Day	mgd	0.05	0.07	0.08
Blowdown Percent of Influent Flowrate	%	0.21	0.21	0.21
Blowdown Events Per Day	No.	2	2	2
Blowdown Duration per Train	min	15	15	15
Total Blowdown Time	min	90	120	135
Instantaneous Blowdown Flowrate	gpm	569	569	600
<b>Blowdown Equalization</b>				
Flowrate In	gpm	569	569	600
Duration of Inflow	min/day	90	120	135
Flowrate Out	gpm	100	100	100
Duration of Outflow	min/day	512	683	811
Equalization Volume Required	gal	42,200	56,300	67,600
<b>Equalization Tank</b>				
Depth	ft	20	20	20
Diameter	ft	19	22	24
Volume	gal	42,400	56,900	67,700



<b>Table 2.12 Design Criteria - Conventional Treatment Alternative, continued</b>				
<b>Joint Water Supply System Analysis</b>				
<b>City of Lake Oswego and Tigard Water Service Area</b>				
<b>Parameter</b>	<b>Units</b>	<b>WTP Capacity</b>		
		<b>24 mgd</b>	<b>32 mgd</b>	<b>38 mgd</b>
<b>Gravity Thickener</b>				
Hydraulic Loading Rate	gpm/sf	0.13	0.13	0.13
Required Area	sf	769	769	769
Number of Gravity Thickeners	No.	2	2	2
Area Per Thickener	sf	385	385	385
Diameter	Ft	22	22	22
Solids Loading Rate	ppd/sf.	8	8	8
Thickened Sludge Concentration	%	2.0	2.0	2.0
Supernatant Overflow Flowrate	gpm	75	75	75
Total Overflow Volume Per Day	gpd	38,394	51,200	60,800
Thickened Sludge Flowrate to Dewatering	gpm	100	100	100
Thickened Sludge Pumpout Duration Per Day	min	128	171	203
Solids Capture Rate	%	90	90	90
<b>Centrifuge</b>				
Daily Solids Loading	lbs/day	1,900	2,600	3,000
Flowrate to Centrifuge	gpm	100	100	100
Daily Hours of Operation	Hrs	2.1	2.8	3.4
Dewatered Solids Concentration	%	20	20	20
Centrate Flowrate	gpm	90	90	90
Daily Centrate Flow Volume	gal	11,500	15,400	18,200

#### **2.4.3.2.3 Reliability**

Because of the robustness of the conventional process, the capability of the system to reliably meet the treatment goals is excellent. The inherent lack of process complexity contributes to the process reliability - fewer things to break or go wrong. This simplicity comes at the cost of site footprint.

#### **2.4.3.2.4 Operational Impacts**

Operation of the conventional process is only slightly more complex than the current direct filtration plant (not including the sludge management system). No additional chemicals are required over what is currently used. Only the scale of the facility and the flocculator and sedimentation basin sludge removal equipment contribute to added operational complexity.

#### **2.4.3.2.5 Noise Impacts**

Increased noise from the converted and expanded conventional treatment facilities will be limited to motor noise from flocculators and sludge collection devices. Higher noise generating facilities, specifically the dewatering centrifuges, will be contained within a building with the appropriate sound attenuating measures in place. In general, the ambient noise level at the property line is not expected to exceed current levels. However, more frequent truck traffic from sludge hauling and chemical delivery will increase individual noise events. These noise events can be scheduled for the middle of the day on weekdays to mitigate impacts on the surrounding community.

#### **2.4.3.2.6 Site Impacts**

As previously mentioned, the simplicity and robustness of the process requires a large footprint. As shown in Figure 2.17, the conventional treatment option nearly fills the available WTP site (excluding the 3.3 acre Mapleton parcel). Expansions beyond 38-mgd would be possible on the current site using conventional treatment, but would be limited to two additional treatment trains.

#### **2.4.3.2.7 Reuse of Existing Facilities**

The conventional process makes the most effective use of existing facilities. The contact tanks will be retrofitted as flocculation and sedimentation basins. The existing filters will remain in service, as will the sludge lagoons, although they will only receive backwash waste instead of the entire WTP solids load.

#### **2.4.3.2.8 Constructability**

By constructing new process tanks, the existing treatment process can remain online until the new process equipment is installed. Primary disruptions in treatment will occur during raw water and existing filter tie-ins. Once the new flocculation/sedimentation basins are on-line, the contact tanks can be taken offline and retrofitted similar to the new basins. Overall, challenges associated with implementation of the conventional treatment option are considered more complex than high rate conventional treatment, but less complex than membrane treatment.

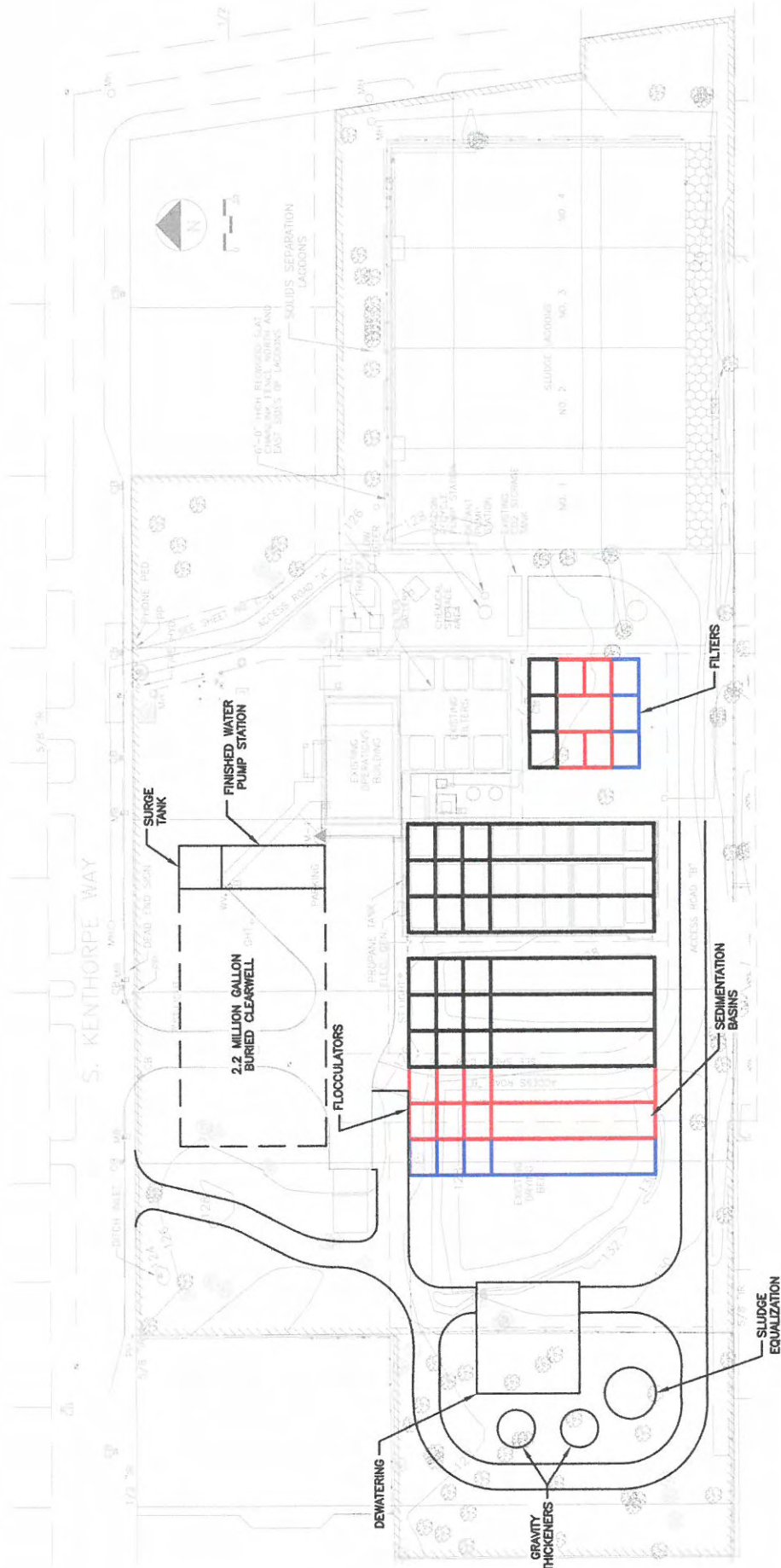


Figure 2-17  
**CONVENTIONAL TREATMENT OPTION**  
**SITE PLAN**  
 JOINT WATER SUPPLY SYSTEM ANALYSIS  
 CITY OF LAKE OSWEGO AND TIGARD WATER SERVICE AREA

### **2.4.3.3 High Rate Conventional**

High rate treatment processes are based on the same treatment concepts as conventional processes, but operate at higher treatment rates due to specific sedimentation process features. The types of high rate conventional treatment processes include:

- Sludge blanket clarification
- Dissolved air floatation
- Ballasted clarification

Sludge blanket clarifiers use a blanket of chemical sludge and solids from the raw water to capture solids that pass through the blanket during sedimentation. The primary example of this process is the Superpulsator®, developed by Infilco Degremont. In the Superpulsator® process, flocculation and sedimentation occur in a common tank. The sludge blanket is “pulsed” using vacuum pumps in order to increase the solids capture efficiency.

The Clackamas River raw water is relatively low in turbidity and suspended solids and is subject to rapid changes in quality during storm events. Sludge blanket clarification relies on a certain percentage of suspended solids in the raw water to maintain a heavy sludge blanket that is resistant to washing out. When treating low suspended solids waters, sludge blanket clarifiers require chemical doses in excess of that required for turbidity, TOC, and color removal in order to artificially create the solids necessary for successful operation. The excess chemical usage not only increases chemical coagulant costs, but also depletes raw water alkalinity thereby requiring more supplemental alkalinity addition. Additionally, the performance of sludge blanket clarifiers is sensitive to rapid changes in flowrate and raw water quality. For these reasons, sludge blanket clarification was not investigated as the high rate conventional treatment option.

Dissolved air floatation (DAF) is a high rate clarification process that uses minute air bubbles to float the floc particles to the surface where they are skimmed off. DAF is an effective technology for waters that have frequent algae blooms and low density solids that cannot be effectively settled. The Lake Oswego WTP has infrequent algae blooms and has shown success at producing settleable solids with alum and polymer addition. Therefore, DAF was not investigated as the high rate conventional treatment option.

The Actiflo® process, a ballasted clarification system, is a compact, conventional-type water clarification system that utilizes microsand as a seed for floc formation. Due to the weight of the sand/polymer/coagulant floc, upflow rates as high as 20 gpm per square foot are attainable. When compared to upflow rates of 1.5 to 2 gpm per square foot in conventional sedimentation basins with plate settlers, the capability to dramatically reduce the facility footprint is obvious.

Actiflo® uses microsand to develop a heavy floc and is not dependent upon the influent solids. Therefore, coagulant doses are based on water quality instead of system performance. Due to the high treatment rate and short residence time within the treatment units, Actiflo® is very responsive to rapid changes in water quality. Based on these advantages over sludge blanket clarification and DAF for this treatment application, Actiflo® is the recommended high rate conventional process for the expansion of the Lake Oswego WTP.

#### **2.4.3.3.1 Process Description**

The Actiflo® process combines the conventional treatment concepts of coagulation, flocculation and sedimentation with floc enhancement to allow for high rate operation. Coagulant is mixed in the coagulation tank, followed by the addition of microsand and polymer in the injection tank. The microsand provides surface area that enhances flocculation and acts as a ballast or weight. From the injection tank, the treated water moves to a maturation tank where the floc is built with gentle mixing. The floc is removed in an upflow sedimentation tank with plate settlers. The clarified water is then filtered using dual media filters, stabilized using lime and carbon dioxide, and disinfected with sodium hypochlorite.

Sludge from the sedimentation process is pumped to cyclone separators, where centrifugal action is used to separate the microsand from the chemical sludge, turbidity, and suspended solids. The recovered microsand (approximately 80 percent of the sludge recirculation flowrate) is returned to the injection tank to be reused. Additional microsand is added to the recycle stream to compensate for microsand lost in the separation process. Sludge from the cyclone separators (approximately 20% of the sludge recirculation flowrate) is sent to gravity thickeners and eventually to the sludge dewatering facility.

Figure 2.18 shows the detailed process flow diagram for the Actiflo® process alternative.

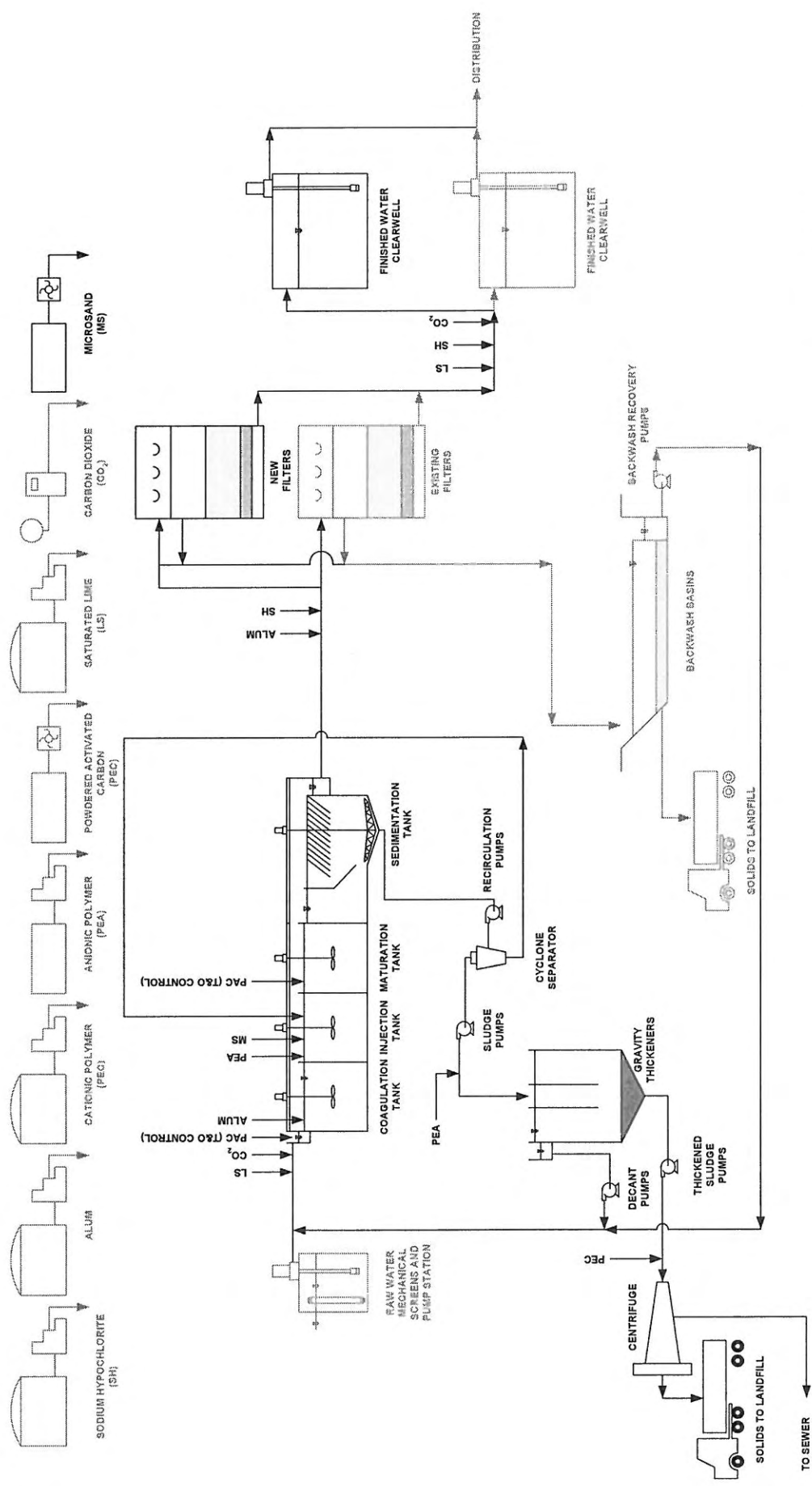


Figure 2.18  
 ACTIFLO® TREATMENT OPTION  
 PROCESS FLOW DIAGRAM  
 JOINT WATER SUPPLY SYSTEM ANALYSIS  
 CITY OF LAKE OSWEGO AND TIGARD WATER SERVICE AREA

#### **2.4.3.3.2 Required Facilities**

Expansion of the Lake Oswego WTP using Actiflo® will require the following modifications:

- New Actiflo® process trains that include the coagulation tank, injection tank, maturation tank, and sedimentation tank.
- Microsand storage and feed facilities.
- Cyclone separators used to segregate the chemical sludge from the recycled microsand.
- Expansion of the filter gallery.
- Gravity thickeners and sludge dewatering facilities.

Table 2.13 presents the Actiflo® design criteria and required facilities for the three capacity scenarios for the Lake Oswego WTP.

#### **2.4.3.3.3 Reliability**

Because of the complexity and high rate operation of the Actiflo® process, it requires more operator attention than the conventional treatment process. The Actiflo® recovery time from a process upset is significantly faster than the conventional treatment process, but the small volume and reliance on several treatment aid feed systems makes the Actiflo® process the least reliable of the treatment options presented.

#### **2.4.3.3.4 Operational Impacts**

The advantages afforded by high rate conventional treatment processes are realized at the cost of increased operational complexity. The addition of the microsand feed system and cyclone separators increase the complexity and maintenance of the Actiflo® process over the conventional treatment option. Additionally, the high process rate requires increased monitoring of raw water quality and adjustments to chemical and microsand feed.

#### **2.4.3.3.5 Noise Impacts**

Increased noise from the Actiflo® facilities will be limited to motor noise from mixer motors and cyclone separators for sand recovery. The proposed Actiflo® alternative has included a structure over the process tankage, which will mitigate the added noise from the mixers and sand separating cyclones. Similar to the conventional treatment alternative, the dewatering centrifuges will be contained within a building with the appropriate sound attenuating measures in place. In general, the ambient noise level at the property line is not expected to exceed current levels. However, more frequent truck traffic from sludge hauling and chemical delivery will increase individual noise events. These noise events can be scheduled for the middle of the day on weekdays to mitigate impacts on the surrounding community.

**Table 2.13 Design Criteria - High Rate Conventional Treatment Alternative (Actiflo®)  
Joint Water Supply System Analysis  
City of Lake Oswego and Tigard Water Service Area**

Parameter	Units	WTP Capacity		
		24 mgd	32 mgd	38 mgd
Number of Treatment Trains	No.	3	4	5
Capacity Per Train	mgd	8.0	8.0	7.6
<b>Actiflo®</b>				
<u>Coagulation Tank</u>				
Contact Time	min	2	2	2
Required Volume Per Train	gal	11,000	11,100	10,600
Water Depth	ft	18	18	18
Dimensions	ftxft	9	9	9
<u>Injection Tank</u>				
Contact Time	min	2	2	2
Required Volume Per Train	gal	11,000	11,100	10,600
Water Depth	ft	18	18	18
Dimensions	ftxft	9	9	9
<u>Maturation Tank</u>				
Contact Time	min	7.5	7.5	7.5
Required Volume Per Train	gal	42,000	42,000	40,000
Water Depth	ft	18	18	18
Dimensions	ftxft	18	18	17
<u>Sedimentation Tank</u>				
Loading Rate	gpm/sf	20	20	20
Required Area	sf	278	278	264
Tank Depth	ft	18	18	18
Tank Width	ft	18	18	17
Tank Length	ft	15	15	16
<b>Filters</b>		See Table 2.11		
<b>Backwash/Thickening Water Recovery</b>				
Total Backwash Volume Per Day (max)	gal	812,500	1,218,800	1,422,000
Backwash Water Recovery Volume	gal	809,700	1,215,000	1,417,400
Gravity Thickener Recovery Volume	gal	179,100	238,900	283,700
Recovered Water Percent of Influent Flow	%	4.1	4.5	4.5
<b>Filter Washwater Lagoons</b>		See Table 11		



**Table 2.13 Design Criteria - High Rate Conventional Treatment Alternative (Actiflo®), continued  
Joint Water Supply System Analysis  
City of Lake Oswego and Tigard Water Service Area**

Parameter	Units	WTP Capacity		
		24-mgd	32-mgd	38-mgd
<b>Solids Production</b>				
Alum Dose	mg/L	15	15	15
Influent Turbidity	NTU	3.5	3.5	3.5
Solids From Aluminum Hydroxide	lbs/day	1,300	1,800	2,100
Solids From Turbidity	lbs/day	1,000	1,400	1,700
Total Solids Production	lbs/day	2,300	3,200	3,800
Solids Captured By Filters	lbs/day	230	320	380
Solids in Sedimentation Basin	lbs/day	2,100	2,900	3,400
Sedimentation Basin Percent Solids	%	0.13	0.13	0.13
Sludge Recirculation Rate	%	4.0	4.0	4.0
Sludge Recirculation Flowrate	gpm	667	889	1,055
Recirculation Flow Wasting Rate	%	20	20	20
Sludge Blowdown Flowrate	gpm	130	180	210
Sludge Blowdown Volume Per Day	gal	192,000	256,000	304,000
<b>Gravity Thickener</b>				
Hydraulic Loading Rate	gpm/sq.ft	0.13	0.13	0.13
Available Area	sq.ft	1,030	1,370	1,630
Number of Gravity Thickeners	No.	2	2	2
Area Per Thickener	sq.ft	513	684	812
Diameter	ft	26	30	32
Solids Loading Rate	ppd/sf	2.31	2.31	2.31
Thickened Sludge Concentration	%	2.0	2.0	2.0
Supernatant Overflow Flowrate	gpm	124	170	200
Total Overflow Volume Per Day	gpd	179,000	239,000	284,000
Thickened Sludge Flowrate to Dewatering	gpm	250	250	250
Thickened Sludge Pumpout Duration Per Day	min	51	68	81
Solids Capture Rate	%	90	90	90
<b>Centrifuge</b>				
Daily Solids Loading	lbs/day	2,140	2,850	3,380
Flowrate to Centrifuge	gpm	250	250	250
Daily Hours of Operation	Hrs	0.9	1.1	1.4
Dewatered Solids Concentration	%	20	20	20
Centrate Flowrate	gpm	225	225	225
Daily Centrate Flow Volume	gal	11,500	15,400	18,200

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#### **2.4.3.3.6 Site Impacts**

The high treatment rate of the Actiflo® process allows for large volumes of treatment in a compact footprint. Of the proposed treatment options, the Actiflo® process requires the least site space for implementation. Figure 2.19 presents a proposed layout, including delineation of the expansion phases, for the proposed facilities described in this section.

#### **2.4.3.3.7 Reuse of Existing Facilities**

Because of the customized configuration of the Actiflo® process, it is recommended that new process tanks be constructed. Existing filters can remain, with additional filters added in a similar configuration. The existing contact tanks are not suitable for conversion to gravity thickeners. Therefore, new gravity thickeners will be constructed and the existing contact tanks demolished.

#### **2.4.3.3.8 Constructability**

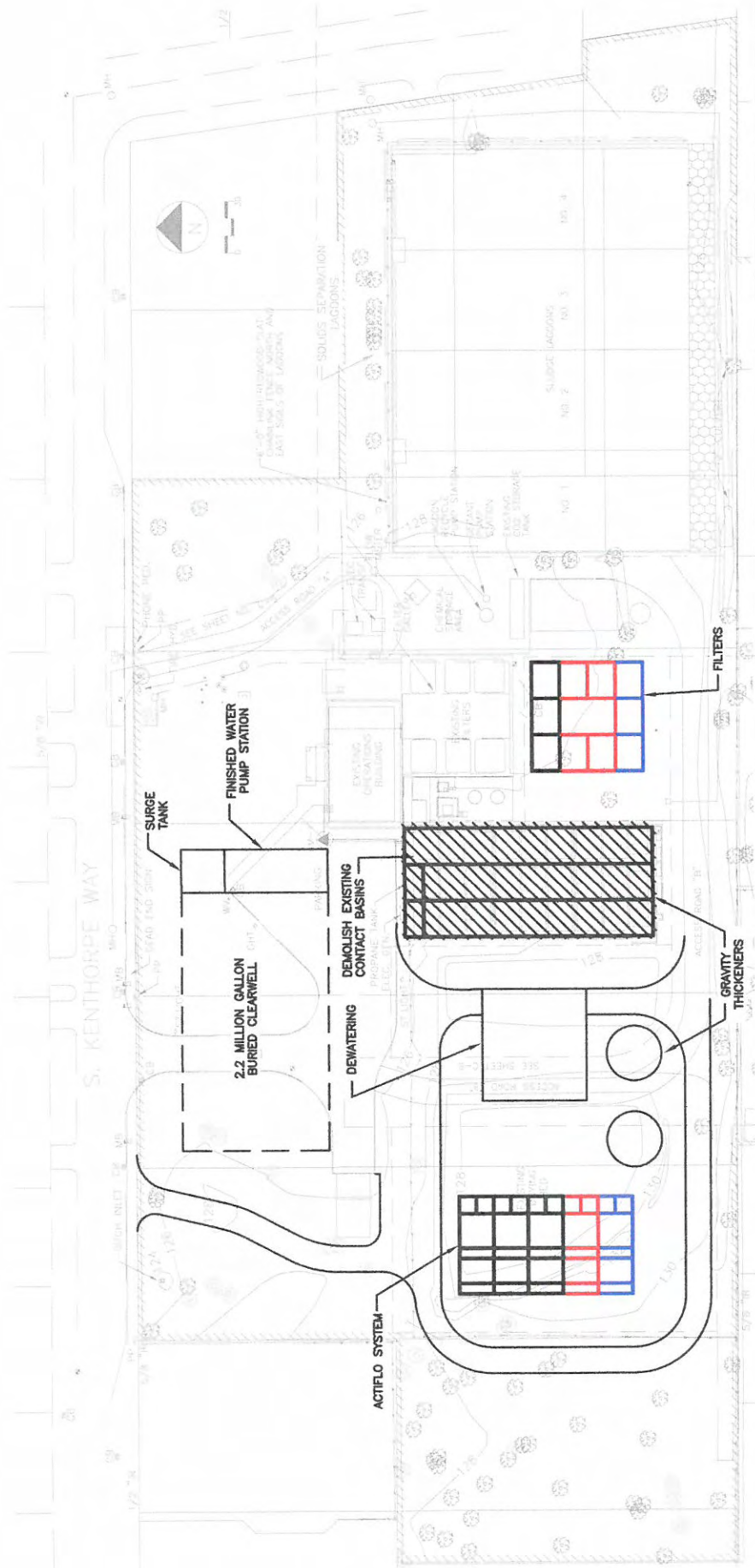
By constructing new process tanks, the existing treatment process can remain online until the new process equipment is installed. Disruptions in treatment will be required during tie-ins of raw water piping and filters. Since the contact tanks will not be retrofitted, the existing process can stay on-line during the construction of the high rate conventional treatment system. Overall, challenges associated with implementation of the high rate conventional treatment option are considered to be the least complex of all the options.

#### **2.4.3.4 Membranes**

The application of low pressure membranes for the treatment of surface water has increased significantly over the last 10 years. Membranes provide an absolute barrier against turbidity, *Giardia*, and *Cryptosporidium*, which has prompted regulatory agencies to grant log removal credit similar to that of conventional treatment with filtration. Dissolved material, such as color, is not removed by membranes without chemical coagulant. As a result, inside most membrane treatment facilities is a conventional treatment process. For example, the recently commissioned North Clackamas County Water Commission (NCCWC) membrane filtration facility employs coagulation and flocculation upstream of the membrane system, which performs the function of sedimentation and filtration.

Unlike conventional treatment processes, membrane processes provide consistent finished water quality (relative to filterable solids and pathogens) regardless of raw water quality. However, where conventional processes realize treated water quality degradation under challenging treatment conditions, membranes suffer performance degradation, such as rapid rise in driving pressure, increased backwashing frequency, and frequent chemical cleanings.

Two membrane configurations exist, pressure driven and vacuum driven. Pressure driven membrane systems use feed pressure to “push” the raw water through the membranes, which are contained in a pressure vessel. Vacuum driven systems “pull” filtered water through the membranes, which are immersed in open process tanks. The vacuum is generated by a pump on the filtered water side of the membranes. Both configurations have been applied successfully around the world.



24-mgd  
 32-mgd  
 38-mgd

**Figure 2.19**  
**ACTIFLO® TREATMENT OPTION**  
**SITE PLAN**  
 JOINT WATER SUPPLY SYSTEM ANALYSIS  
 CITY OF LAKE OSWEGO AND TIGARD WATER SERVICE AREA

For this analysis, immersed vacuum membrane systems were selected for evaluation. The use of immersed vacuum systems was selected because of their use at the North Clackamas WTP and the ability to utilize the filter tanks for membrane installation. Although Memcor CMF-S membranes were used at the NCCWC WTP, Zenon 500 series membranes were used to develop the site layouts, as they represent the most conservative footprint requirement.

#### **2.4.3.4.1 Process Description**

The membrane treatment process combines the conventional treatment concepts of coagulation and flocculation with filtration. If influent solids loading is high, a sedimentation process is recommended prior to application of the coagulated water to the membranes. For the Lake Oswego WTP, however, sedimentation basins are not proposed based on the low solids loading and successful operation of the North Clackamas WTP. The filtered water is stabilized using lime and carbon dioxide, and disinfected with sodium hypochlorite. During normal operation, solids accumulate on the membrane surface. At intervals ranging from 15 to 30 minutes, the membranes are backwashed by pumping filtrate backwards through the membranes. The backwashing process forces solids on the membrane surface back into the process tank. Chlorine may be added to the backwash water intermittently to control the growth of biological material in the pore structure of the membranes.

As filtrate is drawn out of the membrane tank, solids are retained in the tank and the concentration increases over time. Periodic tank drains are used to deconcentrate the process tank and prevent overloading of the membranes with solids. Solids from the membrane tanks are pumped to an equalization tank. The contents of the equalization tank are pumped at a constant rate to gravity thickeners and eventually to the sludge dewatering system.

Occasionally, the fouling of the membranes cannot be removed with standard or chemically enhanced backwashing, at which time the membrane system (typically one train at a time) is taken offline for in-situ chemical cleaning.

Figure 2.20 shows the detailed process flow diagram for the membrane treatment process alternative.

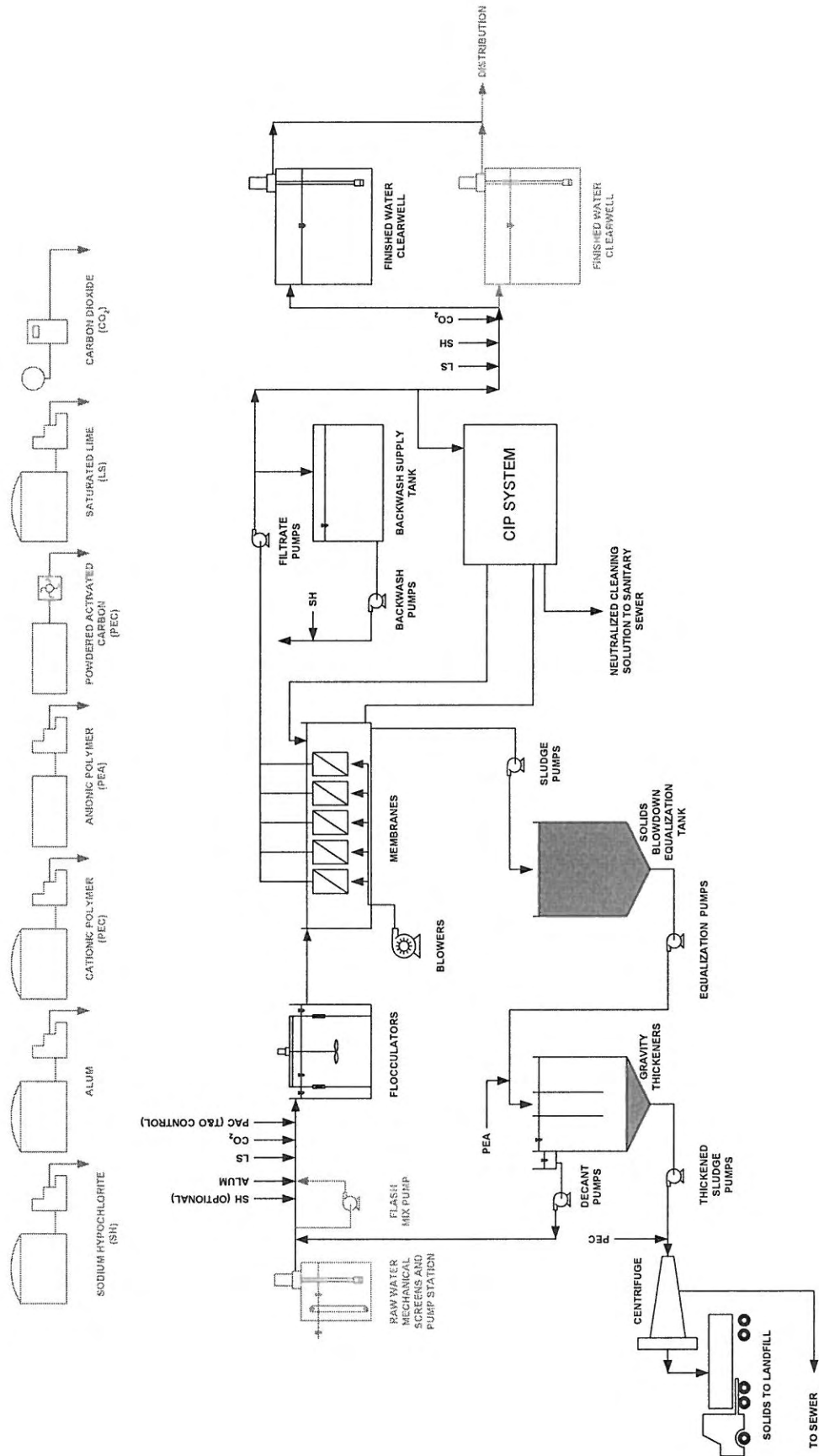


Figure 2.20  
**MEMBRANE TREATMENT OPTION**  
**PROCESS FLOW DIAGRAM**  
 JOINT WATER SUPPLY SYSTEM ANALYSIS  
 CITY OF LAKE OSWEGO AND TIGARD WATER SERVICE AREA

#### **2.4.3.4.2 Required Facilities**

Expansion of the Lake Oswego WTP using membranes will require the following modifications:

- Conversion of a portion of the existing contact tanks to flocculation tanks.
- Conversion of the remaining portion of the contact tanks to a membrane cleaning system.
- Conversion of the existing filters to membrane tanks.
- Construction of new membrane tanks.
- Construction of a backwash water storage tank.
- Installation of blowers and air compressors.
- Construction of a blowdown equalization, gravity thickeners and sludge dewatering facilities.

Table 2.14 presents the membrane design criteria and required facilities for each of the three capacity scenarios for the Lake Oswego WTP.

#### **2.4.3.4.3 Reliability**

Membrane treatment systems are very reliable when assessed based on the quality of the treated water. Constant filtrate monitoring and daily integrity monitoring ensures to a high degree of confidence that the membranes are not compromised. Although water temperature significantly impacts the production capability of the membrane treatment option, these raw water conditions typically correlate to a decrease in demand, which does not impact the ability of the membrane treatment process to reliably meet the treatment goals. As a result, the membrane treatment option is considered the most reliable at consistently meeting water quality goals.

#### **2.4.3.4.4 Operational Impacts**

The highly automated nature of membrane plants allows for more a more hands-off approach to operation. However, the membrane pretreatment process is still conventional in nature and requires monitoring of raw water quality and chemical addition. This aspect of the membrane treatment process is operationally similar to the conventional treatment alternative. From a maintenance perspective, the membrane system alternative is significantly more rigorous than either the conventional or high rate conventional processes. The numerous automated valves and pumps required for filtrate production, backwashing, and cleaning require considerable attention. Although an automated process, the in-situ cleanings must be overseen. Additionally, the membrane system contains a large amount of instrumentation necessary for the high level of automation. Instruments must be serviced and calibrated to assure proper operation. For these reasons, the membrane treatment option will be the most intense from an operational perspective.

**Table 2.14 Design Criteria - Membrane Treatment Alternative  
Joint Water Supply System Analysis  
City of Lake Oswego and Tigard Water Service Area**

Parameter	Units	WTP Capacity		
		24 mgd	32 mgd	38 mgd
Facility Recovery	%	98	98	98
Total Required Raw Water Treatment Capacity	mgd	24.5	32.6	38.7
Total Number of Converted Filter Membrane Treatment Trains	No.	6	6	6
Total Number of New Membrane Treatment Trains	No.	2	5	6
Capacity Per Retrofitted Filter Treatment Train	mgd	3.18	3.18	3.18
Capacity Per New Treatment Train	mgd	3.18	3.18	3.71
Flocculator Capacity	mgd	25.9	34.5	38.8
Membrane Capacity	mgd	25.5	35.0	41.4
<b>Flocculation Basins</b>				
Number of Basins	No.	6	8	9
Volume Per Train	gal	37,400	37,400	37,400
Design Detention Time at Plant Capacity	min	12.5	12.5	12.5
Actual Detention Time at Plant Capacity	min	13.2	13.2	12.5
Volume Per Stage	gal	37,400	37,400	37,400
Number of Stages	No.	1	1	1
Water Depth	ft	12.5	12.5	12.5
Length	ft	20.0	20.0	20.0
Width	ft	20.0	20.0	20.0
Number of Flocculators	No.	6	8	9
<b>Membrane System</b>				
Type:		Immersed, vacuum driven		
Membrane Area Per Module	sf	340	340	340
Modules Per Cassette	No.	52	52	52
Design Flux Rate	gfd	30	30	30
Number of Cassettes Required	No.	62	62	73
Number of Cassettes Installed	No.	66	66	78
Number of Cassettes Per Converted Filter Train	No.	6	6	6
Number of Cassettes Per New Train	No.	6	6	7

**Table 2.14 Design Criteria - Membrane Treatment Alternative, continued**  
**Joint Water Supply System Analysis**  
**City of Lake Oswego and Tigard Water Service Area**

Parameter	Units	WTP Capacity		
		24-mgd	32-mgd	38-mgd
<b>Backwash Tank</b>				
Backwash Flux	gfd	45	45	45
Backwash Flowrate Per Module	gpm	10.6	10.6	10.6
Backwash Flowrate Per Cassette	gpm	553	553	553
Backwash Duration	sec	40	40	40
Backwash Volume Per Cassette	gal	368	368	368
Modules Per Converted Filter Train	No.	312	312	312
Modules Per New Train	No.	312	312	364
Backwash Volume Per Converted Filter Train	gal	2,210	2,210	2,210
Backwash Volume Per New Train	gal	2,210	2,210	2,578
Required Backwash Water Storage	gal	19,900	26,500	31,300
Backwash Tank Depth	ft	12	12	12
Backwash Tank Length	ft	30	30	30
Backwash Tank Width	ft	15	15	15
Backwash Tank Volume	gal	41,000	41,000	41,000
<b>Blowdown Waste</b>				
<i>Converted Filter Tanks</i>				
Filter Tank Volume	gal	27,600	27,600	27,600
Blowdown Events Per Day Per Tank	No.	8	8	8
Blowdown Percentage of Tank Volume	%	25	25	25
Blowdown Volume	gal	7,000	7,000	7,000
Blowdown Time	min	5	5	5
Blowdown Instantaneous Flowrate	gpm	1,400	1,400	1,400
Total Daily Blowdown Volume	gal	331,000	331,000	331,000
<i>New Tanks</i>				
Filter Tank Volume	gal	30,300	30,300	30,300
Blowdown Events Per Day Per Tank	No.	8	8	8
Blowdown Percentage of Tank Volume	%	25	25	25
Blowdown Volume	gal	7,600	7,600	7,600
Blowdown Time	min	5	5	5
Blowdown Instantaneous Flowrate	gpm	1,520	1,520	1,520
Total Daily Blowdown Volume	gal	121,000	303,000	364,000
Total Daily Plant Blowdown Volume	gal	452,000	634,000	695,000
Plant Recovery	%	98	98	98

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**Table 2.14 Design Criteria - Membrane Treatment Alternative, continued**  
**Joint Water Supply System Analysis**  
**City of Lake Oswego and Tigard Water Service Area**

Parameter	Units	WTP Capacity		
		24-mgd	32-mgd	38-mgd
<b>Solids Production</b>				
Alum Dose	mg/L	15	15	15
Influent Turbidity	NTU	3.5	3.5	3.5
Solids From Aluminum Hydroxide	lbs/day	1,300	1,800	2,100
Solids From Turbidity	lbs/day	1,100	1,400	1,700
Total Solids Production	lbs/day	2,400	3,200	3,800
Blowdown Percent Solids	%	0.06	0.06	0.07
Sludge Blowdown Volume Per Day	mgd	0.45	0.63	0.69
Blowdown Percent of Influent Flowrate	%	1.85	1.94	1.80
Blowdown Events Per Day	No.	8	8	8
Blowdown Duration per Train	min	5	5	5
Total Blowdown Time	min	480	480	480
Total Time Available Per Event	min	23	16	15
<i>Instantaneous Blowdown Flowrate</i>				
Converted Filter Tanks	gpm	1,400	1,400	1,400
New Tanks	gpm	1,520	1,520	1,520
<b>Blowdown Equalization</b>				
Flowrate In	gpm	1,520	1,520	1,520
Duration of Inflow	min	5	5	5
Flowrate Out	gpm	337	465	505
Total Inflow During Blowdown Event	gal	7,600	7,600	7,600
Total Outflow Per Event	gal	7,600	7,600	7,600
Duration of Outflow	min/day	23	16	15
Equalization Volume Required	gal	5,900	5,300	5,000
<b>Equalization Tank</b>				
Depth	ft	12	12	12
Diameter	ft	15	15	15
Volume	gal	16,000	16,000	16,000

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**Table 2.14 Design Criteria - Membrane Treatment Alternative, continued**  
**Joint Water Supply System Analysis**  
**City of Lake Oswego and Tigard Water Service Area**

Parameter	Units	WTP Capacity		
		24-mgd	32-mgd	38-mgd
<b>Gravity Thickener</b>				
Hydraulic Loading Rate	gpm/sq.ft	0.13	0.13	0.13
Required Area	sq.ft	2,590	3,560	3,884
Number of Gravity Thickeners	No.	2	2	2
Area Per Thickener	sq.ft	1,295	1,780	1,942
Diameter	ft	41	48	50
Solids Loading Rate	ppd/sf	0.93	0.91	0.98
Thickened Sludge Concentration	%	2.0	2.0	2.0
Supernatant Overflow Flowrate	gpm	304	427	467
Total Overflow Volume Per Day	gpd	438,000	615,000	672,000
Thickened Sludge Flowrate to Dewatering	gpm	200	200	200
Thickened Sludge Pumpout Duration Per Day	min	72	97	115
Solids Capture Rate	%	90	90	90
<b>Centrifuge</b>				
Daily Solids Loading	lbs/day	2,200	2,900	3,400
Flowrate to Centrifuge	gpm	200	200	200
Daily Hours of Operation	Hrs	1.2	1.6	1.9
Dewatered Solids Concentration	%	20	20	20
Centrate Flowrate	gpm	180	180	180
Daily Centrate Flow Volume	gal	13,000	17,400	20,600

**2.4.3.4.5 Noise Impacts**

Increased noise from the membrane facilities will be comprised of noise from flocculator motors, pneumatic actuator operation, blowers, permeate pumps, backwash pumps, and air compressors. The high noise generating equipment, specifically the blowers, pumps, and air compressors, will all be contained within structures to attenuate the noise. Noise from pneumatic valves and flocculators is expected to be minimal. Similar to the conventional and Actiflo® treatment alternatives, the dewatering centrifuges will be contained within a building with the appropriate sound attenuating measures in place. In general, the ambient noise level at the property line is not expected to exceed current levels. However, more frequent truck traffic from sludge hauling and chemical delivery will increase individual noise events. These noise events can be scheduled for the middle of the day on weekdays to mitigate impacts on the surrounding community.

#### **2.4.3.4.6 Site Impacts**

While the membranes themselves have a small footprint due to the density of the membrane surface area, the other facilities, such as flocculation facilities, backwash facilities, and the clean-in-place system will occupy a considerable amount of the site. Additionally, the high volume of membrane tank blowdown will require large gravity thickeners. Of the proposed treatment options, the membrane process requires the second-most site space for implementation. Figure 2.21 presents a proposed layout, including delineation of the expansion phases, for the proposed facilities described in this section.

#### **2.4.3.4.7 Reuse of Existing Facilities**

Membranes, particularly the immersed vacuum type evaluated for this analysis, are amenable to retrofit into existing tanks. The existing filter tanks can be converted to membrane tanks; however, new membrane tanks will also be required to accommodate the expansion of the facility. The existing contact tank can be converted to flocculators and also used for the clean-in-place system. Since the existing washwater lagoons are not designed for sludge removal, they cannot be used for solids blowdown treatment. As a result, the backwash lagoons will be used only as a backup method of solids blowdown in the event the gravity thickeners are out of service. Since these basins are relatively new, using them only as a backup facility makes the membrane treatment option the least effective for using existing facilities.

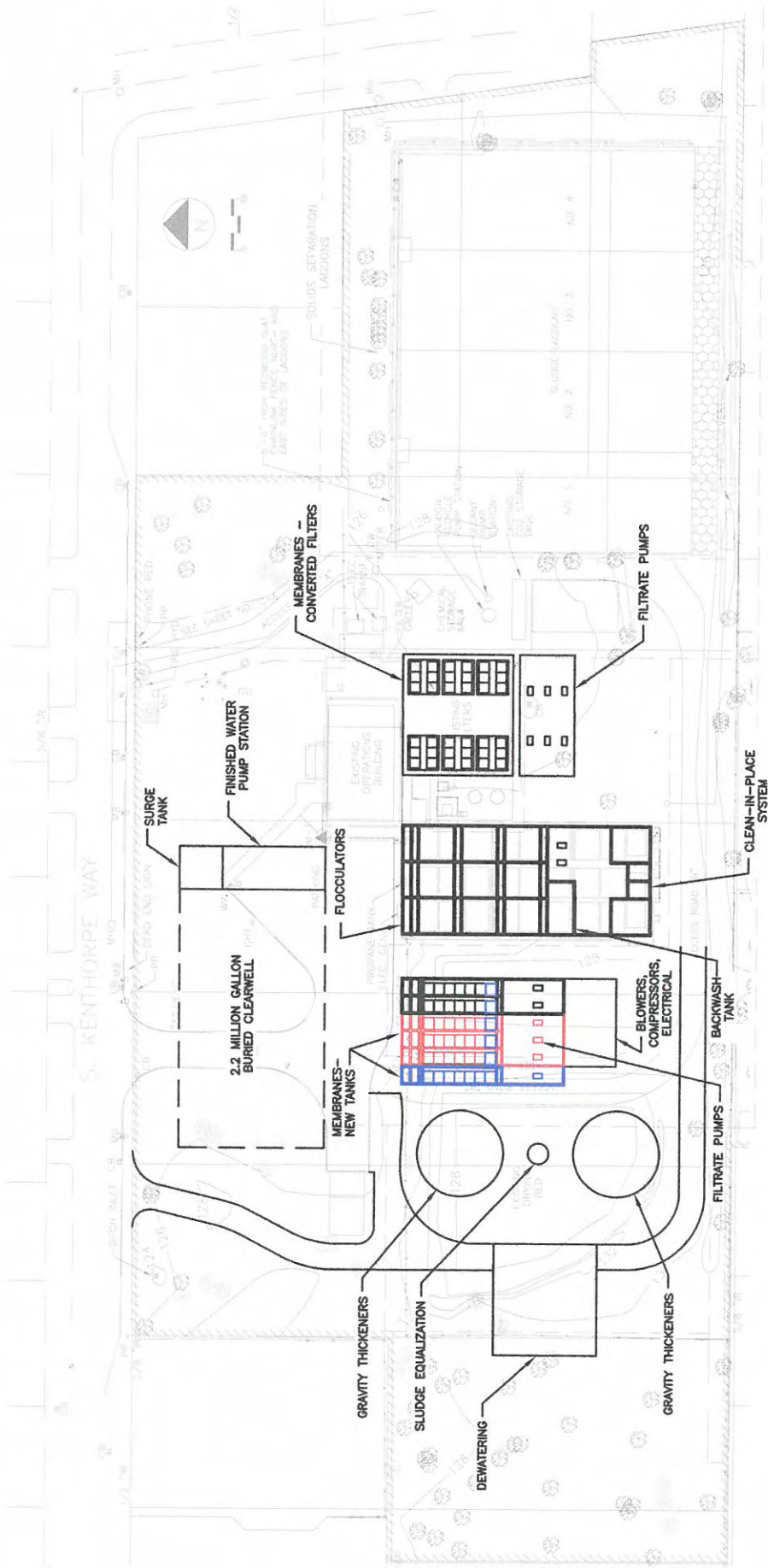
#### **2.4.3.4.8 Constructability**

Since the membranes are to be installed in existing tanks, the phasing of construction is challenging. Retrofitting the filters and contact tanks would require innovative staging and the ability to bring retrofitted units on-line in parallel with the existing treatment process. A good option for construction phasing is to construct the new membrane trains first, place them on-line, and run in a direct coagulation/filtration mode without a flocculation step. This would provide a window for retrofitting the contact basins. The conversion of the existing filters to membrane tanks could then occur after the flocculators and new membrane trains are on-line.

Overall, challenges associated with implementation of the membrane treatment option are considered to be the most complex of the treatment options.

### **2.4.4 General Facilities**

While the specific facilities are unique for each process option, the general facilities, such as chemical storage, clearwell storage, high service pumping, and surge suppression, are common to all three alternatives. The proceeding information provides a review of existing facilities and recommendations for expansions, as necessary.



FACILITIES TO BE ADDED  
 UNIMPROVED FACILITIES ARE  
 DIMENSIONED AS SHOWN  
 THE FOLLOWING LEGEND:

24-mgd	—
32-mgd	—
38-mgd	—

Figure 2.21  
**MEMBRANE TREATMENT OPTION**  
**SITE PLAN**  
 JOINT WATER SUPPLY SYSTEM ANALYSIS  
 CITY OF LAKE OSWEGO AND TIGARD WATER SERVICE AREA

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#### 2.4.4.1 Clearwell

Disinfection of the filtered water serves two general purposes:

- To provide inactivation of target pathogens prior to reaching the first customers connection.
- To provide a disinfectant residual within the distribution system to maintain water quality.

Both objectives are accomplished at the Lake Oswego WTP with chlorine, delivered as sodium hypochlorite solution. Although alternate disinfectants (e.g. ozone or ultraviolet light) can be used for inactivation of pathogens, these practices do not result in a residual through the distribution system. A chlorine-based residual is required for continued disinfection in the distribution system.

Disinfection for the inactivation of pathogens is calculated as the product of the chlorine residual (C) and the contact time (T). A higher CT value indicates a higher level of disinfection. Because a conventional treatment process provides a more reliable barrier than a direct filtration plant to the passage of pathogens through the treatment process, the CT requirements for conventional treatment are less than those for direct filtration.

Table 2.15 compares the current disinfection log removal requirements compared to those for a conversion to any of the three treatment options presented herein.

<b>Table 2.15 CT Requirements<sup>1</sup> Joint Water Supply System Analysis City of Lake Oswego and Tigard Water Service Area</b>					
<b>Parameter</b>	<b>Total Log Removal Required</b>	<b>Direct Filtration</b>		<b>Conventional Treatment</b>	
		<b>Provided by Treatment</b>	<b>Required by Disinfection</b>	<b>Provided by Treatment</b>	<b>Required by Disinfection</b>
<i>Giardia lamblia</i>	3.0	2.0	1.0	2.5	0.5
<i>Cryptosporidium</i> <sup>1</sup>	3.0	3.0	0.0	3.0	0.0
Virus	4.0	1.0	3.0	2.0	2.0

Note:

1. The Clackamas River water quality places the Lake Oswego WTP into Bin 1, as defined by the Long Term 2 Enhanced Surface Water Treatment Rule.

The inactivation CT requirements for *Giardia lamblia* and virus are presented in Table 2.16. The effectiveness of chlorine as a disinfectant diminishes with decreasing temperature and increasing finished water pH. For this analysis, the average water temperature of 13.8°C and a pH of 8.0 were used to assess the CT capacity of the existing clearwell.

<b>Table 2.16 Disinfection CT Requirements<sup>1</sup></b> <b>Joint Water Supply System Analysis</b> <b>City of Lake Oswego and Tigard Water Service Area</b>		
<b>Parameter</b>	<b>Log Removal Required By Disinfection</b>	<b>CT Requirement at 13.8 °C<sup>1</sup></b>
<i>Giardia lamblia</i>	0.5	48
Virus	2.0	3.5
Note:		
1. CT requirements are for free chlorine at 0.8 mg/L.		

The data in Table 2.16 shows that the *Giardia lamblia* inactivation requirement drives the CT requirement. Based on the information in the recently completed tracer study (2006), the existing 400,000-gallon clearwell has an effective volume of 325,000 gallons for CT and a T<sub>10</sub>/T factor of 0.51 to 0.56 for flow rates of 8 mgd and 16mgd, respectively. To conservatively estimate the capacity of the existing clearwell, a T<sub>10</sub>/T factor of 0.50 will be used. Based on these assumptions, the clearwell provides 9.36 mgd of capacity for CT compliance (does not include filters or distribution piping as part of the available CT volume).

Based on these assumptions, new chlorine contact volume will be required to meet the CT requirements of the Lake Oswego WTP at 24 mgd, 32 mgd, and 38 mgd. Applying the T<sub>10</sub>/T factor of 0.50 to the new required chlorine contact basin, the required volumes to achieve CT compliance were calculated assuming a pH of 8 and a residual chlorine concentration of 0.8 mg/L. The results of this analysis are presented in Table 2.17.

<b>Table 2.17 Clearwell Capacity Requirements</b> <b>Joint Water Supply System Analysis</b> <b>City of Lake Oswego and Tigard Water Service Area</b>	
<b>Plant Capacity</b>	<b>Required Additional Clearwell Capacity<sup>1,2</sup></b>
24-mgd	1,275,000-gal
32-mgd	1,800,000-gal
38-mgd	2,200,000-gal
Notes:	
1. CT Required = 48 mg/L. min; T/T <sub>10</sub> = 0.5; Chlorine Residual = 1.0 mg/L.	
2. Assumes 325,000-gal available for CT from existing clearwell.	

Based on the Water Treatment Facilities Plan (1997), the site can accommodate a new 2.2 million gallon clearwell. The recommended criteria for water treatment plant clearwell storage is to provide 20 percent of maximum day capacity as an ideal condition. Many plants cannot meet this ideal condition and operate adequately at 10 percent of maximum day capacity for clearwell storage. The percent of plant capacity provided by the existing clearwell is shown in Table 2.18.

<b>Table 2.18 Existing Clearwell Capacity Versus Plant Flowrate Joint Water Supply System Analysis City of Lake Oswego and Tigard Water Service Area</b>		
<b>Capacity</b>	<b>Existing Clearwell Volume Percent of Capacity<sup>1</sup></b>	
24-mgd	1.4	
32-mgd	1.0	
38-mgd	0.9	
Note:		
1. Assumes usable volume = 325,000-gal.		

From this table it can be seen that the available clearwell storage at the water treatment plant falls well below any reasonable standard. The practical result of this is that the plant is forced to overflow the clearwell frequently at certain times of the year with a resulting of wastage in finished water and discharge of chlorinated water to the Willamette River.

Additional clearwell capacity is needed at the Lake Oswego WTP. Because of site constraints it is not physically possible to construct the recommended 10 to 20 percent of plant capacity for ultimate conditions. The largest clearwell which could reasonably be constructed on the site would have a total capacity of approximately 2.2 million gallons (MG). The resulting combined clearwell capacity is also shown in Table 2.19.

<b>Table 2.19 Proposed Clearwell Capacity Joint Water Supply System Analysis City of Lake Oswego and Tigard Water Service Area</b>		
<b>Capacity</b>	<b>Combined Storage Volume</b>	<b>Percent of Plant Capacity</b>
24 mgd	2,525,000-gal	10.5
32 mgd	2,525,000-gal	7.9
38 mgd	2,525,000-gal	6.6

The new clearwell should be designed to offer the following features:

- Rectangular, reinforced concrete, below-grade construction to provide maximum volume with minimum visual impact.
- Baffling to provide a minimum  $T_{10}/T = 0.5$  to provide additional CT compliance.
- Compartmentalization to allow maintenance while keeping the plant and high service pumps in operation.

To provide the recommended clearwell capacity of 10 to 20 percent of total plant capacity, the clearwell would need to be located off the existing plant site. It is theoretically feasible that a larger clearwell be constructed on the adjacent 3-acre lot; however, there are likely to be related issues which might preclude this option (such as neighborhood regulations,

existing covenants, etc). It is recommended that this possibility be further evaluated during the preliminary design phase to determine the viability of locating the clearwell on the neighboring lot.

#### **2.4.4.2 High Service Pumping & Surge Suppression**

The existing high service pumping station is located above the clearwell. The four high service pumps and one backwash pump are vertical turbine pumps taking suction directly from the clearwell. The three high-pressure finished water pumps are capable of a combined pumping capacity of 16-mgd during summer demand conditions. The single low-pressure pump is capable of pumping approximately 9 mgd; this pump will not run in conjunction with the high-pressure pumps.

Any expansion of plant capacity beyond the current 16 mgd will require construction of additional finished water pumping capacity. It is recommended that a new high service pumping station should be constructed in conjunction with the proposed 2.2 MG buried clearwell. Design of the new finished water pumping station should incorporate the following:

- A new motor control center
- Acoustical design to eliminate nuisance noise
- Overhead crane and inside vehicle bay for pump removal
- Variable speed pumping capability

The variable speed pumping recommendation is important because of the limited size of available clearwell capacity (even including the new 2.2 million gallon clearwell) and because of the need to match raw water pumping flow rate to finished water pumping to minimize the disruption to the treatment process caused by flow changes.

The existing surge tank has been reported to be in need of replacement. This serves a vital function in preventing damage to the finished water transmission main and high service pump station resulting from water hammer. Establishing the type and capacity of new surge suppression is beyond the scope of the current study; however, an allowance has been included in the proposed project costs for replacement of the existing surge tank.

Final sizing of proposed upgrades to the high service pumps, including establishing design criteria, is beyond the scope of the current study. In general, costs assume the upgrades to the high service pumps that are consistent with the capacity of the treatment plant.

#### **2.4.4.3 Chemical Storage Facilities**

##### **2.4.4.3.1 Alum**

The required dose of alum is driven by the removal requirements for turbidity, color, and TOC, which are expected to be similar regardless of the process selected. Table 2.20 shows the projected alum usage at 24 mgd, 32 mgd, and 38 mgd as well as the additional facilities required for 30 days of storage at design flow and average dose conditions.



<b>Table 2.20 Alum Storage Summary Joint Water Supply System Analysis City of Lake Oswego and City of Tigard</b>				
	Units	WTP Capacity		
		24-mgd	32-mgd	38-mgd
<b>Daily Usage</b>				
Minimum	lb/day	666	887	1,057
	gal/day	123	164	196
Average	lb/day	1,426	1,902	2,264
	gal/day	264	352	419
Maximum	lb/day	4,003	5,338	6,338
	gal/day	741	988	1,174
Storage Tanks	No.	2	2	2
Storage Volume, Each	Gal	5,000	5,000	5,000
Storage Volume, Total	Gal	10,000	10,000	10,000
Days of Storage <sup>1</sup>	Days	38	28	24
Additional Volume Required for 30 days of Storage	gal	0	0	2,580
Total Volume Required for 30 days of Storage	gal	7,923	10,564	12,580
Annual Usage <sup>1</sup>	gal/yr	96,400	128,500	153,100
Delivery Frequency <sup>2</sup>	trucks/yr	23	31	36
<b>Dose</b>				
Minimum	7	mg/L		
Average	15	mg/L		
Maximum	20	mg/L		
Notes:				
1. Assumes average dose at annual average flowrate.				
2. Assumes 4,200 gal per delivery truckload.				

Although the existing alum storage will not meet the 30-day storage requirement for the expansion of the Lake Oswego WTP at 38-mgd, it is not recommended that additional alum storage be added. Additional storage is not recommended for the build-out capacity of 38 mgd since the existing alum storage will provide a 24-day supply at 38 mgd, and final storage requirements will depend on actual demands and dose rates. It is recommended

that new alum storage be reconsidered in the future based on final plant performance and actual demands.

#### 2.4.4.3.2 Sodium Hypochlorite

Sodium hypochlorite is the primary disinfectant at the Lake Oswego WTP. Additionally, chlorine can be used upstream of the filters intermittently for algae control on the filters. Table 2.21 shows the projected sodium hypochlorite usage at 24 mgd, 32 mgd, and 38 mgd as well as the additional facilities required for 30 days of storage at design flow and average dose conditions.

		WTP Capacity			
		Units	24-mgd	32-mgd	38-mgd
<b>Table 2.21 Sodium Hypochlorite Storage Summary Joint Water Supply System Analysis City of Lake Oswego and City of Tigard</b>					
<b>Daily Usage</b>					
Minimum		lb/day	95	127	151
		gal/day	115	153	182
Average		lb/day	190	254	302
		gal/day	229	305	364
Maximum		lb/day	380	507	604
		gal/day	458	611	727
Storage Tanks		No.	2	2	2
Storage Volume, Each		gal	4,000	4,000	4,000
Storage Volume, Total		gal	8,000	8,000	8,000
Days of Storage <sup>1</sup>		days	35	26	22
Additional Volume Required for 30 days of Storage		gal	0	0	2,912
Total Volume Required for 30 days of Storage		gal	6,873	9,164	10,912
Annual Usage <sup>1</sup>		gal/yr	83,600	111,500	132,800
Delivery Frequency <sup>2</sup>		trucks/yr	17	22	27
<b>Dose</b>					
Minimum	1	mg/L			
Average	2	mg/L			
Maximum	4	mg/L			
Notes:					
1. Assumes average dose at annual average flowrate.					
2. Assumes 5,000 gal per delivery truck load.					

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Although the existing sodium hypochlorite storage will not meet the 30-day storage requirement for the expansion of the Lake Oswego WTP above 32 mgd, it is not recommended that additional sodium hypochlorite storage be added because of the degradation rate of sodium hypochlorite when stored for long periods of time.

### **On-Site Generation**

The option for converting from bulk storage of sodium hypochlorite at 10-15% concentration to on-site generated sodium hypochlorite at 0.8% may be considered for the Lake Oswego WTP.

On-site generation of bleach is advantageous for the following reasons:

- Eliminates frequent shipments of hazardous chemical through the adjacent residential neighborhood
- Eliminates issues associated with storage and feed of high strength bleach, specifically degradation of chemical strength, air binding of metering pumps from offgassing, and risk of exposure to the operators.

On-site generation, however, is not void of disadvantages. These include:

- Significantly larger volume of solution to be fed because of low concentration, which requires large "day" tanks for storage of the generated bleach
- Requires abandonment of existing metering pumps (capacity is too low)
- Additional storage required for brine solution and salt
- Operational intensity greater than bulk storage and feed due to daily solution generating operations and salt handling
- Significant increase in energy demand due to generation process
- Storage and feed facilities that are designed to accommodate bulk solution delivery in case of a generation system shutdown
- A past history of explosions from improper venting of generated hydrogen gas (related to design issues)

Based on the dosage requirements for bulk sodium hypochlorite storage and feed, the average daily usage ranges from 2,800 to 4,600 gallons per day of 0.8% solution (for 24- to 38-mgd) at average daily flows. Peak usage (peak flow and dose) is approximately 12,000 to 19,000 gallons per day (24- to 38-mgd at 4 mg/L Cl dose). The peak usage quantity establishes the amount of day tank storage required. Therefore, the two existing 4,000 gal storage tanks are not adequate to accommodate the increase in required day tank storage. As a result, an additional 4,000 to 11,000 gallons of day tank storage would be required, in addition to the salt and brine solution storage facilities.

The City should weigh the advantages and disadvantages of on-site generation during the preliminary design phase before making a final decision to convert to on-site generation. The site footprint is available to accommodate the additional tanks required, so the decision should be made based on the importance of the improvements in safety (hauling and

handling) and delivery (no air binding of metering pumps) versus the additional capital costs and operational requirements.

#### 2.4.4.3.3 Lime

Lime is used in conjunction with carbon dioxide to provide alkalinity for coagulation and post treatment stabilization. Lime is fed by supersaturating hydrated lime in a solids contact clarifier. The saturated overflow is fed to the application points. The supersaturation concept allows for addition of lime without creating turbidity problems. Table 2.22 shows the projected lime usage at 24 mgd, 32 mgd, and 38 mgd.

<b>Table 2.22 Lime Storage Summary</b>				
<b>Joint Water Supply System Analysis</b>				
<b>City of Lake Oswego and City of Tigard</b>				
		<b>WTP Capacity</b>		
	<b>Units</b>	<b>24-mgd</b>	<b>32-mgd</b>	<b>38-mgd</b>
<b>Daily Usage</b>				
Minimum	lb/day	294	392	467
Average	lb/day	490	653	778
Maximum	lb/day	2,064	2,751	3,267
Number of Silos	No.	1	1	1
Storage Capacity	tons	24	24	24
Days of Storage	days	98	73	62
Annual Usage <sup>1</sup>	lb/yr	119,850	159,800	190,300
Delivery Frequency <sup>2</sup>	trucks/yr	4	5	6
<b>Dose</b>				
Minimum	3	mg/L		
Average	5	mg/L		
Maximum	10	mg/L		
<b>Notes:</b>				
1. Assumes average dose at annual average flowrate.				
2. Assumes 15 tons per delivery truck load				

The existing lime storage will meet the 30-day storage requirement for the expansion of the Lake Oswego WTP to 38 mgd. Therefore, no modifications to the existing lime storage and feed system are proposed.

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## Noise and Vibration

In order to conform to height restrictions for the WTP facilities, the lime silo was installed on a recessed foundation with a low retaining wall surrounding the recessed area. Installed on the silo is a bin activator, which consists of a spinning eccentric weight, that prevents bridging and clogging of the lime within the silo as material is removed. Presumably, the vibration generated from the bin activator is being translated through the retaining wall (drum affect) and is causing disturbances at surrounding residences. A likely solution to this problem is to reinforce and thicken the surrounding retaining wall on the side exposed to the residences from which the noise complaints are received. A thick concrete "block" should dampen the translation of the vibrations from the silo into the surrounding soil. A more detailed analysis should be performed during the design of the modifications to determine the depth and thickness of the concrete dampener.

### 2.4.4.3.4 Carbon Dioxide

Carbon dioxide is used to lower pH after the addition of lime. Unlike acid, carbon dioxide adjusts pH without consuming alkalinity. Carbon dioxide is stored as a pressurized liquid and fed to the process as carbonic acid. Table 2.23 shows the projected carbon dioxide usage at 24 mgd, 32 mgd, and 38 mgd.

<b>Table 2.23 Carbon Dioxide Storage Summary Joint Water Supply System Analysis City of Lake Oswego and Tigard Water Service Area</b>				
		<b>WTP Capacity</b>		
	<b>Units</b>	<b>24-mgd</b>	<b>32-mgd</b>	<b>38-mgd</b>
<b>Daily Usage</b>				
Minimum	lb/day	285	380	453
Average	lb/day	475	634	755
Maximum	lb/day	2,002	2,669	3,169
Storage Tank Capacity	lb	52,000	52,000	52,000
Days of Storage	days	109	82	69
Annual Usage <sup>1</sup>	lb/yr	173,500	231,400	275,500
Delivery Frequency <sup>2</sup>	trucks/yr	4	6	7
<b>Dose</b>				
Minimum	3	mg/L		
Average	5	mg/L		
Maximum	10	mg/L		
<b>Notes:</b>				
1. Assumes average dose at annual average flowrate.				
2. Assumes 20 tons per delivery truck load.				

The existing carbon dioxide storage will meet the 30-day storage requirement for the expansion of the Lake Oswego WTP to 38 mgd. Therefore, no modifications to the existing carbon dioxide storage and feed system are proposed.

**2.4.4.3.5 Polymers and PAC**

Since these systems require either very low or intermittent usage, no modifications to the current systems are being proposed.

**2.4.5 Treatment Summary and Recommendations**

**2.4.5.1 Performance Comparison**

All three process concepts meet the expansion criteria in that they are:

- Reliable - consistently meet treatment criteria as well as current and future drinking water regulations
- Flexible - ability to respond to changing water quality
- Operator Friendly - operator level of effort is manageable

A summary of the relative ranking of each process concept with respect to reliability, constructability, site impacts, operator impacts, and reuse of existing facilities is presented in Table 2.24. However, since no relative ranking of importance for each of these criteria has been established, the table simply serves to summarize the various aspects for implementation of each process option with respect to the others.

<b>Table 2.24 Process Alternative Ranking Summary Joint Water Supply System Analysis City of Lake Oswego and Tigard Water Service Area</b>			
<b>Parameter</b>	<b>Conventional Treatment Option</b>	<b>High Rate Conventional Treatment Option</b>	<b>Membrane Treatment Option</b>
Reliability	2	3	1
Operational Impacts	1	2	3
Site Impacts	3	1	2
Reuse of Existing Facilities	1	2	3
Constructability	2	1	3
<b>Total</b>	<b>9</b>	<b>9</b>	<b>12</b>
<b>OVERALL RANKING</b>	<b>1</b>	<b>1</b>	<b>3</b>

Note: 1 = Best, 3 = Worst

**2.4.5.2 Labor Comparison**

Expansion of this magnitude cannot occur without a corresponding increase in labor hours required to operate and maintain the treatment system components. At a minimum, a second swing shift operator should be provided daily to handle the sludge dewatering operations. Because of the increase in plant capacity and the operational benefits of

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running 24 hours per day (i.e. process stability), an eight-hour graveyard shift should be added. This results in a baseline increase in labor of approximately 110 hours per week (52 percent increase over current staffing levels), and applies to the conventional and high rate conventional treatment options. For the membrane expansion option, which includes numerous automated valves, pumps, instruments, a dedicated maintenance shift per week should be added to relieve the operators from having to perform all but the normal routine maintenance. This results in an additional 40 labor hours per week above the baseline 110 hour per week increase (76 percent increase over current staffing levels).

### 2.4.5.3 Cost Comparison

#### 2.4.5.3.1 Capital Costs

Capital costs were developed at a conceptual level using previously developed costs adjusted for year and capacity and comparisons with recently bid projects of similar scope. The capital cost breakdowns for the options are presented in Tables 2.25, 2.26, and 2.27 for the conventional, high rate conventional, and membrane options, respectively.

<b>Table 2.25 Conceptual Capital Cost Estimate - Conventional Joint Water Supply System Analysis City of Lake Oswego and Tigard Water Service Area</b>			
	<b>WTP Capacity</b>		
	<b>24-mgd</b>	<b>32-mgd</b>	<b>38-mgd</b>
Floc/Sed Basins	\$3,075,000	\$4,636,000	\$5,440,000
Filters	\$1,152,000	\$3,456,000	\$4,608,000
Gravity Thickeners	\$92,000	\$92,000	\$92,000
Centrifuge Facility	\$4,500,000	\$4,500,000	\$4,500,000
Decant Pump Station	\$75,000	\$75,000	\$75,000
Clearwell	\$1,650,000	\$1,650,000	\$1,650,000
Finished Water Pumping	\$1,680,000	\$2,240,000	\$2,660,000
Chemical Storage	\$100,000	\$200,000	\$200,000
Sub-Total:	\$12,324,000	\$16,849,000	\$19,226,000
Site Work/Yard Piping (5%):	\$616,000	\$842,000	\$961,000
Electrical/I&C Upgrades (15%):	\$1,849,000	\$2,528,000	\$2,884,000
Sub-Total:	\$14,789,000	\$20,219,000	\$23,071,000
Contingency (30% of Construction):	\$4,437,000	\$6,066,000	\$6,921,000
Sub-Total:	\$19,226,000	\$26,285,000	\$29,992,000
General Conditions (10%):	\$1,923,000	\$2,629,000	\$2,999,000
Contractor Overhead and Profit (15%):	\$2,884,000	\$3,943,000	\$4,499,000
Total Construction Cost:	\$24,033,000	\$32,857,000	\$37,490,000
Engineering and Legal (20% of Construction):	\$4,807,000	\$6,571,000	\$7,498,000
<b>Total Project Cost:</b>	<b>\$28,840,000</b>	<b>\$39,428,000</b>	<b>\$44,988,000</b>
<b>Project Cost \$/gal of Total Capacity:</b>	<b>\$1.20</b>	<b>\$1.23</b>	<b>\$1.18</b>

<b>Table 2.25 Conceptual Capital Cost Estimate - Conventional Joint Water Supply System Analysis City of Lake Oswego and Tigard Water Service Area</b>			
	<b>WTP Capacity</b>		
	<b>24-mgd</b>	<b>32-mgd</b>	<b>38-mgd</b>
<b>Construction Cost \$/gal of Total Capacity:</b>	<b>\$1.00</b>	<b>\$1.03</b>	<b>\$0.99</b>

<b>Table 2.26 Conceptual Capital Cost Estimate - High Rate Conventional Joint Water Supply System Analysis City of Lake Oswego and Tigard Water Service Area</b>			
	<b>WTP Capacity</b>		
	<b>24-mgd</b>	<b>32-mgd</b>	<b>38-mgd</b>
Actiflo System	\$7,200,000	\$9,600,000	\$11,400,000
Actiflo Building	\$1,600,000	\$1,100,000	\$1,400,000
Filters	\$1,152,000	\$3,456,000	\$4,608,000
Gravity Thickeners	\$123,000	\$164,000	\$195,000
Centrifuge Facility	\$4,500,000	\$4,500,000	\$4,500,000
Decant Pump Station	\$75,000	\$75,000	\$75,000
Clearwell	\$1,650,000	\$1,650,000	\$1,650,000
Finished Water Pumping	\$1,680,000	\$2,240,000	\$2,660,000
Chemical Storage	\$100,000	\$100,000	\$200,000
Sub-Total:	\$18,105,000	\$22,890,000	\$26,653,000
Site Work/Yard Piping (5%):	\$905,000	\$1,145,000	\$1,333,000
Electrical/I&C Upgrades (15%):	\$2,716,000	\$3,434,000	\$3,998,000
Sub-Total:	\$21,726,000	\$27,469,000	\$31,984,000
Contingency (30% of Construction):	\$6,518,000	\$8,241,000	\$9,595,000
Sub-Total:	\$28,244,000	\$35,710,000	\$41,579,000
General Conditions (10%):	\$2,824,000	\$3,571,000	\$4,158,000
Contractor Overhead and Profit (15%):	\$4,237,000	\$5,357,000	\$6,237,000
Total Construction Cost:	\$35,305,000	\$44,638,000	\$51,974,000
Engineering and Legal (20% of Construction):	\$7,061,000	\$8,928,000	\$10,395,000
<b>Total Project Cost:</b>	<b>\$42,366,000</b>	<b>\$53,566,000</b>	<b>\$62,368,000</b>
<b>Project Cost \$/gal of Total Capacity:</b>	<b>\$1.77</b>	<b>\$1.67</b>	<b>\$1.64</b>
<b>Construction Cost \$/gal of Total Capacity:</b>	<b>\$1.47</b>	<b>\$1.39</b>	<b>\$1.37</b>



<b>Table 2.27 Conceptual Capital Cost Estimate - Membrane Joint Water Supply System Analysis City of Lake Oswego and Tigard Water Service Area</b>			
	<b>WTP Capacity</b>		
	<b>24-mgd</b>	<b>32-mgd</b>	<b>38-mgd</b>
Floc Basins	\$422,000	\$597,000	\$632,000
Membrane System	\$12,226,000	\$16,317,000	\$19,347,000
Gravity Thickeners	\$1,000,000	\$1,500,000	\$1,800,000
Membrane Building	\$311,000	\$427,000	\$466,000
Centrifuge Facility	\$4,500,000	\$4,500,000	\$4,500,000
Decant Pump Station	\$75,000	\$75,000	\$75,000
Clearwell	\$1,650,000	\$1,650,000	\$1,650,000
Finished Water Pumping	\$1,680,000	\$2,240,000	\$2,660,000
Chemical Storage	\$200,000	\$100,000	\$200,000
Sub-Total:	\$22,100,000	\$27,500,000	\$31,400,000
Site Work/Yard Piping (5%):	\$1,105,000	\$1,375,000	\$1,570,000
Electrical/I&C Upgrades (15%):	\$3,315,000	\$4,125,000	\$4,710,000
Sub-Total:	\$26,520,000	\$33,000,000	\$37,680,000
Contingency (30% of Construction):	\$7,956,000	\$9,900,000	\$11,304,000
Sub-Total:	\$34,476,000	\$42,900,000	\$48,984,000
General Conditions (10%):	\$3,448,000	\$4,290,000	\$4,898,000
Contractor Overhead and Profit (15%):	\$5,171,000	\$6,435,000	\$7,348,000
Total Construction Cost:	\$43,095,000	\$53,625,000	\$61,230,000
Engineering and Legal (20% of Construction):	\$8,619,000	\$10,725,000	\$12,246,000
<b>Total Project Cost:</b>	<b>\$51,714,000</b>	<b>\$64,350,000</b>	<b>\$73,476,000</b>
<b>Project Cost \$/gal of Total Capacity:</b>	<b>\$2.15</b>	<b>\$2.01</b>	<b>\$1.85</b>
<b>Construction Cost \$/gal of Total Capacity:</b>	<b>\$1.80</b>	<b>\$1.68</b>	<b>\$1.61</b>

#### **2.4.5.3.2 Operations and Maintenance (O&M) Costs**

O&M costs were developed at a conceptual level and include projected power usage, chemical usage, equipment maintenance, sludge disposal, replacement membranes (if applicable), and labor. Chemical, power, and sludge disposal costs were provided by the City. The O&M cost breakdowns for the option are presented in Tables 2.28, 2.29, and 2.30 for the conventional, high rate conventional, and membrane options, respectively.

**Table 2.28 Conceptual O&M Cost Estimate - Conventional  
Joint Water Supply System Analysis  
City of Lake Oswego and City of Tigard**

	Units	WTP Capacity		
		24-mgd	32-mgd	38-mgd
Annual Power Cost <sup>1</sup>	\$/yr	\$684,536	\$913,148	\$1,086,450
Annual Chemical Cost <sup>2,3</sup>	\$/yr	\$796,226	\$1,061,635	\$1,261,403
Annual Sludge Disposal Costs <sup>2</sup>	\$/yr	\$10,987	\$14,649	\$17,444
Equipment Maintenance Costs <sup>4</sup>	\$/yr	\$40,995	\$50,949	\$58,466
Labor Costs <sup>5</sup>	\$/yr	\$558,000	\$558,000	\$558,000
Fixed Costs <sup>6</sup>	\$/yr	\$248,500	\$248,500	\$248,500
Total Annual O&M Costs	\$/yr	\$2,339,243	\$2,846,880	\$3,230,263
Unit Treatment Cost	\$/mgal	\$562	\$513	\$489

- Notes:
1. Power cost = \$0.0737/kWh.
  2. Unit costs provided by Kari Duncan, WTP Manager.
  3. Chemical usage assumes annual average flow and dose 365 days per year.
  4. Maintenance costs assumed to be 2% of overall operating costs.
  5. Assumes average operator hour cost at an annual salary of \$45,000/yr.
  6. Derived from current Materials and Services budget.

**Table 2.29 Conceptual O&M Cost Estimate - High Rate  
Joint Water Supply System Analysis  
City of Lake Oswego and City of Tigard**

	Units	WTP Capacity		
		24-mgd	32-mgd	38-mgd
Annual Power Cost <sup>1</sup>	\$/yr	\$714,030	\$951,039	\$1,133,781
Annual Chemical Cost <sup>2,3</sup>	\$/yr	\$796,226	\$1,061,635	\$1,261,403
Annual Sludge Disposal Costs <sup>2</sup>	\$/yr	\$10,987	\$14,649	\$17,444
Equipment Maintenance Costs <sup>4</sup>	\$/yr	\$41,585	\$51,706	\$59,413
Labor Costs <sup>5</sup>	\$/yr	\$558,000	\$558,000	\$558,000
Fixed Costs <sup>6</sup>	\$/yr	\$248,500	\$248,500	\$248,500
Total Annual O&M Costs	\$/yr	\$2,369,328	\$2,885,528	\$3,278,540
Unit Treatment Cost	\$/mgal	\$569	\$520	\$496

- Notes:
1. Power cost = \$0.0737/kWh.
  2. Unit costs provided by Kari Duncan, WTP Manager.
  3. Chemical usage assumes annual average flow and dose 365 days per year.
  4. Maintenance costs assumed to be 2% of overall operating costs.
  5. Assumes average operator hour cost at an annual salary of \$45,000/yr.
  6. Derived from current Materials and Services budget.

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<b>Table 2.30 Conceptual O&amp;M Cost Estimate - Membranes Joint Water Supply System Analysis City of Lake Oswego and City of Tigard</b>				
	<b>Units</b>	<b>WTP Capacity</b>		
		<b>24-mgd</b>	<b>32-mgd</b>	<b>38-mgd</b>
Annual Power Cost <sup>1</sup>	\$/yr	\$769,000	\$1,027,402	\$1,219,682
Annual Chemical Cost <sup>2,3</sup>	\$/yr	\$162,938	\$217,274	\$258,651
Annual Sludge Disposal Costs <sup>2</sup>	\$/yr	\$26,184	\$34,945	\$41,435
Membrane Replacement Costs <sup>4</sup>	\$/yr	\$534,857	\$735,429	\$869,143
Equipment Maintenance Costs <sup>5</sup>	\$/yr	\$42,415	\$52,856	\$60,333
Labor Costs <sup>6</sup>		\$627,750	\$627,750	\$627,750
Fixed Costs <sup>7</sup>	\$/yr	\$248,500	\$248,500	\$248,500
<b>Total Annual O&amp;M Costs</b>	<b>\$/yr</b>	<b>\$2,411,644</b>	<b>\$2,944,156</b>	<b>\$3,325,494</b>
Unit Treatment Cost	\$/mgal	\$580	\$531	\$503

Notes:

1. Power cost = \$0.0737/kWh.
2. Unit costs provided by Kari Duncan, WTP Manager.
3. Chemical usage assumes annual average flow and dose 365 days per year.
4. Membrane replacement based on 7 year membrane life.
5. Maintenance costs assumed to be 2% of overall operating costs.
6. Assumes average operator hour cost at an annual salary of \$45,000/yr.
7. Derived from current Materials and Services budget.

#### **2.4.5.4 Summary**

Table 2.31 presents a summary of the capital (project) and O&M costs for all three treatment options. As shown in the table, as the level of process complexity increases, so do the project and O&M costs.

Present worth calculations are based on a 25-year project life and a marginal interest rate of 3 percent (the difference between the discount rate and the rate of inflation).

<b>Table 2.31 Conceptual Cost Estimate Summary - Process Alternatives Joint Water Supply System Analysis City of Lake Oswego and Tigard Water Service Area</b>					
<b>Capacity</b>	<b>Parameter</b>	<b>Units</b>	<b>High Rate</b>		
			<b>Conventional</b>	<b>Conventional</b>	<b>Membrane</b>
<b>24 mgd</b>	Total Project Cost	\$	\$28,840,000	\$42,366,000	\$51,714,000
	Unit Project Cost	\$/gal	\$1.20	\$1.77	\$2.15
	Annual O&M Cost	\$/yr	\$2,339,300	\$2,369,300	\$2,411,600
	<b>25 Year Present Worth</b>	<b>\$</b>	<b>\$69,575,000</b>	<b>\$83,623,000</b>	<b>\$93,708,000</b>
<b>32 mgd</b>	Total Capital Cost	\$	\$39,428,000	\$53,566,000	\$64,350,000
	Unit Capital Cost	\$/gal	\$1.23	\$1.67	\$2.01
	Annual O&M Cost	\$/yr	\$2,846,900	\$2,885,500	\$2,944,200
	<b>25 Year Present Worth</b>	<b>\$</b>	<b>\$89,001,000</b>	<b>\$103,812,000</b>	<b>\$115,618,000</b>
<b>38 mgd</b>	Total Capital Cost	\$	\$44,988,000	\$62,368,000	\$73,476,000
	Unit Capital Cost	\$/gal	\$1.18	\$1.64	\$1.85
	Annual O&M Cost	\$/yr	\$3,230,300	\$3,278,500	\$3,325,000
	<b>25 Year Present Worth</b>	<b>\$</b>	<b>\$101,238,000</b>	<b>\$119,457,000</b>	<b>\$131,375,000</b>

#### **2.4.5.5 Recommendations**

The Conventional option is recommended for all demand scenarios. This is based on the observations that it takes advantage of existing infrastructure, it uses technology that has historically met operational requirements, operators are familiar and confident in the technology, and it has the lowest capital cost and 25-year present worth for each scenario.

## **2.5 FINISHED WATER TRANSMISSION ALTERNATIVES**

### **2.5.1 Existing Alignment**

#### **2.5.1.1 Transmission Main**

The Lake Oswego finished water transmission main serves to convey drinking water from the Lake Oswego water treatment plant (WTP) in West Linn to the Bonita Road Pump Station in Tigard, as well as feeding the Lake Oswego distribution system. The existing transmission main consists of sizes ranging from 16 to 24 inches in diameter.

Lake Oswego's current finished water transmission main begins at the Lake Oswego WTP on Kenthorpe Way in West Linn. The main follows Highway 43 until reaching George Rogers Park in Lake Oswego, where it leaves the highway alignment and passes under Oswego Creek. The pipeline continues through downtown Lake Oswego, following Middle Crest Road to the under crossing at Oswego Lake on North Shore Boulevard. After following North Shore Boulevard, the main then crosses under the railroad at Mulligan Lane. The line then follows Iron Mountain Boulevard from Mulligan Lane to the Lake Oswego Hunt Club. The line then follows along the Hunt Club property to Brookside Road,

where it then travels through residential developments until reaching the Waluga Reservoir in Waluga Park. From the reservoir, the main heads down Carmen Drive to Bonita Road. The main terminates at the Bonita Pump Station after crossing Interstate 5 at Bonita Road. The Bonita Pump Station serves as the connection between Tigard and Lake Oswego. For an aerial view of the existing finished water main alignment, see Appendix A. Pipeline details and alignment information were obtained from as-built drawings provided by Lake Oswego staff.

#### **2.5.1.2 Distribution System**

The distribution network of piping within the Lake Oswego service area currently consists of pipe ranging from 2 to 16 inches in diameter. The distribution system is used to serve individual residents and businesses of Lake Oswego. Branches from the main also provide service to Lake Oswego's wholesale customers.

#### **2.5.1.3 Transmission Main Hydraulics**

Transmission main hydraulics were evaluated using Lake Oswego's H20Net model. Recommendations for new pipe diameters for the finished water main are based on the model and a maximum velocity of 6 fps.

### **2.5.2 Proposed Alignment**

The alignment of the proposed new finished water transmission main consists of seven connected reaches. A description of each of the reaches, including general location and relevant characteristics, is presented in Figure 2.22. Each flow scenario requires different transmission main diameters. Recommended diameters obtained from H20Net are shown in Appendix B. In general, it is assumed the existing finished water transmission main will remain in service, with the proposed improvements consisting of a new pipeline "parallel" to the existing line and the combined capacity of the new and existing lines meeting the required capacity of the demand scenario. The exception is the steel portion of the finished piping coming directly from the treatment plant and ending at Oswego Creek. Because this pipe is old and likely in poor condition, the parallel piping for this reach has been sized to provide the total capacity of the scenario.

### **2.5.3 Finished Water Transmission Main Improvements Summary**

#### **2.5.3.1 Finished Main and Distribution System Cost Criteria**

Cost criteria for the finished water main are the same as those applied to the raw water transmission main, which are detailed in Section 2.3.3.2. Capacity improvements to, and maintenance of, discrete localized reaches within Lake Oswego's distribution system will be required as demands increase. Due to the variability of these reaches, they were not included in the conceptual cost estimate for this chapter.

Reach No.	Description	Length	Comparable Alternative Alignment	Existing Utilities or Rural Conditions (1)	Street Width	Curbs/Sidewalks	Traffic Control	Overall Reach Class
7	Lake Oswego WTP on Kenthorpe Way. Continues W along Kenthorpe, NW along Old River Drive, and W along Cedar Oak Drive until the intersection of Cedar Oak and Highway 43.	2640	NO	Cable Television, City of West Linn Utilities, Electric Utilities, Natural Gas, Telephone Lines	> 24'	YES	Signage Flaggers	2
8	Intersection of Cedar Oak and Highway 43 along Highway 43 to Oswego Creek at George Rogers Park.	9561	NO	Cable Television, City of West Linn and Lake Oswego Utilities, Electric Utilities, Natural Gas, Telephone Lines	> 24'	YES	Signage Flaggers Traffic Plan	4
9	Directional drilling under Oswego Creek in George Rogers Park to intersection of Green Street and Furnace Street. Continues N along Furnace Street, and W along Wilbur Street, ending on the W side of S. State Street via jack and bore under S. State Street.	3034	YES, grid pattern of residential streets offers many options	Cable Television, City of Lake Oswego Utilities, Electric Utilities, Natural Gas, Telephone Lines	> 24'	YES	Signage Detours Possible Road Closure	2, S
10	West side of S. State Street along Middle Crest Road, crossing Oswego Lake and continuing along N. Shore Boulevard to Mulligan Lane. Ending on N side of Pacific Railroad tracks via jack and bore.	5722	NO	Cable Television, City of Lake Oswego Utilities, Electric Utilities, Natural Gas, Telephone Lines	≤ 24'	YES	Signage Flaggers Driveway Access	3, S
11	Intersection of Mulligan Lane and Iron Mountain Boulevard, continuing W along Iron Mountain, leaving the road before traffic circle with Upper Drive and Lakeview Boulevard.	6350	NO	Cable Television, City of Lake Oswego Utilities, Electric Utilities, Telephone Lines	> 24'	NO	Signage Flaggers Traffic Plan	4
12	Lake Oswego Hunt Club property to E end of Brookside Road, continuing W along residential streets to Waluga Reservoir in Waluga Park. Ending on Carmen Drive at N end of Waluga Park.	7523	YES, options exist for alignment through small residential streets	Cable Television, City of Lake Oswego Utilities, Electric Utilities, Natural Gas, Telephone Lines	≤ 24'	YES	Signage Flaggers Driveway Access	3, R
13	West along Carmen Drive to Bonita Road, continuing W along Bonita Road to Interstate 5 where pipe cross underneath the interstate. Ending at Bonita Pump Station near the intersections of Bonita Road and Sequoia Parkway.	5360	NO	Cable Television, City of Lake Oswego and Tigard Utilities, Electric Utilities, Natural Gas, Telephone Lines	> 24'	YES	Signage Flaggers Traffic Plan	4, S

Figure 2.22  
REACH DESCRIPTIONS  
FINISHED WATER TRANSMISSION MAIN  
JOINT WATER SUPPLY SYSTEM ANALYSIS  
CITY OF LAKE OSWEGO AND TIGARD WATER SERVICE AREA

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## **2.5.3.2 Class S Reaches**

### **2.5.3.2.1 Oswego Creek Crossing**

Reach 9 of the finished water transmission main includes a 1,100 foot long crossing of Oswego Creek through George Rogers Park. Directional drilling is the preferred method for this section. Rocky soil conditions are assumed for this area.

### **2.5.3.2.2 S. State Street Crossing**

Reach 9 of this finished water transmission main includes a 100 foot long crossing under S. State Street. The heavy traffic in this area will require boring and jacking underneath the roadway to minimize disruption. Construction will require launching and receiving pits to be excavated 30 ft. back on either side of the roadway. Rocky soil conditions are assumed for this area.

### **2.5.3.2.3 Oswego Lake Crossing**

Reach 10 of the finished water transmission main includes a 250 foot long crossing under Oswego Lake on N. Shore Boulevard. To minimize disturbance to the existing lake and bridge, jack and bore is the preferred method for this section. Construction will require launching and receiving pits to be excavated 30 ft. back on either side of the roadway. Rocky conditions are assumed for this area.

### **2.5.3.2.4 Railroad Crossing**

Reach 10 of the finished water transmission main includes a 120 foot long crossing under the railroad tracks near the intersection of Mulligan Lane and N. Shore Boulevard. To minimize disturbance to the railroad, jack and bore is the preferred method for this section. Construction will require launching and receiving pits to be excavated 30 ft. back on either side of the roadway. Rocky conditions are assumed for this area.

### **2.5.3.2.5 I-5 Crossing**

Reach 13 of the finished water transmission main includes a 600 foot long crossing under Interstate 5 at Bonita Road. The heavy traffic in this area will require boring and jacking underneath the interstate to minimize disruption. Construction will require launching and receiving pits to be excavated 30 ft. back on either side of the roadway.

### **2.5.3.2.6 Capital Cost**

It is assumed that Lake Oswego would prefer continued use and maintenance of the existing finished water transmission main for the remainder of its life. Therefore, for the purposes of this study, it is assumed that a parallel pipe will be installed to provide required capacity improvements for the finished transmission main system. Estimated capital project costs for capacity improvements to the finished water main are summarized below in Table 2.32.

<b>Table 2.32 Conceptual Project Cost Estimate Summary – Finished Water Main Joint Water Supply System Analysis City of Lake Oswego and Tigard Water Service Area</b>							
<b>Reach</b>	<b>Class</b>	<b>Scenario 2</b>		<b>Scenario 3</b>		<b>Scenario 4</b>	
		<b>Length</b>	<b>Project Cost</b>	<b>Length</b>	<b>Project Cost</b>	<b>Length</b>	<b>Project Cost</b>
7	2	2640	\$2,620,000	2640	\$3,140,000	2640	\$3,370,000
8	4	9570	\$11,730,000	9570	\$13,610,000	9570	\$14,590,000
9	2,S	3040	\$4,640,000	3040	\$5,940,000	3040	\$7,060,000
10	3,S	5722	\$6,670,000	5722	\$8,460,000	5722	\$9,010,000
11	4	NA	NA	6350	\$3,830,000	6350	\$5,420,000
12	3,R	NA	NA	7523	\$9,310,000	7523	\$11,600,000
13	4,S	NA	NA	NA	NA	4760	\$4,200,000
<b>Total</b>		<b>20,972</b>	<b>\$25,290,000</b>	<b>34,845</b>	<b>\$44,300,000</b>	<b>39,605</b>	<b>\$55,240,000</b>

### **2.5.3.3 Operations and Maintenance**

Operations and maintenance costs for the pipeline are assumed to be negligible in comparison to the overall cost of the project, and within the error of the overall project cost estimates.

### **2.5.4 Waluga Reservoir**

#### **2.5.4.1 Existing Storage Capacity**

Waluga Reservoir is located in Waluga Park between reaches 12 and 13 of the finished water transmission main. The existing reservoir storage capacity is 4.0 MG.

#### **2.5.4.2 Future Storage Capacity Improvements**

As described in Lake Oswego's 2001 Water System Master Plan, at least an additional 1.0 million gallons in storage is required at the Waluga Reservoir site by the year 2020 to meet additional demands within the Waluga (320) pressure zone. Additional capacity to meet operational requirements of the Bonita Pump Station serving Tigard will also be needed based on pump station flows. For the purposes of sizing this additional storage capacity, it was assumed the additional Waluga reservoir would function as a "clearwell" or "buffer" to serve the inlet of the Bonita Pump Station. It is further assumed that Tigard will continue to provide its own in-system storage to meet Tigard's operational, fire flow and emergency needs within the Tigard system and will not add operational or emergency storage at the Waluga site. This results in the added benefits of minimizing the size of the second Waluga



reservoir and improved reliability of the Tigard system by placing their emergency storage on the discharge side of the Bonita Pump Station.

Based on typical clearwell sizing criteria of providing a storage volume equal to 10% of the peak day demand, additional storage capacity required for Tigard pumping is approximately 1 million gallons under demand scenario 3, and approximately 1.5 million gallons under demand scenario 4.

Figure 2.23 shows an aerial view of the existing Waluga reservoir. The proposed location of the new reservoir is adjacent to the existing on the northwest side. This location will allow the construction of the new reservoir on land currently owned by the City and will not disturb the homes located on those parcels.

### 2.5.4.3 Project Cost Estimate

#### 2.5.4.3.1 Capital Cost

Proposed sizes and associated capital costs for Waluga Reservoir are set forth in Table 2.33.

<b>Table 2.33 Conceptual Project Cost Estimate Summary - Waluga Reservoir Addition Joint Water Supply System Analysis City of Lake Oswego and Tigard Water Service Area</b>				
<b>Parameter</b>	<b>Units</b>	<b>Scenario 2 24 mgd</b>	<b>Scenario 3 32 mgd</b>	<b>Scenario 4 38 mgd</b>
Reservoir Capacity	MG	1	2	2.5
Total Project Cost	\$	\$2,500,000	\$3,800,000	\$4,000,000

#### 2.5.4.3.2 O & M costs

Operations and Maintenance Costs for the reservoir are assumed negligible in comparison to the overall costs of the project, and within the error of the project cost estimates. Therefore, they are not included.

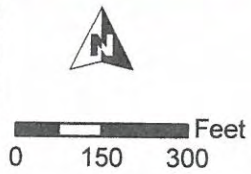
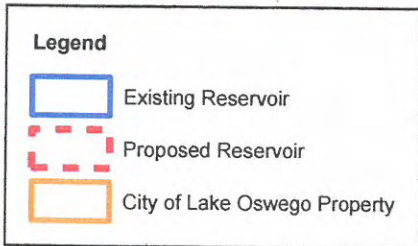
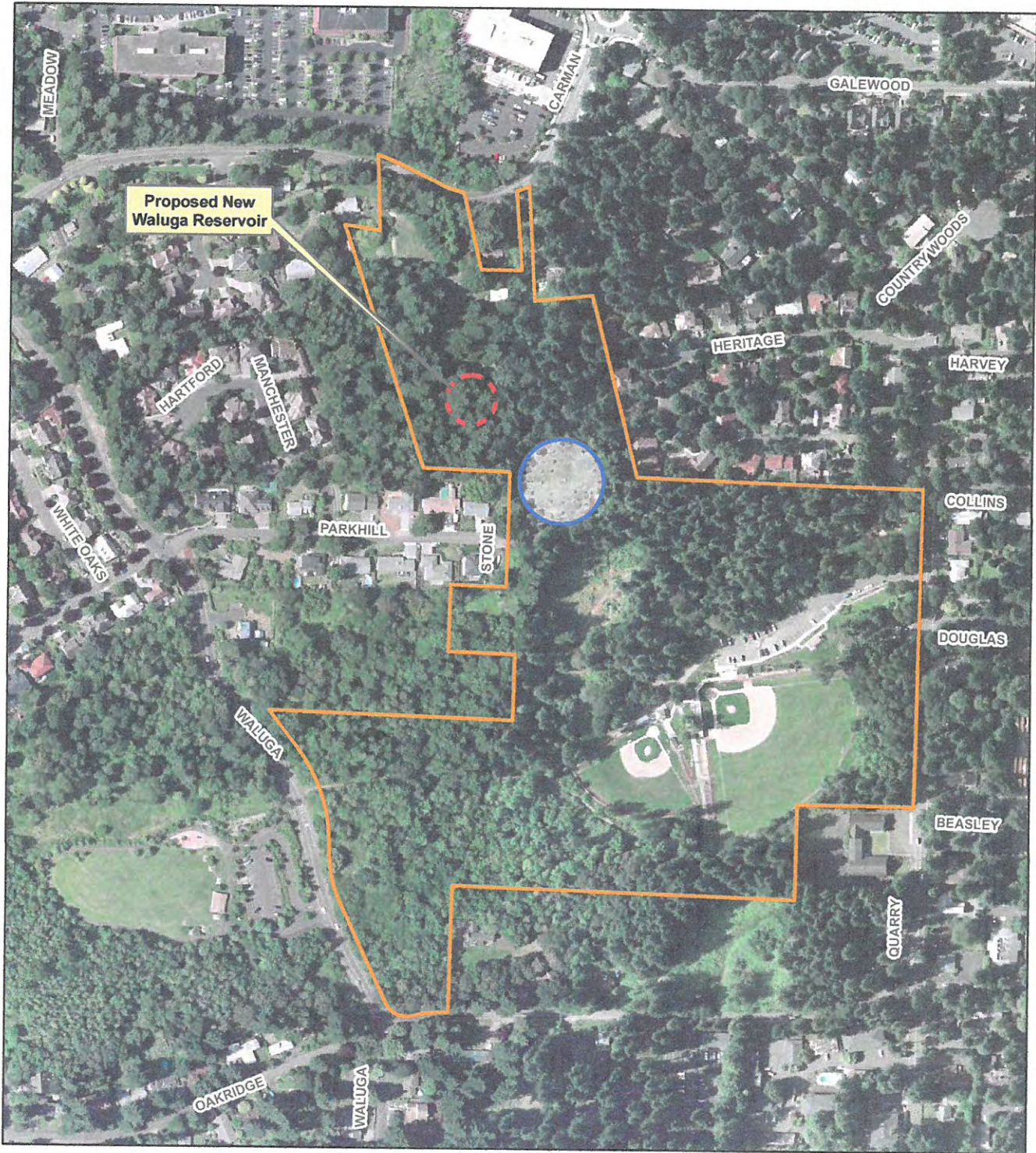
## 2.5.5 **Bonita Pump Station**

### 2.5.5.1 Existing Capacity

Bonita pump station receives finished water from the Lake Oswego distribution system and delivers it to the Tigard water distribution service area. A detailed description of the pump station is set forth in Chapter 1, Section 1.3.1.5. The existing Bonita Pump Station has a firm capacity of 5.3 mgd, and a maximum capacity of 8 mgd.

### 2.5.5.2 Future Demands

According to existing water rights and future projections, Lake Oswego will be capable of delivering to Tigard a peak of approximately 0 mgd, 8 mgd, or 14 mgd, for scenarios 2, 3, and 4, respectively. As the firm capacity of the existing pump station is 5.3 mgd, additional pumping capacity will be required under scenarios 3 and 4. The pump station will be designed for firm capacity equivalent to meet peak capacity available to Tigard.



**Figure 2.23**  
**WALUGA RESERVOIR**  
 JOINT WATER SUPPLY SYSTEM ANALYSIS  
 CITY OF LAKE OSWEGO AND TIGARD WATER SERVICE AREA

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### 2.5.5.3 Cost Estimate

#### 2.5.5.3.1 Estimating Criteria

For scenario 2, the Bonita Pump Station will not be upgraded. For scenarios 3 and 4, it is assumed that existing pump station will be taken out of service and replaced in its entirety in its existing location. Construction of the new pump station will require the existing pump station to be out of service for up to 9 months. The new pump station structure will be above ground to provide operations personnel with a safer operating environment. Additional improvements will include an auxiliary power generator with an 8-hour fuel storage capacity.

#### 2.5.5.3.2 Capital Cost

Capital costs for the Bonita Pump Station as total project costs are presented in Table 2.34.

<b>Table 2.34 Conceptual Project Cost Estimate - Bonita Pump Station Joint Water Supply System Analysis City of Lake Oswego and Tigard Water Service Area</b>			
<b>Type</b>	<b>Scenario 2 24 mgd</b>	<b>Scenario 3 32 mgd</b>	<b>Scenario 4 38 mgd</b>
Firm Pump Station Capacity	5.3 mgd	8 mgd	14 mgd, expandable to 16 mgd
Total Project Cost	N/A	\$1,480,000	\$1,700,000

#### 2.5.5.3.3 O & M Costs

Annual O & M for the Bonita Pump Station are presented in Table 2.35 for assumed average demand of the supply scenario and in resulting cost per million gallons delivered.

<b>Table 2.35 Conceptual Cost Estimate Summary - Bonita Pump Station Joint Water Supply System Analysis City of Lake Oswego and Tigard Water Service Area</b>				
<b>Parameter</b>	<b>Units</b>	<b>Scenario 2 24 mgd</b>	<b>Scenario 3 32 mgd</b>	<b>Scenario 4 38 mgd</b>
Annual O & M costs	\$/yr	N/A	\$231,000	\$235,000
Annual O & M costs	\$/MG	N/A	\$91.72	\$93.31

## 2.6 PROJECT COST SUMMARY & IMPLEMENTATION PLAN

### 2.6.1 Capital Costs

Table 2.36 provides a summary of the capital cost for each proposed component of each demand scenario.

Type	Scenario 2 24 mgd	Scenario 3 32 mgd	Scenario 4 38 mgd
Clackamas River Intake	\$2,100,000	\$4,440,000	\$4,670,000
Raw Water Transmission Main	\$19,890,000	\$23,920,000	\$23,920,000
Lake Oswego Water Treatment Plant	\$28,840,000	\$39,430,000	\$44,990,000
Finished Water Transmission Main	\$25,290,000	\$44,300,000	\$55,240,000
Waluga Reservoir	\$2,470,000	\$3,820,000	\$4,010,000
Bonita Pump Station	N/A	\$1,480,000	\$1,700,000
<b>Total</b>	<b>\$78,590,000</b>	<b>\$117,390,000</b>	<b>\$134,530,000</b>

Throughout the report, capital costs are presented in November 2006 dollars to facilitate comparison of scenarios. However, actual costs will be subject to construction cost escalation up to the time the improvements are actually constructed. This construction cost escalation, based on the anticipated implementation schedule for each scenario, is included in the financial evaluation of alternative scenarios. It should be further noted that because construction cost escalation is projected to occur at a rate greater than the general inflation rate<sup>2</sup>, scenarios that are delayed beyond the anticipated implementation schedule will likely have a higher cost than the costs shown in the report. Further evaluation of the financial implications associated with delaying implementation of the proposed improvements should be conducted before final decisions are made regarding the timing of implementing Scenarios 2-4.

### 2.6.2 Operation & Maintenance Costs

Table 2.37 provides a summary of the operations and maintenance costs for each relevant component of each demand scenario.

System	Units	Scenario 2 24 mgd	Scenario 3 32 mgd	Scenario 4 38 mgd
Clackamas River Intake	\$/million gallons	\$55.52	\$63.45	\$64.94
Water Treatment Plant	\$/million gallons	\$569.00	\$520.00	\$496.00
Bonita Pump Station	\$/million gallons	NA	\$91.72	\$93.31

<sup>2</sup> "Inflation is Set for a Strong Rebound; Steel and Rebar Prices Lead Resurgence in Construction Costs," McGraw Hill Construction, June 2007.

### **2.6.3 Implementation Plan**

The purpose of this section is to establish the completion dates for required water system improvements under Scenarios 2 through 4. These completion dates will serve as the basis from which the financial analysis will be prepared.

#### **2.6.3.1 Implementation Timing Assumptions**

The following assumptions were applied to development of implementation timing of component improvements for each scenario:

- Tigard entered into a 10-year contract for water supply with the City of Portland in 2006. This contract is effective through June 2016. As such, the required completion dates for required water system improvements assume Tigard will fully utilize their allotted capacities under Scenarios 3 and 4 starting in 2016, with no increased capacity required for Tigard use prior to that date.
- A number of the existing water system components are already at their maximum capacity. These components include:
  - Clackamas River Intake structure and pump station.
  - Raw water transmission main.
  - Water treatment plant.
  - Reaches 7 through 10 of the finished water transmission main.

Therefore, it is assumed that these facilities must be expanded immediately to meet the needs of Lake Oswego, independent of the scenario. However, the design capacity of these immediate improvements will be dependent on the selected scenario.

For scenarios 3 and 4, component improvements were phased to provide incremental capacity additions over time to defer costs.

The following sections present a summary of the phasing of improvements under each of the scenarios 2, 3, and 4.

#### **2.6.3.2 Scenario 2 Implementation Plan**

The required completion dates for system component upgrades under scenario 2 are summarized in Table 2.38.

Most of the system components require immediate upgrades. When implemented, the upgrades were assumed constructed to meet Lake Oswego's full build-out capacity of 24 mgd. The exception is the new Waluga Reservoir, which is not required to be in operation until 2020 according to the previous master plan.

<b>Table 2.38 Implementation Plan – Scenario 2 Joint Water Supply System Analysis City of Lake Oswego and Tigard Water Service Area</b>			
<b>Infrastructure Components</b>	<b>Project Completion Date</b>		
	<b>Immediate</b>	<b>2016</b>	<b>2020</b>
Intake Structure & Pump Station	\$2,100,000	-	-
Raw Transmission Main	\$19,890,000	-	-
Water Treatment Plant	\$28,840,000	-	-
Finished Transmission Main	\$25,290,000	-	-
Waluga Reservoir	-	-	\$2,470,000
Bonita Pump Station	-	-	-
<b>Totals</b>	<b>\$76,120,000</b>		<b>\$2,470,000</b>

### 2.6.3.3 Scenario 3 Implementation Plan

The required completion dates for system component upgrades under scenario 3 are summarized in Table 2.39.

As for the previous scenario 2, most system components require immediate upgrades. Implemented upgrades were assumed constructed to the full scenario capacity of 32 mgd. The exceptions are the WTP, finished water transmission line, Waluga Reservoir, and Bonita Pump Station. The phasing for the WTP is an immediate expansion to 24 mgd, with further incremental expansion to 32 mgd by 2016. Upgrades to the finished transmission main must be completed immediately for reaches 7 through 10, with further upgrades to reaches 11 and 12 by 2016. Both the Waluga Reservoir and Bonita Pump Station will need to be in place by 2016 in order to meet Tigard's peak water supply and delivery needs.

<b>Table 2.39 Implementation Plan – Scenario 3 Joint Water Supply System Analysis City of Lake Oswego and Tigard Water Service Area</b>			
<b>Infrastructure Components</b>	<b>Project Completion Date</b>		
	<b>Immediate</b>	<b>2016</b>	<b>2020</b>
Intake Structure & Pump Station	\$4,440,000	-	-
Raw Transmission Main	\$23,920,000	-	-
Water Treatment Plant	\$28,840,000	\$10,590,000	-
Finished Transmission Main	\$31,160,000	\$13,140,000	-
Waluga Reservoir	-	\$3,820,000	-
Bonita Pump Station	-	\$1,480,000	-
<b>Totals</b>	<b>\$88,360,000</b>	<b>\$29,030,000</b>	<b>-</b>

### 2.6.3.4 Scenario 4 Implementation Plan

The required completion dates for system component upgrades under scenario 4 are summarized in Table 2.40.

<b>Table 2.40 Implementation Plan – Scenario 4 Joint Water Supply System Analysis City of Lake Oswego and Tigard Water Service Area</b>			
<b>Infrastructure Components</b>	<b>Project Completion Date</b>		
	<b>Immediate</b>	<b>2016</b>	<b>2020</b>
Intake Structure & Pump Station	\$4,670,000	-	-
Raw Transmission Main	\$23,920,000	-	-
Water Treatment Plant	\$28,840,000	\$16,150,000	-
Finished Transmission Main	\$34,020,000	\$21,220,000	-
Waluga Reservoir	-	\$4,010,000	-
Bonita Pump Station	-	\$1,700,000	-
<b>Totals</b>	<b>\$91,450,000</b>	<b>\$43,080,000</b>	<b>-</b>
<b>Note:</b>			
1. All costs are presented in November 2006 dollars.			

As for the previous two scenarios, most components required immediate upgrades; upgrades were generally assumed to be to the full capacity of 38 mgd. The exceptions are the WTP, finished water transmission line, Waluga Reservoir, and Bonita Pump Station. The phasing for the WTP is an immediate expansion to 24 mgd, with further expansion to 38 mgd by 2016. Upgrades to the finished transmission main must be completed immediately for reaches 7 through 10, with further upgrades to reaches 11 through 13 by 2016. Both the Waluga Reservoir and Bonita Pump Station will need to be in place by 2016 in order to meet Tigard's peak water supply and delivery needs.

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## WATER RIGHTS AND PERMITTING STRATEGY

### 3.1 BACKGROUND

The City of Lake Oswego (Lake Oswego) operates a raw water intake on the Clackamas River with water rights to appropriate a maximum of 38 million gallons per day (mgd). The water is treated at the Lake Oswego Water Treatment Plant (WTP), which has a current capacity of approximately 16 mgd. The treated water is then distributed to retail users within the Lake Oswego service area, as well as to several wholesale customers, including the City of Tigard.

The existing raw water intake and pumps are located in the city of Gladstone, near the mouth of the Clackamas River. The raw Clackamas River water is conveyed through the City of Gladstone, beneath the Willamette River, and overland to the WTP located in the City of West Linn. Treated water is transferred overland via West Linn from the WTP to retail users within the Lake Oswego service area and Lake Oswego's storage reservoirs. Treated water is stored in the reservoirs and, as needed, piped to the Bonita Pump Station in the City of Tigard (Tigard).

To provide sufficient water to meet Lake Oswego's and Tigard's future water needs, the capacity of the supply system must be increased. This means that the entire system must be modified, including:

- The existing intake and pumping facility in Gladstone must be expanded and the raw water transmission capacity must be increased.
- In West Linn, the existing water treatment plant must be expanded within the existing site.
- A new finished water pipeline must be constructed in both West Linn and Lake Oswego to provide increased capacity.
- A new storage reservoir at Lake Oswego's Waluga Reservoir site must be constructed.
- The Bonita pump station in Tigard will need to be enlarged under Scenarios 3 and 4.

This chapter presents a review of water rights and permitting requirements applicable to water supply system improvements identified in Chapter 2. This includes an assessment of Lake Oswego's Clackamas River junior and senior water rights, as well as a review of local, state, and federal permitting requirements associated with the potential projects. Also included are proposed permitting strategies for meeting local as well as state and federal permitting requirements.



### **3.1.1 Review of Water Rights**

This chapter presents a review of surface water rights held by Lake Oswego and Tigard on the Clackamas and Willamette Rivers to support Lake Oswego and Tigard's Joint Water Supply System Analysis (JWSSA). The focus of this review is on municipal water rights and demands on the Clackamas River, and a brief review of Willamette water rights held by both cities. This information has been developed by Golder and Associates based on an update to the 2003 "Water Right Master Plan, Part 1" for the Clackamas River Water Users by CH2M Hill.

Lake Oswego currently holds 38.14 mgd of water rights on the Clackamas River. Tigard has recently completed construction of two Aquifer Storage and Recovery wells with reliable capacity of 3.5 mgd to help meet water demands during time of peak use. Additionally, both Lake Oswego and Tigard have water rights on the Willamette River, for 3.9 mgd and 25.9 mgd, respectively. Further description of these water rights can be found in the Section 3.2.

### **3.1.2 Local Land Use Permits**

Chapter 3 examines the applicability of local land use regulations to construct the water system improvements identified in Chapter 2. Lake Oswego's existing water supply system is located within the cities of Gladstone, West Linn, and Lake Oswego, and small portions of urban unincorporated Clackamas County. Each of the jurisdictions listed above has primary (base) zones and overlay zones that regulate reconstruction of Lake Oswego's water supply facilities. In the sections that follow, applicable city zoning and overlay districts are identified, as well as review criteria and standards, which apply to the reconstruction of water facilities.

Chapter 3 focuses on local land use permits. Since both raw and treated water pipes are located primarily in public rights-of-way (ROW), construction permits issued by the local jurisdictions will also be required.

This information is based on a review by Winterbrook Planning (Winterbrook) of local land use regulations and offers a preliminary land use permitting strategy. It is important to remember that city land use regulations are subject to local interpretation by appointed and elected officials. Therefore, this chapter identifies areas where follow-up with local planning officials is required prior to implementing the proposed permitting strategy.

### **3.1.3 State and Federal Permits**

Chapter 3 provides a preliminary review of state and federal permits that are likely to apply to reconstruction of water facilities necessary to accommodate increased demands from Lake Oswego and Tigard. This review is based on Winterbrook's review of aerial photos showing the anticipated locations and alignments of the proposed water system improvements. Some parts of the proposed projects may require utility easements, licenses, and other legal agreements in addition to the identified state and federal permits.

As alignment and construction options are further refined, the proposed permitting requirements and regulatory strategy should be updated accordingly.

### 3.2 WATER RIGHTS

#### 3.2.1 City of Lake Oswego Water Rights Review

Lake Oswego holds three surface water permits, which allow for the diversion of 59 cfs (38.14 mgd) from the Clackamas River and 6 cfs (3.88 mgd) from the Willamette River, for a total of 65 cfs (42.02 mgd). There are no pending permit applications for Lake Oswego on the Clackamas or Willamette Rivers.

The Clackamas River water rights held by Lake Oswego are summarized in Table 3.1. In summary, Lake Oswego has permits (S32410 and S37839) sufficient to meet the projected demand for Lake Oswego under build-out conditions. Additional rights are available to serve a joint system up to Lake Oswego's existing 38 mgd of permitted rights.

<b>Table 3.1 City of Lake Oswego Surface Water Rights - Clackamas River Joint Water Supply System Analysis City of Lake Oswego and Tigard Water Service Area</b>			
<b>Holder</b>	<b>Water Right (Application/Permit/ Certificate)</b>	<b>Permitted Rate (cfs/mgd)</b>	<b>Source - Priority Date</b>
City of Lake Oswego	S43365 / S32410 / C78332	50/32.32	Clackamas - 3/14/1967
City of Lake Oswego	S50819 / S37839 / certificate issued but number not available	9/5.82	Clackamas - 7/5/1973
<b>TOTAL</b>		<b>59/38.14</b>	

Under Permit Amendment T-8538 issued by the Oregon Water Resources Division (OWRD) in 2000, Permit S37839 has been amended authorizing use by the Cities of Tigard and Tualatin.

#### Clackamas River In-stream Water Rights

The Clackamas River has three in-stream water rights that set minimum flows on the river. In-stream water right C59490 sets the minimum June 1<sup>st</sup> to August 31<sup>st</sup> flow at 400-cfs. Water right C59491 extends the 400-cfs minimum flow from September 1<sup>st</sup> to September 15<sup>th</sup> and C59492 sets a minimum flow of 640-cfs from September 15<sup>th</sup> to June 30<sup>th</sup>.

Lake Oswego holds no water rights senior to Oregon Water Resources Department (OWRD) in-stream water rights C59490 and C59492, however, Lake Oswego permit S32410 is senior to in-stream right C59491 (priority date August 26, 1968). The Lake Oswego permit S37839 for 9 cfs (5.82 mgd) is junior to all in-stream rights. Water rights

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senior to the in-stream rights provide an addition level of reliability. In the case that an extreme drought reduced flow in the Clackamas River to the limit of the in-stream water right, Lake Oswego could be vulnerable to a call on the junior right for restricted use.

### Willamette River Source

The City of Lake Oswego holds one permit on the Willamette River (S43246) for 3.88 mgd. This permit should be retained as an option to provide an emergency supply from the Willamette River to Lake Oswego and Tigard. This water right might also be used together with the Tigard Application S80342 to develop a new Willamette source of supply. The Willamette River permit held by Lake Oswego is summarized in Table 3.2 below:

<b>Table 3.2 City of Lake Oswego Surface Water Rights - Willamette River Joint Water Supply System Analysis City of Lake Oswego and Tigard Water Service Area</b>			
<b>Holder</b>	<b>Water Right (Application/Permit/ Certificate)</b>	<b>Permitted Rate (cfs/mgd)</b>	<b>Source - Priority Date</b>
City of Lake Oswego	S55550 / S43246 / NA	6/3.88	Willamette - 3/24/1977

### 3.2.2 City of Tigard - Review of Willamette Application S-80342

Application S80342, submitted May 18, 1995, requests a permit to divert 40 cfs (25.86 mgd) for municipal purposes from the Willamette River in the area of Wilsonville, Oregon. The permit information is presented in Table 3.3 below:

<b>Table 3.3 City of Lake Tigard Surface Water Rights Joint Water Supply System Analysis City of Lake Oswego and Tigard Water Service Area</b>			
<b>Holder</b>	<b>Water Right (Application/Permit/ Certificate)</b>	<b>Permitted Rate (cfs/mgd)</b>	<b>Source - Priority Date</b>
City of Tigard	S80342 / NA / NA	40/25.85	Willamette - May 18, 1995

Following a lengthy administrative hold at the request of Tigard, the application is now scheduled for review by OWRD and a Proposed Final Order (PFO) for this application is pending. Tigard can expect OWRD, in consultation with Oregon Department of Fish and Wildlife (ODFW) and Oregon Department of Environmental Quality (ODEQ), to place limitations on the quantity of the water diverted from the Willamette during the specific periods in Spring and early Summer. This application is also competing with several other pending applications for water availability on the Willamette River, identified as an available source for regional water supply in the Regional Water Supply Plan.

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The Regional Water Supply Plan (RWSP), adopted in 1996, identified the need for substantial additions to the region's water supplies by 2017, and the Willamette River was one source listed for future development. In response to this finding, several water providers filed individual applications for withdrawal on the Willamette River to meet projected long-term water supply demands. However, the independent filings exceeded the projected demand for water supplies anticipated by the RWSP. To eliminate the need for the Department to choose between competing applications on the Willamette, the Tualatin Valley Water District, Tigard, and other providers formed the Willamette Water Supply Agency (WWSA) to coordinate supply planning activities for the members, as well as the processing of their water right applications. The WWSA was subsequently dissolved and its members formed the WRWC (Willamette River Water Coalition). Tigard's water rights application on the Willamette is now a part of the WRWC's pooled water rights on the Willamette River, of which Tigard is granted 20 mgd of the total WRWC rights for 130 mgd.

In compliance with the WRWC planning activities, Tigard's Application S80342 was originally scheduled to be withdrawn from consideration by August 2, 1999 (TVWD Letter dated May 28, 1999) along with permit S-73581 held by TVWD. The proposed withdrawal was intended to show support for a coordinated planning effort. However, Tigard and TVWD chose to retain the applications until finalizing planning efforts and agreements among water providers. Application S80342 remains viable and can proceed to permit status pending public comment on the PFO.

If Tigard moves forward with Application S-80342 and OWRD issues a permit under Application S-80342, that permit could be amended to add a point of appropriation at a downstream location on the Willamette closer to the Lake Oswego water treatment plant. Because the current Lake Oswego intake on the Clackamas River is approximately 0.9 miles up river from the confluence of the Clackamas and Willamette Rivers, amending the Willamette permit to withdraw from the Clackamas River is not a possibility. Amending the permit to a downstream Willamette location near West Linn or Lake Oswego would require the construction of a new intake or bank filtration well field. In addition, development of this permit to serve Lake Oswego and Tigard would require concurrence with Lake Oswego to use this new source as well as agreement by Tigard pursuant to its existing limitation on use of the Willamette supply.

### **3.2.3 Clackamas River Municipal Water Rights**

This section presents an overview of the municipal water rights on the Clackamas River. There are five active municipal points of diversion (POD) on the Clackamas River, and one inactive site. The Lake Oswego diversion is located at the furthest downstream position. The highest upriver diversion is the original South Fork of the Clackamas diversion formally operated by the South Fork Water Board. The diversions are presented in Table 3.4 with the approximate water rights and demand presented at each POD for the year 2005. Appendix C contains a summary list of municipal water rights on the Clackamas and a table of demand estimates for municipal entities with permits or applications pending on the Clackamas.

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<b>Table 3.4 Clackamas River Municipal Water Rights Joint Water Supply System Analysis City of Lake Oswego and Tigard Water Service Area</b>			
<b>Holder</b>	<b>Total Water Rights (Applications/Permits/Certificates) cfs (mgd)</b>	<b>2005 Demand (mgd)</b>	<b>Status of the POD</b>
City of Oregon City and West Linn (South Fork Water Board)	50 (32.32)	0	Presently Inactive
City of Estacada	4 (2.58)	2.58	Active
Clackamas River Water (CRW-N and CRW-S)	195.4 (126.31)	21.5	Active
North Clackamas County Water Commission (with Gladstone, Milwaukie, and Oak Lodge)	85.73 (55.42)	32.7	Active
South Fork Water Board	66 (42.66)	14.2	Active
City of Lake Oswego	59 (38.14)	16	Active
<b>TOTAL</b>	<b>460.13 (297.43)</b>	<b>84.35</b>	

The presentation of water rights and water demand in Table 3.4 is accurate in total. However, the breakdown of the demand to each of the individual PODs may vary depending on changing water supply agreements; water rights may have multiple PODs and normal operating conditions may allow a service area to accept water from more than one POD. The exact uses in each service area are somewhat transient and the redundancies built into the water supply infrastructure make it possible to move water across systems (wheeling water) to service areas far from the original diversion. Because of these variables, the demands assigned in Table 3.4 can vary considerably in the field. However, even given the variability, Table 3.4 does make clear that based on 2005 data, there are presently about 213 mgd in applications, permits, and certificates that are not currently being put to beneficial use.

### Analysis of Demand and Water Rights 2005 to 2040

The apparent abundance of Clackamas River water rights shown in 2005 data does not take into account future projected water demands of the municipal water rights holders. An analysis of long-term availability that includes the increases in demand with time is presented in Figures 1, 2 and 3. The analysis examines the water right profile and projected water demand for Clackamas River Water (CRW), the North Clackamas County Water Commission (NCCWC), and the South Fork Water Board (SFWB). This analysis is intended to determine if and where additional water rights capacity would be available to Lake Oswego and Tigard in 2030 and beyond (the time at which combined demand from Lake Oswego and Tigard is expected to exceed current water rights).

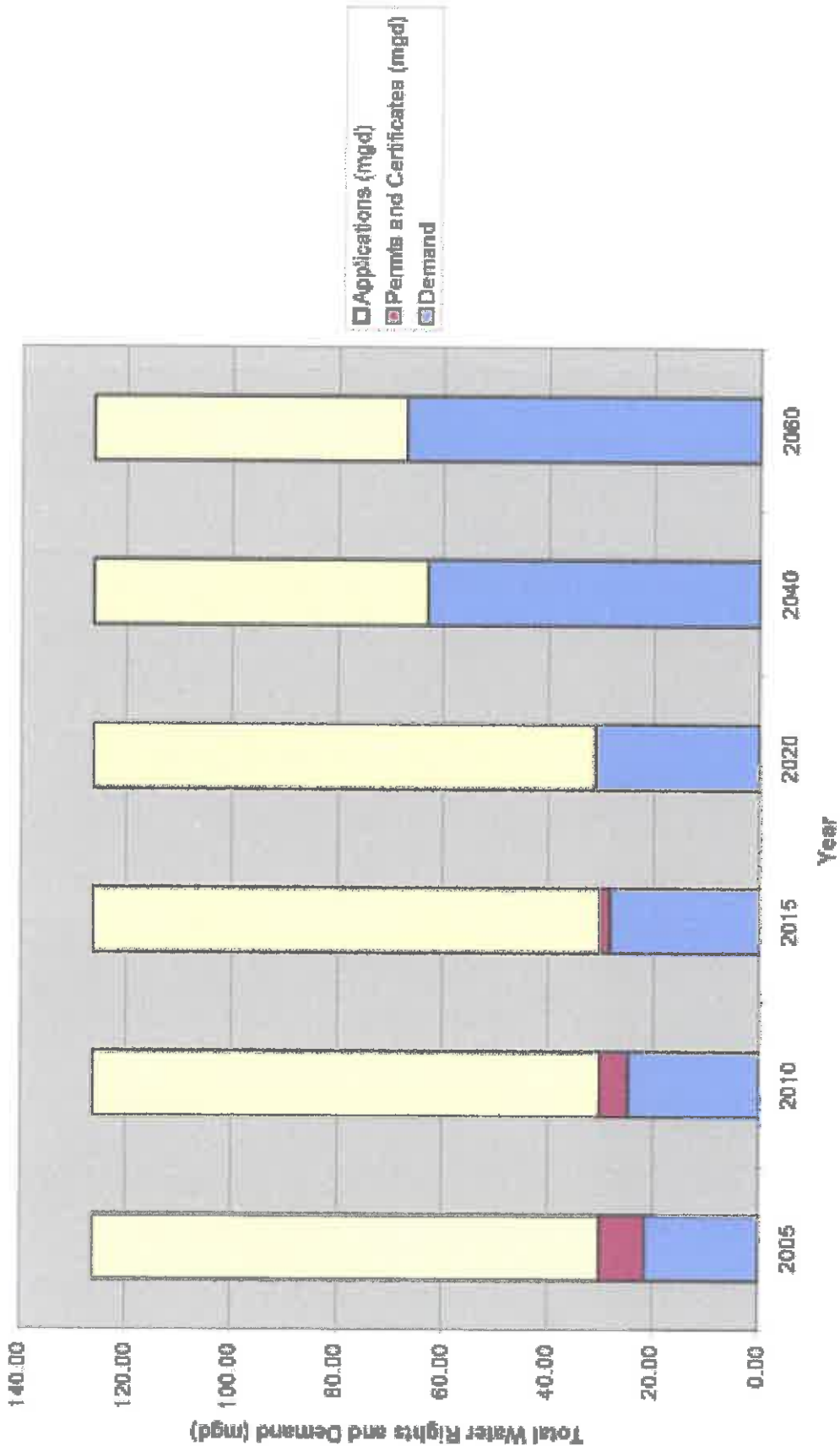
The bar graph in Figure 3.1 presents distribution permits, certificates, and applications listed on the CRW POD versus the increasing demand for water use from 2005 to 2060. In the figure the demand portion of the bar consumes the current capacity of certificates and permits by 2020. In the year 2020 CRW will have to rely on water right capacity that is currently in application status. Lake Oswego and Tigard could participate in the development of these permits to obtain a share of any resulting permit.

Figure 3.2 presents the water right and demand profile of NCCWC. Based on the projected demand at this POD, the permits, certificates and applications will be exhausted shortly following 2010. NCCWC is projecting a water right deficit by 2015 and will be actively competing for available water on the Clackamas River. It does not appear that NCCWC will have any water to spare.

Figure 3.3 presents the permits, certificates and projected demands for the South Fork Water Board (SFWB). This graph indicates that SFWB may have a relative surplus of water rights available for beneficial use. Should projected demands remain accurate, up to 50-mgd may be available into 2060. Another limiting factor for water rights listed at SFWB is that some permits have PODs high in the watershed on the South Fork of the Clackamas River without operable transmission lines in place. Using these rights would require amending the right and moving the location of the POD down stream. Transfer or amendment of a water right may result in a reduction in the total paper right held by SFWB during the open permitting process.

#### **3.2.4 Regulatory and Legislative Requirements**

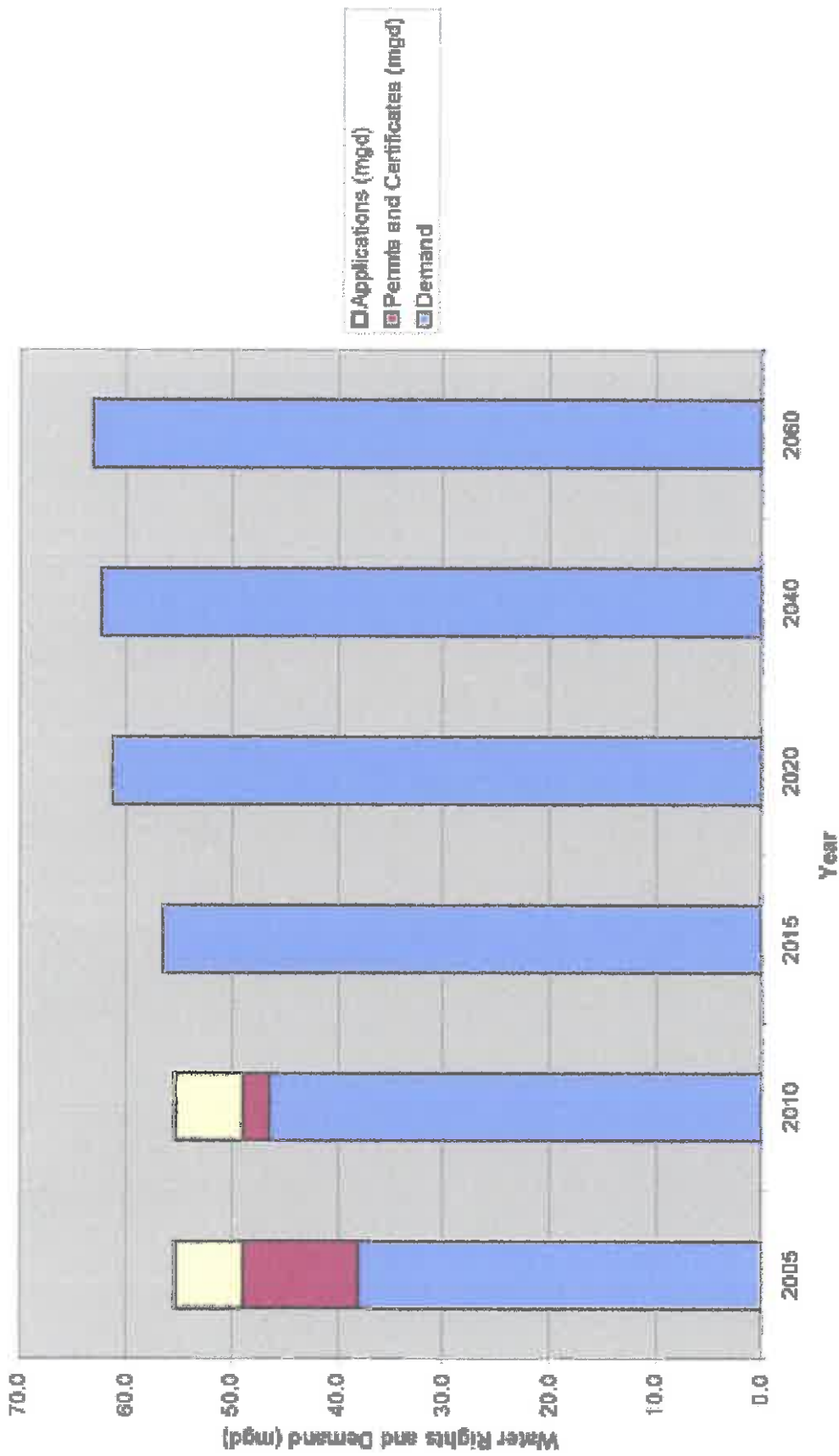
This section presents a brief overview of the origin of House Bill 3038 (HB-3038), how enactment of HB-3038 required amendments to existing statutes (ORS Chapter 537) and Administrative Rules (OAR Chapter 690, Division 315) affecting municipal water rights and extensions thereto, and the impacts of HB-3038 on future water availability to the Cities of Lake Oswego and Tigard.



**Figure 3.1**  
**CLACKAMAS RIVER WATER RIGHT PROFILE OVER TIME**  
 JOINT WATER SUPPLY SYSTEM ANALYSIS  
 CITY OF LAKE OSWEGO AND TIGARD WATER SERVICE AREA

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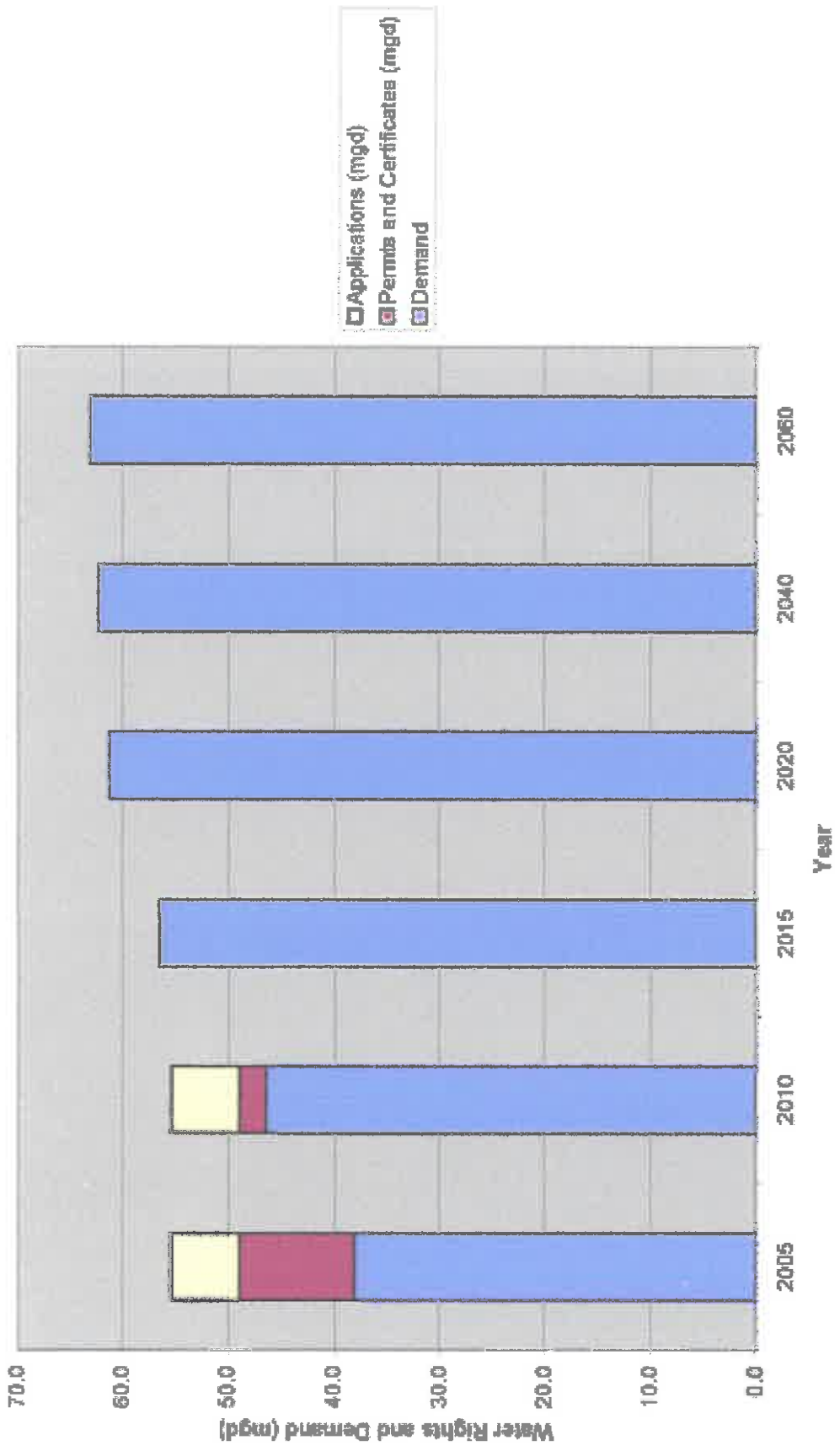


**Figure 3.2**  
**CLACKAMAS RIVER WATER RIGHT PROFILE OVER TIME**  
**JOINT WATER SUPPLY SYSTEM ANALYSIS**  
**CITY OF LAKE OSWEGO AND TIGARD WATER SERVICE AREA**

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**Figure 3.2**  
**NORTH CLACKAMAS COUNTY WATER COMMISSION**  
**WATER RIGHT PROFILE OVER TIME**  
**JOINT WATER SUPPLY SYSTEM ANALYSIS**  
**CITY OF LAKE OSWEGO AND TIGARD WATER SERVICE AREA**

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### The Genesis of HB-3038

In 1997, after considerable review and modification, the Oregon Water Resources Department (OWRD) issued a proposed final order (PFO) approving an application filed by the Coos Bay North Bend (CBNB) Water Board to appropriate 38.7 cubic feet per second (cfs) of water from Tenmile Creek for municipal use. CBNB submitted the application to the OWRD in March 1990. Water Watch protested the PFO on grounds that OWRD erred in issuing the permit alleging the permit was not in the public's interest, the appropriation would harm fish, and the water could not be put to beneficial use within the then statutorily required five year time period. Subsequent to contested case hearings and a petition by Water Watch to the Oregon Court of Appeals for judicial review, the appellate court reversed the final order issued by the Oregon Water Resources Commission approving the permit. In 2004, the parties filed petitions for review with the Oregon Supreme Court. In response to the appellate courts decision, HB-3038 became law. Subsequent to the enactment of HB-3038 and pursuant to a 2006 settlement agreement, CBNB was issued a final order authorizing a maximum withdrawal rate of 23 cfs.

HB-3038 was an attempt at a legislative fix to define the term "construction" as it applied to the development for beneficial use of waters of the state and to recognize the lengthy timelines by which municipal water works are planned for, permitted, designed, and constructed in order to apply water authorized in municipal permits to use. In the waning days of the 2005 legislative session, negotiations between a coalition of municipal water utilities and environmental interests resulted in an expansion of the five year construction window to a 20 year time frame. However, to garner support for the bill from environmental interests, a fish protection provision was added that now, in application of the new rules to municipal extensions, appears to create a new in-stream water right that takes precedence over other more senior permits and thus turns western water law on its head.

### HB-3038 in Application

To implement the legislature's intent behind HB-3038, ORS Chapter 537 "Appropriation of Water Generally" and OAR Chapter 690, Division 315 "Water Rights Extensions" were revised. The revised statutes and rules require that all municipal permit extensions be conditioned to require a water management and conservation plan (WMCP) prior to diverting water beyond the maximum amount beneficially used by the municipality at the time of application for the extension. For the first extension issued after June 29, 2005 for a permit for municipal use issued before November 2, 1998, HB-3038 requires the Department to condition the undeveloped portion of the permit to maintain the persistence of listed fish species. ORS 537 also mandates the following additional conditions on municipal water rights:

- New municipal water right permits will be conditioned to require dirt and shovel type construction to begin within 20 years of permit issuance. Final Orders approving a Water right certificate, permit or extension of time issued prior to the effective date

of the act would not be subject to challenge with respect to the time to commence or complete construction.

- Future municipal water right extensions will be subject to a one-time evaluation (by ODFW) as to whether future use of undeveloped portions of a water right not currently put to beneficial use by the permit holder will “maintain the persistence of listed fish species in portions of waterways affected by water use under the permit”. If it is found that use of the undeveloped portion of the permit will not “maintain persistence of listed fish species”, it can be conditioned to do so.
- Municipal water right extensions granted by the department will be conditioned to place a “hold” on any water granted under the permit but not yet put to beneficial use by the permit holder. Water can be freed for use, or “green-lighted” if municipalities show need for further water diversion / appropriation after having worked toward freeing up water through conservation (i.e., by implementing an approved WMCP).

#### Impacts of “Persistence” Standard on Additional Diversions

Pursuant to OAR 690-315-0080, the OWRD in evaluating an application for an extension, is required to seek the advice of the Oregon Department of Fish and Wildlife (ODFW) regarding the effect of further withdrawals on the persistence of listed fish species. The ODFW is expressly limited to use of existing data in support of its persistence determination. With regard to extension applications filed on the Clackamas River, including Lake Oswego’s, the ODFW is relying on a biological survey conducted in 1964 in the upper reaches of the Clackamas River basin. This report was the basis for ODFW to recently make its determination that current in-stream water rights are insufficient to maintain the persistence of fish and thus is advising OWRD that increased minimum flows are needed to preserve fish populations.<sup>1</sup> With this advice, OWRD is required to condition permit extensions in such a way as to satisfy the ODFW that proposed new minimum fish flows will be maintained in the river as a means of ensuring the persistence standard will be met.

In response to this new fish flow threshold, the Clackamas Water Providers commissioned Portland State University to conduct extensive modeling<sup>2</sup> of the lower portion of the Clackamas River system. In general, the results of the modeling indicate that in typical weather years, daily average stream flows are sufficient to meet the needs of municipalities and maintain the proposed new minimum fish flows. This is due to two factors: 1) The timing of the City’s peak demands, which typically occur in July or August, as compared to

<sup>1</sup> Certificate S-59491, dated August 26, 1968 established an in-stream water right of 400 cfs (May through September 15) increasing to 640 cfs (September 16 through April). Current ODFW advice based upon a 1964 biological survey proposes minimum fish flows of 650 cfs (May through Labor Day) increasing to 800 cfs (day after Labor Day through April).

<sup>2</sup> “Lower Clackamas River Model: Model Development, Calibration, Scenarios, Executive Summary, and Hydrodynamics,” Water Quality Research Group, Department of Civil and Environmental Engineering, Technical Report EWR-01-06-ES, October 2006.

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the timing of typical low stream flows, which occurs in late August or September, and 2) Flow releases from Timothy Lake, which are managed through an intergovernmental agreement between the Clackamas River Water Providers (including Lake Oswego) and Portland General Electric. However, going forward, as growth in the basin continues, and weather patterns vary from average conditions, there will likely be occasions when access to water may be restricted to ensure sufficient water is left in the river to support listed fish stocks.

For example:

- Under existing withdrawal conditions and average stream flow conditions (data collected from 2000-2005) with releases from Timothy Lake and using the higher fish flows recommended by the ODFW, the model indicates that Lake Oswego and other municipal water providers on the river would not need to reduce their withdrawals to maintain minimum fish flows.
- At the other extreme, assuming all current permittees are fully using their permitted diversions and an extremely low water year occurs (for example, 2005 was statistically a year of extremely low flows relative to 100-years of record keeping), then it is possible that Lake Oswego would have to reduce its diversions by 12 percent (4.1 cfs/2.6 mgd) for up to 40 days, with as much as an 18 percent (6.1 cfs/3.9 mgd) reduction over a one day period, even with releases from Timothy Lake.<sup>3</sup>

The consequences of the persistence standard established by HB-3038 and the proposed new fish flows determined necessary by the ODFW to maintain persistence creates some uncertainty as to future water availability under a joint water supply partnership. The development of all undeveloped water in Lake Oswego's Clackamas River permits (34 cfs/22 mgd), (for example implementation of Scenario 4 by 2016), will create an immediate weather dependent uncertainty of peak season supply. While other Clackamas River municipal providers with remaining undeveloped permits might experience a "paper loss" in access to water during times of shortage, Lake Oswego and Tigard's loss would, by contrast, be "wet". However, this uncertainty in availability and potential loss of water can be mitigated in a variety of ways including:

- Effective, sustained conservation programs. A 0.5% reduction in per capita water use per year over an 11-year period could potentially reduce peak day consumption in Lake Oswego by more than 1.3 mgd. More aggressive conservation targets could further reduce risks of shortages.
- Securing agreements to access other sources of supply. Purchase of water from the Willamette River, Trask River, and/or Bull Run systems present opportunities to mitigate

<sup>3</sup> This "worst case" scenario assumes maximum use of all permitted rights combined with a statistically infrequent prolonged, dry weather pattern. Also, this scenario does not reflect that total future build-out water demands for all Clackamas Basin providers could be satisfied with 60% of all water allowed for use under all permitted rights. It should be noted that if the current CRW applications for 96 mgd are not permitted, the build-out demand projections will be 90 percent of the maximum municipal water rights on the Clackamas River.

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potential shortages in the Clackamas River and increase water supply reliability for both cities. Both Lake Oswego and Tigard hold permits to withdraw water from the Willamette River in quantities sufficient to offset any shortage of water from the Clackamas River. The City of Wilsonville's use of the Willamette River as its primary source of drinking water over the last five years demonstrates it is a viable source of water supply.

- The South Fork Water Board holds permits on the Clackamas River well in excess of its forecasted build-out water demand. Oregon water law allows multiple points of diversion and thus some amount of unused water under the SFWB permit could be transferred to Lake Oswego's intake for diversion and use by Lake Oswego or Tigard in times of shortage.

How this potential future water availability uncertainty is managed between the parties of a joint water supply entity is a subject that will need to be addressed in any partnership agreement.

#### **Water Management and Conservation Plan**

Within three years of receiving a water right extension, the municipality must complete the water development or submit a Water Management and Conservation Plan (WMCP) to show how the additional water use is necessary and reasonable. It should be noted that should a partnership be developed between the Cities of Lake Oswego and Tigard, each City would need to update their WMCPs to address the additional demands.

An important consideration for managing the process is that once the plan is approved by OWRD, the file requires progress reports at the indicated (usually 5-year) intervals. Even though they are not formally reviewed or approved, these progress reports are taken into consideration when a municipality asks to use more water under their permit (i.e., the OWRD looks at progress made in conserving water before authorizing more "green light" water to a municipality). Once the water is green lighted and the project is complete, a claim of beneficial use report can be filed to perfect the right. Municipal water providers should be especially careful when completing claims of beneficial use on PODs with multiple water rights, so as to not limit the usefulness of junior water rights at the POD.

#### **OWRD Policy for Municipal Perfection**

The OWRD issued a policy statement (OWRD, 2002) that provides guidelines for perfecting municipal water rights. The policy allows the perfection of a permit to the full capacity of the water system or the limit of the permit, whichever is less. Any such perfection in combination with one or more additional permits is allowed. In the case of multiple permits, each permit, if sufficient in capacity, can be perfected to the full capacity of the water system. However, each certificate subsequent to the first, will be conditioned such that the rate of the permit or combination of permits will allow only the diversion of water that the system can put to beneficial use. With this approach, effective water right rates would be

limited to the capacity of the water system at the time the permits are perfected into certificates.

Under this policy guideline, the strategy presented in this document seeks to maintain the flexibility of water rights for long-term planning while increasing the portion of water under certification. The perfection of permits to certificates, under this policy, requires permit holders to balance the flexibility of a permit, which can be amended and transferred without loss of capacity, with the strength and rigidity of a certificate which is permanent and less flexible. This balance includes optimizing the amount of the water right retained as a permit with the capacity that can be partially perfected based on current use and capacity of the POD. This strategy also includes avoiding over-certification at any one POD, which can diminish the value of junior water rights.

As an example, this policy would allow a water system that can prove 30 cubic feet per second (cfs) of beneficial use to perfect three permits (permits X, Y, and Z) of 30 cfs each at the same point of diversion (POD). Although each of the individual permits may allow the development of 30 cfs, for a total of 90 cfs, all three permits would be conditioned such that no more than 30 cfs could be diverted at any one time under permits X, Y, and Z, as an individual certificate or in combination. This results in the certificated portion of each permit being limited to 10 cfs, which is only one third of the authorized amount.

Once the permit is perfected into a certificate of beneficial use, the limiting conditions would remain in affect, even if the certificate were transferred to a different POD. A transfer of any of the certificates (X, Y, or Z) to allow the operation of an additional 30 cfs POD would be considered by OWRD as an illegal enlargement of the certificate. This type of transfer would only be allowed if production at the original POD was discontinued or reduced by the same amount as was diverted to the second POD. This is an example of over certification that can occur at a municipal POD.

These certificate conditions would effectively limit the permits to a total of 30 cfs in combination, down from the intended 90 cfs of the original permits. The oldest priority date would then determine the order of water use in times of limited water availability. For this reason, certification of additional water rights beyond the capacity of the water system's beneficial use at a POD is not recommended. Over certification may cause excess junior certificates to become water rights on paper only, with little retained value. These junior certificates could not be utilized while the senior water right demand was serviced to the capacity of the system.

A permit holder may retain the flexibility and value of junior water rights by amending the permits to use a POD with available capacity and by completing partial perfection. If a junior permit lists an additional POD that does not have associated senior rights then a partial perfection has the advantage of using the beneficial use of more than one POD. This is an advantage because portions of the permit perfected at POD "Y" as a junior right and at POD "Z" as a senior right will not be shown on the certificate as separate distinct rates for each POD. The certificate will only show the full amount of the beneficial use and indicate

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that both PODs are options for use of the certificate. An example of this advantage is that if a permit were partially perfected for 50 percent on POD "Y" and 50 percent on POD "X," the full perfected use could be made wholly at either POD without showing 100 percent proof at either location. However, the certificate would still be limited to the total beneficial use of the combined PODs.

### **3.2.5 Opportunities for Additional Water Rights**

The downstream position of Lake Oswego's POD is an advantage on the Clackamas River. The downstream position allows upstream water right holders to more readily complete potential transfers of water rights, in-stream leases, or amendments to permits to allow additional uses by Lake Oswego at its POD. The downstream position is important because any movement of water rights must hold other senior water rights harmless and be in the public interest. Keeping additional water in the river and diverting it further downstream is beneficial to the public interest and to water right holders along the reach of the transfer. This provides the river with more cold water for fish in the higher reaches, and does not have the potential to impact other PODs with lower flows.

Lake Oswego has several options to explore. The water right analysis completed in Section 3.2.3 suggests that the SFWB permits and the CRW applications for junior water rights on the Clackamas could conceivably be used to provide additional water to meet the future demands of the combined Lake Oswego and Tigard service area. It should be noted that the status of the CRW junior water rights application is uncertain, and subject to the approval of OWRD.

#### **Clackamas River Water**

CRW holds two large applications (S80438 and S80465 for a total of 96.23 mgd) and has entered into agreements to share these applications with other providers on the Clackamas. However, there are limitations to these applications. Insufficient live flow in the Clackamas requires that these applications be partially met with stored water releases from Timothy Lake. Stored water may not be available at all times of the year. Use of these applications will also require significant coordination with other water users and close monitoring of the river flow to meet the conditions of a permit issued on these applications.

#### **South Fork Water Board**

The South Fork Water Board (SFWB) holds a total of 74.98 mgd in permits and certificates. These water rights are senior to the Clackamas River in-stream water rights and many of the other water rights on the Clackamas River.

Demand projections for SFWB service area suggest that a maximum day demand of approximately 25 mgd is anticipated at build out. SFWB also services several water supply contracts. The predominant contract includes service to Clackamas River Water - South (CRW-S), formerly the Claremont Water District. Should SFWB continue service to CRW-S

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the anticipated demand for this area is 17 mgd by 2060, resulting in a total build-out demand of 42 mgd.

SFWB's total water right holding may also be further diminished by a history limited beneficial use of water rights high in the watershed on the South Fork of the Clackamas River and Memloose Creek (Permits S3778 and S9982). However, the degree of the impact is not clear and a full-winter month allocation may be preserved.

Assuming SFWB maintains the use of Permits S3778 and S9982 and continues to service CRW-S, approximately 32 mgd will be available to meet increased demands within the SFWB service area and for potential agreements that would allow service to others, including Lake Oswego and Tigard.

### **3.2.6 Proposed Course of Action**

Lake Oswego's existing water rights on the Clackamas River (up to 38 mgd) appear to be sufficient to meet demands identified in Chapter 1. It is recommended that Lake Oswego continue to work with other Clackamas River water providers to maximize the protection of these existing rights. In the event that Lake Oswego and Tigard reach an agreement to provide additional water service to Tigard using Lake Oswego's existing water rights, it is further recommended that Lake Oswego update its Water Management and Conservation plan and document perfection of these rights as described in Section 3.2.4.

Options to obtain additional water rights to meet Lake Oswego and Tigard's future need in excess of Lake Oswego's existing rights are available. SFWB has the capacity to meet additional demands through existing water rights. If additional rights are desired, it is recommended Lake Oswego and Tigard develop a water right sharing proposal for each facility to consider, and begin developing a framework for a long-term strategy to partner with one or more water providers.

### **3.2.7 Alternative Options**

#### **Aquifer Storage and Recovery**

A regional aquifer storage and recovery (ASR) network could allow water to be diverted in high flow winter months for use later in the year. The winter water could be treated and distributed to key geographically located ASR wells and stored until the peak demands of summer occur. ASR technology has been used throughout the Northwest to provide solutions to many drinking water management issues including:

- Maintaining and proving up surface water rights.
- Mitigating overdrawn aquifers and restoring natural groundwater levels.
- Restoring summer base flow to temperature impacted streams.
- Meeting peak system demands during critical surface water low-flow months.



- Optimizing the necessary treatment plant capacity by storing treated water during winter months and pumping the stored water to local distribution during high demand months. This use can supplement the demand on the treatment facilities and delay or eliminate some treatment plant expansions.

ASR may also be used to treat groundwater quality issues and reduce undesirable water quality constituents including iron and manganese. Fluoride concentrations may also be managed through displacement of native groundwater high in fluoride with injected treated drinking water that has little or no fluoride concentration.

### **3.3 LOCAL LAND USE PERMITTING STRATEGY**

#### **3.3.1 City of Gladstone**

Lake Oswego has a raw water intake and pump station structure located on land owned by the State of Oregon within ordinary high water of the Clackamas River and zoned C2 (Community Commercial) with a WQ (Water Quality Resource Area) overlay. Once leaving the intake site, the conveyance pipe is located within public street rights-of-way that pass through the R-5 (Single Family Residential), MR (Multi-Family Residential) and C-3 (General Commercial) districts, until reaching Meldrum Bar Park – zoned OS (Open Space). The raw water pipe then crosses the GW (Greenway Conditional Use) overlay district before crossing the Willamette River to West Linn. Expansion of existing water facilities may also be subject to design review. (GMC Chapter 17.80, Design Review) Since water facilities are located within the 100-year floodplain, they must be constructed consistent with floodplain standards of GMC Chapter 17.29.020.

#### **Applicable Gladstone Base Zones and Overlay Zones**

Table 3.5 lists the Gladstone zoning districts that control reconstruction of Lake Oswego's raw water intake and conveyance system.

#### **Gladstone Permitting Strategy**

Permitting Strategy Summary:

- Confirm / Revise Winterbrook Planning observations by meetings with Gladstone planning staff. Focus on reconstruction of water intake and pumping facilities (Clackamas River and WQ district) and Meldrum Bar Park (OS, WR and WQ Districts). Determine whether improvements within public right-of-way are subject to conditional use review.
- Request "pre-application conference" to develop consolidated permitting approach (i.e., view as a single project on a city-wide "site").
- Consolidate applications for water system reconstruction: conditional use permits, Willamette Greenway review, Water Quality district overlay standards, floodplain development standards, and design review.

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- This approach (if acceptable to the city) will allow for alternatives analysis, environmental and neighborhood impacts, and appropriate mitigation programs to be considered on a city-wide basis.
- Coordinate with Public Works regarding water conveyance system improvements within public rights-of-way.

<b>Table 3.5 Applicable Gladstone Zoning Districts Joint Water Supply System Analysis City of Lake Oswego and Tigard Water Service Area</b>				
<b>Water Facility</b>	<b>Zone / Overlay</b>	<b>Permitted Use</b>	<b>Conditional Use Permit</b>	<b>Comment</b>
Intake Well; Pump	C-2/	"Utility facility" (17.18.020)		Reconstruction of utility facilities permitted in WQ overlay zone if disturbance area restored with native vegetation.
	WQ	17.27.040(2)(a)		
Raw water pipe	R-5		"Utility facility" (17.12.040(9))	Not clear if CUP required when reconstruction of utility facilities occurs within public ROW.
Raw water pipe	C-3	"Utility facility" (17.20.020)		
Raw water pipe	MR		"Utility facility" (17.14.040(7))	Not clear if CUP required when reconstruction of utility facilities occurs within public ROW.
Raw water pipe	OS/	Not listed	Not listed	Not clear if CUP required when reconstruction of utility facilities occurs within public ROW.
	WQ/	Permitted 17.27.040(2)(a)		Reconstruction permitted in WQ overlay zone if disturbance area restored with native vegetation.
	GW	Permitted* if "Committed to Urban Use" 17.28.040(1)		If use existed in 1975, then "Committed to Urban Use" and subject to 17.28.040(1) and 17.28.050 standards.

Note: City of Gladstone interpretation required, since *not* a listed use. May be deemed a "non-conforming use," but this is unlikely since other public facilities (streets, water, sewer) exist in park but are not listed in OS district.

### 3.3.2 City of West Linn

There are two alternative locations for the reconstructed raw water pipe as it crosses the Willamette River before entering the City of West Linn (West Linn):

1. The existing route enters West Linn immediately west of Mary S. Young State Park and passes through the park before connecting with Nixon Avenue.

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2. A more direct route crosses the Willamette River diagonally and enters West Linn at the west end of Mary S. Young State Park and continues on the same route along Nixon Avenue.

Both routes would pass through the city's R-10 residential zone, as well as the Willamette River Greenway (WRG) and Wetland and Riparian Area Protection (WRA) overlay zones, before reaching the Kenthorpe Road WTP. Both routes avoid Cedar Island Park and associated limitations on nonauthorized uses, such as "siting of facilities that are not directly required for the park's use" in city-owned open space.<sup>4</sup> The capacity of the WTP must be increased; however, this can occur on the existing site – rather than expanding on to three residential lots owned by the city of Lake Oswego to the west.

Treated water is piped from the WTP within the Kenthorpe Road and Cedar Oak public rights-of-way that passes through the R-10 (Single Family Residential).

### Applicable West Linn Base Zones and Overlay Zones

Table 3.6 lists the West Linn zoning districts that control reconstruction of Lake Oswego's raw water pipes, WTP capacity increase, and treated water conveyance system. The following definitions (WLMC 03.030) are important in determining whether reconstruction of water facilities in certain zones is a "permitted" or "conditional" use:

**Utilities.** Services and utilities which can have substantial visual impact on an area. Such uses may be permitted in any zoning district when the public interest supercedes the usual limitations placed on land use and transcends the usual restraints of the district for reasons of necessary location and community-wide interest. There are two classes of utilities—major and minor.

**Utility, major.** A utility which may have a significant impact on the surrounding uses or the community in terms of generating traffic or creating noise or visual effects and includes

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<sup>4</sup> Chapter XI of the City Charter, reads (in relevant part) as follows:

*(a) The City shall not engage in the lease, sale, exchange or nonauthorized use of City owned park or open space without first receiving voter approval for such lease, sale, exchange or nonauthorized use. Such approval shall consist of a majority of votes cast at a regularly scheduled election in favor of a specific proposal for a lease, sale, exchange or nonauthorized use of City owned park or open space. (b) For the purposes of this section the term "nonauthorized use" shall have the following meanings: (1) A nonauthorized use for a City owned park shall be the siting or construction of facilities that are not directly required for the park's use. \* \* \* (2) A nonauthorized use for a City owned open space shall be the siting or construction of facilities that are not directly required for the maintenance of the open space or use of said open space as open space. (c) For the purposes of the above section the term "open space" shall be defined as City-owned real estate identified in documents adopted or accepted by the City Council or authorized City official as "open space," "green space," "wetland," "drainageway," (excluding city owned roadside drainages), "wildlife habitat" and "stream corridor." Property with the above designations that is not owned by the City shall be exempt from the provisions of this section. (d) This section shall apply to all City-owned park or open space as of the adoption of this section, as well as all park and open space coming into the City's ownership after the adoption of this section."*

utility, substation, pump station, water storage tank, sewer plant, or other similar use essential for the proper function of the community. (1408).

**Utility, minor.** A utility which has a minor impact on the surrounding uses or on the community in terms of generating traffic or creating noise or visual effects and includes the overhead or underground electric, telephone or cable television poles and wires, the underground gas and water distribution systems and the drainage or sewerage collection systems or other similar use essential for the proper functioning of the community."

From the definitions above, it would appear that the WTP and pump station qualify as a "major utility" and that the water pipes qualify as a "minor utility."

<b>Table 3.6 Applicable West Linn Zoning Districts Joint Water Supply System Analysis City of Lake Oswego and Tigard Water Service Area</b>				
<b>Water Facility</b>	<b>Zone</b>	<b>Permitted Use</b>	<b>Conditional Use Permit</b>	<b>Comment</b>
Raw / treated water pipe	R-10	"minor utilities" (03.030)		Public Works construction permits required within ROW.
WTP	R-10		"major utilities" (03.030)	
Treated water pipe	CG	"minor utilities" (03.030)		Public Works construction permits required within ROW.
Treated water pipe	R-10	"minor utilities" (03.030)	"major utilities" (03.030)	
Raw water pipe	WRG	Exempt (28.030(D))		"D. Addition or modification by public utilities for existing utility lines"
Raw water pipe	WRA	Permitted (30.030(B)) "Intensifications of existing uses or activities" (30.030(C)(8))		"B. All uses permitted under the provisions of the underlying base zone ... However, the amount and placement of uses and activities may be limited to conform with the requirements of this chapter."

**West Linn Permitting Strategy**

**Permitting Strategy Summary:**

- Confirm / Revise Winterbrook Planning observations by meeting with West Linn planning staff.

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- The City of West Linn is considering adoption of a new Open Space (OS) district that would be applied primarily to publicly-owned parks. Mary S. Young State Park is currently zoned R-10 (which allows improvements to water lines outright). It is recommended that the OS adoption process be followed closely to ensure that reconstruction of water lines remains a permitted use within the OS district.
- Request “pre-application conference” to develop consolidated permitting approach.
- Consolidate applications for water system reconstruction by jurisdiction: conditional use permits, Willamette River Greenway, Wetland and Riparian Area Protection overlay standards and mitigation, and floodplain development standards.
- This approach (if acceptable to the city) will allow for alternatives analysis, environmental and neighborhood impacts, and appropriate mitigation programs to be considered on a city-wide basis.
- Coordinate with Public Works regarding water conveyance system improvements within public rights-of-way.

### 3.3.3 City of Lake Oswego

The water pipe crosses from West Linn into Lake Oswego beneath Pacific Highway at the southeast corner of Marylhurst University. The water pipe passes through and/ or adjacent to areas zoned for R-10 (residential) and CI (campus), following the highway until just south of Oswego Creek. The Oswego Creek corridor is protected by the City’s Sensitive Lands Overlay District (RC, RP-I, W-29).

North of the creek, the pipeline once again follows public streets, including North Shore Road as it crosses Lakewood Bay. From the north shore of Lakewood Bay, the pipeline continues to generally follow street rights-of-way, through various residential and commercial zones, as noted in Table 3.7. The pipeline crosses through the Lake Oswego Hunt Club, entering via Iron Mountain Boulevard on the southern edge of the Hunt Club and exiting onto Brookside Road on the eastern edge of the Hunt Club.

At East Waluga Park, the pipeline enters from the east via Douglas Way and reaches the Waluga Reservoir at the northern edge of the Park. Here another Sensitive Lands area is crossed (Tree Grove (-6/ RC). From the reservoir, the pipeline crosses land zoned residential and a third Sensitive Lands area (1B-3), before connecting to Carmen Drive. The pipeline follows Carmen Drive to Bonita Drive, through land zoned residential and commercial.

The pipeline continues through a small section of unincorporated Clackamas County before entering Tigard.

#### Applicable Lake Oswego Base Zones and Overlay Zones

Table 3.7 lists the Lake Oswego zoning districts that control reconstruction of Lake Oswego’s finished water transmission system. The following definitions (50.02.005) are

important in determining whether reconstruction of water facilities in certain zones is a "permitted" or "conditional" use:

<b>Table 3.7 Applicable Lake Oswego Zoning Districts Joint Water Supply System Analysis City of Lake Oswego and Tigard Water Service Area</b>				
<b>Water Facility</b>	<b>Zone</b>	<b>Permitted Use</b>	<b>Conditional Use Permit</b>	<b>Comment</b>
Treated water pipe	R-0	Minor Public Facility (50.06.010(3))		
Treated water pipe	R-7.5	Minor Public Facility (50.08.010 (6))		
Treated water pipe	R-10	Minor Public Facility (50.08.010 (6))		
Treated water pipe	R-15	Minor Public Facility (50.08.010 (6))		
Treated water pipe	DD	Minor Public Facility (50.09.010(7))		
Treated water pipe	EC	Minor Public Facility (50.11.010(14b))		
Treated water pipe	CI	Minor Public Facility (50.12.015(12))		
Raw/ treated water pipe	GC	Minor Public Facility (50.11.010(14b))		
Raw/ treated water pipe	MC	Minor Public Facility (50.11.010(14b))		
Treated water pipe, <b>Waluga Reservoir</b>	PF	Minor Public Facility (50.13A.010(2))	<b>Major public facility</b>	Conditional use may be required if Waluga Reservoir to be expanded
Treated water pipe	CR&D	Minor Public Facility (50.11.010(14b))		
Treated water pipe	Sensitive Lands (RP, RC) in ROW	Permitted as "existing utility" in ROW. (50.16.015(3))		Permitted if work is contained in ROW and staging areas are not in Sensitive Lands overlay zone (e.g., in George Rogers Park, if bore pits are outside of RC and RP zones). Otherwise, a sensitive lands development review may be required.
Raw/ treated water pipe	Sensitive Lands (RP, RC) Not in ROW	Permitted as existing utility. (50.16.015(3))		The pipeline is an existing utility and as such is permitted, subject to mitigation measures, as well as state and federal permits.

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Public Facility, Minor. The following public service improvements or structures developed by or for a public agency:

- Minor utility structures, except substations, but including poles, lines, pipes, telecommunications facilities or other such facilities.
- Sewer, storm drainage, or water system structures except treatment plants, reservoirs, or trunk lines, but including reconstruction of existing facilities, pump stations, manholes, valves, hydrants or other portions of the collection, treatment and distribution systems located within public property.”

Guidelines for working in Sensitive Lands areas:

- Expansion of utility is permitted in Sensitive Lands Overlay Zones that are in ROW. Plan must demonstrate that staging area is not in SL, and that all work is in ROW.
- Expansion of utility is permitted in Sensitive Lands Overlay Zones not in ROW (specifically Oswego Creek). City requires grading and erosion control plan and that methods for minimizing impacts to Oswego Creek (or other relevant Sensitive Lands) are defined. Included in requirements is staking top of creek banks and illustrating this in buffer.
- Federal and state permits are required from the Department of State Lands and the US Army Corp of Engineers (see State and Federal Permitting memo).

#### Lake Oswego Permitting Strategy

Permitting Strategy Summary:

- Confirm / Revise Winterbrook Planning observations by meetings with Lake Oswego planning staff. Focus on Sensitive Lands: Oswego Creek, East Waluga Park, and area immediately north of Waluga Reservoir. Also, determine if expansion of Waluga Reservoir is necessary.
- Request “pre-application conference” to develop consolidated permitting approach.
- Consolidate applications for water system reconstruction by jurisdiction: conditional use permits and Sensitive Lands development permits.
- Coordinate with Lake Oswego City Council to review alternatives analysis, environmental and neighborhood impacts, and identify appropriate mitigation programs to be considered on a city-wide basis.
- Coordinate with Public Works regarding water conveyance system improvements within public rights-of-way.

#### **3.3.4 City of Tigard**

The pipeline enters Tigard via Bonita Road, passing beneath Interstate-5. It accesses the Bonita pump station just east of Sequoia Road. The pipeline continues past the Bonita

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pump station approximately 1000 feet and terminates just west of 72<sup>nd</sup> Ave. The zoning for this entire area is Light Industrial (I-L), and the pipeline runs along public streets.

**Applicable Tigard Base Zones and Overlay Zones**

Table 3.8 lists the Tigard zoning districts that control reconstruction of Tigard’s conveyance system and pump station upgrade.

<b>Table 3.8 Applicable Tigard Zoning Districts Joint Water Supply System Analysis City of Lake Oswego and Tigard Water Service Area</b>				
<b>Water Facility</b>	<b>Zone</b>	<b>Permitted Use</b>	<b>Conditional Use Permit</b>	<b>Comment</b>
Treated water pipe	I-L		Basic utility (18.530.1)	Pipe runs along public streets and is likely permitted use – confirm with City.
Bonita Pump Station	I-L		Basic utility (18.530.1)	

**Tigard Permitting Strategy**

Permitting Strategy Summary:

- Confirm / Revise Winterbrook Planning observations by meetings with Tigard planning staff. Focus on conditional use requirements for enlarging Bonita Pump Station.
- Coordinate with Public Works regarding water conveyance system improvements within public rights-of-way.

**3.3.5 Overall Permitting Strategy**

At the local level, the project will require conditional use and related land use permits for major facility improvements (i.e., pump stations, treatment plant). The broader strategy for local permits includes the following steps:

- Confirmation of project alignment and construction methods (most permits can be obtained beginning at the 60% design stage).
- Follow-up with City staff on code interpretation questions (as identified above).
- Schedule pre-application conferences with each City to jointly develop consolidated permitting approach.
- Coordinate the local land use review timelines so that the four jurisdictions can be processing applications concurrently.

A well-planned, coordinated local permit strategy could result in permit approvals within a four to six month period (from acceptance of “complete application” packages by each jurisdiction).

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## 3.4 STATE AND FEDERAL PERMITTING STRATEGY

### 3.4.1 Federal Permits

This project is expected to require federal permits from the U.S. Army Corps of Engineers and consultation with NOAA Fisheries and US Fish and Wildlife Services. National Pollutant Discharge Elimination System (NPDES) permits (i.e., the 1200-C permit) are administered through the Oregon Department of Environmental Quality (see State Permits). Permits are also required from the Union Pacific Railroad Company (a quasi-federal agency) for crossings or encroachments along their tracks.

#### U.S. Army Corps of Engineers (in consultation with NOAA Fisheries, US Fish and Wildlife Service)

Project construction work below the ordinary high water mark of the Willamette and Clackamas Rivers, and within other waters and wetlands, will trigger federal permits under the Federal Clean Water Act (Section 404) and/or River and Harbors Act (Section 10). A Section 404 permit is required for activities that may impact jurisdictional wetlands or waters, either directly (e.g., through filling) or indirectly (e.g., through materials staging). In addition to rivers, this permit applies to any work within other jurisdictional waters or wetlands along the project corridor. The U.S. Army Corps of Engineers (USACE) issues Section 404 permits in conjunction with the Oregon Department of State Lands Removal/Fill permits (see State Permits). Section 10 (Rivers and Harbors Act) regulates work in navigable or tidal waters (Willamette and Clackamas Rivers) including fills and in-water construction.

In addition, Section 7 of the Endangered Species Act (ESA) requires all federal agencies to insure that any actions they authorize are not likely to jeopardize a listed species or adversely modify its critical habitat. Consultation with the National Oceanic and Atmospheric Administration National Marine Fisheries Service (NOAA Fisheries, formerly known as NMFS) and U.S. Fish and Wildlife Service (USFWS) may be required for actions potentially affecting listed, proposed, or candidate species.<sup>5</sup> Generally, a Biological Assessment would be required to evaluate the potential effects of the proposed action on identified listed or candidate species (e.g., salmonids, bald eagle).

#### 3.4.1.1.1 *Applicability*

Based on a review of preliminary plans of the project alignment, a Section 404 permit, Section 10 permit, and/or Section 7 consultation, will be required for work on several key project elements. These elements include:

- Upgrades to the Clackamas River Intake facility (pump station replacement and new intake pipes, if required).

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<sup>5</sup> Generally, NOAA Fisheries has oversight over fish while USFWS reviews terrestrial species impacts.

- Willamette River crossing, related bore pit construction, and connecting pipeline along river edge (within Ordinary High Water line or adjacent wetlands).
- Bore pit construction for Oswego Creek crossing (if fill or removal within stream OHW mark or stream-associated wetland).
- Bore pit construction for Oswego Lake crossing (if fill or removal within OHW mark).
- Other jurisdictional wetlands or water bodies that may be impacted during the water system construction process.

#### 3.4.1.1.2 *Planning Considerations*

NOAA Fisheries has prepared a programmatic biological opinion, the Standard Local Operating Procedures for Endangered Species (SLOPES), which may allow certain utility-related activities and other minor impacts to be approved by the USACE without the need for Section 7 consultation. However, construction of water lines to support a new or expanded service area for which effects have not been analyzed under SLOPES are generally not eligible (review of project with NOAA Fisheries staff will be needed to determine eligibility).

Directional drilling and boring and jacking below water or wetland areas are permitted under SLOPES, provided that the associated pits: 1) span the channel migration zone and any associated wetlands, 2) will not damage the river bed or banks, and 3) no spoil material will enter the waterway. However, trenching (as is currently planned along the east bank of the Willamette River south of the bore pit) is generally not eligible under SLOPES.<sup>6</sup> Also to be eligible, stream or river crossings should be perpendicular to the watercourse, or nearly so (the diagonal Willamette River crossing option is another area to be reviewed with NOAA Fisheries). Therefore, prior to implementation of the proposed Willamette River crossing, the status of the permitting and planning requirements should be revisited as part of a preliminary design alternatives analysis to confirm the piping configuration.

Jack and bore or directional drilling construction methods are planned for most water and wetland crossings. This will significantly reduce potential impacts and limit the scope of related permits. However, there are several areas where these methods will not, and perhaps cannot, be used. Such areas warrant focused attention by the design team to review available alternatives that may reduce impacts, and thereby reduce the scope, timeline, and risk associated with required permits. Two such areas are alluded to above: trenching or bore pit construction located within the ordinary high water mark of rivers or streams.

Another area where environmental/permit impacts should be given paramount consideration is the in-water disturbance related to the replacement of the intake pump station and the reconstructed intake on the Clackamas River. For example, the proposal for

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<sup>6</sup> However, it may qualify as a Nationwide 12 Permit (Utility Line Backfill and Bedding) with a streamlined review process.

a screened intake integrated with the pump station on the riverbank would conceptually be far preferable (from a biological and permitting standpoint) to extending multiple intake pipes out into the river. A full individual permit with formal NOAA Fisheries consultation and preparation of Biological Assessments for multiple species can be expected under the latter scenario, whereas streamlined permit options (e.g., SLOPES or Nationwide Permit 12) may be available if the overall in-water impacts can be minimized.

For the Willamette River crossing, the pipeline must be deep enough to maintain navigation within the river's navigation channel. This means that the pipe must be placed below the river dredging depth and deep enough to allow adequate cover to protect the pipe. As Portland recently did with its river crossing for the West Side CSO project<sup>7</sup>, a bathymetric survey of the river bottom along the proposed pipeline corridor should be completed (unless a recent survey is available) so that accurate cross-sections and depths can be determined. This survey will also be useful to set the boundaries of the Submerged Lands Easement that will be required from the Department of State Lands (see State Permits, below).

All "in-water work" (below ordinary high water) must occur within Oregon Department of Fish and Wildlife designated in-water work windows to minimize impacts to listed species. For work in the Clackamas River, this window is relatively short: July 15 to August 31. For the Willamette River, this window is July 1 to October 31 and December 1 to January 31. Both NOAA Fisheries and the USFWS prefer that work in the Willamette occur during the summer/fall in-water work window and avoid the winter in-water work window to lessen potential adverse impacts and avoid higher river flows in the winter. The same constraints would apply for all water crossings, including Oswego Lake and Sucker Creek.

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<sup>7</sup> At the crossing near Swan Island, the USACE required a minimum depth of -55 feet (Columbia River Datum) for pipe placement to maintain navigation in Portland Harbor.

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### **3.4.1.1.3 USACE Permitting Strategy**

The following steps are recommended to address federal permitting related to river, stream and wetland crossings:

- Map the ordinary high water mark along the Clackamas and Willamette Rivers, using elevations and datum obtained from USACE.
- Review design options for intake, bore pits, and in-water trenching with City and design team to set appropriate "weighting" for environmental/permit factors to be used in the alternatives evaluation.
- Conduct a field reconnaissance along the proposed alignment to review the presence and extent of "waters of the U.S.," including wetlands, and habitat for listed or candidate species (e.g., presence of shallow-water habitat for juvenile Chinook salmon, bald eagle habitat); update project maps and permitting strategy as needed.
- Meet with agency staff to review preliminary project plans with updated base maps (containing OHW, wetland limits, etc) and confirm jurisdictional limits and applicable permit processes. If Section 7 consultation will be triggered, discussions should include scope of the Biological Assessment (BA), identification of target species for review, any specific data or issues to address in assessment, and preferred mitigation strategies. Also, identify any other studies that may be required by regulators as part of the evaluation of fish impacts.
- Refine plans and begin preparation of Biological Assessment and other permit-related studies, if needed. Identify questions to be reviewed with team and regulators.
- When preferred options for in-water construction work are selected, design team representatives (including BA author) should plan to conduct a joint meeting and tour of the alignment with representatives from the USACE, NOAA Fisheries, US Fish and Wildlife Services, Department of State Lands, State Marine Board, and other appropriate agencies. The pre-application tour will provide an opportunity to review the alternatives evaluation and measures taken to minimize impacts, ensure that all concerns have been addressed, and lay the groundwork for a coordinated permit review process.

### **Union Pacific Railroad Company**

A utility encroachment permit is required for parallel encroachments and crossings within the Union Pacific Railroad (UPRR) right-of-way. A UPRR line is located on the north side of Oswego Lake in Lake Oswego [per design staff<sup>8</sup>]. Both UPRR encroachments and crossings may be required based on preliminary alignment plans.

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<sup>8</sup> We understand from project engineers that the railway is owned or controlled by Union Pacific. We have not independently verified this.

The UPRR defines an "encroachment" as a pipeline that enters the railroad company's right-of-way and either does not leave the right-of-way or follows along the right-of-way for some distance. A "crossing" is a pipeline that enters the railroad company's trackage from one side of the right-of-way to the other side of the right-of-way in as near a straight line as possible.

Encroachments and crossings have different sets of standards but will generally be covered under a single "encroachment permit," for which requirements can be onerous. Right-of-entry permits for construction work and site investigation are normally issued as part of the encroachment permit. In cases where pre-construction site investigation is planned, a separate right-of-entry permit will be needed. The review process includes determination of areas of potential impact, coordination with the railroad, and submittal of plans and permit application for review.

#### **3.4.1.1.4 *Applicability***

Based on preliminary project maps, the water line will require one UPRR crossing permit and potentially up to two distinct encroachment permits. The crossing is located at North Shore Road and Mulligan Lane. The potential encroachments are located to the east of this location where North Shore Road and the railroad are adjacent and parallel to each other.

#### **3.4.1.1.5 *Planning Considerations***

Parallel encroachments tend to be a greater concern for the railroad than perpendicular crossings. Crossings must be bored beneath the railroad bed (as planned) and normally require casing pipes. Several general requirements apply to parallel encroachments, including the following:

- Encroachments must generally be located along the outer edge of the railroad right-of-way, at least 35 feet from centerline of nearest track.
- The mainline tracks must be kept operational at all times.
- If construction takes place within 25 feet of an active rail, a flagger is required.
- It is possible to perform construction as close as 12 feet to the centerline of a track, but the shoring or shaft must be designed to carry the substantial railroad loading.

#### **3.4.1.1.6 *UPRR Permitting Strategy***

The following permitting strategy is recommended for UPRR:

- Coordination with UPRR can be a long process and should be initiated during the preliminary design phase, as soon as the crossing and encroachment options are well defined.
- Depending of scope of impacts, a trip to UPRR headquarters in Omaha can help to ensure clear communication and expedient permit approval.

- Coordination should continue throughout the pre-design and design phases of the project. The permit application process can take 6 months or more, particularly if long encroachments are planned or late design changes occur.

### **3.4.2 State Permits**

The project will require several different permits from state level regulatory agencies. The Oregon Department of State Lands (DSL) reviews applications for Section 404/Removal/Fill permits concurrently with the USACE. The Oregon Department of Environmental Quality (DEQ) reviews Section 404 permits for compliance with Section 401 Water Quality Certification requirements. The DEQ also issues the National Pollutant Discharge Elimination System (NPDES) #1200-C construction permit, which will be necessary for the project. The Oregon State Historic Preservation Office (SHPO) issues Phase II and III Archaeological permits, which may be necessary if potential cultural resources are identified along the alignment corridor.

At least four other state agencies will have a role in the review of the project though they do not technically issue construction-related permits.

The Oregon State Marine Board consults with DSL during review of Removal/Fill permits for work within boat/recreation activity areas (i.e., Clackamas and Willamette Rivers). They will be looking for potential navigational hazards created by the project, and are likely to pay particular attention to the design of the intake and pump station on the Clackamas River. It will be important to avoid intake pipes, trash protection devices, or other in-water structures that may create hazards, including submerged hazards that become exposed during low water conditions.

The Oregon Department of Fish and Wildlife (ODFW) sets in-water work windows for Oregon rivers and may also provide comment to DSL on the Removal/Fill permit. Currently, as noted above, the in-water work window for the Willamette River is July 1 to October 31 and December 1 to January 31 (the summer/fall window is preferred). For the Clackamas River, the window is July 15 to August 31.

A section of the proposed raw water line passes through Mary S. Young Park in West Linn. This is a state park owned by the Oregon State Parks Department (OSPD). However, the park is managed by the City of West Linn Parks Department and, according to OSPD, the park is subject only to local zoning provisions that may apply to utility construction in the applicable zone.

Finally, the Oregon Health Division (OHD) regulates drinking water quality for the state. These regulations include requirements for lime and carbon dioxide storage and feed systems, solids handling and dewatering facilities, and sodium hypochlorite and chemical system modifications. All OHD requirements are, or will be, addressed as part of the capacity upgrade of the Lake Oswego Water Treatment Plant.

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## Department of State Lands

Under the Oregon Department of State Lands' (DSL) Removal/Fill Law, permits are required for removal or fill of 50 cubic yards or more of material out of or into waters of the state, including wetlands. Work within a river or stream that is designated essential salmonid habitat (ESH), requires a permit regardless of the volume of fill or removal. Both the Clackamas and Willamette Rivers are designated ESH in the area of the proposed project alignment. Similar to USACE, DSL jurisdiction extends to the ordinary high water mark of rivers and streams, and to the boundaries of jurisdictional wetlands.

The Willamette River crossing and other permanent structures within waters of the state will require a Submerged Lands Easement from DSL.

### **3.4.2.1.1 *Applicability***

Based on a review of preliminary plans of the project alignment, Removal/Fill permits will be required for the same project elements identified under USACE Permits, above. These elements include:

- Upgrades to the Clackamas River Intake facility.
- Willamette River crossing, related bore pit construction, and connecting pipeline.
- Other impacted jurisdictional wetlands or water bodies (e.g., along Oswego Creek or Lake Oswego).

### **3.4.2.1.2 *Planning Considerations***

While the Clackamas and Willamette Rivers are designated as essential salmon habitat, Oswego Creek and Lake Oswego are not. Thus, the 50 cubic yard threshold may not apply to fill or removal activities within the OHW mark of these waterbodies.

There are no streamlined review procedures (known as General Authorizations) for utility construction under DSL's Removal/Fill law. Therefore, a full individual permit with a 120 day review period is anticipated for project elements within DSL's jurisdiction.

Like the USACE, DSL will require compensatory mitigation for unavoidable impacts and implementation of best management practices during construction (i.e., construction should occur in a manner that does not adversely affect other resources and uses (e.g., water quality, fish and their habitats, and recreation).

Submerged Lands Easements will require surveys and negotiation. However, this work need not extend beyond the permit review time significantly (90 days if no protest is made).

#### **3.4.2.1.3 DSL Permitting Strategy**

In addition to the strategies recommended for the USACE permit above, the following actions are recommended for DSL:

- Field reconnaissance should address the areas of DSL jurisdiction (i.e., "waters of the State") and required earthwork within these areas, including review of work along Oswego Creek and Lake Oswego.
- Meet with DSL staff to review preliminary project plans with updated base maps (containing OHW, wetland limits, etc) and confirm jurisdictional limits and applicable permit processes.
- When plans are further developed, meet with State Marine Board staff to review any comments they may have, particularly with respect to the Clackamas River intake.
- When preferred options for in-water construction work are selected, include DSL representative in a joint meeting and tour of the alignment with regulatory agencies. The pre-application tour will provide an opportunity to review the alternatives evaluation and measures taken to minimize impacts, ensure that all concerns have been addressed, and lay the groundwork for a coordinated permit review process.

#### **Oregon Department of Transportation**

The Oregon Department of Transportation (ODOT) requires a Street Opening Permit for any surface construction that occurs within the right-of-way of State owned and maintained roadways. Two ODOT roadway crossings are anticipated for this project: Highway 99E (McLoughlin Blvd) and Highway 43 (Willamette Drive).

The Street Opening Permit allows surface cuts, borings under the highway, and other construction methods within the highway right-of-way. The permit process begins with submittal of an Application and Permit to Occupy or Perform Operations upon a State Highway, which will include a set of project plans (including traffic and landscape plans), a narrative describing the project and construction activities, and a description of a settlement monitoring program (where applicable). Any ground improvement work that may be required for the crossings and encroachments should be coordinated with ODOT.

#### **3.4.2.1.4 Applicability**

The preliminary project alignment indicates that two ODOT facilities will be impacted: Highway 99E (McLoughlin Blvd) and Highway 43 (Willamette Drive). At Highway 99E, a perpendicular crossing (jack and bore) occurs at Gloucester Street. At Highway 43, the proposed alignment shows a long section of parallel encroachment from Cedar Oak Road north to George Rogers Park and a crossing at Wilbur Road.



#### **3.4.2.1.5 Planning Considerations**

Primary ODOT concerns are expected to be construction work within ODOT highways, particularly the long encroachment on Highway 43. A major component of the ODOT review will be the traffic control plan (TCP) established for the project, which should be developed in close association with ODOT. Boring is the construction option preferred by ODOT, which is generally consistent with the construction plans for the two highway crossings. ODOT will generally require that disturbed surface areas be restored to pre-existing conditions.

Early coordination will be critical to address any concerns related to the impacts of the Highway 43 work. Review by ODOT normally takes one month once a complete application is submitted. However, the review process is expected to be longer given the scale of this project.

#### **3.4.2.1.6 ODOT Permitting Strategy**

The following strategy is recommended for addressing ODOT permits:

- Review existing utility as-builts, road and landscape conditions within the project impact area.
- Meet with ODOT permitting and technical staff once the preferred alignment is selected, then at 30 percent and at 60 percent design stages. Meetings should address:
  - All ODOT owned lands impacted by the project, including both rights-of-way and independent parcels owned by ODOT (if any).
  - ODOT projects and plans for future street improvements.
  - ODOT recommended traffic control options and street/landscape reconstruction standards.

#### **Oregon Department of Environmental Quality**

A NPDES 1200-C General Construction Permit is required from the Department of Environmental Quality (DEQ) for construction activities including clearing, grading, excavation, and stockpiling activities that will result in the disturbance of one or more acres of land.

The permit application will include submittal of project design plans, an Erosion and Sediment Control Plan (ESCP), an Erosion Control Worksheet, and a Land Use Compatibility Statement (LUCS) signed by a local planner. For this project, the LUCS will likely need to be signed by planners in each of the four affected Cities. The ESCP must be submitted to DEQ at least 30 days before starting the project.

#### **3.4.2.1.7 Applicability**

A 1200-C permit will be required since the project will disturb more than one acre of land. The permit will apply to all surface construction disturbance (e.g., bore pits, trenching, facility improvements) for the project as a whole.

#### **3.4.2.1.8 Planning Considerations**

This relatively straightforward permit is often obtained by the construction contractor. As erosion control specifications are developed, it is helpful to review current DEQ requirements with the agency contact; recently, more attention has been given to such things as gravel construction aprons, concrete truck washes, and seed specifications. The ESCP needs to show both existing and proposed grading.

Coordination of the LUCS is important since four city planners will need to sign off before submittal of the 1200-C permit to DEQ. Some planning departments charge a fee and may take a week or two to review the LUCS.

#### **3.4.2.1.9 DEQ Permitting Strategy**

- Compile required elements for the permit application at least one to two months before construction is scheduled to commence. These elements include the ESCP, Erosion Worksheet, and a LUCS signed by local planners.
- Permit submittal is best done after all land use permits for the project are obtained so that the land use decision findings can be attached to the LUCS (as required).
- Most efficient strategy is to have the staff planner who reviewed the local land use case sign the LUCS (e.g., set up an appointment).
- Allow at least two weeks for permit review once the complete package is submitted.

#### **Oregon State Historic Preservation Office**

Archaeological permits will be required if archaeological resources are found along the project corridor during pre-construction field assessment or during construction. The determination of archaeological (cultural) resources includes three phases, of which Phases II and III require permits obtained from the SHPO. Phase I is a field assessment of cultural resources in the project area.<sup>9</sup> The Phase II evaluation (if needed) determines the level of significance associated with the resources through a formal review process. Based on the Phase II findings, Phase III may or may not be required. Phase III is the final mitigation process, which is usually focused on avoidance. A Finding of Effect, which evaluates the project's impacts to the resource, is produced in Phase III.

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<sup>9</sup> Projects such as this will typically have an archaeologist involved during the preliminary design phase to conduct a "Phase I" field assessment of the project alignment corridor.

#### **3.4.2.1.10 Applicability**

The archaeological permit, if required, will apply to the whole project. The field investigation focuses on construction activities (e.g., trenching, pit construction, facility upgrades) located at or near the ground surface where resources are most likely to be found.

#### **3.4.2.1.11 Planning Considerations**

A project archaeologist may recommend that a Phase II investigation be conducted and permits be obtained even if no resources are discovered if they believe that there is a strong likelihood of discovery during construction (a permit avoids the potential for work stoppage if artifacts are found during construction).

At a minimum, if no archaeological resources are found during the initial assessment, construction specifications for the project should include discovery provisions to address what happens if resources are found during construction.

#### **3.4.2.1.12 SHPO Permitting Strategy**

- Retain an archaeologist to conduct a Phase I field assessment of the project alignment corridor during the pre-design phase.
- If resources are found, or if desired by the City, complete a Phase II investigation; this normally takes from three to six months to complete and an additional month to process). Complete the Phase III process only if required.

### **3.4.3 Overall Permitting Strategy**

Of the permits reviewed in this memorandum, three may be potential critical path elements for the project schedule. These permits are the following:

- U.S. Army Corps of Engineers (particularly the Section 7 consultation component). Early coordination with USACE, NOAA Fisheries and USFWS is needed, and the permit itself should be submitted by November in anticipation of the July in-water construction start date.
- Department of State Lands. Processed jointly with the above permit, this permit has a 120-day (potentially more) review timeline.
- Union Pacific Railroad. This permit sometimes warrants one or more trips to Omaha and may require six months for processing.

The broader strategy for obtaining state and federal permits is a well-coordinated and focused collaboration with the engineering team and key agency personnel. It includes early field visits to assess potential impacts to wetland and sensitive species, followed by field trips with regulatory agency staff to establish jurisdictional limits and scope of permits. Interagency meetings and/or tours may be warranted (particularly for the USACE and DSL permits) to ensure that all reviewers are on the same page, and to agree on the most efficient permit processing approach. Thorough and well-documented alternative analyses

(e.g., at the intake) and technical reports (e.g., biological assessments) are keys to a successful permit strategy. The strategy will be organized around a permit tracking matrix including all the basic permit and contact information, as well as target dates for each step of the process such as permit preparation, supporting data collection, internal review, permit submittal, and permit issuance, all tied to construction start dates for the affected project elements.

## SIGNIFICANCE OF CONSERVATION ON SUPPLY IMPROVEMENTS

### 4.1 BACKGROUND

The Cities of Lake Oswego and Tigard (Cities) retained Carollo Engineers in June 2006 to develop and evaluate options for the possible formation of a joint water supply system for the two communities. The Joint Water Supply System Analysis (JWSSA) will identify a preferred supply scenario from a range of alternatives, and addresses the permitting, governance, design, financing, and construction related issues associated with implementing the proposed joint water supply system.

As part of this effort, the City of Lake Oswego (Lake Oswego) has requested that an evaluation of the impacts of water conservation within the City on short and long-term supply improvements also be conducted.

### 4.2 PURPOSE

The purpose of this chapter is to describe the relative significance of three potential conservation strategies on the capacity, cost, and implementation schedule of supply requirements, supply scenarios, and the associated capital improvements for the proposed water supply scenarios.

### 4.3 DEMAND PROJECTIONS

The projected build-out demands of Lake Oswego and Tigard are presented in Table 4.1. Further description regarding the basis for these projections can be found in Chapter 1, Water Supply System Evaluation.

<b>Table 4.1 Build-out Demands for Lake Oswego and Tigard Joint Water Supply System Analysis City of Lake Oswego and Tigard Water Service Area</b>		
	<b>Average Day Demand</b>	<b>Peak Day Demand</b>
Lake Oswego Water Service Area	10.4 mgd	23.9 mgd
Tigard Water Service Area	10.1 mgd	21.1 mgd
Total	20.5 mgd	45.0 mgd

## 4.4 CONSERVATION STRATEGIES

To reduce Lake Oswego's projected build-out demands, and therefore reduce the expansion effort of Lake Oswego's water supply infrastructure, the City has identified the need to consider implementing conservation strategies for the community. Based on input from both Lake Oswego and Tigard, three conservation strategies were identified for this analysis:

1. 5% Reduction Target, resulting in 0.5% reduction in per capita demands per year for eleven years,
2. 10% Reduction Target, resulting in 1.0% reduction in per capita demands per year for eleven years,
3. 25% Reduction Target, resulting in 2.5% reduction in per capita demands per year for eleven years.

These strategies were determined to be reasonable alternatives based on an evaluation of the City of Tigard's historical conservation efforts. The type and level of effort needed to obtain these conservation levels is beyond the scope of this effort; however, typical conservation techniques for water suppliers and water users is as follows:

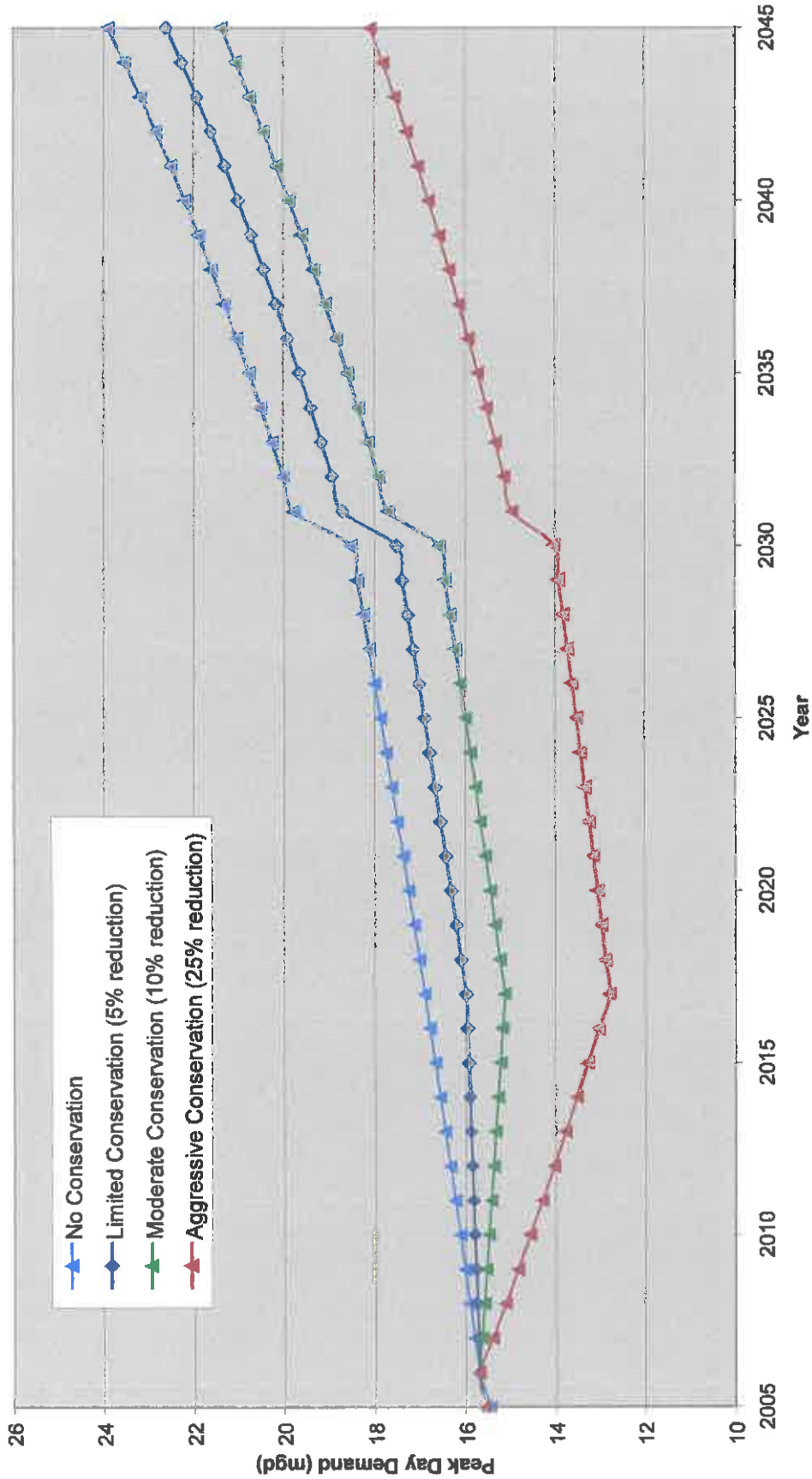
- Water Suppliers: water reuse, water use restrictions, vigilant water metering, and increased awareness of water distribution system maintenance needs.
- Water Users: rainwater collection, water-conserving landscaping and irrigation practices, installation of low-flow fixtures and appliances, and proper swimming pool maintenance.

### 4.4.1 Impacts of Conservation on Demand

The impacts of these three conservation strategies on the build-out demands of the Lake Oswego water service area are presented in Table 4.2.

Strategy	Build-out Demand	Overall Reduction
No Conservation	23.9 mgd	--
5% Target	22.6 mgd	5.4%
10% Target	21.4 mgd	10.5%
25% Target	18.1 mgd	24.3%

The impact of these conservation strategies on Lake Oswego's future demands will defer the necessary timing of the expansion to the City's water supply facilities. The service area demands, as predicted by the three conservation strategies, are presented in Figure 4.1.



**Figure 4.1**  
**CONSERVATION IMPACTS ON LAKE OSWEGO FUTURE DEMANDS**  
 JOINT WATER SUPPLY SYSTEM ANALYSIS  
 CITY OF LAKE OSWEGO AND TIGARD WATER SERVICE AREA

#### **4.4.2 Impacts of Conservation on Timing of Supply Improvements**

By implementing the proposed conservation strategies, the City of Lake Oswego will be able to defer the implementation of its future water supply improvements to 2017 at the earliest. This would allow the City to pursue alternative funding strategies for the supply improvements thereby potentially reducing impacts to customer rates and fees. However, it should be noted that conservation alone will not be sufficient to eliminate the City's need to expand the existing water supply infrastructure.

#### **4.4.3 Impacts of Conservation on Supply Scenarios**

As discussed in Chapter 1, Water Supply System Evaluation, the supply scenarios are as follows:

1. Scenario 1: Existing Capacity (16 mgd)

This scenario represents the existing demands and capacity of the Lake Oswego infrastructure.

2. Scenario 2: Future Capacity (24 mgd)

This scenario represents the required capacity to treat the build-out demands of the Lake Oswego water service area.

3. Scenario 3: Senior Water Right Capacity (32 mgd)

This scenario represents the capacity needed to convey the senior water rights that Lake Oswego has been permitted to withdraw from the Clackamas River.

4. Scenario 4: Combined Junior and Senior Water Right Capacity (38 mgd)

This scenario represents the capacity needed to convey the combined junior and senior water rights that Lake Oswego has been permitted to withdraw from the Clackamas River.

The scenarios were developed to document the supply impacts for four alternatives: existing capacity, intermediate capacity, capacity equivalent to Lake Oswego's senior water rights, and capacity equivalent to Lake Oswego's senior and junior water rights. The first, third, and fourth scenarios are based on fixed parameters; therefore, the only scenario that could be impacted by implementation of conservation techniques is the intermediate capacity scenario, or Scenario 2.

As seen in Table 4.2, the impact of the conservation strategies results in a build-out peak day demand for the Lake Oswego water service area of 22.6 mgd, 21.4 mgd, or 18.1 mgd, respectively. Due to the inherent advantage of increasing capacity in multiples (such as basin sizing, multiple pump capacity, and overall treatment configuration), it was determined that Scenario 2 will be based on a capacity of 24 mgd for the low and moderate



conservation strategies (5% and 10% target reduction), and a capacity of 20 mgd for the aggressive conservation strategy (25% target reduction).

The supply allocations for Lake Oswego and Tigard, as defined by these scenarios and the proposed conservation strategies, are presented in Table 4.3.

Scenario Description	No Conservation		Low Conservation (5% Target)		Moderate Conservation (10% Target)		Aggressive Conservation (25% Target)	
	Lake Oswego	Tigard	Lake Oswego	Tigard	Lake Oswego	Tigard	Lake Oswego	Tigard
	1 16 mgd	23.9	0	22.6	0	21.4	0	18.1
2 24 mgd	23.9	0.1	22.6	1.4	21.4	2.6	18.1	5.9
3 32 mgd	23.9	8.1	22.6	9.4	21.4	10.6	18.1	13.9
4 38 mgd	23.9	14.1	22.6	15.4	21.4	16.6	18.1	19.9

Scenario 4 represents the maximum water rights available to Lake Oswego from the Clackamas River (38 mgd). As seen in Table 4.3, if Lake Oswego does not implement any conservation techniques, Tigard would receive a maximum capacity of 14.1 mgd, which falls considerably short of Tigard's build-out peak day demands of 21.1 mgd. However, it should be noted that Tigard does expect to supplement their peak day demands with Aquifer Storage and Recovery (ASR) for up to 3.5 mgd, reducing their overall build-out peak day demands to 17.6 mgd. Therefore, if Lake Oswego implements an aggressive (25% target) or moderately aggressive (15% target) conservation strategy, they could reduce their demands sufficiently to meet both Cities' build-out peak day demands under Scenario 4 (38 mgd capacity).

#### **4.4.4 Impacts of Conservation on Capital Costs**

As previously stated, only Scenario 2 would be impacted by the proposed aggressive conservation strategy. Therefore, the costs associated with implementing the aggressive conservation strategy for Scenario 2 will also be impacted. The capital costs for implementing the aggressive conservation strategy for Scenario 2 are presented in Table 4.4.

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<b>Table 4.4 Conservation Impacts on Scenario 2 Capital Costs Joint Water Supply System Analysis City of Lake Oswego and Tigard Water Service Area</b>	
<b>Type</b>	<b>Scenario 2 24 mgd</b>
Clackamas River Intake	\$2,100,000
Raw Water Transmission Main	\$18,200,000
Lake Oswego Water Treatment Plant	\$24,000,000
Finished Water Transmission Main	\$18,400,000
Waluga Reservoir	\$2,470,000
Bonita Pump Station	N/A
<b>Total</b>	<b>\$65,170,000</b>

The total costs for Scenario 2 with and without implementation of the aggressive conservation strategy are \$65.2 and \$78.6 million, respectively, resulting in an overall reduction of 17%.

#### 4.5 CONCLUSIONS

As previously stated, implementing the proposed conservation strategies will enable Lake Oswego to defer the timing of the expansion of their water supply infrastructure; however, it will not eliminate the need entirely. Therefore, Lake Oswego must still plan for the capacity expansion of their intake, raw water transmission main, treatment plant, storage, and distribution system. Depending on the conservation strategy adopted, Lake Oswego will be able to defer the timing of the capacity improvements from 2017 to 2037.

A summary of the capital costs and timing for each of the proposed conservation strategies is presented in Table 4.5.

<b>Table 4.5 Summary of Conservation on Infrastructure Costs and Timing Joint Water Supply System Analysis City of Lake Oswego and Tigard Water Service Area</b>				
<b>Conservation Strategy</b>	<b>Cost Savings</b>		<b>Implementation Timing</b>	
	<b>Amount</b>	<b>Percentage</b>	<b>Year</b>	<b>No. of Years Deferred</b>
5% Target	N/A	N/A	2017	8
10% Target	N/A	N/A	2025	16
25% Target	\$13.4M	17%	2037	28

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## EVALUATION OF INTERIM SUPPLY TO LAKE OSWEGO

### 5.1 BACKGROUND

The Cities of Lake Oswego and Tigard (Cities) retained Carollo Engineers in June 2006 to develop and evaluate options for the possible formation of a joint water supply system for the two communities. The Joint Water Supply System Analysis (JWSSA) will identify a preferred supply scenario from a range of alternatives, and addresses the permitting, governance, design, financing, and construction related issues associated with implementing the proposed joint water supply system. As part of this effort, an evaluation of two alternatives to provide interim supply to the City of Lake Oswego (City, Lake Oswego) will be conducted.

### 5.2 PURPOSE

This chapter presents the findings and recommendations of the two interim supply alternatives, including identification of the available capacity of the two alternatives, capital and operations and maintenance (O&M) costs for the associated upgrades, and the implications for timing of future supply improvements to implement the four supply scenarios.

### 5.3 INTERIM SUPPLY ALTERNATIVES

Four water supply scenarios were developed and evaluated as part of the JWSSA, and are described in detail in Chapter 1, Water Supply System Evaluation. The supply scenarios are as follows:

- Scenario 1: "Do Nothing" Existing Capacity (16 mgd)
- Scenario 2: Lake Oswego Only, Future Capacity (24 mgd)
- Scenario 3: Lake Oswego & Tigard, Senior Water Right Capacity (32 mgd)
- Scenario 4: Lake Oswego & Tigard, Combined Junior and Senior Water Right Capacity (38 mgd)

Scenario 1 represents the existing capacity of the Lake Oswego water supply infrastructure (16 mgd). Based on the Lake Oswego water service area population growth and historical per capita demands, it is projected that the capacity of the existing supply system will need to be expanded in 2009 unless further action is take to reduce the existing peak day demands or increase the existing peak day supply capacity. Options for conservation strategies to reduce the existing peak day demand are presented in Chapter 4. Options for increasing Lake Oswego's existing peak day supply capacity are presented in the following

subsection. Such near-term interim supply improvements would potentially allow Lake Oswego to defer the expansion of the water supply infrastructure for several years.

### **5.3.1 Description of Interim Supply Alternatives**

The two interim supply alternatives evaluated for the JWSSA are as follows:

- **Supply from Portland:** This interim supply alternative to Lake Oswego consists of providing supply via the Washington County Supply Line (WCSL) from the City of Portland (Portland). It is assumed this would consist of a connection to the 36-inch diameter "Tualatin Line" that connects to the WCSL and provides gravity flow from Portland to the City of Tualatin. This pipeline passes within approximately two blocks of Tigard's existing Bonita Pump Station. It is further assumed that Tigard's existing wholesale water supply agreement with the City of Portland could be used as the basis for purchasing water from this line.
- **Supply from SFWB:** This alternative consists of supply from the South Fork Water Board (SFWB) via the existing intertie with the City of West Linn (West Linn).

#### **5.3.1.1 Supply from Portland**

The available capacity of the WCSL-Tualatin Line is based on a recent capacity evaluation of the supply pipeline<sup>1</sup> provided by the City of Tigard. As identified in this report, the 2010 peak season demands indicate that the available capacity at the Tualatin Park pressure reducing valve is anticipated to be 11.1 mgd. The 2005 peak 3-day demand of the City of Tualatin (the last user on this segment of the WCSL) is about 8.5 mgd, resulting in an available capacity of about 2.6 mgd. It is assumed that the City of Sherwood, which can purchase water from the City of Tualatin, will continue to implement an alternative supply from the Willamette WTP in Wilsonville; thus, Sherwood's demands are not included in this estimate of available capacity. It is also assumed the existing owners of the WCSL will not object to Tigard's use of the supply line.

To access this additional capacity, it is proposed that the City of Tigard construct a connection to the Tualatin Line at approximately SW 72<sup>nd</sup> and Bonita Road, about two blocks west of Tigard's Bonita Road Pump Station. It is proposed this be a 12-inch diameter connection to provide up to about 3.5 mgd of gravity supply to the City of Tigard for use when non-peak day capacity is available on the Tualatin Line. From the WCSL connection, water would flow to a new vault containing a meter and control valve that would be connected to the existing pipelines from Lake Oswego that are currently used provide supply from Lake Oswego to Tigard's Bonita Road Pump Station. Based on this preliminary analysis, this configuration would provide about 2.5 mgd of peak day capacity from the proposed WCSL connection to Lake Oswego's Waluga Reservoir without pumping and without construction of a new transmission line from Tigard to Lake Oswego.

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<sup>1</sup> "Washington County Supply Line - Delivery System Capacity Assessment", 2005, MSA.

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### **5.3.1.2 Supply from SFWB**

The alternative would provide interim supply to Lake Oswego is from the SFWB, via the existing intertie with West Linn. Per Lake Oswego staff, the 18-inch intertie has enough capacity to provide 2 to 6 mgd of gravity-fed supply to Lake Oswego. However, West Linn staff has indicated<sup>2</sup> that the existing intertie between West Linn and Lake Oswego was developed as an emergency intertie and, as such, there is not sufficient capacity in the West Linn system to provide peak demands to Lake Oswego. This capacity limitation is based on capacity of West Linn's existing Willamette River crossing as well as transmission and distribution system capacity up to the point of the existing intertie with Lake Oswego. Thus, extensive upgrades in West Linn's existing transmission system capacity would be required to provide peak day capacity to serve Lake Oswego. West Linn recently started an update to their water system master plan and was unable to identify specific improvements that would be required.

In addition, West Linn staff also indicated that a new water supply agreement would need to be negotiated by West Linn and Lake Oswego inasmuch as the existing agreement is specifically limited to emergency supply.

Based on these significant limitations with the West Linn connection, this alternative was dropped from further consideration in this analysis.

### **5.3.2 Factors to Consider in Evaluating the Interim Supply Alternative**

Further evaluation of the potential interim supply from Portland has identified two additional factors to consider with respect to the viability of this alternative:

- Recent discussions with Tualatin Valley Water District (TVWD) staff have indicated that the remaining 2.6 mgd within the WCSL-Tualatin Line is available only if the City of Sherwood is not purchasing water in the summer. However, TVWD – which operates the Sherwood water system under contract with the City of Sherwood - has identified that Sherwood anticipates continuing to use their connection with Tualatin for peak season supply for the next two years (through 2009); thus, there would be no excess peak capacity available from this segment of the WCSL for the next two years.
- Additionally, demand projections for the City of Tualatin indicate their peak demands after 2010 will be equal to the available capacity of the WCSL; thus, there would be no excess peak capacity available from this segment of the WCSL after 2010.

Therefore, based on existing agreements and anticipated growth in the service area, a connection to this segment of the WCSL would not be available to meet to meet Lake Oswego's near-term demands or allow a delay in the expansion of Lake Oswego's supply system.

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<sup>2</sup> Personal communication with Dennis Wright, City of West Linn, Acting City Engineer, February 2007.

However, additional considerations warrant further consideration of the possible construction of a connection to the WCSL in Tigard.

- Tigard is currently purchasing pumped water from Portland via their existing connection at Bradley Corner, at a cost of about \$1.02/ccf. Should a connection to the WCSL be made, Tigard might be able to purchase non-peak water from Portland at the gravity rate (a likely cost of \$0.73/CCF). Depending on operational strategies and availability of non-peak season water, this scenario could result in a savings to Tigard of approximately 15% of their annual cost of water from the City of Portland. Further analysis of these savings is presented in Section 8.3.4 of this chapter.
- The new connection by Tigard to the WCSL would provide both Tigard and Lake Oswego with additional reliability through interconnections to the regional water supply infrastructure. Lake Oswego would be able to receive emergency supply via Portland. Similarly, Lake Oswego could potentially provide emergency supply to Tigard and/or the City of Tualatin. The long-term reliability benefit to the region's water providers may help further justify the cost of the new intertie.

### 5.3.3 Implications of Interim Supply on Timing of Future Expansion Needs

As discussed in Section 8.3.2, the interim supply from the WCSL-Tualatin Line does not have sufficient capacity to offset Lake Oswego's peak day demands. Therefore, this alternative does not allow for expansion of Lake Oswego's supply infrastructure to be deferred. The timing of the supply improvements is presented in Table 5.1, and is further discussed in Chapter 2, Evaluation of Water Supply Facility Alternatives.

<b>Service Area</b>	<b>Scenario 1 (16 mgd) Do Nothing</b>	<b>Scenario 2 (24 mgd) LO Go It Alone</b>	<b>Scenario 3 (32 mgd) LO and Tigard</b>	<b>Scenario 4 (38 mgd) LO and Tigard</b>
Lake Oswego Service Area <sup>1</sup>	2009	2045	N/A <sup>2</sup>	N/A
Lake Oswego and Tigard Water Service Area	Now	Now	2019	2035

Notes:  
 1. Lake Oswego Service Area includes current wholesalers and the Stafford Triangle (to be served in 2030).  
 2. Scenario capacity not applicable for this option.

### 5.3.4 Conceptual Capital and Operations Costs for Interim Supply

The capital costs for the interim supply to Lake Oswego from the WCSL-Tualatin Line are presented in Table 5.2.

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<b>Table 5.2 Conceptual Capital Costs for Interim Supply from WCSL Joint Water Supply System Analysis City of Lake Oswego and Tigard Water Service Area</b>	
<b>Component</b>	<b>Capital Cost</b>
Connection to WCSL	\$500,000 <sup>1</sup>
Control Valves and Vault	\$200,000
Connection to Waluga Reservoir Pipeline <sup>2</sup>	\$700,000
<b>Total</b>	<b>\$1,400,000</b>

Notes:

1. "Washington County Supply Line - Delivery System Capacity Assessment", 2005, MSA.
2. 900 linear feet of 18-inch diameter pipe.

As previously discussed, the potential exists for Tigard to incur substantial savings in purchased water if the connection to the Lake Oswego supply system was constructed. If Tigard were able to purchase approximately 50% of its annual average supply from Portland through the gravity connection at a rate of \$0.73/ccf, the total savings would be approximately \$272,000 per year, which represents a savings of about 14%.

If this degree of savings could be achieved, simple payback of cost the Tigard connection to the WCSL-Tualatin Line would be slightly more than five years. In addition, the potential net savings (savings less construction cost) during the nine years remaining on Tigard's existing contract with Portland would be approximately \$1 million.

It should be noted that this savings could potentially be achieved without changes in Tigard's seasonal peaking factor; Tigard would continue to purchase the same quantity of water but would do so from the gravity connection when capacity is available and purchase water from the pumped system when gravity capacity is not available. Specific details and terms for such an arrangement would need to be negotiated with the existing owners of the WCSL, including Portland, TVWD, the Raleigh Water District and the City of Tualatin.

## **5.4 ALTERNATIVE RAW WATER SUPPLY**

In addition to evaluating the feasibility of developing an interim supply source for Lake Oswego, an evaluation was also made to determine the feasibility of purchasing additional raw water capacity from the SFWB's existing intake on the Clackamas River. This alternative assumes the following:

- SFWB would be willing to enter into such an agreement for selling, leasing or transferring capacity of their existing intake to Lake Oswego,
- Lake Oswego and the SFWB are able to establish mutually agreeable terms for such an arrangement, and

- The point of diversion for some of Lake Oswego's existing water rights would be transferred to the SFWB intake.

#### 5.4.1 Cost to Obtain Intake Capacity from the SFWB

This alternative is assumed to consist of: purchasing a proportionate share of the SFWB intake facility (either as purchase or equivalent lease), expanding the pumping capacity of the existing SFWB intake to deliver Lake Oswego's purchased capacity, construction of a new raw water transmission pipeline and river crossing to convey water from the SFWB intake to the Lake Oswego intake, and expansion of the existing Lake Oswego intake pumping capacity. These improvements would deliver the additional raw water only to the existing Lake Oswego intake. This allows for a direct comparison of this alternative to replacing Lake Oswego's existing intake with a new structure. In either case, additional improvements, as outlined in Chapter 2, would be required to convey the raw water to an expanded Lake Oswego water treatment plant.

Capital costs for purchasing raw water intake capacity from the SFWB were developed for Scenarios 3 and 4, which would require purchasing capacity of 8 mgd and 14 mgd, respectively. Conceptual costs, in November 2006 dollars, are summarized in Table 5.3.

<b>Scenario</b>	<b>Project Element</b>	<b>Capital Cost (\$ Millions)</b>
No. 3 Capacity: 32 mgd Purchase: 8 mgd	SFWB Intake Cost Share	\$0.9
	SFWB Intake Pump Expansion	\$0.5
	Pipeline & River Crossing (5,000 LF, 20-inch diam.)	\$10.6
	Expansion of Lake Oswego Intake Pumps	\$1.0
	<b>Total</b>	<b>\$13.0</b>
No. 4 Capacity: 38 mgd Purchase: 14 mgd	SFWB Intake Cost Share	\$1.5
	SFWB Intake Pump Expansion	\$0.6
	Pipeline & River Crossing (5,000 LF, 26-inch diam.)	\$12.1
	Expansion of Lake Oswego Intake Pumps	\$1.3
	<b>Total</b>	<b>\$15.5</b>

As shown in Table 5.3, the cost for purchasing raw water intake capacity from the SFWB ranges from approximately \$13 million to \$16 million for Scenarios 3 and 4, respectively. This cost is dominated by the relatively large cost of the transmission pipeline and river crossing required to convey water from the SFWB intake to the Lake Oswego intake. In comparison, the cost of constructing a new Lake Oswego raw water intake for Scenarios 3 and 4 is approximately \$4.4 million to \$4.7 million, respectively (see Technical Memorandum No. 2, Evaluation of Water Supply Facility Alternatives).



Given the large cost difference between the SFWB option and construction of a new intake, it is recommended that the option for purchasing raw water capacity from the South Fork Water Board be dropped from further consideration in the Joint Water Supply System Analysis.

## **5.5 CONCLUSIONS**

Lake Oswego's existing emergency intertie with the City of West Linn and a possible intertie to the Portland-Washington County Supply Line in Tigard were evaluated as possible interim peak season supplies that would allow Lake Oswego to defer near-term expansion of their existing supply system. In both cases, demands on these alternative sources are such that peak season capacity would not be available to meet Lake Oswego's projected peak day needs; thus, they are not feasible means of deferring expansion of the Lake Oswego supply system.

However, the proposed connection from the WCSL-Tualatin Line would potentially provide near-term benefits to the City of Tigard by decreasing Tigard's costs for non-peak season water purchases from Portland. In addition, Lake Oswego, Tigard and other water providers in the region would benefit by having this connection available as an emergency intertie between the Portland and Lake Oswego supply systems.

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## FINANCIAL EVALUATION AND RATE IMPACTS

### 6.1 FINANCIAL EVALUATION

The financial evaluation of the supply scenarios for Lake Oswego and Tigard was conducted to provide comparative costs of the scenarios for each City, and to evaluate the economic advantages and disadvantages of each scenario. The FCS Group was tasked to 1) define the total costs of each scenario, 2) allocate the costs between Lake Oswego and Tigard, and 3) quantify the economic costs of each scenario for both Cities. This chapter summarizes the financial evaluation and rate impact evaluation conducted by FCS Group; technical memoranda presenting the complete evaluation by FCS Group can be found in Appendix D of this Summary Report.

#### 6.1.1 Methodology

The financial evaluation was conducted for Scenarios 2 - 4 for both Cities. Scenario 1 was excluded from this evaluation because this scenario has a significantly different objective of providing no increase in existing supply capacity and therefore could not be fairly compared to the other scenarios as part of the financial evaluation. An additional scenario (Scenario 5) was originally included in the financial evaluation, which described a scenario in which Lake Oswego and Tigard partnered at a capacity of 38 mgd, and included the costs associated with developing an interim supply source for Lake Oswego to offset the immediate need for expansion to their water supply infrastructure. Further evaluation of the interim supply option (see Chapter 5) identified that an interim supply source is not a feasible alternative to defer the timing of the improvements; therefore, Scenario 5 is not included in this summary of the financial evaluation.

In general, demands used for this evaluation were based on information presented in Chapter 1. Lake Oswego demands were based on the existing degree of water conservation, with no additional conservation savings assumed. It was further assumed that Tigard demands would be satisfied in part by up to 3.5 mgd from Tigard's existing ASR system. The costs associated with Tigard's ASR system are not included in this financial evaluation.

A summary of the scenarios evaluated for each City is presented below:

#### **6.1.1.1 Lake Oswego**

- **Scenario 2 - Lake Oswego "Go-It-Alone" (24 mgd):** Represents the required capacity to meet the projected build-out demands of the Lake Oswego water service area. Under this scenario, Tigard does not receive any supply capacity from the Lake Oswego system.
- **Scenario 3 – Senior Water Right Capacity (32 mgd):** Represents a capacity expansion equivalent to Lake Oswego's senior water rights. This capacity exceeds the build-out demands of the Lake Oswego water service area and thus provides some capacity to meet a portion of Tigard's demands.
- **Scenario 4 – Combined Junior and Senior Water Right Capacity (38 mgd):** Represents a capacity expansion equivalent to Lake Oswego's senior and junior water rights. This capacity meets the build-out needs of Lake Oswego, while providing the majority of Tigard's demands.

#### **6.1.1.2 Tigard**

Scenarios 2, 3 and 4 do not provide sufficient capacity to meet Tigard's ultimate max day demands at build-out (without additional conservation by Lake Oswego). Under each scenario, it was necessary to identify an alternative source of supply to meet Tigard's demands to provide a complete solution for water supply for each community.

In addition to partnering with Lake Oswego, three sub options were developed, including: partnering with the Joint Water Commission (JWC), partnering with other regional water providers to expand the Willamette River source (Willamette with Partners), and Tigard "go it alone" on the Willamette supply (Willamette "Go It Alone"). These options were combined with Scenarios 2 and 3, as needed, to provide a complete cost comparison for Tigard. It was further assumed that these alternative sources would not be available until FY 2016/17. To meet Tigard's needs until then, it was assumed that Tigard would continue to purchase water from the City of Portland.

In the case of Scenario 4, the capacity of a joint supply system (38 mgd) is sufficient to meet about 80 percent of Tigard's projected build-out demands (without Lake Oswego conservation). This was assumed to provide sufficient capacity to Tigard such that it would not be economical for Tigard to invest in an alternative regional supply. Thus, it was assumed that Tigard would continue to purchase water from Portland to make up any shortfall from the joint supply under Scenario 4. It should also be noted that under Scenario 4, if Lake Oswego is able to reduce its per capita demand through implementation of a water conservation strategy (as described in Chapter 4), the potential does exist for a joint Lake Oswego-Tigard supply system to meet the max day build-out demands for both communities under Scenario 4. However, this option was not submitted for financial evaluation given the assumption of no additional conservation saving by Lake Oswego.

Tigard's supply scenarios were further defined as follows:

- **Scenario 2A – JWC.** Tigard invests in expanded JWC capacity to fulfill all Tigard demands (in excess of ASR capacity). No capacity is provided by Lake Oswego. Portland is an interim source for all water needs in the first 10 years.
- **Scenario 2B – Willamette with Partners.** Tigard invests with other regional partners in an expanded Willamette supply from Wilsonville to meet all Tigard demands (in excess of ASR capacity). No firm capacity is provided by Lake Oswego. Portland is an interim source for all water needs in the first 10 years.
- **Scenario 2C – Willamette “Go It Alone”:** Tigard invests without partners in an expanded Willamette supply from Wilsonville to meet all Tigard demands (in excess of ASR capacity). No capacity is provided by Lake Oswego. Portland is an interim source for all water needs in the first 10 years.
- **Scenario 3A – LO (32 mgd) plus JWC:** Tigard invests in expanded JWC capacity to meet demands not met by the Lake Oswego source, as available in Scenario 3. Required contract quantities are purchased from Portland for the first 10 years.
- **Scenario 3B – LO (32 mgd) plus Willamette with Partners:** Tigard invests in expanded Willamette capacity to fulfill demands not met by the Lake Oswego source, as available in Scenario 3. Required contract quantities are purchased from Portland for the first 10 years. Regional capital and operation costs in this scenario assume major cost-sharing partners also invest in Willamette capacity.
- **Scenario 3C – LO (32 mgd) plus Willamette Go It Alone:** Tigard invests in expanded Willamette capacity to fulfill demands not met by the Lake Oswego source, as available in Scenario 3. Required contract quantities are purchased from Portland for the first 10 years. Regional capital and operation costs in this scenario assume Tigard must develop Willamette without the help of major cost-sharing partners.
- **Scenario 4 – LO (38 mgd) plus purchased water:** Tigard does not invest in regional sources other than Lake Oswego. Required contract quantities are purchased from Portland through 2016. In later years, Tigard purchases water from Portland to meet any demand not met by Lake Oswego source available in Scenario 4.
- **Scenario 6A:** Tigard does not invest in Lake Oswego or any other regional source. Instead, it purchases all water from Portland, based on terms of current contract and adjustments for inflation.
- **Scenario 6B:** Tigard does not invest in Lake Oswego or any other regional source. Instead, it purchases all water from Portland, utilizing a gravity connection for a portion of the purchases. The unit price of water is based on terms of current contract but also includes a pumping discount on 2.6 mgd of purchased water, during off-peak months. This discount of \$0.29 per ccf (in 2007 dollars) is also escalated using the inflation rate of 5.6%.

### 6.1.2 Cost Allocation

The capital and operations and maintenance (O&M) costs for the joint supply scenarios are presented in Chapter 2 of this Summary Report. In addition to these costs, an appropriate "buy-in" cost for Tigard was assessed for each scenario. The buy-in costs incorporate the infrastructure assets owned by Lake Oswego that will also provide benefit to Tigard under a joint supply scenario.

Capital costs, along with the fixed assets eligible for Tigard's buy-in, were allocated on either a proportional basis (costs split on each City's share of total capacity) or an incremental basis (costs split on each City's share of increased capacity). An annual inflation factor of 6% was applied to the capital cost estimates (expressed in current costs) to reflect cost in the year of construction. Reimbursement and replacement costs have not been factored into this analysis.

The O&M costs for each scenario were categorized based on whether or not they fluctuate with water flow. Annual fixed costs were allocated to each City using the corresponding project's capacity allocation percentage. To assign shares of variable costs, the equivalent unit O&M cost (presented in Chapter 2) was applied to each City's average day demand supplied from the project, and then annualized. A 3.5% general inflation factor was applied to future O&M costs to reflect future dollars.

Discount costs were used in the development of net present value computations for the cost stream of each City. The 5% discount factor relates to public agencies' assumed cost of capital, while the 7.0% factor reflects more of a rate impact by taking into account growth in customer base.

A summary of the three interest rates used in the financial analysis is presented in Table 6.1.

<b>Table 6.1 Interest Rates Used in Financial and Rate Analysis Joint Water Supply System Analysis City of Lake Oswego and Tigard Water Service Area</b>		
<b>Type of Interest Rate</b>	<b>Percentage</b>	<b>Calculation Applied To</b>
Capital Inflation	6%	Cost of Construction in Future Day Dollars, SDC Escalation
General Inflation	3.5%	O&M Costs in Future Day Dollars
Discount Factor <sup>1</sup>	5%, 7%	Net Present Value
<b>Notes:</b>		
1. Two discount factors are used for comparative purposes in Section 6.2.		

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### 6.1.3 Total Scenario Costs

The net present value of each scenario for Lake Oswego is presented in Table 6.2.

<b>Table 6.2 Net Present Value of Lake Oswego's Supply Options Joint Water Supply System Analysis City of Lake Oswego and Tigard Water Service Area</b>			
<b>Cost Components</b>	<b>Lake Oswego "Go it Alone" Scenario 2 (24 mgd)</b>	<b>Partner with Tigard Scenario 3 (32 mgd)</b>	<b>Partner with Tigard Scenario 4 (38 mgd)</b>
Capital Costs	\$76,500,000	\$61,500,000	\$52,100,000
O&M Costs	\$41,300,000	\$33,200,000	\$31,000,000
<b>Total Costs</b>	<b>\$117,800,000</b>	<b>\$94,700,000</b>	<b>\$83,100,000</b>
<b>Notes</b>			
1. Net Present Values are based on a 25-Year Outlook and a discount factor of 5%.			

The net present value of the lowest cost alternative for each of Tigard's primary supply options is presented in Table 6.3. It should be noted that the Scenario 3 options (LO at 32 mgd plus alternative source) are not included in Table 6.2 since they have significantly higher costs as compared to the Scenario 2 and 4 options given the need to invest in Lake Oswego and an alternative source of supply under the Scenario 3 options.

<b>Table 6.3 Net Present Value of Lowest Cost Supply Options for the City of Tigard Joint Water Supply System Analysis City of Lake Oswego and Tigard Water Service Area</b>					
<b>Cost Components</b>	<b>Partner with JWC</b>	<b>Willamette With Partners</b>	<b>Willamette Without Partners</b>	<b>Partner with Lake Oswego</b>	<b>Purchase from Portland</b>
	<b>Scenario 2A</b>	<b>Scenario 2B</b>	<b>Scenario 2C</b>	<b>Scenario 4</b>	<b>Scenario 6B</b>
Capital Costs	\$145,800,000	\$77,900,000	\$183,100,000	\$80,600,000	\$1,400,000
O&M Costs	\$17,400,000	\$11,700,000	\$14,600,000	\$32,500,000	--
Purchased Water Costs	\$33,600,000	\$33,600,000	\$33,600,000	\$27,800,000	\$97,200,000
<b>Total Costs</b>	<b>\$196,800,000</b>	<b>\$123,200,000</b>	<b>\$231,300,000</b>	<b>\$140,900,000</b>	<b>\$98,600,000</b>
<b>Notes</b>					
1. Net Present Values are based on a 25-Year Outlook and a discount factor of 5%.					

The net present value of each scenario for Tigard is presented in Appendix D.

### 6.1.4 Equivalent Annual Cost Comparison

Equivalent annual costs are an economic statistic that can be used to compare the economic impacts of each alternative. Equivalent annual costs are based on the net present value of the scenarios, with a discount rate of 5 percent, annualized over a 25-year period.

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Lake Oswego's lowest cost option is Scenario 4, developing a joint supply with Tigard at 38 mgd. Tigard's lowest cost option is to purchase water from Portland via the new gravity connection with the WCSL-Tualatin Line (see Chapter 5) for nine months of the year, and to purchase water from Portland via the existing water transmission main during the peak summer months. Tigard's second lowest cost option is to partner with other regional suppliers in the development of the Willamette River Project.

However, without the economies of scale associated with group development at the regional level, costs increase considerably. Therefore, the next the lowest cost option for Tigard is to develop a joint supply with Lake Oswego for 38 mgd (Scenario 4). The equivalent annual costs for both Cities are presented in Table 6.4.

## 6.2 RATE IMPACTS

To evaluate the rate impacts of the supply scenarios, the following steps were taken:

1. Both Cities provided copies of their rate models, along with current financial and budget information. These rate models were updated with FY 2007 budget numbers. All operating and maintenance costs relating to supply and treatment (including water purchases) were replaced with the annual O&M costs calculated for the individual supply system scenarios. For all non-supply/treatment expenses, the gross assumption was made that these costs would continue to annually escalate based on inflation.
2. Rate revenues were annually escalated using the growth forecasts present in each City's models. Adopted rate increases were also integrated (3% in FY 2007/08 for Lake Oswego, 7% in FY 2007/08 for Tigard).
3. Annual capital cost streams for the various scenarios were incorporated. No other planned capital improvement project costs were included in the analysis. Because of this, current capital or system development charge (SDC) fund balances that either City might hold were not used in this analysis. The debt service needed to fund the joint supply projects was calculated and built-in to the impact analysis.
4. Capital supply costs were used to develop a potential SDC that could be implemented; this included supply projects only. This charge was calculated for each of the City's scenarios as detailed below:
  - a. Lake Oswego - Supply SDC was broken into two parts: (1) total capital costs that were allocated based on proportional capacity were divided by the total capacity available to Lake Oswego (23.9 mgd in each scenario), and (2) total capital costs that were allocated on incremental capacity were divided by the added capacity (7.9 mgd in each scenario).
  - b. Tigard - Supply SDC is the total cost of all capital projects (Lake Oswego as well as regional partner projects) divided by their total capacity needs. Tigard's buy-in payment to Lake Oswego is also included in the capital costs.

<b>Table 6.4 Equivalent Annual Costs<sup>1</sup> Joint Water Supply System Analysis City of Lake Oswego and Tigard Water Service Area</b>		
<b>Scenario</b>	<b>Lake Oswego</b>	<b>Tigard</b>
<b>2 (24 mgd):</b> Lake Oswego "Go It Alone"	\$8,400,000	N/A
<b>2A:</b> Tigard to JWC	N/A	\$14,000,000
<b>2B:</b> Tigard to Willamette with partners	N/A	\$8,700,000
<b>2C:</b> Tigard to Willamette without partners	N/A	\$16,400,000
<b>3 (32 mgd):</b> Lake Oswego and Tigard Partner for Joint Water Supply	\$6,700,000	N/A
<b>3A:</b> Tigard partners with Lake Oswego for 32 mgd and invests in JWC to fulfill demands not provided by Lake Oswego	N/A	\$15,400,000
<b>3B:</b> Tigard partners with Lake Oswego for 32 mgd and invests in Willamette with partners to meet demands not provided by Lake Oswego	N/A	\$10,800,000
<b>3C:</b> Tigard partners with Lake Oswego for 32 mgd and invests in Willamette without partners to meet demands not provided by Lake Oswego	N/A	\$14,600,000
<b>4 (38 mgd):</b> Lake Oswego and Tigard Partner for Joint Water Supply	\$5,900,000	\$10,000,000
<b>6A:</b> Tigard purchases water from Portland through existing connection year-round	N/A	\$7,400,000
<b>6B:</b> Tigard purchases water from Portland via new gravity connection for 9 months	N/A	\$7,000,000
<b>Notes:</b>		
1. Equivalent annual costs are based on a 5% discount rate and annualized over a 25-year period.		

5. An SDC revenue stream was forecasted from each supply SDC charge. The growth provided in each City's rate model was lower than the annual growth forecasted in supply planning. In order to remain conservative in our analysis, the lower annual growth rate was used to predict this SDC revenue. SDC charges were also escalated annually with construction cost inflation of 6 percent. The stream of revenues generated from supply SDCs were assumed to be fully available to pay debt service and meet coverage requirements.
6. With all supply-related costs incorporated into the technical models, rate impacts were analyzed. All rate increases were smoothed over several years to mitigate sharp rate impacts on customers. It is important to note that levelizing rates in earlier years buys down future rate impacts.

The annual and cumulative impact on rates for Lake Oswego and Tigard are presented in Table 6.5 and Table 6.6, respectively.

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<b>Table 6.5 Lake Oswego Summary of Rate Impacts Joint Water Supply System Analysis City of Lake Oswego and Tigard Water Service Area</b>												
<b>FYE</b>	<b>2007</b>	<b>2008<sup>1</sup></b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>
<b>SCN 2</b>	Annual Rate Impact	0.00%	0.00%	148.00%	35.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Cumulative Rate Impact	0.00%	0.00%	148.00%	148.00%	148.00%	148.00%	148.00%	148.00%	148.00%	148.00%	148.00%
	<b>Average Customer Bill<sup>2</sup></b>	<b>\$21.01</b>	<b>\$21.59</b>	<b>\$53.54</b>	<b>\$53.54</b>	<b>\$53.54</b>	<b>\$53.54</b>	<b>\$53.54</b>	<b>\$53.54</b>	<b>\$53.54</b>	<b>\$53.54</b>	<b>\$53.54</b>
<b>SCN 3</b>	Annual Rate Impact	0.00%	0.00%	60.00%	4.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Cumulative Rate Impact	0.00%	0.00%	60.00%	66.40%	66.40%	66.40%	66.40%	66.40%	66.40%	66.40%	66.40%
	<b>Average Customer Bill<sup>2</sup></b>	<b>\$21.01</b>	<b>\$21.59</b>	<b>\$34.54</b>	<b>\$35.93</b>	<b>\$35.93</b>	<b>\$35.93</b>	<b>\$35.93</b>	<b>\$35.93</b>	<b>\$35.93</b>	<b>\$35.93</b>	<b>\$35.93</b>
<b>SCN 4</b>	Annual Rate Impact	0.00%	0.00%	56.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Cumulative Rate Impact	0.00%	0.00%	56.00%	56.00%	56.00%	56.00%	56.00%	56.00%	56.00%	56.00%	56.00%
	<b>Average Customer Bill<sup>2</sup></b>	<b>\$21.01</b>	<b>\$21.59</b>	<b>\$33.68</b>	<b>\$33.68</b>	<b>\$33.68</b>	<b>\$33.68</b>	<b>\$33.68</b>	<b>\$33.68</b>	<b>\$33.68</b>	<b>\$33.68</b>	<b>\$33.68</b>

**Notes:**

1. 2008 Rate Increase does not include the 3% increase already adopted by City.
2. Based on assumed monthly usage of 10 ccf.
3. Rate impacts presented in this table do not include impacts from other, non-supply improvement projects.

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**Table 6.6 Tigid Summary of Rate Impacts  
Joint Water Supply System Analysis  
City of Lake Oswego and Tigard Water Service Area**

FYE	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2023
Annual Rate Impact	0.00%	0.00%	15.00%	15.00%	15.00%	15.00%	15.00%	15.00%	28.00%	0.77%	0.00%
Cumulative Rate Impact	0.00%	0.00%	15.00%	32.35%	52.09%	74.90%	101.14%	131.31%	196.07%	198.35%	198.35%
Average Customer Bill	\$24.83	\$26.57	\$30.55	\$35.14	\$40.41	\$46.47	\$53.44	\$61.45	\$78.66	\$79.26	\$79.26
Annual Rate Impact	0.00%	0.00%	15.00%	15.00%	15.00%	15.00%	15.00%	5.00%	5.00%	2.90%	0.00%
Cumulative Rate Impact	0.00%	0.00%	15.00%	33.25%	52.09%	74.90%	101.14%	111.19%	121.75%	128.18%	128.18%
Average Customer Bill	\$24.83	\$26.57	\$30.55	\$35.14	\$40.41	\$46.47	\$53.44	\$56.11	\$58.92	\$60.62	\$60.62
Annual Rate Impact	0.00%	0.00%	15.00%	15.00%	15.00%	15.00%	26.00%	43.00%	15.00%	10.69%	0.00%
Cumulative Rate Impact	0.00%	0.00%	15.00%	33.25%	52.09%	74.90%	120.37%	215.14%	262.41%	301.14%	301.14%
Average Customer Bill	\$24.83	\$26.57	\$30.55	\$35.14	\$40.41	\$46.47	\$58.55	\$83.73	\$96.28	\$106.57	\$106.57
Annual Rate Impact	0.00%	0.00%	40.00%	14.00%	14.00%	14.00%	14.00%	14.00%	14.00%	0.52%	0.00%
Cumulative Rate Impact	0.00%	0.00%	40.00%	59.60%	81.94%	107.42%	136.45%	169.56%	207.30%	208.89%	208.89%
Average Customer Bill	\$24.83	\$26.57	\$37.20	\$42.40	\$48.34	\$55.11	\$62.82	\$71.62	\$81.64	\$82.07	\$82.07
Annual Rate Impact	0.00%	0.00%	40.00%	10.00%	10.00%	10.00%	10.00%	10.00%	6.50%	6.15%	0.00%
Cumulative Rate Impact	0.00%	0.00%	40.00%	54.00%	69.40%	86.34%	104.97%	125.47%	140.13%	154.91%	154.91%
Average Customer Bill	\$24.83	\$26.57	\$37.20	\$40.91	\$45.01	\$49.51	\$54.46	\$59.90	\$63.80	\$67.72	\$67.72
Annual Rate Impact	0.00%	0.00%	30.00%	16.00%	16.00%	16.00%	15.00%	15.00%	10.00%	9.58%	0.00%
Cumulative Rate Impact	0.00%	0.00%	30.00%	50.80%	74.93%	102.92%	133.35%	168.36%	195.19%	223.47%	223.47%
Average Customer Bill	\$24.83	\$26.57	\$34.54	\$40.06	\$46.48	\$53.91	\$62.00	\$71.30	\$78.43	\$85.94	\$85.94
Annual Rate Impact	0.00%	0.00%	67.00%	5.00%	5.00%	5.00%	5.00%	5.00%	0.00%	0.08%	0.00%
Cumulative Rate Impact	0.00%	0.00%	67.00%	75.35%	84.12%	93.32%	102.99%	113.14%	113.14%	113.30%	113.30%
Average Customer Bill	\$24.83	\$26.57	\$44.37	\$46.59	\$48.92	\$51.36	\$53.93	\$56.63	\$56.63	\$56.67	\$56.67
Annual Rate Impact	0.00%	0.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%
Cumulative Rate Impact	0.00%	0.00%	5.00%	10.25%	15.76%	21.55%	27.63%	34.01%	40.71%	47.75%	171.97%
Average Customer Bill	\$24.83	\$26.57	\$27.90	\$29.29	\$30.76	\$32.29	\$33.91	\$35.60	\$37.38	\$39.25	\$72.26
Annual Rate Impact	0.00%	0.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	1.44%
Cumulative Rate Impact	0.00%	0.00%	5.00%	10.25%	15.76%	21.55%	27.63%	34.01%	40.71%	47.75%	169.14%
Average Customer Bill	\$24.83	\$26.57	\$27.90	\$29.29	\$30.76	\$32.29	\$33.91	\$35.60	\$37.38	\$39.25	\$71.50

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## 6.2.1 Summary of Rate Impact Analysis

For Lake Oswego, the lowest impact on rates results from the implementation of a joint supply system with Tigard (Scenario 4). The worst-case scenario for Lake Oswego would be under Scenario 2 (Lake Oswego "Go-It-Alone"), in which case the cumulative rate impact would be 148% over 25 years. Table 6.5 shows a summary of the annual and cumulative rate impacts for the first ten years and the last year of each scenario. It also calculates an average monthly customer bill based on the rates of each fiscal year. This average bill assumes a usage of 10 ccf per month and helps to provide an actual dollar comparison among all scenarios. At the end of 25 years, the lowest cost option produces a typical bill (increased solely for supply system impacts) of \$33.68 for Scenario 4.

For Tigard, partnership with Lake Oswego as presented in Scenario 4 provides the lowest impact on rates. Under this scenario, supply costs would impact rates approximately 113% over a 25-year period. Scenario 2C (Willamette supply without cost-sharing partners) produces the highest impact on rates, with approximately a 301% increase needed over the next 25 years. Table 6.6 presents the annual and cumulative impact, as well as the average monthly customer bill (again, assuming a usage of 10 ccf per month). In the twenty-fifth year, the monthly customer bills for Scenarios 2B and 4 are within approximately four dollars of one another, with Scenario 4 at \$56.67 and Scenario 2B at \$60.62.

## 6.2.2 Conclusions

The rate impact analysis illustrates cost preferences similar to those identified in the economic analysis of the joint supply system scenarios. For Lake Oswego, partnership with Tigard provides considerably lower impacts to rates than developing the necessary improvements alone. In Tigard's case, materially lower impacts are seen in both the Lake Oswego-based scenario (Scenario 4) as well as in the Willamette option with partners (Scenario 2B) as compared to the JWC and Willamette "go it alone" options (Scenarios 2A and 2C).

The analysis also shows that, though Scenarios 6A and 6B are considerably less expensive than the other scenarios in the 25-year time frame, this is not the same for the rate impacts. It should be noted that, whereas other scenarios can collect a supply of SDC revenue stream, all costs in Scenarios 6A and 6B are wholesale water purchase costs, and therefore no additional revenue source can be used to offset the impact on rates.

Again, it should be emphasized that this study provides only an analysis of how supply costs would affect each City's rates; it makes a gross assumption regarding the constant continuation of existing operating costs and does not include any capital costs other than those defined in the joint supply analysis. A rate study incorporating all financial aspects of each City's utility is necessary to determine actual rate increases and SDC charges.

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## STRATEGIC OUTREACH & COMMUNICATION

### 7.1 INTRODUCTION

Strategic outreach and communication is a key aspect of a joint water supply system between Lake Oswego and Tigard. It will allow Lake Oswego, Tigard, and West Linn policy makers to actively participate in the water supply analysis. Outreach and communication will also allow Lake Oswego and Tigard to inform customers, environmental groups, and other interested parties of issues and opportunities related to the project. Providing the public with clear information as the project progresses will allow conflicts to be resolved as they arise, reducing the potential for delays in later stages of the project.

Content of this chapter was prepared by Clark Worth of Barney & Worth, Inc. to provide outreach and communication planning related to the Joint Water Supply System Analysis.

### 7.2 STRATEGIC OUTREACH & COMMUNICATIONS PLAN

#### 7.2.1 Goals

The goals for strategic outreach and communication are to:

- Invite Lake Oswego, Tigard, and West Linn policy makers to participate actively in the water supply analysis, and ensure the results contribute meaningfully to effective and timely decision processes for those jurisdictions.
- Inform water customers in Lake Oswego and Tigard, along with other interested parties, of the issues and opportunities surrounding a possible joint water supply system.

#### 7.2.2 Objectives

- Organize and conduct the analysis as an education process, recognizing that few participants are knowledgeable about water supply options.
- Target the most affected and deeply interested organizations for public outreach.
- Inform and involve policymakers from the early stages of the analysis.
- Structure the analysis to answer policymakers' most pressing questions.
- Inform / involve customers later in the analysis, when more answers are known regarding the feasibility of a water systems merger. Anticipate and answer their questions.
- Inform / involve other water suppliers at appropriate intervals in the process.

- In communications, highlight the benefits to both parties – especially cost savings.
- Clarify the relationship between a possible joint water system and regional growth.
- Highlight the policy priorities for Lake Oswego and Tigard to promote water conservation and sustain adequate stream flows during critical times for fish passage.

### 7.2.3 Target Audiences

Audiences to target with information regarding the joint water supply system analysis include, but are not limited to, those listed in Table 7.1.

<b>Table 7.1 Target Audiences Joint Water Supply System Analysis City of Lake Oswego and Tigard Water Service Area</b>			
<b>Lake Oswego</b>	<b>Tigard</b>	<b>West Linn</b>	<b>Others</b>
City Council	City Council	City Council	Clackamas River Water Suppliers
City Manager	City Manager	City Manager	Regional Water Suppliers
Water System Manager	Water System Manager	Robinwood Neighborhood Association	Watershed Councils
Other Key Managers	Other Key Managers		Environmental Interest Groups
Neighborhood Association	Intergovernmental Water Board		Growth Interest Groups
Water Customers	Neighborhood Association		
	Water Customers		

### 7.2.4 Outreach and Communications Activities

#### 7.2.4.1 Stakeholder Interviews

A cross-section of Lake Oswego and Tigard policymakers and other key stakeholders were interviewed at the outset of the project to gain their views and suggestions, and enlist their participation. Interview results are summarized in Section 7.3.

#### 7.2.4.2 Strategic Outreach & Communications Plan

The Cities of Lake Oswego and Tigard will adopt a joint work plan that guides public outreach for water supply analysis. The Strategic Outreach & Communications Plan will define goals and objectives for outreach, identify target participants, outline specific

methods to inform and involve interested citizens, and establish an outreach schedule and assignments.

#### **7.2.4.3 Information Materials & Tools**

Information materials and tools will be created to enable the Cities of Lake Oswego and Tigard to identify and reach policymakers, and other interested stakeholders, answering their questions and inviting their involvement. These materials and tools may include:

- Fact sheets / Updates
- Targeted communications for interested groups
- Project mailing list
- Synopses of technical issues and analysis
- Portable displays
- Website

#### **7.2.4.4 Policymaker Workshops**

Two workshops will be convened to include Lake Oswego and Tigard City Council members and other key policymakers. The workshops will enable the participants to learn more about the water supply options, ask questions, and share their views on a preferred directions, individuals supply options, operations issues, costs, and intergovernmental arrangements.

#### **7.2.4.5 Public Meetings**

Public meetings, workshops, and open houses will be scheduled near the culmination of the analysis, to publicize the results and promote public understanding. Held in Lake Oswego and Tigard, the meetings will be organized and facilitated to enable interested citizens to learn more about future water system options, and share their views.

#### **7.2.4.6 Media Relations**

Lake Oswego and Tigard will identify project spokespersons that will be responsible for all media contacts. Draft media releases will be distributed at key intervals to the Cities' standard lists. Media briefings conducted by City staff will be scheduled as needed. Local news coverage on the joint water supply options will also be monitored.

#### **7.2.4.7 Website(s)**

Timely information will be developed and posted on the Cities' websites. The websites will provide general information, publicize study findings, announce public meetings, and offer water system facts, project schedule, timely information and opportunities for public comment, downloadable documents, web survey(s) and information contacts.

#### **7.2.4.8 Strategic Communication**

Messaging about joint water supply options will be developed thoughtfully and will be centrally coordinated to maintain a continuous flow of accurate public information that remains current during the dynamic project.

#### **7.2.4.9 Documentation**

An "interested parties" mailing list will be developed and maintained. The results of public outreach and communications will be documented, and highlights shared with key policymakers.

#### **7.2.4.10 Presentations and Briefings**

Lake Oswego, Tigard, and West Linn City Councils, as well as the Intergovernmental Water Board, will be briefed at key intervals of the analysis.

### **7.3 STAKEHOLDER INTERVIEWS**

As an early step in the project, Barney & Worth, Inc. interviewed elected officials and top managers in Lake Oswego and Tigard, representatives of their partner agencies, and other key stakeholders. Interviews were conducted in-person and by telephone with some nineteen persons who are involved or have an interest in Lake Oswego and Tigard water supply.

Participants were asked to share personal perceptions related to their understanding of water supply issues, their outlook on Lake Oswego/Tigard water sharing arrangements, and their suggestions for public participation.

#### **7.3.1 Summary of Findings**

The following findings highlight the main points offered by nineteen key stakeholders and other observers who were interviewed for the joint water supply analysis. This report reflects the advice, feelings and attitudes of the individuals interviewed. It is not intended to provide a scientifically valid profile of community opinion as a whole. Specific interview questions and answers along with a list of interviewed persons can be found in Appendix E.

Policymakers are hopeful the Lake Oswego and Tigard joint water supply will be shown to be feasible. Elected officials, top managers and other participants envision benefits that make this decision, in their view, the best option available.

Costs and rate impacts are the biggest issue(s) for most stakeholders when considering Lake Oswego / Tigard water supply options. In evaluating various water supply scenarios, both jurisdictions say they will first and foremost examine costs.

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Another important matter will be the shape of any agreement between the two cities. Tigard policymakers expect Lake Oswego will take the lead, but want to know what say they'll have in drinking water affairs, and what assurances will be given: "The real questions are political, not technical." All parties seem confident a workable deal can be arranged: "It will be up to the two city governments to iron out the details and present a salable deal to the public."

Motivating factors for each participating city are apparent to most observers. It's no secret why both cities are interested. For Lake Oswego, the primary driver is thought to be cost savings. Facing substantial costs to upgrade its water system, Lake Oswego can lessen the impact on rates by spreading the costs over a larger customer base. Another impetus is the necessity to protect its undeveloped water rights on the Clackamas River. For Tigard, the main motivator is the prospect to share ownership of water resources, and along with it, the assurance of future supply for the community: "It's time for Tigard to secure its drinking water future."

A multitude of additional benefits are foreseen. Participants say merging the two water systems offers numerous advantages to Lake Oswego, Tigard, West Linn and other communities, as illustrated in Table 7.2.

A leading concern is the need to expand Lake Oswego's treatment facility. Located outside town in West Linn's Robinwood neighborhood, the plant must be expanded to meet the needs of Lake Oswego. Therefore, stakeholders are concerned its neighbors will raise questions about how they are to be impacted. The potential does exist, however, to develop a win-win opportunity, by upgrading the facility and installing new membrane technology, while minimizing the impact of the facility footprint and providing other benefits to the Robinwood community, such as a connection to the community hike and bike trails.

Another top issue is Lake Oswego's future growth. Although Lake Oswego is a mature community with slow population growth, policymakers want to be certain that future water needs can be met if a portion of Lake Oswego's water is allocated for Tigard. Uncertainty about future development scenarios for the Stafford area fuels these concerns.

Deliberations on Lake Oswego / Tigard water supply issues will require an education process. A few policymakers report they have been deeply involved in this topic. Most say they'll need to know more about the two cities' water systems, pros and cons of the various alternatives – including effects of the "status quo". A frequent suggestion is to convene a joint meeting of the two City Councils, to background elected leaders and foster collaboration.

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<b>Table 7.2 Benefits of Merger Joint Water Supply System Analysis City of Lake Oswego and Tigard Water Service Area</b>	
<b>Participant</b>	<b>Benefits</b>
Lake Oswego	<ul style="list-style-type: none"> <li>▪ Cost sharing; cost savings; economies of scale</li> <li>▪ Minimize long-term rate impacts</li> <li>▪ Protect water rights</li> <li>▪ Upgrade L.O. water treatment facility</li> <li>▪ Provide emergency intertie and alternate sources</li> <li>▪ Diversify water sources</li> <li>▪ Improve location of L.O. water intake</li> <li>▪ Merge with more modern plant</li> <li>▪ Build stronger relations with neighboring communities</li> <li>▪ Strengthen L.O. voice in regional water issues</li> </ul>
Tigard	<ul style="list-style-type: none"> <li>▪ System ownership and control</li> <li>▪ Secure, long-term source</li> <li>▪ Access to water rights</li> <li>▪ O&amp;M cost savings; economies of scale</li> <li>▪ Easier permitting than other options</li> <li>▪ Emergency intertie / alternate sources</li> <li>▪ Keeps other supply options open</li> </ul>
West Linn	<ul style="list-style-type: none"> <li>▪ Leverages portions of South Fork system and frees up South Fork water rights to meet other needs</li> <li>▪ Provides backup connections to Portland, Willamette, JWC</li> <li>▪ O&amp;M cost savings; economies of scale</li> </ul>
Others	<ul style="list-style-type: none"> <li>▪ Frees up Washington County water sources for other growing communities</li> <li>▪ Promotes regional water supply system; bigger pipes able to move water both ways</li> <li>▪ Helps lower water rates</li> <li>▪ Indirectly benefits wholesale customers and partners</li> </ul>

The Lake Oswego / Tigard water discussions present an opportunity to re-think, and perhaps reorganize, the regional water supply system. Several observers see an opening to consolidate the number of water suppliers in the area. Others see trouble: "The Clackamas River is fraught with issues."

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What about the public? A proactive information / education program is warranted, participants say. But there's no consensus about when and how to involve the public in decisions for the joint water supply option, should citizens be involved during the study – or afterwards? "The public is almost totally unaware of this possibility." "Most people don't or won't pay much attention to where their water comes from." Consensus advice: "Be prepared to answer citizens' questions."

"Please include us!" Other area water suppliers ask to be included in the Lake Oswego / Tigard study. They extol the advantages of a regional approach, and point to additional opportunities for regional water supply arrangements. Another logical participant is the City of West Linn, where Lake Oswego's water treatment facility is located.

### **7.3.2 Values and Principles**

The following is a list of values and principles that were found to be important aspects of the potential joint water supply system and should be considered as the analysis proceeds:

- Secure Lake Oswego's and Tigard's water future, ensuring both communities can meet their long-term growth needs.
- Demonstrate cost savings and favorable rates when compared with other supply options.
- Retain / obtain ownership interest in long-term drinking water resources.
- Retain and perfect Lake Oswego's full Clackamas River water rights.
- Design the Lake Oswego / Tigard partnership to offer parity – fairness – balance.
- Develop redundant water sources, for backup and emergencies.
- Promote equitable distribution of natural resources throughout the region.
- Communicate openly with policymakers and the public, educating them on the communities' current water sources, water system assets, future infrastructure needs and various supply options.
- Nurture cooperation among Lake Oswego, Tigard and surrounding communities that is beneficial to drinking water and other public services.
- Expand Lake Oswego / Tigard leadership in regional water supply decision making.

## 7.4 SCHEDULE AND STAFFING

### 7.4.1 Schedule

The joint water supply system analysis began in June 2006 and is planned to continue through December 2007. Table 7.3 shows milestones and their approximate due dates.

<b>Table 7.3 Schedule Joint Water Supply System Analysis City of Lake Oswego and Tigard Water Service Area</b>	
<b>Date</b>	<b>Milestone</b>
June 2006	Project Startup
June – August 2006	Stakeholder Interviews
August 2006	Strategic Outreach & Communications Plan
September – October 2006	Information Materials & Tools City Council Briefings
November 14, 2006	Policymaker Workshop #1
November 2006 – July 2007	Council Briefings
July 17, 2007	Policymaker Workshop #2
August - October 2007	Documentation, Presentation & Briefings
December 2007	Partnership Agreement between Lake Oswego and Tigard

### 7.4.2 Preliminary Staff Assignments

Completion of the joint water supply system analysis will require cooperation of individuals from varying disciplines. Table 7.4 gives a preliminary list of staff assignments needed for public outreach.

<b>Table 7.4 Preliminary Staff Assignments Joint Water Supply System Analysis City of Lake Oswego and Tigard Water Service Area</b>	
<b>Staff</b>	<b>Responsibilities</b>
Joel Komarek City of Lake Oswego	Project manager Lake Oswego spokesperson Policymaker workshops Community briefings Public meetings Presentations
Jane Heisler City of Lake Oswego	Media relations Lake Oswego spokesperson
Dennis Koellermeier City of Tigard	Tigard spokesperson Policymaker workshops Community briefings Public meetings
Mark Knudson Carollo Engineers	Consultant team lead Policymaker workshops Public meetings Displays Presentations
Clark Worth Barney & Worth, Inc.	Public outreach lead Stakeholder interviews Outreach & Communications Plan Information materials & tools Policymaker workshops Public meetings Strategic communications Presentations
Michele Neary Barney & Worth, Inc.	Information materials & tools Website / web surveys Mailing list Documentation

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## EVALUATION OF ORGANIZATIONAL AND GOVERNANCE OPTIONS

### 8.1 INTRODUCTION

As the City of Lake Oswego and the Tigard Water Service Area consider long-term water supply improvements, governance becomes a key consideration. Lake Oswego and Tigard have a long-standing relationship for supplying water to the two service areas through the traditional surplus water supply contract (wholesale contract). The nature and complexity of the proposed Joint Water Supply project, and the associated significant capital investments, requires discussion and adoption of a service delivery model beyond the existing surplus water supply contract. There are various governance and institutional models for water utility service that could be used by the Cities. This memorandum describes and compares various governance options to provide a basis for further discussion and consideration by the cities. Once a governance model or concept has been selected, detailed work can proceed to develop the information needed to further refine and implement such a concept.

Much of the content of this chapter was developed by Clark I. Balfour of Cable Huston Benedict Haagenesen & Lloyd LLP. A disclaimer concerning limitations of use of this information is presented in Appendix F.

### 8.2 GOVERNANCE OPTIONS

There are five alternative governance structures for joint water supply: (1) an intergovernmental agreement ("IGA"); (2) a People's Utility District ("PUD"); (3) a domestic water supply district ("Water District"); (4) a County Service District ("Service District"); and (5) a Water Authority ("Water Authority"). The following gives details on each governance structure. A summary and comparison of utility service delivery models is presented in Appendix G.

#### 8.2.1 Methods of Formation

##### 8.2.1.1 Intergovernmental Agreement

The IGA method is formed under ORS Chapter 190 by a written agreement between local governments, and approved by ordinances of each party's Council. The agreement specifies the functions the IGA will perform, describes the governing body, and indicates the powers the parties delegate to the IGA. Following formation of the IGA, the individual participating entities continue in existence and control decisions under the agreement. Amendments can be made as circumstances dictate. Additional parties can be added. No election or boundary decision is required. Formation through this method is the simplest and fastest as the Councils consider what is best for their respective citizens.

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#### **8.2.1.2 People's Utility District**

A PUD is a unit of local government formed under ORS Chapter 261. An example is Rockwood Water People's Utility District. To form a PUD, citizens file a petition, which ultimately results in an election to determine whether or not a PUD should be formed within the designated boundaries. Another method is by resolution from the Board of County Commissioners. If the area for the proposed PUD overlaps County boundaries, each County Commission must adopt a resolution. Presumably, they could hold combined hearings. There is no authority for the County having the largest population or territory to act as the Principal County. The Principal County is the County having the greater portion of property tax assessed value in the proposed district. Each City would need to pass a consent resolution. The election process can be cumbersome. For example, a City is considered a "separate parcel of territory" and the vote of those electors are counted separately. In this case, voters of one City could pass the PUD formation and the others could reject and be excluded. Also, if there are non-contiguous territories within a City, those would be separately counted. A patchwork election result is possible. Drafting the measures in a manner that passage of one is dependent on passage of the others would be necessary.

#### **8.2.1.3 Domestic Water Supply District**

A Water District is a special district formed under ORS Chapter 264. A past example of a District overlaying an entire City is the Tigard Water District (boundaries prior to 1994). To form a Water District, electors file a petition or the Board of County Commissioners initiates proceedings. A consent resolution of each City is necessary. The Board of County Commissioners may approve the formation of the Water District following a public hearing. The Order of the County Commissioners is final unless remonstrances from 100 voters are received. If so, formation is approved upon the majority vote of the electors within the proposed boundaries. Where multiple Counties are involved, the Principal County presides.

#### **8.2.1.4 County Service District**

A County Service District may be formed under ORS Chapter 451 to provide water services. Like a water district, it may be by elector petition or the County Board can initiate proceedings. A consent resolution of each City is necessary. The Board of County Commissioners is the governing body. The Board of County Commissioners will decide on formation following a public hearing. The Commissioners' Order is final unless remonstrances are received from 100 voters. If so, an election on formation would occur. If the area overlaps County boundaries, the consents of the Principal County as discussed above and the Affected County are necessary. The formation process is presided over by the Principal County. The statute is not clear, but seems to imply that if formed, the Principal County Board will be the governing body. This creates interesting questions about voter disenfranchisement in the affected non-represented County. Finally, prior to

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construction of any service facilities, a referendum election may be held on the facilities to be constructed and the method of financing.

The example of a County Service District overlaying Cities is most prevalent in the wastewater and surface water management world. Examples of this would be Tri-City Service District, which provides wastewater treatment, major transmission and pumping for the Cities of Gladstone, Oregon City and West Linn, while the underlying Cities provide collection sewer services. The other example is Clean Water Services, which provides treatment, transmission and pumping as well as collection sewer services. Some of the Cities also provide collection sewer service. Clackamas County Service District No. 1, in the North Clackamas urban area, is another example. The Metropolitan Wastewater Management Commission provides services similar to Tri-City Service District for the Cities of Eugene and Springfield.

#### **8.2.1.5 Water Authority**

A Water Authority typically results from a resolution passed by a combination of two or more cities or districts to consolidate existing water supply entities into a new, single unit of local government under ORS Chapter 450. It may also start by formation petition. The Board of County Commissioners holds a public hearing, which focuses on the ability to provide more efficient and effective service. The election and remonstrance provisions apply. The Water Authority may provide all aspects of service (source to tap or the underlying cities could provide the "retail side" to tap). The major issue with authorities from a City perspective is the inability of a City to withdraw infrastructure upon annexation into the Authority as it could with a District. That may not be an issue in this case if the two cities seek to form an Authority with co-terminus boundaries.

### **8.2.2 Governing Bodies**

#### **8.2.2.1 Structures**

The Water District, PUD, and Water Authority entities are generally governed by a five- or seven-member board of separately elected directors with equal voting power. Directors of PUDs, Water Districts and Water Authorities are elected to alternating four-year terms. Upon approval of the formation order for a Water District, Authority or County Service District by the Board of County Commissioners, one and possibly two things occur. First, if remonstrances are received, there is an election on formation at the next available election date. Whether remonstrances are received or not, there is an election for the five or seven Board seats. The PUD elections on both formation and new Board members are automatic. These are non-lucrative offices so absent a City Charter prohibition, a Councilor could run for the new Board, but there is a good chance that the Board members will be new people, separately elected, and free to develop their own consensus and direction on water service. Cities would still need to negotiate transfer of the assets and this is significant leverage, but once transferred, the Cities' ability to control water policy erodes

significantly. The Board of County Commissioners governs the County Service District. The concept of a separately elected Board may be the main issue for the Councils.

In contrast, the form of governing body for an IGA is determined by agreement. Assets and powers are delegated. How decisions are made and how money is spent are all negotiated up front in the agreement. The parties may choose to consolidate existing water supply departments or let them stand as is. They will create a board of appointed directors or commissioners, and appoint administrative or managing officers. Board members are appointed by the City Councils rather than elected. They may be either appointed or elected officials from the individual parties. Some models have Councilors while others have a combination of Councilors/Staff and citizens. The agreement may provide for population based voting, equal voting or supermajority voting on key issues. The agreement terms are negotiated to fit the parties' desires. A structure is not imposed by statute.

#### **8.2.2.2 Powers**

All models have the relevant powers, including eminent domain, to provide the full range of service. The PUD, Water District, County Service District, and Water Authority governing bodies and Special Districts cannot regulate zoning or land use. They must follow the provisions of the applicable land use decision maker: County or City. In contrast, the individual Cities to an IGA may delegate some authority to carry water related land use issues and control extension of services consistent with state law and the Metro Code. Even without delegation, the Cities probably have more comfort knowing that water policy and service are in conformance with other City policies.

### **8.2.3 Operating Characteristics**

#### **8.2.3.1 Operations and Maintenance**

Once we are past the governance, powers, and formation issues, daily operations and maintenance of the facilities under each governance structure is essentially the same. Each governance structure provides the authority to hire administrative staff and operate facilities. The entities may also contract with private companies or existing public agencies (including the underlying cities) for staffing and services. As the Table shows, utility ratemaking, system development charges, procurement and other typical governmental powers and restrictions are all virtually the same.

#### **8.2.3.2 Ownership**

##### **8.2.3.2.1 Intergovernmental Agreement**

The assets along with associated liabilities of the water supply system are often assigned to the entity and valued as a partnership contribution to capital. There is flexibility so that title or deed transfer is not necessary. The agreement may specify that specific assets are held by individual parties to the agreement and dedicated for the use and benefit of the group.

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This has occurred in the Joint Water Commission. South Fork is an example where all supply assets are held in the name of South Fork. There can be formulas and buy-out mechanisms if a party wishes to sell or transfer. That can be coupled with mandatory buy-outs by the remaining partners. Upon dissolution, the assets and liabilities of an IGA are distributed under the terms of the agreement.

#### **8.2.3.2.2 *Districts and Authorities***

The creation of any Water District, County Service District, PUD or Water Authority winds up on the desk of the County Commissioners. There are some variations with a PUD, but generally the factors the Board of County Commissioners will consider are whether service will be provided in a more efficient or effective manner. The ownership of assets and financial structure are key components. In the formation proceeding, it would need to be clearly articulated what assets and liabilities will be transferred and on what conditions. It would have to be by mutual agreement with the underlying Cities. In the absence of a mutual agreement, the District or Authority cannot compel transfer or condemn and pay for the assets. One public entity cannot condemn another.

Once transferred (and monetary or non-monetary consideration may be involved) then the assets belong to another separate public entity. While there may be reverter rights under the plan of distribution and liquidation if the new entity is dissolved, the practical effect is that the assets are gone and owned by a separately elected, independent governing body. The Cities at that point would not have the ability to influence policies such as line extensions, timing of major capital improvements, rate increases, or other matters that may have an impact on other City values and practices.

Another curious situation is that there is no entity for the City to make a binding commitment with until after formation and election of the District/Authority Board of Directors. The formation proceeding carries with it a leap of faith that if the Board of County Commissioners approves and the District is formed, then good faith negotiations will yield a resulting transfer. That may not happen. If the mutual agreement referred to above is not consummated between the Council and the new Board, then there could be a situation where a shell organization lays over the City. A shell organized with no assets is probably not an impact to the City other than nuisance. It does matter in the case of a PUD.

It is important to note that in the case of Districts and Authorities the formation order limits them to the type of service it will provide. In the case of PUDs, formation automatically vests the power to provide water and electricity service. There is no menu approach in the statutes. There are nine PUDs in Oregon. Six provide power only, and three provide water only. However, the three that provide water are fully empowered to enter into electricity service. An unintended consequence of PUD formation could be that while it is for water only, once formed the governing body of the PUD may decide to acquire investor-owned electric utility assets within its boundaries which may cause extreme discord within the City. The Councils may be faced with criticism that they created an organization for water

purposes that changed to something much broader than what the Council or their citizens had in mind. Admittedly, the ability to energize and acquire assets will probably be voted upon by the people within the City, but the Cities need to be prepared that they may have an unintended consequence if the PUD model were chosen.

#### **8.2.4 Capital Financing and Rates**

Each governance structure may set rates, system development charges, and issue revenue bonds. The authority to issue revenue bonds is generally subject to the majority vote of the electors by remonstrance. There are some variations with the PUD. IGAs may issue revenue bonds either through the individual parties to the agreement or by delegation of power to the IGA.

In addition, most governance structures are also authorized to issue general obligation bonds and levy taxes. The authority to issue general obligation bonds or to obtain a local operating levy is also subject to the majority vote of the electors. IGAs, however, cannot be delegated power to issue general obligation bonds or levy taxes.

#### **8.2.5 Additional Issues**

##### **8.2.5.1 Annexation**

Annexation statutes and extension of services are large issues. Cities may have different views and restrictions by Charter or Comprehensive Plan as to what, when and where services are provided to unincorporated areas. Districts and Authorities may not have these limitations so that they become more ad hoc policy choices.

Annexation to an existing entity generally requires the majority vote of electors in the new territory. For Water Districts, County Service Districts, and Water Authorities, annexation also generally requires the majority vote of the existing entity to which the new territory will be annexed. This latter point is open with respect to PUDs. In contrast, new territory would be subject to an IGA as each City makes a decision on annexation and the agreement provisions react to the expanded territory as specified.

##### **8.2.5.2 New partners**

In addition to annexation, Water Districts and Water Authorities may annex, merge or consolidate with cities and other districts or authorities. PUDs, on the other hand, cannot annex territory already part of another PUD except by dissolving and forming a new PUD. PUDs cannot merge or consolidate with non-like kind districts. They can only annex. The key point is that once a new entity is created, new partners and territory could be brought in that are objectionable to the original City founders. With an IGA, new partners require unanimous consent.

### **8.2.5.3 Withdrawal/Dissolution**

Withdrawal from a District or Authority generally requires the majority vote of the electors in the territory seeking to withdraw following a public hearing. Individual territories within a PUD, however, cannot withdraw without dissolving the PUD. Only where the PUD cannot provide service is withdrawal allowed. Withdrawal or territory transfer under the District/Authority statutes is not clear. The safer thing to conclude is once in, always in.

Dissolution generally requires the majority vote of electors upon the petition of the governing body along with a plan of distribution. An IGA, however, may be dissolved by unanimous vote of the individual parties to the agreement.

## **8.3 ORGANIZATIONAL & GOVERNANCE FRAMEWORK**

After a preferred governance model has been identified by the parties, formation of a new joint water supply system will require additional decisions regarding key considerations such as specific objectives and scope of the joint system, fiscal authority, system ownership, and operational standards. A summary of potential governance and organizational details is provided in Appendix H. Decisions regarding these and other key issues will help establish a framework for an agreement between Lake Oswego and Tigard to form a joint water supply system.

## **8.4 RECOMMENDATIONS**

It is clear that all the service delivery models can provide efficient and effective water service on a utility revenue-based system appropriate for Tigard and Lake Oswego. In our opinion, the real issue is control and certainty. The IGA provides the best path for the Cities.

An intergovernmental agreement ("IGA") is the simplest form of structure for water supply. A surplus water supply contract is an IGA. Although there are some limitations, an IGA provides the most flexibility regarding the relationship between the participating entities. An IGA may be formed without a vote by the electors; the governing body of an IGA may be appointed by the participating cities; the participating entities may retain ownership in the facilities like a partnership agreement; and the agreement between the parties defines the powers of the new entity. It is also easier to withdraw from or dissolve an IGA than the other governance structures. It is also easy to add new partners or make an amendment. An IGA is limited by the inability to levy taxes or issue general obligation bonds. However, these factors are not usually major drivers in utility settings because of the ability of the entity and its underlying partners to charge utility fees and charges and system development charges.

There are three excellent examples of the intergovernmental agreement model. The first is the Joint Water Commission, consisting of the Cities of Hillsboro, Beaverton, Forest Grove, Tigard and the Tualatin Valley Water District. The Joint Water Commission owns supply, treatment, storage, and transmission facilities in the Tualatin River system. This partnership has been in place since 1976. Tualatin Valley and Tigard joined subsequent to 1976. The second example is the North Clackamas County Water Commission consisting of the Sunrise Water Authority (including the City of Happy Valley and the City of Damascus) Oak Lodge Water District and the City of Gladstone. That entity owns supply, treatment and transmission facilities on the Clackamas River facility up stream from the Lake Oswego intake. A third example is the South Fork Water Board consisting of Oregon City and West Linn. It also owns treatment, transmission, and storage facilities on the Clackamas River just upstream from the Lake Oswego intake. While there will always be some issues that arise in any partnership, these entities show a tried and proven track record of long-term success.

If Lake Oswego and Tigard agree with this recommendation to use an IGA as the basis of a joint water supply system, it is further recommended that the parties engage in a process of developing the anticipated terms of such an agreement. The list of issues identified in Appendix I of this report is intended to serve as a starting point for further discussion between the Cities. It is recommended that the financial terms of such an agreement, including fiscal authority, system ownership, and fiscal standards, be an initial priority since these terms will establish the basis for subsequent financial evaluation of the proposed joint supply system.

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Figure A-1  
 EXISTING AND PROPOSED  
 TRANSMISSION MAIN ALIGNMENT  
 JOINT WATER SUPPLY ANALYSIS  
 CITY OF LAKE OSWEGO AND  
 TIGARD WATER SERVICE AREA

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**Figure A-2**  
**EXISTING AND PROPOSED**  
**TRANSMISSION MAIN ALIGNMENT**  
**JOINT WATER SUPPLY ANALYSIS**  
**CITY OF LAKE OSWEGO AND**  
**TIGARD WATER SERVICE AREA**

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Figure A-3  
 EXISTING AND PROPOSED  
 TRANSMISSION MAIN ALIGNMENT  
 JOINT WATER SUPPLY ANALYSIS  
 CITY OF LAKE OSWEGO AND  
 TIGARD WATER SERVICE AREA

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**Figure A-4**  
**EXISTING AND PROPOSED**  
**TRANSMISSION MAIN ALIGNMENT**  
**JOINT WATER SUPPLY ANALYSIS**  
**CITY OF LAKE OSWEGO AND**  
**TIGARD WATER SERVICE AREA**

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**Figure A-5**  
**EXISTING AND PROPOSED**  
**TRANSMISSION MAIN ALIGNMENT**  
**JOINT WATER SUPPLY ANALYSIS**  
**CITY OF LAKE OSWEGO AND**  
**TIGARD WATER SERVICE AREA**

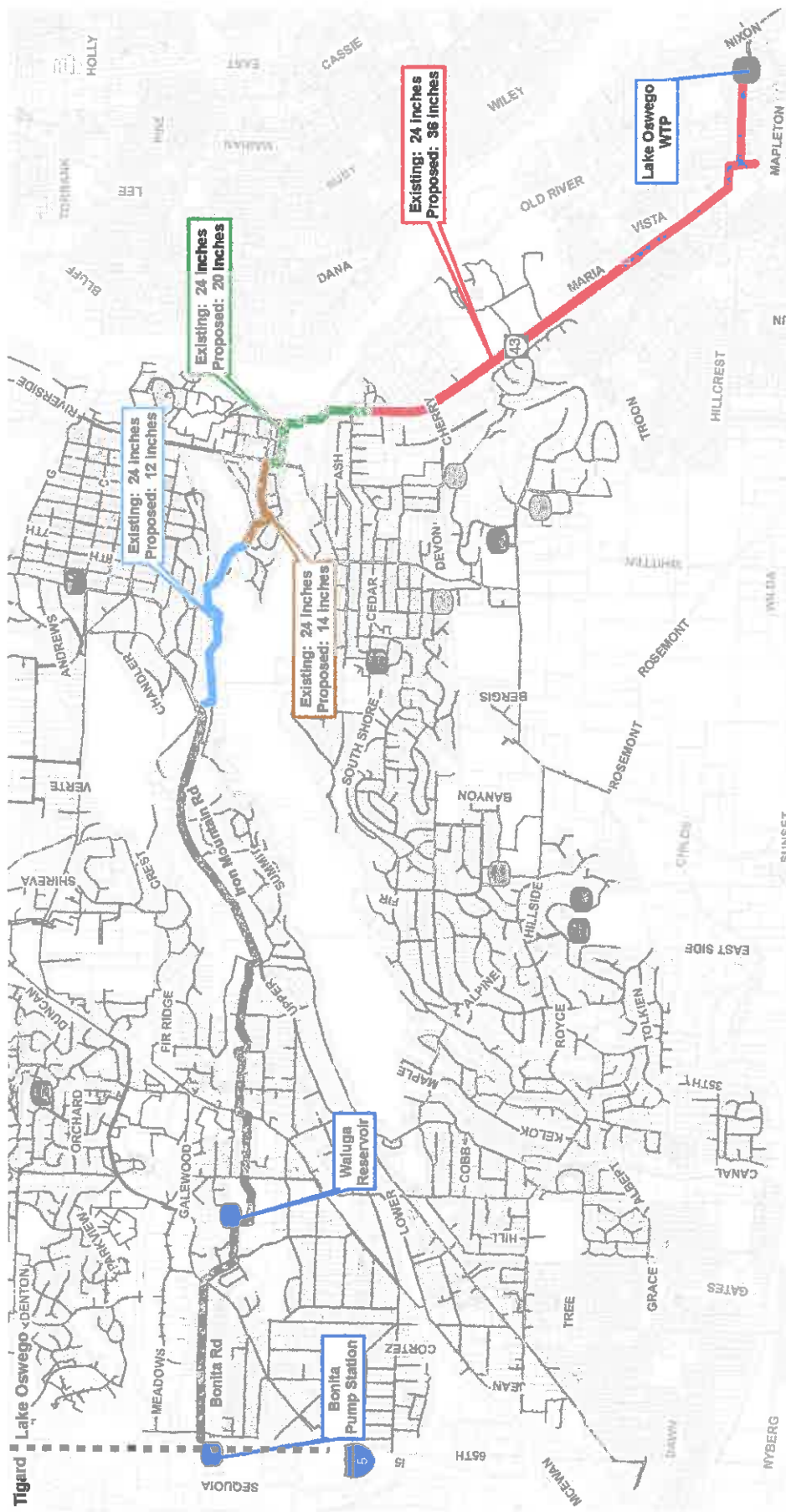
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Figure A-6  
**EXISTING AND PROPOSED  
 TRANSMISSION MAIN ALIGNMENT**  
 JOINT WATER SUPPLY ANALYSIS  
 CITY OF LAKE OSWEGO AND  
 TIGARD WATER SERVICE AREA



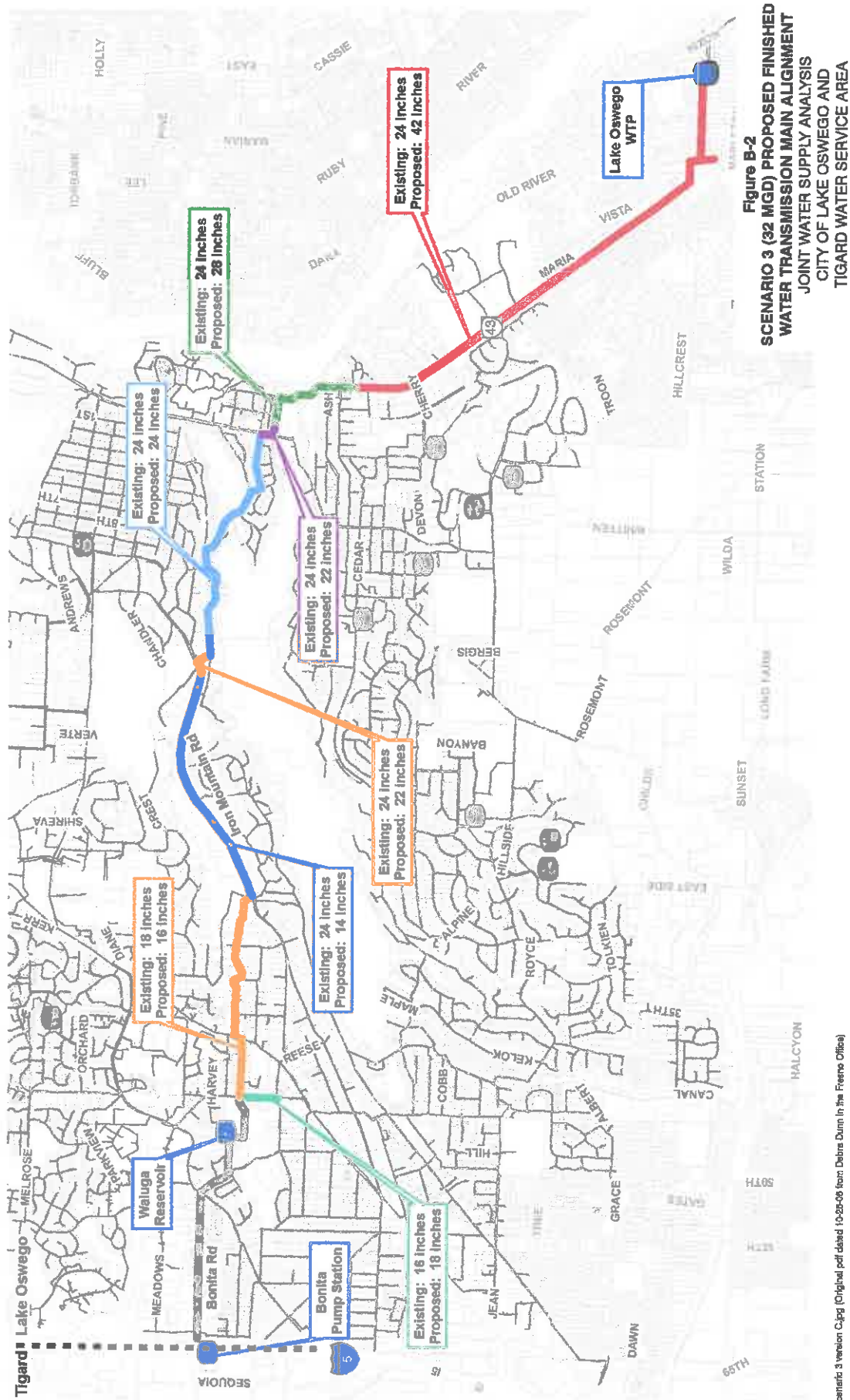
Figure A-7  
**EXISTING AND PROPOSED  
 TRANSMISSION MAIN ALIGNMENT**  
 JOINT WATER SUPPLY ANALYSIS  
 CITY OF LAKE OSWEGO AND  
 TIGARD WATER SERVICE AREA



**Figure B-1**  
**SCENARIO 2 (24 MGD) PROPOSED FINISHED**  
**WATER TRANSMISSION MAIN ALIGNMENT**  
 JOINT WATER SUPPLY ANALYSIS  
 CITY OF LAKE OSWEGO AND  
 TIGARD WATER SERVICE AREA

Scenario 2 version C.dwg (Original pdf created 10-26-08 from Debra Dunn in the Finance Office)

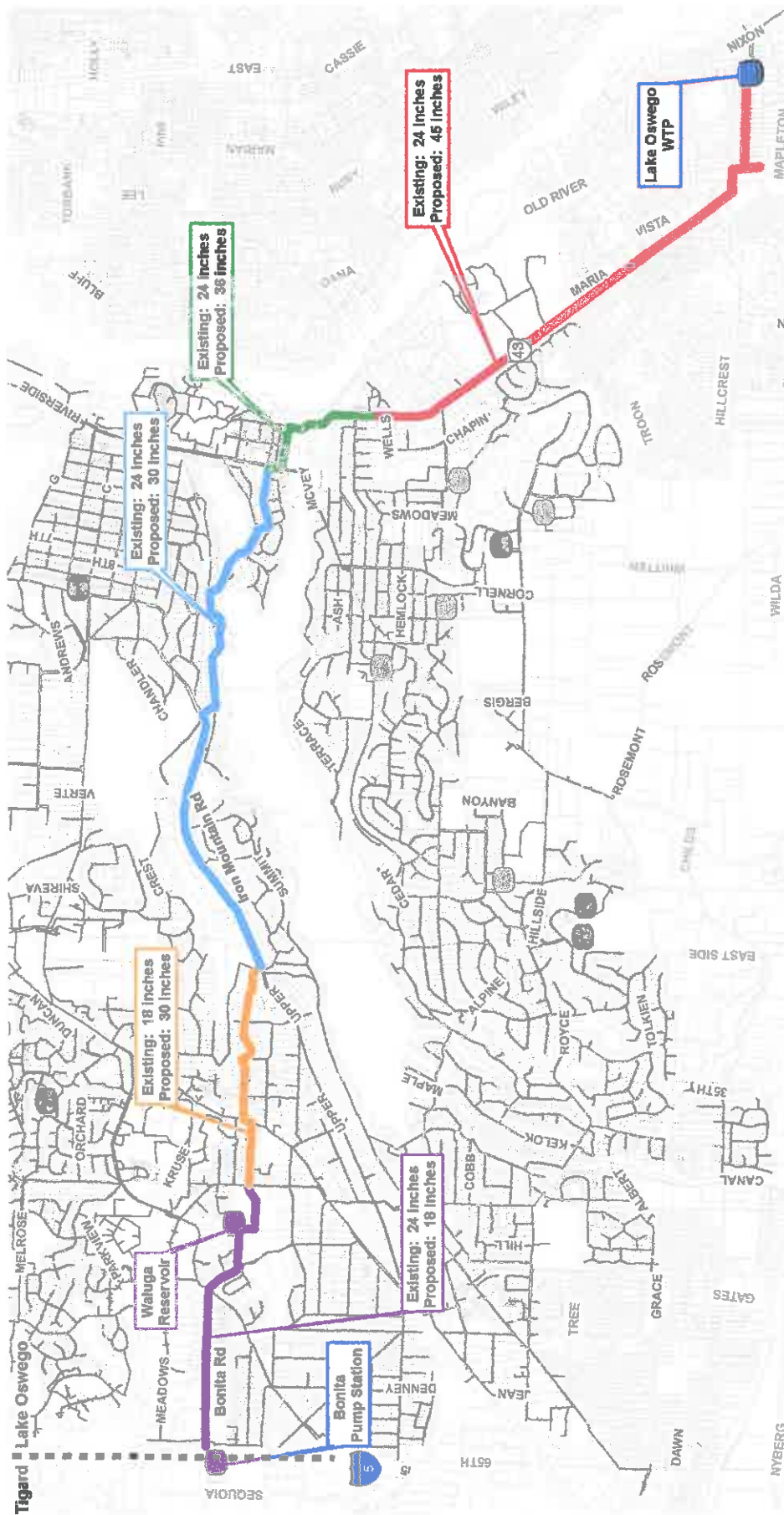
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Scenario 3 version C.dwg (Original pdf dated 10-26-06 from Debra Dunn in the Fresno Office)

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**Figure B-3**  
**SCENARIO 4 (38 MGD) PROPOSED FINISHED**  
**WATER TRANSMISSION MAIN ALIGNMENT**  
 JOINT WATER SUPPLY ANALYSIS  
 CITY OF LAKE OSWEGO AND  
 TIGARD WATER SERVICE AREA

Scenario 4 version C1.jpg (Original pdf dated 10-28-08 from Debra Dunn in the Finance Office)

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**Appendix C - Municipal Water Rights on the Clackamas River**

Current Water Rights Holder	Water Rights Holder On Certificate	Source	Source Description	Certificate Number	Status	Permit No.	Application Number	Transfers/Amendments	Amount cfs	Amount mgd	Priority Date	
City of Estacada	City of Estacada	Clackamas	Clackamas River	C26471	Non-cancelled	S 23610	S 28972		2	1.29	5/10/1955	
City of Estacada	City of Estacada	Clackamas	Clackamas River	C50566	Non-cancelled	S 37376	S 49891		2	1.29	1/19/1973	
City of Gladstone	City of Gladstone	Clackamas	Clackamas River		Pending Certification	S 20145	S 25728	T5791	4	2.59	3/15/1951	
City of Gladstone	City of Gladstone	Clackamas	Clackamas River		Non-cancelled	43170	57226	T7434	1.73	1.12	3/29/1978	
City of Gladstone	City of Gladstone	Clackamas	Clackamas River		Non-cancelled	46120	60632	T7434	8	5.17	4/21/1981	
City of Lake Oswego	City of Lake Oswego	Clackamas	Clackamas River	C76332	Non-cancelled	S 32410	S 43365	T8538	25 (Certificated) 25 (Pending)	16.16 (Certificated) 16.16 (Pending)	3/14/1987	
City of Lake Oswego	City of Lake Oswego	Clackamas	Clackamas River		Non-cancelled	S 37839	S 50819		9	5.82	7/6/1975	
Clackamas River Water	Clackamas River Water	Clackamas	Clackamas River		Pending Application	File-80438			77.4	50.02	6/13/1995	
Clackamas River Water	Clackamas River Water	Clackamas	Clackamas River		Pending Application	File-80465			71.5	46.21	6/15/1995	
Clackamas River Water	Clackamas River Water	Clackamas	Clackamas River	C37794	Non-cancelled	27925	37245		15	9.69	4/25/1982	
Clackamas River Water	Clackamas River Water	Clackamas	Clackamas River	C64979	Non-cancelled	33586	44939		25	16.16	5/20/1988	
Clackamas River Water	Clackamas River Water	Clackamas	Clackamas River		Non-cancelled	S 34426	S 46072		6.5	4.20	5/23/1989	
North Clackamas County Water Commission	Mt. Scott Water District	Clackamas	Clackamas River		Pending Application		S-74056		10	6.46	18-May-1994	
Oak Lodge Water District (NCCWC)	Oak Lodge Water District	Clackamas	Clackamas River		Non-cancelled	S-35297	47144	T7389	62	40.07	7/1/1970	
South Fork Water Board	City of Oregon City	Clackamas	S. Fork Clackamas R.	C1067	This certificate was cancelled by T6162. A confirming right should be issued.	2257	3787	T 8162	6	3.88	7/17/1914	
South Fork Water Board	City of Oregon City	Clackamas	S. Fork Clackamas R.		Non-cancelled	3778	5942		20	12.93	1/16/1918	
South Fork Water Board	South Fork Water Commission	Clackamas	Clackamas River		Partial Proof of 14.48 mgd of total, likely only 15 cfs to be certificated, due to available flows.	22681	26676		60	38.78	8/3/1953	
South Fork Water Board	City of Oregon City and City of West Linn	Clackamas	S. Fork Clackamas River and Memorial Creek			9982	11007		30	19.39	08/17/1926 for S Fork; 1/16/1931 for Memorial	
									total	460.13	297.39	
									total permits	226.23	146.22	
									total certificates	75.00	48.47	
									total applications	158.90	102.70	
									Total certificates and permits	301.23	194.69	
									Total certificate and Permits less S.Fork permits (50 cfs)	251.23	182.37	
									Total certificates and permits less S. Fork, Lake Oswego, and Estacada	186.23	121.66	

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Date: July 6, 2007

To: **Mark Knudsen, Carollo Engineers**  
**Cara Wilson, Carollo Engineers**

From: Ed Cebron, FCS Group  
Samantha Holert, FCS Group

Re: **Update - Lake Oswego/Tigard Joint Supply Analysis**

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The purpose of this memo is to describe the general approach and findings of the joint supply system analysis conducted by FCS Group for the City of Lake Oswego and the City of Tigard. Data for this analysis was supplied by Carollo Engineers and the Cities. The role of FCS Group was to develop an analysis that provided comparative costs and evaluate the economic advantages and disadvantages of each scenario.

In developing this comparative analysis, FCS Group had the following responsibilities: to define total costs of each supply option, allocate these costs between the Cities of Lake Oswego and Tigard, and quantify the economic costs of each project, using present value and unit costs. This provided the basis of comparison to evaluate Tigard's supply options and the potential benefit to Lake Oswego of developing their source into a joint supply.

The three supply options evaluated, as defined in Carollo's Technical Memorandum No. 1, include:

- **Scenario 2 - Lake Oswego "Go-It-Alone" (24 mgd):** Provides the required capacity to treat the build-out demands of the Lake Oswego water service area. Under this scenario, Tigard does not receive any supply capacity.
- **Scenario 3 – Senior Water Right Capacity (32 mgd):** Represents capacity needed to deliver the senior water right of Lake Oswego. This capacity exceeds the build-out demands of the Lake Oswego water service area and thus provides capacity to meet a share of Tigard's demand.
- **Scenario 4 – Combined Junior and Senior Water Right Capacity (38 mgd):** Provides capacity needed to deliver the senior and junior water rights of Lake Oswego. This capacity meets the build-out needs of Lake Oswego, while providing the majority of Tigard's demand needs through build-out.

A fourth and fifth supply scenario were added, as defined below:

- **Scenario 5 – Combined Water Right Capacity, Interim Supply to Lake Oswego:** Beginning in 2016, scenario provides capacity needed to meet build-out needs of Lake Oswego, while providing the majority of Tigard's demand. Until 2016, assumes that, to the extent Lake Oswego needs peak water



capacity, a water trade will occur with Tigard. No net purchase of water is assumed due to limited duration and volume constraints.

- **Scenario 6 – Tigard only Scenario, Tigard Continues Purchasing Water from Portland:** Tigard meets all demand needs through water purchases from Portland Water Bureau.

### **General Approach**

The comparative costs developed for this evaluation were generated from present value computations based on the demand forecasts of each city, parameters of each supply scenario, and the capital and operating costs associated with them. To develop such a comparison, the following data was required:

#### **1. Supply requirements for each City:**

Carollo provided (through Technical Memorandum 1 and subsequent demand updates) 2005 and 2030 peak day demand (PDD) and average day demand (ADD) figures for both the Cities of Lake Oswego and Tigard. Using linear interpolation, we forecasted annual demands for each City from FY 2005/06 through 2055/56. Both Lake Oswego and Tigard reach build-out demand in 2030.

#### **2. Definition of supply scenarios:**

The supply scenarios evaluated in this analysis are defined in the introduction of this memorandum. In Scenarios 2 and 3, Tigard is not able to obtain all of their capacity needs from Lake Oswego. Therefore, to create a complete cost comparison, the costs incurred to fill these excess capacity needs were also incorporated.

Two alternative regional sources of supply were analyzed for Tigard's use: the Joint Water Commission (JWC) and the Willamette River Project (Willamette). Should Tigard become a partner in either JWC or Willamette, the source would not be available until FY 2016/17.

In Scenario 6, Tigard does not invest in any supply system; instead they purchase water on a wholesale basis to fulfill all of their water demand needs.

To meet Tigard's needs until 2017, this analysis assumes water purchases from Portland. The analysis uses the terms of Tigard's current contract with Portland and the 2006 Portland water cost of \$1.02 per ccf, escalated annually at 5.6%. The floor constraint provided in the contract are also taken into account, and thus in all scenarios, this minimum amount is purchased from Portland. In scenarios where more capacity is needed in these interim years, it is assumed that Tigard will purchase more water from Portland to meet their needs.

Tigard's supply scenarios were further defined as follows:

- **Scenario 2A:** Tigard invests in expanded JWC capacity to fulfill demands not met by the Lake Oswego source, as depicted in Scenario 2. Portland is an interim source for all water needs in the first 10 years.
- **Scenario 2B:** Tigard invests in expanded Willamette capacity to fulfill demands not met by the Lake Oswego source, as depicted in Scenario

2. Portland is an interim source for all water needs in the first 10 years. Regional capital and operation costs in this scenario assume major cost-sharing partners also invest in Willamette capacity.
- **Scenario 2C:** Tigard invests in expanded Willamette capacity to fulfill demands not met by the Lake Oswego source, as depicted in Scenario 2. Portland is an interim source for all water needs in the first 10 years. Regional capital and operation costs in this scenario assume Tigard must develop Willamette without the help of major cost-sharing partners.
  - **Scenario 3A:** Tigard invests in expanded JWC capacity to fulfill demands not met by the Lake Oswego source, as depicted in Scenario 3. Required contract quantities are purchased from Portland for the first 10 years.
  - **Scenario 3B:** Tigard invests in expanded Willamette capacity to fulfill demands not met by the Lake Oswego source, as depicted in Scenario 3. Required contract quantities are purchased from Portland for the first 10 years. Regional capital and operation costs in this scenario assume major cost-sharing partners also invest in Willamette capacity.
  - **Scenario 3C:** Tigard invests in expanded Willamette capacity to fulfill demands not met by the Lake Oswego source, as depicted in Scenario 3. Required contract quantities are purchased from Portland for the first 10 years. Regional capital and operation costs in this scenario assume Tigard must develop Willamette without the help of major cost-sharing partners.
  - **Scenario 4:** Tigard does not invest in any regional source. Required contract quantities are purchased from Portland for the first 10 years. In later years, it purchases water from Portland to meet any increments of demand not met by Lake Oswego source.
  - **Scenario 5:** Tigard does not invest in any regional source. Portland is an interim source for all water needs in the first 10 years. In later years, it purchases water from Portland to meet any increments of demand not met by Lake Oswego source.
  - **Scenario 6A:** Tigard does not invest in Lake Oswego or any other regional source. Instead, it purchases all water from Portland, based on terms of current contract and adjustments for inflation.
  - **Scenario 6B:** Tigard does not invest in Lake Oswego or any other regional source. Instead, it purchases all water from Portland, utilizing a gravity connection for a portion of the purchases. The unit price of water is based on terms of current contract but also includes a pumping discount on 2.6 mgd of purchased water, during off-peak months. This discount of \$0.29 per ccf (in 2007 dollars) is also escalated using the inflation rate of 5.6%.

It should be emphasized that this analysis assumes that the percentage of PDD Tigard receives from each of its supply sources (less the capacity realized via Aquifer Storage and Recovery) determines the percentage of ADD Tigard will use from the corresponding source. This assumption is used for two reasons: first, to avoid a distortion of volumetric unit costs for individual supply sources; and second, to provide reasonable assurance that wholesale cost structures are consistent with the planned utilization. The exception to this occurs in the first ten years of Scenario 3 and 5, when Tigard must first fulfill its contract purchases to Portland and then obtain the remainder of water from Lake Oswego.

Exhibit 1 below summarizes how Lake Oswego's and Tigard's PDD and ADD are met in each of the supply scenarios.

**Exhibit 1: 2030 Water Needs by Source of Supply**

	City of Lake Oswego: Sources of Supply Assumed	
	Lake Oswego	
<b>Scenario 2</b>	PDD: 23.9 mgd ADD: 10.4 mgd	
<b>Scenario 3</b>	PDD: 23.9 mgd ADD: 10.4 mgd	
<b>Scenario 4</b>	PDD: 23.9 mgd ADD: 10.4 mgd	
<b>Scenario 5</b>	PDD: 23.9 mgd ADD: 10.4 mgd	
<b>Scenario 6</b>	N/A	

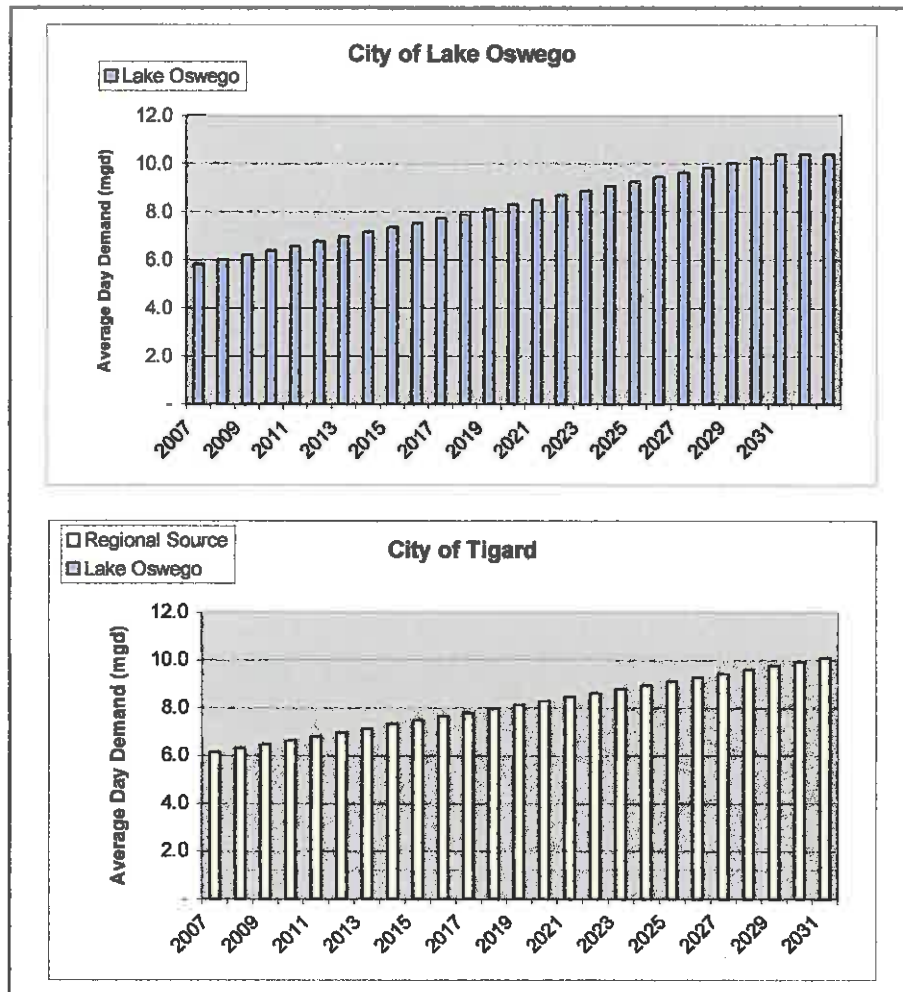
	City of Tigard: Sources of Supply Assumed		
	Aquifer Storage and Recovery	Lake Oswego	Other Regional Sources
<b>Scenario 2</b>	PDD: 3.5 mgd ADD: 0 mgd	PDD: 0 mgd ADD: 0 mgd	PDD: 17.6 mgd ADD: 10.1 mgd
<b>Scenario 3</b>	PDD: 3.5 mgd ADD: 0 mgd	PDD: 8.1 mgd ADD: 4.6 mgd	PDD: 9.5 mgd ADD: 5.5 mgd
<b>Scenario 4</b>	PDD: 3.5 mgd ADD: 0 mgd	PDD: 14.1 mgd ADD: 8.1 mgd	PDD: 3.5 mgd ADD: 2.0 mgd
<b>Scenario 5</b>	PDD: 3.5 mgd ADD: 0 mgd	PDD: 14.1 mgd ADD: 8.1 mgd	PDD: 3.5 mgd ADD: 2.0 mgd
<b>Scenario 6</b>	PDD: 3.5 mgd ADD: 0 mgd	PDD: 0 mgd ADD: 0 mgd	PDD: 17.6 mgd ADD: 10.1 mgd

The following graphs, Exhibits 2 through 6, illustrate the assumed use of each source (ADD) in each of the supply scenarios. As stated in the previous section, it

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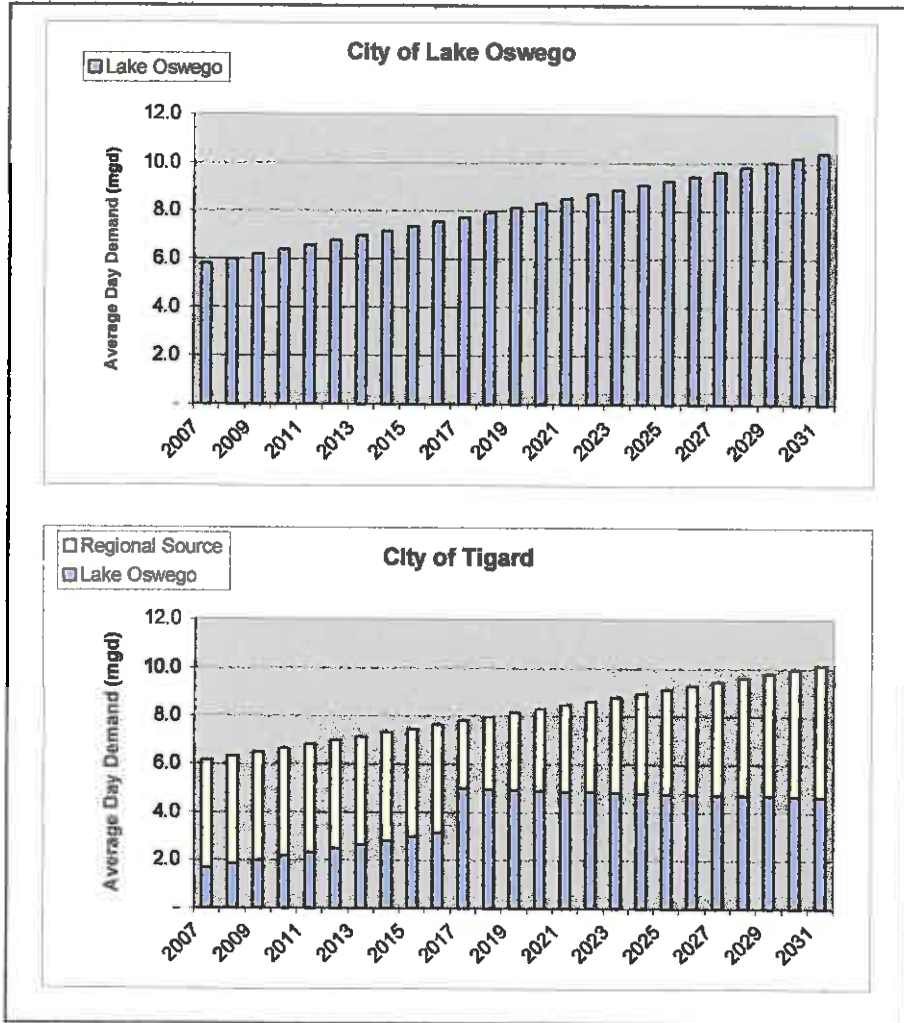
was assumed Tigard receives ADD from each source in proportional to PDD, as described in the preceding tables, excluding the portion of PDD provided to Tigard via ASR.

**Exhibit 2: Scenario 2 Utilization by Source (ADD)**



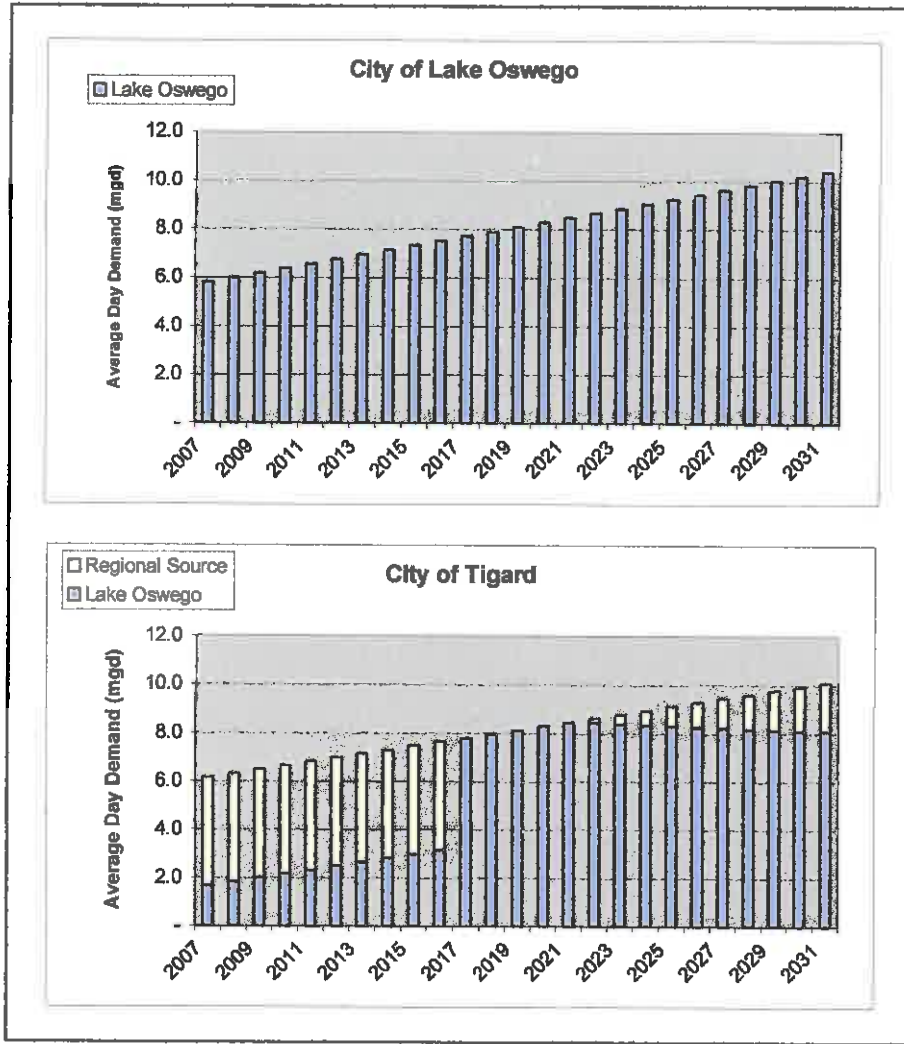
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**Exhibit 3: Scenario 3 Utilization by Source (ADD)**

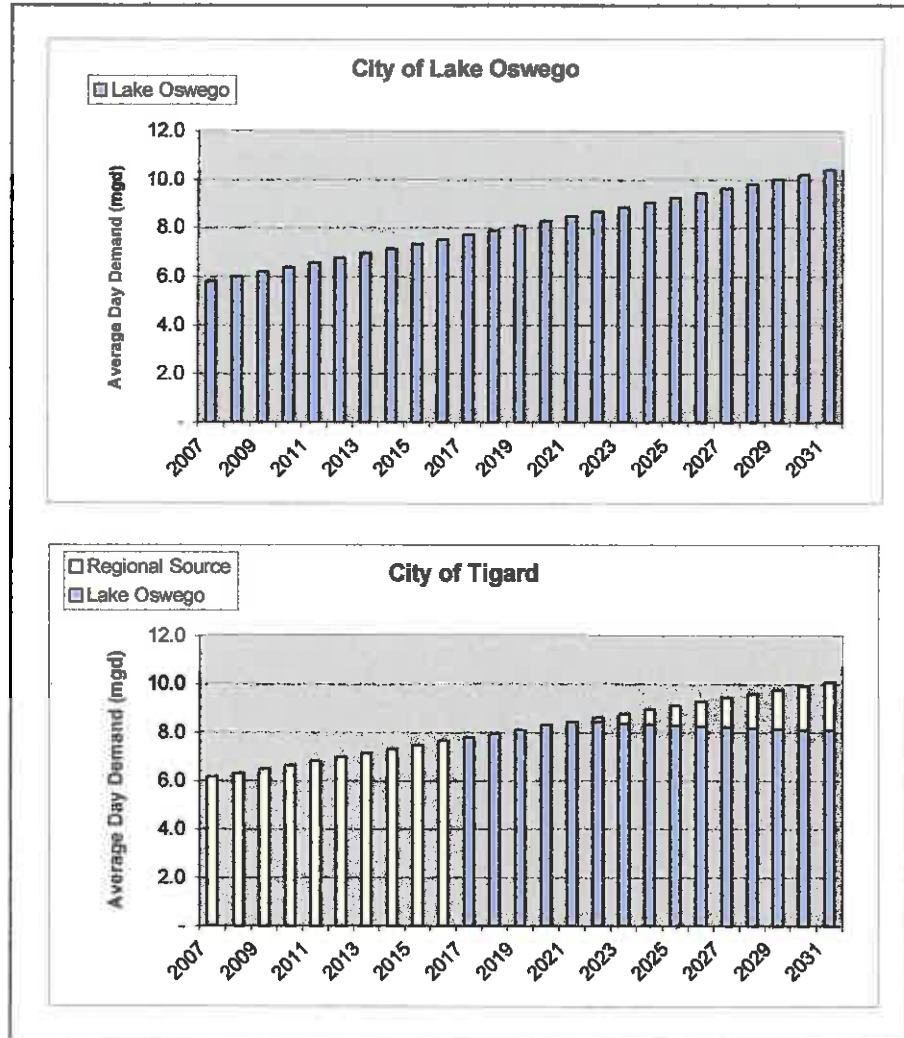


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**Exhibit 4: Scenario 4 Utilization by Source (ADD)**

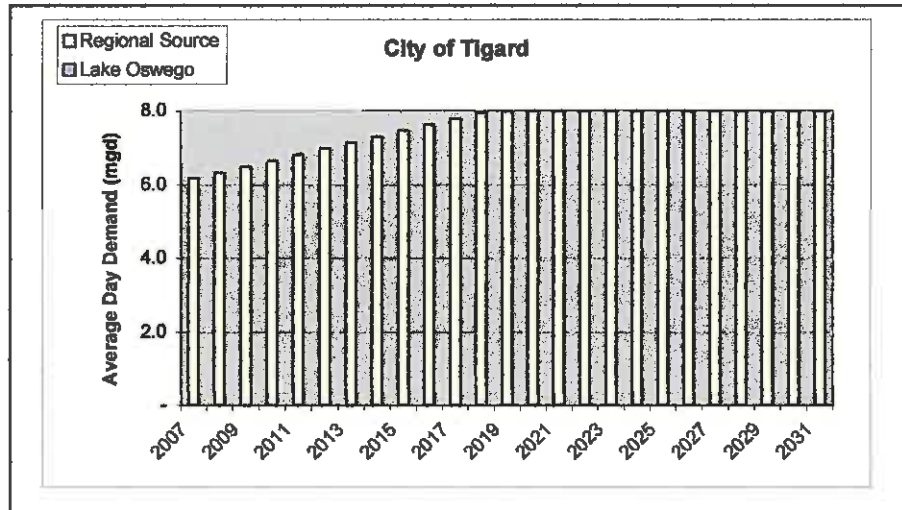


**Exhibit 5: Scenario 5 Utilization by Source (ADD)**



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**Exhibit 6: Scenario 6 Utilization by Source, Tigard only (ADD)**



**3. Definition of costs for each supply scenario:**

**A. Lake Oswego Supply System**

Capital costs for Lake Oswego’s and Tigard’s joint supply scenarios were provided by Carollo in Technical Memorandum 2 and subsequent updates. An allocation basis for all project costs was determined for each City. An appropriate “buy-in” cost for Tigard to pay to Lake Oswego was also assessed. This buy-in took into account plant assets owned by Lake Oswego that would also provide benefit to Tigard.

Capital costs, along with the fixed assets eligible for Tigard’s buy-in, were allocated either on a proportional basis (costs split on each City’s share of total capacity) or an incremental basis (costs split on each City’s share of increased capacity). The schedule of these project costs was also provided by Carollo. A 6% annual inflation factor was applied to the capital cost estimates (expressed in current costs) to reflect year of construction dollars. Reimbursement and replacement costs have not been factored into this analysis.

The O&M costs corresponding to each capital project were also defined in Technical Memorandum No. 2. These costs were categorized based on whether or not they fluctuate with water flow. Annual fixed costs were allocated to each City using the corresponding project’s capacity allocation percentage. Along with the annual O&M costs, Carollo provided equivalent costs per million gallons. To assign shares of variable costs, this unit cost was applied to each City’s ADD supplied from the project, and then annualized. A 3.5% general inflation factor has been applied to future O&M costs to reflect future dollars.

The basis on which each of the costs has been allocated is shown in Exhibit 7.

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### Exhibit 7: Lake Oswego Supply System Cost Allocation Matrix

	Capital Costs	Buy-In for City of Tigard	O&M Cost Assumptions
Raw Water Intake	Proportional: Total replacement; costs of new intake proportional to each City's share of total capacity	None: Existing intake to be completely replaced.	Costs assumed to vary based on water consumption; allocated to each city based on forecasted average day demand (ADD).
Raw Transmission Main	Proportional: Replacement; costs of new transmission main proportional to each City's share of total capacity	Proportional: Existing transmission main to be used for emergencies; shared by both parties.	N/A
Water Treatment Plant: Land	N/A	Proportional: Land benefits both Cities.	N/A
Water Treatment Plant: Structures & Equipment	Incremental: Addition to existing WTP; costs of new WTP split on each City's share of increased capacity.	None: New WTP sufficient to serve City of Tigard. There may be rationale for some fractional buy-in to some existing structures or equipment.	Power, chemical and sludge disposal costs assumed to vary with usage. Remaining O&M costs assumed fixed. Allocate variable costs on each city's ADD; fixed costs on proportion of WTP capital expense.
Finished Water Main	Incremental: Main added parallel to existing; costs of new main split on each City's share of increased capacity needs.	None: New main sufficient to serve City of Tigard.	N/A
Waluga Reservoir: Land	N/A	Proportional: Land benefits both Cities.	N/A
Waluga Reservoir: Structures & Equipment	Proportional: Reservoir added to serve both Cities. Costs of new reservoir proportional based on storage analysis in TM 2.	None: New reservoir sufficient to serve Tigard's future storage needs.	N/A
Bonita Pump Station	All to Tigard: Pump station to only serve City of Tigard.	None: Existing pump station to be completely replaced.	Costs assumed to vary based on water consumption; 100% of costs to Tigard, based on their forecasted ADD.
Interim Supply to Lake Oswego	All to Lake Oswego: Built to serve only City of Lake Oswego.	None: Built to serve Lake Oswego.	N/A
Computer Systems/Software	N/A	Proportional: Equipment to be shared by both Cities.	N/A
General Plant	N/A	Proportional: Equipment to be shared by both Cities.	N/A

#### B. Outside Supply Sources

Our analysis looks to regional suppliers to meet Tigard's remaining capacity needs. The floor constraints and unit purchase cost set in Tigard's contract with Portland was provided to FCS Group and used in the analysis. Capital and O&M costs associated with both Willamette scenarios were developed and provided to FCS Group by Carollo. To maintain consistency with the Lake Oswego methodology, the provision for reimbursements and replacements was taken out of the regional cost analysis. The capital and O&M costs associated with the JWC were based on an existing study FCS Group conducted for a regional consortium of water service providers. Tigard's current demand forecast, as provided by Carollo, had been revised since its use in the existing regional supply analysis. It was necessary to account for this shift in demand and thus resize capital costs. To calculate these adjusted capital costs, as well as the costs associated with the portion of capacity needed in Scenario 3, capital costs were scaled in proportion to the revised demand needs for each scenario. To reduce potential error and more precisely allocate these costs, further cost estimation would be needed for varying supply commitments. This simplification was necessary to provide scalability to outside cost

estimates, but the limited accuracy of the assumption should be recognized when comparing source options.

**C. Summary of Project Costs**

Exhibit 8 summarizes the capital costs, in current dollars, that each City would incur in satisfying their future capacity needs for each scenario. In Exhibit 9, annual O&M and wholesale water purchase costs for all scenarios are expressed in escalated dollars.

**Exhibit 8: Total Capital Costs (Current Dollars)**

	Lake Oswego Capital Costs	Tigard Capital Costs	
		Lake Oswego Supply	Other Regional Supplies
Scenario 2A	\$ 78,590,000	\$ -	\$ 142,086,182
Scenario 2B	\$ 78,590,000	\$ -	\$ 77,100,000
Scenario 2C	\$ 78,590,000	\$ -	\$ 180,900,000
Scenario 3A	\$ 64,433,063	\$ 52,956,938	\$ 107,234,716
Scenario 3B	\$ 64,433,063	\$ 52,956,938	\$ 48,100,000
Scenario 3C	\$ 64,433,063	\$ 52,956,938	\$ 97,400,000
Scenario 4	\$ 55,577,287	\$ 78,952,713	\$ -
Scenario 5	\$ 56,977,287	\$ 78,952,713	\$ -
Scenario 6A	N/A	\$ -	\$ -
Scenario 6B		\$ -	\$ 1,484,000

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**Exhibit 9: Annual O&M and Purchased Water Costs (Escalated Dollars)**

		Lake Oswego Costs			Tigard Costs		
		2010	2020	2030	2010	2020	2030
Scenario 2A	O&M Costs	\$ 2,112,876	\$ 3,448,123	\$ 5,523,659	\$ -	\$ 2,475,688	\$ 3,658,558
	Purchased Water	\$ -	\$ -	\$ -	\$ 4,221,157	\$ -	\$ -
Scenario 2B	O&M Costs	\$ 2,112,876	\$ 3,448,123	\$ 5,523,659	\$ -	\$ 1,609,210	\$ 2,653,884
	Purchased Water	\$ -	\$ -	\$ -	\$ 4,221,157	\$ -	\$ -
Scenario 2C	O&M Costs	\$ 2,112,876	\$ 3,448,123	\$ 5,523,659	\$ -	\$ 2,065,358	\$ 3,297,126
	Purchased Water	\$ -	\$ -	\$ -	\$ 4,221,157	\$ -	\$ -
Scenario 3A	O&M Costs	\$ 1,648,236	\$ 2,801,750	\$ 4,624,649	\$ 1,648,236	\$ 3,973,360	\$ 6,599,438
	Purchased Water	\$ -	\$ -	\$ -	\$ 2,784,712	\$ -	\$ -
Scenario 3B	O&M Costs	\$ 1,648,236	\$ 2,801,750	\$ 4,624,649	\$ 1,648,236	\$ 3,531,463	\$ 6,088,867
	Purchased Water	\$ -	\$ -	\$ -	\$ 2,784,712	\$ -	\$ -
Scenario 3C	O&M Costs	\$ 1,648,236	\$ 2,801,750	\$ 4,624,649	\$ 1,648,236	\$ 3,888,871	\$ 6,593,026
	Purchased Water	\$ -	\$ -	\$ -	\$ 2,784,712	\$ -	\$ -
Scenario 4	O&M Costs	\$ 1,521,399	\$ 2,623,884	\$ 4,375,233	\$ 1,137,996	\$ 3,477,860	\$ 4,747,302
	Purchased Water	\$ -	\$ -	\$ -	\$ 2,784,712	\$ -	\$ 3,696,598
Scenario 5	O&M Costs	\$ -	\$ 2,623,884	\$ 4,375,233	\$ -	\$ 3,477,860	\$ 4,747,302
	Purchased Water	\$ -	\$ -	\$ -	\$ 4,221,157	\$ -	\$ 3,696,598
Scenario 6A	O&M Costs	N/A			\$ -	\$ -	\$ -
	Purchased Water				\$ 4,221,157	\$ 9,029,354	\$ 18,588,607
Scenario 6B	O&M Costs	N/A			\$ -	\$ -	\$ -
	Purchased Water				\$ 3,897,098	\$ 8,470,545	\$ 17,624,994

Capital costs can have a different impact on rates due to potential inclusion in water SDCs. It is important to note that this analysis does not extend to rate and SDC impacts.

The components of the one-time buy-in cost are illustrated in Exhibit 10. For economic analysis, the buy-in is treated as a one-time payment from Tigard to Lake Oswego. This is also equivalent, from the Cities' perspectives, to installment payments at prevailing interest rates. The buy-in was based on estimated replacement cost (depreciated) of system assets allocated as outlined in Exhibit 7. This analysis assumes the buy-in from Tigard is paid to Lake Oswego in the year construction projects for the joint supply system occur; therefore an annual escalation factor will be added to original buy-in payment (shown in Exhibit 10 in 2007 dollars).

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**Exhibit 10: Tigard Buy-In Payment**

	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6
Raw Water Intake	\$ -	\$ -	\$ -	\$ -	\$ -
Raw Water Transmission	\$ -	\$ 940,184	\$ 1,378,203	\$ 1,378,203	\$ -
Water Treatment Plant: Land	\$ -	\$ 555,734	\$ 814,643	\$ 814,643	\$ -
Water Treatment Plant: Structures & Equipment	\$ -	\$ -	\$ -	\$ -	\$ -
Finished Transmission Main	\$ -	\$ -	\$ -	\$ -	\$ -
Waluga Reservoir: Land (Reservoir Property)	\$ -	\$ 212,800	\$ 311,941	\$ 311,941	\$ -
Waluga Reservoir: Structures & Equipment	\$ -	\$ -	\$ -	\$ -	\$ -
Bonita Pump Station	N/A	N/A	N/A	N/A	N/A
Computer System/Software	\$ -	\$ 83,628	\$ 122,589	\$ 122,589	\$ -
General Plant	\$ -	\$ 26,148	\$ 38,330	\$ 38,330	\$ -
<b>TOTAL Buy-In</b>	<b>\$ -</b>	<b>\$ 1,818,494</b>	<b>\$ 2,665,706</b>	<b>\$ 2,665,706</b>	<b>\$ -</b>

An annual cost stream, incorporating capital, buy-in and O&M costs, was developed for each City and scenario combination. The buy-in is applied as a cost to Tigard and credit to Lake Oswego. Tigard's cost stream also integrated the costs of purchasing remaining capacity from other sources, forming a complete supply portfolio. These cost streams were used in the generation of meaningful comparisons between scenarios.

The present value calculation determines a "lump sum" cost expressed in terms of total equivalent cost. For comparative purposes, and to provide scale to these results, we have also expressed each present value result as an equivalent annual cost, both in total dollars and as a cost per hundred cubic feet (ccf). This is achieved by amortizing the net present value of each supply scenario over 25 years, using rates equal to the discount factor. It is these equivalent annual cost results that are used in visual comparisons of supply scenarios.

In our net present value computations for each annual cost stream, we have produced two outcomes: 1) using a 5.0 % discount factor, and 2) using a 7.0% discount factor. The 5.0% discount factor relates to public agencies' assumed cost of capital, while the 7.0% factor reflects more of a rate impact by taking into account growth in customer base. It should be noted that our computations assume raw annual costs, and do not factor in any

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use of debt financing for the capital programs. In particular, low interest loans from assistance programs would reduce the net present value of affected projects.

The present value comparative analyses do not consider salvage value at the end of the analysis period. In each scenario, residual values of resources and facilities are likely to be substantial. Therefore, while these findings reasonably track and compare costs incurred during the analysis period, some differential in residual useful lives and value could affect comparative results.

### Summary of Analysis

Exhibit 11 below shows the net present values costs of each City broken down into capital, O&M and purchased water costs. A five percent discount rate is used in the values shown.

**Exhibit 11: Allocated Net Present Value Costs**

		CITY OF LAKE OSWEGO PRESENT VALUE COSTS				
		Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6
25-Year Outlook	Capital Costs Only	\$ 76,506,006	\$ 61,450,081	\$ 52,101,552	\$ 55,397,256	N/A
	O&M Costs Only	41,307,366	33,233,496	31,016,671	19,070,890	N/A
	Purchased Water Costs Only	N/A	N/A	N/A	N/A	N/A
	<b>Total Costs</b>	<b>\$ 117,813,382</b>	<b>\$ 94,683,577</b>	<b>\$ 83,118,223</b>	<b>\$ 74,468,146</b>	<b>N/A</b>
50-Year Outlook	Capital Costs Only	\$ 76,506,006	\$ 61,450,081	\$ 52,101,552	\$ 55,397,256	N/A
	O&M Costs Only	75,311,642	61,703,347	57,951,089	46,005,308	N/A
	Purchased Water Costs Only	N/A	N/A	N/A	N/A	N/A
	<b>Total Costs</b>	<b>\$ 151,817,648</b>	<b>\$ 123,153,428</b>	<b>\$ 110,052,641</b>	<b>\$ 101,402,564</b>	<b>N/A</b>

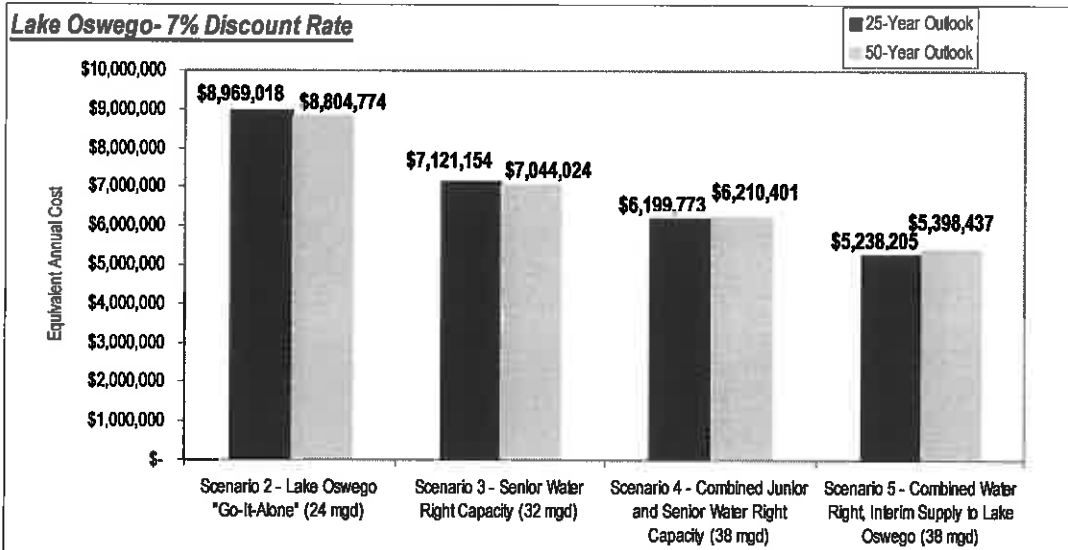
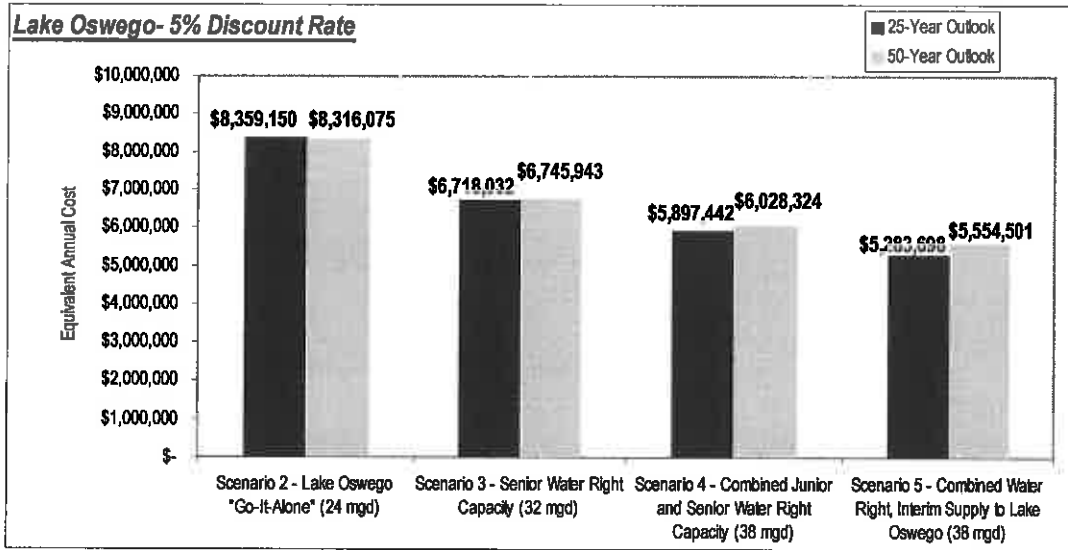
			CITY OF TIGARD PRESENT VALUE COSTS									
			Scenario 2A	Scenario 2B	Scenario 2C	Scenario 3A	Scenario 3B	Scenario 3C	Scenario 4	Scenario 5	Scenario 6A	Scenario 6B
25-Year Outlook	Lake Oswego Supply	Capital Costs Only	\$ -	\$ -	\$ -	\$ 53,929,473	\$ 53,929,473	\$ 53,929,473	\$ 80,611,102	\$ 83,210,173	\$ -	\$ -
		O&M Costs Only	-	-	-	22,839,984	22,839,984	22,839,984	32,513,468	23,548,037	-	-
		Purchased Water Costs Only	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Other Regional Supplies	Capital Costs Only	\$145,858,830	\$ 77,889,372	\$183,133,465	\$110,189,344	\$ 48,582,462	\$ 98,602,551	\$ -	\$ -	\$ -	\$ 1,220,890
		O&M Costs Only	17,384,217	11,856,337	14,586,331	8,544,082	5,835,021	8,109,836	-	-	-	-
		Purchased Water Costs Only	33,609,020	33,609,020	33,609,020	21,884,129	21,884,129	21,884,129	27,832,320	39,557,210	103,893,416	97,244,096
<b>Total</b>	<b>Total Costs</b>	<b>\$196,831,866</b>	<b>\$123,154,729</b>	<b>\$231,338,896</b>	<b>\$217,388,992</b>	<b>\$152,881,049</b>	<b>\$204,365,753</b>	<b>\$ 140,956,689</b>	<b>\$ 146,315,420</b>	<b>\$103,893,416</b>	<b>\$ 98,464,896</b>	
50-Year Outlook	Lake Oswego Supply	Capital Costs Only	\$ -	\$ -	\$ -	\$ 53,929,473	\$ 53,929,473	\$ 53,929,473	\$ 80,611,102	\$ 83,210,173	\$ -	\$ -
		O&M Costs Only	-	-	-	41,193,875	41,193,875	41,193,875	61,738,384	52,772,953	-	-
		Purchased Water Costs Only	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Other Regional Supplies	Capital Costs Only	\$145,858,830	\$ 77,889,372	\$183,133,465	\$110,189,344	\$ 48,582,462	\$ 98,602,551	\$ -	\$ -	\$ -	\$ 1,220,890
		O&M Costs Only	41,130,273	27,992,713	35,112,086	23,032,210	14,648,910	20,227,184	-	-	-	-
		Purchased Water Costs Only	33,609,020	33,609,020	33,609,020	21,884,129	21,884,129	21,884,129	57,245,706	68,870,686	251,801,182	237,484,428
<b>Total</b>	<b>Total Costs</b>	<b>\$220,597,922</b>	<b>\$139,491,105</b>	<b>\$251,834,891</b>	<b>\$250,229,081</b>	<b>\$180,348,849</b>	<b>\$238,837,212</b>	<b>\$ 198,585,282</b>	<b>\$ 204,863,813</b>	<b>\$251,801,182</b>	<b>\$238,703,316</b>	

Equivalent annual costs are derived from present value costs. To calculate these costs, the total annual costs for each scenario are compiled and the present value of these total scenario costs is computed. This present value total is equally annualized over the time period, providing a cost statistic that can be used in the comparison of scenarios. Again, it is important to emphasize that this analysis does not define impacts on rates, and that this leveled statistic, while a basis for scenario comparison, does not translate directly into rate impacts.

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For Lake Oswego, we find that Scenario 5, initially implementing a water trade option with Tigard, and then joining to utilize the junior and senior water right, results in the lowest equivalent costs. The highest cost option for Lake Oswego would be to “go-it-alone” as presented in Scenario 2. Please refer to Exhibit 12 for Lake Oswego’s equivalent cost comparisons, shown as levelized annual cost (Scenario 6A & 6B are not applicable to Lake Oswego).

**Exhibit 12: Lake Oswego Comparative Supply Costs**

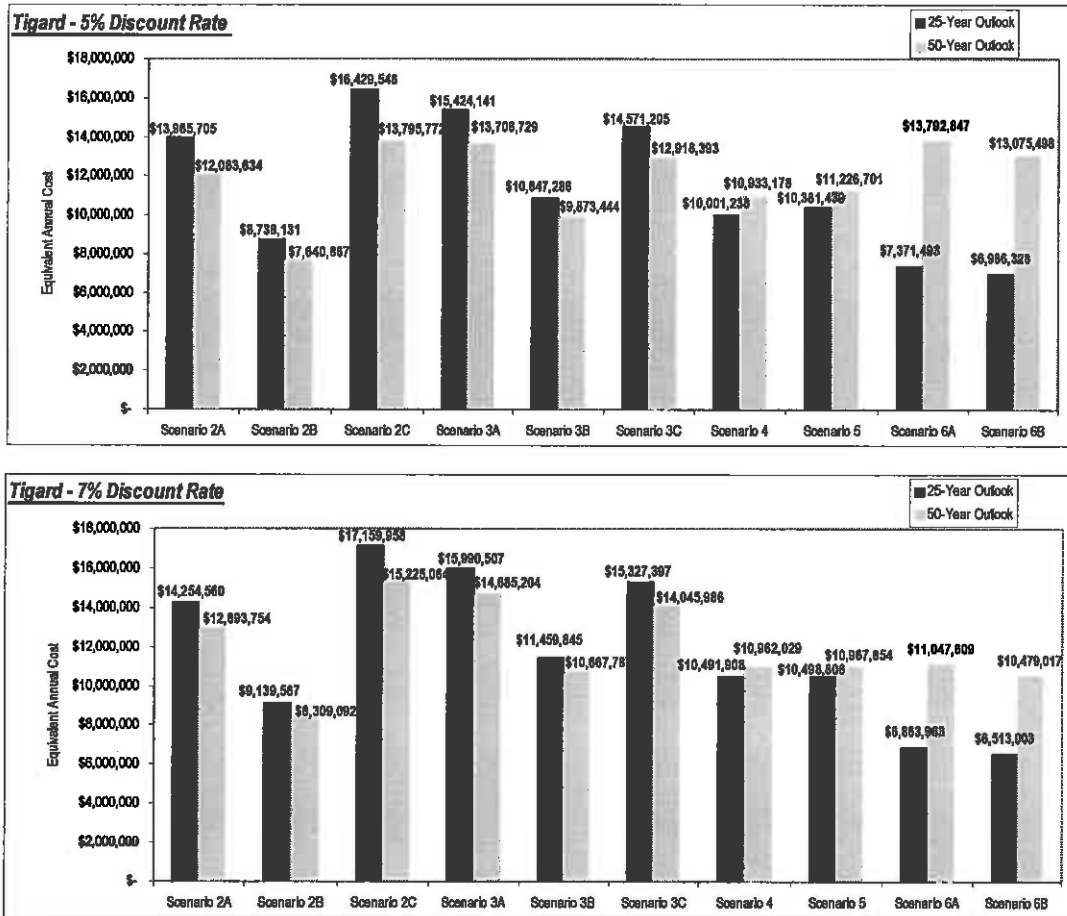


In a 25-year outlook, Tigard’s least expensive option would be to meet all demand needs through water purchases from Portland, utilizing the gravity connection; in a more long-term outlook, this becomes a more expensive option. The lowest cost option in the 50-

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year outlook would be to obtain interim water from Portland and then partner with Willamette, assuming the involvement of other major cost-sharing partners (Scenario 2B). However, without the economies gained by such group development at the regional level, costs are much higher, and the lowest cost option is full service from Lake Oswego (Scenario 4). The highest equivalent cost is Scenario 2C, where water is attained from Portland and then Willamette without a major cost-sharing partner. Exhibit 13 shows the Tigid's equivalent costs for all scenarios.

**Exhibit 13: Tigid Comparative Supply Costs per CCF**



**Conclusions**

Regarding Lake Oswego, a joint system with Tigid provides material cost savings opportunities with or without buy-in. There is a slight economic benefit, particularly near-term, for larger scale regionalization, as contemplated in Scenario 4 and 5.

For Tigid, the regional analysis has illustrated strong cost preference for Willamette versus the JWC. In this context, this preference remains. Further Willamette, provided major cost-sharing partners, appears the most cost effective supply source for Tigid, as illustrated in Exhibit 13. If pursued individually, this option is no longer the low cost option, and in fact becomes the highest cost supply scenario. Between the two Lake

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Oswego-only scenarios, beginning construction of major projects immediately provides a slightly reduced cost. However, the costs of both scenarios are extremely close, and lower in cost than all other long-term supply options except those involving regional development of Willamette capacity. Beginning immediately on major construction projects provides a slightly reduced cost.

The summary provided in Exhibit 13 illustrates a side-by-side comparison of complete supply options where:

Scenario 2A = JWC,

Scenario 2B = Willamette with major cost-sharing partnership

Scenario 2C = Willamette without major cost-sharing partnership

Scenario 4 = Lake Oswego, immediately

Scenario 5 = Lake Oswego, postponing construction until 2016.

Scenario 6A = Portland, without incorporating gravity connection

Scenario 6B = Portland, utilizing gravity connection

This shows Scenario 6B as the lowest cost option in a 25-year outlook; Scenario 2B as the long-standing lowest cost option. However, if Tigard must develop the Willamette River Project without major cost-sharing partners (Scenario 2C), the costs to join with Lake Oswego (Scenario 4 or 5) becomes a less expensive option long term.

Scenarios 3A, 3B and 3C illustrate costs for a combination of sources, with findings generally consistent with an average of individual source costs.

Economic comparison is but one part of the decision making basis, which could also include environmental concern, political issues, schedule, risk water quality and various other related factors. A composite of all these factors and criteria lead to a final decision.



Date: July 6, 2007

To: **Mark Knudsen, Carollo Engineers**  
**Cara Wilson, Carollo Engineers**

From: Ed Cebron, FCS Group  
Samantha Holert, FCS Group

Re: **Lake Oswego/Tigard Rate Impact Analysis**

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This memorandum defines the methodology used and results found by FCS Group in the joint supply system rate impact analysis. FCS Group was tasked to evaluate how the implementation of the various supply scenarios would impact rates for the City of Lake Oswego and the City of Tigard. The cost data used in this analysis was taken from the Joint Supply System cost comparison that FCS Group also developed.

The five supply options evaluated, as defined in Carollo's Technical Memorandum No.1, are summarized below:

- **Scenario 2 - Lake Oswego "Go-It-Alone" (24 mgd):** Provides the required capacity to treat the build-out demands of the Lake Oswego water service area. Under this scenario, Tigard does not receive any supply capacity.
- **Scenario 3 – Senior Water Right Capacity (32 mgd):** Represents capacity needed to deliver the senior water right of Lake Oswego. This capacity exceeds the build-out demands of the Lake Oswego water service area and thus provides capacity to meet a share of Tigard's demand.
- **Scenario 4 – Combined Junior and Senior Water Right Capacity (38 mgd):** Provides capacity needed to deliver the senior and junior water rights of Lake Oswego. This capacity meets the build-out needs of Lake Oswego, while providing the majority of Tigard's demand needs through build-out.
- **Scenario 5 – Combined Water Right Capacity, Interim Supply to Lake Oswego:** Beginning in 2016, this scenario provides capacity needed to meet build-out needs of Lake Oswego, while providing the majority of Tigard's demand. Until 2016, assumes that, to the extent Lake Oswego needs peak water capacity, a water trade will occur with Tigard. No net purchase of water is assumed due to limited duration and volume constraints.
- **Scenario 6 – Tigard only Scenario, Tigard Continues Purchasing Water from Portland:** Tigard meets all demand needs through water purchases from Portland Water Bureau.

The City of Tigard's scenarios were further defined to incorporate the costs incurred from obtaining any capacity needs not fulfilled by Lake Oswego. These scenarios are recapped below:

- **Scenario 2A:** Tigard invests in expanded JWC capacity to fulfill demands not met by the Lake Oswego source, as depicted in Scenario 2. Portland is an interim source for all water needs in the first 10 years.
- **Scenario 2B:** Tigard invests in expanded Willamette capacity to fulfill demands not met by the Lake Oswego source, as depicted in Scenario 2. Portland is an interim source for all water needs in the first 10 years. Regional capital and operation costs in this scenario assume major cost-sharing partners also invest in Willamette capacity.
- **Scenario 2C:** Tigard invests in expanded Willamette capacity to fulfill demands not met by the Lake Oswego source, as depicted in Scenario 2. Portland is an interim source for all water needs in the first 10 years. Regional capital and operation costs in this scenario assume Tigard must develop Willamette without the help of major cost-sharing partners.
- **Scenario 3A:** Tigard invests in expanded JWC capacity to fulfill demands not met by the Lake Oswego source, as depicted in Scenario 3. Required contract quantities are purchased from Portland for the first 10 years.
- **Scenario 3B:** Tigard invests in expanded Willamette capacity to fulfill demands not met by the Lake Oswego source, as depicted in Scenario 3. Required contract quantities are purchased from Portland for the first 10 years. Regional capital and operation costs in this scenario assume major cost-sharing partners also invest in Willamette capacity.
- **Scenario 3C:** Tigard invests in expanded Willamette capacity to fulfill demands not met by the Lake Oswego source, as depicted in Scenario 3. Required contract quantities are purchased from Portland for the first 10 years. Regional capital and operation costs in this scenario assume Tigard must develop Willamette without the help of major cost-sharing partners.
- **Scenario 4:** Tigard does not invest in any regional source. Required contract quantities are purchased from Portland for the first 10 years. In later years, it purchases water from Portland to meet any increments of demand not met by Lake Oswego source.
- **Scenario 5:** Tigard does not invest in a regional source. Portland is an interim source for all water needs in the first 10 years, as construction projects for joint supply system with Lake Oswego are not expected to be completed until 2016. In later years, Tigard purchases water from Portland to meet any increments of demand not met by Lake Oswego source.
- **Scenario 6A:** Tigard does not invest in Lake Oswego or any other regional source. Instead, it purchases all water from Portland, based on terms of current contract and adjustments for inflation.

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- **Scenario 6B:** Tigard does not invest in Lake Oswego or any other regional source. Instead, it purchases all water from Portland, utilizing a gravity connection for a portion of the purchases. The unit price of water is based on terms of current contract but also includes a pumping discount on 2.6 mgd of purchased water, during off-peak months. This discount of \$0.29 per ccf (in 2007 dollars) is also escalated using the inflation rate of 5.6%.

The results of the Joint Supply System cost comparison are shown in Exhibits 1 and 2. Exhibit 1 shows both Cities' total capital costs in current day dollars. Exhibit 2 depicts annual O&M costs for years 2010, 2020 and 2030 (shown in future day dollars).

**Exhibit 1: Total Capital Cost Comparison**

	Lake Oswego Capital Costs	Tigard Capital Costs	
		Lake Oswego Supply	Other Regional Supplies
Scenario 2A	\$ 78,590,000	\$ -	\$ 142,086,182
Scenario 2B	\$ 78,590,000	\$ -	\$ 77,100,000
Scenario 2C	\$ 78,590,000	\$ -	\$ 180,900,000
Scenario 3A	\$ 64,433,063	\$ 52,956,938	\$ 107,234,716
Scenario 3B	\$ 64,433,063	\$ 52,956,938	\$ 48,100,000
Scenario 3C	\$ 64,433,063	\$ 52,956,938	\$ 97,400,000
Scenario 4	\$ 55,577,287	\$ 78,952,713	\$ -
Scenario 5	\$ 56,977,287	\$ 78,952,713	\$ -
Scenario 6A	N/A	\$ -	\$ -
Scenario 6B		\$ -	\$ 1,484,000

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**Exhibit 2: Annual O&M Cost Comparison**

		Lake Oswego Costs			Tigard Costs		
		2010	2020	2030	2010	2020	2030
Scenario 2A	O&M Costs	\$ 2,112,876	\$ 3,448,123	\$ 5,523,659	\$ -	\$ 2,475,688	\$ 3,658,558
	Purchased Water	\$ -	\$ -	\$ -	\$ 4,221,157	\$ -	\$ -
Scenario 2B	O&M Costs	\$ 2,112,876	\$ 3,448,123	\$ 5,523,659	\$ -	\$ 1,609,210	\$ 2,653,684
	Purchased Water	\$ -	\$ -	\$ -	\$ 4,221,157	\$ -	\$ -
Scenario 2C	O&M Costs	\$ 2,112,876	\$ 3,448,123	\$ 5,523,659	\$ -	\$ 2,065,358	\$ 3,297,126
	Purchased Water	\$ -	\$ -	\$ -	\$ 4,221,157	\$ -	\$ -
Scenario 3A	O&M Costs	\$ 1,648,236	\$ 2,801,750	\$ 4,624,649	\$ 1,648,236	\$ 3,973,360	\$ 6,599,438
	Purchased Water	\$ -	\$ -	\$ -	\$ 2,784,712	\$ -	\$ -
Scenario 3B	O&M Costs	\$ 1,648,236	\$ 2,801,750	\$ 4,624,649	\$ 1,648,236	\$ 3,531,463	\$ 6,088,867
	Purchased Water	\$ -	\$ -	\$ -	\$ 2,784,712	\$ -	\$ -
Scenario 3C	O&M Costs	\$ 1,648,236	\$ 2,801,750	\$ 4,624,649	\$ 1,648,236	\$ 3,888,871	\$ 6,593,026
	Purchased Water	\$ -	\$ -	\$ -	\$ 2,784,712	\$ -	\$ -
Scenario 4	O&M Costs	\$ 1,521,399	\$ 2,623,884	\$ 4,375,233	\$ 1,137,996	\$ 3,477,860	\$ 4,747,302
	Purchased Water	\$ -	\$ -	\$ -	\$ 2,784,712	\$ -	\$ 3,696,598
Scenario 5	O&M Costs	\$ -	\$ 2,623,884	\$ 4,375,233	\$ -	\$ 3,477,860	\$ 4,747,302
	Purchased Water	\$ -	\$ -	\$ -	\$ 4,221,157	\$ -	\$ 3,696,598
Scenario 6A	O&M Costs	N/A			\$ -	\$ -	\$ -
	Purchased Water				\$ 4,221,157	\$ 9,029,354	\$ 18,588,607
Scenario 6B	O&M Costs	N/A			\$ -	\$ -	\$ -
	Purchased Water				\$ 3,897,098	\$ 8,470,545	\$ 17,624,994

**General Approach**

In this analysis, the impacts of the supply scenario costs were isolated from the rest of the system. To do this, the following steps were taken:

1. Both Cities provided copies of their rate models, along with current financial and budget information. These rate models were updated with FYE 2007 budget numbers. All operating and maintenance costs relating to supply and treatment (including water purchases) were replaced with the annual O&M costs calculated for the individual supply system scenarios. For all non-supply/treatment expenses, the gross assumption was made that these costs would continue to annually escalate based on inflation.
2. Rate revenues were annually escalated using the growth forecasts present in each City's models. Adopted rate increases were also integrated (3.0% in FY 2007/08 for Lake Oswego, 7.0% in FY 2007/08 for Tigard).
3. Annual capital cost streams were incorporated into the corresponding models. No other planned capital improvement project costs were included in the analysis. Because of this, current capital or system development charge (SDC) fund balances that either City might hold were not used in this analysis. The debt service needed to fund the joint supply projects was calculated and built-

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in to the impact analysis. It is important to note that Scenario 6A did not include any capital project costs.

4. Capital supply costs were used to develop a potential SDC that could be implemented; this included supply projects only. This charge was calculated for each of the City's scenarios as detailed below:
  - Lake Oswego - Supply SDC was broken into two parts: (1) total capital costs that were allocated based on proportional capacity were divided by the total capacity available to Lake Oswego (23.9 mgd in each scenario), and (2) total capital costs that were allocated on incremental capacity were divided by the added capacity (7.9 mgd in each scenario).
  - Tigard - Supply SDC is the total cost of all capital projects (Lake Oswego as well as regional partner projects) divided by their total capacity needs. Tigard's buy-in payment to Lake Oswego is also included in the capital costs.
5. An SDC revenue stream was forecasted from each supply SDC charge. The growth provided in each City's rate model was lower than the annual growth forecasted in supply planning. In order to remain conservative in our analysis, the lower annual growth rate was used to predict this SDC revenue. As allowable by Oregon statute, SDC charges were also escalated annually with inflation. The Cities chose to use construction cost inflation (6.0%) for this escalator. The stream of revenues generated from supply SDCs were assumed to be fully available to pay debt service and meet coverage requirements.
6. With all supply-related costs incorporated into the technical models, rate impacts were analyzed. All rate increases were smoothed over several years to mitigate sharp rate impacts on customers. It is important to recognize that leveling rates in earlier years buys down future rate impacts, allowing for a lower cumulative increase.

### Summary of Analysis

For Lake Oswego, the lowest impact on rates results from the implementation of a joint supply system with Tigard. In Scenario 5 (Combined Water Right, Interim Supply to Lake Oswego), rates would cumulatively increase 52% due to supply costs over the 25-year period. The worst-case scenario for Lake Oswego would be under Scenario 2 (Lake Oswego "Go-It-Alone"), in which case the cumulative rate impact would be 148% over 25 years. Exhibit 3 below shows a summary of the annual and cumulative rate impacts for the first ten years and the last year of each scenario. It also calculates an average monthly customer bill based on the rates of each fiscal year. This average bill assumes a usage of 10 ccf per month and helps to provide an actual dollar comparison among all scenarios. At the end of 25 years, the two lowest cost options produce a typical bill (increased solely for supply system impacts) of \$33.68 and \$32.84 for Scenario 4 and 5, respectively.

**Exhibit 3: Lake Oswego Summary of Rate Impacts**

FYE		2007	2008 [a]	2009	2010	2011	2012	2013	2014	2015	2016	2032
SCN 2	Annual Rate Impact	0.00%	0.00%	148.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Cumulative Rate Impact	0.00%	0.00%	148.00%	148.00%	148.00%	148.00%	148.00%	148.00%	148.00%	148.00%	148.00%
	Average Customer Bill [b]	\$ 21.01	\$ 21.59	\$ 53.54	\$ 53.54	\$ 53.54	\$ 53.54	\$ 53.54	\$ 53.54	\$ 53.54	\$ 53.54	\$ 53.54
SCN 3	Annual Rate Impact	0.00%	0.00%	60.00%	4.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Cumulative Rate Impact	0.00%	0.00%	60.00%	66.40%	66.40%	66.40%	66.40%	66.40%	66.40%	66.40%	66.40%
	Average Customer Bill [b]	\$ 21.01	\$ 21.59	\$ 34.64	\$ 35.93	\$ 35.93	\$ 35.93	\$ 35.93	\$ 35.93	\$ 35.93	\$ 35.93	\$ 35.93
SCN 4	Annual Rate Impact	0.00%	0.00%	56.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Cumulative Rate Impact	0.00%	0.00%	56.00%	56.00%	56.00%	56.00%	56.00%	56.00%	56.00%	56.00%	56.00%
	Average Customer Bill [b]	\$ 21.01	\$ 21.59	\$ 33.88	\$ 33.88	\$ 33.88	\$ 33.88	\$ 33.88	\$ 33.88	\$ 33.88	\$ 33.88	\$ 33.88
SCN 5	Annual Rate Impact	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	15.00%	15.00%	15.00%	0.00%
	Cumulative Rate Impact	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	15.00%	32.25%	52.09%	52.09%
	Average Customer Bill [b]	\$ 21.01	\$ 21.59	\$ 21.59	\$ 21.59	\$ 21.59	\$ 21.59	\$ 21.59	\$ 24.83	\$ 28.55	\$ 32.84	\$ 32.84

[a] 2008 Rate Increase is on top of 3% increase already adopted by City. Both increases included in average customer bill  
 [b] Based on assumed monthly usage of 10 ccf

In Tigard's case, the joint system with Lake Oswego presented in Scenario 4 provides the lowest impact on rates. Under this scenario, supply costs would impact rates approximately 113% over a 25-year period. Scenario 2C (partnering with Willamette, absent major cost-sharing partner) produces the highest impact on rates, with approximately a 301% increase needed over the next 25 years. Exhibit 4 shows the annual and cumulative impact, as well as the average monthly customer bill (again, assuming a usage of 10 ccf per month). In the twenty-fifth year, the monthly customer bills for Scenarios 2B, 4 and 5 are all within seven dollars of one another, with Scenario 4 at \$56.67, Scenario 2B at \$60.62 and Scenario 5 at \$63.01.

**Exhibit 4: Tigard Summary of Rate Impacts**

FYE		2007	2008 [a]	2009	2010	2011	2012	2013	2014	2015	2016	2032
SCN 2A	Annual Rate Impact	0.00%	0.00%	15.00%	15.00%	15.00%	15.00%	15.00%	15.00%	28.00%	0.77%	0.00%
	Cumulative Rate Impact	0.00%	0.00%	15.00%	32.25%	52.09%	74.90%	101.14%	131.31%	196.07%	198.35%	198.35%
	Average Customer Bill [b]	\$ 24.83	\$ 26.57	\$ 30.55	\$ 35.14	\$ 40.41	\$ 46.47	\$ 53.44	\$ 61.45	\$ 78.66	\$ 79.28	\$ 79.28
SCN 2B	Annual Rate Impact	0.00%	0.00%	15.00%	15.00%	15.00%	15.00%	15.00%	5.00%	5.00%	2.90%	0.00%
	Cumulative Rate Impact	0.00%	0.00%	15.00%	32.25%	52.09%	74.90%	101.14%	111.19%	121.75%	128.18%	128.18%
	Average Customer Bill [b]	\$ 24.83	\$ 26.57	\$ 30.55	\$ 35.14	\$ 40.41	\$ 46.47	\$ 53.44	\$ 56.11	\$ 58.92	\$ 60.62	\$ 60.62
SCN 2C	Annual Rate Impact	0.00%	0.00%	15.00%	15.00%	15.00%	15.00%	26.00%	43.00%	15.00%	10.89%	0.00%
	Cumulative Rate Impact	0.00%	0.00%	15.00%	32.25%	52.09%	74.90%	120.37%	215.14%	262.41%	301.14%	301.14%
	Average Customer Bill [b]	\$ 24.83	\$ 26.57	\$ 30.55	\$ 35.14	\$ 40.41	\$ 46.47	\$ 58.55	\$ 83.73	\$ 96.28	\$ 106.57	\$ 106.57
SCN 3A	Annual Rate Impact	0.00%	0.00%	40.00%	14.00%	14.00%	14.00%	14.00%	14.00%	14.00%	6.50%	0.00%
	Cumulative Rate Impact	0.00%	0.00%	40.00%	59.80%	81.94%	107.42%	136.45%	169.56%	207.30%	208.89%	208.89%
	Average Customer Bill [b]	\$ 24.83	\$ 26.57	\$ 37.20	\$ 42.40	\$ 46.34	\$ 55.11	\$ 62.82	\$ 71.82	\$ 81.84	\$ 82.07	\$ 82.07
SCN 3B	Annual Rate Impact	0.00%	0.00%	40.00%	10.00%	10.00%	10.00%	10.00%	10.00%	6.50%	6.15%	0.00%
	Cumulative Rate Impact	0.00%	0.00%	40.00%	54.00%	69.40%	86.34%	104.97%	125.47%	140.13%	154.91%	154.91%
	Average Customer Bill [b]	\$ 24.83	\$ 26.57	\$ 37.20	\$ 40.91	\$ 45.01	\$ 49.51	\$ 54.46	\$ 59.80	\$ 63.80	\$ 67.72	\$ 67.72
SCN 3C	Annual Rate Impact	0.00%	0.00%	30.00%	18.00%	18.00%	18.00%	15.00%	15.00%	10.00%	9.58%	0.00%
	Cumulative Rate Impact	0.00%	0.00%	30.00%	50.80%	74.93%	102.92%	133.35%	168.36%	195.19%	223.47%	223.47%
	Average Customer Bill [b]	\$ 24.83	\$ 26.57	\$ 34.54	\$ 40.06	\$ 46.48	\$ 53.91	\$ 62.00	\$ 71.30	\$ 78.43	\$ 85.94	\$ 85.94
SCN 4	Annual Rate Impact	0.00%	0.00%	67.00%	5.00%	5.00%	5.00%	5.00%	5.00%	0.00%	0.08%	0.00%
	Cumulative Rate Impact	0.00%	0.00%	67.00%	75.35%	84.12%	93.32%	102.99%	113.14%	113.14%	113.30%	113.30%
	Average Customer Bill [b]	\$ 24.83	\$ 26.57	\$ 44.37	\$ 46.59	\$ 48.92	\$ 51.38	\$ 53.93	\$ 56.83	\$ 56.63	\$ 56.67	\$ 56.67
SCN 5	Annual Rate Impact	0.00%	0.00%	15.00%	15.00%	15.00%	10.00%	10.00%	10.00%	10.00%	6.51%	0.00%
	Cumulative Rate Impact	0.00%	0.00%	15.00%	32.25%	52.09%	67.30%	84.03%	102.43%	122.67%	137.17%	137.17%
	Average Customer Bill [b]	\$ 24.83	\$ 26.57	\$ 30.55	\$ 35.14	\$ 40.41	\$ 44.45	\$ 48.89	\$ 53.78	\$ 59.16	\$ 63.01	\$ 63.01
SCN 6A	Annual Rate Impact	0.00%	0.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	0.00%
	Cumulative Rate Impact	0.00%	0.00%	5.00%	10.25%	15.76%	21.55%	27.63%	34.01%	40.71%	47.75%	171.97%
	Average Customer Bill [b]	\$ 24.83	\$ 26.57	\$ 27.90	\$ 29.29	\$ 30.76	\$ 32.29	\$ 33.91	\$ 35.60	\$ 37.38	\$ 39.25	\$ 72.28
SCN 6B	Annual Rate Impact	0.00%	0.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	1.44%
	Cumulative Rate Impact	0.00%	0.00%	5.00%	10.25%	15.76%	21.55%	27.63%	34.01%	40.71%	47.75%	169.14%
	Average Customer Bill [b]	\$ 24.83	\$ 26.57	\$ 27.90	\$ 29.29	\$ 30.76	\$ 32.29	\$ 33.91	\$ 35.60	\$ 37.38	\$ 39.25	\$ 71.50

[a] Any FYE 2007 rate increase is on top of 7% increase already adopted by City for this year. Both increases included in average customer bill  
 [b] Any FYE 2008 rate increase is on top of 7% increase already adopted by City for this year. Both increases included in average customer bill  
 [c] Based on assumed monthly usage of 10 ccf

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## **Conclusions**

This rate impact analysis illustrates cost preferences similar to those shown in our economic analysis of the joint supply system scenarios. For Lake Oswego, a joint system with Tigard provides considerably lower impacts to rates than continuing alone. In Tigard's case, materially lower impacts are seen in both of Lake Oswego-only scenarios (Scenarios 4 and 5) as well as in the Willamette option, though only with the presence of a major cost-sharing partner.

The analysis also shows that, though Scenarios 6A and 6B are considerably less expensive than the other scenarios in the 25-year time frame, this is not the same for the rate impacts. It should be noted that, whereas other scenarios can collect a more substantial supply SDC revenue stream, all costs in Scenario 6A, and the majority in Scenario 6B, are wholesale water purchase costs, and therefore the additional supply SDC revenue source can not be used to offset the impact on rates.

Again, this study provides only an analysis of how supply costs would affect each City's rates; it makes a gross assumption regarding the constant continuation of existing operating costs and does not include any capital costs other than those defined in the joint supply analysis. A rate study incorporating all financial aspects of each City's utility is necessary to determine actual rate increases and SDC charges.

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**STAKEHOLDER INTERVIEWS**

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<b>Others</b>		
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John Thomas and Nicki Iverson Sunrise Water Authority	Sunrise Water Authority 10602 SE 129th Avenue Portland, OR 97236	(503) 761-0220 <a href="mailto:jthomas@sunrisewater.com">jthomas@sunrisewater.com</a>

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**LIMITATIONS OF ORGANIZATIONAL AND  
GOVERNANCE INFORMATION**

## **DISCLAIMER**

Sections 2 and 4 and Appendix B of this Technical Memorandum were prepared by Cable Huston Benedict Haagensen & Lloyd LLP to provide general information about potential governance structures for joint water supply under Oregon law. These documents are not intended to provide legal advice and the Cities of Lake Oswego and Tigard need to consult with their respective legal counsel to obtain a more detailed analysis of these laws, and how they may apply to the specific circumstances and facts of this proposed project.

**CLARK I. BALFOUR**

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**DRAFT - July 11, 2007**

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**UTILITY SERVICE DELIVERY MODELS**

**UTILITY SERVICE DELIVERY MODELS**  
**Clark I. Balfour**  
**Cable Huston Benedict Haagenesen & Lloyd LLP**  
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<b>Interlocal Partnership/ Joint Operating</b>	<b>People's Utility District</b>	<b>Domestic Water Supply District</b>	<b>County Service District</b>	<b>Authority</b>
<b>Statutory Basis</b> ORS 190 (Intergovernmental Unit Cooperation). Local governments may enter into a written Agreement to perform any or all functions that a party to the Agreement has authority to perform.	ORS 261 (People's Utility District). Individual property owners may choose to form a unit of local government with statutory authority to provide water and power.	ORS 264 (Domestic Water Supply Districts). Communities may be incorporated into special districts to supply water.	ORS 451 May provide full range of services. Governed by County Commissioners.	ORS 450 (Authorities). Two or more existing cities or districts consolidate into a single, independent Authority. These are units of local government.
<b>Formation &amp; Security of Boundaries</b> Approval of Agreement by parties adopting ordinance; Boundaries affected by withdrawal/termination of a party and Agreement provisions.	Vote; inclusion of municipality requires favorable vote of its voters; after formation, not subject to annexation and withdrawal of territory by City except in very limited circumstances.	Vote; subject to annexation and withdrawal by city Boundary change in limited circumstances.	Authority to own or operate facilities upon formation by BCC; assets subject to annexation and withdrawal by City. Boundary changes in limited circumstances.	Vote; land subject to annexation but assets not subject to withdrawal by City. Boundary change in limited circumstances.
<b>Viable for providing Utility Service</b>	Yes	Yes	Yes	Yes
<b>Voting</b> Details of governance structure are determined by Agreement between jurisdictions. Board members may not be directly elected for the 190 positions, but may be elected or appointed officials. Weighted voting possible as per Agreement.	Water and Power Yes	Yes	Yes	Yes
<b>Ownership</b> In general a joint agency is the legal owner of any assets, with individual partners owning percentage interest shares in the common agency. However, ownership of specific assets may be retained by specific jurisdictions by Agreement and assigned (e.g. leased) to the entity.	A five-member Board of Directors, elected by apportioned geographic subdivision, ORS 261.405. Each Director has equal vote.	A five-member Board of Commissioners elected at large, ORS 264.410 (1). Each Commissioner has equal vote.	County Commission is governing body.	A five- or seven-member Board of Directors, ORS 450.600-665. Directors may be elected at-large or by apportioned geographic subdivision. Each Director has equal vote.
<b>Operations &amp; Maintenance</b> May hire staff and operate facilities owned by the joint agency or any of its constituent jurisdictions, ORS 190.010 (2-3). May also contract with private companies for O&M. May contract with existing public agencies for staffing or services.	District would own all assets.	District would own all assets.	District would own all assets.	Newly formed Authority may acquire all existing water supply assets (including receivables), depending on the incorporation resolution. The Authority would own all regional assets. Pre-existing debt may be distributed among constituent agencies by agreement.
<b>Operations &amp; Maintenance</b> May hire staff and operate facilities owned by the joint agency or any of its constituent jurisdictions, ORS 190.010 (2-3). May also contract with private companies for O&M. May contract with existing public agencies for staffing or services.	May hire administrative and operational staff and operate facilities owned by the district, ORS 261.305 (4). May also contract with private companies for O&M. May contract with existing public agencies for staffing or services.	May hire administrative and operational staff and operate facilities owned by the district, ORS 264.210. May also contract with private companies for O&M. May contract with existing public agencies for staffing or services.	May hire administrative and operational staff and operate facilities owned by the district, ORS 450.075. May also contract with private companies for O&M. May contract with existing public agencies for staffing or services.	May hire administrative and operational staff and operate facilities owned by the district, ORS 450.075. May also contract with private companies for O&M. May contract with existing public agencies for staffing or services.

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UTILITY SERVICE DELIVERY MODELS

Interlocal Partnership/ Joint Operating	People's Utility District	Domestic Water District	County Service District	Authority
<p><b>System Expansion</b> Determined by agreement. Joint agency determines how and when to expand. Individual entities may have option to not participate in projects. May allow for members to "buy back" at a later date. Possible differential rates to account for participants/nonparticipants.</p> <p><b>Latecomers</b> Joint agency Agreement may be expanded to include new partner jurisdictions. Precise procedures for expansion and/or dissolution of the joint agency are specified in the initial Agreement.</p>	<p>District Board of Directors controls planning and timing of system expansion. Possible differential rates to account for participants/nonparticipants.</p> <p>The district may annex a parcel or municipality, or consolidate with one or more other districts, following approval of voters in both the district and the area to be annexed, ORS 261.105 (1-3).</p>	<p>District Board of Commissioners control planning and timing of system expansion. Possible differential rates to account for participants/ nonparticipants.</p> <p>District may annex property or consolidate or merge with one or more Districts. Vote usually required. Potential Metro Process.</p>	<p>District Board controls planning and timing of system expansion. Possible differential rates to account for participants/nonparticipants.</p> <p>Boundary is established in the formation order. District may annex property. Vote usually required.</p>	<p>District Board of Directors controls planning and timing of system expansion. Possible differential rates to account for participants/nonparticipants.</p> <p>The Authority may annex a parcel or municipality, or consolidate with one or more additional districts, following approval of all elected bodies and approval of voters in all affected areas (ORS 460.860) with some exceptions. Potential Metro Process.</p>
<p><b>Capital Financing</b> Agency may issue revenue bonds pursuant to the partnership Agreement if the parties have the ability to delegate this power to entity. Alternatively, the governing bodies of each of the partner jurisdictions may approve the issuance of revenue bonds (100% consensus). Finally, one or more member jurisdictions may issue revenue bonds backed by revenue pledged from other partners. Agency may not levy taxes or issue G.O. bonds. Agreement may allow the following:  Levy SDCs: Yes Set Rates: Yes/Differential SRF Grants/Loans: Yes Create LIDs: Yes</p> <p><b>Financial Risk Sharing</b> Risk shared among members. Generally, risk follows ownership of assets. However, agreement may make specific risk assignments. Statute says Joint and Several Liability</p>	<p>May issue revenue bonds, following a public hearing and independent financial review, with the approval of the board of directors and voters. May issue G.O. bonds in an amount <math>\leq 2.5\%</math> of the property value in the district with approval of voters in a special election at which at least 25% of registered voters turn out. May levy taxes to cover bond payments when revenues are exhausted.</p> <p>Levy SDCs: Yes Set Rates: Yes/Differential SRF Grants/Loans: Yes Create LIDs: No</p> <p>Risk borne by the district and its citizens/landowners/ratepayers.</p>	<p>May issue revenue bonds when approved by district commission. May issue G.O. Bonds or tax levy with voter approval. G.O. Bonds may not exceed 2.5% of taxable value.</p> <p>Levy SDCs: Yes Set Rates: Yes/Differential SRF Grants/Loans: Yes Create LIDs: Yes</p> <p>Risk borne by the district and its citizens/landowners/ ratepayers.</p>	<p>May issue revenue bonds when approved by Council. May issue GO bonds up to 13% of real property value. May levy taxes with votes.</p> <p>Levy SDCs: Yes Set Rates: Yes/Differential SRF Grants/Loans: Yes Create LIDs: Yes</p> <p>Risk borne by the district and its citizens/landowners/ ratepayers.</p>	<p>May levy taxes on property with vote and impose various other fees and charges. May issue G.O. bonds with approval of the Board of Directors and the voters, following a public hearing. May issue revenue bonds with approval of the Board, following a public hearing.</p> <p>Levy SDCs: Yes Set Rates: Yes/Differential SRF Grants/Loans: Yes Create LIDs: Yes</p> <p>Risk ultimately borne by the Authority and its citizens/landowners/ ratepayers. Specific pre-existing liabilities could be assigned to specific surviving jurisdictions according to the incorporation resolution</p>

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UTILITY SERVICE DELIVERY MODELS

Interlocal Partnership/ Joint Operating	People's Utility District	Domestic Water Supply District	County Service District	Authority
<p><b>Resource Planning</b> A joint agency may be authorized to conduct any and all water resource planning conducted by its individual partners (including zoning enforcement, land use, etc.), depending on the details of the partnership Agreement.</p>	<p>Resource Planning authority held by district commissioners. District enjoys most relevant planning powers—including eminent domain—no zoning and land use codes and enforcement.</p>	<p>Resource Planning authority held by District Board. District enjoys most relevant planning powers—including eminent domain. No zoning and land use code enforcement.</p>	<p>Water Resource Planning authority held Authority Board of Directors. Authority enjoys most relevant planning powers—including eminent domain—no zoning and land use codes and enforcement.</p>	
<p><b>System Management &amp; Reliability</b> Determined by agreement. The agreement may assign administrative roles to particular member jurisdictions, or create an independent joint agency structure with responsibility for system management.</p>	<p>District is responsible for system management and reliability.</p>	<p>District is responsible for system management and reliability.</p>	<p>District is responsible for system management and reliability.</p>	<p>Authority is responsible for system management and reliability.</p>
<p><b>Subject to Laws</b> Public Contracting – Yes Tort Liability – Yes Public Records – Yes Open Meetings – Yes Elections – No</p>	<p>Public Contracting – Yes Tort Liability – Yes Public Records – Yes Open Meetings – Yes Elections – Yes</p>	<p>Public Contracting – Yes Tort Liability – Yes Public Records – Yes Open Meetings – Yes Elections – Yes</p>	<p>Public Contracting – Yes Tort Liability – Yes Public Records – Yes Open Meetings – Yes Elections – Yes</p>	<p>Public Contracting – Yes Tort Liability – Yes Public Records – Yes Open Meetings – Yes Elections – Yes</p>
<p><b>Dissolution/Withdrawal</b> Dissolution/Withdrawal. According to terms of Agreement for process Compensation provisions.</p>	<p>Vote. Liability for incurred obligations.</p>	<p>Vote. Liability for incurred obligations.</p>	<p>Vote. Liability for incurred obligations.</p>	<p>Vote. Liability for incurred obligations.</p>

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UTILITY SERVICE DELIVERY MODELS

Interlocal Partnership/ Joint Operating	People's Utility District	Domestic Water Supply District	County Service District	Authority
<p><b>Pros/Cons</b></p> <ul style="list-style-type: none"> <li>Easier process for formation and expansion without public vote.</li> <li>No direct voter election of governing body</li> <li>Individual members may have charter or statutory limitations on ability to delegate legislative power or to transfer property/title. Lease or other operational agreements may be needed.</li> <li>Withdrawal/termination is an easier process, but it could also contribute to uncertainty as to whether parties are committed for the long term.</li> <li>Can split supply/ distribution functions</li> <li>Members can use SDC's to fund Agency projects.</li> </ul>	<ul style="list-style-type: none"> <li>Cities must place issue on ballot as part of formation in proceeding before County Commissioners.</li> <li>Electoral vote to select commissioners.</li> <li>Upon formation or authorization, clear power to act in all aspects: legislative/ ministerial.</li> <li>Succeed to or obtain all assets necessary</li> <li>Probably can split supply/ distribution functions</li> <li>Achieving legal agreement on exactly how the agency will function prior to formation not possible (unlike ORS 190 entity where all terms are spelled out in ORS 190 Agreement)</li> <li>Water and Power</li> <li>Not covered by Oregon budget law</li> <li>Difficult to add new territory or withdraw</li> <li>Existing agencies do not become owners of the new entity</li> <li>Existing Pub's disappear into new entity; districts may be incorporated; cities can continue</li> </ul>	<ul style="list-style-type: none"> <li>Cities must consent to formation in proceeding before County Commissioners.</li> <li>Electoral vote to select commissioners.</li> <li>Upon formation or authorization, clear power to act in all aspects: legislative/ ministerial</li> <li>Succeed to or obtain all assets necessary</li> <li>Probably can split supply/ distribution functions</li> <li>Achieving legal agreement on exactly how the agency will function prior to formation not possible (unlike ORS 190 entity where all terms are spelled out in ORS 190 Agreement) or withdraw</li> <li>Existing agencies do not become owners of the new entity</li> <li>Some existing entities may cease to exist</li> </ul>	<ul style="list-style-type: none"> <li>Cities must consent to formation in proceeding before County Commission.</li> <li>Possible proceeding before Metro.</li> <li>Electoral vote for County Commissioners</li> <li>Upon formation or authorization, clear power to act in all aspects: legislative/ ministerial</li> <li>Succeed to or obtain all assets necessary</li> <li>Can split supply/ distribution functions</li> <li>Achieving legal agreement on exactly how the agency will function prior to formation not possible (unlike ORS 190 entity where all terms are spelled out in ORS 190 Agreement) or withdraw</li> <li>Existing agencies do not become owners of the new entity</li> <li>Some existing entities may cease to exist</li> </ul>	<ul style="list-style-type: none"> <li>Cities must consent to formation in proceeding before County Commissioners. Possible proceeding before Metro.</li> <li>Electoral vote to select commissioners.</li> <li>Upon formation or authorization, clear power to act in all aspects: legislative/ ministerial</li> <li>Succeed to or obtain all assets necessary</li> <li>Clearly can split supply/distribution functions</li> <li>Achieving legal agreement on exactly how the agency will function prior to formation not possible (unlike ORS 190 entity where all terms are spelled out in ORS 190 Agreement) or withdraw</li> <li>Existing agencies do not become owners of the new entity</li> <li>Some existing entities may cease to exist</li> </ul>

**NOTES:**

- The ability of the interlocal partnerships/joint operating agreement (ORS 190) to receive a delegation of powers from underlying members depends upon the statutory charter powers and limitations of those members. Some entities may not be able to delegate "legislative" functions to the entity, which could require issues to be referred back to the members for a decision. Each entity should seek an opinion of legal counsel. Even if the delegation of a power is not a legislative matter, the process to adopt the ordinance approving and entering into the intergovernmental agreement may be legislative and thereby subject the agreement to initiative or referendum powers.
- Vote or voter approval means vote of electors in the affected territory.
- Assets could mean "wholesale" or "retail."
- "Differential rates" means the ability to levy a different rate within a defined area based upon facilities used for that area of service.
- SRF means the State Revolving Loan Fund from OEDD or DEQ.
- Tort Liability/Damage Cap Limitations are in flux with the recent case of *Clarke v. OHSU*, 2006 WL 1867755 (2006), but this question is applicable to all service models and does not make a significant difference in the alternative selected.

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**ORGANIZATIONAL AND GOVERNANCE FRAMEWORK**

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City of Lake Oswego and Tigard Water Service Area  
Joint Water Supply System Analysis

**Organizational and Governance Framework**

In creating a new joint water supply system to serve the City of Lake Oswego and the Tigard Water Service Area, many of the following factors or key issues will need to be decided upon. These decisions will serve as the framework for a new joint water supply agency or water supply agreement between the parties.

1. Scope and Objectives of Agency
  - a. Define Service Area: LO/Tigard or LO and entire Tigard Service Area
  - b. Water supply (supply, treatment, transmission) versus distribution?
  - c. Water supply sources (Clackamas only or other, future sources?)
  - d. Operation and maintenance of joint facilities for:
    - i. Reliable water supply, including backup
    - ii. Regulatory compliance to meet state and federal water quality standards
    - iii. Efficient and effective use of water resources
2. Nature of Agreement Between Agencies
  - a. Created under existing Oregon law
  - b. IGA, PUD, Special District, or Water Authority
3. Type of Agency / Rights of Agency
  - a. Enterprise utility
  - b. Full municipal powers to provide water service
4. Governance
  - a. Board composition / member representation
  - b. Appointment versus election of governing Board
  - c. Powers of the Board
  - d. Board voting system
  - e. Executive Committee
  - f. Managing Agency
  - g. Managing Agency's powers
5. Agency Formation
  - a. Name (at least a "placeholder")
  - b. Required approvals - authorization of agency creation and funding
  - c. Financial contributions & accounting
  - d. Assumptions for valuation of existing assets
  - e. Transition process
  - f. Interim service to Tigard while projects constructed; interim improvements to provide service and allocation of payment
6. Fiscal Authority
  - a. Budgeting and payment by members
  - b. Ability to make and administer rates
  - c. Ability to fund capital improvements
  - d. Authority to sell debt
  - e. Contract for wholesale water sales to non-members
  - f. Contract for wholesale purchase for alternative supplies

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City of Lake Oswego and Tigard Water Service Area  
Joint Water Supply System Analysis

7. System Ownership
  - a. Basis of ownership in the joint system
  - b. Method of assigning value to agency (e.g., capacity versus shares versus units)
  - c. Treatment of existing water rights and assets contributed
  - d. Source of starting capital / structure of initial capitalization
  - e. Treatment of existing debts
  - f. Upfront proof of project funding source
8. Operational Standards & Authorities
  - a. Standards of operation
  - b. Process and time frame for water supply allocation
  - c. Water quantity
    - i. Routine / reliable supply
    - ii. Emergency supply
  - d. Water quality
    - i. Compliance with applicable state and federal standards
  - e. Wholesale water sales - Policy on contracting services to others (first rights of water supply to members then to wholesalers)
  - f. Wholesale water purchases
  - g. Ability to resell water
  - h. Conservation and curtailment policies
  - i. Role in source water protection and water resource management
  - j. Emergencies
9. Fiscal Standards & Authorities
  - a. Basis of rates & charges
  - b. Overuse charges or system impacts
  - c. Planning and implementation of capital improvements
  - d. "Must lease" excess capacity
  - e. Policies and procedures for fiscal accountability
  - f. Initial capitalization of first year O&M with true-up at end of year
  - g. Emergencies
10. Future Considerations
  - a. Planning and forecasts of future demands
  - b. Latecomer policy
  - c. Policy on members changing system ownership amount
  - d. Policy of expansion to supply system / authority to develop alternative supplies and/or emergency supplies
  - e. Notice of proposed project to other; may proceed alone after notice of offer
  - f. Ability to modify agency responsibilities and services over time
  - g. Joint pursuit and perfection of existing and future water rights
11. Access by Customers and Members of the Public
  - a. Policies on public participation and access by the public
  - b. Policies on accountability to the public
12. Other
  - a. Member exit terms
    - i. Voluntary

City of Lake Oswego and Tigard Water Service Area  
Joint Water Supply System Analysis

- ii. Involuntary
  - iii. Valuation
  - iv. Purchase terms option/mandatory
- b. Dispute resolution process
- c. Dissolution and winding up

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**ORGANIZATIONAL AND GOVERNANCE ISSUES BETWEEN  
IGA AND IGA ENTITY**

Organizational and Governance Issues Between IGA and IGA Entity

May 16, 2007  
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Issue	Options	Advantages	Limitations
Governance	<ul style="list-style-type: none"> <li>Separate IGA entity with governing board appointed from Council of each party (equal vote)</li> <li>Separate entity with governing board appointed from Council of each party (weighted vote by investment or population)</li> <li>Separate entity with board of appointed officials/staff or citizens (Non Council Members or Combination) (Equal vote or weighted vote)</li> <li>Agreement (without creating entity) to delegate/allocate operations and management to one party with oversight governing body appointed from each Council (equal vote)</li> </ul>	<ul style="list-style-type: none"> <li>Separate entity bears some or all risks</li> <li>Liability shield to underlying parties (at least partial)</li> <li>Population or investment shifts will not affect voting powers</li> <li>Separate entity bears some or all risks</li> <li>Liability shield to underlying parties (at least partial)</li> <li>Vote may be weighted toward party to reflect larger interest</li> <li>Separate entity bears some or all risks</li> <li>Liability shield to underlying parties (at least partial)</li> <li>More direct citizen involvement if non Council members appointed</li> <li>Same issues on equal or weighted voting as above</li> <li>No separate entity. Some additional layer of decision-making and recommendation to Councils. Major decisions by each Council.</li> <li>Least amount of formality in operations</li> <li>Population or investment shifts will not effect voting powers</li> <li>Direct responsibility and risk to partners</li> <li>Same as above</li> <li>Vote may be weighted toward party bearing greater investment risk or population</li> <li>Greater control by individual city councils on each issue</li> <li>Same issues as above</li> <li>Responsibility and risk borne by separate entity</li> </ul>	<ul style="list-style-type: none"> <li>Population not related to voting power</li> <li>Voting power not related to investment</li> <li>Additional layer of decision-making</li> <li>Relative populations may shift, upsetting power balance</li> <li>Relative investment ratio may shift, upsetting power balance</li> <li>Additional layer of decision-making</li> <li>Council control somewhat limited if citizen members appointed</li> <li>Decisions may not be consistent with underlying partner's goals and policies</li> <li>Same issues on equal or weighted voting as above</li> <li>Parties directly bear risks and liability</li> <li>Population or investment may shift, but no change in voting</li> <li>Timing issues if major decisions must be made by each Council</li> <li>Risk of split Council decisions</li> <li>Same as above</li> <li>Parties directly bear risks and liabilities</li> <li>Population or investment may shift, upsetting power balance</li> <li>Parties directly bear risks and liabilities</li> <li>Slower process and more room for political influence</li> <li>Same issues as above</li> <li>Individual parties do not retain any benefits of title</li> <li>Agreement must provide a method to recover assets or value on dissolution</li> </ul>
Ownership	<ul style="list-style-type: none"> <li>Agreement (without creating entity) to delegate/allocate operations and management to one party with governing body appointed from each Council (weighted vote)</li> <li>Agreement to delegate/allocate operations and management to one or among parties without governing body (separate Council vote on all issues (equal or weighted votes))</li> <li>Separate entity owns assets</li> </ul>		

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Organizational and Governance Issues Between IGA and IGA Entity

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Issue	Options	Advantages	Limitations
	<ul style="list-style-type: none"> <li>Assets dedicated for use by or held in trust by individual parties for separate entity</li> <li>Individual parties retain title to assets or title. No transfers made to reflect joint ownership</li> </ul>	<ul style="list-style-type: none"> <li>Assets used for mutual benefit along with clear right of underlying members to compel rights of supply</li> <li>Individual parties retain assets upon dissolution without having to compel a transfer back</li> <li>Responsibility and risk borne primarily by individual partner. No change in City's asset base</li> <li>Individual parties retain assets upon dissolution without having to compel a transfer back</li> </ul>	<ul style="list-style-type: none"> <li>Individual parties do not retain all benefits of title</li> <li>Agreement must provide a clear release of trust interest on assets or dedication of use on dissolution</li> <li>Agreement must clearly address ability of City to enforce rights against the other City to compel delivery of water to get benefit of bargain</li> </ul>
Management	<ul style="list-style-type: none"> <li>Entity Board hires separate management/staff</li> <li>Parties appoint governing body</li> <li>Entity Board appoints general manager/ staff from the parties</li> <li>Parties appoint governing body</li> <li>Individual parties appoint management advisory committee and designate existing staff</li> <li>Decisions by respective Councils</li> </ul>	<ul style="list-style-type: none"> <li>Entity Board has equal control over management and perception of no allegiances</li> <li>Probably not hiring new staff. Transfer of existing staff to obtain efficiencies and institutional/operational knowledge</li> <li>More participatory model for Councils</li> <li>Keeps staff efficiencies</li> </ul>	<ul style="list-style-type: none"> <li>Less control over management by individual parties</li> <li>May lead to increased staffing and defeat efficiencies</li> <li>General Manager/Staff from one party may afford greater control or allegiance to that party</li> <li>Management committees may slow process</li> <li>Full Council involvement may create timing issues and risk of split Council decisions</li> </ul>
Expansion -Territory	<ul style="list-style-type: none"> <li>Facilities managed by assigned parties</li> <li>Include new territory of individual party upon expansion without further process (automatic)</li> <li>Require majority vote of each governing body to include new territory in water supply system</li> <li>If entity, requires unanimous vote of governing body to include new territory in water supply system</li> </ul>	<ul style="list-style-type: none"> <li>Individual parties may manage individually owned assets</li> <li>No joint control</li> <li>Individual parties have control and assurance over the provision of services upon expansion</li> <li>Some flexibility regarding the expansion of the water supply system but restricted</li> <li>Requires consideration of system capacity</li> <li>All parties have a say in whether new territory should be included</li> <li>Veto power over another based on impact to water supply system</li> </ul>	<ul style="list-style-type: none"> <li>May not achieve desired comfort level on facility operation</li> <li>Unilateral large expansion or water use intensive expansion could commit existing capacity earlier than anticipated and force improvements</li> <li>More difficult to provide service demands if approval of others needed</li> <li>May create veto and defacto moratorium unless adoption of clear criteria for decision</li> <li>Creates veto and defacto moratorium unless adoption of clear criteria for decision</li> </ul>

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Organizational and Governance Issues Between IGA and IGA Entity

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Issue	Options	Advantages	Limitations
	<ul style="list-style-type: none"> <li>If entity, require majority approval of entity governing body to include</li> </ul>	<ul style="list-style-type: none"> <li>Reduces veto somewhat, but need a definition of majority.</li> <li>Same as above</li> </ul>	<ul style="list-style-type: none"> <li>Same issues as above on veto and defacto moratorium</li> <li>Depending on definition of majority. May allow party with majority vote to include territory at will and deny minority party</li> </ul>
Expansion of System Capital Improvements	<ul style="list-style-type: none"> <li>"Must lease" excess capacity to avoid premature capital investment</li> <li>Proposal to expand by party and others may join or decline. If joiner, then move to financing, design, and construction. If decline, proposing party may proceed at its sole cost.</li> <li>Buy Back/No Buy Back</li> <li>Proposal by party and others must participate</li> </ul>	<ul style="list-style-type: none"> <li>Provides for use of existing capital assets prior to expansion</li> <li>Lease provides revenue stream for unused capacity. Gives flexibility and time in considering scope of improvements and capital financing</li> <li>Once capacity is used or lease expires, a party has the right to continue with expansion at its cost without forcing others to participate</li> <li>One party cannot prevent another from proceeding</li> <li>One party cannot proceed and impose a financial burden on another</li> <li>Requires some parties to invest when expansion not needed</li> <li>Improvements required by change in Regulations can carry mandatory participation requirements</li> </ul>	<ul style="list-style-type: none"> <li>The lease term must be on the shorter side to give the Lessor City assurance that it can get the water when it needs it. A vigorous demand planning exercise must be employed so that Lessor and Lessee have predictability in determining the term</li> <li>One party bears risk and debt to benefit of other parties if nonparticipating party has buy back right</li> <li>One party bears risk and retains benefits if no buy back right</li> <li>If no buy back, may influence party to invest with partners even though it does not have an immediate need for improvement. Hardship to ratepayers</li> <li>Forces parties to participate that may lack finances or need for expansion</li> </ul>
Buy-Out - Formulas and Terms Voluntary Withdrawal	<ul style="list-style-type: none"> <li>Remaining party must purchase at set formula (ex: original cost less depreciation)</li> <li>Remaining party must purchase at negotiated price</li> </ul>	<ul style="list-style-type: none"> <li>Mandatory buyout creates certainty for withdrawing partner and an unexpected, but predictable burden on remaining partners</li> <li>Preserve relationships with known remaining partners if multiple parties</li> <li>Formula terms or limits may induce a party to remain</li> <li>Same as above</li> <li>Potential high purchase price might induce a partner to leave and reinvest in a cheaper alternative</li> </ul>	<ul style="list-style-type: none"> <li>Formula may not account for value to remaining partner of not having to find a new water source</li> <li>Allows for value of assets to remaining party to reflect value of not having to find a new water source</li> <li>Negotiated price may be too burdensome</li> </ul>

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Organizational and Governance Issues Between IGA and IGA Entity

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	<ul style="list-style-type: none"> <li>Remaining party may purchase at set formula. If a party declines then may sell to 3<sup>rd</sup> party (local government)</li> <li>Remaining party may purchase at negotiated price. If party declines, then may sell to 3<sup>rd</sup> party</li> <li>No exhaustion of alternate remedies required</li> <li>Formal negotiation and mediation before taking legal action</li> <li>Formal negotiation, mediation and nonbinding arbitration before legal action</li> </ul>	<ul style="list-style-type: none"> <li>Optional purchase retains flexibility for all</li> <li>Same as above</li> <li>Parties may proceed directly to legal action in the event of an otherwise irresolvable dispute</li> <li>Some opportunity for resolution before initiating legal action</li> <li>More opportunity for resolution before initiating legal action</li> </ul>	<ul style="list-style-type: none"> <li>Optional purchase creates doubt as to whether a partner can leave if a decline by the partner and no 3<sup>rd</sup> party interested</li> <li>Remaining party may not want to be partners with 3<sup>rd</sup> party buyer</li> <li>Same as above</li> <li>No requirement to attempt to resolve disputes before parties invest in legal action</li> <li>May delay ultimate resolution if parties cannot agree prior to legal action</li> <li>Longer delay in resolution if parties cannot agree prior to legal dispute</li> </ul>
<p>Dispute Resolution</p>	<ul style="list-style-type: none"> <li>Individual parties responsible for contributing appropriate share and choose method to raise funds when entity makes a capital call</li> </ul>	<ul style="list-style-type: none"> <li>Individual parties control preferred mode of raising finances. All financial tools available. Parties take on risk and burden to finance. Not responsible for another</li> </ul>	<ul style="list-style-type: none"> <li>Parties take on the risk that another party will not raise sufficient funds or budget in timely fashion so project is not constructed or constructed late.</li> </ul>
<p>Capital Financing Tools          (authority to levy SDCs, set rates, get SRF grants/loans, create LIDs)</p>	<ul style="list-style-type: none"> <li>Parties delegate some authority to raise financing to separate entity</li> <li>Parties delegate all possible authority to raise financing to separate entity</li> </ul>	<ul style="list-style-type: none"> <li>Individual parties retain some control over financing their share. Some tools may not be available. Parties may not be primary debtor in financing</li> <li>Separate entity has wide range of financing options</li> <li>Parties may not be primary debtor in financing</li> </ul>	<ul style="list-style-type: none"> <li>Pass through liability or guaranty of debt of others</li> <li>Separate entity has limited range of financing options because of lack of history or statutory limitations</li> <li>May impact ability of individual partner to use some financing tools (sdc's).</li> <li>Individual parties retain much less control over the chosen method of financing</li> <li>May impact individual's ability to charge sdc's and use financing tools</li> <li>Pass through liability or guaranty of debt of others</li> </ul>
<p>Opportunity For Buy-In or Initial Contribution/Capital Investment</p>	<ul style="list-style-type: none"> <li>Require initial cash or in-kind contributions and initial proportional investment for all improvements so equal ownership attained</li> <li>Have initial parties contribute current assets or cash but disproportionate initial capital contributions result</li> </ul>	<ul style="list-style-type: none"> <li>Stable relationship for existing parties</li> <li>Initial equality in system</li> <li>Stable relationship for existing parties without financial hardship. "Contribute what you have."</li> </ul>	<ul style="list-style-type: none"> <li>May require capital contribution at outset and work a hardship on a partner who needs to "even up" the initial contribution</li> <li>If voting is weighted based on investment, one party may become a minority interest</li> </ul>

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Organizational and Governance Issues Between IGA and IGA Entity

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<p>New Partners</p>	<ul style="list-style-type: none"> <li>Allow nonparticipating parties to buy share of improvements upon consent of all. Consent not unreasonably withheld</li> <li>Prohibit nonparticipating parties from later buying in</li> <li>Buy in with full up front proportional investment on formula basis</li> <li>Buy in with full up front proportional investment on negotiated basis</li> <li>Buy in with partial up front proportional investment on formula and payment terms</li> <li>Buy in with partial up front proportional investment as negotiated and payment terms</li> </ul>	<ul style="list-style-type: none"> <li>Allow for specified method of bringing in new partners. Reasonableness is standard</li> <li>Agreement is clear there will not be new partners except with unanimous consent. No reasonableness standard.</li> <li>Allow for immediate cash payment to reimburse original members for investment</li> <li>Allows for some "blue sky" value to account for previous risk taken by existing members</li> <li>Allow for cash payment over time to reimburse original members for investment</li> <li>Allows for some "blue sky" value to account for previous risk taken by existing members</li> </ul>	<ul style="list-style-type: none"> <li>A party may want to object to a new member, but reasonableness standard creates risk the party's objections will not be recognized.</li> <li>Requires full negotiation to bring in a new partner</li> <li>Financial hardship for new members</li> <li>Financial hardship for new members</li> <li>Initial parties take risk to get supply facilities in place and then act as bank to let another entity obtain benefits of same deal.</li> <li>Particularly a problem if expansion and capital call on all parties at the same time.</li> </ul>
<p>Charter Limitations</p>	<ul style="list-style-type: none"> <li>Agreement consistent with existing Charter limitations</li> <li>Agreement modified to incorporate future charter amendments</li> <li>Future Charter amendments that are contrary to terms of the agreement may not be enforced as impairment of contract</li> <li>Consistent ordinance provisions on conservation and other system/user matters affecting source and demand</li> </ul>	<ul style="list-style-type: none"> <li>Consistency with existing Charter</li> <li>Provides for automatic amendment</li> <li>Preserves effect of the agreement</li> <li>Uniformity of water policies and goals to reduce demands and defer capital improvements</li> </ul>	<ul style="list-style-type: none"> <li>Difficult to change existing Charter provisions</li> <li>Impact of one Party's charter amendments on the other</li> <li>May create issues within one party</li> <li>Uniformity may run contrary to individual community values</li> </ul>

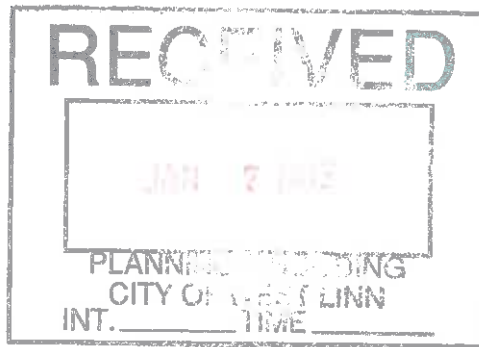
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RE: AP-12-02 and AP-12-03.

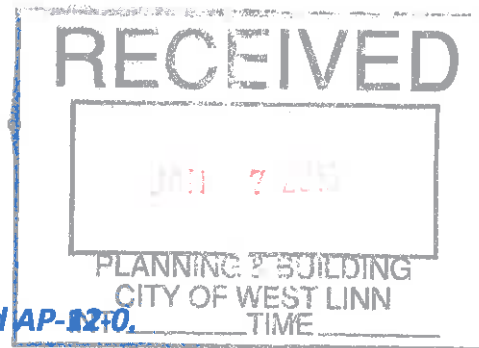
In addition to what is being said by newly elected officials in Lake Oswego, the West Linn City Council should not expect their decision to be appealed to LUBA.

1. Attorneys hate to lose. LOT's lawyers are no exceptions.
2. Of the 50 plus cases appealed to LUBA only 3 or 4 were overturned on procedure.
3. The West Linn Planning Commission made their decision on overwhelming evidence. The project clearly does not meet the city's code and is not a benefit.
4. The West Linn Planning Commission was extremely careful to properly evaluate the application.
5. The West Linn Planning staff and other members of the West Linn staff have foolishly provided the applicant contrary information with misguided conclusions basically ignoring the good work the West Linn Planning Commission completed.

David Froode  
19340 Nixon Ave  
West Linn



**Subject:** Small Angry Group  
**From:** Dave Froode <dfroode@comcast.net>  
**Date:** 1/2/2013 6:46 AM  
**To:** zpelz@westlinnoregon.gov



Please enter this in the the council record for **RE: AP-12-02 and AP-12-0**.

We very much resent being labeled a "small angry group", "small noisy group", "fear mongers" and spreading lies". In the last three years those that oppose the LOT Partnership are marginalized and vilified by city employees from Oswego, Tigard and even West Linn. We citizens do not appreciate it when employees who are supposed to be serving our community, try to beat us up with our own tax dollars and then label the opposition in a disrespectful manner.

Some city employees claim to be representing the entire community, not just a small group impacted by the project. Those city employees really need to get out of their work cubicles more to determine what the citizens do want. Yes, we understand there is a process with rules. Two of which require the project to: 1) meet the code and 2) be a benefit to the community. The bottom line is who better to define what benefits this entire community then the people who live here?

Those who oppose this project in West Linn include a large number of West Linn citizens, seven Neighborhood Associations, the West Linn Riverfront Association, over 100 business people along Hwy 43, and members from Waterwatch Oregon, Trout Unlimited and Coastal Conservation Association. Citizens from surrounding communities denounce it. The summation constituting a bit more than a small group.

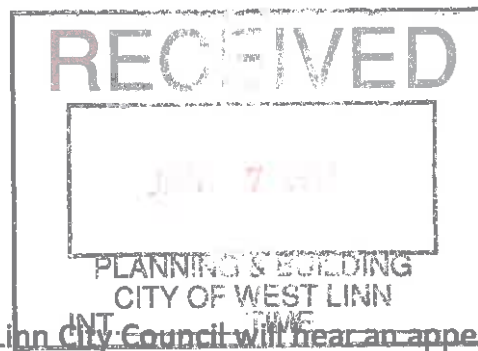
Know the new political climate in Lake Oswego opposes this project. Ask them. We did!

On top of all of the political opposition, the West Linn Planning Commission objectively voted unanimously to deny the permits and truly represented the whole community.

But those few city employees who label are right about two things. We are very angry and we will be very noisy. As one leader from Lake Oswego put it, "whether or not you are a small group, you are very effective!" Considering we are up against three cities with their paid professionals, we will take that as a compliment.

As for spreading lies and fear, that is not at all necessary when you speak the truth.

David J. Froode  
19340 Nixon Ave WL



## Guest Opinion

On Jan 14-15, the West Linn City Council will hear an appeal by Lake Oswego-Tigard Water Partnership project which was denied by the West Linn Planning Commission. The West Linn council would be wise to consider the new political climate in Lake Oswego.

Those in West Linn opposed to the Lake Oswego Tigard Water Treatment plant expansion have been labeled a small noisy group. This is an attempt to marginalize the opposition by the few still advocating the project. If seven Neighborhood Associations, the West Linn Riverfront Association, along with the West Linn Planning Commission, coupled with over 1,000 signatures on a petition is a small noisy group, then yes, we are a small noisy group.

But let's set aside the small noisy groups in West Linn and focus on another small noisy group to the north. They are called the new and improved Lake Oswego City Council. Slowly but surely people in Lake Oswego are connecting the dots and realizing this Titanic of a project is a lose-lose-lose deal for them, the citizens in Tigard and West Linn. Other active groups in Oswego also stand opposed to this project. Fact is, there are lots of small noisy groups opposed to this project.

People in West Linn, specifically the Robinwood neighborhood, totally understand Oswego's need to update their water system. West Linn has similar issues. Eventually what ever project is done will no doubt benefit the communities involved. But this Titanic is not the right project or the best answer. We have told key community leaders from Oswego we will be very willing to work through issues amicably in our neighborhood. That has always been our message from day one. With respect and good faith we are confident we can create a win win for all.

The Carollo Report was a feasibility study done by the partnership in 2007. We are now in the year 2013 and changes have occurred. Today, Oswego's average water use is six million gallons per day with a capacity of 16 mgd. According to this report, coupled by the Water Resource Board Report submitted by Lake Oswego last August, the average daily water consumption has been reduced by 36% due to a successful conservation effort by the citizens of Oswego. Nicely done. However, even with a build out in to Stafford area, Oswego should not ever need the capacity. Yet the new facility is cranked up to produce 24 mgd. People are asking why?

The citizens of all three cities need to know there is a lot of fiction and false crises created in an effort to justify this project. No ones water rights are at stake. No one will be with out water, ever. No one needs to worry about emergency water. Tigard has multiple options to get water

besides the Clackamas River. For the West Linn community, know this project and the benefits offered by Oswego are not going to fix all our water problems in West Linn. In fact some of the alleged fixes are temporary at best.

We are of the opinion, Lake Oswego's new political climate will not allow the Titanic to leave the dock. It is way too expensive and not necessary. The good people of Tigard should start paying attention to this project before their water bills skyrocket. Bottom line all cities have better options that will cost less and create a far better long term solution for everyone.

The smart play is to listen to the new politics being broadcasted from Oswego. They are quick to point out their "water rates have jumped 30%". They do not want to continue with this "stupid partnership with Tigard." And "no matter what happens in West Linn, this project will not be done because it is way too expensive!"

By upholding the West Linn Planning Commission's decision, the WL Council would be making the best decision for the citizens of Oswego, Tigard and West Linn. People from all three cities can re think their needs. Once the more efficient and less expensive alternatives are evaluated we as regional partners can come to an amicable decision that is a win win win. No doubt the same benefits offered today will exist for all three communities.

There are far better options available to all three cities. With that, we can all be "Good Neighbors".

David J. Froode,  
Managing Partner  
STOP, LLC <http://www.westlinnfirst.com>  
West Linn

# Skyrocketing water bills lead to concerns

**W**hy is my utility bill so high?" That is the No. 1 question citizens ask as I campaign door-to-door throughout Lake Oswego. The answer is that the city is collecting in advance for the Lake Oswego-Tigard Water Partnership (LOTWP) for which not a shovel of dirt has yet been moved.

Planned rate increases will continue to mount for several more years and then they will remain at the same high level until 2038 when project debt is retired. No one asked citizens if they wanted to commit to LOTWP on these terms. Fees are like taxes without our vote. We never had a chance to vote on this largest capital project in the city's history, \$250 million.

Portland consultants may be pleased with LOTWP because we are paying them mightily. In just two years, the figure appears to be a staggering \$20 million (consultant costs are not readily available from the city). In addition, we carry almost a million dollars annually in staff personnel costs on the project, not to mention escalating legal fees for contentious issues with our West Linn neighbors.

Tens of millions are already dedicated toward this project, although its legality is still challenged. Land use approvals have not been obtained from West Linn. Approval for the amount of water to be pumped from the Clackamas River remains in the state Appeals Court. Sequencing of steps is important in carrying out a plan, but in this case, commit-

## CITIZENS VIEW

Karen Bowerman



ment of IO funds preceded assurance that the project could be done.

Planning documents from 2007 show significant cost increases over time with no idea of when they may stop. Furthermore, there are out-of-date assumptions that led to overcapacity in volume and scope. Assumptions about population growth were high. Assumptions about additional land to be served with IO water were high. Assumptions about conservation were underestimated. Thus, LOTWP proceeded too quickly for proper implementation over a longer time horizon. When assumptions underlying a plan lead to out-of-date conclusions, the plan itself should be questioned and re-worked.

In Lake Oswego, the council has not re-evaluated LOTWP capacity or scope. Our average water usage is about 6 million gallons per day. Current capacity is 16 million gallons per day of clean water, yet we are planning for 24 (plus 14 for Tigard — a total of 38 million gallons per day).

The extent of growth in these fees has made the issue important to everyone in IO. Controlling growth in fees and taxes is especially important to our citizens on fixed incomes as well as to businesses that want to remain in Lake Oswego.

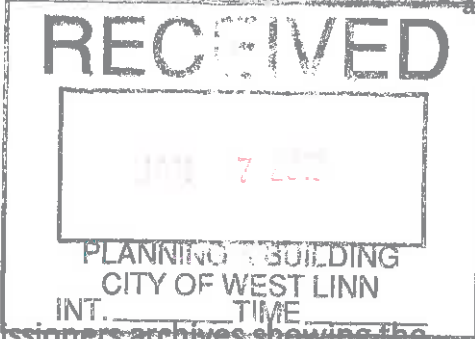
**Instead, let's do an honest cost-benefit analysis and do what is right for IO. No single factor is a sole reason for stopping LOTWP or canceling the contract. However, in the aggregate of so many factors I've described, it is clear that city council must ask pointed questions and re-evaluate how wisely it is spending our tax dollars.**

Some residents complained that they allowed their grass to die this summer in order to save water, but their bills were still many times higher than ever because a large percentage of each bill is "fixed," regardless of use level and conservation efforts.

What should be done beyond certain needed repairs? Some say "charge forward" because otherwise IO would face a penalty. Instead, let's do an honest cost-benefit analysis and do what is right for IO. No single factor is a sole reason for stopping LOTWP or canceling the contract. However, in the aggregate of so many factors I've described, it is clear that city council must ask pointed questions and re-evaluate how wisely it is spending our tax dollars.

*Karen Bowerman is a candidate for Lake Oswego City Council.*





Please submit to record for **RE: AP-12-02 and AP-12-03**

History

Attached is a document from the Clackamas County Commissioners archives showing the beginning of the Lake Oswego Water Treatment Facility in Robinwood. In 1967, Robinwood was unincorporated and opposed the facility in 1967. Evidence of that is illustrated by the 350 signatures on a petition provided by Mary Hill from Nixon Ave. Mary was well informed. Her brother was the manager of the Robinwood Water Board.

The document is a copy of the ruling from the Board of Clackamas County Commissioners dated April 19, 1967. However, note the Clackamas County Planning Commission denied Lake Oswego permits to build the facility on Feb. 27th, 1967. LO appealed the CC PC decision and it was over turned by the County Commissioners without a public hearing or input or at least no record of the sort is available.

At the bottom of the ruling, please note the second condition for approval, "(2) and that said treatment plant will provide for the future needs of water users in Robinwood...and Lake Oswego areas." As we all know, even though there was adequate time for LO to connect Robinwood residents to their facility, it never happened. In addition, at least three property owners who lived in Robinwood at the time were never told by any one the facility would provide water to their homes. One could assume, if Oswego intended this facility to be a benefit to the Robinwood residents, that fact would have been widely broadcasted. But the contrary is true, the first they heard of it was reviewing this CCC document in 2012. Those three are Mary Hill, Elenora Larsen and Monte King. We contend the beginning of this facility was based on misrepresentation and quite likely acts of manipulation. Contrary to Oswego's allegation, the facility has never been welcomed in Robinwood.

Intertie Agreement

Since the facility was installed, LO has used the intertie agreement three times as a benefit in order to obtain Conditional Use Permits from West Linn. The first two were minor alterations, this one is a complete over haul involving a new facility with expansion to four acres. How many times is one agreement going to be used to justify this facility in a residential area?

The last IGA was formed in 2003. From 2003 to 2012, the two cities supplied emergency water to each other seven times for a total of 14 times one or the other needed water. That agreement seemed to be wokring fine until LO decided it could no longer honor it.

With this latest project, which is actually a whole new facility to accommodate Tigard's addition, once again the intertie is back on the table to be used as a benefit to West Linn. What

should be understood is during a June 4th, 2012 work session between the WL CC and the City Manager, the council was told any changes to the IGA would be minor. The WL CM said most likely just involve adding Tigard to the agreement. The CM went on to say the staff would handle it and the council would probably not have to be involved. It is important to recall that work session because this new agreement is being heralded as a cure for West Linn's emergency water needs. It is no longer a minor adjustment to an agreement that was working fine. Obviously the breach allowed LO to create a new crises and a new benefit to justify the CUP being applied for.

### Corollo Report

Further evidence of this calculated manipulation is illustrated in LOT's Corollo Report along with the recent Water Resource Board report submitted by LO this past summer. The Corollo Report was a feasibility study done by LOT in 2007 to justify the project. As it turned out, from 2007 to 2012, the next five years, the numbers have changed. Oswego has reduced it's consumption by 36% due to conservation efforts. They will no longer need to increase their taking even with a build out to include the Stafford area. It would seem logical to conclude their allegation of not being able to supply emergency water to West Linn does not prove correct either.

### Need and Purpose

The only reason why Oswego still wants (but not a need) to take more water from the Clackamas River is to supply Tigard with it. Tigard is not in the Clackamas River basin. Tigard can continue with Portland's Bull Run system. Tigard can changed it's charter to use the Willamette River water. Tigard can cobble on to Wilsonville's over built water system. Tigard does not have to have Clackamas River water to meet their city's needs. Yet Oswego allows Tigard to tap the Clackamas River so Tigard can pay 53% of the cost for the new facility needed by Oswego, but benefits Tigard too. Tigard wants and problems should not be West Linn's problem.

### New IGA

The new IGA is not a long term solution for West Linn. It only lasts 29 years and the renewal would be LOT's decision based on water being available. Also, if the IGA is not renewed, LOT would not remove the facility in West Linn. As the West Linn Planning Commission implied, the new IGA is only temporary and possible. It is kicking the can down the road.

### Conclusions

Given Oswego's track record back to 1967 demonstrating their struggles with honoring agreements, is it wise for West Linn to continue dependency on Oswego for our future needs? We think not. We would much prefer to develop solutions that are dependable and creates a long term fix.

Our options involve Clackamas River Water Board who did supply emergency water in Dec 2011. Or WL could purchase a mobile purification system called Tempest Environmental units.

The unit can produce 30,000 gallons of water a day in an emergency. The cost is \$155,000.00 with grants available through Clackamas River Water Providers, Dept of Homeland Security. Last, it is time to explain to Oswego they will honor the agreement that was serving both communities since 2003. Or it might be time to remove the facility from West Linn due to the breach.

This project benefits Oswego and Tigard at West Linn expense. It was mishandled from the beginning by LOT and WL. Lets not allow their mistakes to jeopardize our community's future. It contains one false crises after another fabricated by LOT and wrongly being promoted by WL staff. The LOT Partnership will collapse under its' own political weight and West Linn will be back to square one. At some time in the future, at least LO will be back pursuing a CUP and will certainly want to negotiate. What is on the table today, will be available in the future but at a far less cost to our community. Lets focus on them and pursue them as a united community.

Please honor the unanimous decision made by the West Linn Planning Commission. We have better choices, as do the citizens of Oswego and Tigard.

Respectfully,  
David J. Froode  
19340 Nixon Ave. WL.

BEFORE THE BOARD OF COUNTY COMMISSIONERS  
OF CLACKAMAS COUNTY, STATE OF OREGON

CLACKAMAS COUNTY  
FILED

APR 20 1967

ROBERT SCHUMACHER, County Clerk

NO. 14810

In the Matter of the Appeal of the CITY OF LAKE OSWEGO for a water treatment plant to be classified as a Conditional Use on property located on the south side of Kenthorpe Way at its easterly terminus, Robinwood Area

This matter coming on regularly at this time to be heard, and it appearing to the Board of County Commissioners that Deane Seeger, representing the City of Lake Oswego, has made application to the County Planning Commission to construct a water treatment plant as a Conditional Use within an R-10 Single Family Residential District, on property located as stated above, and more particularly described as Tax Lots 11-11, 11-12, 11-16, 30, 31, 32, and 33, George Walling D.L.C., Section 24, T2S, R1E, W.M., and

It further appearing to the Board that said application was heard at the regular meeting of the County Planning Commission on February 27, 1967, at which time the Commission denied the Conditional Use request, and

It further appearing to the Board that, subsequent to the Planning Commission's decision, Mr. Seeger, again representing the City of Lake Oswego, did, on the 9th day of March, 1967, file an appeal with the governing body of the County, and

It further appearing to the Board that said appeal application was heard by the Board of County Commissioners, after due notice, pursuant to the provisions of the Clackamas County Zoning Ordinance, at their regular session on Wednesday, April 5, 1967, at which time this matter was continued, and

It further appearing to the Board that subsequent to their afore-mentioned hearing, and after due consideration, the Board reached a decision on the appeal, now therefore,

IT IS HEREBY ORDERED that the appeal of the City of Lake Oswego for a water treatment plant as a Conditional Use on the above-described property be and the same is hereby approved subject to the regulations of the Clackamas County Zoning Ordinance and recommendations of the County Health Department, and (1) adequate landscaping and design so as not to detract from the residential character of the area; (2) and that said treatment plant will provide for the future needs of water users in Robinwood, Glenmorrie, Marylhurst and Lake Oswego areas.

DATED this 19th day of April, 1967.

BOARD OF COUNTY COMMISSIONERS

*Dean Hob*  
Chairman

*Fred Steffen*  
Commissioner

*[Signature]*  
Commissioner

RE: AP-12-02 and AP-12-03.

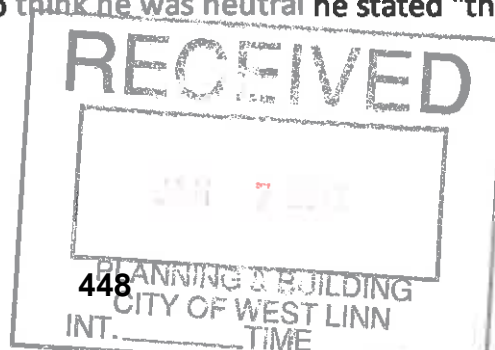
The Parks Director and five others citizens discussed the City Charter regarding MSY Park and Cedar Island parks. Below is Parks Director Ken Worcestor's conclusions. We believe the Charter issue is independant of the LOT appeal but per the city's insistence have submitted it to the record for the appeal.

Our conclusions:

1. Per the attached map, it is clear the LOT Water Partnership intends to create a pedestrian path on the east side of the Mapleton right of way. This path will intersect and pass through the LOT staging area. Park users of all kinds will have to contend with heavy construction equipment and activity to use the parks. Mapleton is currently a well used egress to access the north end of leased MSY park and Cedar Island and the Willamette River Beach owned by the City of West Linn.
2. Per Atty Pamela Beery's memorandum Oct 2011, if the construction activity is above ground and interferes with the use of the park, the City Charter should be applied. The staging area is above ground, construction activity will interfere with the use of the parks.
3. The existing parking areas used by park users will be eliminated by the Staging area, the pedestrian path and the construction activity again interfering with the use of the parks.
4. It is our understanding interpretation of the City Charter is the responsibility of the West Linn City Council, not the Parks Directors or City Managers.
5. The Parks Director stated the \$90,000.00 mitigation is not a benefit to West Linn but a benefit to State Parks because they are the owners. Nine people to include the Parks Director were in the room with that said.
6. The Parks Director also said the Parks Board had little to do with the mitigation list yet in his letter to the City Manager and in another letter to State Parks Director Tim Woods, the Parks Director states the members of the Parks Board had every thing to do with the decision, even approving it by motion.
7. Members of the Parks Board have stated they had little to do with the decision. But the chairperson said "if we can get money for parks I am all for it."
8. Though the Parks Director wanted us to think he was neutral he stated "the city does not want the charter to be applied."



DAVID & DIANNE FROODE  
19340 NIXON AVE.  
WEST LINN, OR. 97068



1/7/2013 7:01 AM

----- Original Message -----

**Subject:**RE: MSY Charter

**Date:**Thu, 20 Dec 2012 14:52:04 -0800

**From:**Worcester, Ken <Kworcester@westlinnoregon.gov>

**To:**'Dave Froode' <dfroode@comcast.net>, Norman King <normbking@gmail.com>, gwen sieben <gwensieben@att.net>, Pete Bedard <pete.bedard@gmail.com>

Hi Dave;

Because the Charter mentions "City-Owned" in reference to real estate, property, park or open space no less than 13 times, Ms. Beery logically assumed non-city owned property would not be in the discussion at all, especially given the route she was reviewing at the time, would be that of beneath "City-owned" property designated park or open space.

I do agree with Mr. Stamp that the "time" and "interference" issue it would definitely be a stretch.

After reviewing some of the other stuff you sent me on Friday, (the construction management plan specifically) we saw a lot of information not provided previously that specifically says there will be no or at worst minor or temporary interferences with the areas you folks mentioned. I've attached back to you, excerpts of that plan. Given that the information shows in both the text and on the maps that all access to the trails and Mary S. Young Park will remain open throughout the entire project, and considering the discussion above, it makes a tie back to the Charter based on "interference" a non-starter, so there is nothing I feel we can help you with, as it relates to the Charter.

Ken

## Memorandum

Date: November 26, 2012

To: Chris Jordan, City Manager

From: Ken Worcester, Parks and Recreation Director 

Subject: A Synopsis of Our Involvement with the LOT Water Line Project as it Relates to Mary S. Young Park

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**Purpose:**

To provide a summary of the above mentioned staff work.

**Background:**

After presenting multiple routing options for a new water line through Mary S. Young Park (Park), in March of 2012 the LOT Partnership settled on a proposal that would tunnel beneath the Willamette River and beneath the Park proper, and eventually daylight on property owned by the Oregon Parks and Recreation Department abutting Mapleton Drive adjacent to the Park.

Because both an underground easement and an above ground easement would be required across the State Parks property, and because we have entered into a lease agreement with Oregon Parks and Recreation Department (OPRD) to manage Mary S. Young Park, we were asked to provide a list of potential projects that could if approved help demonstrate an "overwhelming benefit to the park system" as defined in OPRD Policy #PSP.010.

This action was part of a due diligence process OPRD staff was directed to undertake as it related to granting the easements. (State Parks Commission action item attached)

As we understood the request, it was to provide a list of potential projects we could agree upon, that OPRD could then use to secure a financial commitment from the LOT Partnership that would meet the criteria of PSP.010 to mitigate for the disturbance of approximately 3700 square feet of "above ground" property.

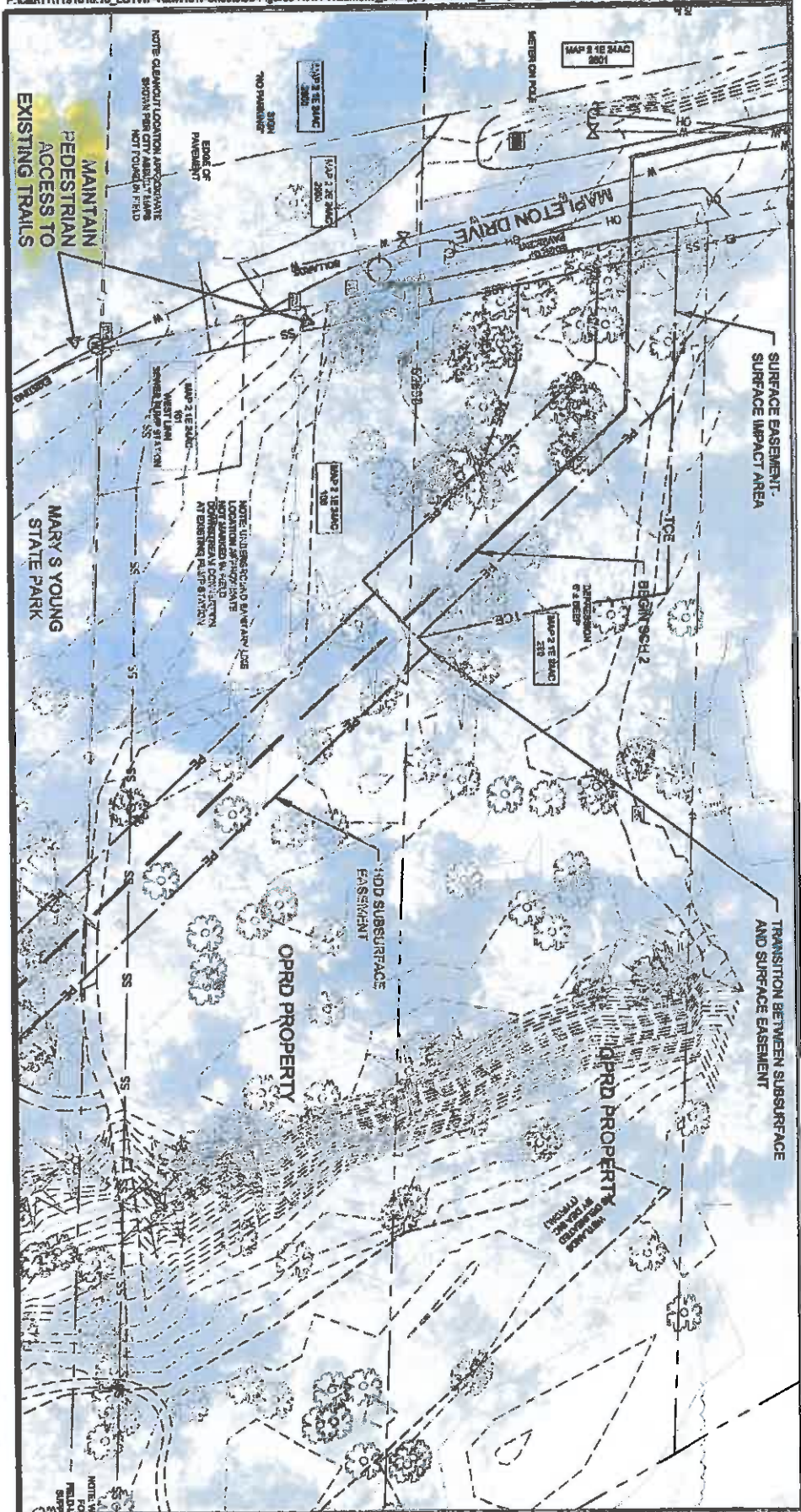
On March 22, 2012, the West Linn Parks and Recreation Advisory Board adopted a list of projects (attached). This list was sent to Tim Wood, the Director of OPRD along with an offer on our part to manage the projects for OPRD as we manage everything at the Park anyway.

Though LOT has agreed in principal to fund the proposed projects, to date, there are no finalized agreements between LOT and OPRD for the easements, nor are we party to any finalized agreement to execute the proposed mitigation projects.

**Summary:**

To summarize, the only property to be impacted is 3700 square feet of a State owned parcel that is not part of Mary S. Young Park. Access to Cedar Island will not be prevented by this work. Any mitigation agreement will be between the LOT Partnership and OPRD, and we may or may not manage the mitigation work.

- LEGEND**
- OPEN CUT PIPE ALIGNMENT
  - HDD PIPE ALIGNMENT
  - PE PERMANENT EASEMENT
  - TCE- TEMPORARY CONSTRUCTION EASEMENT



Kennedy/Jenks Consultants  
**OPRD SITE DEVELOPMENT  
 HDD STAGING AND PARK  
 ACCESS**  
**FIGURE 2**



## 1. Introduction

The Lake Oswego – Tigard Water Partnership (Partnership) includes two major pipeline systems. The Raw Water Pipeline (RWP) will convey raw water from the River Inlet Pump Station (RIPS) located in Gladstone to the Water Treatment Plant (WTP) located in West Linn. The Finished Water Pipeline (FWP) will convey treated drinking water from the WTP to reservoirs and pumping stations in Lake Oswego and Tigard.

This Construction Management Plan (CMP) discusses the construction activities, potential construction impacts, and construction impact mitigation that will be employed to assist the RWP and FWP within West Linn city limits, per the requirements of the West Linn Community Development Code. This document does not address any construction activities or impacts associated with the upgrade of the WTP. A separate CMP for the WTP will be submitted as part of the WTP land use application update. In addition, the Partnership will submit a consolidated CMP at a later date which will discuss the construction activities for both pipelines and the WTP projects.

## 2. Construction Overview

There are three distinct construction phases for the RWP and FWP projects within the City of West Linn. The construction methodologies for each phase include open-cut construction on Mapleton Drive for the RWP and FWP, open-cut construction on Highway 43 for the FWP, and horizontal directional drilling (HDD) construction for the RWP within property owned by the Oregon Parks and Recreation Department (OPRD). Figure 1 shows the construction alignment and phases. Each of these is described in more detail below.

### 2.1 Construction Phases

The construction phases are described in the sections below.

#### 2.1.1 HDD Construction

The Partnership proposes to use HDD methods to construct the RWP underneath the Willamette River. The crossing will consist of a 42-inch-diameter pipe that is 3,800 feet long. The HDD crossing will begin (entry) at property owned by the OPRD at the southeast end of Mapleton Drive (adjacent to the City of West Linn's Mapleton Pump Station and north of Mary S. Young State Park) and will end (exit) at Midlrum Bar Park in Gladstone. Approximately 950 linear feet of this crossing alignment will be in West Linn. Figure 2 shows the location and layout of the HDD operation within the two OPRD properties, and the HDD alignment through these properties and Mary S. Young State Park. The HDD alignment will be tracked approximately 30 to 60 feet below the bed of the Willamette River and Mary S. Young State Park between entry and exit locations. Open cut excavation of the river crossing was considered and was not selected due to adverse impacts to the park and recreational fishing activities within the Willamette River. The HDD construction process will not result in any impacts along the alignment other than the entry and exit points. HDD is the construction technique preferred by the state and federal agencies with jurisdiction in the river.

Many of the HDD drilling activities will occur at the HDD entry location on the west side of the river in the OPRD parcels. HDD drilling activities will occur within approved construction work hours, which are 7 a.m. to 7 p.m. Monday through Friday and 9 a.m. to 5 p.m. Saturday. HDD construction methods are described in Section 3.1.1.

#### 2.1.2 Mapleton Drive Open-Cut Construction

The RWP includes the construction of approximately 1,500 linear feet of 42-inch-diameter open-cut pipeline on Mapleton Drive (see Figure 1). This segment of the RWP will begin at the southeast end of Mapleton

### 2.3 Project Phasing

Construction of the RWP and FWP projects within West Lane is anticipated to occur between March 2014 and August 2015. Table 1 lists possible construction window for each phase. The estimate construction duration for each phase will be shorter than the possible construction window and is also included in Table 1.

Phase	Anticipated start of construction window	Anticipated end of construction window	Estimated construction duration
HDD construction (from Mapleton Drive)	March 2014	October 2014	6 Months
Open-cut construction on Mapleton Drive	November 2014	March 2015	3 Months
Open-cut construction on Highway 43 (West Lane portion)	June 2014	August 2015	5 Months

### 2.4 Pipeline Easements

The Partnership will obtain permanent pipeline easements from OPRD through Mary S. Young Park and the two OPRD parcels as noted in Table 2. The Partnership will also obtain temporary construction easements from the OPRD to allow sufficient construction work area for staging and operations during the HDD construction phase.

No permanent or temporary construction easements are required for the FWP pipeline alignment in the Mapleton or Highway 43 rights-of-way.

Table 2. Example Summary Table in West Lane

Task/step/Parcel number	Type of easement	Description
21E24/00600	Subsurface permanent	25' wide permanent subsurface pipeline easement through Mary S Young Park and 25' wide permanent surface easement and temporary construction easement in OPRD parcels.
21E244/20100	Permanent and temporary	
21E244/20200	Permanent and temporary	

## 3. Construction Methodology

This section describes the different construction methods for each pipeline segment.

### 3.1 HDD Construction Method

The HDD phase of construction is described in detail below.

#### 3.1.1 HDD Overview

HDD is a three-phase process: 1) pilot bore drilling; 2) borehole reaming to reach the design borehole diameter; and 3) pipe pullback in which the pipe is pulled into the reamed borehole. The process begins with the preparation and mobilization at the HDD entry site. Mobilization activities will include mulch tree removal, installation of erosion control measures, fencing, installation of temporary construction sound mitigation wall, implementation of erosion control measures, setup and positioning of the HDD construction equipment, and installation of the HDD conductor casing. These activities are estimated to take approximately 2 weeks.



Specific construction impacts to traffic and access and proposed mitigation measures in regard to setup and mobilization are discussed in Section 4.2.

Drilling will begin once mobilization is complete at the OPRD site. During the first phase, the pilot bore is drilled by a steerable bit with its position along the alignment measured using a remote tracking system. In the second phase, a reamer is advanced through the pilot bore multiple times to increase the bore diameter to a size suitable to accept the designed pipeline. Drilling mud will be circulated and pumped into the bore hole throughout the pilot bore and reaming processes to keep the bore hole open and to remove excavated material. Drilling mud (also referred to as drilling fluid) primarily consists of bentonite, an environmentally safe and naturally occurring clay material, and water. Water used to create and maintain drilling mud will be obtained by tapping into the existing City of West Linn water main in Mapleton Drive as approved by the City of West Linn or by tapping into the existing City of Lake Oswego RWP also in Mapleton Drive. Drilling mud will be separated from excavated material onsite, and excavated material will be trucked from the OPRD site to a disposal site via haul routes defined in Section 4.2.1. Erosion control best management practices (BMPs) will be employed to ensure that drilling mud is handled properly throughout the construction process and that spills, in the unlikely event that one should occur, are cleaned up properly and immediately.

Once the bore hole operation is complete, the contractor will pull the product pipe into the bore hole from Gladstone to West Linn via a process called pipe pullback. The pipe will be assembled in two 1,900-foot segments in Gladstone and pulled into the bore hole over a single 34- to 48-hour period. The pipe will be assembled offshore and floated to the Madrasen Bay Park HDD site. Once the pipe is floating on the river and in position, it will be lifted via cranes and barges so that the leading sections are in line with the exit angle of the bore. The pipe will then be pulled through the prepared bore all the way back to the entry point on the OPRD site. During this 24- to 48-hour period, construction activities must occur around-the-clock to maintain the sink of the pipe becoming stuck within the bore hole. The contractor will apply for a work hour variance from the West Linn City Manager, consistent with West Linn code. The contractor will also provide pullback construction information to local residents at least 2 weeks prior to commencing the pullback operation.

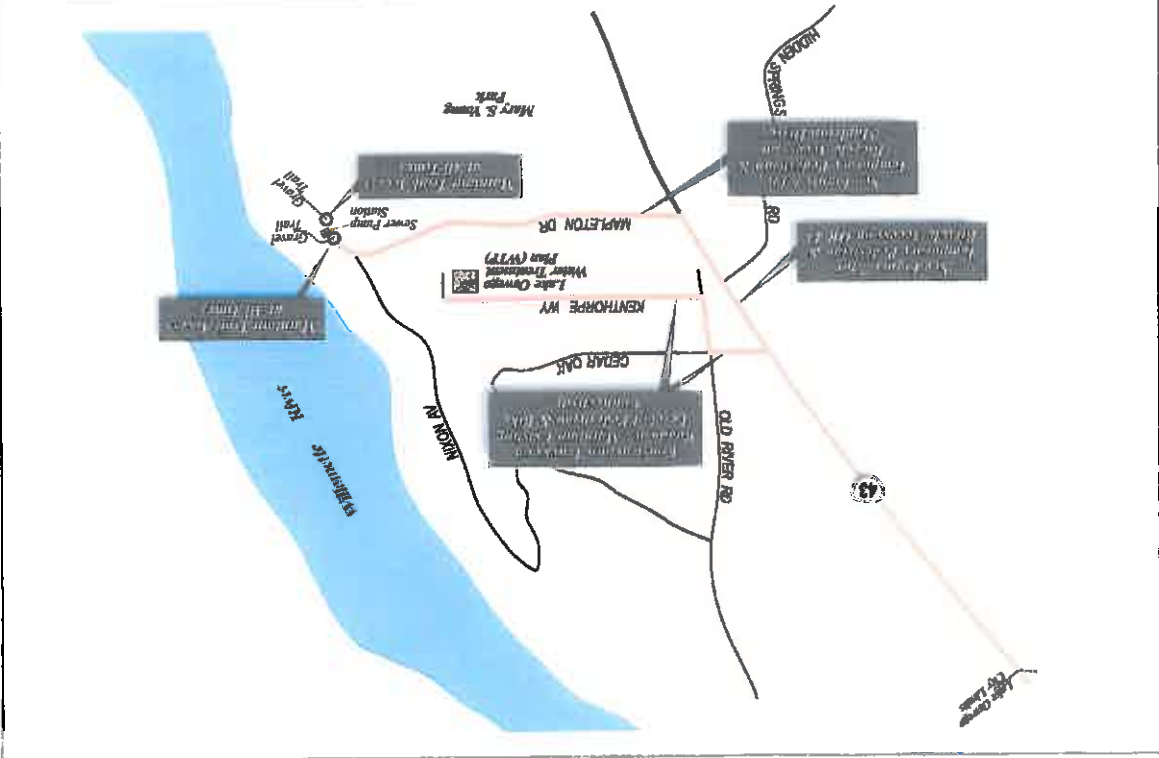
Once pullback is complete, the pipe will be grouted in place. Then the entry and exit sites will be dewatered and reinforced and the associated equipment will be disassembled and removed. These demobilization activities are anticipated to take approximately 1 week, and will mark the end of the HDD process.

### 3.1.2 HDD Staging

The HDD entry staging area for the drilling operation will be located on OPRD-owned property. Drilling equipment will be located and operated within a permanent pipeline easement and temporary construction easement from the OPRD HDD pilot bore and reaming operations will be supported from this staging area. The pipeline will be pulled into the bore hole from the east side of the river via equipment located at the HDD entry staging area. Vacuum trucks and dump trucks carrying spoils will require routine access to the site throughout all drilling phases. The entry location and work area will be isolated from the rest of Mary S. Young Park, OPRD property, and public eight-foot-wide security fencing. With the exception of the fenced work area, HDD operations will not impact recreation within Mary S. Young Park and OPRD property, and signage will be provided to inform pedestrians about how to navigate safely around the HDD construction activity and staging areas. Existing pathways and trails into Mary S. Young Park will remain open throughout all phases of HDD construction. Figure 2 shows the construction equipment staging layout plan within the permanent and temporary construction easement in the park.

### 3.1.3 HDD Hydrofracture Mitigation

Hydrofracture is a risk associated with drilling in soil and occurs when drilling fluid pressure exceeds the strength and confining stress of the soil surrounding the bore hole. The excess pressure fractures the soil around the bore hole, allowing drilling fluid (water and bentonite) to escape. Hydrofracture is not a risk while



January 7, 2013

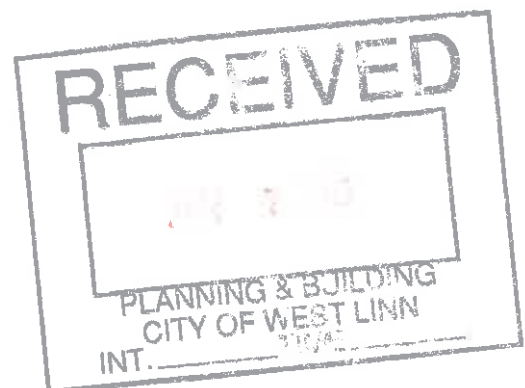
City of West Linn  
City Council

RE: AP-12-02 and AP-12-03

Attached is approximately 88 business signatures in opposition to the Lake Oswego-Tigard Water Treatment Plant expansion and pipeline

And

Requesting the City Council to uphold the Planning Commission decision to deny the proposal.



# West Linn Businesses Are Against Tigard Oswego Project

The Lake Oswego-Tigard Water Partnership (LOTWP) is requesting the construction of a new regional Water Treatment plant to service the cities of Lake Oswego and Tigard. The construction would occur in the middle of a West Linn residential neighborhood. The project will also require massive road construction for several miles in the middle of Highway 43, a very key, crucial commercial corridor for the City of West Linn. If this project were allowed to happen there would be several miles of road work that our customers, residents and others would have to contend with. It would also bring to Highway 43 and to the area tens of thousands of additional trucks, miscellaneous debris and additional vehicular traffic which will cause even further congestion.

The project would create bottleneck traffic along Highway 43 for at least three years, the minimum projected length of time for the project. By our estimation, the intersections of Cedar Oak and Hidden Springs will unquestionably fail, and especially at peak use periods. As a result of this road construction work and additional traffic, both during the day and at night, our customers will search for convenience and lessened traffic, and detour away from our businesses finding alternative routes and places to do business. This will cause us irreparable financial harm which will lead to the failure of some of our businesses, loss of jobs, certainly the loss of significant current and future income for all of us, and most likely cause multiple bankruptcies.

In addition, this industrial development will be placed in the middle of a residential neighborhood causing the neighborhood severe hardships and irreparable harm in many currently known ways, and most likely also unknown ways. As a result, seven West Linn Neighborhood Associations and the West Linn Riverfront Association oppose this project. All of this is being proposed by the Tigard Lake Oswego Project irrespective of the harm that it will do to the West Linn neighborhood and the devastating effect that it will have on our business community.

LOT Partnership has other options, but has said that "installing the facility in West Linn is their least expensive alternative." Oswego could use their own industrial area of Foothills but has that area reserved for urban development to improve their tax base while being exempt from taxes in West Linn. Tigard could cobble on to Wilsonville's system or remain with Bull Run, but claims their charter forbids the use of Willamette River water. They only need to change their charter to solve that problem.






In an economic period when many businesses are just beginning to gradually recover from the past five years of economic downturn, this is not the type of unnecessary encroachment on our local commerce that we should permit. The LOT Water Partnership would have you believe there will be adequate benefits to West Linn and with no intended hardships to businesses. Frankly, this is just not true. A good source of information for facts that they would like to ignore is [www.WestLinnFirst.com](http://www.WestLinnFirst.com).

On Nov 1<sup>st</sup> 2012, the West Linn Planning Commission voted 7-0, to deny the LOTWP application for two Conditional Use Permits for the large industrial scale treatment plant and the unprecedented 48" transmission pipeline to be placed under two residential streets and in the middle of Highway 43 from Mary S. Young Park to Lake Oswego.

Our Planning Commission unanimously found that the project did not comply with CDC 60.070(A)(3), which states that the project must be consistent with the overall needs of the community. Simply put, the building of the industrial scale treatment plant in a residential neighborhood is bad for the West Linn community, businesses, and residents.

The Planning Commissioners also agreed that the LOTWP project did little to improve West Linn's aging water system and instead offered a false sense of security, delaying vital improvements that the City of West Linn needs.

We, the undersigned West Linn business owners and employees, strongly urge the West Linn City Council to please hear the pleas of our businesses and residents by respecting and upholding the extremely conscientious, in depth unanimous decision of the West Linn City Planning Commission. There were many reasons for The Planning Commission's decision and they enumerated them in both the oral and written ruling and found this project to be inconsistent with the overall needs of the West Linn community, which resulted in the unanimous vote to NOT approve the Lake Oswego Tigard Project.







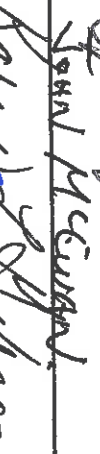





Name	Business	Signature
Tavis Brown	Round Table Pizza	
Ryan Korfir	Round Table Pizza	
Emily Rhoades	Round Table Pizza	Emily Rhoades
Eryn Russell	Round Table Pizza	Eryn Russell
Thomas Hollenbeck	Round Table Pizza	
Michael Leslie	Round Table Pizza	Michael Leslie
Sara Brunette	Round Table Pizza	Sara Brunette
Arielle McQueen	Round Table Pizza	Arielle McQueen
Coby Beland	Round Table Pizza	
Jessica Reeves	Round Table	
James Davis	Round Table Pizzeria	James Davis

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Name	Business	Signature
Hang Dinh	Superior Nails	Kathy
Erica Haugen	Gente care chiropractic	<del>Erica</del>
Shannon Anderson	DI'S SHEAR ENERGY	Shannon Anderson
Carol Fiedt Credit TITRZ	DI'S Shear Energy	Carol Fiedt
Mason Hartman	Nature's Pet Market	Mason Hartman
Van Nguyen	Aqua Nails Bar	Van Nguyen
Deborah HANAU	Advanced Beauty Arts Corp	Deborah HANAU
Pedro Briceas	Taco del Mar	Pedro Briceas
Dorothy Rogers	TACO DEL MAR	Dorothy Rogers
Mitchell Rossall	ISLANDS Tanning	Mitchell Rossall
Steven Koole	Diamond Wireless	Steven Koole
BRITANNY MRS	Diamond Wireless	BRITANNY MRS
Anna Hustori	Diamond Wireless	Anna Hustori
CHARLIE NISSIK	Diamond Wireless	Charlie Nissik







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Name	Business	Signature
Jacquelyn Rodgers	Elements West Linn	
Ampai Liang Pachanaporn Chairatamprapa	Thai Linn Thai Linn	
Vickie Rogers.	Sport Clips	
Judy Morsen	Sport Clips	
Sylvia Lussie	Sport Clips	
 Amanda S. Wilson	Five-O-Three Phix Diner	
William Tascor William Tascor	Buddies Flowers	
<del>Buddies</del> TAMMY NATHASHIMADA	Buddies Flowers	
Pranesh Sharma	The sauce boss grill	
Eileen Thielon-Smith	I. Meyer Salom	
	I. Meyer Salom	GEORGE THOMAS




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Name	Business	Signature
Bobby ALSTADT	West Linn Chevron	
H. H. Meurer	West Linn Primary Care	Almeida
Grace Earhart	Sawdough Valley	Wise + Grace Earhart
Holly Pollock	West Linn Animal Hosp.	
ROSINI DANKÉ	Hidden Springs Family Dentistry	
Barbara E. Drake	Hidden Spring Family Dentistry	
Gonna Ruppel	Hidden Springs Family Dent	Gonna Ruppel
JENNIFER WILSON	HIDDEN SPRINGS FAMILY DENTISTRY	
NATALIE HORDIN	Hidden Springs Family Dentistry	
DAVIN GAINFARH	MPS- STORE	
Mick Shubert	Liquor Store	
<del>Jim</del> Jim Jamis	Liquor Store	
<del>Sierra</del> Brad Rakes	Linn City Pub	
Sierra Gray	Linn City Pub	

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Name	Business	Signature
William Z. Moore	Robinson & Shopp's Center	
<del>Jeff Morrison</del>	<del>Great Northwest Property Management</del>	
Sun Man	Robinson Cleaners	
Ho Sonu	Robinson Cleaners	
Gwend Wkrole	Sweet-UV Properties Maint	Glenda Wkrole





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Name	Business	Signature
JOSEPH W. Nolan	WEST LINN DENTAL	
JILL OVERTON	West Linn DENTAL	Jill Overton
Doris Ciancio	WEST LINN DENTAL	
Gregory Stein	Premier Market Arts	






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Name	Business	Signature
Ramona Register	Curves West-Linn	Ramona Register
Kathryn Berslenc	Curves West-Linn	Kathryn Berslenc
TERRA English-Hebert	Curves West-Linn	TERRA English-Hebert
Eli Kazmierski	Curves West-Linn	Eli Kazmierski
Michael McLeod	Curves West-Linn	Michael McLeod
Gregory Cohen	Curves West-Linn	Gregory Cohen

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Name	Business	Signature
TAMMIE DUNPHY	17151 Canal Circle Lake Oswego	
Karen Schellinkhorst	2001 NWares Park Shop West Linn	
Vickie Cosentino	21540 W. Hammett Dr. West Linn	
Shirley Benson	1355 Fall Oaks Ct. West Linn, OR	

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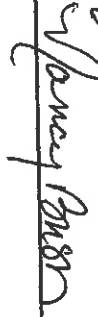
Name	Business	Signature
Gustavo Tolsted	Linn City Pub	
Victor Alvariano	Linn City Pub	
Joel LaFolle	Royal Treatment Fly Fishing	
Steven Lent	Royal Treatment + Fly Fishing	
Nick Wheeler	Royal treatment Fly Fishing	

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Name	Business	Signature
April Reich	West Linn Airport Inc.	[Signature]
Dorothy Wenzel	West Linn Airport	[Signature]
Robyn Garrison	West Linn Airport	[Signature]
Kenzi Bolliver	West Linn Airport	[Signature]
Kaida Zednick	West Linn Airport	[Signature]
Janet Bradshaw	West Linn Airport, Inc	[Signature]
Nicole Br	West Linn Airport	[Signature]
Melanee	West Linn Airport	[Signature]
Claire Sheet	West Linn Airport	[Signature]
Melanie Spryves	West Linn Airport	[Signature]



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Name	Business	Signature
JANICE DUNPHY	17151 CANAL CROSS LAKE OSWEGO	
Karen Schellinkhout	WOOD/NWAVES GARDEN SHOP WEST LINN	
Vickie Assentino	21540 W. HAMMILL DR. WEST LINN	
Shirley Benson	1355 Fall Oaks Ct. West Linn, OR	

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Name	Business	Signature
Tim Anderson	Acesonpoker	

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Name	Business	Signature
Sean Andersson	Ace Computer Repair	Sean Andersson

# West Linn Businesses Are Against Tigard Oswego Project

The Lake Oswego-Tigard Water Partnership (LOTWP) is requesting the construction of a new regional Water Treatment plant to service the cities of Lake Oswego and Tigard. The construction would occur in the middle of a West Linn residential neighborhood. The project will also require massive road construction for several miles in the middle of Highway 43, a very key, crucial commercial corridor for the City of West Linn. If this project were allowed to happen there would be several miles of road work that our customers, residents and others would have to contend with. It would also bring to Highway 43 and to the area tens of thousands of additional trucks, miscellaneous debris and additional vehicular traffic which will cause even further congestion.

The project would create bottleneck traffic along Highway 43 for at least three years, the minimum projected length of time for the project. By our estimation, the intersections of Cedar Oak and Hidden Springs will unquestionably fail, and especially at peak use periods. As a result of this road construction work and additional traffic, both during the day and at night, our customers will search for convenience and lessened traffic, and detour away from our businesses finding alternative routes and places to do business. This will cause us irreparable financial harm which will lead to the failure of some of our businesses, loss of jobs, certainly the loss of significant current and future income for all of us, and most likely cause multiple bankruptcies.

In addition, this industrial development will be placed in the middle of a residential neighborhood causing the neighborhood severe hardships and irreparable harm in many currently known ways, and most likely also unknown ways. As a result, seven West Linn Neighborhood Associations and the West Linn Riverfront Association oppose this project. All of this is being proposed by the Tigard Lake Oswego Project irrespective of the harm that it will do to the West Linn neighborhood and the devastating effect that it will have on our business community.

LOT Partnership has other options, but has said that "installing the facility in West Linn is their least expensive alternative." Oswego could use their own industrial area of Foothills but has that area reserved for urban development to improve their tax base while being exempt from taxes in West Linn. Tigard could cobble on to Wilsonville's system or remain with Bull Run, but claims their charter forbids the use of Willamette River water. They only need to change their charter to solve that problem.

In an economic period when many businesses are just beginning to gradually recover from the past five years of economic downturn, this is not the type of unnecessary encroachment on our local commerce that we should permit. The LOT Water Partnership would have you believe there will be adequate benefits to West Linn and with no intended hardships to businesses. Frankly, this is just not true. A good source of information for facts that they would like to ignore is [www.WestLinnFirst.com](http://www.WestLinnFirst.com).

On Nov 1<sup>st</sup> 2012, the West Linn Planning Commission voted 7-0, to deny the LOTWP application for two Conditional Use Permits for the large industrial scale treatment plant and the unprecedented 48" transmission pipeline to be placed under two residential streets and in the middle of Highway 43 from Mary S. Young Park to Lake Oswego.

Our Planning Commission unanimously found that the project did not comply with CDC 60.070(A)(3), which states that the project must be consistent with the overall needs of the community. Simply put, the building of the Industrial scale treatment plant in a residential neighborhood is bad for the West Linn community, businesses, and residents.

The Planning Commissioners also agreed that the LOTWP project did little to improve West Linn's aging water system and instead offered a false sense of security, delaying vital improvements that the City of West Linn needs.

January 7, 2013

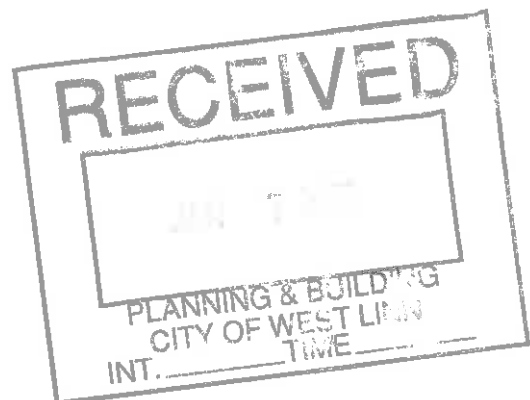
City of West Linn  
City Council

RE: AP-12-02 and AP-12-03

Attached is approximately 878 signatures of citizens in opposition to the Lake Oswego-Tigard Water Treatment Plant expansion and pipeline

And

Requesting the City Council to uphold the Planning Commission decision to deny the proposal.



# Help Save West Linn



The Lake Oswego-Tigard Water Partnership (LOTWP) is trying to construct their new regional Water Treatment project in the middle of a West Linn residential neighborhood and along the Highway 43 commercial corridor.

On Nov 1<sup>st</sup> 2012, the West Linn Planning Commission voted 7-0, to deny the LOTWP application for two Conditional Use Permits, for the large industrial scale treatment plant and the 48” transmission pipeline to be placed in the middle of Highway 43 from Mary S. Young Park to Lake Oswego.

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I agree that:

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2. The West Linn City Council should vote to uphold the unanimous decision of our West Linn Planning Commission.

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Signature	Print Name	Street Address	Email (optional)
<i>Robert Sobolewski</i>	Robert Sobolewski	2020 Tompkins St 1084 DOLLAR ST W.L.	
<i>Carolyn Skee</i>	Carolyn Skee	6220 Newstrom Ln W.L.	
<i>John Davids</i>	John Davids	1707 DIVISION ST OREGON CITY OR 97138	
<i>Heidi Shepherd</i>	Heidi Shepherd	4284 Magneton	
<i>Kim Cozby</i>	Kim Cozby	3565 Rutland Ln SE 97317	
<i>Kara Vining</i>	Kara Vining	3565 Rutland Ln SE 97317	
<i>Kevin Vining</i>	Kevin Vining	3565 Rutland Ln SE 97317	
<i>Leslie Mollenhoff</i>	Leslie Mollenhoff	2324 SW Oregonate Sherwood, Oregon	
<i>James Mollenhoff</i>	James Mollenhoff	2324 SW Oregonate Sherwood, OR 97158	
<i>Ray Cozby</i>	Ray Cozby	4284 Magneton Dr West Linn OR	

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Signature	Print Name	Street Address	Email (optional)
<i>Amber Arigothi</i>	Amber Arigothi	1033 9th St.	Arigothi@gmail.com
<i>Olivia Wolf</i>	Olivia Wolf	15037 St. Andrews Dr.	wolf2010@yahoo.com
<i>Derrick Arigothi</i>	Derrick Arigothi	1033 9th St.	Darr
<i>Kary Kanahe</i>	Kary Kanahe	5057 SE Logan Rd	K-Kanahe@yahoo.com
<i>Frank Burtouch</i>	Frank Burtouch	2 JEFFERSON PKWY APT 24	\$
<i>Stacie Ericsson</i>	Stacie Ericsson	Orchard rd Medlin	ericsson@hotmail.com
<i>Lori Arigothi</i>	Lori Arigothi	1033 9th St West Linn	<del>ericsson@hotmail.com</del> arigothi@comcast.net
<i>Benny Dionne</i>	Benny Dionne	11865 SW Tinkler Rd	
<i>Peter Bernard</i>	Peter Bernard	19431 Wilberness Ln	
<i>Kellie Beldart</i>	Kellie Beldart	Same as above	\$

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Signature	Print Name	Street Address	Email (optional)
<i>Joan H. Briscoe</i>	JOAN H. BRISCOE	2628 PINECO TER, W.L.	briscoejan@hotmail.com
<i>Patty D. Holleran</i>	Patty D. Holleran	2013 Pine Stoga Ln	
<i>Rosemary Foss</i>	Rosemary Foss	2630 PINECO LN	
<i>Marianne M. Cadden</i>	MARIE M. CADDEN	2630 SW PINE	
<i>BARBARA BRISCOE</i>	BARBARA BRISCOE	3985 Roxbury Dr. West Linn	
<i>William T. Briscoe</i>	WILLIAM T. BRISCOE	3985 ROXBURY DR.	
<i>Joan Kraig</i>	JOAN KRAIG	3993 Roxbury Dr.	
<i>Michelle Gebbs</i>	Michelle Gebbs	3963 Roxbury Dr.	
<i>Laila Triban</i>	Laila Triban	3970 Roxbury Dr.	
<i>Marian M. Wilson</i>	Maria M. Wilson	3094 Roxbury Dr.	

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Signature	Print Name	Street Address	Email (optional)
<i>Jordan Hill</i>	Jordan Hill	3084 Roxbury Dr	
<i>Miyona Rattle</i>	Miyona Rattle	4018 S. 117th Ave Dr.	
<i>Jeff DeBruy</i>	Nick Danvers	3999 Roxbury Dr.	
<i>Mary Hill</i>	Tacey Taylor	1085 Sprucey Way	
<i>[Signature]</i>	Scott Stein	3075 Roxbury Dr	
<i>[Signature]</i>	Jae Beku	3044 Roxbury Drive	
<i>[Signature]</i>	Leslie Mackrow	3042 Roxbury Dr	
<i>[Signature]</i>	Denise Saira	3049 Roxbury Dr	
<i>[Signature]</i>	Callie Spahr	3035 Roxbury Dr	
<i>[Signature]</i>	Ron Estemara	3063 Roxbury Dr.	

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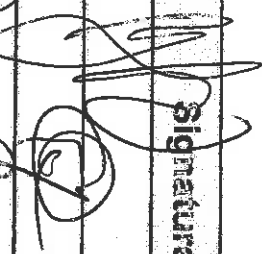

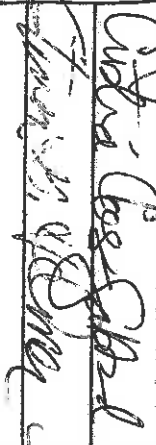

Signature	Print Name	Street Address	E-mail (optional)
<i>Z Malenbury</i>	Jeff Mollencop	Po Box 415 Pacific City Oregon	
<i>Emily Shear</i>	Emily Shear	1744 W. 15th Ave Tigard OR 97148	
<i>Karen Scott</i>	Karen Scott	55107 River St West Linn OR 97148	
<i>Adrian Scott</i>	Adrian Scott	5567 River St West Linn OR 97148	102963@yahood.com
<i>Dawn Kirsbaum</i>	Dawn Kirsbaum	16081 S. Moore Rd. Tigard, OR 97148	
<i>W. Lee</i>	Richard Kirsbaum	16081 S. Moore Rd Tigard OR 97148	

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Signature	Print Name	Street Address	Email (optional)
	Ronald D York	1125 Williams Rd West Linn	
	Jesse Case-Cambria	722 Harrison St Oregon	bodare3@gmail.com
	Cristina Case-Gibbert	722 Harrison St Oregon	
	Steve Helmer	33751 SW Eiderberry	

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Signature	Print Name	Street Address	Email (optional)
<i>Rex E Parsons</i>	Rex E Parsons	2624 Pimlico Terr	
<i>Linda D Parsons</i>	Linda D. Parsons	2614 Pimlico Terr	
<i>James F. Lighter</i>	James F. Lighter	2515 Pimlico Terr	
<i>Kathryn A Hibbard</i>	Kathryn A Hibbard	2515 Pimlico Terr	
<i>Russell J Dru</i>	RUSSELL WILSON	2612 Pimlico Terr	2012 Pimlico Terr
<i>Bonnie H. Phillips</i>	Bonnie H. Phillips	2612 Pimlico Terr	
<i>Robert L. Anderson</i>	ROBERT L. ANDERSON	2600 Pimlico Terr	
<i>Karen Anderson</i>	Karen Anderson	2600 Pimlico Terr	
<i>Margaret DeJardin</i>	MARGARET DEJARDIN	2610 Pimlico Terr	
<i>Ruth Chadwick</i>	RUTH CHADWICK	2602 Pimlico Terr	

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Signature	Print Name	Street Address	Email (optional)
	denise Goldstein	19456 Wilderness dr.	
	Bob Goldstein	19456 Wilderness Dr	



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Signature	Print Name	Street Address	Email (optional)
<i>Melissa Morlan</i>	Melissa Morlan	2090 Tanner Creek Ln West Linn	
<i>Dan Morlan</i>	Dan Morlan	2090 Tanner Creek Ln West Linn	
<i>Ward Lewis</i>	Ward Lewis	2492 Wanger Blvd West Linn	
<i>Tracey Freney</i>	Tracey Freney	15540 Partridge Dr West Linn	
<i>Jessie Briggs</i>	Jessie Briggs	332 Lakewood Rd West Linn	
<i>Jarwin Brown</i>	Jarwin Brown	5740 Perrin Street West Linn	(sign)
<i>Tawie Beard</i>	Tawie Beard	3030 Purdoso Ct West Linn	(sign)
<i>Robert Fry</i>	Robert Fry	1324 Standover Dr West Linn	
<i>Kelvin Ng</i>	Kelvin Ng	19710 Wildcat Dr West Linn	
<i>KARIN HARRIS</i>	KARIN HARRIS	2275 River Heights CIR West Linn	

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Signature	Print Name	Street Address	Email (optional)
<i>[Handwritten Signature]</i>	Kelsey Holder	4000 Mapleton Dr	
<i>[Handwritten Signature]</i>	R. Rowner	4025 Mapleton	MURBAR@Q.COM
<i>[Handwritten Signature]</i>	Muriel Rowning	4025 Mapleton Dr	"
<i>[Handwritten Signature]</i>	Gayle Scherer	4040 Mapleton Dr.	gayle8319@comcast.com
<i>[Handwritten Signature]</i>	Julia Spivey	455 Mapleton Dr.	
<i>[Handwritten Signature]</i>	DON HART	1885 NIXON AVE	DON-HART1@YAHOO.COM

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Signature	Print Name	Street Address	Email (optional)
<i>McKinley Holder</i>	McKinley Holder	4000 Mapleton Dr.	Kinzholder@comcast.net
<i>Lillian Lander</i>	Lillian Lander	4020 Mapleton Dr.	
<i>Janet Beckett</i>	Janet Beckett	3990 Mapleton Dr.	
<i>Winnie Beckett</i>	Winnie Beckett	3996 Mapleton Dr.	
<i>Samuel I. Stephens</i>	Samuel I. Stephens	" "	
<i>Will Beckett</i>	William Beckett		
<i>Song Driley</i>	Song Driley	4582 Kenthorne Way	Songdriley@gmail.com
<i>Steve Mills</i>	Steve Mills	P.O. Box 191, W.L.	
<i>Jeff Miller</i>	Jeff Miller	4200 Cedar Oak Dr.	
<i>John Morris</i>	John Morris	5455 Skyline Dr	

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Signature	Print Name	Street Address	Email (optional)
	THOMAS E. HOYER	4000 MADISON DR	thom_holder@comcast.net
	AMY SCHULTZ	3278 SARD LAKE	mschultz@comcast.net
	JOHN FOGARTY	2433 WOODHILL CT	SPFOGARTY@johno.com
	TINA MCLURE-MILLS	2600 RAINIER PLACE <small>PO BOX 191</small>	millsst1@comcast.net
	Angie K. Hammond	2711 Rainier Pl	MikeAngieHammond@comcast.net
	STACEY FINCKLEY	3216 Subo Lane	Stacey@realtortrust.com
	John Fogarty	2433 WOODHILL CT	JohnFog@Gmail.com
	Katherine Fogarty	2433 WOODHILL CT.	Fogartyk8@gmail.com
	Diana DeMaia	5745 Skylene Dr.	demaia.diana@gmail.com
	Sue Miller	4300 Cedar Oak Dr	

# Help Save West Linn



I agree that:

1. The Lake Oswego Tigard proposal is not consistent with the overall needs of the West Linn community.
2. The West Linn City Council should vote to uphold the unanimous decision of our West Linn Planning Commission.

Signature	Print Name	Street Address	Email (optional)
<i>[Signature]</i>	Harvey Lucas	1733 Javie Cir. W	
<i>[Signature]</i>	KEITH LUCAS	1733 Javie Cir W	
<i>[Signature]</i>	BROOK JONK	1125 WILMETHO FIELDS W.L.	
<i>[Signature]</i>	Lynn Froescher	4023 Sussex St. W.L.	
<i>[Signature]</i>	Ken Froescher	4023 Sussex St W.L	
<i>[Signature]</i>	Wesley Miller	2426 BURGAL ST W.L	
<i>[Signature]</i>	Donna E. Miller	5126 Burgall St W.L	
<i>[Signature]</i>	Larry Madison	19401 Westwood Dr. Be City	
<i>[Signature]</i>	Bruce Koepke	1155 Valley View Dr. W.L.	
<i>[Signature]</i>	Gary Emblem	4080 Mapleton Dr W.L.	

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Signature	Print Name	Street Address	Email (optional)
<i>[Signature]</i>	Jill Klemens	5203 Summit St	
<i>[Signature]</i>	Anton Klemens	5203 Summit St	
<i>[Signature]</i>	Cathy Stevens	Milwaukee Dr	
<i>[Signature]</i>	Todd Swager	17603 Knolls Ct	
<i>[Signature]</i>	Ashen Sieben	4950 Mapleton Dr W	
<i>[Signature]</i>	THOMAS SIEBEN	4950 MAPLETON DR W.L.	

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Signature	Print Name	Street Address	Email (optional)
<i>Marilyn Matters</i>	MARILYN I. BETHEN	2918 Mark Lane	
<i>Jennifer Bethen</i>	Jennifer Bethen	2808 Mark Lane	
<i>Ryan McCall</i>	Ryan McCall	2788 Mark Lane	
<i>Loyce Hobbachy</i>	Loyce Hobbachy	2657 York Lane	
<i>Margaret Carke</i>	Margaret Carke	2610 Mark Ln	
<i>Danielle Boesel</i>	Danielle Boesel	2576 Mark Ln	
<i>Don Rothacker</i>	DON ROTHACKER	2749 Mark Ln	
<i>Richard Moffat</i>	Richard Moffat	2515 Mark Ln	
<i>William Schwartz</i>	William Schwartz	2508 Hoover Blvd	
<i>Joseph Matters</i>	Joseph Matters	2835 Latave St.	

Help Save West Linn



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Signature	Print Name	Street Address	Email (optional)
<i>[Signature]</i>	ELWON & John Childs	6540 Fairling St.	
<i>[Signature]</i>	Garrett Park	6530 Fairling Street	
<i>[Signature]</i>	Jeanette Kramer	6175 Skyline Dr NW	
<i>[Signature]</i>	Bruce Bergelot	2005 Parkside Ct	
<i>[Signature]</i>	Laura Gumbel	2009 Boersive Ct	
<i>[Signature]</i>	Melissa Johnson	2021 Preside Ct.	
<i>[Signature]</i>	Eileen Tate	2014 Parkside Ct	
<i>[Signature]</i>	Patrick Tate	2014 Parkside Ct.	
<i>[Signature]</i>	Harvey Lazar	6535 Fairling St	


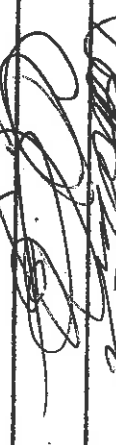



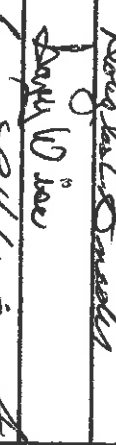

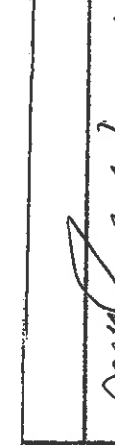
Help Save West Linn



**HELP STOP LAKE OSWEGO/TIGARD WATER GRAB FROM CLACKAMAS RIVER**

- The Lake Oswego/Tigard Water Partnership (LOT) is proposing a water treatment plant and pipeline that takes up to 38 million gallons of water from the Clackamas River every day.
- Lake Oswego is proposing to maximize their water rights to 100%, more than doubling their taking from 16 mgd to 38 mgd in order to send the water to Tigard.
- The State has over allocated the Clackamas River by 200%.
- Tigard is not in the Clackamas River basin. Tigard could join Wilsonville's water program that draws from the Willamette River. But Tigard's refuses this because their charter does not allow Tigard to use Willamette River water. Wilsonville water produces Coca-Cola products including Dasani water. Times have changed, technology has changed and Tigard needs to simply change their charter:
- Oswego officials have said in 30-40 years the Clackamas won't be able to sustain the demand given the 500,000-700,000 people that will move the region. Yet Oswego wants to send Clackamas River water to Tigard.
- Lake Oswego also does not need more water. Since this proposal was put in to motion, Oswego has reduced their consumption by 35% due to their conservation program.
- If all cities did what Oswego is proposing, the Clack would be a trickle. More important, our natural resources and habitat would be the greatest of victims.

**JOIN US BY SAYING NO TO THE LO/TIGARD WATER GRAB!**

Signature	Print Name	Street Address	Email (optional)
	Robert White	Oregon City OR 97045 17320 Lost Horse Lane	
	Scott Nichols	564 Hartke Loop Wilsonville OR 97045	
	Alvin Houston	8551 SE Clackamas Rd Clackamas OR 97015	
	CHRISTINE BERTON	16804 S Clackamas R. Dr O. City, OR 97045	
	STACIE L DAVIS	8940 SE SPENCER DR HEPPY VALLEY CROSS	
	Douglas E. SWADER	918 SW SCHAFFER RD, WEST LINN, ORE 97068	
	GARY WISE	16951 South Stone Hill Dr. Molalla OR 97038	
	JAMES T. MARCOVITCH	16400 SE McLEANE CT Milwaukie, OR 97267	

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Signature	Print Name	Street Address	Email (optional)
JANE CHAN	Jane Chan	2413 South Slope <sup>2014</sup>	N/A
<i>[Signature]</i>	MAESTER S. GUENUSY	5570 Summit St	N/A
<i>[Signature]</i>	MARVIN K. GUENUSY	5570 Summit St	N/A
<i>[Signature]</i>	MARGO FAWCETT	3027 Quilblaise Ct	N/A
<i>[Signature]</i>	ARNO ENDE	5280 <del>700</del> VIBUL CT	N/A
<i>[Signature]</i>	Kevin Ahern	" "	N/A
Donna McShan	Donna McShan	2111 Sunset Ave	N/A
Phonak Wilson	Phonak Wilson	918 Dearbrook <del>Dr</del>	N/A
Bin Tilley	Bin Tilley	3580 OR. CITY Blvd	N/A
Dorothy A. Shinkbe	Dorothy A. Shinkbe	1655 Carriage Way - W.L.	N/A

Help Save West Linn





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Signature	Print Name	Street Address	Email (optional)
Carmine Nelson	Carmine Nelson	17480 Holy Names Dr. <sup>B-44</sup>	N/A
Mary M. Sides	MARY SIDES	01659 S.W. GREENWALD Rd.	N.A.
Mary Sides	MARY SIDES	34 BACKST L O	N/A
Carol Lenz	CAROL LENZ	20385 S NOBIE <sup>W.O.L.</sup>	N/A
Juilette Marto	JUILETTE MARTO	805 S W BACKLICK	N/A
Margaret R. Hallam	MARGARET L. HALLAM	2081 SUNRAY CIR W.L.	na
Margaret E. Hallam	MARGARET E. HALLAM	1200 Chesham Dr. KC	—
Burdella K. Elliott	Burdella Elliott	4722 Coleridge Dr.	—
Wicki Sides	WICKI SIDES	3280 Top View Dr	—
Margaret R. Hallam	MARGARET R. HALLAM	5015 FOSTER LANE <sup>APT G</sup>	—

Help Save West Linn



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Signature	Print Name	Street Address	Email (optional)
<i>David C. Mann</i>	David C. Mann	1980 Tuckerm Trail LO.	
<i>Brad Fullerton</i>	Brad Fullerton	2521 Brown Sub.	
<i>Diane Holmes</i>	Diane Holmes	25145 Terrilligan Portland	
<i>Deanne F. Marshall</i>	Deanne F. Marshall	2147 Sp... Seymour #...	

Help Save West Linn



I agree that:

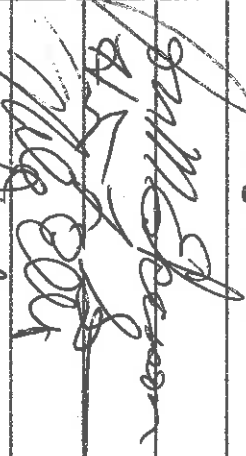
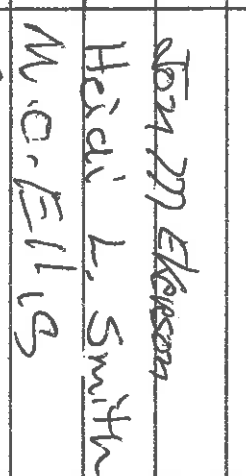
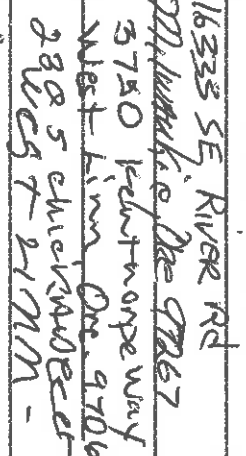







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Signature	Print Name	Street Address	Email (optional)
<i>Therese Johnson</i>	<i>Therese Johnson</i>	<i>13115 S. Capistrano Ct</i>	
<i>Christy Hostetter</i>	<i>Christy Hostetter</i>	<i>321 SW 2nd St</i>	



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Signature	Print Name	Street Address	Email (optional)
	Tom M Ekerson	16335 SE River Rd Milwaukie, OR 97147	
	Heidi L. Smith	3750 Kelton Ave West Linn, OR 97068	sig OK
	M. O. Ellis	2305 Cheviot Ave West Linn, OR 97068	
	David Gonthier	19363 Willow Hill K-Willamette	
	Brian Speed	19181 Willow Hill Dr West Linn, OR 97068	
	Charley Wilson	21880 Canyon Creek Rd Balsville, OR	
	Justin Webb	21330 Canyon Creek Rd Balsville, OR	
	Mandy Thayer	20910 Sycamore Ave Tualatin, OR 97062	
	Fadi Ibsies	18750 Sycamore Dr. SE West Linn, OR 97068	
	Azza Al-Masri	18750 Sycamore Dr. SE West Linn, OR 97068	

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Signature	Print Name	Street Address	Email (optional)
<i>Alleen Con...</i>	Alleen Conning	2365 Dilan Dr.	
<i>Jennifer Cortis</i>	Jennifer Cortis	2711 Ashford St	
<i>Brady Weber</i>	Brady Weber	1273 11th St.	
<i>Sally Wsher</i>	Sally Wsher	21082 Sunset Meadows Ln	
<i>Donna Ragan</i>	Donna Ragan	4481 Maple St	
<i>Jennifer Fay</i>	Jennifer Fay	4961 Mapleton Dr.	
<i>Christina Spunspord</i>	Christina Spunspord	5035 Mapleton Dr.	
<i>Andrew Thompson</i>	Andrew Thompson	5035 Mapleton Dr	
<i>Diane Froede</i>	Diane Froede	1934b Nixon Av	
<i>Diane Froede</i>	Diane Froede	1934b Nixon Av. Westlinn	

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Signature	Print Name	Street Address	Email (optional)
<i>Memery Ryan</i>	Thomas Blair	4930 Calanga Dr. West Linn, OR 97268	
<i>Katherine Becker</i>	Kathy Becker	6305 Summerlin Way	kathybecker@comcast.net
<i>David M. Becker</i>	David Becker	11	
<i>Jill Oprie</i>	Tiffany Gillespie	15081 Leo Ct DE 97045	
<i>Ernie Gillespie</i>	Ernie Gillespie	15981 Leo Ct DE 97045	
<i>[Signature]</i>	med ever	245 SW Tualatin road	
<i>[Signature]</i>	Danny D. Cole	12470 SW Huron St	metrowestEMT
<i>Paula Stuber</i>	Paula Hankin	51635 mgary Ct	
<i>[Signature]</i>	Amanda Davidson	42602 Mopson Dr.	
<i>Jean Ann</i>	Sean Ann	140 Furman ST RD	

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Signature	Print Name	Street Address	Email (optional)
<i>Lori Brown</i>	LOREI BRAUN	3751 CEDARCREAK	
<i>Phyllis Falkner</i>	Phyllis Falkner	4177 TEMPERANCE DR.	
<i>John DuBay</i>	John DuBay	6275 Clubhouse Dr	
<i>Winnifred N. Simonson</i>	Winnifred N. Simonson →	1570 Rosemont Rd	
<i>Elna Shirley Green</i>	ELNA SHIRLEY GREEN	3765 RIDGEWOOD WAY	
<i>Margaret DeSjarko</i>	MARGARET DESJARKO	2410 Amlico Ter	
<i>Sally Olson</i>	Sally Olson	2423 Saddle Ct	
<i>Barbara L. Pore</i>	BARBARA L. PORE	1990 6th Ave.	
<i>Judith L. Rice</i>	Judith L. Rice	1203 Orchard St.	
<i>Patricia Spear</i>	PATRICIA SPEAR	2131 Greene St.	
<i>Kiln Rain Robert</i>	Kiln Rain Robert	785 Bonland Rd	
<i>Tony Roberts</i>	Tony Roberts		

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Signature	Print Name	Street Address	Email (optional)
<i>Margaret Le Byrne</i>	Margaret Byrne	18400 Nixon Ave	
<i>Meg Smith</i>	Meg Smith	19710 Spring Ridge Dr	
<i>Madeth A. Hutchinson</i>	Madeth A. Hutchinson	3011 Sunset Ave # 14	
<i>Phyllis Clark</i>	Phyllis Clark	1674 5th Ave Westlinn	
<i>Norma Sahr</i>	Norma Sahr	2204 Carson Dr	
<i>Dave Pitzer</i>	Dave Pitzer	5357 Windsor Ter West Linn	
<i>Charles LePey</i>	Charles LePey	6335 Caulfield St. West Linn	
<i>Debra Mackery</i>	Debra Mackery	22311 Hegener West Linn	
<i>Daine Austin</i>	Daine Austin	1845 Deana Dr Westlinn	
<i>Margaret S</i>	Margaret S	3012 Clabour Ct	
<i>Kathleen Hubertson</i>	Kathleen Hubertson	1330 West Linn Stonewall Dr. W.L.	

Help Save West Linn





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Signature	Print Name	Street Address	Email (optional)
Mary Hill	Mary Hill	19050 Nixon Ave	m2hill@comcast.net
Molly Hill	Molly Hill	19650 Nixon Ave	
Randy Feltner	Randy Feltner	19050 NIXON	
Carol Skellenger	Carol Skellenger	2287 WALTERSON CT	
Betsy Edlmsbee	Betsy Edlmsbee	50616 Noble Ln	
DAN FULLERTON	DAN FULLERTON	1330 STANETHAN DR.	
Sean Fullerton	Sean Fullerton	1330 Stanekow Dr.	
Gladys Iris Hernandez Kennedy	GLADYS IRIS HERNANDEZ KENNEDY	6916 LARSON DR.	glad1194@yahoo.com
William B. Levensky	William B. Levensky	6716 LARSON DR	wble_98@comcast.net
ANNE BRADWIN-PRICE	ANNE BRADWIN-PRICE	4291 RIVERVIEW DR.	

Help Save West Linn

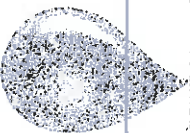


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Signature	Print Name	Street Address	Email (optional)
Doris Clark	Doris Clark	4110 W Cornwall	-
Jane Davis	JANE DAVIS	3785 Summerlin Dr.	
Robin Ross	Robin Way	2140 Hidden Springs Ct.	
Jan Jones	Janet Jones	2892 Mark Ln	
Tana Berger	TANA BERGER	6060 Summerlin Way	
Bill Bree	Yvett Bree	6060 Summerlin Way	
Seannette Sheising	Seannette Sheising	4040 Elmman Dr,	
Janette Carlson	Juanita Carlson	705 Sunny Hill Dr.	
Gertrude Hunt	Gertrude Hunt	1288 11th St	
M. Belmont - Price	BAIRDWIN - PRICE	4291 Riverway Dr.	

West Linn



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Signature	Print Name	Street Address	Email (optional)
<i>Isabelle Schenk</i>	Isabelle Schenk	3264 Dr	
<i>Denise King</i>	Denise King	4257 Kentmore Way	
<i>Pamela Wright</i>	Pamela Wright	119 Meadowview Ct	
<i>Janet E. Eppelsheimer</i>	Janet E. Eppelsheimer	4198 Cornwall St	
<i>Gary L. Eppelsheimer</i>	Gary L. Eppelsheimer	4198 Cornwall St	
<i>Mary M. Eppelsheimer</i>	MARY M. EPPSHEIMER	2815 MARK LAKE	
<i>Janet Enger</i>	Janet Enger	5621 Roscoe St	
<i>Nancy Hawkins</i>	Nancy Hawkins	1956 Derby St.	

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Signature	Print Name	Street Address	Email (optional)
<i>Grand</i>	CHERYL ADILLIAMS	2917 Ascot Hill	
<i>NOEL</i>	NOEL Williams	2917 Ascot Circle	
<i>EMIL</i>	EMIL KEAVIK	1834 CHEVRIER TRAIL	-
<i>DAVID</i>	DAVID YOSTON	5201 SW NEAL	
<i>WILLIAM</i>	WILLIAM MICKES	18420 ROBERT	
<i>BRYAN</i>	Bryan Howard	7895 SW FARMWOOD #5	

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Signature	Print Name	Street Address	Email (optional)
	Sally K. Polley	4650 Alder St.	
	DAVID MALONE	6307 Sweetwilliger	
	BRAD RODENBURG	880 W 1 <sup>ST</sup> STREET	
	Matt Cantello	31225 NW Hillcrest	NorthPlains208133
	Josh Share	1508 37 <sup>th</sup> Abernethy	91132
	Dave Mann	10163 NW Kehler	
	Marvin Brown	13245 Sutherland Rd OR CITY	
	Alison Beck	13245 SW Leelan	

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Signature	Print Name	Street Address	Email (optional)
<i>Cheryl L. Tanner</i>	Cheryl L. Tanner	2562 LA FAYE	<del>cherry@westlinn.com</del>
<i>Mark E. Sells</i>	Mark E. Sells	6001 CAVERLY ST WEST LINN, OR 97138	<del>msells@westlinn.com</del>
<i>Jennifer Seibel</i>	Jennifer Seibel	1030 SPINDERS RIDGE WEST LINN, OR 97138	
<i>Josie Sells</i>	Josie Sells	1418 W. STEVEN RD WEST LINN, OR 97138	
<i>Richard Sells</i>	Richard Sells	"	
<i>Scott Sells</i>	Scott Sells	17435 SW SEPULCRE DR LAKE OSWEGO	
<i>Sherri Klein</i>	SHERRI KLEIN	1261 WELLS ST L.O.	
<i>Angela Kreps</i>	Angela Kreps	8594 SE BRICK PACT DR. HAPP VALLEY, OR 97103	
<i>Tracy Cohen</i>	TRACY COHEN	28425 SW HILLYARD	

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Signature	Print Name	Street Address	Email (optio
<i>Michael Myers</i>	Michael Myers	5005 Mapleton Dr	
<i>Tracy Myers</i>	Tracy Myers	5005 Mapleton Dr.	
<i>Dan Davis</i>	Dan Davis	1932 Samburst Terrace	
<i>Wini Davis</i>	Wini Davis	" "	windqvist@ hotmail.com
<i>Nancy McMath</i>	NANCY MCMATH	4845 Wilkonnelle Falls Dr.	
<i>Lilla Minniti</i>	Lilla Minniti	2011 York Street	
<i>Erin Anderson</i>	Erin Anderson	West Linn	
<i>Doreen Layton</i>	Doreen Layton	West Linn.	











NO!

*Doreen Layton*  
*Marten Sims-Bundy* 1336 Stonehaven Dr. West Linn OR 97088  
*Wally Carthy* 5144 Elyettez Ln SE Everett WA 98148  
*Mike Osberg*  
 97068 (Sign)

HELP SAVE WEST LINN

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Signature	Print Name	Street Address	Email (optional)
	TROY C. STUEGEL, MD	19682 Wildwood Dr.	NO WAY EVER
	Gwyn Adams	21280 Seneca Dr	gwynadams@att.net
	Jon Feeney	15346 Partridge Dr S.O.	jonfeeney@comcast.net
	Lisa Byham	16016 Forefronte	
	Robin Rabinoff	2858 Rainier Pl.	rab71@comcast.net
	Gregory Bray	10963 SW Flores	Greg.bray@comcast.net
	Linda Rose Baker	2495 Willamette falls	-
	Lori Day	20910 Fairview Dr	-
	Pauline Wamboldt	2209 methuon Ct	
	Cyndi Dashkoff	2751 Mark Ln.	Lynn Sign: Cyndiashkoff@gmail.com

Help Save West Linn



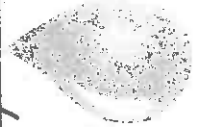


Auburn laZan  
 6555  
 Falls

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Signature	Print Name	Street Address	Email (optional)
	MICHAEL R. POLLEY	WEST LINN 4650 ALDER ST OR 97068	
	MATTHEW L. CUMMINS	1145 ROYAL CT WEST LINN 97068	516N
	Cheri Cummins	1145 Royal Ct West Linn 97068	
	Scott Reavely	2277 Ocean Rd.	
	Brian Cochran	2760 Summit Ave. WL 97068	Sign
	Judy Cochran	2760 Summit Pl. West Linn 97068	
	Anne Faden	640 Collins CR 97027	
	RICHARD FADEN	640 COLLINS CR 97027	
	TAYLOR REAVELEY	4710 Alder St. West Linn OR 97068	
	VASIMUR MARIJAKU	4854 Spangler CR. WL	Sign



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Signature	Print Name	Street Address	Email (optional)
<i>[Handwritten Signature]</i>	Nessi Blive	9016 SE 44 <sup>th</sup> Ave PO Box 979011 Portland, OR 97208	
<i>[Handwritten Signature]</i>	Don Kingsland	Box 148 2414 Welton St. West Linn, OR	sign
<i>[Handwritten Signature]</i>	Jessica Grice	266 S. Stone Rd Lake Oswego, OR	
<i>[Handwritten Signature]</i>	Christine Helton	19305 Robin Circle West Linn, OR 97138	
<i>[Handwritten Signature]</i>	Drina Neda	2069 Henryhurst West Linn, OR 97138	
<i>[Handwritten Signature]</i>	Wendy Elbert	240 W. 8 <sup>th</sup> West Linn, OR 97138	sign
<i>[Handwritten Signature]</i>	Gary Spear	1097 Kellaway Drive West Linn, OR 97138	sign
<i>[Handwritten Signature]</i>	Elizabeth Hall	1692 Kellaway Drive West Linn, OR 97138	
<i>[Handwritten Signature]</i>	Matt Hall	8001 Cahoon St West Linn, OR 97138	
<i>[Handwritten Signature]</i>	Linda Goodman		

Help Save West Linn



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Signature	Print Name	Street Address	Email (optional)
<i>[Handwritten Signature]</i>	JENNIFER BRUNSACK	14850 BELLEVUE WAY	
<i>[Handwritten Signature]</i>	Steve Hopkins	3910 Market St	
<i>[Handwritten Signature]</i>	NANCY HOPKINS	3910 MARKET ST	hopkins.n@comcast.net
<i>[Handwritten Signature]</i>	Sarah Tucker	2941 Mark Lane	faithlygale@gmail.com
<i>[Handwritten Signature]</i>	BILL OETIKER	2912 MARK LN	BOETIKER@comcast.net
<i>[Handwritten Signature]</i>	DAVID WICKEL	2837 MARK LANE	
<i>[Handwritten Signature]</i>	Melinda Nickles	2777 Mark Ln	Melinda.nickles@gmail.com
<i>[Handwritten Signature]</i>	Jeff Nickles	2777 Mark Lane	jeff.nickles@gmail.com
<i>[Handwritten Signature]</i>	Debra Gardner	2450 Munger	dg2450@comcast.net

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Signature	Print Name	Street Address	Email (optional)
<i>[Signature]</i>	Michelle Winger	19030 Nixon Ave, WA	brokermw@gmail.com
<i>[Signature]</i>	Thomas J. Elliott	5310 Windsor Terrace	fellhoff@mes-law.com
<i>[Signature]</i>	HARRY LITRELL	10340 SE 5 <sup>th</sup> St Milwaukie	
<i>[Signature]</i>	Shirlene Littrell	10340 SE 5 <sup>th</sup> St Or.	
<i>[Signature]</i>	RANDY HEATER	3101 Courtney	candy.heater@att.com
<i>[Signature]</i>	Karin Cook	5025 SE 5 <sup>th</sup> omires	
<i>[Signature]</i>	Louise Holladay	6525 N Killian Lane	standpp@aol.com
<i>[Signature]</i>	Genevieve Thomas	13273 Clairmont Ave, Dr, C	
<i>[Signature]</i>	TIM O'GARA	2177 S. CERRA PT. RD CLATSOP	
<i>[Signature]</i>	Joelene Montgomery	127 Elmwood Dr O.C	

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Signature	Print Name	Street Address	Email (optional)
<i>Annmarie Leach</i>	Tamara Underwood	2595 Remington Dr	<del>tt@tt.com</del>
<i>Annmarie Leach</i>	Tamara Underwood	2123 Quinlan Ln	<del>tt@tt.com</del>
<i>Janet Hels</i>	Janet Hels	16438 SA Boulding	Oregon City
<i>Joanne Gordon</i>	Joanne Gordon	2267 Campister St	West Linn
<i>Robt M Knutson</i>	Robt M Knutson	5670 Mapleton Ave	
<i>Sharon A. Knutson</i>	Sharon A. Knutson	5076 Mapleton Dr.	NRNRS1344@yahoo.com
<i>Scott Gordon</i>	Scott Gordon	5675 Mapleton	Scott@PPIK&L.com
<i>Erin Patterson</i>	Erin Patterson	19070 Dixon Ave	ekettle@hotmail.com
<i>Robin Winter</i>	Robin Winter	19030 Dixon Ave	robin.winter@gmail.com

Help Save West Linn



*Handwritten initials/signature*

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Signature	Print Name	Street Address	Email (optional)
<i>Michelle Lewis</i>	MIKE CORRIE	2718 LAFAYETTE	
<i>Maria Galtier</i>	ALICIA FORD	MIKEE 2781 LAFAYETTE	
<i>Sharon Kuylenstierna</i>	Diana Kuylenstierna	2705 Kuylenstierna	
<i>Sean Kuylenstierna</i>	Sean Alexander	2510 Lakepoint Blvd	
<i>Rebecca Bevens</i>	Rebecca Bevens	2510 Salford Rd	
<i>Theresa Wittig</i>	Theresa Wittig	6809 Magnolia Dr	West Linn
<i>Malcolm Bevens</i>	Malcolm Bevens	2501 Yule St	
<i>Steve Mowatt</i>	Steve Mowatt	2507 Tulare St	

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Signature	Print Name	Street Address	Email (optional)
<i>[Handwritten Signature]</i>	Ryan Kover	2721 Lake St	
<i>[Handwritten Signature]</i>	STEVEN YUSKAM	6842 LOWELL AVE	
<i>[Handwritten Signature]</i>	Susan Kava	2789 Lake Pointe	
<i>[Handwritten Signature]</i>	ALAN G. LEWIS	2700 RAINIER R	
<i>[Handwritten Signature]</i>	Betty J. Misseldine	2306 Tulane	
<i>[Handwritten Signature]</i>	Barbara Nischelle	2305 Tulane	
<i>[Handwritten Signature]</i>	AL Gettel	2303 Tulane	

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Signature	Print Name	Street Address	Email (optional)
<i>Jackie Girach</i>	JACKIE GIRACH	2814 LeLave St	jackiegirach@comcast.net
<i>Celeste Lynch</i>	CELESTE LYNCH	1948 Lowell Ave	celestealynch@gmail.com
<i>Ben Marcus</i>	BEN MARCUS	2687 Jolie Point Rd	
<i>Louise Marcus</i>	Louise Marcus	2687 Jolie Point Rd	
<i>Lori Forest</i>	Lori Forest	2653 Jolie Pointe	
<i>Kelly LeBeau</i>	Kelly LeBeau		
<i>Kedra Patterson</i>	Kedra Patterson	1724 Ruizer Ct	



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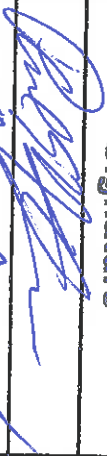


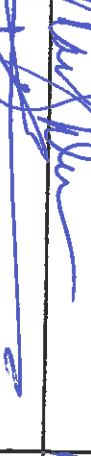






Signature	Print Name	Street Address	Email (optional)
	SEAN ALVARSTEIN	Avenue, W.A. 5602 ELIZABETH LOOP SE	SEANALVARSTEIN@MSO.COM
	Robert Switz Brown Acheved	8705 W Regal W.W. 6691 W Burnside	rse.president@privet.com sewitz@privet.com allreydb@gmail.com

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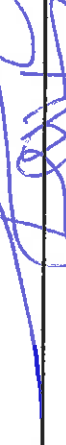



Signature	Print Name	Street Address	Email (optional)
	Paul Flowers	204 SE 78th Ave Portland, OR 97215	
	Amy C. Stevens	12555 SW 232 Dunnville, OR 97089	
	Tony Monaghan	15561 Boone Ferry Rd Linn, OR 97035	
	Mark D Hunter	17187 SW Montague King City, OR 97224	
	Paul Stecher	507 4th Avenue Linn, OR 97034	
	Gregory McWade	18108 Pilkington Rd Lake Oswego, OR	
	Virgil Howell	28350 Sembridge Rd Lake Oswego, OR 97066	
	Ronald E. Myers IV	4777 Malice Dr Lake Oswego, OR 97035	
	Anthony M Bonachera	25590 Remyngton Dr. West Linn, OR 97068	
	Harvey Smythe	19119 KANTARA CT West Linn, OR 97068	

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Signature	Print Name	Street Address	Email (optional)
	Nancy L. Bartz	10990 Levey Dr	NLBARTZ@gates.com
	Brian T. Hest	2148 Summit Dr	h.o.
	E. Main	18401 S. Matthews St @N. Sun City	
	B. Schilling	13725 Silver View Crestwood	
	Cliff Gerber	18406 Nixon Ave	
	Alix Gerber	" West Linn "	
	Mari Gerber	18406 Nixon Ave	
	Males Gerber	18406 Nixon Ave	
	Sherman Anderson	1009 Swides Dr.	
	Scott Gerber	3940 Kenmore Hill	

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Signature	Print Name	Street Address	Email (optional)
<i>Chris Jones</i>	Chris Jones	1223 17th St West Linn	
<i>Bruce Benson</i>	Bruce Benson	1647 Holly St. Linn West	
<i>Carmen Meadows</i>	Carmen Meadows	3882 Kenton Ave Linn	
<i>Eric Peddek</i>	ERIC PEDEK	3880 KENTON BLVD	
<i>Jennifer Prodek</i>	Jennifer Prodek	3880 Kenton Ave Linn	
<i>Tara E. Glavin</i>	Tara E. Glavin	211 Riverside Summit	jeanetandere@gmail.com
<i>BARBARA WATT</i>	BARBARA WATT	1064 Eppendy Way	
<i>Elise Kunde</i>	Elise Kunde	1065 Eppendy Way	elise-kunde@yahoo.com
<i>Susan Ziegler</i>	Susan Ziegler	2190 Crestview Dr	
<i>KARINA DENMARK</i>	KARINA DENMARK	5536 River St West Linn	drdenmark@gmail.com

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Signature	Print Name	Street Address	Email (optional)
<i>Wanna Woodard</i>	Betsy Woodard	3999 Kenthorpe	
<i>Michele Woodard</i>	Mickelle Woodard	" "	
<i>Stephanie</i>	Stephanie Farris	18575 Old Riverly	
<i>Bos Meyer</i>	Bos Meyer	3882 KENTHROPES WAY	RIMMERLINA@GMAIL.COM
<i>Kathleen Kneutser</i>	Kathleen Kneutser	3400 Kenthorpe Way	
<i>James E. Hackett</i>	JAMES E. HACKETT	3900 KENTHORPE WAY	
<i>Shawn V. Miller</i>	SHAWN V. MILLER	2171 HUDSON SQUARES CT	
<i>Sarah Colarchnik</i>	Sarah Colarchnik	2008 Will. Falls Dr. (Chav)	
<i>Paula Moore</i>	PAULA MOORE	20350 S Floricid	plactomas@county.or.gov
<i>Keith Holms</i>	Keith Holms	12836 S. Robinson St WLn	

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Signature	Print Name	Street Address	Email (optional)
<i>[Signature]</i>	Michael & Barbara	15932 SE 102 <sup>nd</sup> St	Mike@barb@comcast.net
<i>[Signature]</i>	Kevin Stewart	1104 NW 17 <sup>th</sup> PDX	97209
<i>[Signature]</i>	Deanna Perry	250Y NE 35 <sup>th</sup> Pl	97212
<i>[Signature]</i>	Robert Perry	7431 SD Siskiy Blvd	
<i>[Signature]</i>	Janet Avenet	7008 N mobile	97217
<i>[Signature]</i>	Harold Weigh	244 NW Sierra Blvd PDX 97210	janetweigh@yahoo.com
<i>[Signature]</i>	Francis Lancaster	6045 SE 19 <sup>th</sup> Ave P.M.D. 0197202	
<i>[Signature]</i>	Deanna Putney	1015 SW 19 <sup>th</sup> St P.M.D. 07219	
<i>[Signature]</i>	William D. Pears	4335 NW Shaver St. Pdx	97213
<i>[Signature]</i>	Nel Poiry	5833 SE 14 <sup>th</sup> Ave PDX	97215

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Signature	Print Name	Street Address	Email (optional)
<i>Mae E. Crary</i>	Grace E. Crary	19824 White Cloud <i>Crary</i>	_____

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Signature	Print Name	Street Address	Email (optional)
<i>Top Dever</i>	Top Dever	5749 Terrace Dr	
<i>Genda Edwards</i>	Genda Edwards	5749 Terrace Dr.	
<i>Coni Rosetti</i>	Coni Rosetti	5781 Terrace Dr	
<i>Bryan Helle</i>	Bryan Helle	5781 Terrace Dr	
<i>Russ Schumacher</i>	Russ Schumacher	<del>5781</del> 5781 Terrace Dr	
<i>Norma Schumacher</i>	Norma Schumacher	2151 Webb	
<i>Darleen M. Dasee</i>	Darleen M. Dasee	2135 Webb St	
<i>Margaret W. Thompson</i>	Margaret W. Thompson	2025 Webb St.	
<i>Edward W. Thompson</i>	Edward W. Thompson	202 Webb St.	
<i>Angela R. Dreher</i>	Angela R. Dreher	5767 Terrace Dr.	

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Signature	Print Name	Street Address	Email (optional)
<i>Ellen M Smith</i>	ELLEN M. SMITH	5714 Terrace Dr	
<i>Gene D. Venis</i>	Gene D. Venis	5714 Terrace Dr	
<i>Debra Campbell</i>	Debra Campbell	5718 Terrace Dr	
<i>Kate Oaier</i>	KATE OAIER	5720 K ST	
<i>Scott E. Murphy</i>	SCOTT E. MURPHY	5745 K ST	
<i>Christy Lummes</i>	Christy Lummes	574 K St	
<i>Jennifer Fosberg</i>	JENNIFER FOSBERG	<del>5716</del> 5716 5 K STREET	
<i>Michael Cook</i>	Michael Cook	2112 Ubb St	
<i>Debra Silver</i>	DEBRA SILVER	5621 WEST "A" ST.	
<i>Jennifer Davis</i>	Jennifer Davis	5746 K St.	

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Signature	Print Name	Street Address	Email (optional)
<i>Gene V. Beiser</i>	Gene V. Beiser	17167 Stanchelma Dr.	
<i>William A. Beiser</i>	William A. Beiser	17167 Stanchelma Dr.	
<i>H J. Wright</i>	H J. Wright	1378 Cushman Dr	wright@mea-architects.com
<i>Cynthia S. Wright</i>	Cynthia S. Wright	1378 Cushman Dr	lawn sign 503 657 9141
<i>Alice M. Jones</i>	Alice M. Jones	1375 Cushman Dr	
<i>Gayle Agee</i>	Gayle AGEE	2090 RIDGEBROOK DR	lawn sign
<i>Mike Agee</i>	Mike Agee	el	el

HELP SAVE WEST LINN



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Signature	Print Name	Street Address	Email (optional)
<i>[Signature]</i>	ROBERT LEVA	1915D NIXON WEST LINN	
<i>[Signature]</i>	VICTOR CONCA	1915D NIXON WEST LINN	
<i>[Signature]</i>	LARRY JONES	2067 RIVERVIEW ST. BARRY, JOHNSON	BARRY.JONES@WESTLINN.OREGON
<i>[Signature]</i>	S. Jones	2067 RIVERVIEW ST. BARRY, JOHNSON	BARRY.JONES@WESTLINN.OREGON
<i>[Signature]</i>	WILLIAM SAUROCK	1825 DENNITT DR WEST LINN	
<i>[Signature]</i>	NATHAN A. BERTOLD	1835 DENNITT DR WEST LINN LO 97035	
<i>[Signature]</i>	Jennifer Langrath	4729 Lakeview Park	







# Help Save West Linn



**HELP STOP LAKE OSWEGO/TIGARD WATER GRAB FROM CLACKAMAS RIVER**

- The Lake Oswego/Tigard Water Partnership (LOT) is proposing a water treatment plant and pipeline that takes up to 38 million gallons of water from the Clackamas River every day.
- Lake Oswego is proposing to maximize their water rights to 100%, more then doubling their taking from 16 mgd to 38 mgd in order to send the water to Tigard.
- The State has over allocated the Clackamas River by 200%.
- Tigard is not in the Clackamas River basin. Tigard could join Wilsonville's water program that draws from the Willamette River. But Tigard's refuses this because their charter does not allow Tigard to use Willamette River water. Wilsonville water produces Coca-Cola products including Dasani water. Times have changed, technology has changed and Tigard needs to simply change their charter.
- Oswego officials have said in 30-40 years the Clackamas won't be able to sustain the demand given the 500,000-700,000 people that will move the region. Yet Oswego is wants to send Clackamas River water to Tigard.
- Lake Oswego also does not need more water. Since this proposal was put in to motion, Oswego has reduced their consumption by 35% due to their conservation program.
- If all cities did what Oswego is proposing, the Clack would be a trickle. More important, our natural resources and habitat would be the greatest of victims.

**JOIN US BY SAYING NO TO THE LO/TIGARD WATER GRAB!**

Signature	Print Name	Street Address	Email (optional)
	Jon Pampush	785 SE 63rd A. Hillsdale	Jon-pampush@yola.com
	Ron Richards	8945 SW Hester St. Portland, OR 97225	
	HENRY HOSEIELS	9321 SW CAPITAL HWY PORTLAND, OR 97204	
	William J Hadley	8990 SW CAPITAL HWY PORTLAND OR 97209	
	Michael S. Gentry	359 SW 45th St Portland, OR 97214	
	Michael S. Gentry	85 Tanglemood Drive Lake Oswego, OR 97035	

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Signature	Print Name	Street Address	Email (optional)
<i>John M. Jorde</i>	JOHN M. JORDE	215 Rosemont, 201	
<i>Rita S. Kilstrom</i>	Rita S. Kilstrom	2027 Pindico Way	
<i>Keith Mason</i>	KEITH MASON	2464 SW Valley View Rd	
<i>Pat Regan</i>	PAT REGAN	2481 - Oregon City Blvd	
<i>Roberta Vignery-Seward</i>	Roberta Vignery-Seward	1729 Regency St.	



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Signature	Print Name	Street Address	Email (optional)
Ramona Register	Ramona Register	13607 Vestel Ct.	
Kathy Wade	KATHRYN WADE	19603 Donly Ct NW	
Jenaca Woods	TERESA WOODS	21445 Miles Drive	
Erin McFadyen	ERIN MCFADYEN	1342 137th St.	
Lori Wentz	Lori Wentz	3601 Robinview West Linn	
Michelle Melland	Michelle Melland	8345 Century Ln. West Linn	
Pauline Vandenberg	PAULINE VANDEBENBERG	1230 FARVIEW ST	
Myrna Marsden	Myrna Marsden	4630 Falk View	
Margaret Matthews	MARGARET MATTHEWS	1531 11th St West Linn	97068

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Signature	Print Name	Street Address	Email (optional)
<i>[Signature]</i>	Robert Schwan	2206 Timber Dr West Linn	roberta.schwanz@comcast.net
<i>[Signature]</i>	Robert Schwan	2119 Greene 9268	rschwanz@yahoo.com
<i>[Signature]</i>	Robert Schwan	2109 Greene 9268	
<i>[Signature]</i>	Robert Schwan	2101 GREENE ST	daver@rosop.com
<i>[Signature]</i>	Robert Schwan	1803 BRUNES CIRCLE	robert.schwanz@comcast.net
<i>[Signature]</i>	Miriel M'Gill	3020 Remington Dr.	smith10892@msn.com
<i>[Signature]</i>	BRENDA PERRY	2086 HASKINS RD	perry.bs@gmail.com
<i>[Signature]</i>	ANTHONY PERRY	2286 HASKINS RD	
<i>[Signature]</i>	Patrick McGuire	1611 Rogers Cir. W. Linn	NorthwestE.com@earthlink.net

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Signature	Print Name	Street Address	Email (optional)
<i>Angela Liang</i>	Angela Liang	485 Maryhurst Dr	paob641t@gmail.com
<i>Mark Liang</i>	MARK LIANG	" "	paos5tor@yahoo.com
<i>Aaron Beerman</i>	AARON BEERMAN	16200 S STOLTZ RD	aaron.beerman@yowal.com
<i>Gloria Beerman</i>	GLORIA BEERMAN	16200 S STOLTZ RD	
<i>Roxanne Bross</i>	Roxanne Bross	2963 MARK LANE	
<i>Marie Bross</i>	MARIE BROSS	2963 MARK LANE	
<i>Julia Wilbanks</i>	JULIA WILBANKS	48992 SUMMIT ST	
<i>Harry Wilbanks</i>	HARRY WILBANKS	4892 Summit St	harry@yowal.com

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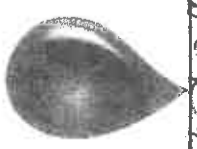


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Signature	Print Name	Street Address	Email (optional)
<i>[Handwritten Signature]</i>	ANNE ELLIOTT	2019 DILLARD DRIVE	
<i>[Handwritten Signature]</i>	PEGGY LUSH	2024 Hughes Dr.	
<i>[Handwritten Signature]</i>	Levi Dorschid	P.O. Box 3	
<i>[Handwritten Signature]</i>	Timmy Boudier	2542 Hagler Ave	
<i>[Handwritten Signature]</i>	Dimple Boudier	2542 Hagler Ave	
<i>[Handwritten Signature]</i>	Kan or	20760 Wilson Street	
<i>[Handwritten Signature]</i>	ANGELA TROST	6270 DAVENPORT	
<i>[Handwritten Signature]</i>	Katherine C. Lockey	6335 Caulfield St	
<i>[Handwritten Signature]</i>	Nora Christman	2460 Tompkins St.	
<i>[Handwritten Signature]</i>	Georgie K. Black	3820 Waverley Park Dr	
<i>[Handwritten Signature]</i>	Georgie Bullard	3820 Mapleton Drive	Wlinn@pcc.edu

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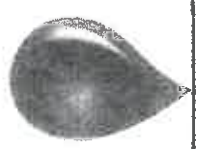


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Signature	Print Name	Street Address	Email (optional)
<i>Brian May</i>	Brian May	6565 Lowry Dr. <sup>W</sup>	BrianMay2@hotmail.com
<i>John Leineuber</i>	John Leineuber	6533 Lowry Dr	
<i>Tyson Wolf</i>	Tyson Wolf	2620 SW 211 <sup>th</sup> Monopole	
<i>Tina Duncan</i>	Tina Duncan	6385 Barclay St NW	
<i>Ramona Lucy Pintero</i>	Ramona Lucy Pintero	6285 Davenport St	
<i>Korrell Morris</i>	Korrell Morris	6332 Caulfield St	
<i>JANNE</i>	JANNE	6204 Filling St	
<i>Dunnequest</i>	Dunnequest	5716 West 14 <sup>th</sup> St	
<i>Thane Fyson</i>	Thane Fyson	5830 West 1 <sup>st</sup>	
<i>THANE</i>	THANE	13855 TUNABASHIE WOOD RD	

Help Save West Linn



20

I agree that:

1. The Lake Oswego Tigard proposal is not consistent with the overall needs of the West Linn community.
2. The West Linn City Council should vote to uphold the unanimous decision of our West Linn Planning Commission.

Signature	Print Name	Street Address	Email (optional)
<i>Zandra Brant</i>	ZANDRA BRANT	1924 Artec Ct	zbrant@comcast.net
<i>Robert Regan</i>	Robert Regan	1391 High Touch St	—
<i>Edward Schwarr</i>	Edward Schwarr	2206 Turner Dr	—
<i>William Brant</i>	William Brant	1924 Artec Ct	—
<i>Terry Burke</i>	Terry Burke	1391 High Touch St	burke.terry@comcast.net
<i>Pat Gath</i>	Pat Gath	2672 Willow Dr.	—
<i>Benjamin</i>	BENJAMIN	2595 Willow Dr	—
<i>Maria Wheland</i>	Maria Wheland	4330 N 7th Dr	—
<i>Don Dillon</i>	Don Dillon	2157 Dillon Dr.	—
<i>Tony Place</i>	Tony Place	2135 Dillon Dr	—

HELP SAVE WEST LINN



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Signature	Print Name	Street Address	Email (optional)
<i>Kathy Hoedl</i>	Kathy Hoedl	2455 Dillow Rd.	
<i>MJ, Hoedl</i>	Lorey Hoedl	2455 Dillow Rd.	
<i>EG Hoedl</i>	Evelyn Elvinton	2591 Dillow Dr.	
<i>Dee A. MacMillan</i>	Dale A. MacMillan	2591 Dillow Dr.	
<i>[Signature]</i>	Scott Ferguson	6981 Yarrow St.	
<i>Susan Meyer</i>	Karen Meyers	4575 Beam St	
<i>[Signature]</i>	Patrick Kelly	6557 Beam St	
<i>R. Farnest</i>	Brian Fassett	6547 Beam St	
<i>Vicki Hightower</i>	Vida Gilbertson	6550 Beam Bl.	
<i>[Signature]</i>	Brenda Forster	6005 Lundy Dr.	

Help Save West Linn



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Signature	Print Name	Street Address	Email (optional)
<i>Sophie Morts</i>	Sophie Morts	2400 Dillow Dr.	
<i>Carl Cannizzo</i>	Carl Cannizzo	3400 Dillow Dr W2	c.cannizzo@comcast.net
<i>Jay Beth</i>	JAY Bethnestzi	2405 Dillow Drive	Jaybeths@gmail.com
<i>Sandi Butniski</i>	Sandi Butniski	2405 Dillow Dr W2	
<i>Patrick Hannegan</i>	Patrick Hannegan	2415 NE Dillow Dr	
<i>Rebecca Tribben</i>	Rebecca Tribben	2108 Willamette View Ct	tribbenr2@gmail.com
<i>Clarence E. Burns</i>	CLARENCE BURN	240 Dillow Drive	
<i>Ann Humphreys</i>	Ann Humphreys	2350 Century Lane	
<i>Dustin Franks</i>	Dustin Franks	648 Dillow Dr	
<i>Steph Arbery</i>	Steph Arbery	2059 Sycamore Ct	

HELP SAVE WEST LINN



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Signature	Print Name	Street Address	Email (optional)
	Brad J. Bitz	2309 Tompkins St	
	Joseph Edwin	6300 Barclay St.	joe@doelis.com
	Michael J. Mizar	6300 Barclay St.	mizarrpdx@gmail.com
	Irene Herget	1615 Buck Street	ireneherget@yahoo.com
	Suzanne Webster	1516 Buck Street	weston.shane@gmail.com
	Janice M. Goira	1464 Buck St	opal-jm@hotmail.com
	John Radke	1670 Buck St	
	Zack Shupe	1170 Buck St	
	Kate Rock	11070 Buck St	
	Matt Conner	1691 Buck St	Matt@doelis.com

HELP SAVE WEST LINN



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Signature	Print Name	Street Address	Email (optional)
<i>Jana J. Rea</i>	Jana J. Rea	4240 Mapleton Dr.	
<i>Deas Rea</i>	Deas Rea	4240 Mapleton Dr.	
<i>Patty Hartman</i>	Patty Hartman	2332 Athena Rd.	
<i>Robert Mauer</i>	Robert Mauer	5796 Robert Mauer St.	
<i>John Roddy</i>	John Roddy	5915 Penn St West Linn 97068	
<i>John C. Lee</i>	John C. Lee	22708 Jones Rd West Linn	
<i>John P. Hart</i>	John P. Hart	1475 William St West Linn	
<i>Vera Matukov</i>	Vera Matukov	2765 York St West Linn	
<i>George A. Gray</i>	George A. Gray	1438 D. Magee Rd. West Linn	
<i>Dustin Meyer</i>	Dustin Meyer	2220 River Heights Circle	

# Help Save West Linn



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Signature	Print Name	Street Address	Email (optional)
<i>Jennifer Cook-Loney</i>	Jennifer Cook-Loney	1660 Cavanaugh Way West Linn, OR 97068	
<i>Archie F. Hildebrandt</i>	ARCHE F. HILDEBRANDT	226 SW FOREST COVE WEST LINN, OR 97068	
<i>Guendolyn Rose</i>	Guendolyn Rose	1563 Peltic Ave West Linn, OR 97068	
<i>Marcy Davidson</i>	Marcy Davidson	4262 Maplewood Dr. West Linn, OR 97068	
<i>Jessica Hoopes</i>	Jessica Hoopes	4855 Riverview Ave West Linn, OR 97068	
<i>Pam Harris</i>	Pam Harris	1133 Dollan St West Linn, OR 97068	
<i>Shirley St. Mary</i>	Shirley St. Mary	1697 5th Ave West Linn, OR 97068	
<i>Salvatore Aquilone</i>	Salvatore Aquilone	4851 10th St #10 West Linn, OR 97068	
<i>Teresa D. Gibson</i>	Teresa D. Gibson	4351 Exeter #16 West Linn, OR 97068	
<i>Robert Beswick</i>	Robert Beswick	1364 SW Bayland West Linn, OR 97068	

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Signature	Print Name	Street Address	Email (optional)
<i>[Handwritten Signature]</i>	<i>Linn Beswick</i>	<i>1364 SW Portland Rd</i>	<i>linnbeswick@yahoo.com</i>



**HELP STOP LAKE OSWEGO/TIGARD WATER GRAB FROM CLACKAMAS RIVER**

- The Lake Oswego/Tigard Water Partnership (LOT) is proposing a water treatment plant and pipeline that takes up to 38 million gallons of water from the Clackamas River every day.
- Lake Oswego is proposing to maximize their water rights to 100%, more then doubling their taking from 16 mgd to 38 mgd in order to send the water to Tigard.
- The State has over allocated the Clackamas River by 200%.
- Tigard is not in the Clackamas River basin. Tigard could join Wilsonville's water program that draws from the Willamette River. But Tigard's refuses this because their charter does not allow Tigard to use Willamette River water. Wilsonville water produces Coca-Cola products including Dasani water. Times have changed, technology has changed and Tigard needs to simply change their charter.
- Oswego officials have said in 30-40 years the Clackamas won't be able to sustain the demand given the 500,000-700,000 people that will move the region. Yet Oswego is wants to send Clackamas River water to Tigard.
- Lake Oswego also does not need more water. Since this proposal was put in to motion, Oswego has reduced their consumption by 35% due to their conservation program.
- If all cities did what Oswego is proposing, the Clack would be a trickle. More important, our natural resources and habitat would be the greatest of victims.

**JOIN US BY SAYING NO TO THE LO/TIGARD WATER GRAB!**

Signature	Print Name	Street Address	Email (optional)
<i>[Handwritten Signature]</i>	George X. Wilson	11725 SW Safford Way Beaverton 97005	
<i>[Handwritten Signature]</i>	Eric J Thompson	9841 SW Spring Crest Drive Portland OR 97225	

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Signature	Print Name	Street Address	Email (optional)
<i>CK Norman</i>	ERLE NORMAN	6152 S.W. NEUBER CT PORTLAND, OR 97219	
<i>Richard S. Hollenbeck</i>	RICHARD HOLLENBECK	147 NW ZOBEL ST ESTACADA, OR 97023	drk@clackamasriverveterans
<i>Robert Williams</i>	ROBERT WILLIAMS	1931 SW 34TH AV PORTLAND, OR 97219	
<i>Andy Andrews</i>	Andy Andrews	1230 N.W. McDaniel Rd Portland 97226	
<i>Teddy Leneale</i>	Teddy Leneale	3914 SW HEWETT BLVD PORTLAND, OR 97221	
<i>James H Fenner</i>	James H Fenner	5765 Windfield Loop Lake Oswego, OR 97035	

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Signature	Print Name	Street Address	Email (optional)
	Brandon Beebe	4520 SW Marigold St. #12A PDX	bbeebe.Brandon@gmail.com

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Signature	Print Name	Street Address	Email (optional)
	Aaron Stansfield	1913 McMillikan St. <small>West Linn</small>	PanicinPaw@Gmail.com
	AARON PORTER	6388 Barclay St. <small>West Linn</small>	
	Bill Gardner	5625 S.E. Jennings	
	Bill Mutton	5625 SE Jennings	
	Allen C. Boyles	5625 SE Jennings	
	Chris M. Richards	5625 SE Jennings Ave.	
	Gregory T. Baker	5625 SE Jennings	
	Jane Ashburn	5625 SE Jennings	
	Ken Stephens	5625 SE Jennings	
	Robert Best	5625 SE Jennings	
	Ashley Mitchell	5625 SE Jennings Ave	

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Signature	Print Name	Street Address	Email (optional)
George Nelson	George Nelson	1686 5th Ave W 14630 5th Ave W	georgnelson@yahoo.com
Agnes Spidal	Agnes Spidal	14630 5th Ave W	—
Betty Nelson	Betty J. Nelson	1686 5th Ave W	—
Helen D. Arneson	Helen D. Arneson	19320 Old River Dr.	—
Joyce V. Helgeson	Joyce V. Helgeson	3945 Sunnyside Lane	—
Marsha E. Guthrie	Marsha E. Guthrie	19500 Hidden Springs Rd	—
Pamela F. McAllister	Pamela F. McAllister	6331 White Tail Dr #4	—
Robert Damon	Robert Damon	1885 Tualatin Ave	rob-denss@yahoo.com
Colleen Mickelson	Colleen Mickelson	1941 SE Pike Rd	—
Nancy J. Ross	NANCY J. ROSS	6254 FAULING ST. W.	—

Help Save West Linn



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Signature	Print Name	Street Address	Email (optional)
<i>Janet J. Lane</i>	Tommy L Crane	2115 SE <del>Terrest</del> Gladstone	TommyCrane068@Aol.com
<i>K. R. Sapp</i>	Kent Capasso	415 PATRICIA 11612 Hazelnut Ct	
<i>Karen L Snyder</i>	Karen L Snyder	Oregon City 5030 Broadway St	
<i>Chris Dahl</i>	Chris Dahl	West Linn	
<i>Jan Olson</i>	Jan Olson	1687 April Ct 97068	
<i>Timothy P. Sommer</i>	Timothy P. Sommer	11612 Hazelnut Ct Oregon City OR 97045	
<i>Sea M. J. Sten</i>	Sea M. J. Sten	5995 Green St. West Linn	
<i>R. Philpot</i>	R. Philpot	2323 Buck St. W	
<i>Darcey Philpot</i>	Darcey Philpot	2388 Buck St. West Linn	
<i>Sally Polig</i>	Sally Polig	4650 Alder St. W. Linn	

Help Save West Linn



*[Handwritten flourish]*

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Signature	Print Name	Street Address	Email (optional)
<i>Elizabeth O'Brien</i>	ELIZABETH O'BRIEN	18740 NIXON AVE	Lilynpelly@gmail.com
<i>Alyson O'Brien</i>	ALYSON O'BRIEN	18740 Nixon Ave 97068	
<i>Jeff O'Brien</i>	JEFF O'BRIEN	18740 Nixon Ave 97068	
<i>Miss C. Henderson</i>	Alison C. Henderson	19095 Nixon Ave 97068	alison-henderson@comcast.net
<i>Robert B. Hurd</i>	Robert B. Henderson	19095 Nixon Ave 97068	
<i>Sharon C. Henderson</i>	Shannon C. Henderson	19095 Nixon Ave 97068	
<i>Karen W. Henderson</i>	Karen W. Henderson	19095 Nixon Ave 97068	
<i>Janice L. Hurd</i>	Jessie L. Henderson	19095 Nixon Ave 97068	
<i>Rob. Ann Henderson</i>	Robert G. Henderson	19095 Nixon Ave 97068	
<i>Bill Krainer</i>	Bill Krainer	6175 Skyline Dr Will	

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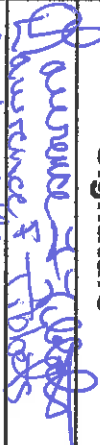









Signature	Print Name	Street Address	Email (optional)
	Victoria Lowell	7425 SW Vlahos Dr #501 Wilsonville, OR 97070	
	Laura Biosi	7905 Sw Vlahos Dr #501 Wilsonville, OR 97070	
	Robin Smith	1773 Bellast West Linn Ave	
	Robin Smith	2135 Alpine Dr, West Linn	
	Anne He	20310 SW Bayview Cir, Wilsonville OR	
	Elizabeth Pollock	10945 Lake Forest Blvd Lake Oswego, OR 97035	
	Zachary Rice	Oakson Cir, OR 97045 18783 Conifer Dr.	
	Shadi Patrick	15046 S Springwater Rd Oregon City OR 97045	
	Vince Castillo	30509 SW Thomas St Wilsonville OR 97070	
	Alex Barber	25774 S. Reid Rd Estacada OR 97025	

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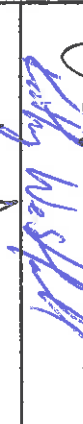






Signature	Print Name	Street Address	Email (optional)
	Lawrence F. Tibbels	13188 Kingsway Dr ORE CITY 97045	
	Douglas Walden	17104 Sautwelder Ave ORE CITY 97045	
	TALITE Fujiwara	8075 SW Thom St. ORE CITY OR 97045	
	William McKnight	17110 S Patier Rd ORE CITY OR 97045	
	KEITH BOWERS	39099 SW Goodfiches Rd NW	
	Mike Ford	11207 SW 81st Ave Tigard 97223	
	Shane Nugen	15229 NE Waukegan Ave VALLEY 97234	
	Kevin Foster	16515 SW Bull Mt Rd TIGARD OR	
	Joseph Alley	435 E Exeter Goldstone	
	CHRIS BAKER	775 CASCADE ST, OC	

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Signature	Print Name	Street Address	Email (optional)
	Richard Fowler	29260 SW Parkway Ct 45 Wilsonville, OR 97150	bbbl117@yahoo.com
	PATRICIA GARZA	1604 NW Parlor Dr. Portland, OR 97229	
	KAI HAINSTOCK	815 N. KENNETH BLVD GAINESVILLE, FL 32609	
	KATHY WESTFALL	29665 SW ROSE LAKE #287 WILSONVILLE, OR 97150	
	CK Sun	3718 Mapleton Dr. Mapleton, OR 97130	
	Merty Marshall	3701 Mapleton Dr. West Linn, OR 97146	
	Raymond E. Maden	3708 Mapleton Dr. West Linn, OR 97146	
	Vikki Maden	3708 Mapleton Dr. West Linn, OR 97146	
	Linda Edwards	3480 Mapleton Dr. West Linn, OR 97146	
	Carl Edwards	3600 Mapleton Dr. West Linn, OR 97146	

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Signature	Print Name	Street Address	Email (optional)
<i>Marilyn H. King</i>	MARYLEE H. KING	19420 Wilderness Dr	
<i>Maryellen Cocks</i>	Maryella Cocks	3071 Arbor Dr.	
<i>Moby Regan</i>	MARY REGAN	2481-Quezon City Blvd	
<i>Ben Saitsu</i>	BEN SAITSU	19910 Bluegrass Cir.	



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Signature	Print Name	Street Address	Email (optional)
	Scott A Andersson	19125 Willemette Dr	sandersson@accomputerrepair.biz
	Tim G. Andersson	19125 Willemette Dr.	techsupport@accomputerrepair.biz
	Sean Andersson	19125 Willemette Dr	laparis@accomputerrepair.biz



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Signature	Print Name	Street Address	Email (optional)
<i>[Signature]</i>	Alice Willmarth	17765 Hillside Dr.	awillmarth@gmail.com
<i>[Signature]</i>	Kathy Grant	7131 Greene St.	
<i>[Signature]</i>	Amber D. Norem	18522 WOODMIDWAY DR	
<i>[Signature]</i>	Jeremy Hogue	2961 Astor Circle	Chunke1219@yahoo.com
<i>[Signature]</i>	Katie Anderson	19137 Nilanette DR	—

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Signature	Print Name	Street Address	Email (optional)
<i>Cheerl Keicher</i>	Cheerl Keicher	22320 S Beaver Creek Rd	
<i>Nema Spras</i>	Nema Spras	191415 Willamette Dr.	West Linn 97068
<i>Margaret Browning</i>	Margaret Browning	2645 Arbor Dr.	West Linn, OR 97068
<i>Kaia Zednick</i>	Kaia Zednick	1777 Maple St. #20	West Linn OR 97068
<i>Katya Peterson</i>	Katya Peterson	1930 Arena Court,	West Linn OR 97068
<i>Julia Simpson</i>	Julia Simpson	1671 Killarney Dr.	WL
<i>Reyn Gassen</i>	Reyn Gassen	19145 Willamette Dr	West Linn, OR 97068
			-

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Signature	Print Name	Street Address	Email (optional)
<i>Joseph R. Nolan</i>	Joseph W Nolan	14157 McMillanville Dr West Linn	
<i>Julie Overton</i>	JILL OVERTON	2176 Hidden Springs Ct. West Linn	
<i>Marcy Stryhe</i>	MARCY STRYHE	20763 S. Dryden Rd West Linn	
<i>Doris Candice</i>	DORIS CANDICE	3057 W. Sunset Dr. S. Alo. Chicago, IL	

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Signature	Print Name	Street Address	Email (optional)
<i>Wendy Mosser</i>	Valerie Mosser	19185 Willamette Dr	magnoliaheights@westoflinc.net
<i>Margi McCalister</i>	Marie McAlister	2181 Clubhouse Dr OR	
<i>Dynn Olson</i>	LYNN OLSON	14060 Aurora Heights Dr 97045	
<i>Michelle Dunlap</i>	LaTonda Dunlap	19155 Willamette Dr	

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Signature	Print Name	Street Address	Email (optional)
<i>Lillian Landeen</i>	Lillian Landeen	4020 Mapleton Dr. D.L.	
<i>Myron Wallace</i>	Myron Wallace	1515 Rosemont Rd W.L.	
<i>Joan Wallace</i>	Joan Wallace	" " "	
<i>Robert P. Demers</i>	Robert P. Demers	4087 RCT'S FOOT CR LAKE OSWEGO 97035	
<i>Tune Lenkan</i>	Tune Lenkan	19701 Sincerest Dr West Linn	
<i>KARL WALKER</i>	KARL WALKER	1119 MARSHWOOD CT WEST LINN OR 97068	Meadow View Ct
<i>Patricia J. Larson</i>	PATRICIA LARSON	1752 8th Ave West Linn	
<i>Sandra L. Jones</i>	Sandra L. Jones	5439 Peachtree St West Linn, OR 97068	
<i>Anna Deagler</i>	Anna Deagler	1985 S. Sweetbrier St. West Linn, OR 97068	
<i>Kathleen A. Lainsen</i>	Kathleen A. Lainsen	6126 Joving St West Linn, OR 97068	

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Signature	Print Name	Street Address	Email (optional)
<i>Roger Collingwood</i>	Roger Collingwood	1295 N Turpin	CANBY
<i>Arthur J. Donner</i>	ARTHUR J. DONNER	16201 S Bradley Rd	CANBY
<i>Elizabeth A. Donner</i>	ELIZABETH A. DONNER	16201 S Bradley Rd	DonnerCity 97045

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1. The Lake Oswego Tigard proposal is not consistent with the overall needs of the West Linn community.
2. The West Linn City Council should vote to uphold the unanimous decision of our West Linn Planning Commission.

Signature	Print Name	Street Address	Email (optional)
<i>Heidi MacLaren</i>	Heidi MacLaren	6534 Apollo Rd. West Linn OR 97068	-
<i>Dennis MacLaren</i>	Dennis MacLaren	6534 Apollo Rd West Linn OR 97068	-



I agree that:

1. The Lake Oswego Tigard proposal is not consistent with the overall needs of the West Linn community.
2. The West Linn City Council should vote to uphold the unanimous decision of our West Linn Planning Commission.

Signature	Print Name	Street Address	Email (optional)
<i>John Schwan</i>	John Schwan	1844 Barnes Circle <i>W.L.</i>	
<i>Terin Sebass</i>	Terin Sebass	1167 Blainey Dr	
<i>Aimee Craven</i>	Aimee Craven	2276 Rogue Way	
<i>Nerdy Mohr</i>	Nerdy Mohr	25619 Cheryl Drive	
<i>Larry Steel</i>	Larry Steel	19695 Wisconsin Dr	
<i>Arctod Mark</i>	Arctod Mark	25619 CHEVY DR	
<i>Maura Crossman</i>	Maura Crossman	1080 EPPLEY WAY	
<i>Julie Cardiner</i>	Julie Cardiner	1080 Eppley Way	
<i>Jeff Leonard</i>	Jeff Leonard	1909S Kantana Ct.	

# Help Save West Linn



RE: AP-12-02 and AP-12-03

I would like to comment on the Lake Oswego – Tigard Partnership’s water treatment plant expansion and water transmission line as it relates to development in the Stafford area.

In the West Linn Comprehensive Plan, Goal # 9 states, “Oppose urbanization of the Stafford Triangle and pursue policies that would *permanently* retain that area as a rural buffer between West Linn and neighboring communities.” This is directly relevant to LOT’s appeal of their application. In its chapter on conditional use requirements, the Community Development Code Section 60.070(A)(7) states that “The use will comply with the applicable policies of the comprehensive plan.” The West Linn Planning Commission in its unanimous decision against LOT’s proposal came to the conclusion that this proposal would indeed facilitate development of the Stafford area and, as such, does not meet CDC 60.070(A)(7). This conclusion was reached after hearing testimony from LOT representatives that a portion of the 38MGD that will be taken from the Clackamas River was allotted for Stafford development.

Although LOT has tried to downplay it, it is no secret that Stafford development is included in the long range plans of this project. I am including an article from 2010 in which several of LOT’s representatives refer to this aspect of the project. The city of West Linn may want to consider the fact that not only does this violate the goals of the comprehensive plan, but may also be one reason why LOT does not want to guarantee the intertie past 2041. I have highlighted some relevant sections in this article, and I would like it to be entered in the record along with my comments.

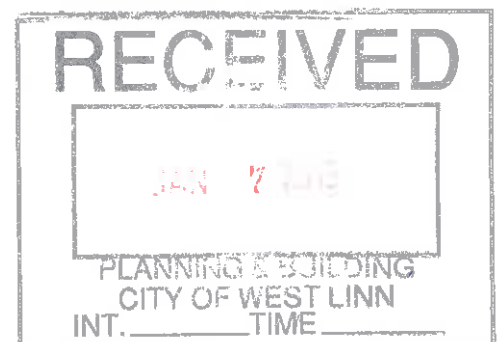
It should also be noted that the issue of how much water is needed is discussed in the sidebar of the attached article. The WaterWatch suit is still in the courts and is addressing the fact that LO does not need the amount of water it is requesting from the Clackamas. This is relevant because LO’s current daily average use is 4.7MGD with peak daily demand at 12MGD. This fact belies LO’s claim of “need” as well as its claim that it might not have enough water to maintain the intertie with West Linn.

In short, the expansion of this plant facilitates development of Stafford, is not necessary to maintain the intertie, and is not the answer to West Linn’s water future. The City Council should support the planning commission’s decision and deny the LOT application.

Thank you

Scott Gerber

3940 Kenthorpe Way West Linn OR



# PortlandTribune

## How much is enough?

*Lake Oswego and Tigard are counting on growth in Stafford, West Bull Mountain to draw water from the jointly-owned utility*

BY REBECCA RANDALL

*The Lake Oswego Review, Nov 18, 2010*

**Under the 2008 water partnership with Tigard, Lake Oswego is seeking to develop all of its water rights on the Clackamas River, saying that the water will serve customers in currently unincorporated areas, such as Stafford and West Bull Mountain.**

The partnership will more than double the current amount of water being drawn from the Clackamas River under Lake Oswego's water rights. The plan would draw up to 38 million gallons during peak demand instead of the city's current 16 million gallons. Planners hope to have the system online by 2016.

According to population projections made in 2007, by 2030 the new system is projected to support up to 47,300 people in Lake Oswego's urban services boundary (city limits plus unincorporated areas) — up from a 2005 population of 40,000. The full build out projection of the Lake Oswego service area is 54,000.

The latest population projection for the water service area of Tigard is for 64,000 by 2030, up from the 2005 population of 56,000 people. The full build out projection of Tigard's service area is 85,500. The estimate does not include west Bull Mountain or other urban reserve areas.

The growth in Lake Oswego assumes that residents in the Lake Grove Water District, Skylands Water Company, Glenmorrie Water Company, Arrowood (served by Portland) and Alto Park (served by Portland) will eventually be served by the city. Rivergrove Water District, which is not included in the service area, is served by a system of wells, but also has an emergency tie to the city system.

Currently, Lake Grove buys half of its water from Lake Oswego, while Glenmorrie and Skylands both buy from the city in the summer during the highest water demand. Joel Komarek, water project director for Lake Oswego, said that Glenmorrie and Skylands will have little choice from whom else they may choose to get their water based on proximity, while Lake Grove customers could chose to buy all of its water from Portland in the long run instead.

The city also expects to serve 925 acres of the 3,900-acre Stafford Triangle by 2030, which Metro designated as urban reserve earlier this year — a designation marking the area for future development. Lake Oswego's population projections show a boost in Stafford's population from 1,700 to 2,600 people by 2030. At full buildout, the projection is for 6,900.

In Tigard, the water service area includes the southern two-thirds of Tigard, Durham and King City as well as the unincorporated area of west Bull Mountain. About 20 percent of that area is served by the Tigard Water District, which is separate from the city of Tigard. The northern one-third of the city of Tigard, defined roughly by the boundary of Highway 217, is not included in the service area.

Komarek thinks it's reasonable to expect the growth of Tigard, Stafford along with the annexations of smaller water districts into the city of Lake Oswego.

He pointed out that the city of Lake Oswego's build-out forecasts of Stafford are a lot lower than what Metro is forecasting. Additionally, Lake Oswego is planning on low-density development in the region. If there were more development in Stafford, Lake Oswego would not be able to serve all of the area, said Komarek.

The area would have to be incorporated into the city limits in order for homes and businesses to hook up to the utility.

Komarek estimates that about 2.5 million gallons of the permit would be used in Stafford some day. In Tigard, the Bull Mountain amount is much smaller since there is a lot less land.

In Lake Oswego, developers began paying increased system development charges (SDCs) in January to help pay for system upgrades and expansion. SDCs are one-time fees collected at the time of development. Existing properties do not pay SDCs unless they redevelop. SDCs offset rate increases for water users, by putting the burden of new infrastructure on developers instead of current customers.

In Tigard, the city council voted Tuesday to raise water rates, but has not yet approved SDCs. That is on the agenda, however. SDCs will account for about 40 percent of Tigard's share of the costs.

City of Tigard public works director Dennis Koellermeier acknowledged the methodology for SDCs must assume growth; without any growth the money will not be there to pay for the upgrades.

"I know some people are concerned that we are developing water for the future, but that's what we have to do," said Koellermeier. "This is a 50-year plan. We'd be responsible if we didn't plan for the future."

According to a study done by Washington County, the other alternatives for future water needs in west Bull Mountain are the Tualatin Valley Water District or Beaverton, but the cost would nearly double for both options compared to an \$8 million cost to incorporate into Tigard and its partnership with Lake Oswego

**SIDEBAR/SIDE STORY:** Conservation group worries that the Clackamas River is in danger of being overdrawn

The city of Lake Oswego's water rights are currently being challenged by a river conservation nonprofit, WaterWatch, and the South Fork Water Board, which serves West Linn and Oregon City. The bulk of the arguments center on the issue of maintaining a presence of fish in the Clackamas River, though the heart of the issue is that some feel that Lake Oswego has been granted the right to draw too much water.

In 2000, Lake Oswego applied to have its two Clackamas River water right permits extended until 2040. Of the two permits, only one of them is currently being used. The first permit, which was approved in 1967, allows the city to draw 32 million gallons of water per day. The city is currently using only half of that permit. Lake Oswego's other right, which was approved in 1973, is authorized to draw six million gallons of water. It is not currently using any of this water.

It has been common for municipalities to hold water rights in excess of what they currently plan on developing, and then later "certificate" (state law requires at least 25 percent) of their rights as the need arises. A 2005 law, which froze the pending Lake Oswego permit application until legislation was complete, will now only allow utilities to hang onto unused water rights for 20 years.

South Fork Water board argues that the state did not take into account its seniority in the decision to extend the time on Lake Oswego's water rights. In Oregon, water rights are given a hierarchy based on when the right was given. The oldest water rights have seniority, and more junior rights can be limited in order to assure sufficient water for the senior rights during a dry season. Lake Oswego's right is junior to three rights held by the South Fork Water Board.

WaterWatch argues that the city should not be allowed to develop more water rights than it can use, and that it should have to reapply every time it wants to use more water. WaterWatch contends that the water capacity for the city of Tigard is counted in a number of projects besides the Lake Oswego-Tigard Water Partnership. According to a past interview with WaterWatch, the Oregon Water Resource Department rarely subtracted unused water rights from stream flows before approving new rights, so in a sense it had given away water more than once.

Joel Komarek, director of the water project, said that if the water is needed as expected, Lake Oswego will be able to use it. If it is not needed (and Water Watch is correct), then it will not be used.

An administrative law judge from the Office of Administrative Hearings released his proposed final order on Aug. 3 affirming the state's original decision with modifications.



However, all parties involved in the protest filed an exception to the Water Resources Department ruling in September. The director must consider those exceptions, but there is no time limit on his findings. Once those are released, there is an appeal opportunity. If there is still dissatisfaction, the issue could go directly to appellate court.

— Former Review reporter Lee van der Voo contributed to this article.

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## Pelz, Zach

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**From:** ericjones2009@aol.com  
**Sent:** Monday, January 07, 2013 4:24 PM  
**To:** Pelz, Zach; Ericjones2009@aol.com  
**Subject:** Fwd: Testimony for AP-12-02 and AP-12-04 - Correction to AP-12-03  
**Attachments:** CC\_LO\_67\_Plant\_Acceptance.jpg; Mom\_12-25-2010.jpg; WL\_CC\_LOT\_Appeal\_Testimony\_1-2013.docx

Zach,

I noticed that the second appeal number is AP-12-03, not AP-12-04. Please use this corrected testimony along with the two JPEGs sent earlier and confirm back as requested below. Sorry for the confusion on the second number. It was not on the city page that you sent the link to earlier - only the AP-12-02 was so I erroneously assumed the second number would match the CUP numbers.

Thank you.

Eric Jones

-----Original Message-----

**From:** ericjones2009 <ericjones2009@aol.com>  
**To:** ZPELZ <ZPELZ@westlinnoregon.gov>; Ericjones2009 <Ericjones2009@aol.com>  
**Sent:** Mon, Jan 7, 2013 2:04 pm  
**Subject:** Testimony for AP-12-02 and AP-12-04 - Addition

Zach,

I realized that I did not show my name on page three so I have corrected this oversight and am resubmitting my testimony. I was originally going to submit it as a pdf with a signature but the quality was not acceptable. Please use this second testimony as my *official testimony* and confirm the same three points as requested below.

Thank you.

Eric Jones

-----Original Message-----

**From:** ericjones2009 <ericjones2009@aol.com>  
**To:** ZPELZ <ZPELZ@westlinnoregon.gov>; Ericjones2009 <Ericjones2009@aol.com>  
**Sent:** Mon, Jan 7, 2013 1:52 pm  
**Subject:** Testimony for AP-12-02 and AP-12-04

Zach,

Attached is my written testimony for AP-12-02 and AP-12-04. It is submitted as a Word document and two JPEGs. Please confirm receipt, that you can open them, and that this will all become part of the official record for these two appeals.

Thank you.

Eric Jones

Jay Eric Jones  
4310 Mapleton Drive  
West Linn, OR 97068  
January 7, 2013

West Linn City Council  
22500 Salamo Road  
West Linn, OR 97068

RE: AP-12-02 and AP-12-04

By reference here, I re-submit to the official record my previous written and verbal Planning Commission (PC) testimony concerning CUP-12-02/DR-12-04 & CUP-12-04/DR-12-14 (now before you as AP-12-02 and AP-12-04).

I begin by stating the obvious – the proposed project detailed in AP-12-02 and AP-12-04 does NOT meet the requirements of CDC 60.070 A-1, A-3, and A-7. There is NO real and permanent community benefit, the site is inadequate and inappropriate for fully-mitigated operation of an industrial size water plant in a residentially-zoned neighborhood *surrounded* by residences (from “any adverse effect” as the code requires), and the project is not in full compliance with CDC 55’s development requirements. The application is also inconsistent with the WL Comprehensive Plan and the area’s zoning (R-10). The public involvement process for these applications has been in *non-compliance* with the city council’s goal of promoting meaningful access for citizen involvement throughout the city’s land use process and with state law. Being unable to talk to our elected officials (or the city manager) for over a year (based in part on bogus legal advice from the city attorney – also Tigard’s attorney) left West Linn’s citizenry without any process representation. As it turns out, public involvement *is* allowed with appropriate disclosure by Oregon law. On all of these legally-binding code and process deficiencies alone, both appeals should be denied by this council.

As you know, on August 15, West Linn reaches its 100 year anniversary. We were in the top 100 places in America to live in 2011, according to CNN Money. We have *a lot* to be proud of in our community – *great* people, lots of trees, two rivers, hills, and being a peaceful place to live and raise families. We are in danger of losing this peace because of a project by two cities that have no stake or interest in *our* community’s livability. They are just interested in saving money for themselves, reducing the inconvenience for *their* citizens (not ours), and are fixated upon doing *whatever* it takes to put this project in exactly the place it does NOT belong – in a West Linn residential neighborhood on the most seismically dangerous soils existing in the State of Oregon. A specialist at the state commercial building codes division said “holy cow!” when I told him about the proposed project. He said that in his over 30 years of experience, he had not worked on such a project or even heard of one. Note from the Geotech report that the Class F soils ONLY

have Class E building standards available for a constructed plant; no Class F standards exist. And this does not address the shaking the first pipeline will encounter as it travels under the river and up Mapleton Drive to the plant site and the second one will experience as it traverses Mapleton and Highway 43. The 7.5 earthquake at the Juan de Fuca plate off Alaska this weekend and the September 6.4 British Columbia coast quake prove that the subduction zone is active and a large earthquake off the Oregon coast is very possible *at any time*. In recent months, there has been plate activity near the California border, to the north of Washington, and directly off the Oregon coast. The clock is ticking! The proposed project is NOT in a safe place – in an area surrounded entirely by family and elder-occupied homes.

My mother moved into her home 53 years ago in the spring of 1960, preceding the plant's existence. She was opposed to it in 1967 and still is today. She is now in her mid-80s and has specific health challenges. Much of her money is contained in her home's equity. Being sued by her "good neighbor" (Lake Oswego), she is unlikely to be able to sell her house anytime soon for any reasonable dollar value. And she will be at risk (with about 5 extra minutes of emergency response time) during all the construction on Mapleton. This construction period (3 years) may in fact be a "lifetime sentence" for her; her picture is attached. This is patently unfair for a project that never should have been built in the first place!

The plant doesn't belong in the Robinwood neighborhood and it never has. It was opposed by most living in the area in 1967. The Clackamas County CUP appeal approval by county commissioners was contingent upon Lake Oswego supplying water to Robinwood (see attachment). That has not occurred and is still not happening today. I negotiated with representatives of Lake Oswego and Tigard as part of the Robinwood Neighborhood Association's Great Neighbor Committee for over a year and as part of the Greg McKenzie facilitation process this past summer. I personally witnessed numerous attempts by public officials and their representatives to mislead, misdirect, and ignore the committee's and the neighborhood's efforts to reach reasonable mitigations for the project. A number of problems, errors, and omissions that we found and reported during the process were NOT corrected or updated by the Partnership. Some were addressed somewhat, but not completely. A number of promises were not kept. Although I diligently tried for nearly two years to work with them, I have reached the point where I do not trust the Partnership to be open, forthcoming, and honest. I do not believe that they will keep promises that they make or even follow any conditions of approval to their fullest intent. I am *hugely* disappointed to have reached this point! I never thought I would see collusion and deception by our local governments. We don't need this to be allowed or condoned in anyway in West Linn!! Our PC got it right!

The PC listened to exhaustive testimony from both sides in considering the project. They rendered a well-reasoned decision: the plant and two pipelines (for numerous reasons including a lack of community benefit) do not belong in our Robinwood neighborhood. From all that I saw of the PC members, they were a fair and unbiased group of citizen professionals who listened to all the evidence and then applied the applicable codes to come to a correct decision (7-0 against

both applications). There were no dissenters. As the body that delegates land use decisions to the PC for diligent and thoughtful consideration, you should affirm their well-reasoned and code-based rejections of the applicant's two CUP requests.

I respectfully ask that you reject the appeal for AP-12-02 and AP-12-04. The project is NOT good for West Linn and its citizens, does NOT provide a real and permanent community benefit, and it does NOT meet the relevant codes that we rely on to make our city livable and safe. And the process itself was flawed throughout, thus preventing West Linn's citizens from meaningful access to and involvement in the land use process. Please affirm West Linn's livability as we reach 100 years old and reject the applicant's two appeals. Mom and I are counting on you! Thank you for your consideration of this testimony and of our high quality of life.

Sincerely,

Graduate of WLHS, Class of 1978

7

BEFORE THE BOARD OF COUNTY COMMISSIONERS  
OF CLACKAMAS COUNTY, STATE OF OREGON

CLACKAMAS COUNTY  
PLANNING COMMISSION

APR 11 1967

COUNTY PLANNING COMMISSION  
NO. 14910

In the Matter of the Appeal of the CITY OF LAKE OSWEGO for a water treatment plant to be classified as a Conditional Use on property located on the south side of Kenthorpe Way at its easterly terminus, Robinwood Area

This matter coming on regularly at this time to be heard, and it appearing to the Board of County Commissioners that Deane Seeger, representing the City of Lake Oswego, has made application to the County Planning Commission to construct a water treatment plant as a Conditional Use within an R-1 Single Family Residential District, on property located as stated above, and more particularly described as Tax lots 11-11, 11-12, 11-16, 30, 31, 32, and 33, George Walling D.C.S., Section 24, T2S, R1E, W.M., and

It further appearing to the Board that said application was heard at the regular meeting of the County Planning Commission on February 27, 1967, at which time the Commission denied the Conditional Use request, and

It further appearing to the Board that, subsequent to the Planning Commission's decision, Mr. Seeger, again representing the City of Lake Oswego, did, on the 9th day of March, 1967, file an appeal with the governing body of the County, and

It further appearing to the Board that said appeal application was heard by the Board of County Commissioners, after due notice, pursuant to the provisions of the Clackamas County Zoning Ordinance, at their regular session on Wednesday, April 5, 1967, at which time this matter was continued, and

It further appearing to the Board that subsequent to their afore-mentioned hearing, and after due consideration, the Board reached a decision on the appeal, now therefore,

IT IS HEREBY ORDERED that the appeal of the City of Lake Oswego for a water treatment plant as a Conditional Use on the above-described property be and the same is hereby approved subject to the regulations of the Clackamas County Zoning Ordinance and recommendations of the County Health Department, and (1) adequate landscaping and design so as not to detract from the residential character of the area; (2) and that said treatment plant will provide for the future needs of water users in Robinwood, Glenmorris, Marylhurst and Lake Oswego areas.

DATED this 19th day of April, 1967.

BOARD OF COUNTY COMMISSIONERS

[Signature]  
Chairman

[Signature]  
Commissioner

[Signature]  
Commissioner



**Pelz, Zach**

---

**From:** ericjones2009@aol.com  
**Sent:** Monday, January 07, 2013 4:12 PM  
**To:** Pelz, Zach; Ericjones2009@aol.com  
**Subject:** AP-12-02 and AP-12-03  
**Attachments:** 1967\_appeal\_doc\_from\_Clackamas\_Co 10-12.pdf; JMJ LOT Appeal Testimony 1-13.docx

Zach,

Attached is the testimony from my mother, Jeane M. Jones. Please confirm receipt and that it is added to the official record. Please advise if you have trouble opening the attachment.

Thank you.

Eric Jones



Jeane M. Jones  
4310 Mapleton Drive  
West Linn, OR 97068  
January 7, 2013

West Linn City Council  
22500 Salamo Road  
West Linn, OR 97068

RE: Appeals AP-12-02 and AP-12-03 of CUP-12-02/DR-12-04 & CUP-12-04/DR-12-14

I have lived on Mapleton Drive since 1960 and am writing to oppose the appeal of the Lake Oswego-Tigard Water Partnership's two CUP requests for a water treatment plant and its accompanying pipelines. I opposed the plant when it was first proposed (see attached petition – my signature is on page 8 of the appeal packet). I still oppose it today!

I have specific health issues and needs that will not allow my utilities to be disrupted for protracted periods of time (i.e. 8 hours a day for weeks to move the water line). The bulk of my retirement money is in my home's equity. Right now, Lake Oswego is suing me and my neighbors over residential structure-only covenants that I count on to maintain my neighborhood's livability. Lake Oswego bought into these covenants – in 1989 and 1995. They have the same responsibility to live up to what they agreed to when they purchased their property as I do. They should not be suing me and my neighbors, forcing us to pay to retain an attorney. They have insulted us by offering \$1000 for waiving our covenant rights. Lake Oswego has not played fair or treated me and my neighbors like "good neighbors" despite their claims to the contrary. I don't need the stress of this fight at this point in my life. I have earned some peace!

Many of my good neighbors (like Mary Hill and Bob Rowning) agree with my position against the monstrosity of this project. I won't have any peace for three years during the construction, my utilities will be turned off and on, my house and property may suffer damage (i.e. cracks, pipe breakages, and potential water damage) from the project, and I can't even consider selling my home for a reasonable profit while this process and the lawsuit are underway. The project does not meet the requirements of the CDC 60.070 A nor of common sense. This plant does not belong where it is – in a residentially-zoned area of our city.

My son and I have worked hard to battle this project and protect our neighborhood's livability, property values, and peaceful nature. Please reject the two appeals before you and maintain West Linn's high quality of life and our livability. Thank you.

Sincerely,  
Jeane M. Jones

12332

CW13-67

21E 24BD 300

*Decision Appealed  
& Reversed by Commissioners  
Treatment plant therefore  
was approved.*

March 6, 1967

City of Lake Oswego  
City Hall  
40 "A" Avenue  
Lake Oswego, Oregon

Gentlemen:

This is to advise you that at the regular meeting of the Clackamas County Planning Commission, Monday evening, February 27, 1967, your application for permission to construct a water treatment plant as a Conditional Use on property described as Tax Lots 11-11, 11-12, 11-16, 30, 31, 32 and 33, George Walling D.L.C., Section 24, T2S, R1E, W.M. was presented and carefully studied.

The Commission considered all the facts and evidence presented at the meeting, and subsequently voted to deny your request on the basis that the proposed use would be incompatible with the overwhelming single family residential character of the area and thus could well be adverse to the general welfare of the community as attested to by many residents of the district.

All correspondence and opinions orally expressed to the Commission were given careful consideration before a decision of denial was reached.

Pursuant to the Clackamas County Zoning Ordinance, Section 13, a Conditional Use application denied by the Planning Commission may be appealed to the governing body of the County within fifteen (15) days of the date of such denial, and shall be in writing and filed with the Planning Commission. (Appeal forms are available in the Planning office upon request.)

If you have any questions concerning this matter, please contact this office.

Sincerely,

CLACKAMAS COUNTY PLANNING COMMISSION

DEVAL E. MCKEEL  
Zoning Administrator

DEM:ft

cc: Board of County Commissioners

Persons responding (See attached list (8) )

19050 S. Nixon Ave.  
Lake Oswego, Oregon  
April 3, 1967

Clackamas County Board of Commissioners  
Oregon City, Oregon

Dear Sirs:

This letter is written in reference to the City of Lake Oswego's appeal for a conditional use for a water treatment plant on Kenthorpe Way. As the appeal is at 10 A.M. April 5, most residents of the Robbinwood area are unable to attend the hearing but feel as I do about the proposed installation. This feeling is reflected in the signatures on the petition presented to the Planning Commission on February 27, 1967. The decision of that body was just and correct and in keeping with the projected residential and commercial character of our small but proud area.

This planned development was done in conjunction with the Planning Commission and the Robbinwood Community Club as a cooperative effort to prevent unsightly structures from cluttering the community. There was no attempt to restrict commercial progress as areas have been designated for this purpose. The West Lynn School District has followed this pattern as has the Robbinwood Water District with its office and fire station. These are a part of our community. The proposed plant is not. The Planning Commission has demonstrated the same opinion.

In our county as in others the trend is toward promoting the annexation of areas such as ours if incorporation is not feasible and this may be in the best interest of all. But there are certain rights these unincorporated, unrepresented areas do have - one of these is to be accorded equality with the larger, more powerful, and more articulate cities that exert an undue pressure when they have desires to be gratified.

Lake Oswego has turned down many similar zone changes within their city and continue to do so. Lake Oswego has land within its city limits on which to build this plant. Lake Oswego had no plans for water transmission from Kenthorpe to Oswego on the Feb. 27 hearing by admission of the engineer-designer when I questioned him. Elaborate plans were made with Gladstone but evidently none with the County concerning Robbinwood. One can only assume they will plow through where they wish or lay it along the river and ruin our waterfront property. On March 28 Lake Oswego project engineer Kenneth Biehlman indicated that the site acquisition had been only delayed and that they hoped to call for bids on schedule. Does Lake Oswego already know the decision of the Clackamas County Commissioners? There is no attempt here to question the integrity of any of the bodies or persons mentioned herein but I do question the motive for the placement of the three story concrete and steel treatment plant that is unquestionably a totally nonconforming structure.

Sincerely,  
*Charles F. Hill*  
Charles F. Hill

RECORDED  
APR 11 1967  
CLACKAMAS COUNTY BOARD OF COMMISSIONERS

*11-5-67*  
*Hester*

*Paul R. M.*  
27 Feb 67  
320  
281  
SIGNERS  
SIGNERS

P E T I T I O N

TO THE CLACKAMAS COUNTY PLANNING COMMISSION  
AND/OR THE COUNTY COURT

---

We, the under-signed of the Robinwood Cedar Oaks Park Area protest the request for a conditional use within a residential zone for the construction of a water treatment plant for the city of Lake Oswego for the following reasons:

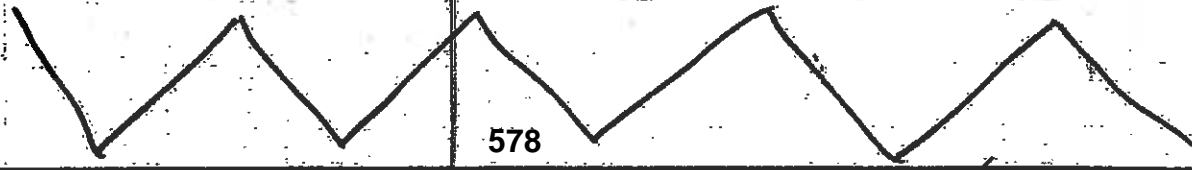
1. It would destroy the beauty of our suburban surroundings.
2. It would ruin twelve homes and potential residential property.
3. It would be a mosquito menace.
4. There would be an objectional odor.
5. The noise from such a plant would be objectionable.
6. We would receive no benefit whatever from such a plant.
7. We have no voice in Lake Oswego's civic or political affairs.
8. We are absolutely against any change of zoning, even conditional.

Leisl V. Brinkley	3888 S. Kenthorpe Way
Vivian C. Brinkley	3888 S. Kenthorpe Way
Byron B. Woodard	3979 S KENTHORPE WAY
Doraa Woodard	3979 S. Kenthorpe Way
Doris Ellis	4388 S. Kenthorpe Way
M. C. Ellis	4388-S-Kenthorpe way
Alma L. Fagg	4388 S Kenthorpe Way
A. King	4257 S Kenthorpe way
Emilia King	4257 S. Kenthorpe Way
Richard F. Murphy	4160 SW Kenthorpe way
Maria D. Murphy	4160 S.W. Kenthorpe Way
Audrene J. Bell	4040 Kenthorpe Way
Troy S. Bell	4040 Kenthorpe Way
John Kargianis	4428 S. Kenthorpe Hwy
William Kargianis	4428 S. Kenthorpe way
Pietu Tjaden	4445 S Kenthorpe Way
Marlyp Tjaden	4445 S. Kenthorpe Way
Richard H. Wanke	3606 S. Kenthorpe Way
Annette M. Wanke	3606 S. Kenthorpe Way
Gertrude M. Campbell	3611 S Kenthorpe Way
Ernest Campbell	3611 Kenthorpe Way
May A. Olive	3878 S Kenthorpe Way
Baby Calandra	3878 S Kenthorpe Way
Julius A. Larsen	3708 S. Kenthorpe Way
Lo H. Blackison	4107 S Kenthorpe way
Mary Lou Danner	3753 S. Kenthorpe Way
E. Bruce Danner	3753 S. Kenthorpe way

NAME

ADDRESS

- |                       |   |
|-----------------------|---|
| 1 Mary M. Hill        | 19050 S. Nixon Ave Lake Oswego          |
| 2 Charles F. Hill     | 19050 S. Nixon Ave Lake Oswego          |
| 3 Martha M. Hastings  | 18717 S. Midhill Drive, Lake Oswego     |
| 4 Martha L. Maxam     | 18891 S. Mitchell Dr., Lake Oswego      |
| 5 La Verne Blake      | 4412 S. Mapleton Dr Lake Oswego         |
| 6 O.C. Rasmussen      | 18730 S. Nixon Lake Oswego              |
| 7 Carson F. Heddle    | 18675 S. Nixon Lake Oswego              |
| 8 Norma R. Heddle     | 18675 S. Nixon Lake Oswego              |
| 9 Eleanor J. Bothen   | 18320 S. Nixon Lake Oswego              |
| 10 Mary J. [unclear]  | 18320 S. Nixon Lake Oswego              |
| 11 [unclear]          | 18333 So Steady Bury Way - Lake Oswego. |
| 12 Frank M. Carpenter | 18393 S. Steamboat Way, Lake Oswego     |
| 13 Ralph E. [unclear] | 18400 S. Nixon Ave, Lake Oswego         |
| 14 Patricia [unclear] | 18444 S. Nixon Ave, Lake Oswego         |
| 15 Charles Stoddard   | 18444 S. Nixon Ave Lake Oswego          |
| 16 Margaret Byrne     | 18400 S. Nixon Ave. Lake Oswego         |
| 17 Oliver L. Woodrum  | 18340 S. Nixon, Lake Oswego             |
| 18 Dorothy A. Woodrum | 18340 S. Nixon, Lake Oswego             |
| 19 [unclear]          | 18406 S. Nixon Lake Oswego              |
| 20 [unclear]          | 18480 D. Nixon Lake Oswego              |
| 21 [unclear]          | 18480 S. Nixon - Lake Oswego            |
| 22 James P. Wilman    | 18480 S. Nixon, Lake Oswego             |
| 23 Gordon Pabolo      | 4040 S. Glen Terrace, Oswego            |
| 24                    |   |
| 25                    |   |



Richard J. Smith	3714 S. Mapleton Drive
Mrs. Richard T. Smith	- 3714 S. Mapleton Dr. - Lake Oswego
Mr. Ronald R. Swain	- 19556 S. Pacific Hwy, Lake Oswego
Mr. Ronald R. Swain	" " " " " "
Mr. R. J. Wigg	3673 So Mapleton - Lake Oswego
Mrs. R. J. Wigg	" " " " " "
Margie C. Daily	3701 S. Mapleton Dr. Lake Oswego -
Clyde R. Daily	" " " " " "
Beverly E. Brown	3708 S. Mapleton Dr, Lake Oswego
Dorwood Brown	" " " " " "
Kenneth Bilgen	3711 S Mapleton Dr, Lake Oswego
Carol Bilgen	" " " " " "
Ruth E. Rukuba	3757 S. Mapleton Dr. Lake Oswego.
Kenneth Summerville	3777 S. " " " " " "
Lucille Summerville	3777 S. " " " " " "
Mildred W. Locher	4305 S. Mapleton Dr. Lake Oswego
M. B. Locher	4305 S. Mapleton Dr. Lake Oswego
Jerry L. Bullock	3820 S. Mapleton Dr. Lake Oswego
Pat H. Bullock	3820 S. Mapleton Dr. Lake Oswego
Emma C. Kosta	3960 S. Mapleton Dr.
Alfred Kosta	3960 S. Mapleton Dr.
Lida B. Jones	3951 S. Mapleton Dr. L.O.
Maynard L. Christensen	3990 S. Mapleton Dr. L.O.
Vera E. Christensen	3990 S. Mapleton Dr. L.O.
R. E. Rowing Jr.	4025 S. Mapleton Dr. L.O.
Muriel R. Rowing	4025 S. Mapleton Dr. Lake Oswego



Virgil M White 4120 South Mapleton Drive  
 Jeanne M. Jones 4310 S. Mapleton Drive  
 Glenn L Stone 4245 S Mapleton Dr Lake Oswego  
 Jean K. Stoney 4245 So. Mapleton Dr Lake Oswego  
 Lynn Lu White 4120 S. Mapleton Dr. Lake Oswego  
 Erna J. Nelson 4226 S. Mapleton Dr Lake Oswego  
 Harold E. Nelson 4226 S. Mapleton Dr. Lake Oswego, Ore.  
 Robert C. Thorington 4284 S. Mapleton Dr. Lake Oswego, Ore.  
 Dellamay Thorington " " " " " "  
 Hannah J. Schmidt 4315 " " " " " "  
 Lois J. Schmidt " " " " " "  
 E. V. Olson 4620 " " " " " "  
 Geraldine C. Olson 4020 S. Mapleton Dr. Lake Oswego  
 Douglas G. Jones 4682 S. Mapleton Dr.  
 Cecilia M. Jones " " " "  
 Norma Jean Schmidt 4117 S Mapleton Dr. Lake Oswego Ore  
 Alton Schmidt " " " " "  
 Hulma Stewart 4451 So. Mapleton Dr. Lake Oswego  
 Harry J. Blake 4412 S. Mapleton Dr Lake Oswego  
 Edgy Leathersberg 4322 S. Mapleton Dr. Lake Oswego  
 Lester Leathersberg 4322 S. Mapleton Dr. Lake Oswego, Oregon.  
 Julia A. Post 3963 S. Mapleton Dr. Lake Oswego, Ore  
 Mary K. Eskridge 20182 S. Old River Lake Oswego, Ore.  
 David V. Eskridge 20182 S. Old River Drive Lake Oswego Ore.

Robert T. Soper	3315 So. Walling Way
Merna V. Soper	3315 S. Walling Way
Robert T. Soper	3314 S. Williams Way
Hermana R. Murray	3314 So. Walling Way
Yvonne Bennett	3320 S. Walling Way
Lurwood Bennett	3320 S. Walling Way
Essex O. Meehan	3364 S. Walling Way
Harry B. Meehan	3364 S. Walling Way
Mary L. Rowinski	3424 S. Walling Way
Dan Rowinski	3424 S. Walling Way
Beverly Kestek	3435 S. Walling Way
Raymond Kestek	3536 S. Walling Way
Robert E. Green	3499 S. Walling Way
Jean M. Green	3499 S. Walling Way
John Hartmann	18888 South Walling Circle
Jean Hartmann	" " " "
Marta A. Bryant	18891 S. Walling Circle
Mary M. Krellwitz	18909 S. Walling Circle
Grace E. Dichtel	18950 S. Walling Circle
Robert D. Dichtel	" " " "
Mallory Paul	18993 S. Walling Circle
Angie Pond	" " " "
Luth Hillis	19023 S. Walling Circle
Murdell B. Hillis	" " " "
Helen M. Ditter	19055 S. Walling Circle
Lillian M. Bailey	19055 S. Walling Circle

NAME	ADDRESS
Eugene L. Phipps	4064 S. Glen Terrace Way
Mrs. A. Fabert	3593 S. CHEROKEE CT.
Mrs. Henry A. Fabert	3593 S. Cherokee Ct.
Harvey A. Hanson	4084 S. Cedar Oak Dr.
Mrs. Landon Hanson	3969 S.W. Ridgewood Way
Albert B. Krist	3780 S. Cedar Oak Dr.
Mrs. Albert B. Krist	3780 S. Cedar Oak Dr.
O. L. Hampton	3801 S. Cedar Oak Dr.
Mrs. O. L. Hampton	3801 S. Cedar Oak Dr.
O. L. Hanson	3893 S. Cedar Oak Dr.
Thyllis C. Hanson	3893 S. Cedar Oak Dr.
Mrs. E. L. Shappell	4044 S. Cedar Oak Dr.
Chas. Robert	19015 Trillium Way
Flourne Robertson	19075 S. Trillium Way
John S. Howard	19895 S. Old River Dr.
Raymond B. Gibbon	19308 S. Middle Hill Dr.
Reynolds Howard M.	3056 S. LAZY RIVER WAY.
Robert F. Miller	3680 S. Mapleton Dr.
Harold L. Scfield	4030 S. Calypso Circle
Marlene E. Miller	3680 S. Mapleton Dr.
Neoma M. Phipps	4064 S. Glen Terrace Way
Eugene R. Shappell	4044 S. Cedar Oak Dr.
Jeanette M. Hamel	19260 S. View Dr.
Judy Roberts	4040 S. Glen Terrace Way
Kenneth Cole	3855 S. CEDAR OAK DR.

NAME

ADDRESS

Esther A. Colise	3855 S. Cedar Oak Park Lake Oswego
Marian B. Lachey	4142 S Cedar Oak Dr Lake Oswego
Dorothy M. Lachey	4142 S. Cedar Oak Dr. Lake Oswego
Blair Nicholas	4194 S. CEDAR OAK DR., LAKE OSWEGO
Betty Nicholas	4194 S CEDAR OAK DR. LAKE OSWEGO
Anna H. Fleishman	4206 S Cedar Oak Dr. Lake Oswego
Otis F. Fleishman	" " " "
Mrs Ruth Eiselle	4242 Terra Vista Ct. L.O.
Orca E. Eversmann	4299 S. Terra Vista ex L.O.
Winifred E. Eversmann	4299 S. Terra Vista Ct. L.O.
E. G. West	4394 S. Cedar Oak Dr.
Clare Williams	4424 S. CEDAR OAK DR.
Louise Williams	4424 S. Cedar Oak Dr. L.O.
Mrs & Mrs. R. C. Bailey	19016 S. Marshall Dr. L.O.
Denny Haino	4084 S. Cedar Oaks Drive
Stanley G. Gage	4114 S. Palaeopteral
Martin & Eael	4242 Terra Vista Ct L.O.
Oh. McKinney	4488 - S Cedar Oaks Dr.
Mrs O. J. McKinney	" " " "
Donna Polypine	4552 Cedar Oak Dr.
Palma Hamersley	18901 S. Trillium Way, L.O.
R. L. Thom	18888 Trillium Way L.O.
Noel A. Thom	18888 Trillium Way L.O.
Mike Buckley	18811 Trillium Way L.O.
Jeanette Buckley	18811 Trillium Way L.O.

1925

NAME

ADDRESS

Hazel E. Grangier	2766 S. Maylhurst Dr. Lake Oswego, Ore.
Robert L. Koch	19595 S <del>Thorn</del> View Dr.
<del>William J. Koch</del>	19595 S View Dr.
Robert M. Langiers	19586 S View Dr.
Maurice C. Langiers	19586 S View Drive Lake Oswego, Ore.
Dorothy A. May	19468 S. Midhill Dr. Lake Oswego.
Joseph E. Hamel	19260 S View Dr. L. Oswego
Phyllis Cooper	2615 S. Robinwood Way. L. Oswego.
Dora Overson	19612 S. Midhill Drive L. Oswego
Bonnie Rothgeb (with exception of 8)	19735 S. Midhill Dr. L. Oswego
<del>Frank J. Green</del>	2615 S. Maylhurst Dr. Lake Oswego
Meda M. Venable	2622 S. MAYLHURST DR. LAKE OSWEGO
Jesse Kregel	2757 S. Maylhurst Dr. Lake Oswego
Marilyn Fugate	2757 S. Maylhurst Dr. " "
Frank C. Lore	19611 S. View Dr. Lake Oswego, Ore.
Lorraine A. Glass	" "
Ida Schmidt	19512 S. View Dr. L. Oswego, Oregon
Luz & Julia Lelina	19515 S. View Dr. Lake Oswego
Elmer O. White	19540 S. View Drive Lake Oswego
Lulu Mathis	19477 S. View Drive Lake Oswego
Helen King	19464 S. View Dr. Lake Oswego
Robert L. Milson	19426 S. View Dr. Lake Oswego
Allen E. Wilson	" "
Barol D. Heiser	19275 S. Midhill Dr. L. Oswego
Dale A. Heiser	19275 S. Midhill Dr. L. Oswego

## NAME

## ADDRESS

Mrs. Walter O'Donnell	19192 S. Midhill Drive, Lake Oswego
Thomas E. Miller	19166 S. Midhill Dr. Lake Oswego
Alice M. Miller	19166 So Midhill Dr. Lake Oswego
Mrs. Estelma Maddox	19143 So. Midhill Dr. Lake Oswego
Elmer C. Maddox	19143 So. Midhill Dr. Lake Oswego
John H. O'Connell	19192 So. Midhill Dr. Lake Oswego
Dana R. Roberts	19178 So Midhill Dr Lake Oswego
Marnett Roberts	19178 S. Midhill Dr, Lake Oswego
Margie Steffey	19088 S Midhill Dr, Lake Oswego
Thelma Hicks	19044 S Midhill Dr, Lake Oswego
Mrs. Herb R. C. Bailey	19016 S. Midhill Dr " "
George Parsons	2108 S Marywood Dr Lake Oswego
Anne E. Parsons	" "
Roy B. Bland	19535 South View Drive Lake Oswego
Stella F. Fuzer	18725 S. Oak, Hwy. Oswego
* Alice Richmond	19309 S. Midhill Drive, L.O.
Melba Mack	19477 S View Drive
Vivian Dinger	19469 S View Dr Lake Oswego Ore
Edward E. White	19240 S. View Dr. Oswego, Ore.
J. J. Schmidt	19512 S. View Dr Lake Oswego Ore
Irene F. Hoffman	19888 S View Dr Lake Oswego Ore
Richard S. Hoffman	same
Dean C. May	19468 S. Midhill Dr. Lake Oswego Ore.
Joseph Praeger	19625 S. Midhill Dr. Lake Oswego Ore
Sonny Grayney	19625 S. Midhill Dr. Lake Oswego

<u>NAME</u>	<u>Address</u>
1 Mrs. David E. Weht	18718 So. Rowway
2 Mrs. Robert A. Baynes	18652 S. Rowway
3 Mrs. Anna M. Mohr	3344 S. Fairview Way
4 Mrs. Kathleen Hamblin	3316 S. Fairview Way
5 Mrs. Judy Moore	18747 S. Rowway
6 Mr. Grady Johnson	3262 S. Fairview Way
7 Gande Jarbutter	3220 S. Fairview Way
8 Mildred P. Jarbutter	3220 S. Fairview Way
9 Bruce B. Kayser	3215 S. Fairview Way
10 Robert H. Williams	3176 S. Fairview Way
11 Yvonne Williams	3111 S. Fairview Way
12 Roger C. Johnson	18530 S. Vista Court
13 Barbara Johnson	" " "
14 Robert L. Weber	18525 S. Vista Court
15 Maria J. Weber	18525 S. Vista Ct.
16 Rosemarie Westwood	18485 S. Vista Ct.
17 Lawrence L. Knapp	18455 S. Vista Ct.
18 Marie S. Knapp	18455 S. Vista Ct.
19 Carolyn Whitcraft	18460 S. Vista Ct.
20 S. G. Whitcraft	18460 S. Vista Ct.
21 Jack Sinner	3204 S. Fairview Way
22 Naomi Bruner	"
23 Elizabeth Ann Rose	"
24 Robert N. Rose	"
25 Louise M. Kayser	3215 S. Fairview Way - Cave
26 Marie Patrick	3611 S. Ridgewood Way

NAME	address
Jan Johnson	19386 SW. View Dr. Oswego, Or.
Elmer O. Ranning	19412 S View Drive Lake Oswego
Marnett Ranning	19505 S. Midhill Dr. Lake Oswego.
Helen M. Parvizi	" " " " " "
George F. Miller	19585 S. Midhill Dr. Lake Oswego
Helen J. Miller	19634 S. Midhill Dr. Lake Oswego
Charles R. Reaney	19634 S Midhill Dr. Lake Oswego
Betty Reaney	2716 S O Robinwood Oswego
Weldon E. Chamberlain	2716 S. Robinwood way Lake Oswego
Jane E. Chamberlain	19663 S. Midhill Lake Oswego
Judith M. Farrell	" " " " " "
John Buckley	18882 S. Midhill Dr. Lake Oswego
Norman E. Foley	18933 S. Midhill Dr. " "
Bice M. Russell	18754 S " " " "
Patricia Russell	18687 S. Midhill Dr. Lake Oswego
Sandra A. Good	18687 S. Midhill Dr. Lake Oswego
David S. Good	18787 S Trilium Way
Jean Douglas	18787 S Trilium Way
J. H. Douglas	20240 S Old River Dr.
	20240 S. Old River Dr.



NAME	Address
<del>Mrs</del> Mrs D. C. Beier	19888 S. Old River Dr - Lake Oswego
Mr. D. C. Beier	19888 S. Old River Dr. Lake Oswego
Frank C. Cochell	19844 S. Old River Dr. Lake Oswego
Jeanne Cochell	19844 S. Old River Dr. L.O.
Diane W. Warner	19079 S. Old River Dr. Lake Oswego
Gay V. Cardiff	19775 S. Old River Dr. Lake Oswego
Georgie F. Cardiff	" " " " " "
James Black	19728 S. Old River Dr. Lake Oswego
Mary M. Black	19728 So Old River Dr. Lake Oswego
George J. Black	19930 S. Old River Dr. Lake Oswego
Edna D. Black	19930 S. Old River Dr. Lake Oswego
Ellen C. Black	19930 S. Old River Dr. Lake Oswego
Georgiana Stark	19930 S. Old River Dr. Lake Oswego
Mark A. Lachy	20024 So. Old River Dr. Lake Oswego
Cherie L. Lachy	20024 S. Old River Dr. Lake Oswego
Louis Cordeiro	3787 S. Ridgewood Way Lake Oswego, Ore.
Rhulma R. Miller	3787 S. Ridgewood Way Lake Oswego, Oregon
Doris J. Poppel	3753 S. Ridgewood Way Lake Oswego
Herman K. Poppel	3953 S. Ridgewood Way Lake Oswego
D. E. Walsh	3737 S. Ridgewood Way Lake Oswego
Laurie Walsh	3737 S. Ridgewood Way Lake Oswego
Jedoth	3716 S. Ridgewood Way, Lake Oswego
Janice Scott	3716 S. Ridgewood Way, Lake Oswego
Flarence Riehl	19522 So. Old River Dr. Lake Oswego
J. T. Riehl	19522 S O OLD RIVER DR LAKE OSWEGO

NAME	address
Robert Menger	19717 S. OLD RIVER DR. L. O.
Larry E Hill	19484 S. Old River Drive Lake Oswego
Mary S. Hill	19484 S. Old River Dr. Lake Oswego
Hilda Edmonston	19477 S. Old River Dr. Lake Oswego
Milton Edmonston	19477 S. Old River Dr. Lake Oswego
Mrs Rowning	19445 S Old River Dr Lake Oswego
John Mary Rowning	19445 S. Old River Dr. L. Oswego
Marjette Thomas	19430 S Old River Dr. L. Oswego
Margaret S. Thomas	" " " " " 14
John D. Dierbach	19085 S. Old River Drive Oswego
John S. Dierbach	19085 S. Old River Dr. Lake Oswego
Charles M. James	19970 S. Old River Dr. Lake Oswego
Constance K. James	19970 S. Old River Dr. L. Oswego
David W Dadds	18931 S. OLD RIVER DRIVE, LAKE OSWEGO
Irene M. Dadds	18931 S. Old River Dr. Lake Oswego
H. H. Foster	19136 S. Old River Dr. Lake Oswego,
Joan K. Foster	19136 S Old River Dr. L. Oswego,

NAME

ADDRESS

R. H. Chirchew

18819 S. Midhill Dr.

Helen Chirchew

" " " "

Sharon Becker

18777 S. Midhill Dr.

Larry Kitzel with exception  
of no. 8.

19735 S. Midhill Dr.

Ladise McDermott

19767 S. Midhill Dr.

Barbara McKelam

18250 S. Pac. Hwy.

Boyd Kessore

18350 S. Pacific Hwy. except # 8

PCU-13-67

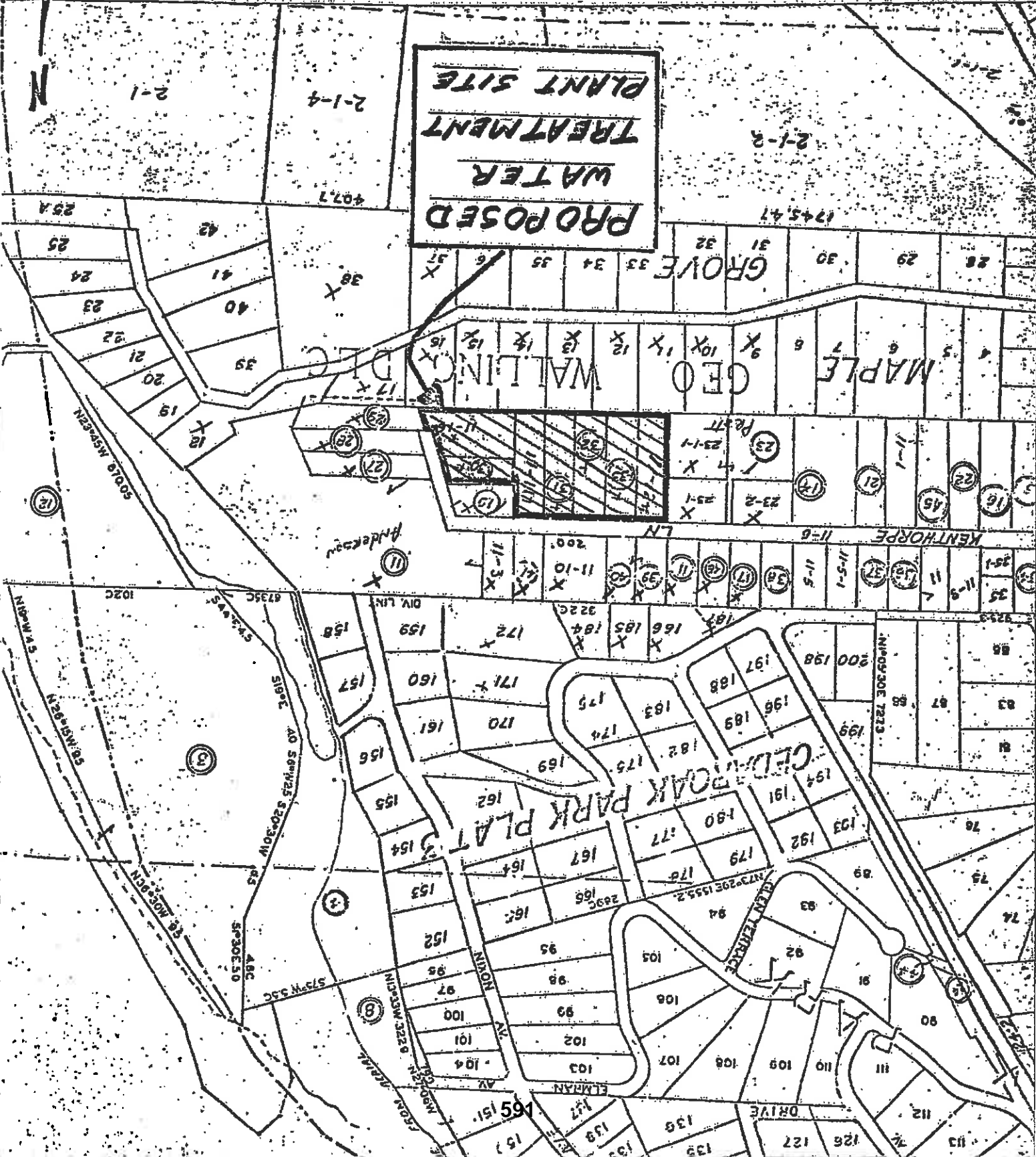
CITY OF LAKE OSWEGO

LOCATION: SEC. 24 T2S. R1E

GEO. WALLING D.L.C.

SCALE: 1"=400'

COPIES



RECOMMENDATION

FILE NUMBER: POU-13-67

APPLICANT: City of Lake Oswego

STAFF RECOMMENDATION: The Staff recommendation is to deny this application.

BASIS:

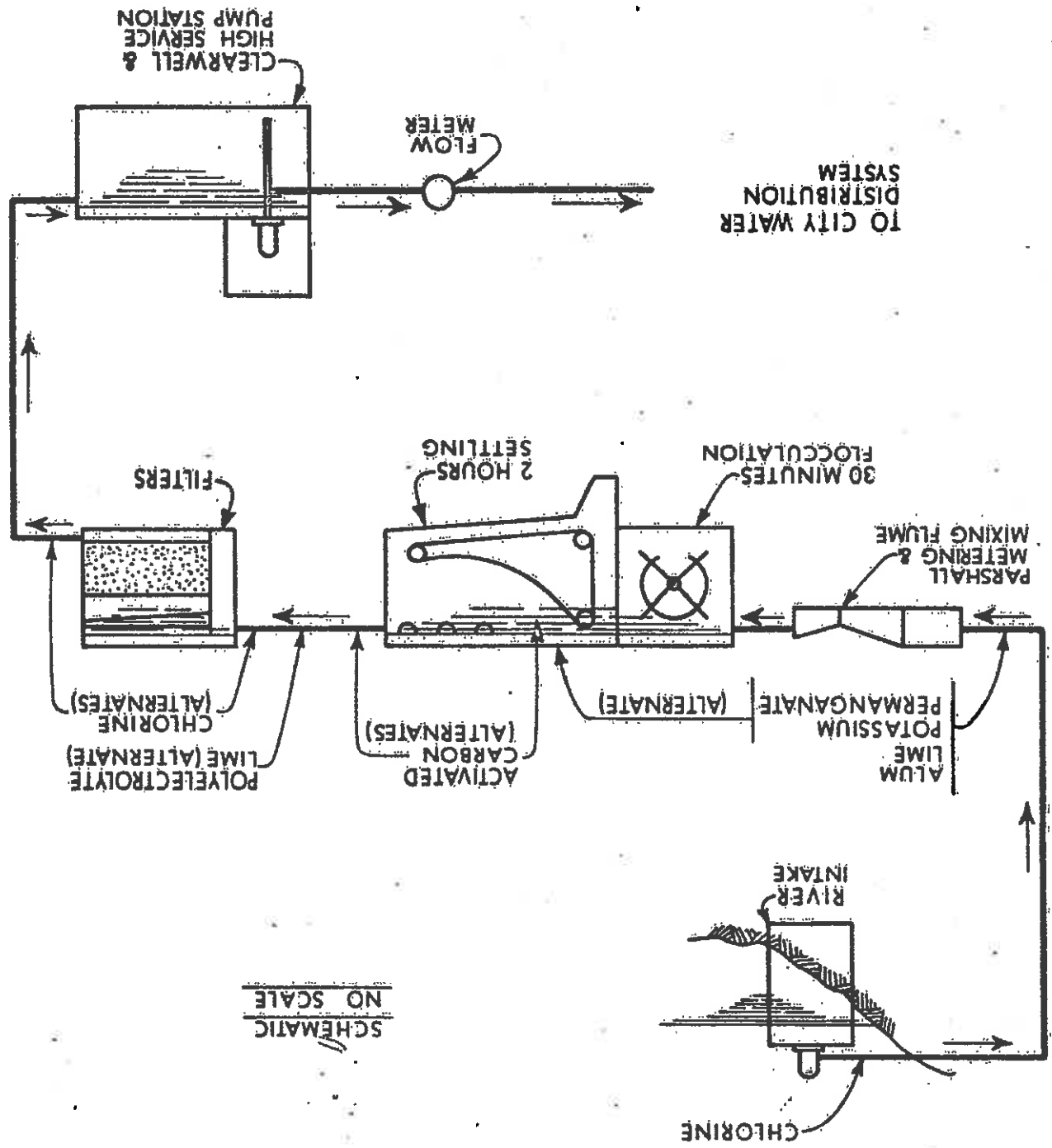
The proposal is for a plant to treat water taken from the Willamette River, presumably for use in the City water system. It is a three-story building proposed in an area of single family dwellings on small-to-medium sized lots. A water treatment plant seems to be an incompatible use in this area which would lower property values of the existing property owners and preclude any further development. The possibility exists, in uses of this type, of objectionable noise and odor.



CORNELL, HOWLAND, HAYES & WERRYFIELD  
ENGINEERS - CONSULTANTS

# CITY OF LAKE OSWEGO, OREGON WATER TREATMENT PLANT FLOW DIAGRAM

EXHIBIT "D"  
FIGURE 1



SCHEMATIC  
NO SCALE



SCALE: 1" = 100'

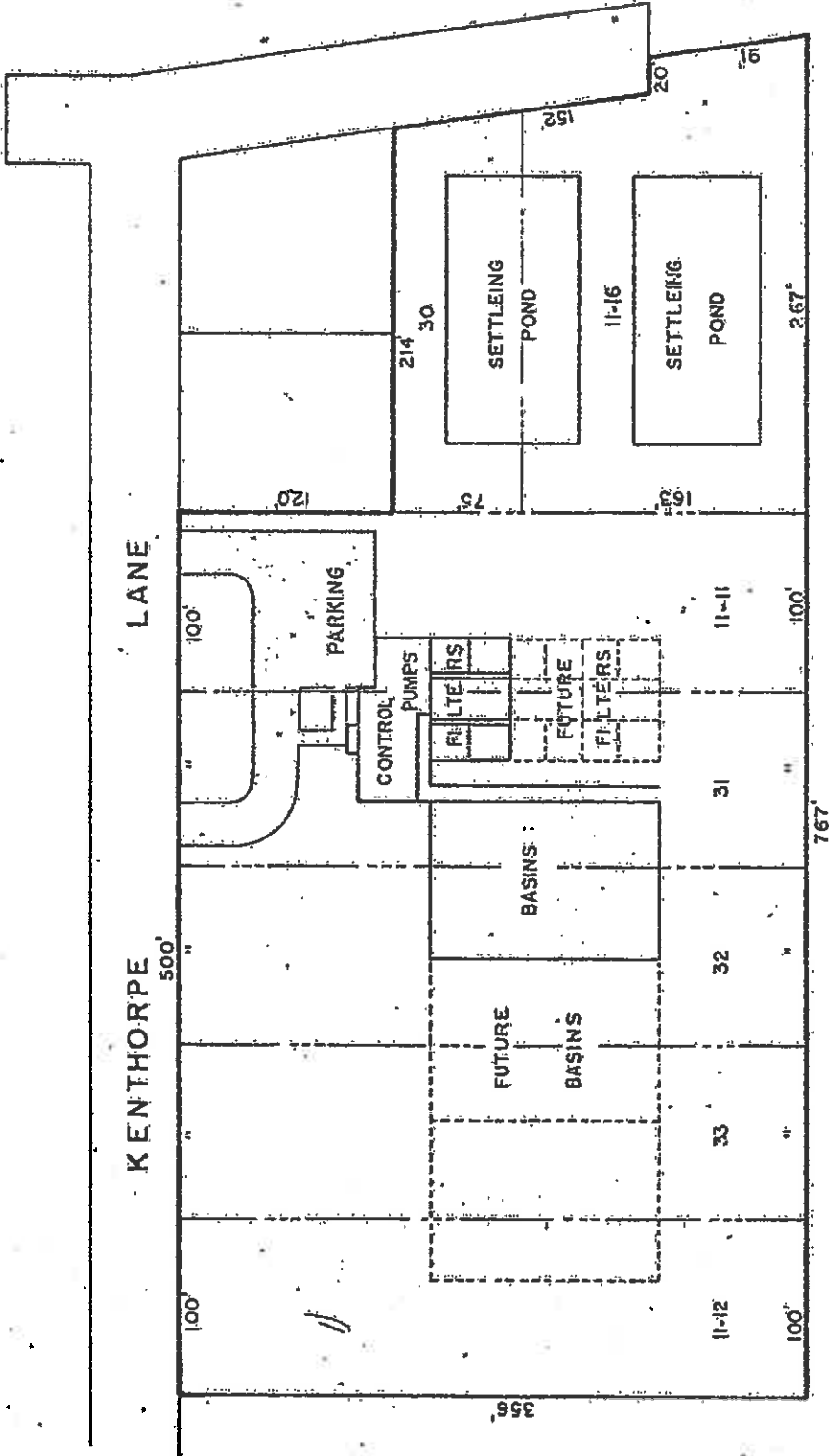
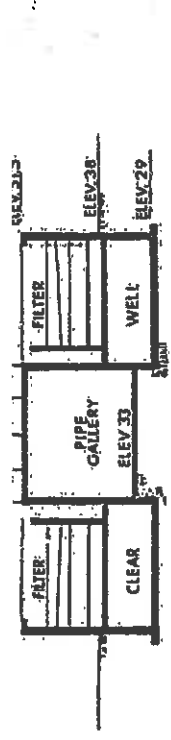
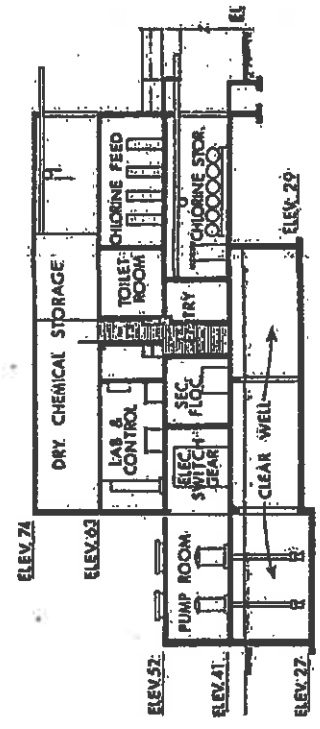


EXHIBIT "B"

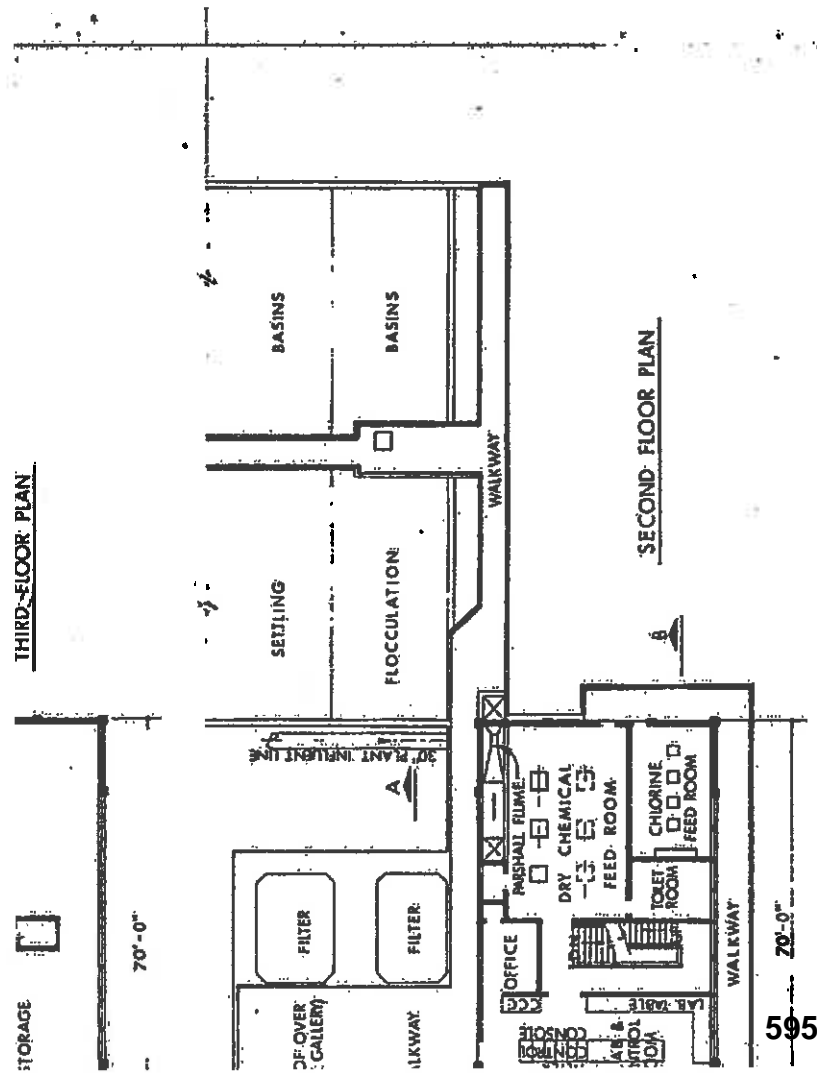
CITY OF LAKEOSWEGO, ORE.  
 WATER TREATMENT PLANT  
 SITE PLAN



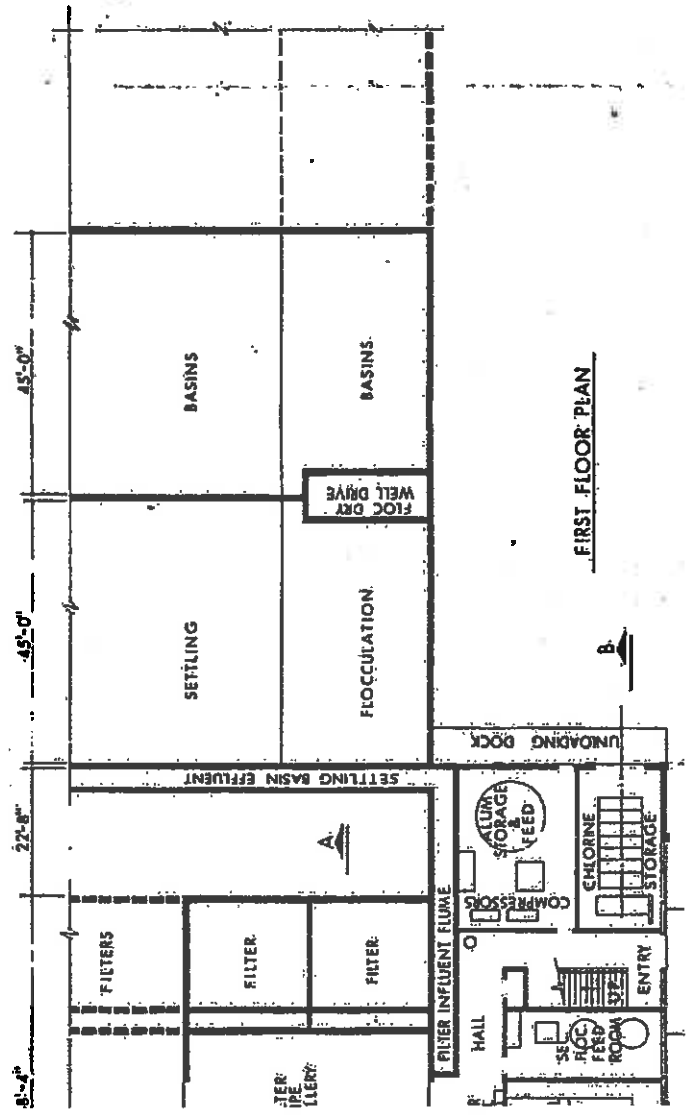
SECTION A-A



SECTION B-B



THIRD-FLOOR PLAN



FIRST FLOOR PLAN



Commission

RESIDENTIAL

R-10, SFD

APPLICANT OR 965

CONDITIONAL USE

A. PRESENT ZONE: WATER TREATMENT PLANT  
B. PROPOSED USE: STAFF MEMBER: [Signature]

DATE OF HEARING: 2-27-67

REQ. NO. PC-1426 Fee: 25.00

C. Name of Applicant: City of Lake Oswego, Oregon Phone: 636-8495

Address: City Hall, 40 "A" Avenue, Lake Oswego, Oregon 97034  
Legal Owner: ( ) Contract Buyer: ( ) Option Holder: ( ) Agent: ( )

D. Who holds the Title to the property? See Exhibit "A"  
Name \_\_\_\_\_ Address \_\_\_\_\_

If you do not hold the Title to the Property, what is your interest? City negotiating for acquisition of land

E. Number and Street: Kenthorpe Lane Between Old River Rd. and Easterly Terminals of Kenthorpe

F. Tax Lot 11-111 11-12:11-16: 30: Section 24 T 2 South R 1 East D/C Geo. Walling D/C 343 324 33:

G. Size of Lot is: See Exhibit B Total Area: 5.4 Acres

ALL CONTIGUOUS PROPERTIES UNDER SAME OWNERSHIP:

Tax Lot \_\_\_\_\_ Section \_\_\_\_\_ T \_\_\_\_\_ R \_\_\_\_\_ D/C \_\_\_\_\_  
Block \_\_\_\_\_ Addition \_\_\_\_\_

Size of Lot is \_\_\_\_\_ X Total Area: \_\_\_\_\_

H. State in detail specific conditional use requested (if necessary, attach additional pages) Requesting conditional use for the construction operation and maintenance of a Municipal Water Treatment Plant

Type, Size and Use of all proposed structures: See Exhibits "B" through "H"

Total number of People to use water and Sanitary Facilities: 3 persons

Square feet of Drainage area available: See Exhibit "B"

Parking Provisions-Square Feet available: See Exhibit "B"

Future Expansion Plans: See Exhibit "B"

Type, Size, Use and Disposition of all Existing Structures (Indicate on plot plan Structures to remain): None

I certify that the above information is true and accurate to the best of my knowledge. City of Lake Oswego

Signature of Applicant City Manager [Signature]

Date 2/6/67

(DO NOT WRITE IN SPACE BELOW)  
(FOR HEALTH DEPARTMENT USE ONLY)

County Health Department recommendation:

County Health Department recommendation: *See Health Dept Planning Code Requirements*

## Pelz, Zach

---

**From:** Mark Kimball [mark.kimball2@frontier.com]  
**Sent:** Monday, January 07, 2013 4:10 PM  
**To:** Pelz, Zach  
**Subject:** Lake Oswego Tigard Water Partnership

I am asking the West Linn City Council to please support the West Linn Planning Commission to deny Lake Oswego a conditional use permit to build a new water treatment plant in the Robinwood neighborhood for the Lake Oswego Tigard Water Partnership. There is no real benefit to West Linn, but there will be real costs and real damages.

The study supporting the Water Partnership is flawed, and is dependent on the development of Foothills and Stafford to "pencil out" Does West Linn really want to sacrifice Robinwood so Lake Oswego can build out Stafford?

The water rates in Lake Oswego have already increased to the point of hardship for many Lake Oswego residents in anticipation of this project. Water is a basic need for life. You can not disconnect your water service like you can drop your cable or cell phone service when money gets tight. I can not imagine what will happen to the Lake Oswego water rates if this project goes forward, with what I expect will be extensive cost over runs.

Water Infrastructure in both West Linn and Lake Oswego need repair and updating that would not be addressed by this water project. I am suggesting that West Linn and Lake Oswego spend money addressing real needs instead of this project.

Regards, Lisa Volpel 5655 SW Kenny St. Lake Oswego OR. 97035

## Pelz, Zach

---

**From:** David Beckett [dave@becketts.net]  
**Sent:** Monday, January 07, 2013 2:41 PM  
**To:** Pelz, Zach  
**Subject:** Jan 15 testimony - David Beckett

Hello Zack Petz

This is a request to speak at the West Linn City Council meeting Jan 15, 2013.

Here is a draft of my presentation:

Planned Testimony to West Linn City Council  
Jan 15, 2012

I am Chair of the Blue Heron Neighborhood Association in Lake Oswego. In that capacity I have attended meetings with the Mayor and other neighborhood association chairs in which the managing engineer for Lake Oswego on the LO-Tigard water supply renovation gave testimony. I have also heard reports by LO City Councilors of the gradual expansion of goals for the water treatment system that grew from a \$50MM enterprise to one that will cost over \$250MM. It is now designed to accommodate over 6000 new households in the Stafford triangle. However, development of Stafford is not currently planned. That would increase the population of Lake Oswego by about 40%.

If West Linn refuses the permits for the water treatment system expansion and the accompanying pipeline, I will recommend that Lake Oswego not appeal the decision.

That might then force cancellation or revision of the plans for renovation of the water treatment facility. It would provide a face-saving exit for the cities of Lake Oswego and Tigard from their current contract. It would be a least cost solution for both Lake Oswego and Tigard under the terms of their Joint Operating Agreement. This would be to the advantage of all three municipalities involved.

Lake Oswego could then make more modest plans for the water system to meet the real needs of our community rather than a speculative 40% growth of population. It may not be necessary to accommodate Tigard needs, because they could continue to rely on the Portland water system and other sources.

Hopefully the revised design would mitigate features that are causing stress for residents of West Linn.

David Beckett  
17738 Kelok Road  
Lake Oswego OR 97034  
[dave@becketts.net](mailto:dave@becketts.net)  
503-636-4140

## Pelz, Zach

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**From:** Jay or Patti McCoy [realmccoy2000@yahoo.com]  
**Sent:** Monday, January 07, 2013 2:33 PM  
**To:** Pelz, Zach  
**Subject:** Re: LOT WTP Hearing  
**Attachments:** McCoy CUP12-02.pdf

Thanks Zach,  
Please include my letter attached with the council packet.

Jay McCoy  
503.655.3445

**From:** "Pelz, Zach" <ZPELZ@westlinnoregon.gov>  
**To:** "McCoy, Jay amd Patti" <realmccoy2000@yahoo.com>  
**Sent:** Monday, January 7, 2013 8:15 AM  
**Subject:** RE: LOT WTP Hearing

Good morning, Jay -

Any testimony that we receive today before 5pm will be transmitted to the City Council tomorrow. Testimony received after 5pm will be delivered to the Council on Jan. 14 at the hearing.

Thanks,

Zach

[cid:imagebd9014.gif@fd7863cf.56934f40]<<http://westlinnoregon.gov/e-news>>

Zach Pelz, AICP  
[ZPELZ@westlinnoregon.gov](mailto:ZPELZ@westlinnoregon.gov)<<mailto:ZPELZ@westlinnoregon.gov>>  
Associate Planner  
22500 Salamo Rd.  
West Linn, OR 97068  
P: (503) 723-2542  
F: (503) 656-4106  
Web: [westlinnoregon.gov](http://westlinnoregon.gov)<<http://westlinnoregon.gov>>

[cid:imagea12ef8.jpg@5fdd5be2.d2b1443c]<<http://westlinnoregon.gov/rss>>[cid:image98661f.jpg@657fc9d8.1f774feb]<<https://www.facebook.com/CityofWestLinn>>[cid:image928756.jpg@7a139994.e3734019]<<https://twitter.com/WestLinnUpdate>>

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available to the public.

From: Jay or Patti McCoy [mailto:[realmccoy2000@yahoo.com](mailto:realmccoy2000@yahoo.com)]

Sent: Saturday, January 05, 2013 12:41 PM

To: Pelz, Zach

Subject: LOT WTP Hearing

Zach,

I have been asked to submit a letter in favor of the water treatment plant. What is the process? Can I send/email a letter to you or am I too late? Has the packet already been sent to the city councilors?

Jay McCoy  
503.655.3445

---

City Council  
City of West Linn  
22500 Salamo Rd.  
West Linn, OR 97068

Re: CUP12-02 Water Treatment Plant Expansion

January 7, 2013

Mayor Kovash and Councilors,

City Council has made improvements to West Linn's aging water system a priority. To the extent that voters will be asked to approve an 18% rate increase this Spring.

In 2008, West Linn ratepayers paid for a Water Master Plan that recommended partnering with Lake Oswego in expanding their water treatment plant. This was the low cost option that saves nearly \$12 million over the other options to improve West Linn's water supply. Council, in 2008, directed staff to pursue this option. This option is the very option now under consideration. The other options presented in 2008 would require a 30% rate increase.

The Planning Commission erred in their conclusion that West Linn would not benefit from the Lake Oswego Water Treatment Plant expansion. It is clearly the lowest cost option for West Linn ratepayers.

In my opinion as a retired professional engineer and a 27 year resident of West Linn, it would be inconsistent for the Council to vote against the Lake Oswego water plant expansion and also ask ratepayers to approve a rate increase this Spring. Ratepayers paid for the 2008 Master Plan. Council concurred in the recommendations of that master plan and directed staff to expend resources to pursue the low cost option now being considered. Council would not be acting as good stewards of the public trust if they knowingly vote in a manner that creates additional costs for West Linn ratepayers. Please concur with staffs recommendation and overturn the Planning Commission's denial of a conditional use permit for the water treatment plant expansion.

Jay McCoy  
22615 Crown Ct.  
West Linn, OR  
97068

**Pelz, Zach**

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**From:** Steve & Kathy Veenhuizen [skv82095@gmail.com]  
**Sent:** Monday, January 07, 2013 10:58 AM  
**To:** Pelz, Zach  
**Subject:** West Linn City Council Meeting - 01 14 13  
**Attachments:** Kathy\_Veenhuizen\_Testimony\_1-13.docx

January 7, 2013

Hi Zach ~

Please see our attached Testimony and confirm back to us that our testimony will become part of the official record for **AP-12-02 and AP-12-04**.

Our information is:

Steve & Kathy Veenhuizen  
9660 SW Serena Way  
Tigard OR 97224

Sincerely,

Kathy Veenhuizen  
Steve Veenhuizen  
503 679 4937

## **Kathy Veenhuizen Testimony to West Linn City Council 1-14-13:**

I live in the city of Tigard. My family and I have lived in that community for over 15 years. I am here tonight to express my family's opposition to the Lake Oswego-Tigard Water Partnership, the expansion of Lake Oswego's treatment plant - primarily at Tigard's ratepayers' expense, and the unfair and burdensome nature of building a *regional* water treatment plant in a quiet *West Linn* neighborhood.

Tigard water customers were just hit by a 14% rate increase this month to pay for this expensive, unneeded, and unwanted project. We already have had to endure a 30% increase that took effect two years ago. This is a whopping 44% increase in just two years! Enough is enough!! We can continue to get our water from Portland, who has some of the most pristine water in the nation. Or, we could draw water from the Willamette River like Wilsonville and Coca-Cola does. Both options would cost less than the outrageous expense Tigard's ratepayers are paying with this partnership with Lake Oswego.

West Linn residents should NOT be forced to deal with three years of construction, the unfair disruption to the livability of their everyday lives, and the burden of enduring the monstrous regional plant existing in their residential neighborhood and city. My family does NOT support these two CUP applications, the Partnership's expanded plant and pipelines, or the *uncalled for intrusion* into West Linn's livability in its 100<sup>th</sup> year and beyond. We support West Linn citizens and businesses in rejecting this project. We are not the only Tigard family to do so! Please reject both appeals!!!

Thank you.



## Pelz, Zach

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**From:** Gary Hitesman [ghitesman@gmail.com]  
**Sent:** Monday, January 07, 2013 10:17 AM  
**To:** Pelz, Zach; Sonnen, John  
**Cc:** RNA Great Neighbor Committee  
**Subject:** Request for CC Recuse AP-12-02/AP 12-04

To the Esteemed City Planner Mr. Zach Pelz and the Laggard City Council of West Linn,

**REQUEST: The entire council recuse themselves from hearing the appeal, based on "actual bias" as held up by the Oregon Supreme Court.**

Unless mentioned by the council and put to a vote, I will object at the time that it is warranted at the start of the hearings. In the least, please put this into the record.

ON one hand, it is interesting that some may have access to LO city councilors who are willing to talk to citizens who are outside their jurisdiction when their own elected officials cower behind a new Ex Parte interpretation and continue to misrepresent the people on whom they have pledged to serve.

On the other hand, the latest information possibly suggests again, like my previous email, that the city has proceeded too hastily and is wasting limited resources on a predetermined course to get this project approved come hell or high water. And there is continuing, mounting evidence, that as time goes on the *actual bias* that exists will cloud these council proceedings.

I assert that the scheduled January 14 hearing, and the existence of "actual bias", will not meet with the intent and public protections offered citizens in Land Use proceedings. There is a bias and an untimely erratic, inconsistent process that has :

1. neutered real public participation,
2. has not allowed for other affected cities to catch up\*,
3. failed to meet the level of transparency required by State law,
4. fast tracked under the sole discretion of a city manager with no experience in land use or urban planning,
5. and allowed changes in the project to occur outside what is 'normally consistent' and reasonable under ORS 197.

[I believe] the Oregon Supreme Court has held actual bias exists when a decision maker is both

predisposed to interpret the law in a particular fashion and the decision maker either:

- prejudices the facts,
- is personally biased against a party, or
- has substantial pecuniary interests in the proceedings.

~ Davidson v. Oregon, Government Ethics Commission, 300 Or 415, P2d (1985).

I claim the City Council has erred by constructing a City Charter that allows too much control and insufficient oversight of our city manager. It is the actions of the city manager that have broken with many aspects of the Comprehensive Plan and conflict with the intent of ORS 197.

In addition, there has been unfounded precedent as well as an inconsistent policy regarding Ex Parte that goes well beyond the intent or requirements of Ex Parte as stated in ORS 197.

I claim that there is sufficient known, as well as unknown, facts that indicate this council, as decision makers, are predisposed to INTERPRET the law in a particular fashion that favors the applicant.

In relationship to "actual bias" as determined by the Oregon Supreme Court, the decision makers Jones, Kovash, Tan and Carson, along with city manager Chris Jordan, to differing degrees, have both personal biases against "a party", [Consisting of West Linn citizens and residents whom the CM and council deem 'undesirable' and have been barred from the process and censored at times over the last 2 years.] Other parties with standing may feel that they too have experienced personal bias. One fact was how the city manager went about selecting who would participate in public discussions and who would not. I was specifically mentioned as a persona-non-Grata by Chris Jordan. But I am in good, plentiful company. The record contains yet another example of actual bias in the city manager's selection of a Portland architect who went on the record saying that too many people participating did not suit his needs. The recording of his statements can be submitted as how the law has been interpreted in a particular fashion that prejudices, or positions, the facts. In terms of personal bias, certainly Councilor Mr. Mike Jones stands apart as the most egregious when it comes to assaulting public participation not only in this application, but in previous applications as well. Mr. Jones, in particular, is predisposed to interpret the law in a particular fashion AND has exhibited a personal bias against many a party with standing. In the past, Mr. Jones has instructed city staff to "not" send anything to him electronically that would be inappropriate to read to his two year old at the breakfast table. This "particular fashion", although possibly defensible, creates a perceptible bias that can be interpreted as undermining his very own integrity to reach an objective decision on this application.

In regards to perceptible 'substantial' pecuniary interests, those councilors with actual, or implied, associations with proposed development, Stafford Basin, the applicant, and/or the property owner L.O. and contracted third-

party Tigard should declare those interests for the record. These are associations with other elected officials and city administrators that may have a personal connection or undeclared relationship with working individuals on the project, if they exist at all, and those associations that could be misconstrued as having a bias. The recent request for water service to the Stafford Basin, from a builder of very nice residential structures, recently sought their favor. And indeed, water service is already permitted to some areas of the Stafford Basin which goes against the WL Comprehensive Plan. Councilor Carson is on the record for encouraging development of higher capacity commuting routes on Rosemont Road that will, in the future (if not already) assist future development. (Which is against the intent of the current WL Comprehensive Plan.)

Lastly, in addition to city manager actions thwarting real public participation, an unsubstantiated public source quotes Chris Jordan saying "if the city screws this up it could well cost West Linn 12 million." This comment needs to be addressed and reconciled with what the public has been told so far. Because I know for a fact that the City has screwed up before ( and remained clueless of the errors until multiple residents fought to have it reviewed.) I know this council is aware of those screw ups in the past.(Holiday Inn[AP-09-02] and Trillium Creek Elementary School[CUP-10-03], to name a few.) In the least, I request a public and transparent discussion of this concern. (When you consider how quickly the City of Lake Oswego filed lawsuits against neighbors to condemn covenants, the threat appears to be of real pecuniary interest?)

I request that the decision makers, in the least, decide whether they have acted in good faith or are working under the unsubstantiated assumption that a upheld PC decision will cost the city 12 million dollars.

Maybe we can actually get to the truth by releasing all the public and private records on the Holiday Inn proceedings and the fallout that ensued that last time the city manager royally 'fubared' an application? ( A case that Kovash, Jones, and Carson, in some city business capacity, were involved in.) For all I can surmise, The city manager knows what he is talking about and the threat of 12 million dollars creates an actual bias that can no longer hide behind the curtain or be left unaddressed.

## **pecuniary interests**

### Web definitions

(Pecuniary Interest) This means a financial interest or association with the proposed development, the land, the applicant or land owner..

[203.221.255.17/index.asp](http://203.221.255.17/index.asp)

**\* Why put the City of West Linn at risk when the applicant may decide to change or revamp the project anyway?** The project has already changed due to budget estimate increases, is running behind schedule, has changed significantly to reflect cost realities (not because there is an added benefit or intent to blend in with the community), and rammed through by the West Linn city manager.(And under a bias that favors the applicant.)**I**

request a third party evaluate the schedule and construction schedule as revised by the LOT Partnership. Previously, the plant would have forgone 14 months of commissioning and do it in less than 2 months. How is that supposed to work?

## Pelz, Zach

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**From:** Ann Hageman [annhageman@comcast.net]  
**Sent:** Monday, January 07, 2013 9:33 AM  
**To:** Pelz, Zach  
**Subject:** Water Treatment Plant

It is time that West Linn, like Lake Oswego, need to scrap the entire LO/Tigard agreement, completely rethink the upgrade of the LO water treatment plant so it advantages both West Linn and LO, and put this entire fiasco behind all of us. West Linn can contribute greatly to this with the City Council voting no in tonight's meeting.

Like many of the other negative issues that the LO City Council has thrust upon the LO residents and the residents of its neighbor city, this agreement was implemented through personal agendas and political friendships, not in behalf of the interest of what LO, Tigard and West Linn needed.

Please correct this by doing the right thing. Vote NO on allowing the expansion of the LO water treatment plant and encourage the new LO City Council to rectify this error.

\  
Thank you

Dennis Hageman

## Pelz, Zach

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**From:** Gary Hitesman [ghitesman@gmail.com]  
**Sent:** Sunday, January 06, 2013 6:11 PM  
**To:** Pelz, Zach  
**Cc:** RNA Great Neighbor Committee  
**Subject:** Incorrect Email

Zach,

The previous email 'carbon copied to you" was premature and is an outright mistake on my part. It was not yet intended for the public record (as were some of the city manager evaluations you added to the record for whatever reason.) My most sincere apologies are extended to all the good neighbors, both for and against this project, that I may have offended in my errant Cc.

In this action, I mistakenly placed your address into the :cc column because I don't have any city email address committed to memory and I was seeking a validating action from what I thought might be a source of verification. I was in error to send that email as was my assumption on the source of verification.

To make up for my error, I have an issue that is in it's early development which may be related.

**REQUEST: The entire council recuse themselves/postpone from hearing the appeal. And if the CM/CC postpones, announce it sooner than later.**

I will follow through with a quick draft for inclusion into the record for AP 12-02/04.

An excerpt:

On the other hand, the latest information possibly suggests again, like my previous email, that the city has proceeded too hastily and is wasting limited resources on a predetermined course to get this project approved come hell or high water. And there is continuing, mounting evidence, that as time goes on the *actual bias* will create civil, civic matters between our two cities that will be neither productive, necessary, or constructive.\*

I assert that the scheduled January 14 hearing, and the existence of "actual bias", will not meet with the intent and public protections offered citizens in Land Use proceedings. There is a bias and an untimely erratic, inconsistent process will :

- 1. neuter reasonable, purposeful public participation,
- 2. not allow for other affected cities to catch up\*,
- 3. provide the level of transparency required by State law,
- 4. fast track ongoing mistakes committed under the direction of a city manager with no experience in land use or urban planning,
- 5. and allow changes in the project to occur outside what is acceptable and reasonable under ORS 197.

**\* Why put the City of West Linn at risk when the applicant may decide to change or revamp the project anyway?** The project has already changed due to budget estimate increases, is running behind schedule, has changed significantly to reflect cost realities (not because there is an added benefit or intent to blend in with the community), and rammed through by the West Linn city manager. (And under a bias that favors the applicant.) **I request a third party evaluate the schedule and construction schedule as revised by the LOT Partnership. Previously, the plant would have forgone 14 months of commissioning and do it in less than 2 months. How is that supposed to work?**

## Pelz, Zach

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**From:** Sonnen, John  
**Sent:** Monday, January 07, 2013 8:14 AM  
**To:** Pelz, Zach  
**Subject:** FW: Stop LOT - West Linn First - The Final Weel

John Sonnen, Planning Director  
Planning and Building, #1524

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**From:** Tan, Jennifer  
**Sent:** Saturday, January 05, 2013 4:16 PM  
**To:** Sonnen, John  
**Cc:** Jordan, Chris  
**Subject:** FW: Stop LOT - West Linn First - The Final Weel

Hi John,  
Can you please include in the record? Thank you.  
Jenni

 **Councilor Jennifer Tan**  
[itan@westlinnoregon.gov](mailto:itan@westlinnoregon.gov)  
West Linn City Councilor  
22500 Salamo Rd  
West Linn, OR 97068  
P: (503) 657-0331  
F: (503) 650-9041  
Web: [westlinnoregon.gov](http://westlinnoregon.gov)

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**From:** Rhodhood [rhodhood@comcast.net]  
**Sent:** Saturday, January 05, 2013 12:10 PM  
**To:** Bryck Kevin  
**Subject:** Stop LOT - West Linn First - The Final Weel

As many of you know, the LOT appeal hearing is on the City Council Agenda for Monday 1/14 and Tuesday 1/15, with the presumption that it will need to be extended. The staff report came out Friday, and as expected is a glowing recommendation in favor of the LOT proposal.

1. If you have West Linn First or STOP LOT signs, please put them back out now. If your signs went missing as many have, please email with your street address. We have more.  
New signs read "LO-Tigared Water = Stafford Development"



2. Visit [www.WestLinnFirst](http://www.WestLinnFirst) for current information and link to the STOP site for petition forms.

There are instructions on that site for returning forms.

3. Please come to the Council hearing and testify against this proposal.

## Pelz, Zach

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**From:** Dave Froode [dfroode@comcast.net]  
**Sent:** Friday, January 04, 2013 10:18 AM  
**To:** Pelz, Zach  
**Subject:** Fwd: Oregon Law on Prejudgment Bias

Zach:

Would you please include this letter in to the record RE: AP-12-02 and AP-12-03.

Please send confirmation.

Thanks, Dave

----- Original Message -----

**Subject:** Oregon Law on Prejudgment Bias

**Date:** Tue, 04 Dec 2012 06:11:58 -0800

**From:** Dave Froode <dfroode@comcast.net>

**To:** Dave Froode <dfroode@comcast.net>

**CC:** Jones, Michael <mjones@westlinnoregon.gov>, Sonnen, John <JSONNEN@westlinnoregon.gov>, Jordan, Chris <cjordan@westlinnoregon.gov>, pam@gov-law.com <pam@gov-law.com>

Below is a comprehensive case study discussing ex parte contacts and bias. No one included in this email should have any issue that would prevent them from reading this study.

Frankly, I do not agree with the wall that has been created between the city council and the people they represent. It has caused division, severe hardship for the community and placed the City Council in a very difficult position that is not necessary.

It is true, Atty Stamp is assisting our group. But know we interviewed four other prominent land use attorneys that found the ex parte activity in this city to be difficult to accept. I am not a lawyer but I have a good understanding of the English language.

Respectfully submitted,  
David J. Froode

[Oregon Law on Prejudgment Bias by Atty Andrew](#)

Stamp

"Bias" is a term which refers to prejudice or prejudgment of facts to such an extent that an official is incapable of rendering a fair judgment. The Oregon Supreme Court has required that a local land use proceeding be fair and free of actual bias. See *Neuberger v. City of Portland*, 288 Or 585, 590, 607 P2d 722 (1980). When a decision maker is actually biased for whatever reason, the appropriate corrective action is for that person to abstain from participation and voting in the process. Failure to abstain in these circumstances will affect the right to an impartial tribunal. *1000 Friends of Oregon v. Wasco Co. Ct.*, 14 Or LUBA 315 (1986).

The Oregon Supreme Court has held actual bias exists when a decision maker is both predisposed to interpret the law in a particular fashion and the decision maker either: prejudices the facts, is personally biased against a party, or has substantial pecuniary interests in the proceedings. Davidson v. Oregon Government Ethics Commission, 300 Or 415, P2d (1985).

To my knowledge, the issues presented in the latter two bullets set forth above do not appear to be present here. Thus, we focus on the prejudgment of facts.

As relevant here, a party challenging a city councilor for bias would have the burden to show that the decision maker "prejudged" the facts related to the application, which means that the decision maker did not reach a decision by applying relevant standards based on the evidence and argument presented during the proceedings. Spiering v. Yamhill County, 25 Or LUBA 695, 702 (1993). Stated another way, a challenger has the burden of showing that the decision maker was incapable of making a decision based on the evidence and argument that was before that decision maker. Lovejoy v. City of Depoe Bay, 17 Or LUBA 51, 66 (1988). A finding of actual bias sufficiently strong to disqualify a decision maker is a drastic step that is not lightly assumed, and must be demonstrated by the challenger in a clear and unmistakable manner. As discussed below, the "actual bias" standard allows the decision maker to decide matters in all but the most extreme cases.

It is critical to note that Oregon law rejects the more strict "appearance of fairness" doctrine that has been adopted by Washington and other states. Unlike Oregon, Washington courts will overturn a decision where circumstances make the decision appear to be the result of improper conduct. For example, in Smith v. Skagit Co., 75 Wash 2nd 715, 453 P2d 832 (1969) the Washington Supreme Court overturned a county zoning decision in part because the decision lacked an appearance of fairness. The court noted: "when the law which calls for public hearings gives the public not only the right to attend but to be heard as well, the hearings must not only be fair but must appear to be so. It is a situation where appearances are quite as important as substance." 75 Wash 2nd at 739.

In Oregon, mere appearances of impropriety or inferences of favoritism are insufficient to establish bias. Schneider v. Umatilla County, 13 Or LUBA 281, 284 (1985). Rather, Oregon courts require proof of actual bias. As a practical matter, that gives decision makers a wide degree of leeway to say things that suggest an appearance of bias, so long as the decision makers state on the record that they will put their personal feelings aside and rule on the matter based on the criteria and evidence before them.

Oregon policy on this issue stems from the recognition that elected officials are voted into office because of their views on issues, not in spite of those views. Eastgate Theatre v. Bd. of County Comm'rs, 37 Or App 745, 750-52, 588 P2d 640 (1978). In Woodard v. City of Cottage Grove, 54 Or LUBA 176, 178 (2007), LUBA was asked to determine if a City Councilor should have recused himself. LUBA explained that:

"Local quasi-judicial decision makers, who frequently are also elected officials, are not expected to be entirely free of any bias. To the contrary, local officials frequently are elected or appointed in part because they generally favor or oppose certain types of development. 1000 Friends of Oregon v. Wasco Co. Court, 304 Or 76, 82-83, 742 P2d 39 (1987); Eastgate Theatre v. Bd. of County Comm'rs, 37 Or App 745, 750-52, 588 P2d 640 (1978). Local decision makers are expected, however, to (1) put whatever bias they may have to the side when deciding individual permit applications, and (2) engage in the necessary fact finding and attempt to interpret and apply the law to the facts as they find them so that the ultimate decision is a reflection of their view of the facts and law rather than a product of any positive or negative bias the decision maker may bring to the process. Wal-Mart Stores, Inc. v. City of Central Point, 49 Or LUBA 697, 709-10 (2005)."

Nonetheless, Oregon Courts have held that bias can be found where there is "evidence of a strong emotional commitment by a decision maker to approve or to defeat an application for the land use approval." Catholic Diocese of Baker v. Crook County, 60 Or LUBA 157, 165-166 (2009).

LUBA has distinguished actual prejudgment bias from conduct which it characterizes as "economic boosterism." For

example, in Woodard, LUBA noted that one City Council member, Mr. Haskell, was an outspoken proponent of a car racing "speedway" facility that was proposed in Cottage Grove. LUBA rules that active support of a proposed development prior to the initiation of a formal application is not in-and-of-itself evidence of actual bias:

Petitioners cite to a number of statements and actions taken by councilor Haskell, as evidence that Haskell was biased, both in favor of the speedway and against the opponents. Some of those statements or actions occurred during the time when the county was considering a nonconforming use verification application for the speedway, prior to the city's annexation of the speedway site in August 2003. During that pre-annexation period, councilor Haskell allegedly spoke at local rallies and attended fundraisers to support the speedway, and made statements indicating that he "strongly supported" the speedway.

As an initial matter, the city argues that it is immaterial what statements or actions Councilor Haskell made prior to the date the applications for the challenged ordinances were filed, for purposes of determining whether Haskell was biased and should have recused himself from voting on the three ordinances at issue in this appeal.

We agree with the city that Haskell's actions or statements made when the speedway was subject to a pending application before the county hearings officer are not particularly probative in determining whether Haskell should have recused himself from participating in the city's decision on the current applications. At that time (2002) there was no quasi-judicial application involving the speedway pending before the city, so Haskell was not constrained by the obligations of a quasi-judicial decision maker. In any case, even if we considered the cited actions and statements in support of the speedway in 2002, those actions and statements appear to be nothing more than an example of the kind of economic boosterism that is commonly expected from elected officials. Such boosterism, in itself, is not an indication that Haskell was incapable of reaching an impartial decision on any future land use applications to the city involving the speedway. (Emphasis added).

LUBA has also consistently rejected bias claims based on a challenger's generalized suspicions about the ability of a decision maker to put aside personal philosophies and/or friendly / adversarial feelings about a party or issue and render a decision on a land use permit application on its merits. Similarly, statements indicating a general predisposition toward one party are not sufficient. *Friends of Jacksonville v. City of Jacksonville*, 42 Or LUBA 137, aff'd 183 Or App 581, 54 P3d 636 (2002), Generally speaking, so long as the decision maker states on the record that he can put aside his personal feelings on an issue and render a decision based on the criteria and evidence, LUBA will not overturn that decision.

A good example of this arose in the case of *Oregon Entertainment Corp. v. City of Beaverton*, 38 Or LUBA 440 (2000), 172 Or App 417, 16 P3d 520 (2001). This case involved the application of an adult video store to extend its operating hours past 10pm. The mayor and various other members of the City Council made statements at the hearing that made it very clear that they were not pleased with the nature of the applicant's business:

"[Mayor Drake:] While on a personal basis, I think the Council and I \* \* \* don't want these businesses in the community, the fact is our personal [feeling] versus our obligation as elected officials to uphold the law is very different, and so we can't base any decisions tonight based on content."

"[Councilor Stanton]: The citizens have chosen not to allow their local jurisdictions or the State to regulate [adult entertainment]. And that is the constraint we are under. \* \* \* I wish we had the authority to regulate [adult entertainment] in terms of time and location, but we are \* \* \* precluded by state law from doing that at this point."

"[Mayor Drake:] Well, before I ask the vote, the mayor votes only in the event of a tie, it's apparent tonight there is no tie. I do have some opinions and I want to give them, and this is on a personal basis as a citizen of Beaverton, not as the City's Mayor.

"I understand that [petitioner] is entitled to his right to exist, and he moved into that facility knowing that he was allowed outright from 7:00 a.m. to 10:00 p.m. What he does there is protected expression, and I understand it. On a personal basis I don't agree with it. And I do respect though \* \* \* your right, sir, to exist as a business.

"My personal view is that you pedal smut and there's no value added to our community. The sad point is that there is business in the community for what you do, and I see that, and I understand it, but it doesn't mean on a personal basis I have to agree with it."

However, LUBA found that despite these statements, the City Councilors had all said they could put their personal feelings aside and rule on the matter based on the facts and criteria. LUBA said that this "show[ed that] the city councilors recognized that they must put their personal feelings about petitioner aside and make their decision in this matter based on the evidence and arguments that were presented during the quasi-judicial proceedings below." *Id.* at 446-7. LUBA cautioned that "[t]here may be cases where a quasi-judicial decision maker's verbal recognition of his or her duty to put aside personal opinions about a party will be insufficient to avoid an inference of bias from that decision maker's expressions of personal animosity toward a party. However, petitioner has not shown that such is the case here."

Based on the case law decided to date, the type of conduct that has sufficed to demonstrate "actual bias" is really quite narrow, and includes the following:

Personal verbal or written attacks on a party that indicate personal animus;  
Developing evidence outside the record, particularly when the goal is in developing that evidence is to favor one side's position,  
Inflammatory statements, particularly those that indicate an inability of the decision maker to be fair and objective - or that suggest that the result is a foregone conclusion.

Four recent LUBA cases illustrate the type of conduct that results in disqualification for bias or prejudgment. The first of these, *Halvorson-Mason Corp. v. City of Depoe Bay*, 39 Or LUBA 702 (2001), is a case that I worked on against the City of Depoe Bay. In *Halvorson Mason*, three city councilors were residents of the "Little Whale Cove" subdivision, in which the developer of the subdivision proposed to operate a controversial real estate office. We represented the developer, *Halvorson Mason Corp.*, and we challenged the right of three councilors to participate in the proceedings. LUBA concluded that the mere fact that two councilors were residents of the subdivision in which the office was proposed was not, in itself, sufficient to demonstrate that the councilors were biased. However, LUBA held that one councilor, also a resident of the subdivision, should have recused himself from voting on the proposed development, based on evidence that the councilor actively opposed the real estate office both before and during his tenure as City Councilor. He had written letters to other owners of Little Whale Cove advocating against the office. These letters included personal and inflammatory attacks on *Carl Halvorson* and *Halvorson Mason Corp.* In those letters, the councilor disparaged the integrity of the developer, accusing him of using "Tijuana street vender-style sales tactics." That same City Councilor was caught ripping down the development companies' "for sale" signs.

In the second case, *Friends of Jacksonville v. City of Jacksonville*, 42 Or LUBA 137, *aff'd* 183 Or App 581, 54 P3d 636 (2002), two city councilors were members of a church that had filed an application with the city. LUBA held that church membership alone was not enough to show bias. However, LUBA found that one councilor should have recused himself, based on evidence that (1) prior to his election as city councilor the councilor had advocated in favor of the development proposal before the planning commission, (2) the councilor had stated prior to his election that he did not feel the need to be objective about the proposal and that supporters of the proposal would fight a denial "all the way to the Supreme Court," (3) the councilor had signed a petition in favor of the development when it was pending before the city council, and (4) during the city council deliberations the councilor submitted a document explaining why he believed the application met the approval criteria, with specified conditions he proposed. LUBA concluded that, based on the totality of the evidence, the councilor believed he was elected on a mandate to approve the application, and the only question to be decided was what conditions to impose. LUBA found that the evidence was sufficient to establish that councilor was incapable of impartially deciding the application based on the evidence and arguments before him. Accordingly, LUBA remanded the decision for the city council to consider the application without that councilor's participation.

In the third case, *Woodard v. City of Cottage Grove*, 54 Or LUBA 176, 178 (2007), discussed *supra*, a City Council member

named Haskell sought to develop evidence on his own that would have a tendency to discredit some of the more vocal opponents to a motor speedway application. The Councilor went so far as to request confidential "Police Fact Files" and "logs" on the opponents, in order to show instances where the opponents had been in contact with police. LUBA also noted that the fact that the same councilor had co-signed a letter that personally attacked one of the opponents showed an indication of animus towards those opponents.

Lastly, in *Oregon Natural Desert Ass'n v. Harney County*, \_\_\_ Or LUBA \_\_\_ (LUBA No. 2011-097, May 3, 2012), LUBA found that a commissioner erred by participating in a public hearings process, even though he had refrained from voting. That Commissioner had published a guest opinion in a local newspaper that exhibited a degree of hostility toward the opponents and their legal actions. The article was published at a time when the matter at issue was pending before the Planning Commission. In his article, he referred to the opponents as an "extreme environmental organization" and a "silent killer" engaged in "terrorism," and even made reference to the opponents' pending local appeal of the farm dwelling approval at issue as an example of such terrorism. LUBA held that not only was he required to recuse himself, but the fact that he commented on the matter during the Council deliberations potentially tainted the proceedings sufficiently to warrant remand.

On the other hand, the following are examples of situations where the evidence did not support a showing of bias:

The fact that a mayor made pre-hearing public statements that could be construed as supporting the PUD application does not, by itself, suffice to demonstrate reversible bias. Petitioners cited to a newspaper interview with the mayor in which the mayor discussed a contract modification and stated "Yes, we'd like to be further along, but we are still very happy with Capstone and we're making progress." In addition, petitioners argue that the mayor testified at a Metro Council meeting on January 20, 2010, just prior to the city council hearings on the PUD application, and reportedly indicated that the Cannery Square project "would soon begin." *Claus v. City of Sherwood*, \_\_\_ Or LUBA \_\_\_ (2012).

The impact of a proposed development on a surrounding neighborhood is a valid consideration by a local government and the fact that the neighborhood contains "expensive" homes does not convert the decision-maker's concern into some sort of prohibited bias. *Atwood v. City of Portland*, 2 Or LUBA 397 (1981).

A county commissioner's attendance at a planning commission hearing in this matter with his wife who opposed the application falls far short of the evidence that LUBA has required to support an allegation of bias *Catholic Diocese of Baker v. Crook County*, 60 Or LUBA 157, 165-166 (2009).

The fact that the Mayor and a Councilperson attend a particular church involved in a quasi-judicial land use action before the city does not automatically rise to the level of improper bias on the part of the city official. *Northeast Neighborhood Ass'n v. City of Salem*, 4 Or. LUBA 260 (1981).

No bias found where a hearings officer was employed and paid by the city and heard testimony and accepted recommendations on a land use application from the city's planning department. *West v. City of Salem*, 61 Or LUBA 166, 172 (2010).

No bias found with regard to various members of the City Council who heard a case involving an application for a PUD, zones change, and PAPA, despite the fact that those City Councilors had served on the board of an urban renewal agency at a time when that agency had sold the same land to the developer for purposes of development. *Claus v. City of Sherwood*, \_\_\_ Or LUBA \_\_\_ (2012).

In a case involving a zone change case, two of the five county commissioners disqualified themselves because of previous involvement with the matter in different capacities. One felt that he could not be impartial because he had been chairman of a community planning organization which had studied and unanimously recommended approval of the proposed plan change. The other disqualified himself because he was a director of the Metropolitan Service District which had expressed an interest in acquiring the parcel as a site for a solid waste milling-transfer station. The court concluded that the abstention from voting by the two commissioners was based upon a misinterpretation of law, and

that they could have participated in the vote. Eastgate Theatre v. Bd. of County Comm'rs, 37 Or App 745, 588 P2d 640 (1978).

According to the State Attorney General, testimony by a member of a local governing body in favor of a particular land-use application before that person became a member of the governing body is not, standing alone, evidence of bias sufficient under Oregon law to disqualify the official from participation in a proceeding involving that application. 41 Op Atty Gen 490 (1981).

On 12/3/2012 6:10 PM, Dave Froode wrote:

FYI: reply from the people.

Dear Pam:

As you may have heard, I am representing a group of Citizens organized under the name of "STOP" with regard to the LOT water line project. My understanding is that one of the members of STOP, Dave Froode, has been in communication with one of the City Councilors, Councilor Jones, regarding the interpretation of Chapter XI of the West Linn City Charter. As you will recall, you opined on this issue in a Memo dated November 3, 2011. The factual premise underlying your conclusion may have changed, and hence, the issue of the applicability of the City Charter provision to the LOT case may be coming to the forefront once again.

Commissioner Jones asked that Mr. Froode forward correspondence to him via your office. It is not entirely clear to me why Commissioner Jones sought to use you as a go-between for this exchange of information. Nonetheless, it is our expectation that you will forward the requested materials to Commissioner Jones without delay. The City Charter issue is separate from the land use issues because the Charter is not a land use approval standard for the permits being sought. Therefore, discussions between citizens and the City Council on matters related to the Charter do not constitute ex parte contacts with regard to the pending quasi-judicial land use process currently before the City Council.

With regard to the ethical rules that apply to attorneys prohibiting communication directly with a represented party, I do not mind if you communicate with Dave Froode or other members of STOP, although I would imagine that you don't see much ongoing need to do so.

Thanks,

Andrew Stamp

On 12/3/2012 4:29 PM, Jones, Michael wrote:

Dave-


I am forwarding the letter I received from Pam Berry. It is clear that we cannot have a work session prior to the appeal I am assuming is going to occur.

All my best-Mike

[mjones@westlinnoregon.gov](mailto:mjones@westlinnoregon.gov)  
503.344.4683

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Save the Salmon

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**West Linn**

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**From:** Pam Beery [[Pam@gov-law.com](mailto:Pam@gov-law.com)]  
**Sent:** Monday, December 03, 2012 4:19 PM  
**To:** Jones, Michael  
**Cc:** Thornton, Megan; Jordan, Chris; Sonnen, John; Kristen Ketchel - Bain  
**Subject:** Confirming our telephone conversation regarding the Lake Oswego-Tigard Water Project applications

Hello Mike,

This confirms our telephone conversations concerning the role of the Council and of individual Council members now that the Planning Commission has issued a final decision on the referenced applications, and as such the anticipated appeal to the City Council (due to be filed no later than December 11, 2012) would be the next step in the process. We discussed the desire of members of the Robinwood Neighborhood to talk with you about the case, and potentially with other Council members as well. We also discussed the idea of a second Council work session, so that any comments could be garnered in an open meeting and then placed in the Council's hearing record on appeal in an effort to limit these ex parte communications.

My strong advice to you was that you not engage in ex parte communications (and that you limit them to the extent possible where you are unable to avoid them). I know you understand that such communications will need to be disclosed at the commencement of the Council hearing, but given the strong public interest in this project it behooves the Council to avoid even the appearance of potential bias so that we can assure our process will withstand scrutiny when/if it is appealed further to the Land Use Board of Appeals. To this end, limiting ex parte communications is an important step in this case.



I also indicated that although I had received a number of email communications from Mr. Froode, I will not be engaging in review of those emails or any other communications from him or others related to the project. As I advised him in an email earlier this afternoon, I believe my role as legal advisor to the City staff and elected and appointed officials requires that I do all I can to both remain impartial so there is no question about my advice on that front, and to maintain the integrity of the process for hearing these applications. Additionally, it is my understanding that there is now an attorney representing some or all of the neighborhood residents, and any direct contact with a represented party is not appropriate under the ethical rules applicable to lawyers in Oregon.

As to the second issue related to a potential work session of the Council, I also strongly advise against such a work session. Such a session would be highly irregular during the course of the City's processing of a pending land use application and presents a serious risk that any decision would be subject to legal challenge on an appeal to LUBA. I also believe such a course risks creating a situation where members of the Council could become biased – or give the appearance of being biased. First, a work session is completely outside the established process. Any appeal to Council will be filed on or before December 11; any work session could not be conducted until after the appeal is already filed, at which point it is clear Council will be sitting in its quasi-judicial capacity to hear the appeal. Second, a work session could result in inherent unfair access to the Council with not all parties present since it would not be noticed in the same manner as a land use hearing, albeit it would be a “public meeting”. The timing of the work session means that some parties will have earlier full access to Council than other parties, with the potential for resulting publicity and not all sides of the story being told. Finally, the Council is required to make every effort to maintain its impartiality both based on the Community Development Code Section 99.180, and your Council rules, which define ex parte contact as including any contact where not all interested parties on a particular issue are part of the discussion:

Ex parte contacts are those by a party on a fact in issue under circumstances which do not involve all parties to the proceeding. Ex parte contacts can be made orally when the other side is not present, or they can be in the form of written information that the other side does not receive.

Under the present circumstances, inviting these kinds of contacts where not all interested parties have received notice and would not expect to have a Council work session prior to the appeal hearing would be ill advised.

As I said when we talked, I do respect the effort you and other members of Council are making to assure that you remain impartial and able to participate in the hearing when and if an appeal is filed. It's all about good government. I hope this helps.

I am providing a copy of the email to Megan Thornton, Chris Jordan and John Sonnen for their information. I hope and trust that they will pass this along to other Council members if that is the appropriate protocol in West Linn.

Pam

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**Pelz, Zach**

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**From:** Gary Hitesman [ghitesman@gmail.com]  
**Sent:** Thursday, January 03, 2013 10:26 PM  
**To:** Pelz, Zach; councilmail@tigard-or.gov; CouncilDistribution@ci.oswego.or.us  
**Subject:** Re: AP-12-02/04 City Mis-Administration and failure at conforming to CDC Chp. 60

By removing the existing building, the elevated lights for the tanks beyond are no longer screened from the neighborhood and nearby homes. Although I am sure the lighting meets the bare minimum requirements of the code, the solution has gone from abhorrent to pure evil.

I fail to see how the introduction of an un-screened, elevated industrial-lit complex blends in with the community? The applicant should take a look at the sight line sections they presented already to show how these lights will now stream into homes at all hours of the night, 365 days a year.

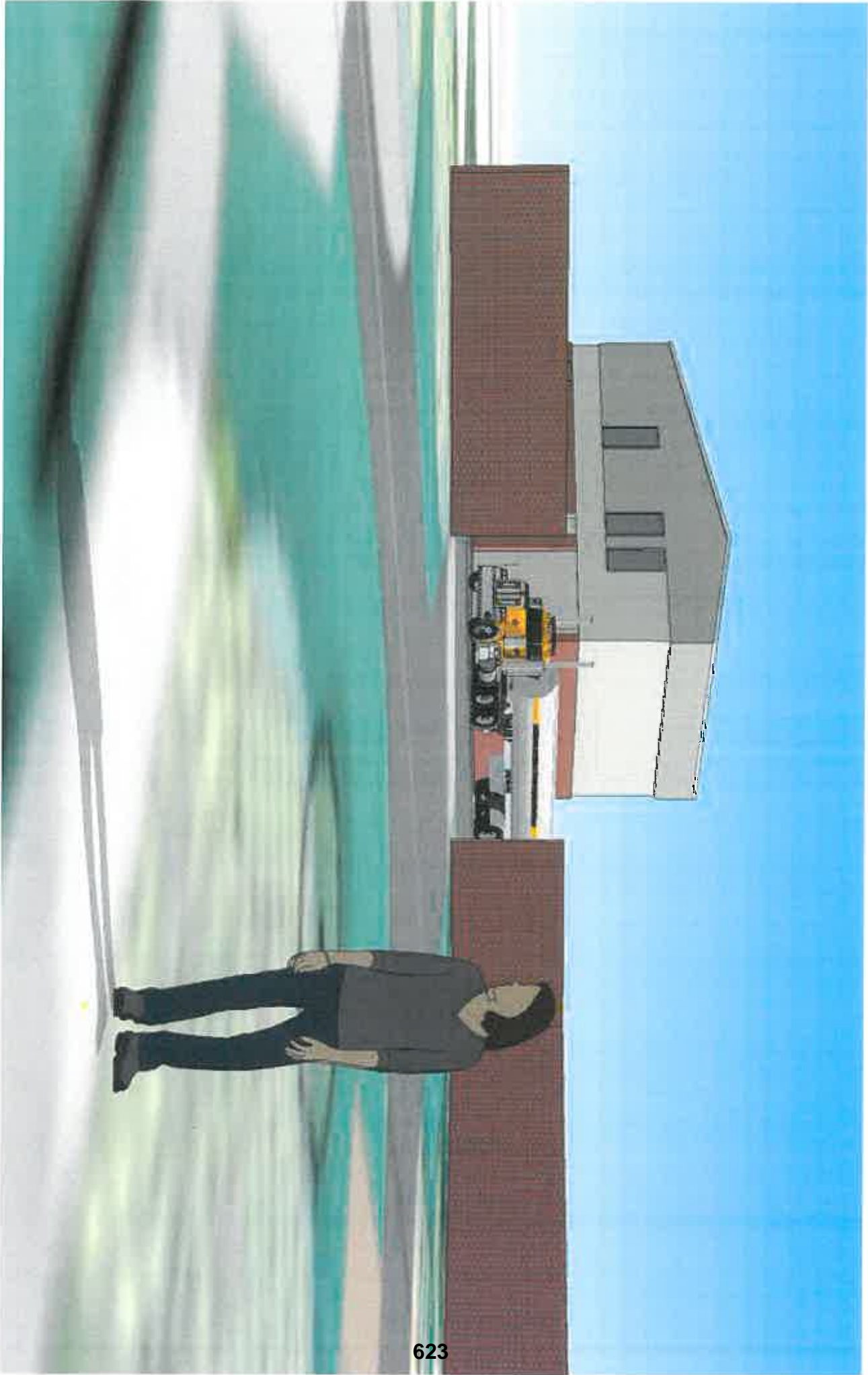
The application is far worse for the changes. Yet, there is also precedent in West Linn on why the CC shall uphold the PC decision. The recently approved Trillium Creek School, which had a lighting scheme with less impact than proposed in AP-12-02, was found to be unsustainable. The district was forced to turn "lights out" on the structure facing homes to the East. These homes are further away too boot. There is absolutely no way the council can approve this project now, even with all the conditions of approval.

These changes are due because the project is spending money faster than what can be bonded. The "changes", which are also not allowed, were done to save money wasted to-date and meet the budget guesstimates from long ago.

This will be a joyful task to render this solution! Oh, the Horror. We know have a Hindenburg AND a Titanic all-in-one. Except West Linn has neither the tarmac or ocean to hide it in.

The West Linn Planning Commission is looking like geniuses ever the more.

Unemotionally yours, with objective analysis,  
Gary Hitesman



**Pelz, Zach**

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**From:** Gary Hitesman [ghitesman@gmail.com]  
**Sent:** Thursday, January 03, 2013 9:48 PM  
**To:** Pelz, Zach; councilmail@tigard-or.gov; CouncilDistribution@ci.oswego.or.us  
**Subject:** AP-12-02/04 City Mis-Administration and failure at conforming to CDC Chp. 60  
**Attachments:** sketch\_001.xps; sketch\_002.jpg

Mr. Zach Pelz,

With all due respect;

I have searched the pertinent records posted for this application and notice that the information, figures, and images I provided as part of my testimony are missing from the record. When I noticed that my original rebuttal had not been included at the last hearing, as it should have, I was assured by both you and Ms. Beery that the information I provided would be placed into the record.

What else has been revised, contorted, or round-filed?

So far, the four images I presented to the PC have not been posted. (One was a copy of an image provided to the public by the applicant and not even that was put in the record! Astounding!) I admit I'm not an attorney, but I fail to find within the Oregon State Statutes or Oregon Administrative Rules were this type of censorship or deletion of publicly submitted documents is warranted.

In addition to the existing precedent that invalidates the applicants claim (an earlier email), I will be re-asserting my previous testimony that, as the PC ruled, the project does not meet CDC 60. None of it.

Attached are two images of proposed structures as they will appear on Opening Day, should the project make it through the Oregon Court of Appeals (which I highly doubt). These buildings have never met the intent or even come close to manifesting a superior design. The architecture presented is worse than Pruitt Igo in St. Louis, Mo., which is ironic because that is where Michael Willis, the project architect, grew up. I know Michael and quite frankly, I am surprised at the low level his firm has prostituted itself. It is not only shameful, but sadly, a monument to the architect's dereliction of duty and lack of civility.

Also, when the applicant never made the presentation to explain how the project fit CDC 55.100, they failed to meet the burden of proof. And even with Ms. Beery's apparent suppression of my opinion, the failure is obvious. CUP-12-02/04 fails to meet CDC 55.100 as well as a host of other codes, rules, and statutes. (As the attached sketches demonstrate.)

I have seen plenty of bad applications get more than their fare share of attention and biased approvals before; but by far, this application will be the one that takes the cake.

From my perspective, this whole effort has been astoundingly stupid and ill-conceived from the get go. The fact that staff actually approved this project has destroyed any modicum of integrity the City of West Linn may have ever had. If LO had a respectable and reasonable sense of civility and less ego, perhaps the project could have been successful. But as I learned at the close of the PC hearing, LO reps congratulated us on "the win". What arrogance! The arrogance of LO is what killed this project from the very beginning. And sadly, our own city manager appears, through a greater arrogance, to have boxed himself into a corner.

No one will win. We will all be losers; one way or another. (Thank you Mr. Chris Jordan!)

Hear is the plain truth. This is not a game. This is supposed to be about community building. And sadly, all the city administrators involved in this project failed to do their job and the applicant fostered this win/lose attitude that will be the downfall of their project and/or the needless destruction of a small community.

Good day.

Gary Hitesman