

**CITY OF PHILOMATH
Water System Master Plan,
Philomath, Oregon**

EXECUTIVE SUMMARY

INTRODUCTION

This Water System Master Plan provides recommendations and a master plan for water production, treatment, distribution and storage within the City of Philomath. The City's previous planning effort was completed in 1984 and included recommendations based on 20-year projections. As such, the previous planning document is outdated and a new master plan is needed.

The City's current development standards require findings that adequate capacity is available in the utility systems prior to development occurring. Without a current water system master plan which identifies area-wide improvements required with a schedule guiding their construction, implementation of these policies is difficult. Without a community wide understanding of how the water system works and how development within the community impacts its performance, it is difficult at best to determine what improvements to the water system are necessary to facilitate new development.

PROJECT OBJECTIVES

The purpose of this study is to evaluate the City's water system with respect to its existing and future needs, identify improvements and associated costs necessary to meet those needs, and provide the City with a design guide for future growth of the City's water system. It is intended that the information contained herein assist the City in the planning and implementation of capital improvements to the water system, as well as ongoing system maintenance.

This evaluation and master plan accomplishes the following specific objectives:

- Maps the existing water system based on field data collection and as-built drawings.
- Identifies current and future water system deficiencies on a prioritized basis
- Provides an evaluation of the options for correcting these deficiencies with preliminary construction cost estimates for recommended alternatives.
- Provides the City with a Water System Master Plan which addresses concerns of both the City and regulating authorities.
- Provide specific recommendations to the community and City Council for action.

BACKGROUND INFORMATION

Philomath's original water system was designed to distribute water from Corvallis' Rock Creek Facility. For many years all water for Philomath's system was purchased from Corvallis. As demand due to population growth in the Corvallis-Philomath area increased beyond the capacity of the Rock Creek facility, both Corvallis and Philomath began to seek alternate water sources. Corvallis constructed the Taylor Water Treatment Plant and now draws most of its water from the Willamette River. In the 1970's Philomath drilled two municipal wells. For a time, these wells served as the primary water source for the City. Due to quality problems in the wells and the rising costs of purchasing water from Corvallis, the City of Philomath decided to construct a new water treatment facility and use the Marys River as its primary source.

The City currently obtains municipal drinking water from two sources. These are the Marys River and the 11th Street well. Water from the Marys River is withdrawn and treated at the City's water treatment plant (WTP) constructed in 1985. The 11th Street well was developed in 1977. The Marys River serves as the City's primary water source and the 11th Street well is used primarily as a backup source.

Storage is provided in a 1.25 million-gallon cast-in-place concrete reservoir that was constructed in 1994. The reservoir is located atop Neabeack hill on the east end of the City. Most of the City's transmission and distribution piping is constructed of cast iron, ductile iron, and PVC pipe. While there are some 12 and 16-inch transmission lines capable of delivering major fire flows, the majority of the distribution system piping is 6 and 8-inches in size. A detailed description of the existing facilities is included in **Section 4**. The major components of the water system are shown in **Figure 4-1**. Detailed water system maps are included in **Appendix A**. A schematic representation of the water system is presented in **Figure 4-2**.

BASIS FOR MASTER PLANNING

As the City continues to grow and as the existing facilities continue to age, improvement will be required. However, haphazard improvements that do not adequately consider all of the issues that impact the system may end up costing the City more in the long run than well thought-out, carefully-applied solutions. For example, if a particular water line is too small to deliver adequate quantities of water for fighting fires in the surrounding area, a logical solution is to replace the pipe with a larger pipe. However, if the larger pipe is sized only to accommodate the existing conditions with no considerations for growth in the surrounding area, the pipe size may need to be increased a second time to accommodate the increases in demand resulting from population growth. Instead of replacing the pipe twice, a more cost-effective solution is to replace the pipe once with a pipe sized to accommodate the existing conditions plus the anticipated future growth. As this example illustrates, some water facilities cannot be expanded incrementally to accommodate growth. More often than not, the most cost effective solution is to initially size the facilities to accommodate anticipated growth within the planning period. Therefore, this Master Plan not only considers the existing deficiencies, but also considers what improvements are going to be required during

the planning period as the City grows and develops. The intent of the recommendations proposed in the plan is to provide the City with reliable water facilities that not only meet current demands, but that will also adequately serve the City well into the future.

The Oregon Health Division (OHD) recommends a minimum 20-year planning period for master planning. This planning period begins once the construction of the required improvements is completed. The intent of this approach is to construct improvements that have minimum design life of 20-years. Based on the project schedule outlined in **Section 7**, the construction of the first phase of the recommended improvements should be completed during the 2009 calendar year. Based on a 20-year planning period, the recommended improvements are expected to serve the City's needs until 2029. In order to assess the City's needs in the year 2029, population growth projections must be made to determine future wastewater flows and loads. Based on historic population trends, the projected population in 2029 is approximately 7,365 (see **Section 2**). Projected water demands are based, in part, on this population. The improvements recommended in this plan are based on development of land within the UGB in its present location, as well as the existing land use zoning for these areas. It is assumed that no significant development will occur within the study area that will require major changes to the existing zoning, and that there will be no significant expansions of the UGB within the study period. Changes in any of these assumptions could change the recommendations contained in this plan. Should significant changes in any of the above occur, the master plan should be updated accordingly.

Section 5 discusses the evaluation of the historical water use rates, then projects these patterns into the future to provide a basis for sizing treatment, pumping, and distribution facilities. The projected demands were determined based on a number of variables including the following.

- Rate of projected population increases.
- Land use zoning within the study area.
- Projected per capita flowrates.
- Projected fireflow demand.

Philomath's current (2002) water demand is as follows:

• Population	4,100	
• Average Daily Demand	488,000 gallons/day	119 gallons/capita/day
• Maximum Month Demand	763,000 gallons/day	186 gallons/capita/day
• Maximum Day Demand	1,005,000 gallons/day	245 gallons/capita/day

Projecting the per capita flows to 2029, the demands are as follows:

• Population	7,365	
• Average Daily Demand	876,000 gallons/day	
• Maximum Month Demand	1,370,000 gallons/day	
• Maximum Day Demand	1,804,000 gallons/day	

Fire flows are based on the flowrates required to provide adequate fire protection to various sizes and types of structures anticipated in a given zone. The City's Public Works Design Standards contains recommendations fire flowrates and duration. These are listed as follows.

- Residential Single Family 1,000 gpm for 2 hours
- Residential Multi-Family 2,500 gpm for 2 hours
- Commercial 3,500 gpm for 3 hours
- Industrial 4,000 gpm for 4 hours

WATER SYSTEM EVALUATION AND RECOMMENDATIONS

The primary purpose of the Water Master Plan is to provide the City a guide for developing and maintaining the water system in a logical, cost efficient manner. Using the water demand projections, the long term needs of the water system were determined for water supply, treatment, storage and distribution. A graphical representation of the recommended improvements is shown on **Figure 6-1**. Brief discussions of the recommended improvements follow. More detailed analysis and discussion is presented in **Section 6**.

- Water Supply Water Rights

An analysis of the City's existing water rights and water supplies identified three areas of work for the next planning period. These include work to solidify the City's existing water rights, development of a Water Management and Conservation Plan, and obtaining additional early water rights. A more detailed analysis of the City's water supply and water rights is presented in **Section 6.2**. A brief summary of this work follows.

A review of the City's current water rights, showed that some work needs to be done to ensure the rights remain valid through and beyond the planning period. The specific items required to strengthen the City's overall water rights position are listed in **Section 6.2.1**. At the time this plan was written, the City had begun work with a Certified Water Rights Examiner to perform these tasks. As such, this work element is considered complete for the purposes of this planning effort, and no budgetary provisions are recommended.

To date, the City has not prepared a Water Management and Conservation Plan (WMCP) in accordance with the guidelines set forth in OAR 690-86. It is recommended that the City prepare and obtain approval for such a plan early in the planning period. Completion of a WMCP will likely be a condition of approval for the water rights work discussed in the previous paragraph. It is recommended that the City implement a formal water conservation program in accordance with State guidelines following the completion of the WMCP. A budget of \$20,000 is recommended.

Based on the analysis of alternative water supplies presented in **Section 6.2**, it is clear that the most cost-effective strategy for ensuring reliable water supplies through the

planning period is to continue to use the Marys River as the primary source. It is recommended that the City work to obtain early water rights that predate the 1964 in-stream water right owned by the State of Oregon. It is recommended that the City continue to work toward defining a list of target water rights that are transferable and may be obtained at a reasonable cost. As part of this work, the City should develop a plan for obtaining early water rights that targets several water rights as well as a step by step plan for purchasing, and transferring each water right as demand requires. A key element of this plan is the identification of how each right will be exercised from the date of purchase to the date of transfer to municipal use at the WTP. Due to the importance of this work it is recommended that a budget of \$50,000 be reserved for the development of a water rights acquisition plan as well as for the purchase of the water rights.

- Water Production Facilities

The City owns and operates two water production facilities. These are the Marys River Water Treatment Plant and the 11th Street Well. The 11th Street Well is intended as an emergency backup water supply only. Thus, for long range planning purposes, the Marys River Water Treatment Plant must be able to satisfy essentially all of the City's demands. Common practice is to size water production facilities to meet or exceed maximum day demands. As discussed in **Section 5**, the existing maximum day demand is approximately 1.07 MGD and is expected to grow to 1.80 MGD by the end of the planning period. The nominal capacity of the Marys River Water Treatment Plant is approximately 1.0 MGD. Therefore, additional treatment capacity is required. The analysis summarized in Section 6, shows that expansion of the existing Marys River Water Treatment Plant is the most cost effective means of providing additional treatment capacity. The recommended improvements will increase the capacity of the treatment plant to 2.0 MGD. The estimated overall project cost of the treatment plant expansion is \$3,252,000. A detailed discussion of the recommended improvements is included in **Section 6.3**.

- Water Storage Facilities

Water system storage serves three purposes: it equalizes daily variations between supply and use; it provides a reserve for fire fighting; it provides a reserve that can be used during an emergency interruption of supply. The total recommended storage in the system is the sum of the operational, fire, and emergency storage. An analysis of the storage requirement for the City is presented in **Section 6.4**. Based on this analysis, a new 1.75 million gallon reservoir is recommended. The City currently has a site identified for this reservoir in the hills west of town. The total project cost for the reservoir is estimated to be approximately \$2,835,000. A detailed cost breakdown is included in **Appendix E**.

In addition to the construction of a new water reservoir, some work at the existing reservoir atop Neabeack Hill is recommended. The Neabeack Hill Reservoir is in relatively good condition with the exception of some leaks around the exterior of the

tank. In order to reduce existing and future leakage, it is recommended that the interior of the tank be coated with a sealing material. This will require draining the tank and removing it from service. Since the Neabeack Hill Reservoir is the only storage reservoir in the City's system, it cannot easily be removed from service until the new tank is constructed. In addition to the interior coating, the tank inlet and outlet valving must also be reconfigured to properly operate the reservoir when the new reservoir is constructed. The recommended improvements for the Neabeack Hill Reservoir are discussed in detail in **Section 6.4.6**. The total estimated construction cost for the Neabeack Hill Reservoir Improvements is approximately \$245,000.

- Water Pumping Facilities

The City owns and operates three pump stations. These are the Neabeack Hill Domestic Pump Station, the Neabeack Hill Fire Pump Station, and the Starlight Village Pump Station. Each of the pump stations was evaluated and a list of improvements for each station was compiled. The primary shortcoming of each station is the lack of auxiliary power. The results of this work are presented in **Section 6.5**. In addition to the Starlight Village Development, the Starlight Village Pump Station will eventually serve the entire contiguous portion of the upper service level on the western edge of the UGB (See **Figure 6-1**). The pump station currently lacks the capacity to serve the entire area. As such, upgrades will become necessary as development continues. By the time the upgrades are required, it is likely that the existing pumping facilities will be near the end of their useful life. Therefore, a complete replacement of the pump station is envisioned. It is envisioned that a new pump station will be constructed adjacent to the original pump station. An above grade structure will house the pump station and controls. The construction of a new pump station to serve this area is identified as the Starlight Village Phase 2 Improvements.

The estimated project cost for the Neabeack Hill Fire Pump Station improvements is \$146,000. The cost for the Neabeack Hill Domestic Pump Station improvements are included in the project cost for the Neabeack Hill Reservoir Improvements. The estimated project cost for the Starlight Village Pump Station Phase 1 Improvements is \$268,000. The estimated project cost for the Starlight Village Pump Station Phase 2 Improvements is \$470,000. Detailed cost breakdowns are included in **Appendix E**.

- Water Distribution Facilities

An analysis of the existing distribution system was performed to assess its ability to maintain adequate pressures under peak domestic and fire demands. The analysis enabled the identification of system shortcomings. Alternatives for Long-range distribution system improvements to address these shortcomings were simulated and analyzed to develop a recommended set of distribution system improvements. A discussion of this analysis is presented in **Section 6.6**. The recommended distribution system improvements are listed in the following table.

RECOMMENDED DISTRIBUTION SYSTEM IMPROVEMENTS				
Location	Existing Size (inch)	Recommended Size (inch)	Length (feet)	Total Project Cost
Dampier Street (Pioneer Street to West Reservoir)	NA	12	1100	\$142,000
Marilyn Drive Service Relocation	NA	NA	NA	\$4,000
20 th Street Waterline Extension (Main to Applegate)	NA	10	640	\$74,000
High School Site Waterline Extension (Applegate to end)	NA	10	1580	\$183,000
Ash Street Waterline Extension (19 th to 18 th)	NA	8	280	\$29,000
Main Street Waterline Replacement (9 th to 14 th)	8	8	2020	\$234,000
Applegate Street Waterline Replacement (Newton Creek Bridge to 30 th Street)	8	8	2860	\$292,000
Canberra Street (connect to 12" in Pioneer St.)	NA	8	35	\$4,000
College Street (12 th to 13 th)	NA	12	200	\$26,000
12 th Street (Pioneer to College)	NA	8	120	\$12,000
8 th Street (Main to Pioneer)	NA	8	500	\$51,000
College Street (19 th to 20 th)	6	12	620	\$80,000
19 th Street (College to End)	6	12	600	\$78,000
12th Street (Monroe to Houser)	4	10	1050	\$121,000
12 th Street (Pioneer to Grant)	2	10	900	\$104,000
Benton View Drive Waterline Extension	NA	8	600	\$61,000
Upper Philomath Service Level Transmission Main (Pioneer Street to end)	NA	10	4600	\$532,000
Middle School Site Waterline Extension (From existing FH to Chapel Drive)	NA	10	1120	\$129,000
North Arterial Transmission Main				
Pioneer Street to 9th Street	NA	12	2200	\$291,000
9th Street to Hills Road	NA	12	3400	\$439,000
Hills Road to Existing System in Green Road	NA	12	4200	\$543,000
Green Road to Boulevard Street	NA	12	4550	\$588,000
Boulevard Street to Corvallis-Newport Highway	NA	12	6050	\$861,000
South Arterial Transmission Main				
13th Street to Chapel Drive	NA	10	1950	\$225,000
Chapel Drive to 19th Street (Including 15th Street)	NA	10	2450	\$283,000
19th Street to Southwood Drive	NA	10	4950	\$576,000

RECOMMENDED CAPITAL IMPROVEMENT PRIORITIES

As summarized in the previous sections, the water system has a number of deficiencies which inhibit the City's ability to provide the required flows to many areas. Some of these deficiencies are more critical than others. In order to assist the City in the planning and scheduling the construction of needed improvements, the improvements recommended in previous sections are grouped as Priority 1, Priority 2 and Priority 3 as outlined in **Section 7.1**. The prioritization of improvements factors in the criticality, cost, and benefit of each project allowing essential, high benefit to cost projects to be identified and constructed first, while less critical, lower value projects to be delayed until a later time. Each of the projects identified in the plan were examined and assigned a priority for implementation as listed in the following table.

RECOMMENDED PROJECT PRIORITIES		
Project	Priority	Recommended Project Budget*
Obtain Additional Early Water Rights	1	\$50,000
Water Management and Conservation Plan	1	\$20,000
Water Treatment Plant Expansion	1	\$3,252,000
1.75 MG West Side Reservoir	1	\$2,835,000
Dampier Street Waterline (Pioneer St. to West Side Reservoir)	1	\$142,000
Neabeack Hill Reservoir Improvements	1	\$245,000
Starlight Village Pump Station Phase I Improvements	1	\$268,000
Neabeack Hill Fire Pump Station Aux Power Improvements	1	\$146,000
Marylin Drive Service Relocation	1	\$4,000
20 th Street Waterline Extension (Main to Applegate)	1	\$74,000
High School Site Waterline Extension (Applegate to end)	1	\$183,000
Priority 1 Subtotal		\$7,219,000
Ash Street Waterline Extension (19 th to 18 th)	2	\$29,000
Main Street Waterline Replacement (9 th to 14 th)	2	\$234,000
Applegate Street Waterline Replacement (Newton Creek Bridge to 30 th Street)	2	\$292,000
Canberra Waterline Extension (connect to 12" in Pioneer)	2	\$4,000
College Street Waterline Extension (12 th to 13 th)	2	\$26,000
12th Street (Pioneer to College)	2	\$12,000
8th Street (Main to Pioneer)	2	\$51,000
College Street (19th to 20th)	2	\$80,000
19th Street (College to End)	2	\$78,000
12th Street (Monroe to Houser)	2	\$121,000
12th Street (Pioneer to Grant)	2	\$104,000
Benton View Drive Waterline Extension	2	\$61,000
Water Master Plan Update	2	\$40,000
Priority 2 Subtotal		\$1,132,000
Starlight Village Pump Station Phase II Improvements	3	\$470,000
Upper Service Level Transmission Main (Pioneer Street to end)	3	\$532,000
Middle School Site Waterline Extension	3	\$129,000
North Arterial Transmission Main		
Pioneer Street to 9th Street	3	\$291,000
9th Street to Hills Road	3	\$439,000
Hills Road to Existing System in Green Road	3	\$543,000
Green Road to Boulevard Street	3	\$588,000
Boulevard Street to Corvallis-Newport Highway	3	\$861,000
South Arterial Transmission Main		
13th Street to Chapel Drive	3	\$225,000
Chapel Drive to 19th Street (Including 15th Street)	3	\$283,000
19th Street to Southwood Drive	3	\$576,000
Priority 3 Subtotal		\$4,937,000
GRAND TOTAL		\$13,288,000
*Costs are 2004 dollars and assume dry weather construction. ENR 20 Cities Index = 6956 (March 2004)		

FINANCING

Philomath does not currently have the resources nor is the City's existing user fee structure sufficient to fund the recommended improvements. Therefore, alternative funding sources must be pursued. Several potential funding sources are identified and discussed in **Section 7** of the Master Plan. All likely funding options will require the City to increase user rate and SDC's. We recommend that the City perform a user fee study and implement new user rates and SDC's as soon as possible.

IMPLEMENTATION PLAN

We recommend the City begin working toward the implementation of the Priority 1 improvements as soon as possible. The recommended implementation plan shows construction of the improvements in 2009. A two-phase implementation plan is recommended. This is discussed in greater detail in **Section 7**. The first phase includes the development of a funding plan for the recommended improvements. This should include an evaluation of the current user rates and SDC fees. The rates and fees should be increased as required. The second phase includes the implementation (i.e., construction) of the priority 1 improvements. A third and final phase of the implementation plan also exists. This includes the construction of the priority 2 improvements. These improvements are heavily dependent upon growth and may or may not be required during the planning period. Nonetheless, the City should plan for these improvements to avoid future crisis situations. The City should periodically evaluate the demands placed on the utility to determine how actual growth compares to the projections presented herein. If growth occurs faster than anticipated, the priority 2 improvements may be needed sooner. Should growth occur slower than anticipated, the priority 2 improvements may be delayed. The following table lists milestones and recommended completion dates for the first two phases of the implementation plan.

PROPOSED IMPLEMENTATION SCHEDULE (Priority 1 Projects – 2009 Construction)	
Milestone	Date
PHASE I	
Submit Draft Water Master Plan to OHD & City	5/15/05
Receive Comments from OHD & City	7/15/05
Submit Final Master Plan to OHD & City	9/01/05
OHD Approval of Final Master Plan	10/01/05
City Adopts Final Master Plan	10/15/05
Perform Rate Study & SDC Analysis	1/01/06
Update CIP	6/01/06
Implement New User Rates and SDC's	7/01/06
Conduct Funding Meeting with OECDD and RUS	1/01/07
Submit Funding Applications	3/01/07
Finalize Funding Package	5/01/07
PHASE II	
Select Design Consultant Prepare Predesign Reports	6/01/07
Submit predesign report to OHD, OEDD & City	9/01/07
OHD, OEDD & City approval of predesign report	11/01/07
Funding for Detailed Design Secured	12/01/07
Start Final Design of Recommended Improvements	1/01/08
Complete Final Design of Recommended Improvements	10/01/08
OHD, OEDD & City Approval of Plans & Specifications	12/01/08
Advertise for Construction Bids	1/01/09
Receive Construction Bids	2/01/09
Award Contracts	2/15/09
Start Construction	4/1/09
Complete Construction of Recommended Improvements	12/31/09