Council Meeting Date: June 11, 2012 **Agenda Item:** 8(a)

CITY COUNCIL AGENDA ITEM

CITY OF SHORELINE, WASHINGTON

AGENDA TITLE:	Council Goal No. 2: Acquisition of Seattle Public Utilities Water System in Shoreline – Due Diligence Review
DEPARTMENT:	Public Works
PRESENTED BY:	Mark Relph, Public Works Director Debbie Tarry, Assistant City Manager
ACTION:	____ Ordinance ____ Resolution ____ Motion __**X**__ Discussion ____ Public Hearing

PROBLEM/ISSUE STATEMENT:

City Council Goal No. 2, Improve Shoreline's utility, transportation, and environmental infrastructure, includes an action step to acquire the Seattle Public Utility's (SPU) water system in Shoreline. In November of 2011, the City of Seattle and the City of Shoreline announced a tentative agreement in principle to the sale of the water system assets at a price of $25 million in the year 2020.

In late 2011, the City began the next step in the process, which was to perform an engineering and financial analysis to test the viability of creating a City water utility. This "due diligence" process has been aided by a citizen steering committee, created by the City Manager to review the analysis and process. The City Manager tasked the committee to make a recommendation to her, for which she will then evaluate and make a recommendation to City Council as to how to proceed or not.

The Council was briefed on the progress of the citizen steering committee and the due diligence process on March 5th and again on May 7th. Tonight's briefing is to provide an update on the committee's progress since that date, review any significant changes to the due diligence information, review the continued negotiations with SPU in developing a formal agreement, review of the recently completed polling regarding the potential SPU acquisition and finally, to review the next steps in the process.

FINANCIAL IMPACT:

There is no immediate impact to Shoreline residents. However, if the acquisition is to proceed, the financial mechanism to purchase the system would be a revenue bond issued at the time of acquisition and paid for only by the utility rate payers within the SPU service area. Citizens who receive their water service from the Shoreline Water District (SWD) are not financially affected by this decision. Repayment of the revenue bond, or debt service, would be incorporated within the future water utility rate structure approved by City Council.

RECOMMENDATION

No action is required. This is intended as an update and for Council discussion.

Approved By: City Manager: City Attorney:

INTRODUCTION

The goal to acquire the SPU water system within the City of Shoreline has been a specific Council goal since 2009; however, the issue has been discussed perhaps as far back as the time of the City's incorporation. The central issues regarding the SPU water system have been the lack of direct citizen representation on issues such as rates and service, plus limited control over decisions that affect infrastructure improvements since the utility is owned and operated by Seattle. The Council's goal with the acquisition has been to address such concerns, but within a rate structure that would be equal to or less than the forecasted SPU rate structure for Shoreline customers.

The Council was briefed on the progress of the citizen steering committee and due diligence process on March 5th and again on May 7th. Tonight's briefing is to review the committee's progress since that date, review any significant changes to the due diligence information, review the continued negotiations with SPU in developing a formal agreement, review the recently completed polling regarding the potential SPU acquisition and finally, to review the next steps in the process.

BACKGROUND

The SPU water system is located approximately west of I-5 and a small section in the south-east corner of Shoreline (see attachment A) and serves roughly two thirds of the City. The water system within Shoreline is a distribution system. It includes water storage tanks and pump stations, but does not include a watershed or water treatment. There are larger transmission lines that pass through the City, providing treated water supply to larger wholesale customers (e.g. Shoreline Water District, Olympic View Water & Sanitation District) and south to the Seattle distribution systems. With the SPU system in Shoreline being solely a distribution system, the costs and responsibilities are more narrowly focused and less substantial had it included the water supply system.

The infrastructure itself varies in age from the 1930s to present day with a large phase of construction in the 1950s through the 1960s, as the Shoreline area developed into an unincorporated suburb of King County. While the pipelines are perhaps moderate in age, the question that many have raised is whether or not the level of maintenance performed over that time has been adequate, and if the investment in capital improvement programs (CIP) has met the demands of redevelopment and fire protection. This has been one of the central issues staff has discussed with SPU during the past several months.

On April 18, 2011, staff presented to City Council an update on the negotiations with SPU, including:

1. The reasons for acquiring the system;
2. What are the parameters to decide if the acquisition would be successful; and
3. The extent of the public participation process.

A copy of the full staff report may be found at:

http://cosweb.ci.shoreline.wa.us/uploads/attachments/cck/Council/Staffreports/2011/staffreport041811-7b.pdf

In November 2011, the City of Seattle and the City of Shoreline announced a tentative agreement on the sale of the water system assets at a price of $25 million in the year 2020. With the announcement of the tentative agreement, the City began a more detailed engineering and financial analysis for creating a City water utility. This "due diligence" phase was completed by the firm EES Consulting. The team assembled has considerable experience in the financial analysis of utilities and has added two key engineering personnel tasked with the development of an operations and maintenance plan for the water utility.

EES completed four key tasks:

1. Performed a preliminary engineering due diligence on the distribution and general plant water system
2. Completed a financial analysis and feasibility study
3. Developed a Business or Operating Plan
4. Provided an overview and study of water supply options in the region

The detailed staff report explaining the contract and this "due diligence" may be found on the City's website at:

http://cosweb.ci.shoreline.wa.us/uploads/attachments/cck/Council/Staffreports/2011/staffreport052311-8a.pdf.

On January 23, 2012, staff provided Council another update on the project and specifically discussed the due diligence work along with the formation and responsibilities for the citizen steering committee. A copy of this staff report may be found at:

http://cosweb.ci.shoreline.wa.us/uploads/attachments/cck/Council/Staffreports/2012/Staffreport012312-8c.pdf.

On March 5, 2012, staff provided Council another update on the project and specifically discussed the status of the public steering committee's review of the due diligence work. A copy of this staff report may be found at:

http://cosweb.ci.shoreline.wa.us/uploads/attachments/cck/Council/Staffreports/2012/Staffreport030512-7a.pdf.

On May 7, 2012, Staff provided to Council an update on the project and specifically discussed the status of the steering committee's review since the previous meeting and reviewed the preliminary detail of the engineering report and financial analysis. A copy of this staff report may be found at:

http://cosweb.ci.shoreline.wa.us/uploads/attachments/cck/Council/Staffreports/2012/Staffreport050712-7a.pdf.

DISCUSSION

SPU Citizen Steering Committee

Prior to the previous Council briefing on May 7th, the steering committee had met on six different occasions, plus two meetings of an engineering subcommittee and two meetings of a financial subcommittee. The first meeting on January 24th was a general introduction to the issues and process. The second meeting on February 8th provided the committee a preliminary review of the revenue forecasts based upon information developed by EES, including rate and consumption data specific to Shoreline customers and rate forecasts developed in large part by SPU. The third meeting on February 22nd was a presentation by EES staff on the draft engineering report. The engineering report was intended to document an assessment of the SPU assets and maintenance practices, provide cost estimates on the operation and maintenance of a City utility, plus propose a level of capital investment (initial and on-going) if the City were to acquire the system.

The March 14th meeting included a review of the costs of operating the utility and the preliminary financial analysis. The April 3rd meeting included a tour of the SPU facilities in Shoreline, a general discussion of the future of water supply in the region and how this affects Shoreline, plus a review of the base financial case and sensitivities analysis. The April 25th meeting included a discussion on any outstanding issues left unanswered and a presentation of the operational challenges of the Shoreline Fire Department.

The engineering subcommittee meetings of March 8th and April 11th included review of the engineering questions since the February 22nd submittal of the engineering report and updates on the discussions with the Department of Health regarding water storage requirements and the long-term water plan requirements, respectively.

The financial subcommittee meetings of March 26th and May 2nd included discussions on the general assumptions for revenues and expenditures and the review of the financial questions generated since the April 25th committee meeting, respectively.

The detail behind each of these meetings can be found on the City's webpage at the following locations:

1. January 24th Steering Committee meeting: http://shorelinewa.gov/Modules/ShowDocument.aspx?documentid=10679.
2. February 8th Steering Committee meeting: http://shorelinewa.gov/Modules/ShowDocument.aspx?documentid=10719.
3. February 22nd Steering Committee meeting: http://shorelinewa.gov/Modules/ShowDocument.aspx?documentid=10782.
4. March 14th Steering Committee meeting: http://shorelinewa.gov/Modules/ShowDocument.aspx?documentid=10926.
5. April 3rd Steering Committee meeting: http://shorelinewa.gov/Modules/ShowDocument.aspx?documentid=10975.
6. April 25th Steering Committee meeting: http://shorelinewa.gov/Modules/ShowDocument.aspx?documentid=11196

Engineering Subcommittee:

A. March 8th meeting materials: http://shorelinewa.gov/Modules/ShowDocument.aspx?documentid=10896.

B. April 11th meeting materials:
http://shorelinewa.gov/Modules/ShowDocument.aspx?documentid=11122.

Financial Subcommittee:

A. March 26th meeting materials:
http://shorelinewa.gov/Modules/ShowDocument.aspx?documentid=10956.
B. May 2nd meeting materials:
http://shorelinewa.gov/Modules/ShowDocument.aspx?documentid=11248.

Since the May 7th Council briefing, the Steering Committee has had two regular meetings (# 7 & #8), plus one engineering subcommittee meeting. The topics and meeting materials can be found on the City's webpage.

Committee Meetings:

7. May 9th Steering Committee meeting:
http://shorelinewa.gov/Modules/ShowDocument.aspx?documentid=11247.
8. May 30th Steering Committee meeting:
http://shorelinewa.gov/Modules/ShowDocument.aspx?documentid=11307.

Engineering Subcommittee:

C. May 23rd meeting materials:
http://shorelinewa.gov/Modules/ShowDocument.aspx?documentid=11284.

Since the May 7th Council briefing, the citizen committee has reviewed the details of the Engineering Report, the Financial Report and Sensitivity Analysis, plus the Business Plan for the proposed utility. The Committee made suggestions and that resulted in changes to the final updated reports. Those final reports were submitted to the Steering Committee at the May 30th meeting, which the Committee is considering as they begin to make their recommendation to the City Manager. This staff report will summarize the changes in those three reports since the May 7th Council briefing.

Due Diligence

The purpose of the due diligence is to evaluate the feasibility of the acquisition from an engineering and financial perspective. The Council briefing of May 7th provided a detailed summary of the draft Engineering Report, the draft Financial Report and sensitivity analysis, plus the Efficiency Report for integrating the utility with City operations. Since that briefing, some changes have been made to those documents as well as the preparation of a Business Plan for operating the utility. A summary of those changes are as follows:

Engineering Report

The updated Engineering Report is Attachment B. Updates to the report primarily add clarification to the issues and do not change the cost estimates or recommendations reviewed by Council on May 7. However, there were a few changes to the report that did revise how the project may be approached and resulted in some changes to the initial cost estimates. These are summarized as follows:

- The City's administrative overhead estimate for the utility was recalculated using current estimates for operations and maintenance. This resulted in a reduction from the original estimate of $1.5 million to approximately $1.1 million, for a net

annual savings of approximately $400,000. The original estimate was made in 2010 anticipating that more detailed analysis would be completed during a due diligence phase. The City supplied the Steering Committee a separate technical memo regarding the overhead calculation on May 9. The administrative overhead includes an allocation to the utility for shared service costs such as legal, city administration, human resources, accounting and budget, facilities, etc.

- The North City Pump Station has the capacity to meet normal system demands. A second connection in the vicinity of 145th and Aurora will either be a full service "wholesale" connection, or an emergency intertie. The difference between the two could influence the amount of water storage required depending upon whether or not the Department of Health views this second connection as a "second source." A "second source" connection may reduce the water storage requirements. While SPU has a preference for an emergency intertie, the acquisition agreement will address the future for the wholesale service. The final decision would be made a few years prior to the acquisition date as noted in the Business Plan. The engineering cost estimates have been revised to reflect a more conservative single source water storage requirement. This information is reflected in Table 14, Required Capital Improvements Prior to the Independent System Operation, of the Engineering Report. The result of this change was an increase of $784,100 from $4.1 million to $4.9 million.
- The pump station and control system capital improvements, Table 9 of the Engineering Report, include an increase in cost of $50,000, from $14,400 to $64,000 for the Dayton Pump to include a second standby pump.
- The operational challenges of the Shoreline Fire Department were presented to the Committee on April 25 and included in the Council update on May 7. The Engineering report reflects those areas of concern with their inclusion in the water main replacement program.
- The B3 Alternative separation costs (Table 7 of the Engineering Report) have been revised upwardly by approximately $733,900. The largest component of the change includes a $645,000 increase in cost for the Foy Standpipe replacement, which is necessary for SPU operation. The remaining $88,000 cost increase is related to increased metering costs.

Since the May 7 Council briefing, SPU has completed a hydraulic modeling of the separated system for both the SPU portion and the Shoreline system. SPU provided a report which is Attachment C. Staff contracted with the engineering firm CH2MHill to critique the modeling, which is Attachment D. The conclusion of both reports is that the separation concept (B3 of the Engineering report) is reasonable and both systems function reasonably with no fatal flaws in the separation concept and in operation. Further modeling in the future is expected per the Business Plan to a large part in setting priorities within the water main replacement program.

CH2MHill was also contracted to critique the engineering cost estimates used in the separation concepts and the capital improvement program. Attachment E is a copy of their report. The conclusions of this report are that the cost estimates are reasonable for this level of engineering analysis.

Financial Report

The updated Financial Report is Attachment F. The Financial Report was updated based on the changes in costs identified in the Engineering Report and adjustments to the revenue projections based on additional rate projection information from SPU. The primary changes in the financial report include:

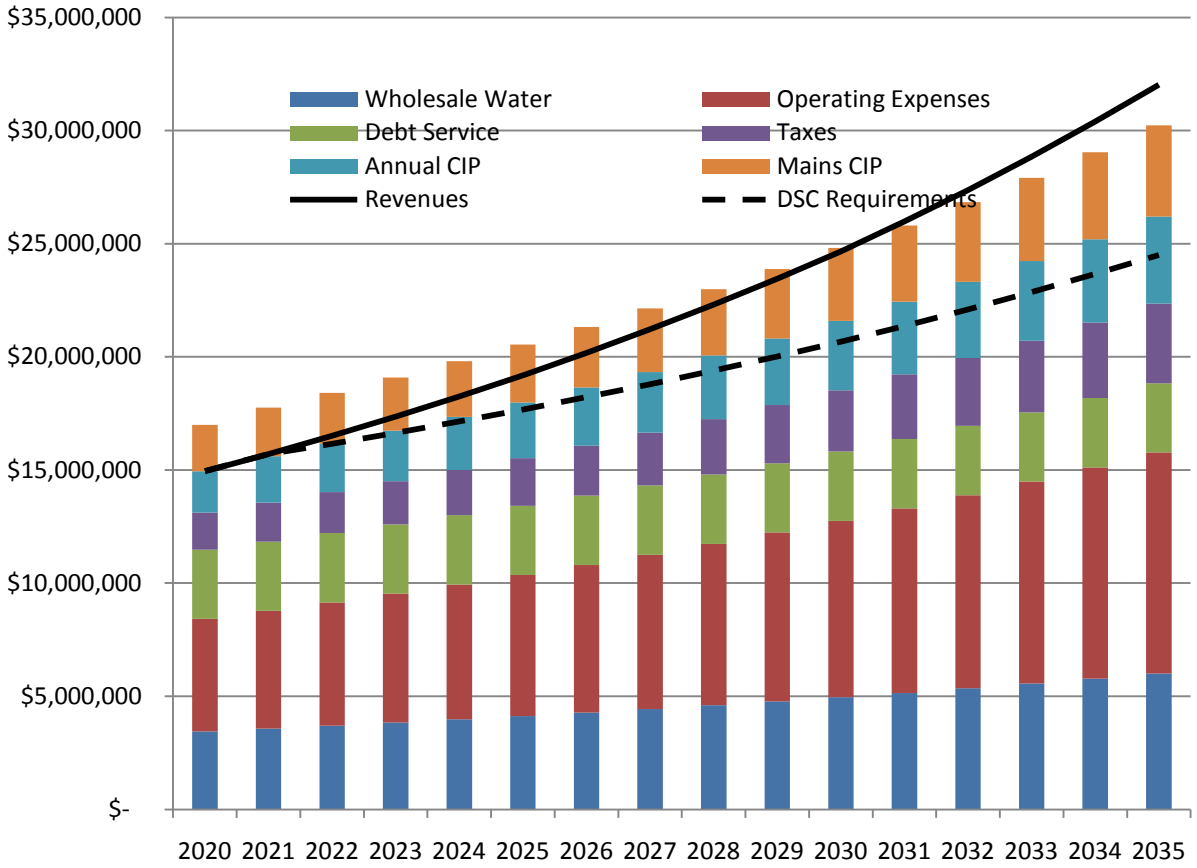
- The projected SPU rate increases for 2012 through 2014 were updated to reflect the rate increases adopted in SPU's 2012-2014 Rate Study. The draft report reflected increases of 9.3%, 9.5%, and 9.6% for 2012, 2013, and 2014 respectively. The rate study adopted by the City of Seattle has rates increasing by 8.7%, 8.7% and 8.5% for 2012 through 2014. As a result, the long-term revenues are slightly lower in the final report than the draft report. In 2020 the projected utility revenues are now $14.9 million as compared to the $15.2 million in the draft report.
- The acquisition price for the SPU assets has been adjusted from $25 million to $26.6 million. The primary change is the increased value of the improvements currently being made to the Richmond Highland water storage tank ($1.1 million). The remaining increase is related to the improvements being completed as part of the Aurora project.
- The final report has total acquisition and initial capital costs of $40.8 million. The draft report had total acquisition and initial capital costs of $37.7 million. The increase reflects the increased separation cost and the increased capital costs for water storage facilities as discussed in the Engineering Report section of this report. Since the acquisition and initial improvements will be funded with proceeds from revenue bonds, the debt service to repay the bonds increased from $2.8 million to $3.06 million. The debt service payments will be made from the water utility fees over a 30 year period.
- The operating costs of the utility have been adjusted to reflect the decrease in administrative overhead costs discussed previously in the Engineering Report section of this staff report.
- The updated financial analysis reflects a slight increase in the amount available to fund on-going capital improvements starting in 2020 than the draft plan.

Below is a table reflects the change in revenues and costs from the draft to the final Financial Report:

Comparison of Original to Updated Base Case		
Capital Costs	**Original**	**Updated**
Purchase Price (2012 $)	$25,000,000	$26,600,000
Separation Cost (2012 $)	$5,204,400	$5,938,300
Upfront Costs (2012 $)	$7,459,770	$8,293,470
Mains Replacement (2012 $)	$32,695,157	$32,901,908
First Year Revenues/Costs - Year 2020		
Revenues	$15,274,607	$14,941,318
Wholesale Water Cost	$3,443,399	$3,443,399
Labor	$1,759,465	$1,759,465
Materials & Supplies	$945,339	$945,339
Employee Benefits	$703,787	$703,787
Administrative Overhead	$2,149,536	$1,567,134
Taxes	$1,676,734	$1,639,976
Debt Service	$2,811,358	$3,062,131
Expenses before CIP	$13,489,618	$13,121,230
Amount Remaining for CIP	$1,784,989	$1,820,088

Using the updated financial analysis the base case scenario results in the ability to fund 111% of the main replacement program during the first 20 years of the utility operation. The following chart summarizes the costs and revenue projections for the base case scenario for years 2020 through 2035.

Base Case Revenue vs. Cost Comparison
2020-2035



Business Plan

The Business Plan (Attachment G) is intended to provide the City with a list of tasks and responsibilities that will be necessary over time to implement the engineering and financial plans, ultimately creating the City water utility. This document is intended to be updated and expanded upon since new information and details will be pursued as the City moves forward with implementation. The Business Plan contains five sections:

1. Overall responsibilities and organization for the new utility
2. Discussion of the startup and transition issues.
3. The Wholesale Water purchases
4. Engineering and Operations
5. Administrative and General.

The organizational structure proposes the utility to be a function of Public Works. This is fairly typical for a City organization the size of Shoreline, especially with an engineering function within the department. There are also administrative and billing oriented functions within the utility and would become part of the Administrate Services Department.

The startup of the utility is divided into three time periods, 2012-2016, 2016-2020 and the initial operating period of 2020-2021. The first time period will require execution of the Agreement between Seattle and Shoreline, plus negotiation of the wholesale water contract and preliminary planning for the maintenance facility.

The second time period will be focused on the planning and engineering of the separation and other initial system improvements, plus the continued planning for the maintenance facility, new equipment and staffing. It is also during this time period where the City will develop a Comprehensive Plan for the utility. This plan will need to be reviewed and approved by the Department of Health.

The last two years of the second time period will be a time of construction for the separation of the system and the other initial capital improvements necessary to make the Shoreline system a standalone water utility (e.g. pump station modifications, storage tank construction, SCADA system, utility billing, etc.). To accomplish this task, short term financing will have to be arranged to fund all of the initial improvements. The cost of this financing would be included in the revenue bond which is to be issued once the City takes ownership in 2020. The cost of this short-term financing has been included in the financial model of the utility.

The third time period is the first year of operation. The physical handoff from SPU to Shoreline on January 1, 2020 will take careful planning and coordination. The Department of Health will also require specific certifications to operate as a water utility; Satellite Management Agency - SMA. This may be accomplished either through a contract with another water utility (SPU), or the City may apply for such status. It is the goal of the City to the SMA as soon as possible.

Polling

The City hired EMC to conduct polling regarding the potential SPU acquisition. The polling questions and results are included as Attachment H. The polling represents a statistically valid sampling of the Shoreline community. The polling represents results from 501 participants and has an error rating of +/- of 4.4%. Andrew Thibault, from EMC, will be present at the meeting this evening to present the results of the polling. The following three themes summarize the results from the poll:

1. The city stills receives very strong performance ratings – 74% of respondents say the City is headed in the right direction.

2. A majority initially support the acquisition, but there is considerably uncertainty – 51% of respondents initially supported the acquisition with 32% stating they didn't know.

3. Details about the process reassure residents and dramatically increase support – support for acquisition increases to 79% and those who don't know goes down to 11%. Those opposing the acquisition falls from 17% before additional details are shared to 10% after additional details are shared.

SPU Acquisition Agreement

Staff has been working with the City of Seattle to develop the acquisition agreement. There are a number of issues that will need to be addressed in a final agreement, including not only the acquisition and system separation costs, but also the wholesale water agreement, transition of operations, and SPU system maintenance in the years between voter approval and 2020. In discussions with the City of Seattle, staff has agreed that it will take the next few months to work through the agreement. Given that there will be a substantial amount of time invested in the development of the agreement for both the City of Seattle and City of Shoreline, staff believes that it would be prudent to have the City of Seattle adopt a resolution, authorized by the Seattle City Council, supporting the sale of the SPU system in Shoreline and the negotiation of the related purchase/sale agreement. Staff would anticipate that the Seattle resolution should be approved prior to August 6, which is the final date for the Shoreline Council to authorize placing the acquisition on the November General Election. Staff would anticipate that the purchase/sale agreement should be reviewed and adopted by both councils this fall, prior to the November election. The draft Seattle resolution is Attachment I.

Ballot Language

The City Council will need to authorize placing the SPU acquisition on the ballot for a city-wide vote. Staff and Council have been targeting the November General Election. The deadline for the Council to authorize ballot language is August 6, since the ballot language must be submitted to King County Elections no later than August 7.

Except as provided to the contrary in RCW 82.14.036, 82.46.021, or 82.80.090, the ballot title of any referendum filed on an enactment or portion of an enactment of a local government and any other question submitted to the voters of a local government consists of three elements:

a. An identification of the enacting legislative body and a statement of the subject matter;
b. a concise description of the measure; and
c. a question.

The ballot title must conform with the requirements and be displayed substantially as provided under RCW 29A.72.050, except that the concise description must not exceed seventy-five words. Ballot measures submitted by cities are developed by the City Attorney. Although additional work will be needed to develop the final ballot language for Council's consideration, the City Attorney has begun drafting language. Below is a preliminary draft of what Council may anticipate as the recommended ballot language:

PROPOSITION NO. 1
AUTHORIZING CITY OF SHORELINE WATER SERVICES AND SYSTEM ACQUISITION

The Shoreline City Council passed Ordinance No. XXX concerning City operation of a water utility within the Seattle Public Utilities (SPU) service area in the City of Shoreline, and approving acquisition of the SPU water distribution system within Shoreline, including all facilities, properties and contracts obligations, excluding storage and transmission facilities serving customers outside Shoreline.

The ordinance authorizes Shoreline to provide water service in the SPU service area in Shoreline, construct system improvements including facilities needed to separate the distribution system costing approximately $14.4 million, and acquire the SPU water distribution system in Shoreline on December 31, 2019 for $26.6 million; all to be financed with grant funds or revenue bonds repaid by water rates from customers in the SPU service area following acquisition.

Should this measure be:
Approved ____
Rejected ____

STAKEHOLDER OUTREACH

The City is committed to an extensive public process, which will occur over the next few months. Sharing the details and soliciting input on the level of water service problems, the CIP, maintenance, rates, and expectations on customer service will be important to determine if a proposed budget will meet the public expectations and ultimately the financial parameters established by Council.

Coordinated with the Steering Committee are other types of opportunities for public participation which include:

- Attending neighborhood, business, and civic group meetings;
- Providing open houses and workshops;
- Distributing information to neighborhood newsletters, *Currents*, the cable channel, direct mailers to the affected rate payers as well as all the citizens of Shoreline; and
- Conducting formal public hearings.

City staff has already attended several neighborhood meetings to provide information about the SPU acquisition and have scheduled two public open houses for June 14 and June 19.

RECOMMENDATION

No action is required. This is intended as an update and for Council discussion.

ATTACHMENTS

Attachment A – SPU Water Service Area within the City of Shoreline
Attachment B – EES Engineering Report, May 2012
Attachment C – SPU Hydraulic Modeling Draft Report
Attachment D – CH2M Hill Hydraulic Modeling Critique
Attachment E – CH2M Hill Engineering Cost Estimate Critique
Attachment F – EES Financial Report, May 2012
Attachment G – EES Preliminary Business Plan, May 2012
Attachment H – EMC Polling Report
Attachment I – Draft City of Seattle Resolution

Attachment A

SHORELINE

Geographic Information System

Shoreline Utilities 2011

Water District

- Other
- Shoreline Water District
- Seattle Public Utilities

Utility districts occupying entire City Limits:
Ronald Wastewater District
AT&T Broadband
Puget Sound Energy
Seattle City Light

City Boundary

1 inch = 2,000 feet

0 495 990 1,980 2,970 3,960 Feet

Updated on: February 16, 2006

City of Shoreline

Shoreline Water System Engineering Review

May 2012

Prepared by:

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Contents

Introduction 1

Status & Condition of Existing System 2

Current Maintenance Program 20

Current Capital Improvement Program 22

Proposed Maintenance Prior to Shoreline Acquisition 23

Proposed Post-Acquisition Maintenance Program 25

Proposed Post-Acquisition O&M Budget 28

Separation Options, Issues & Costs 31

Proposed Capital Improvements and Budget 39

Additional Water Utility Functions 52

Further Engineering Review & Evaluation 55

Introduction

The City of Shoreline is evaluating the feasibility of acquiring and operating Seattle Public Utilities' water system infrastructure within the city limits of Shoreline. The acquisition would take place in the year 2020. This report provides an initial engineering review of the Seattle Public Utilities (SPU) water system assets which are under consideration for acquisition by the City of Shoreline. The author based the review on his experience of operating and managing staff and infrastructure at a large water utility, along with review of relevant engineering documents related to the Shoreline water system, interviews with SPU and Shoreline staff, and site visits to key facilities. The report outlines the overall operation of the system, including pump stations, storage facilities, pressure reducing stations and distribution system infrastructure. Condition of the facilities is evaluated, and deficiencies and other issues are identified. The Shoreline water system is presently an integral part of the SPU system and will need to be modified to become a separate water system, so separation alternatives, issues and costs are outlined. Operation and maintenance costs of the new utility are estimated, as are staffing levels and capital improvement budgets. Since the acquisition will occur a number of years in the future, recommended maintenance and capital improvements are also listed for the period prior to acquisition. During the years prior to the transfer of assets to Shoreline, additional engineering review and evaluation work will need to be carried out. Next steps in the engineering process are identified in this report. This report is prepared as a feasibility evaluation and is not intended to provide a design level of detail.

Status and Condition of Existing System

Summary of Existing Facilities and Operations

The City of Shoreline receives water service from Seattle Public Utilities (SPU) and from the Shoreline Water District, as shown on Figure 1. Most of the SPU service area is located west of I-5, although a small area in the southeast corner of the City also is served by SPU.

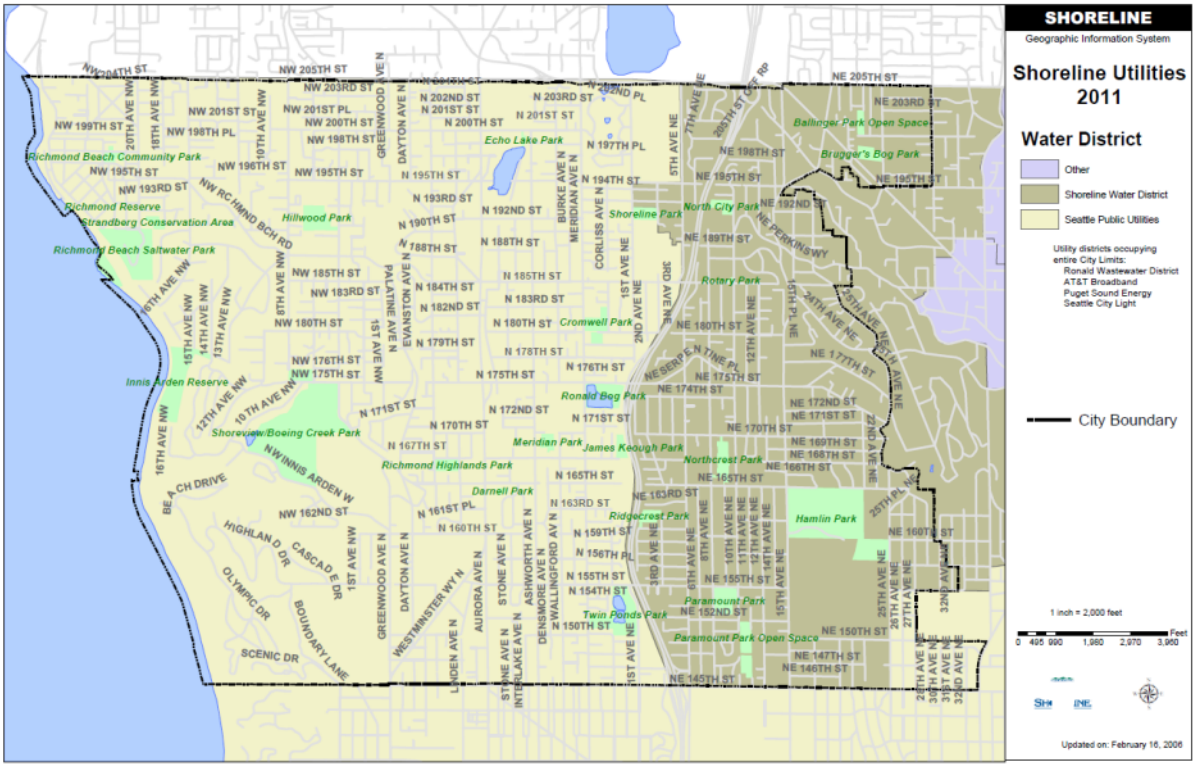


Figure 1 - Water Utility Service Areas

Water is supplied to the City of Shoreline from SPU's Tolt system through the 550 Pipeline, although water from the Cedar River system can also be delivered if the Tolt system is unavailable. Most of the system to be acquired from SPU is located to the west of I-5. This area is presently supplied through the North City Pump Station, the Foy Pump Station, and at times, the Bitter Lake Pump Station. A small area in the southeast corner of the City of Shoreline would also be acquired. This area would be fed from the adjacent SPU distribution system through a metered connection.

SPU provides wholesale water service to the Olympic View Water District through connections located on the north boundary of the City of Shoreline. Water for these connections is pumped

through the Shoreline area by the North City and Foy Pump Stations. SPU also provides wholesale water service to the Shoreline Water District using the North City Pump Station.

Storage in the Shoreline area is provided by the 2 million gallon Richmond Highlands elevated Tank 2, located at Fremont Ave and N 195th Street, the adjacent 1 million gallon Richmond Highlands elevated Tank 1, and by the 1 million gallon Foy Standpipe, located at Dayton Ave N and N 145th Street.

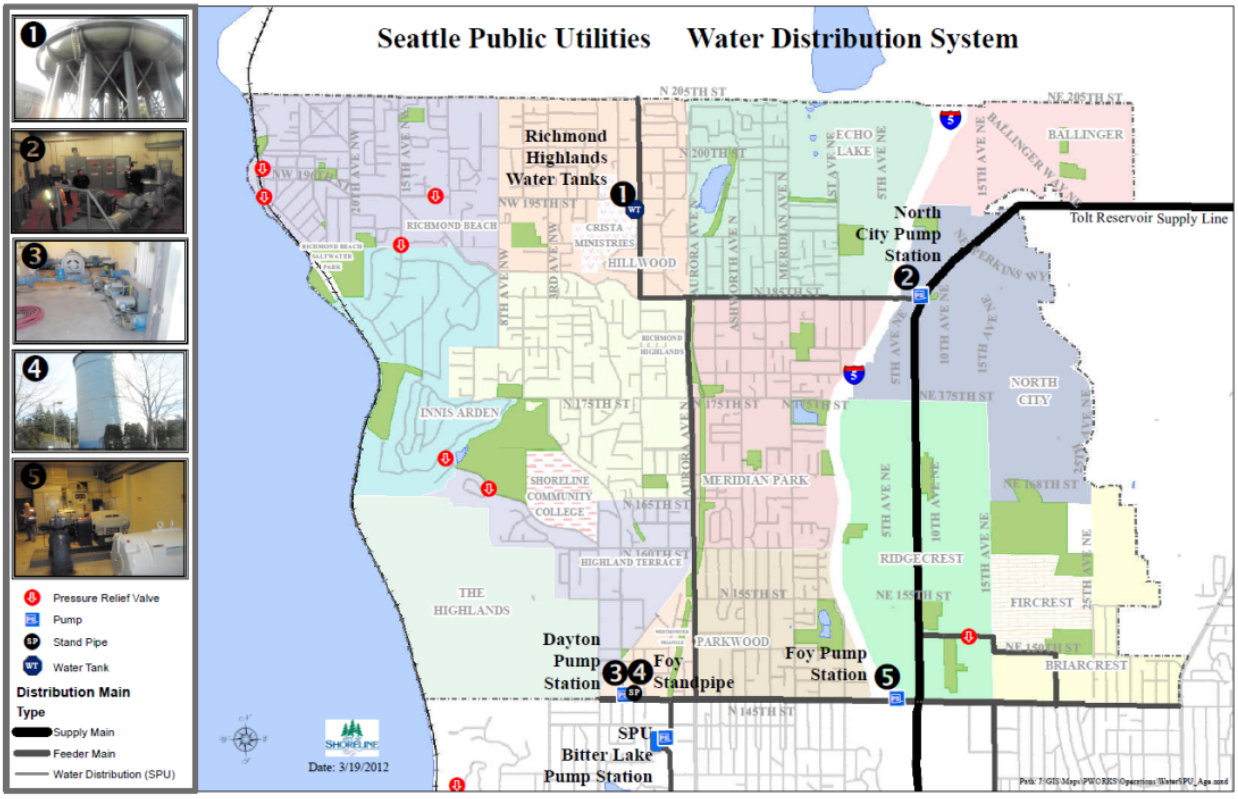


Figure 2 - SPU Water Facilities within Shoreline

The largest pressure zone in the Shoreline area is the 590 zone, fed by pumping from the Tolt 550 Pipeline. The 590 pressure zone extends into Seattle to the south of Shoreline as shown in Figure 3. The 590 zone supplies the 480, 430, 290 and 210 pressure sub-zones through pressure reducing valves. The lower zones are equipped with pressure relief valves. The closed loop 660 pumped zone is fed by the Dayton Pump Station, located by the Foy Standpipe.

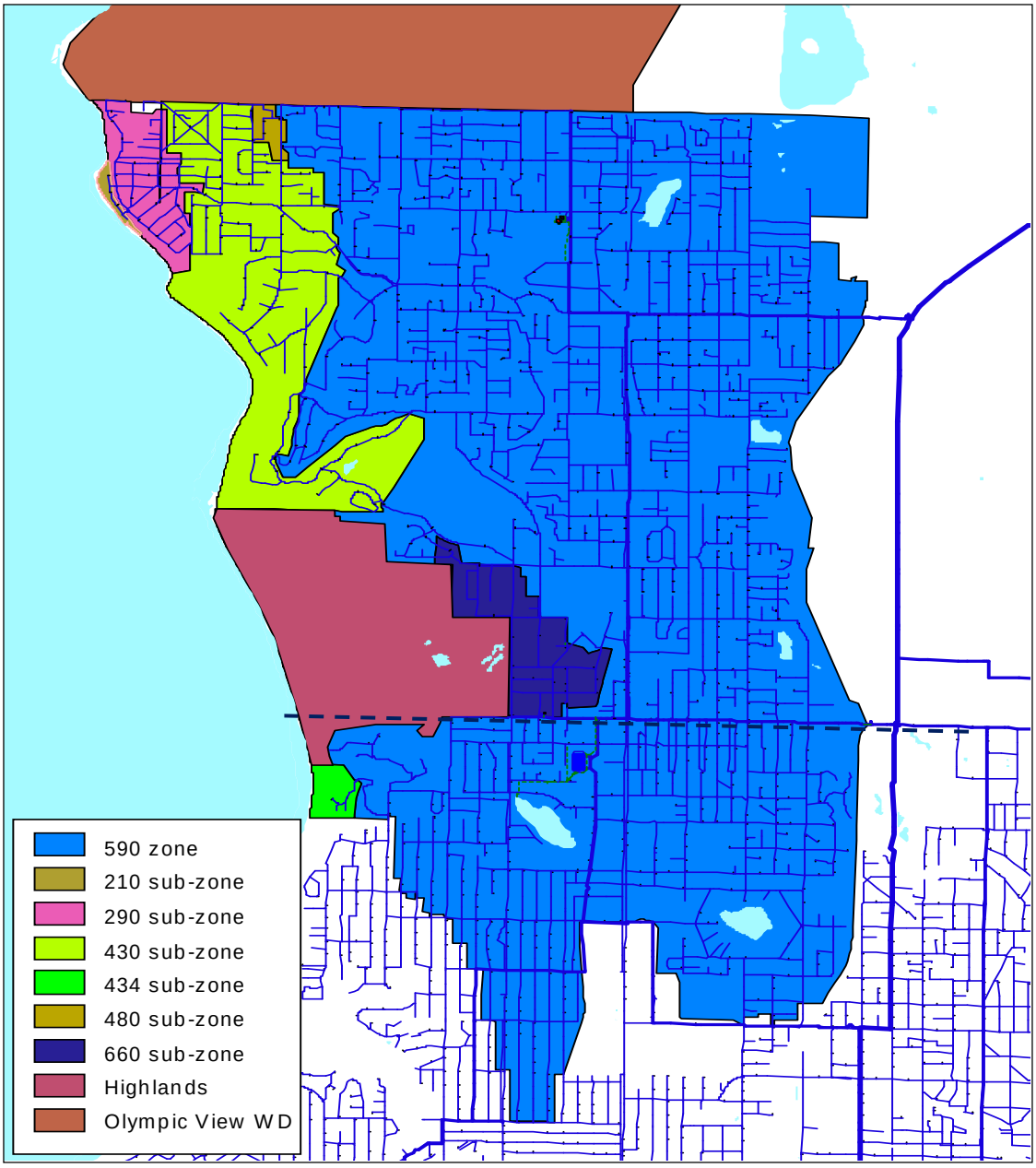


Figure 3 - 590 Pressure Zone and Sub-Zones

Pump station capacities are summarized below. North City and Dayton Pump Stations would be acquired by Shoreline under all scenarios, and Foy Pump Station would provide service to Shoreline under some alternatives. Bitter Lake Pump Station would not be acquired and would not provide supply to Shoreline, and consequently is not listed here.

North City Pump Station	11,000 gallons per minute
Foy Pump Station	11,000 gallons per minute
Dayton Pump Station	1,400 gallons per minute

Storage facility capacities are also summarized. Richmond Highlands Tanks 1 and 2 would be acquired by Shoreline under all scenarios. Although Foy Standpipe would not be acquired, it is listed here since Shoreline would be required to upgrade or replace the facility for SPU's use.

Richmond Highlands Tank 1	1,000,000 gallons
Richmond Highlands Tank 2	2,000,000 gallons
Foy Standpipe	1,000,000 gallons

Summary of System Demands

SPU has 10,570 services in the 590 zone (including the sub-zones as shown on Figure 3) in Shoreline, and 340 services in the 430 zone located in the southeast portion of Shoreline.

Figure 4 shows annual billed consumption converted to average day demand for the SPU system within the City of Shoreline. Total consumption would include an additional amount of non-revenue water, estimated at 5%.

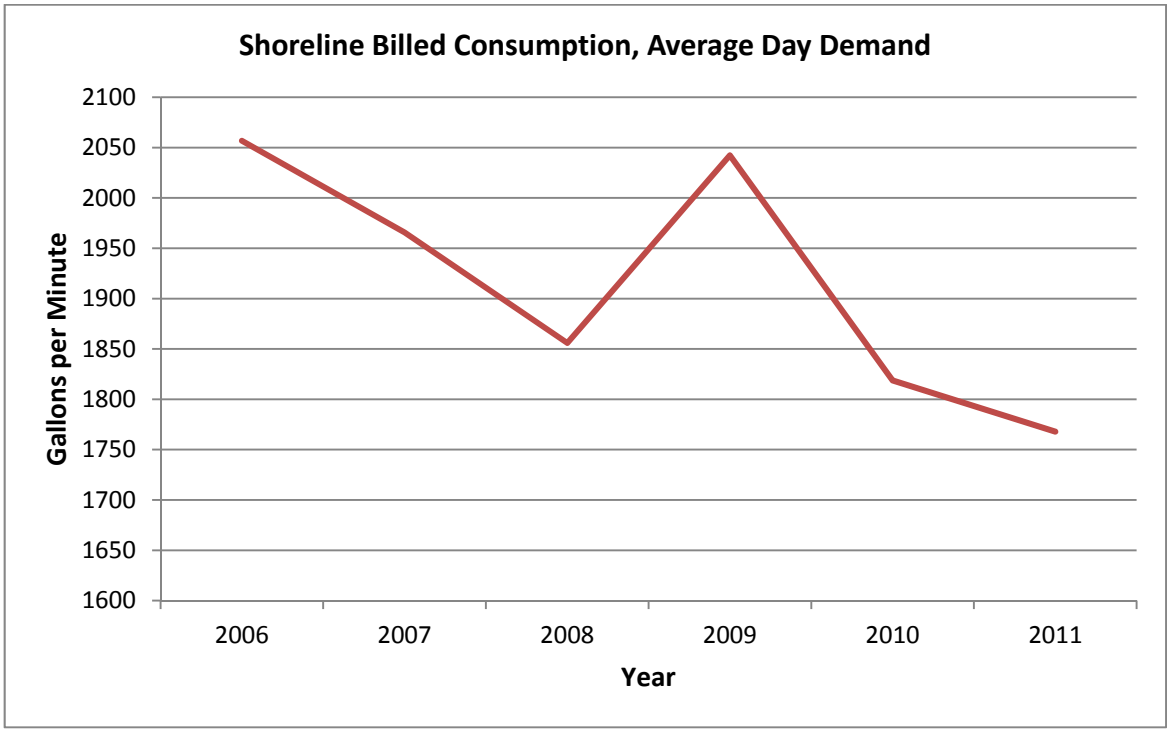


Figure 4 - Average Day Demand

Maximum day demand is estimated at 1.8 times average day demand, and is shown in Figure 5. These demands also reflect billed consumption, and would increase by an estimated 5% to provide total maximum day demand.

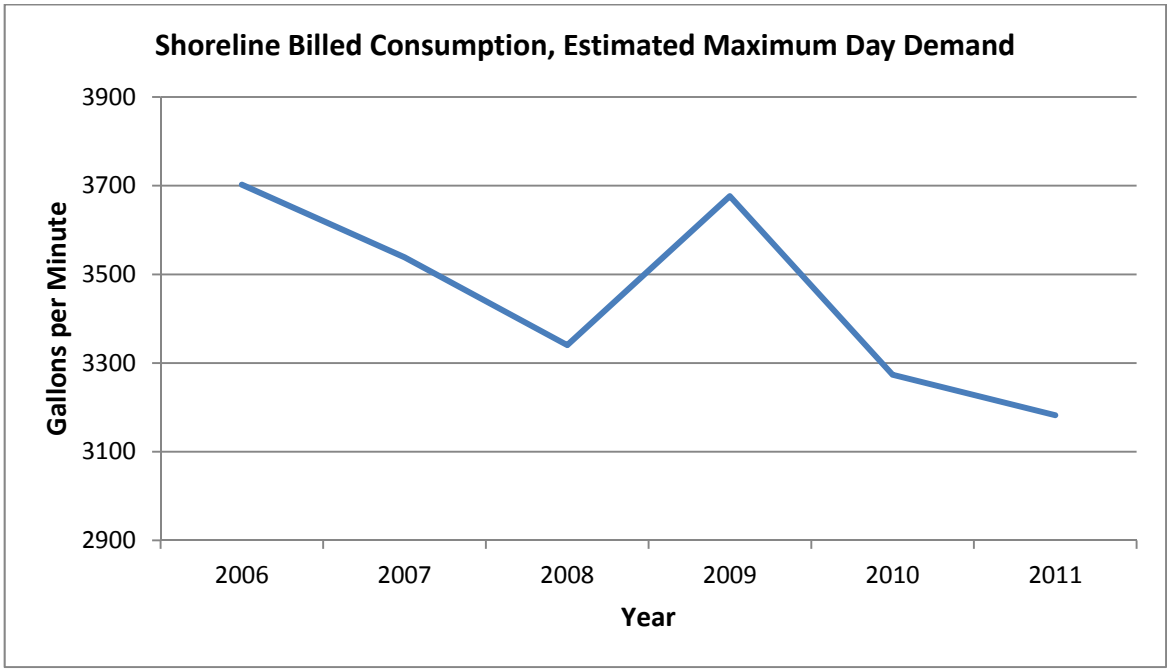


Figure 5 - Maximum Day Demand

In addition to the water used within the SPU system in Shoreline, wholesale water is also pumped through the Shoreline area to the Olympic View Water & Sewer District and Shoreline Water District. Average daily demand through the 590 pressure zone to these services is approximately 700 gallons per minute.

Description of Facilities and Operations

North City Pump Station

Figure 6 – North City Pump Station Interior

North City Pump Station is located on NE 185th Street, between 8th and 9th Ave NE. North City Pump Station is used as the primary feed to the Shoreline area. The underground station was constructed in 1968 and is located adjacent to the 550 Pipeline. The station includes two pumps, each rated at 6,500 gpm and powered by a 250 hp motor. The pumps can be operated in parallel, with a combined output of 11,000 gpm. The inlet flow meter at the pump station is used for operational purposes but would not be suitable as a revenue meter.

Telemetry at the station includes pump start/stop control from SPU's Operations Control Center (OCC), pump status, suction and discharge pressure, inlet flow, and a station intrusion alarm. The station has a flood alarm but not a fire alarm. OCC operators start and stop the pumps as needed to maintain the water level in the Richmond Highlands tanks.

Figure 7 – North City Pump Station Exterior

In the event of loss of power at the pump station, a check valve along with a remotely controlled 12" bypass valve can be opened to allow 550 Pipeline pressure to feed the Shoreline area at sufficient pressure to keep the system pressurized. The bypass would only be used when SPU's Lake Forest Reservoir is taken offline and the 550 Pipeline is operated at 590 feet. The station does not have standby power or a connection for portable standby power. An additional manually operated 24" bypass line is located outside the pump station.

Foy Pump Station

Figure 8 – Foy Pump Station Interior

Figure 9 – Foy Pump Station Exterior

Foy Pump Station is located at the intersection of 5th Ave NE and NE 145th St. The pump station is an above ground concrete building with a pitched roof. It can draw suction from either the 550 Pipeline or the 430 pressure zone, with the station normally drawing from the 550 Pipeline. The building and piping were originally constructed in 1933. New pumps were installed in the early 1990's, including two 400 hp 4,400 gpm pumps and one 6,000 gpm pump. A separate set of impellers is kept at the station for use when pumping from the 430 zone; however they are no longer used due to the similarity of pump performance with either set of impellers installed.

Telemetry at the station includes pump start/stop control from the OCC, pump status, suction and discharge pressure, smoke, flood, and station intrusion alarms. A circular chart recorder is installed but is not in use. OCC operators start and stop the pumps as needed to maintain the water level in Foy Standpipe and the Richmond Highlands tanks.

The station does not have standby power or a connection for portable standby power.

Bitter Lake Pump Station

This pump station would not be acquired by Shoreline, and would continue to serve SPU's portion of the 590 zone. Its relevance to Shoreline is that it currently provides the only pumped backup source if North City and Foy Pump Stations are offline. To replace this function, North City Pump Station would be equipped with backup power, as discussed later in this report. Bitter Lake Pump Station is located south of Shoreline, at Bitter Lake Reservoir at Linden Ave N and N141st St. It can be used to pump from the reservoir to the 590 zone, and presently can be used as a backup supply to the Shoreline area. After system acquisition, this station will continue to be a component of the SPU system which is able to provide backup supply on an 'as available' basis. The station includes three pumps rated at 4,000 gpm each, one of which has a diesel powered standby generator. This location also includes a pressure relief valve for the 590 zone. The pump station's normal use is to improve turnover of the storage at the reservoir. When operated on standby power, the

generator must be started onsite, and must be staffed continuously while running. Addition of remote start capability is planned for 2012.

Dayton Pump Station

Figure 10 – Dayton Pump Station Exterior

Figure 11 – Dayton Pump Station Interior

The Dayton Pump station was constructed in 1978 to supply the higher elevation area to the north of Foy Standpipe. The pump station building is located in an above ground concrete building next

to Foy Standpipe on N 145th St and Dayton Ave N. The station operates as a closed loop system, with two pumps. A 3 hp, 70 gpm pump operates continuously, and a 50 hp, 1,400 gpm pump cycles as needed to maintain pressure within a 20 psi operating band. Two 10,000 gallon hydropneumatic tanks are used to allow the pumps to cycle based on pressure. At peak demands, the large pump is reported to cycle as much as 80 times a day. The station does not have standby power, but is equipped with check valves to feed from the 590 zone if needed.

Scada includes pump start/stop control, discharge flow and pressure. Alarm functions include intrusion and flood, but no smoke alarm is installed.

Richmond Highlands Tanks 1 and 2

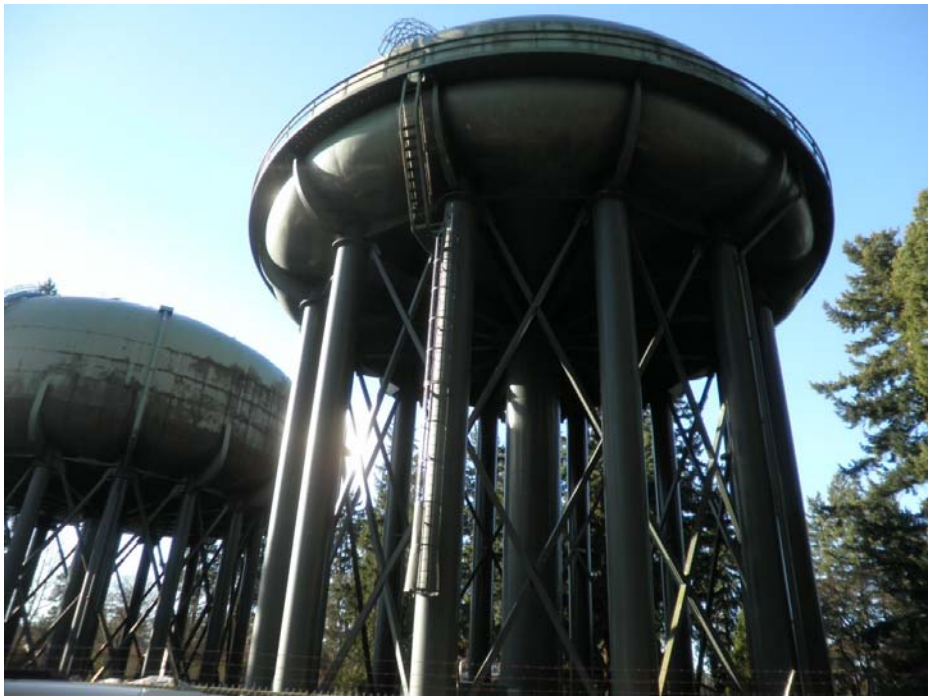


Figure 12 – Richmond Highlands Tank 1 (right) and Tank 2 (left)

The Richmond Highlands Tanks are located at N 195th St and Fremont Avenue N. Both are elevated steel tanks of similar design. Tank 1 was constructed in 1954 and Tank 2 was built in 1958. Both were seismically upgraded in 1994. Tank 1 has a bowl diameter of 86 feet and height of 25 feet, providing 1 million gallons of capacity. Tank 2 has a bowl diameter of 101 feet and height of 35 feet, providing 2 million gallons of capacity. Both tanks have a spill elevation of 590 feet. The top of the concrete base is at elevation 492.5 for Tank 1, and 488.5 for Tank 2.

Tank 1 has interior coal tar lining, which was found to need replacement in the most recent inspection by SPU. The tank bowl's exterior is painted with lead based paint which also was found to need replacement. Tank 1's legs were repainted as part of the 1994 seismic upgrade work, but the coatings on the bowl were not replaced during the seismic work.

Tank 2 is currently being internally and externally recoated, with the exception of the legs and substructure. Tank 1 is planned to be taken out of service once Tank 2 is recoated. The current plan is to leave Tank 1 empty and out of service but intact and physically connected to the system. SPU proposes Tank 1 would be minimally maintained and placed into service in its current condition during times that Tank 2 is out of service for scheduled cleaning or other maintenance. Tank 1's failed internal and external coatings are not scheduled for replacement, but the tank would be maintained in mothballed condition such that it could be recoated and returned to regular service at some point in the future.

The Richmond Highlands tanks have telemetry to monitor water level. The tanks are not outfitted with internal cathodic protection systems to prevent internal corrosion and subsequent coating failure. The tanks do not have intrusion alarms on the hatches but are padlocked. Ladders are caged with locked gates at the bottom of the cages.

Foy Standpipe

Figure 13 – Foy Standpipe

Foy Standpipe is located on the north side of NE 145th St at Dayton Avenue N. It is a riveted steel standpipe and was constructed in 1933, with a diameter of 46 feet and height of 85 feet. Its capacity is 1 million gallons, of which 130,000 gallons are available to support a minimum pressure

of 30 psi in the 590 zone. An additional 290,000 gallons support a minimum pressure of 20 psi. The standpipe is used as an antenna mount by a cellular communications provider.

The tank exterior was last repainted in 1980. An inspection in 2005 found the interior lining to be in good condition. The roof was determined to need repair and recoating. The exterior coating is presently in poor condition particularly on the south face, and results in periodic complaints from neighbors.

The structure has not been seismically upgraded. A ribbon anode cathodic protection system is reported to be installed.

Telemetry at the site consists of water level. There is no intrusion alarm.

Distribution Mains

SPU's distribution system within the Shoreline city limits consists of 614,962 feet of main, or about 116 miles. The predominant materials are cast and ductile iron, which together make up 89% of the system. The galvanized iron total on Table 1 also includes piping listed as galvanized steel. The miscellaneous materials included in the 'Other' category consist of copper, polyvinylchloride, concrete cylinder, kalamein, plastic, and a small amount of pipe listed as unknown material.

Table 1
Distribution Main Materials

Material	Length (ft)	Percent of Total
Cast Iron	395,487	64.3
Ductile Iron	152,689	24.8
Steel	51,029	8.3
Galvanized Iron	10,221	1.7
Other	5,535	0.9
Total	614,962	100

Table 2 shows the distribution of ages and lengths in feet for the various types of piping used in the system. Note that the oldest material in the system is steel pipe, followed closely by cast iron. SPU transitioned from using unlined cast iron to lined cast iron pipe approximately 65 years ago, and transitioned from using cast iron to ductile iron pipe about 40 years ago. Unlined cast iron loses capacity over time as internal corrosion reduces available flow area. Cast iron, whether lined or unlined, is more susceptible to main breaks than is ductile iron.

Table 2 Main Material & Length by Age							
	Cast Iron	Ductile Iron	Steel	Galv. Iron	Other	Total, ft	% of Total
0 - 10 years	0	11,524	0	0	131	11,655	1.9
10 - 20 years	0	26,547	0	0	12	26,559	4.3
20 to 30 years	117	25,051	0	30	336	25,535	4.2
30 to 40 years	12,339	79,072	6	30	1,244	92,691	15.1
40 to 50 years	146,954	10,215	18,619	310	808	176,906	28.8
50 to 60 years	150,766	5	12,228	3,258	503	166,760	27.1
60 to 70 years	72,003	0	1,918	3,289	7	77,217	12.6
70 to 80 years	11,020	159	18,260	3,155	0	32,594	5.3
over 80 years	300	0	0	0	0	300	0.0
unknown	1,986	115	0	90	2,494	4,686	0.8

Approximately 75% of the system is over 40 years old. About 6% of the system has been installed in the last 20 years, and 2% has been installed in the last ten years.

In general, utilities have found that a good quality distribution main that is properly installed can be expected to last 100 years. However, mains are not normally replaced solely based on age. Some of the oldest cast iron pipe was made using a process that resulted in very thick pipe walls which have proven to have very long life. Some other types of pipe such as small diameter galvanized iron will have much shorter service lives. Main replacement is typically carried out based on frequency of repairs and adequacy of size or capacity. From a long term perspective, average service life of the water mains in a system can be expected to be approximately 100 years.

Summary of Existing Operations

Most water delivered to the Shoreline area is pumped at North City Pump station, which is manually controlled by the OCC operators as they monitor the water level at Richmond Highlands Tanks. North City Pump Station provides the most economical source of supply to the Shoreline area. Additional water is pumped by Foy Pump Station using the same manual control method, based on the OCC operators monitoring the water level in Foy Standpipe and in Richmond Highlands Tanks. The Bitter Lake Pump Station provides a third available supply, and is the only one of the three pump stations which has backup power. SPU has determined that backup power is not considered necessary at North City or Foy Pump Stations due to the availability of gravity pressure in the 550 Pipeline when operated at elevation 590, and due to the availability of backup power at the Bitter Lake pump station. North City Pump Station is equipped with a 12”bypass system, including a check valve and a remotely controlled valve. A 24” bypass line is located near the pump station on a separate connection to the 550 Pipeline. The control valve for this bypass is no longer electrically operated, although the manually operated valve remains in place.

Due to power failures caused by storms, North City and Foy Pump Stations have simultaneously failed in the past. In this situation, the 590 zone including the Shoreline area would be fed by storage at Richmond Highlands Tanks and by Foy Standpipe storage. The only available pumped

supply to the area would be provided by the Bitter Lake Pump Station; however it requires staff onsite to start the pump station, which takes up to 2 hours. Remote start capability is planned to be installed in 2012. Depending on demand and on storage tank levels, Richmond Highlands and Foy Standpipe storage can be expected to last a minimum of 12 to 24 hours. Should storage be depleted before the Bitter Lake pump is started, or should demand exceed the capacity of the Bitter Lake pump, the check valve from the 550 Pipeline at North City Pump Station would open to provide a reduced level of system pressure. The bypass valve at North City can also be manually opened, but not by remote control during a power failure, due to lack of battery backup for the valve operator. Given several hours to reconfigure valves on SPU's transmission system, the 550 Pipeline can be operated at elevation 590, in which case the area could be returned to near normal pressure. Available storage at Richmond Highlands provides sufficient time to allow for SPU to start the Bitter Lake pump or to make any needed system changes to provide transmission supply at normal 590 zone pressure.

Olympic View Water District has about 5,000 services and is supplied from the 590 zone on the north side of Shoreline. Olympic View has its own 2.5 million gallon tank and several emergency interties with the City of Edmonds. Check valves on the Olympic View supply points would allow Olympic View to maintain normal pressure in the event of a loss of pressure in Shoreline and the 590 zone.

In order to provide sufficient storage to the 590 zone and the Shoreline area, SPU relies on three large reservoirs in the SPU system, Lake Forest Park, Maple Leaf, and Bitter Lake. A portion of the storage in these reservoirs, along with the Richmond Highlands Tanks and Foy Standpipe, provides needed storage for the area. However, should Shoreline become a wholesale customer, the reservoirs outside of the Shoreline boundaries would no longer be designated to provide storage for Shoreline except on an 'as available' basis, unless Shoreline were able to negotiate an arrangement with SPU which allowed access to SPU storage. Without such an agreement, Shoreline would need additional storage capacity, as discussed later in the capital improvements section.

SPU staff has recommended that Foy Standpipe be decommissioned. Once it is out of service, and assuming Richmond Highlands Tank 1 is mothballed as proposed by SPU, Richmond Highlands Tank 2 will be the only operational storage facility at 590 elevation in the zone. When Richmond Highlands Tank 2 is out of service for cleaning or maintenance, the zone will no longer have a storage facility online which can be used to regulate pressure in the zone. One of two methods would need to be used in order to operate without Richmond Highlands Tank 2: Tank 1 could be temporarily returned to service, or water in excess of demand can be pumped at North City or Foy Pump Station, with the excess water released to Bitter Lake Reservoir through the pressure relief valve at that location. The feasibility of temporarily placing Tank 1 in service is unknown and would need to be discussed with the DOH engineer. The tank would need to be cleaned and disinfected prior to being returned to service, and after an extended period of being out of service, it may be difficult to return the tank to a condition suitable for storing potable water due to the poor internal coating condition.

Facilities Condition

Based on site visits, review of documentation, and discussions with SPU and Shoreline staff, the following observations on facility conditions are noted:

Pump Stations

North City, Foy and Dayton Pump stations were toured. They were found to be clean, dry and generally appeared in good repair. Paint was in good condition both internally and externally. Safety measures were in place, including signage and cages around moving parts. All had overhead cranes marked with load limits. The Dayton pump station appeared to be less maintained than the larger North City and Foy pump stations.

North City Pump Station is located in a large underground vault which is not considered by SPU as a confined space. The station is accessed by stairs rather than by ladder, and at the time of the tour, a ventilation fan was in continuous operation.

Chart recorders are no longer in service, which makes it more difficult for field staff to diagnose failures. The control panel for the North City bypass valve did not appear to be functioning correctly and may not have been fully in service. Staff reported they did not carry out wire-to-water pump and motor efficiency testing, and pump performance does not appear to be tracked. Vibration monitoring was carried out at North City pumps in the past but was discontinued. Electrical switchgear is not checked by infrared scan for loose connections or overheated wires, however an annual switchgear inspection is carried out and connections are checked at that time. As part of the annual electrical check, larger motors are reported to be electrically tested to check winding insulation quality.

SPU staff reported that all stations are checked weekly. North City and Foy Pump Stations are manually controlled by the OCC operators, who operate the stations by monitoring water levels in the receiving reservoirs. While this process easily lends itself to automation, SPU prefers the manual approach as a way to more actively engage the OCC operators in the operation of the water system. SPU also relies on OCC operator intervention to protect pumps against failures such as pump control valves not opening or closing as needed. Standard industry practice relies on automated control systems to protect equipment in the case of local malfunctions.

North City, Foy and Dayton Pump stations are all without backup power systems. In the event of loss of line power, check valves and alternate sources such as the Bitter Lake Pump Station are relied on to provide sufficient pressure to keep the distribution system pressurized once local storage is depleted. Storage at Richmond Highlands Tank 2 would last less than a day at average day demand. It is expected that the alternate means of supplying the area could be initiated within the amount of time that local storage would last.

Dayton Pump Station uses a hydropneumatic system, where pumps cycle based on the pressure in two hydropneumatic tanks. The large pump at this station has been reported to cycle off and on up to 80 times per day at peak demands, with the station's discharge pressure cycling between 60 psi and 80 psi. This type of system is no longer the industry standard for closed loop pumping

systems. Variable speed pump control systems are commonly used in this application which allow the pumps to run at any speed needed to maintain a constant discharge pressure. Pump speed is automatically controlled by altering the frequency of the power supplied to the pump motor. This type of system also has the advantage of being energy efficient.

Control systems at the pump stations appear to be fairly basic. They are appropriate for a system which uses control system operators but would need modification to be suitable for a system that did not have control station operators but that instead relied on automated control. Some flow and pressure readouts are provided but circular charts or data loggers are not in service at the stations. Stations do not appear to have programmable logic controllers (PLC's) for overall station local control, alarms and motor protection; instead some or all functions either appear to be handled by the operator at the OCC or by local relay systems.

Pump controls include Hand-off-Auto control, which allows pumps to be turned on at the station or by the OCC. Transducers are labeled according to function.

All stations had sufficient space to accommodate their equipment and to provide ample work space.

Storage Tanks

The Foy Standpipe and Richmond Highlands Tank sites were toured. Foy Standpipe is in need of exterior paint, with numerous rust streaks visible from the street. Richmond Highlands tanks also need exterior paint, and recoating work on Tank 2 is presently underway. Tank 1 has extensive rusting on the roof, which is visible from the street. The legs of the tanks were repainted in 1994 and the paint remains in fair to good condition, with some oxidation on the south faces and some areas in need of touch up.

The bowl of Richmond Highlands Tank 2 is currently being relined and repainted. The tank's structure was seismically updated and painted in 1994. Richmond Highlands Tank 1 is reported to have poor internal coal tar enamel coating and has poor exterior paint on the tank bowl. SPU plans to take this tank out of service with the possibility of returning it to service at some future time after recoating.

SPU staff has recommended that Foy Standpipe be decommissioned. Its exterior coating is in poor condition and draws complaints from neighbors. The tank has been found to need substantial work if kept in service, including roof repair, new internal and external coatings, installation of an internal mixing system, and seismic upgrade work. The standpipe has lead based paint on the exterior (under the visible coat of paint which was installed in 1980) and vinyl internal coating. Standpipes contain a high proportion of unusable dead storage which can lead to poor water quality unless the contents are well mixed. Foy Standpipe presently does not have a mixing system.

Hydrants

Hydrants are not routinely exercised by either SPU or by the local fire jurisdiction. SPU responds when a hydrant is reported in need of repair, but does not have a regular hydrant exercising or testing program. SPU relies on local fire jurisdictions to notify SPU if a hydrant is in need of repair. The Shoreline Fire Department reports that there are numerous hydrants with inadequate flow capacity. The Fire Department also reports that SPU responds in a timely manner when hydrants are reported out of service.

Mains, Services & Meters

Gate valves are not routinely exercised. Also, Shoreline staff reported difficulty in getting SPU to raise gate boxes in response to street paving. This, along with the gates not being exercised, increases the possibility that some gate boxes have been paved over or lost.

Mains are not routinely flushed. The local fire jurisdiction reported that mud, sand and rocks are often discharged when hydrants are flowed. Flow tests are infrequently done, and would be SPU's responsibility except in emergency situations.

Services and meters are replaced as needed.

Pressure Reducing Valve Stations

Figure 14 – Pressure Reducing Valve, 9th Ave NW & Innes Arden Way

Discussion with SPU maintenance staff indicated that pressure reducing valves are maintained on a 2 to 8 year interval, depending on criticality rating, activity of the valve, and valve size. The valves and pilot systems are standardized with units from high quality manufacturers. Most

pressure zones that are fed by pressure reducing valves are also equipped with pressure relief valves. Pilot lines are copper or, in some cases, stainless steel.

One station was toured, at 9th Ave NW & Innes Arden Way. This station has ductile iron main with galvanized bypass piping. Reducing valves have isolation valves installed. Access is through a standard circular manhole equipped with a steel ladder. The vault is located out of traffic, and provides sufficient space to access and maintain the valves. The vault had no standing water and appeared to be well drained. The floor of the vault was partially covered by sand and gravel. The station appeared to be consistent with standard utility practices, with the minor exception of sand and gravel on the floor. While a rectangular access hatch is preferable to circular manhole access, the industry practice of using rectangular access hatches at pressure reducing valve stations is relatively recent and most pressure reducing vaults in service typically still have manhole access.

The PRV station at 23rd Ave NW and NW 197th St is connected to Scada to monitor the 430 and 290 zone pressures.

Current Maintenance Programs

SPU's maintenance plans, as described in the 2007 Comprehensive Water System Plan (CWSP), are summarized below. Following the description from the CWSP, maintenance practices as reported by SPU staff are noted where different from the CWSP descriptions:

Pump Stations

At pump stations, the CWSP reports that a mechanic checks the station twice weekly and grounds maintenance staff checks the sites weekly. Pump motor starters are maintained twice a year. Annual maintenance includes a building inspection and valve operator inspection and maintenance. Every two to five years, flow meters are inspected and overhauled if needed, and pressure regulator valves are overhauled. Every five to seven years, pump efficiency is tested and pumps are overhauled if needed. Emergency maintenance is carried out when a critical piece of equipment has failed. Each pump's criticality has been predetermined and is incorporated into SPU's work management system in order to minimize the length of time that critical equipment is out of service.

SPU staff reported they carry out weekly station checks. Pressure regulating valves are serviced monthly based on criticality. Staff reports that meters are serviced monthly or semiannually depending on lubrication requirements.

Storage Tanks

The CWSP indicates that elevated storage facilities supplied by the Tolt system are inspected every 5 years and internally cleaned every 25 years unless it is determined cleaning is needed sooner for water quality purposes. The water supplying the Shoreline area is filtered so sediment load in the water delivered to Shoreline is negligible. Tanks are painted approximately every 15 years or as needed.

SPU staff reported that the actual practice is to clean tanks every three to five years and to conduct sanitary inspections annually.

Hydrants

The CWSP reports that maintenance of hydrants consists of repair or replacement of broken or obsolete hydrants. SPU does not routinely exercise or test hydrants, instead relying on local fire jurisdictions to report defective hydrants to SPU. Hydrants are classified either as In Service or as Out of Service. As soon as a hydrant is identified as out of service and until it is repaired, a white engine port cap is installed to alert fire authorities that the hydrant is unavailable. SPU replaces broken or obsolete hydrants when the opportunity arises and as a result of other construction occurring at the hydrant's location. Hydrants are normally repainted on a five year cycle.

Mains, Services & Meters

The CWSP indicates that maintenance of mains, services and meters is primarily in response to failure of components, such as replacement of broken valves, repair of main breaks, replacement of nonfunctioning small meters, and replacement of leaking service lines. SPU does not routinely exercise distribution valves. Internal condition of the distribution mains is noted when main breaks are repaired, but there is no overall condition assessment of the internal condition of the mains. Main flushing is carried out as needed to address water quality issues including low chlorine residuals, but is not done routinely throughout the system. Large meters are tested and repaired; however this category of meters consists of only 3% of all retail meters. For smaller meters, particularly residential meters, it is more economical to replace rather than repair the meters. Problems with meters are generally identified through the billing system.

Leaking service lines are replaced with copper lines.

Pressure Reducing Valve Stations

No documented maintenance practices are described in the CWSP for these facilities. Similar pressure regulator equipment at pump stations is overhauled every two to five years.

Discussion with SPU maintenance staff indicated that pressure reducing valves are maintained on a 2 to 8 year interval, depending on criticality rating, activity of the valve, and valve size.

Current Capital Improvement Plan

SPU's 2007 Comprehensive Water System Plan addresses capital improvements, in some cases specifying individual projects, but in other cases focusing more on broad programs. Within the Shoreline area, one specific project in the CWSP was the recoating of Richmond Highlands Tank 2, work on which is presently nearing completion. The CIP also included budget for replacing mains that are impacted by other projects, which would include the Aurora Avenue work in Shoreline. Beyond these two projects, specific work in the Shoreline area cannot be identified. While the CIP includes funding for categories such as relining and replacing mains, replacing leaking services, or replacing service meters, these types of work are system-wide and, while some work can be assumed to fall within Shoreline, it is not specifically identified in the CIP.

An approximation can be made for the proportion of general distribution capital improvement work in the Shoreline area by assuming such work is carried out uniformly across the SPU distribution system. This assumption is likely to be more accurate for general categories such as meter or service replacements and less accurate for categories where the work consists of larger, more discrete projects such as water main relocations or main extensions. Table 3 is based on the premise that the distribution CIP is spread uniformly across the SPU distribution pipe network, which consists of 1640 miles of distribution mains. This number does not include SPU's 160 miles of transmission mains. The City of Shoreline includes 116 miles of SPU mains, or 7.1% of the SPU system. Table 3 allocates 7.1% of SPU's annual distribution CIP to the SPU mains located within Shoreline. Actual expenditures may be less than indicated in the table.

Table 3
SPU Distribution CIP Estimated for Shoreline
Based on Proportional Length of Mains

SPU Distribution CIP Category	SPU Annual CIP	Proportionate Share in Shoreline
Reline or replace aging water mains and improve pressures and fire flows where cost effective.	$5,500,000	$390,500
Extend water mains to new developments.	$1,000,000	$71,000
Relocate water mains impacted by other projects and upgrade water mains in redevelopment areas.	$3,000,000	$213,000
Replace leaking service connections and install new services.	$10,000,000	$710,000
Replace meters.	$600,000	$42,600
Total	$20,100,000	$1,427,100

Proposed Maintenance Prior to Shoreline Acquisition

Shoreline would not be acquiring the SPU water system until 2020, or approximately eight years from the present time. During this period, SPU would continue to own, operate and maintain the system. Shoreline has an interest in having the system be in a well maintained condition at time of acquisition. In addition to SPU's current maintenance practices, the following are recommendations for Shoreline to request of SPU.

Pump stations

Wire-to-water pump and motor efficiency tests should be carried out on each pump at the pump stations to be acquired and data should be provided to the City of Shoreline. Any units needing repair or replacement should be identified and repairs should be made. Wire-to-water efficiency testing evaluates the combined efficiency of the pump and motor, and measures the percent efficiency of the conversion of electrical power input to hydraulic energy output. Acceptable minimum efficiency varies by pump and motor size, but ranges from about 45% for small pumps to 60% for large pumps. Pump units that fall below the normal acceptable range for their size often have older, inefficient motors, worn internal pump clearances, or other condition issues that should be remedied.

Infrared scans should be taken of the electrical switchgear, pumps and motors. Infrared scans detect locations that are hotter than would be expected, such as loose electrical connections. Identifying and correcting such problems can prevent fires, and detect failing bearings, undersized wiring, and other issues which otherwise may not be detected. Any deficiencies should be identified and repaired.

Storage Tanks

Richmond Highlands Tank 2's legs were repainted in 1994 as part of the seismic upgrade, and the reservoir bowl exterior will be repainted in 2012. Based on a 15 year painting cycle, the legs were due to be repainted in 2009, however the 1994 paint remains in fair to good condition at present. The legs and substructure will need repainting prior to 2020.

Richmond Highlands Tank 2 presently does not have an internal cathodic protection system. A system should be installed as soon as possible following completion of recoating the tank interior.

Richmond Highlands Tank 1 is not in service but will still need exterior painting for aesthetic purposes prior to 2020. Prior to repainting the exterior, a determination should be made regarding if the tank will eventually be returned to service or decommissioned.

If not decommissioned, Foy Standpipe would need exterior painting in the near future.

Hydrants

Responsibility needs to be established for monitoring hydrant condition. SPU's policy is that the local fire jurisdiction is responsible for reporting hydrant problems. Hydrants should be tested for basic operation and repaired as needed. Any broken or inadequate hydrants should be clearly marked as out of service.

Mains, Services & Meters

An initial priority should be to exercise distribution gate valves and hydrants. In order to do so without causing widespread dirty water complaints, a planned main flushing program should be carried out, in conjunction with exercising the distribution system gates and hydrants. SPU has used the unidirectional flushing process in the past, a method which would be appropriate in this area. Unidirectional flushing begins at the upstream end of a system and works downstream, so increased velocities due to flushing only occur in mains that have already been flushed, and water always flows in the same direction. Discharged water is dechlorinated and filtered as required by the receiving sewer utility or environmental requirements. Planning a main flushing program is often done using a hydraulic pipe model. While the water supplying the Shoreline area is presently filtered, most of the Shoreline piping system predates construction of the Tolt filter plant, which began service in 2000. If system-wide flushing was not carried out prior to construction of the filter plant, the mains are likely to still contain significant amounts of settled sediment which restricts flow in the mains and which generates dirty water during fire flows, peak demands, or when flow direction is changed as system valves are operated.

The main flushing program will also provide an opportunity to further calibrate the hydraulic pipe model in the Shoreline area. Models are typically calibrated by flowing hydrants and by comparing modeled results with actual pressures and flows. A well-calibrated model is essential for efficient operation of a water system, including prediction of available fire flows and prioritizing individual main replacement projects.

If distribution gates have not been operated for years, it can be expected that some valves will break when operated. A program should be in place to replace or at least identify and document broken valves as they are found.

Pressure Reducing Valve Stations

Pressure reducing valves are presently maintained but specific tasks and frequency are unclear. Pressure reducing valves should be maintained regularly in order to avoid valve failures which can overpressure lower elevation zones. While pressure relief valves can reduce the consequences of over pressurization, they are considered to be a safety feature rather than relied on to allow the main pressure relief valve to run to failure. Pressure reducing and pressure relief valve pressure settings and basic operation should be checked on a six month cycle. Depending on the activity and criticality of the valve, pilot systems should be rebuilt on a one to three year cycle. Galvanized piping in vaults should be inspected and replaced if needed.

Proposed Post-Acquisition Maintenance Program

When Shoreline assumes responsibility for operating and maintaining the water system infrastructure, long-term operation and maintenance plans will be needed. The following maintenance programs and activities are recommended to be implemented upon Shoreline's acquisition of the water system.

General Practices

- Make arrangements for on-call staff to respond to after-hours emergencies
- Maintain written and electronic maintenance records for all equipment
- Determine criticality of equipment and respond to failures accordingly
- Critical equipment will not be run to failure
- Preventive maintenance will be carried out on all equipment
- Staff will be equipped with the tools and training they need
- Spare parts will be stocked for typical repair needs
- A safety program will be established or expanded to include the water utility
- Staff in responsible charge of daily operations will be State certified
- Staff responsible for water quality sampling will be State certified

Pump Stations

- Conduct a weekly station check by a mechanic
- Check and adjust pump control and pressure relief valves in accordance with pressure reducing valve maintenance procedures
- Check and maintain oil levels weekly
- Remove motors for repair as needed
- Change out or repair pumps and meters as needed
- Paint piping and structure as needed
- Rebuild control valve pilots in accordance with pressure reducing valve maintenance procedures
- Overhaul relief valves and control valves in accordance with pressure reducing valve maintenance procedures
- Change charts weekly, or install data loggers at stations
- Electrical maintenance including cleaning switchgear every five years, checking connections, infrared scans and megging motors (checking winding insulation) every five years or more frequently as needed
- Conduct periodic wire to water efficiency tests and track results in a database

Storage Tanks

- Inspect tanks every 5 years to evaluate cathodic protection systems, screens and vents, lining systems and structural integrity.
- Clean tanks at 5 year intervals.

- Periodically clean exterior of tanks as needed (contracted work)
- Remove graffiti within one week if possible
- Conduct weekly site checks
- Perform spot painting as needed
- Check and maintain ladders, climbing systems and security features as needed

Hydrants

- Exercise hydrants and valves annually to ensure working order
- Lubricate the operating shaft bearing as needed
- Check accessibility of control valves
- Clear any brush and debris around the hydrant
- Repair any faults found during inspection
- Paint hydrants every five years or as needed

Mains & Services

- Exercise inline valves every five years or as part of the flushing program
- Repair or replace inoperable valves
- Clean out valve boxes, and ensure they are visible and at grade
- Flush dead end mains as needed to maintain water quality
- Carry out unidirectional flushing to help maintain system capacity and water quality
- Repair or replace service lines as needed
- Install new services as needed
- Abandon old services as needed
- Respond to turn on / turn off requests
- Provide locate service (contract)
- Take water quality samples as required

Meters

- Replace meters 1” and smaller as needed or when renewing service lines
- Test, repair or replace meters 1 ½” and larger based on age or as needed
- Read meters bimonthly

Pressure Reducing Valves

- Visually inspect the pilot valve and related piping every 6 months
- Clean the pilot screen and check the valve operation every 6 months
- Check and reset the pressure annually
- Rebuild the pilot valve every 1 to 3 years, depending on activity of the valve
- Rebuild the main valve every three to five years
- Replace pilot piping in the chamber every five years
- Inspect & replace galvanized piping as needed

Structures

- Clean roofs & gutters annually
- Repair and replace roofs and gutters as needed
- Paint as needed
- Maintain landscaping to a defined standard appropriate to the location

Proposed Post-Acquisition O&M Budget

Projected Annual Labor Expense

SPU presently operates and maintains its system in the Shoreline area with crews that are assigned to work throughout SPU's northern service area. Labor hours and costs are not directly tracked with regard to city boundaries, and complete estimates of labor and cost were not available from SPU at the time this report was written.

In the November 2004 report prepared for the Shoreline Water District, *Seattle Public Utilities within the Cities of Shoreline and Lake Forest Park, Water System Valuation Report,* RH2 Engineers assessed the level of effort needed to operate and maintain the SPU system located within the City of Shoreline, plus a small portion of the SPU system located within Lake Forest Park. RH2 Engineers surveyed the Cities of Bellingham, Renton and Kirkland regarding their water utility staffing and level of effort applied to typical water utility activities. Based on unit levels of effort, RH2 Engineers determined that 15.17 full time equivalent (FTE) staff would be required to service the study area, consisting of 1.54 FTE office/clerical, 11.83 FTE field, and 1.79 FTE supervision.

In evaluating the current validity of the 2004 RH2 Engineers report's staffing evaluation, the following are considered:

- The full area evaluated in the 2004 RH2 report included 626,283 feet of main. Shoreline presently has 614,962 feet of main, or 98% of the amount in the 2004 study area. Adjustment of the results to compensate for the small amount of Lake Forest Park service area in the 2004 report falls within the rounding error and does not affect the results as applicable to Shoreline.
- Census results for the years 2000 and 2010 indicate a stable population at 53,000 in Shoreline.
- No major changes have occurred since 2004 which would alter general productivity or job duties in water utility field or office work.
- The 2004 report was based on the assumption that the additional staff would be added to existing staff at Shoreline Water District (SWD). In the case of the City of Shoreline establishing a new water utility, staff will be required beyond those identified in the 2004 report.

The 2004 RH2 report defined additional staff positions in terms of SWD classifications, but in more general terms, the identified staff positions would consist of 3 customer service staff, 4 lead or senior field crew workers, 4 crew workers and 4 crew helpers. These staff would be needed to support field operations and maintenance, customer service, and meter reading functions.

Since Shoreline would need to form an entirely new water utility, other functions will need to be supported. These include a water utility manager, water operations manager, office manager, mapping technician, water quality technician, warehouse technician and administrative and financial support. Some of these functions may be handled by existing City staff or by utility staff supporting the planned wastewater utility. For estimating purposes, all

these functions with the exception of administrative and financial support will be assumed to be included as water utility staffing. Administrative and financial support expense is included as a separate cost in the O&M budget calculations.

Determination of market based salaries will require salary surveys of utilities considered comparable to the proposed Shoreline water utility. For estimating purposes, the salaries in Table 4 are based on salaries in the 2004 RH2 report, escalated to 2011 dollars. Costs shown are direct costs and do not include overhead expense.

Table 4
Staffing Requirements and Salary Cost

Classification Title	Required Staff	Classification Salary	Total Salary Cost
Water Utility Manager	1	$117,973	$117,973
Water Operations Manager	1	$85,471	$85,471
Water Quality Technician	1	$59,329	$59,329
Mapping technician	1	$63,018	$63,018
Office Manager	1	$64,420	$64,420
Customer Service Assistant	3	$47,468	$142,404
Lead Field Crew Worker	4	$68,354	$273,416
Field Crew Worker	4	$47,468	$189,872
Field Crew Helper	4	$46,107	$184,428
Warehouse Technician	1	$47,468	$47,468
Total	21		$1,227,799

Projected Annual Non-Labor Expense

The 2004 RH2 report also estimated the unit material and supply costs required to support the operation and maintenance of the SPU system within Shoreline, based on SWD unit costs. The report noted that reliance on the SWD unit costs assumes the SPU system is in comparable condition with the SWD system, which appears to not be the case. Material and supply costs for a system in need of more maintenance can be expected to be higher than those for a more updated system. Table 5 shows the SWD unit costs, escalated to 2011 dollars. To reflect increased maintenance materials expenses and engineering services, proposed unit costs for Operations and Engineering are two times the SWD unit costs. Proposed unit costs reflect additional costs for hydrant and valve maintenance and repair, and for additional engineering services related to the transition to an independent water utility.

Table 5 Estimated O&M Material & Supply Costs					
Program Area	**SWD Unit Cost**	**Proposed Unit Cost**	**Measure**	**Number of Units in System**	**Estimated Costs**
Operations	$0.43	$0.86	ft of main	614962	$528,867
Engineering	$0.04	$0.08	ft of main	614962	$49,197
Water Quality	$5.56	$5.56	connections	10739	$59,709
Customer Service	$2.04	$2.04	connections	10739	$21,908
Total					$659,681

Projected Annual O&M Budget

Table 6 includes labor cost from Table 4, materials and supplies from Table 5, employee benefits estimated at 40% of base salary and administrative expense. Administrative expense is the general fund overhead estimated cost as outlined in a May 9, 2012 memo prepared by Shoreline staff.

Table 6 Annual O&M Budget	
Category	**Annual Budget**
Labor	$1,227,799
Materials & Supplies	$659,681
Employee Benefits	$491,120
Administrative	$1,093,585
Total	$3,472,184

Separation Options, Issues & Costs

The water system in Shoreline is presently an integral part of the SPU system. Physically separating the Shoreline portion of SPU's system will involve construction of additional infrastructure in order to enable the two systems to operate independently. At present, most of the storage that supports the Shoreline area is located in large regional reservoirs outside of Shoreline. By policy, SPU does not allow wholesale customers to rely on SPU storage capacity for planning purposes; wholesale customers must provide their own storage as needed to meet regulatory requirements. Any physical separation option may need to include construction of additional storage in Shoreline. Additional storage is discussed in the Capital Improvements section.

Separation Options

SPU has presented the following two conceptual or base options:

Alternative A

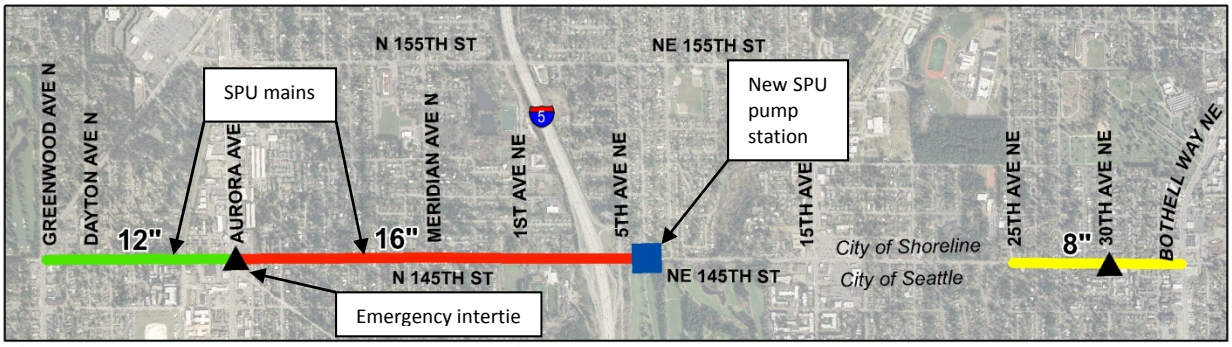


Figure 15 – New Mains, Connections and Pump Station, Alternative A

Shoreline would acquire North City and Foy Pump Stations. Shoreline would also acquire the 24" main in N 145th St. Shoreline would install a new pump station for SPU adjacent to the 550 Pipeline in the vicinity of Foy Pump Station, and approximately 8,600 feet of 12 and 16" of new SPU main in 145th St. from the new pump station to Greenwood Avenue. Mains and services feeding south from the 24" line in N 145th would be disconnected and transferred to the new main. Shoreline would install a new elevated tank for SPU in the vicinity of Bitter Lake Reservoir, or, if a new tank is not acceptable to the community, Shoreline would refurbish Foy Standpipe for SPU and connect it to the new SPU main in N 145th St. A bi-directional emergency metered intertie would be added at a point along N 145th St. and an agreement would be made between SPU and Shoreline allowing use of the intertie when SPU's 590 zone storage facility is out of service for cleaning or maintenance. The new mains and pump station constructed under Alternative A would be for SPU's use, with the exception of the 8" main between 25th Ave NE and Bothell Way NE, which would be a Shoreline main. This section of 8" main is included in all alternatives.

Alternative B

Shoreline would acquire North City Pump Station. Foy Pump Station and the 24" main in N 145th would remain with SPU, and mains and services to the north of N 145th would be disconnected from the main. Shoreline would make modifications elsewhere in its system to replace the function of the 24" main. These modifications are described in the following Alternatives B1 through B5. Foy Pump Station would be modified to operate with the smaller SPU 590 pressure zone by downsizing two pumps and upgrading electrical equipment. Shoreline would install a new elevated tank for SPU in the vicinity of Bitter Lake Reservoir, or, if a new tank is not acceptable to the community, Shoreline would refurbish Foy Standpipe for SPU. A bi-directional emergency metered intertie would be added at a point along N 145th St. and an agreement would be made between SPU and Shoreline allowing use of the intertie when SPU's 590 zone storage facility is out of service for cleaning or maintenance.

Discussion of Alternatives A and B

An underlying concept for any separation alternative is that SPU's existing 590 zone is being divided into two adjacent but independent zones, each of which will need storage and supply mains. Alternatives A and B are identical with regards to storage needs for SPU, and with regards to a mutually beneficial emergency intertie. The primary difference is in who retains the Foy Pump Station and the existing 24" line in N 145th St. Alternative A requires construction of a new main across I-5. Although not described in Alternative B, Shoreline would need a means to receive water from the 550 Pipeline at or near the southern city limits, and any new Shoreline main from the 550 Pipeline would also need to cross I-5.

Under any alternative, provision for flow in either direction between SPU's 590 zone and Shoreline's 590 zone would need to be provided for the benefit of both utilities. Also, SPU would deliver wholesale water to current SPU wholesale customers at the boundary between the SPU and Shoreline water systems. Shoreline would transmit the water to the customers' existing points of delivery. All demands in Shoreline, including those of SPU's wholesale customers, can be met entirely by the supply point at North City Pump Station. The connection to the SPU system in south Shoreline would either serve as an alternate wholesale connection or as an emergency connection, depending on negotiations with SPU. If only an emergency connection is provided, it would be located in the vicinity of Aurora Avenue and 145th St.

There are five variations of Alternative B that could be considered as options for Shoreline to replace the function of the 24" main as mentioned in SPU's Alternative B. These each provide a different means to interconnect and supply the southern part of Shoreline but are otherwise as described by SPU's Alternative B. Alternatives B1 and B5 include construction of new pump stations and alternatives B2, B3 and B4 rely on pumped supply from SPU's Foy Pump Station, which would require payment of an additional surcharge in the supply contract with SPU. This cost will need to be included as part of the cost of water supply for Shoreline. All of the B alternatives also include costs to retrofit Foy Pump Station.

All new mains, connections and pump stations shown for the following alternatives would be owned by Shoreline.

An 8" main and wholesale service connection is provided in all alternatives to supply the area in southeast Shoreline that is currently served by SPU. Although shown as located in 145th St, another option would be to locate this main in 150th St as discussed later in this report.

Alternative B1

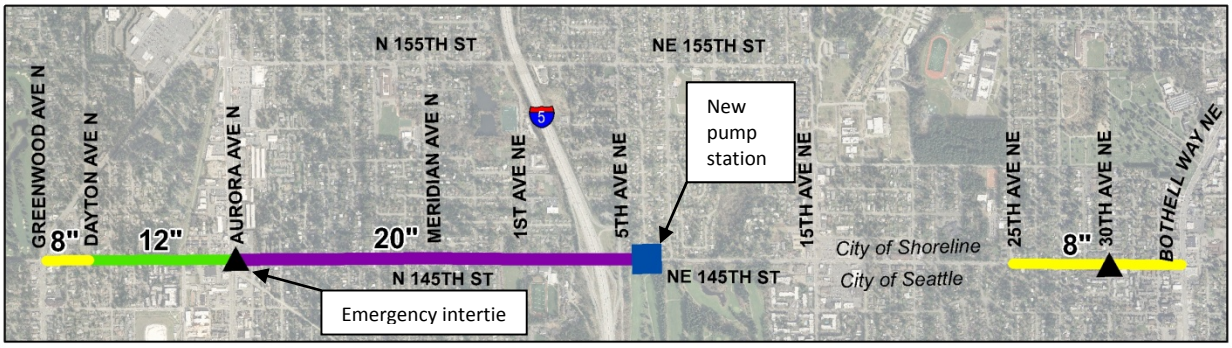


Figure 16- New Mains, Connections and Pump Station, Alternative B1

Alternative B1 would have Shoreline construct a new pump station near Foy Pump Station on N 145th, along with 20", 12" and 8" mains in N 145th St, similar to the description in Alternative A. Under Alternative B1, the new pump station and all new mains would be part of the Shoreline system. All mains and services presently connected to the north side of the 24" main in N 145th would be transferred to the new main. An emergency intertie would be provided at Aurora Avenue. A major drawback to this option is the cost of construction of infrastructure that duplicates the function of the existing SPU infrastructure. Also, Shoreline does not need additional pump capacity beyond that provided by North City Pump Station to meet normal system demands. While a new main is needed in 145th to support the southern part of the Shoreline distribution grid, its size for that purpose would be much less than 20" diameter.

Alternative B2

Figure 17 - New Mains and Connections, Alternative B2

Alternative B2 is a variation on Alternative B1. Rather than Shoreline constructing a new pump station, Shoreline would build only the portion of new main beginning west of I-5 and extending to Greenwood Ave N., consisting of 7,300 feet of main varying from 20" to 8". This main would connect with all existing mains and services on the north side of N 145th St. and would be fed by SPU through a meter near 1st Ave NE and N 145th St. An emergency intertie would also be provided at Aurora Avenue. The connection to the SPU system may require a check valve to prevent the connection from reversing flow as Shoreline filled its storage using the North City Pump Station. SPU would continue to operate Foy Pump Station, and supply to Shoreline through this connection would depend on the level in Shoreline's storage as well as how North City Pump Station was operated. Under normal conditions, supply from Foy Pump Station would not be needed to meet Shoreline demands. This option has the advantage that if in the future, should Shoreline wish to receive supply through its own pump station from the 550 Pipeline, the new pump station could be built on N 145th, along with construction of the main from the pump station across I-5 to the main as described in this alternative. It has the disadvantage that the new main would be larger than needed should Shoreline decide not to construct the future pump station. As with Alternative B1, additional pump station capacity is not needed to meet current or anticipated demands.

Alternative B3

Figure 18 - New Mains and Connections, Alternative B3

Alternative B3 assumes Shoreline does not have future plans to construct its own pump station to replace the functionality of the Foy Pump Station. In this case, Shoreline would construct the 7,300 feet of main in N 145th St between Greenwood Ave N. and I-5, but the diameter would be 8" and 12". A wholesale or emergency connection to the SPU system would be located at Aurora Ave N. The connection may require a check valve as described in Alternative B2. This option relies on the use of SPU's Foy Pump Station at times, however most water received by Shoreline can be delivered by North City Pump Station. This option allows for use of Foy Pump Station and Bitter Lake Pump Station as an alternate supply if needed. The new 12" main provides sufficient capacity to support the Shoreline distribution grid either with a wholesale service or an emergency intertie at Aurora.

Alternative B4

Figure 19 - New Mains and Connections, Alternative B4

Alternative B4 is similar to Alternative B3 except that the south side of Shoreline west of I-5 would be served by three wholesale or emergency connections to SPU, at Dayton, Aurora, and Meridian Ave. N. With three feeds, the entire new main in N 145th St. could be 8" diameter. These connections may also need check valves. The additional complexity of having three service connections in the 590 zone on 145th Street makes this alternative less attractive than Alternative B3.

Alternative B5

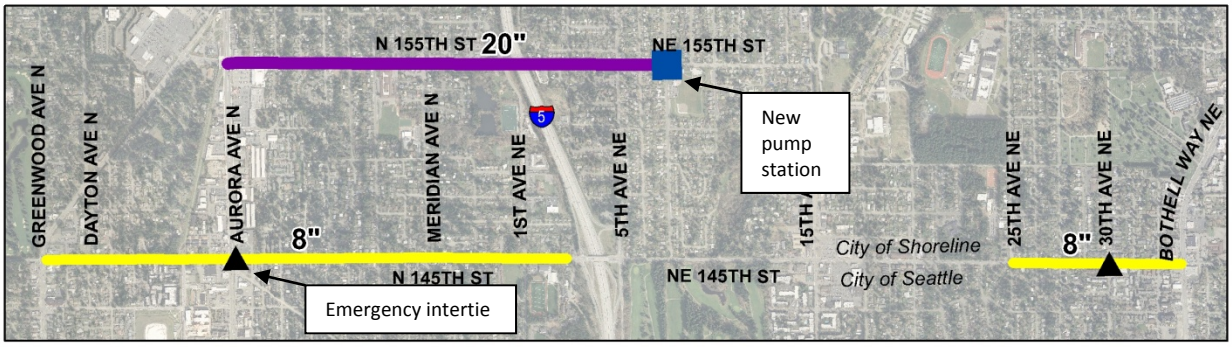


Figure 20 - New Mains, Connections and Pump Station, Alternative B5

Alternative B5 would have Shoreline construct a pump station adjacent to the 550 Pipeline at N 155th St, and 6,000 feet of 20" main from the new pump station to Aurora Ave N. This alignment would take advantage of the underpass under I-5. An emergency intertie would be located on 145th at Aurora Avenue. Although the N 155th St. alignment provides a less expensive location to cross I-5 than the N 145th St. alignment in Alternative B1, it has the disadvantage that approximately 7,300 additional feet of 8" main would still need to be constructed in N 145th St. to tie in the existing mains and services that would be disconnected from the 24" main. This new 8"main is needed to strengthen the east-west distribution grid in south Shoreline, as well as to connect to dead end mains and customers that would be disconnected from SPU's 24" line. This main needs sufficient capacity to provide fire flows from

the Shoreline water system along N 145th St. Alternative B5 also has the disadvantage that by adding a new pump station and discharge line, it is incurring the costs of duplicating existing infrastructure. As with the other alternatives involving new Shoreline pump stations, this alternative involves the addition of capacity which is not needed under normal operating conditions.

Separation of the Southeast Shoreline Area

Approximately 2,300 feet of 8" main would be needed in NE 145th St. to serve the current SPU customers in southeast Shoreline. This section of new main would connect to the mains and services on the north side of NE 145th St from 25th Ave NE to Bothell Way NE, and would be fed by a wholesale connection to the 24" SPU line. It would have sufficient capacity to provide fire flows to Shoreline residents along NE 145th St. One wholesale connection and 2,300 feet of 8" main are included in all alternative estimates. Storage would need to be provided through the SPU system. While SPU does not guarantee availability of fire flows through wholesale connections, such flow can be used on an as-available basis. SPU presently provides wholesale service to other areas that do not have their own storage. If this arrangement is found not to be feasible in this case, construction of a storage facility may be necessary in order for the southeast area to operate separate from the SPU system. An alternate approach would be to provide standby and fire flow to the area from SPU on an 'as available' basis. System design would also include an emergency connection, bypass piping or other means to serve the area during an emergency or during meter maintenance work. This secondary connection may be available from the Shoreline Water District, also providing standby and fire flow on an 'as available' basis. The cost of this secondary means of supply is included in all alternatives as equivalent to an additional wholesale connection. Cost of a storage tank is not included.

An alternate alignment to provide service to the southeast Shoreline area would be to install a new main in NE 150th Street, providing service from SPU's 510 bypass line in 22nd Ave NE. The new line would extend to connect to the existing main in 30th Ave NE. While this option requires addition of a pressure regulating valve, about 100 feet of additional main, and acquisition of a portion of easement, it may warrant consideration due to its favorable location within the service area and its avoidance of construction in the 145th St corridor. Supplying the zone from the SPU 510 bypass line also would allow for increasing the pressure in this area.

Table 7 summarizes separation alternative costs for the alternatives as discussed above. Unit costs are for ductile iron distribution mains, and are listed in Table 10, with the exception of 20" main, which is not included in Table 10 and which has a unit cost of $521 per foot. Costs include 10% contingency for distribution mains and 25% contingency for all other projects, 5% surveying & permitting, 12% engineering, 8% construction inspection, and 10% sales tax. Additional costs are calculated as a percentage of construction cost.

Table 7 Separation Alternative Costs						
	A	**B1**	**B2**	**B3**	**B4**	**B5**
8"main	$529,000	$678,500	$678,500	$1,150,000	$2,208,000	$2,208,000
12"main	$765,850	$578,000	$578,000	$1,329,400		
16"main	$2,493,050					
20" main		$3,099,950	$2,422,650			$3,126,000
I-5 Crossing	$863,000	$863,000				
Pump stations	$2,215,000	$3,210,000	$500,000	$500,000	$500,000	$3,210,000
Foy Standpipe	$2,410,900	$2,410,900	$2,410,900	$2,410,900	$2,410,900	$2,410,900
Metering	$734,000	$734,000	$734,000	$548,000	$724,000	$734,000
Total	$10,010,800	$11,574,350	$7,324,050	$5,938,300	$5,842,900	$11,688,900

SPU has evaluated operation of the system after Shoreline separation and has concluded that North City Pump Station can meet all demands as well as maintain sufficient fire flow and pressure, even without service to the 590 zone along 145thSt. SPU has evaluated their system on the basis of providing an emergency intertie rather than wholesale connection on 145th, and has concluded that Foy Standpipe, or an equivalent new structure, would provide SPU with sufficient elevated storage. The Foy Standpipe cost in Table 7 includes recoating the interior and exterior, seismic modifications, roof replacement, addition of a mixing system, and piping modifications. Modifications at Foy Pump Station would include replacing two of the three pumps with smaller pumps, and retaining a 4,400 gpm pump to provide fire flow or to provide emergency intertie service to Shoreline, in conjunction with the Bitter Lake pump station if needed. This project cost is provided by SPU and is included in all options. Should Shoreline desire a large capacity wholesale service to the 590 zone along 145th St, modifications at Foy Pump Station may be more extensive. Metering costs are facility charges from SPU for meter installations.

The recommended alternative is Alternative B3. Although the estimated cost is marginally higher than Alternative B4, Alternative B3 has the advantage of requiring only a single service connection with SPU on 145th St west of I-5. Alternative B3 is viable with either a wholesale or emergency connection located in the vicinity of Aurora Avenue, where Alternative B4 would require multiple wholesale or emergency connections.

Operations Issues Related to System Separation

SPU presently uses mains within the City of Shoreline to deliver water to several of its wholesale customers. When the mains are acquired by Shoreline, water for the SPU wholesale customers will be delivered at the boundary between SPU and the Shoreline water utility. The wholesale customers, SPU and the City of Shoreline will need to arrive at suitable arrangements

to provide for transmission of wholesale water through Shoreline mains. Under normal conditions, North City Pump Station has sufficient capacity to provide all of the supply to the 590 zone in Shoreline and to the wholesale customers. Supply from SPU's Foy or Bitter Lake Pump Station would be needed if North City Pump Station was offline, or if additional supply was otherwise needed in south Shoreline. In most cases, water pumped at Foy or Bitter Lake Pump Station would only need to be used if an equivalent amount of water was unavailable from North City Pump station. SPU's pump stations would typically not need to be operated simultaneously with North City Pump Station to supply Shoreline or SPU's wholesale customers. Provision of an emergency intertie to the 590 zone would be acceptable in place of a wholesale service in the context of provision of adequate supply, however this would have implications on required storage quantities as discussed later in this report in the Capital Improvements section.

Shoreline would need to establish emergency intertie agreements with adjacent water utilities.

Proposed Capital Improvements and Budget

In addition to costs associated with physically separating the Shoreline system from the SPU system, other capital improvements will be necessary prior to operation of the Shoreline water system as an independent water utility. These include water storage facility improvements, pump station improvements, control systems, utility office and shop space, acquisition of heavy equipment and vehicles, tools and inventory. Distribution system improvements, other than those directly related to system separation, would not need to be in place at the time the independent utility begins operation, but rather would be made on an ongoing basis.

System Reliability Standards

A key driver of capital improvement costs is the standard of service which the utility establishes for its system. In the *2009 Water System Design Manual,* the Washington Department of Health (DOH) recommends the following standards, intended to promote high levels of water system reliability:

Source

Two or more supply sources are available with a capability to replenish depleted fire suppression storage within 72-hours while concurrently supplying the maximum daily demand (MDD) for the water system.

1. Combined source capacity for the water system is enough to provide the MDD in a period of 18 hours or less of pumping.

2. With the largest source out of service, the remaining source(s) can provide a minimum of the average day demand (ADD) for the water system.

3. Pump stations have power connections to two independent primary public power sources, or have portable or in-place auxiliary power available.

4. The firm yield of surface water sources is consistent with the lowest flow or longest period of extended low precipitation on record.

Booster Pump Stations

1. Multiple pumps are installed with capacity to provide the MDD of the service area when the largest pump is out of service.

2. At least 20 psi at the intake of the pumps under peak hourly demand (PHD) or fire flow plus MDD rate-of-flow conditions is always maintained.

3. An automatic shutoff is in place for when the intake pressure drops below 10 psi.

4. Power connections are available to two independent primary public power sources, or there is a provision for in-place auxiliary power if the pumps provide fire flow or are pumping from ground level storage.

Distribution Storage

1. More than one gravity storage tank (wherever feasible) exists with the ability to isolate each tank while continuing to provide service.

2. Storage is sufficient to give standby capacity of at least two times the ADD for all users, and to ensure that fire suppression service will be available while not allowing pressure to drop below 20 psi at any service connection.

3. A minimum standby volume of 200 gallons per day per residential connection, or equivalent, is provided regardless of the capacity of the sources available.

4. An alarm system is included that notifies the operator(s) of overflows, or when the storage level drops below the point where the equalizing storage volume is depleted. This should only occur during abnormal operating conditions.

Distribution System

1. Distribution mains are looped wherever feasible.

2. Pipeline velocities do not exceed eight feet per second under PHD conditions.

3. All pipelines can be flushed at a flow velocity of at least 2.5 feet per second.

4. All mains and distribution lines have appropriate internal and external corrosion protection.

5. If fire flow is provided, the engineer should conduct a hydraulic analysis to determine whether high fire fighting demands may cause very low pressure (below 30 psi) in the distribution system. Very low water system pressure presents an increased risk of contamination from cross-connections and pathogen intrusion at joints.

DOH recognizes that different communities and utilities may want to operate at different standards of reliability, and notes that doing so is acceptable as long as public health is not put at risk and as long as the standards are consistent with WAC 246-290. DOH requires that all points in the system maintain a minimum of 30 psi at peak hourly demand with all equalizing storage depleted, and a minimum of 20 psi during fire flows at maximum daily demand with all standby and fire suppression storage depleted, in accordance with WAC 246-290.

SPU has established its own design standards, which are included as an appendix to SPU's *2007 Water System Plan.* As a complex system, SPU calculates storage requirements based on

hydraulic modeling scenarios rather than on the methodology in the DOH *2009 Water System Design Manual.* New construction in the SPU system is done in accordance with the DOH minimum pressure requirements, but some older areas were built when the minimum pressure requirement was 20 psi, and some of these areas are unable to meet the current 30 psi requirement.

If the City of Shoreline acquires the water system within its boundaries, it is recommended that the DOH guidelines be used as system reliability standards. Any new construction, such as new storage, will need to be designed in accordance with the current edition of the DOH *Water System Design Manual.*

Storage Capital Improvement Recommendations

Water storage at a utility is provided in accordance with Washington Department of Health requirements which break storage capacity into five components. The top portion of storage is defined as operational storage, and consists of the range that the storage fluctuates as pumps are turned on and off. Next is equalizing storage, which is the amount that gets drawn down when demand exceeds pump capacity at peak demands, and which refills in time for the next day's peak demands. Both of these storage components must be available at a minimum of 30 psi to all customers. Next is standby storage, which is needed in order to continue to provide a reliable supply with pump outages or other disruptions that may occur, and which must provide a minimum of 20 psi. The next lower volume of storage is fire suppression storage, which also must be at a sufficient elevation to maintain 20 psi for all customers during fire fighting. Any remaining volume is considered dead storage. In general, standby storage and fire suppression storage can be 'nested' in determining overall storage requirements, in which case the larger of the two components is considered to suffice for both components.

In development of a comprehensive water system plan, Shoreline and its planning engineer will have some flexibility in determining how much storage is appropriate. Shoreline will have sufficient supply capacity such that equalizing storage will not be necessary, although it may be desired in order to reduce peak flows. There is also some flexibility in determining standby storage quantities, based on community expectations of reliability and on DOH guidance. Standby storage is intended to provide system reliability under abnormal conditions such as the loss of a source. While DOH provides recommendations for standby storage quantities, they do not specify a required amount of standby storage for a particular system. DOH expects to see standby storage provided in sufficient quantity to meet the community's expectations of reliability, and in accordance with DOH guidance unless an alternate approach can be successfully proposed and supported by the community.

DOH provides guidance on appropriate levels of standby storage. For a system with a single source, DOH recommends having enough standby storage to last two days at average day demand. For a system with multiple sources, DOH recommends having a volume equivalent to two days of average day demand, reduced by the amount of available source capacity with the largest source out of service. As a minimum regardless of availability of other sources, DOH

recommends having at least 200 gallons of standby storage per Equivalent Residential Unit (ERU).

As an independent water utility, the 590 zone portion of Shoreline may have two sources including a wholesale connection feeding North City Pump Station on 185th Street, and a wholesale connection on 145th Street at Aurora (under Alternate B3). While these are both fed by the SPU transmission system, SPU can draw their supply from the Tolt system or from the Cedar system, and supply to the connection on Aurora can be pumped at Foy Pump Station from either the 550 Pipeline or from the 430 zone Maple Leaf Reservoir. Supply to the Aurora connection can also be pumped from storage at Bitter Lake Reservoir, which in turn can be supplied from the Cedar source. There is enough difference between these two sources that they can be considered to be independent sources. Either source by itself would be sufficiently large to fully provide average day demand to Shoreline with the other source out of service, and the large diameter mains in Aurora, 185th St., and to the north of Richmond Highlands are sufficiently large for either source by itself to maintain sufficient pressures throughout the system. Applying the DOH guidance for systems with multiple sources to the 590 Shoreline system, if the largest source is out of service, the other source can still meet average day demand on its own. In that case, the DOH minimum standby storage recommendation of 200 gallons per ERU would apply. The 590 zone in Shoreline has 16,400 ERU's, for a DOH minimum recommended standby storage quantity of 3,280,000 gallons.

If Shoreline were to use the North City Pump Station as its only wholesale connection, with the connection at Aurora Avenue as an emergency intertie, standby quantities should be calculated on the basis of a single source system. While an emergency intertie can provide a replacement supply if needed, emergency interties are typically not automatically activated and may not be immediately available so cannot be considered equivalent to a wholesale connection. In addition, DOH only considers emergency interties as a source if the intertie agreement specifies that the emergency intertie can be used for provision of storage. Applying the DOH guidance for systems with a single source to the 590 Shoreline system, standby storage should be equivalent to twice the average day demand. Average day demand is dependent on the years used to calculate demand, but if average day demand is considered to be 1850 gpm (see Figure 4), the resulting amount of standby storage would be 5,330,000 gallons, or about 325 gallons per ERU.

As presently operated, Foy Standpipe and Richmond Highlands Tank 1 are in service, with Richmond Highlands Tank 2 out of service for recoating and repainting. Upon completion of the Tank 2 work in May 2012, SPU's intent is to take Tank 1 out of service and only perform minimum aesthetic maintenance on Tank 1 as required.

The Richmond Highlands Tanks are presently operated with a 10 to 15 foot operating range. A 10 foot range is larger than would typically be used for pumped storage, but in this case the large range is necessary in order to avoid excessively cycling the North City and Foy Pump Station pumps. If at least some of the pumps supplying the zone were equipped with variable speed drives, a much narrower range, such as 3.5 feet, could be used for operational storage. If

both the existing Richmond Highland tanks were operated with a 3.5 foot operating range, they would provide approximately 2,630,000 gallons of standby storage and 367,000 gallons of operating storage. In order to meet the standby quantities needed for a system with two sources, Shoreline would need to have 3,280,000 gallons of standby storage. To provide this quantity, a new 2.0 million gallon elevated tank could be constructed at Richmond Highlands, replacing the existing Tank 1. This improvement would provide 3,546,000 gallons of standby and fire suppression storage and 454,000 gallons of operating storage. Table 8a lists the capacity and cost of additional storage needed for Shoreline if operated with two available sources, with standby storage per the DOH minimum recommended amount of 200 gallons per ERU.

Table 8a
New Storage for 590 Zone, Multiple Sources Scenario

Facility	Cost
2.0 Mg Elevated Tank	$4,072,000

Should Shoreline use North City Pump Station as its only wholesale connection, a larger volume of standby storage would be required. Rather than construct the full quantity of standby storage as elevated storage, a preferable approach would be to construct a new ground level standpipe at the Richmond Highlands site. The tank would be constructed with the same spill elevation as the existing tanks, with a diameter of 79 feet, and with a capacity of 3,700,000 gallons. A pump station with backup power would be located adjacent to the new tank. The pump station would be designed to pump Shoreline's maximum daily demand, or about 3,300 gpm, from the new tank to Richmond Highlands Tank 2. In this manner, all of the volume of the new tank, with the exception of the top 3.5 feet of operational storage, would be available as standby storage. The new tank would provide 3,570,000 gallons of standby storage and Tank 2 would provide 1,773,000 gallons, for a total of 5,343,000 gallons of standby storage and 356,500 gallons of operating storage. Tank 1 would be decommissioned. This approach would exceed the recommended standby storage amount for a system with a single source. Table 8b lists the facility costs of the additional tank and standby pump station needed for Shoreline if operating with a single source. The standby pump station is included as a storage cost since it is an integral component necessary to provide standby storage under this approach.

It is not known at this time if the connections to the 590 zone on 145th St. will be wholesale service connections or emergency interties, which will determine if Shoreline's storage capacity will need to be based on multiple sources or on a single source. For purposes of this evaluation, the costs as shown in Table 8b will be used for determining overall capital costs.

Table 8b New Storage & Standby Pump Station for 590 Zone, Single Source Scenario	
Facility	**Cost**
3.7 Mg Standpipe	$3,251,600
Standby Pump Station	$1,604,500
Total	$4,856,100

Estimated costs include 25% contingency, 5% surveying & permitting, 12% engineering, 8% construction inspection, and 10% sales tax. Additional costs are calculated as a percentage of construction cost.

The 430 zone in southeast Shoreline presently has no storage facilities and relies entirely on SPU transmission system storage. The southeast area contains 480 ERU's. The needed amount of standby storage would be about 150,000 gallons, or two days worth of storage at average day demand. The area also needs access to fire suppression storage, which would be 1,020,000 gallons based on the structures with the highest fire flow requirements in the zone, at 4250 gpm for 4 hours. However, the recommended approach is to first consider the continued reliance on SPU storage on an 'as available' basis, as is done with some other small wholesale systems supplied by SPU. Supply would be supported by a secondary connection, possibly to Shoreline Water District, also on an 'as available' basis. Construction of a storage facility for this small area should only be considered once other options have been fully explored.

Pump Station & Control System Capital Improvement Recommendations

North City Pump Station

It is recommended that both pumps at this station be equipped with variable frequency drives to allow use of a smaller operating range at the Richmond Highlands tanks. It is also recommended that by the time of system acquisition that this station be equipped with a standby generator sized to operate one pump. The generator installation should include an automatic transfer switch to automatically start the generator and transfer the station to backup power should line power fail. Provision of standby power would reduce reliance on local storage and would allow the Shoreline system to have a higher reliability of remaining at normal operating pressure in the case of extended power outages.

Foy Pump Station

The recommended separation alternative leaves Foy Pump Station with SPU. Total project costs of modifying Foy Pump Station are estimated by SPU at $500,000 and are included in Table 7. Modifications are necessary to enable Foy Pump Station to satisfactorily serve the SPU 590 zone while also retaining the ability to support the Shoreline 590 zone if needed.

Modifications include replacing two pumps with smaller pumps and upgrading electrical equipment

Dayton Pump Station

It is recommended that the hydropneumatic system used at this station be replaced with a variable frequency drive closed loop pumping system. Such a system allows pumps to run more efficiently and to avoid cycling off and on. The station should also be equipped with a standby generator sufficient to operate the largest pump in the station. This installation should also include an automatic transfer switch for the generator. Without backup power, in the event of a power failure at Dayton Pump Station, the hydraulic gradient in the Dayton 660 zone drops to slightly less than that in the adjacent 590 zone, or about 20 to 25 psi at the highest locations in the Dayton 660 zone. In the event of a widespread loss of power that also affects the North City and Foy Pump Stations, pressure in the 590 zone is initially supported by storage at Richmond Highlands Tanks and Foy Standpipe (as presently operated). Under both current and proposed practices, backup power would be used to support the 590 zone prior to storage being excessively drawn down. Should backup power fail or otherwise not be available, the 590 zone would be supported by gravity flow from the Tolt 550 Pipeline. In this situation, the hydraulic gradient in the Dayton 660 zone would be less than elevation 550 and the highest locations in the zone would be only minimally pressurized at about 5 psi or less. Addition of backup power at the Dayton Pump Station would enable sufficient pressure and fire flow to be maintained under all foreseeable conditions.

Dayton Pump Station presently has only one primary pump. In order to provide redundancy and additional capacity to meet fire flows, a twin pump is recommended. The station piping was constructed to allow for installation of the second pump without the need for extensive piping modifications. Hydraulic modeling of the distribution system may indicate that the Dayton 660 zone could be enlarged to include adjacent areas that have marginal pressure. Addition of the second pump would enable the zone to be expanded if needed.

Supervisory Control and Data Acquisition (SCADA) System Upgrades

Shoreline will need to establish its own Scada system in order to operate the water utility independently of SPU. To do so, Shoreline will need to have its own control center, which would consist of a central programmable logic controller (PLC), data logger, modems and other equipment including a desktop terminal which would be located in the Water Operations manager's office. The new system would be designed to be much more automated than the existing SPU system, such that the primary operational requirement of staff will be to respond to alarms as needed. The new system should be designed to include an autodialer to direct alarms to an assigned duty person. The pump stations should be equipped with distributed control systems so they can function automatically at times the control center is offline or otherwise unavailable. The pump station systems will require station PLCs that are programmed to respond to reservoir levels and alarm conditions without direction from the control center.

Shoreline's Scada system will connect its central control station to North City Pump Station and Dayton Pump Station, to wholesale meter connections from the SPU system, to the 590 zone wholesale connections to Olympic View Water & Sewer District and Shoreline Water District, and to the Richmond Highlands tanks. The system will also need to be connected to SPU's Scada system to obtain status information on Foy Pump Station.

Cost of the upgraded Scada system is dependent on the required complexity of design, software licensing costs, features desired by Shoreline and by the state of the art at the time the system is designed and constructed. For preliminary estimating purposes, cost of the Scada system is estimated at $400,000.

Table 9 includes costs for pump station and control system upgrades. Pump station costs include 25% contingency, 5% surveying & permitting, 12% engineering, 8% construction inspection, and 10% sales tax. Additional costs are calculated as a percentage of construction cost.

Table 9
Pump Station & Control System Capital Improvements

Project	Estimated Cost
North City PS Standby Power	$339,200
North City PS Variable Frequency Drives	$192,000
Dayton PS Pump & Drive Upgrades	$64,000
Dayton PS Standby Power	$188,800
Scada System	$400,000
Total	$1,184,000

Distribution System Capital Improvement Recommendations

The following distribution system improvements would not need to be completed prior to operation of the Shoreline water system as an independent utility, but instead could be made as part of a long term main replacement program.

Two reports have been written describing improvements needed to provide adequate fire flows and to meet service standards in the SPU service area in Shoreline. The June 2000 SPU report, *590 Richmond Highlands Pressure Zone Hydraulic Analysis Report,* evaluated upgrades for fire flow deficiencies. This report identified the need for 1,263 feet of 6" main and 28, 824 feet of 8" main, including hydrants.

A review of the existing SPU mains in Shoreline was conducted by RH2 Engineers in the November 2004 report, *Seattle Public Utilities within the Cities of Shoreline and Lake Forest Park, Water System Valuation Report,* prepared for the Shoreline Water District (SWD). This report evaluated the distribution mains against SWD's standards, which are substantially equivalent to the DOH system reliability standards. The review identified mains, in addition to

those identified in the June 2000 SPU report, in need of upgrade to bring the system into compliance with the SWD standards. The proposed mains within the City of Shoreline consisted of 15,435 feet of 4", 4,990 feet of 6", 71800 feet of 8", 12,260 feet of 12" and 4,345 feet of 16" main. It is important to note that the standards for new construction are more stringent than the standards that would have been in place at the time these mains were constructed. There is no DOH standard requiring main replacements. However, evaluating existing mains against current standards provides a reasonable means to help identify and prioritize mains for an ongoing main replacement program. More specific prioritization of main replacements will require that the hydraulic model for the Shoreline system be accurately calibrated as noted earlier.

The lists of deficient mains in the 2000 and 2004 reports have been reviewed by the Shoreline Fire Department (SFD) to ensure that all known areas of deficiency are addressed. SFD noted four areas in particular where problems had been identified. These include the 660 Dayton pressure zone, the western portion of the 430 pressure zone in southeast Shoreline, the Echo Lake vicinity near 199th St and Aurora, and the Innes Arden area. With the exception of the Echo Lake area, these locations have been identified in the 2000 and 2004 reports as needing improvements. Recommended main replacements and upgrades in these areas are shown on Figures 4 and 6 of the 2004 RH2 Engineers report. The Echo Lake area includes approximately 1400 feet of 4" cast iron main, including about 900 feet which would need to be upgraded to support development along Aurora Avenue. As main replacement projects are prioritized, areas of deficiency should be further evaluated by hydraulic modeling and flow tests.

The main replacements identified in these two reports are included on Table 10, plus an additional 900 feet of 8" main to upgrade the 4" main on Aurora as identified as deficient by SFD. Total length of the main replacements equals approximately 139,800 feet, which constitutes 23% of the system's 615,000 feet. Replacement of these mains would bring the water system into compliance with current DOH reliability standards and would provide distribution system capacity and hydrants to provide sufficient fire flows.

Unit costs in Table 10 are based on 2011 unit construction costs from Tacoma Water, which has an active main replacement program in place, using ductile iron pipe. Unit costs shown in Table 10 include construction cost plus 5% survey & permitting, 12% engineering design, 8% inspection, 10% sales tax and 10% contingency. Additional costs are calculated as a percentage of construction cost. Contingency cost for distribution main construction is less than the contingency used in this report for other construction types due to the lower level of complexity in main construction.

Table 10 Distribution Main Replacements						
Diameter	**4**	**6**	**8**	**12**	**16**	**Total**
Length, ft	15435	6250	101522	12261	4345	139813
Unit cost	185	217	230	289	419	
Total Cost	$2,855,560	$1,355,931	$23,321,989	$3,548,223	$1,820,205	$32,901,909

As with any utility with aging infrastructure, Shoreline can expect to eventually need to replace its entire distribution system as it reaches the end of its service life. Shoreline has an advantage over older utilities in that only 5% of the Shoreline system is currently more than 70 years old. A system that is constructed of good materials and that is well maintained can expect service life of 100 years from its distribution mains. Viewed purely from the perspective of infrastructure age, Shoreline would not need to begin replacing most of its mains until about 25 to 30 years from now. This gives Shoreline a window of opportunity to establish a main replacement program to address the deficiencies in Table 10 during the next 25 to 30 years and then to shift the main replacement program's focus to ongoing replacement of infrastructure due to age. Replacing the mains in Table 10 over a 23 year period would equate to replacing an average of 1% of the system annually, ultimately resulting in replacing the entire system on a 100 year cycle. As a main replacement program is developed and individual projects are prioritized, some mains identified above may be found to have lower replacement priority than others, such as mains in need of replacement due to new development. In any case, an assumption of replacement of approximately 1% of the system per year, on average, provides for a reasonably conservative ongoing replacement rate.

Water Utility Buildings, Tools & Equipment Capital Improvement Recommendations

A new water utility will require shops, office space and yard space to store materials. It will also require heavy equipment, service vehicles and tools for the field crews. Some functions, such as office space and a customer service counter, may be incorporated into existing space at City Hall or combined with similar functions at the wastewater utility which is anticipated to be established prior to establishment of the water utility. Similarly, the water utility's shop and yard space may be combined with the wastewater utility or with other City field operations facilities.

Table 11 shows the estimated required square footage and cost for office and shop space sufficient to support the level of staffing discussed earlier in this report. Office space is assumed to be available in City Hall, and is estimated at 50% of the cost of new construction. Shop space is assumed to be located at the same site as other city utility shops. Estimated costs include construction, outfitting and furnishing the office and shop space but do not include land or site development cost. The City is presently pursuing options to obtain a suitable site for consolidated utility shops through an intergovernmental land trade.

Table 11 Water Utility Space Requirements		
Building	**Area, sq ft**	**Cost**
Office	2625	$329,440
Shops	5290	$714,150
Total	7915	$1,043,590

Crews will require heavy equipment, service vehicles and tools. Table 12 lists estimated quantities and costs of heavy equipment and vehicles. Service van costs include outfitting with work benches, cabinets, generator sets and work lighting. Costs reflect retail internet pricing plus 10% tax. The equipment in Table 12 is intended to meet the routine needs of the utility. Large equipment such as track hoes or mobile cranes are not included and would typically be rented for jobs where such equipment is needed. In case of emergencies requiring large equipment, mutual aid agreements with other utilities may also provide access to larger or specialized equipment.

Table 12 Heavy Equipment & Vehicle Cost			
Equipment	**Quantity**	**Unit Cost**	**Total**
Backhoe	2	$96,800	$193,600
Backhoe trailer	2	$5,500	$11,000
Shoring Box	2	$11,000	$22,000
Shoring box trailer	2	$4,400	$8,800
Dump truck	2	$77,000	$154,000
Boom truck	1	$154,000	$154,000
Service van	3	$66,000	$198,000
Pickup	5	$38,500	$192,500
Total			$933,900

Table 13 lists the initial cost of tools and materials to outfit the utility shops and the field crews. Inventory cost represents a minimum needed to deal with day to day operations and assumes that supplies can be readily replenished by local suppliers. Costs in this table were developed by itemizing typical tools and materials and their estimated costs, plus 10% tax.

Table 13 Initial Tools & Inventory Cost	
Category	**Estimated Cost**
Shop Tools	$46,970
Field Tools	$127,160
Inventory	$101,750
Total	$275,880

Capital Improvements Summary

Table 14 summarizes the capital improvements that need to be completed in order for the Shoreline system to operate as an independent water utility, including a 3.7 million gallon standpipe and standby pump station as shown on Table 8b, pump station & control improvements listed in Table 9, building space listed in Table 11, heavy equipment and vehicles in Table 12, and tools & inventory shown in Table 13. Table 14 does not include the separation costs shown in Table 7 nor the distribution main improvements shown in Table 10. Separation costs as shown in Table 7 are additive to those in Table 14. Distribution main replacement costs in Table 10 are shown as an annual capital expense in Table 15.

Costs related to starting up the new water utility's operations (Tables 11, 12 & 13) may be incurred at the time of acquisition or may be phased, depending on operating arrangements Shoreline may make with SPU or other utilities.

The largest capital improvement expense facing Shoreline is the cost of bringing the distribution system up to current standards. This cost should be addressed as an annual expense for an ongoing main replacement program. Assuming the main replacement program is planned to replace 1% of the system on average per year, the total cost to replace the mains as shown on Table 10 would be incurred over 23 years, at an annual cost of $1,430,518. This cost is shown in Table 15 as an annual expense.

Table 14 Required Capital Improvements Prior to Independent System Operation	
Category	**Estimated Cost**
3.7 MG Standpipe & Standby Pump Station	$4,856,100
Pump Stations & Controls	$1,184,000
Utility Buildings	$1,043,590
Heavy Equipment & Vehicles	$933,900
Tools & Inventory	$275,880
Total	$8,293,470

Annual Capital Improvement Costs

In addition to the capital improvements in Table 14, Shoreline's water utility will also have annual capital expenses. Table 15 summarizes estimated annual capital costs, with vehicle replacement and tool replacement costs estimated at 10% of the initial costs from Tables 12 and 13. Costs for distribution main extensions and relocations, and service replacements are as shown in Table 3, based on SPU's capital costs. The annual main replacement program is included as discussed above. Meter replacement cost has been increased beyond SPU's cost to reflect meter replacement based on age rather than on replacement due to failure. The remaining costs in Table 15 are approximations based on system size.

Table 15
Annual Capital Improvements

Category	Estimated Cost
Vehicle Replacements	$93,390
Tool Replacements	$17,413
Distribution main extensions	$71,000
Distribution main relocations	$213,000
Main replacement program	$1,430,518
Service replacements	$710,000
Meter replacements	$72,000
Hydrant Replacements	$50,000
Valve Replacements	$50,000
Water Quality Improvements	$10,000
Cathodic Protection Improvements	$10,000
Pump & Storage Improvements	$50,000
Scada & communications Improvements	$20,000
Total	$2,797,321

Additional Water Utility Functions

In addition to the core functions supported by a water utility's field operation and maintenance staff, customer service support, and by billing and administrative staff, certain other functions must be addressed. Some may be covered by existing City staff, by contracting, or possibly by addition of utility staff.

Grounds Maintenance

Reservoir and pump station sites, shops and offices grounds, and non-street right-of-way areas will need to be maintained to a level comparable to neighborhood standards. This typically includes mowing, landscaping maintenance, and removal of litter and illegal dumping.

Property Management

Adjacent property owners may have complaints about the utility's property, or may wish to obtain easements, permits, or other property rights on utility property, in particular any undeveloped or right-of-way properties outside of City streets. Cellular phone providers may inquire about installation of antennas on the utility's storage tanks, and any resulting contracts will need to be administered.

Water Quality Testing

Routine bacteriological and chlorine residual sampling is required, as are a number of organic and inorganic samples as required by the EPA. In addition, sampling will be required in order to put newly constructed projects in service or in cases where the system has been subject to contamination. While the utility's water operations manager and water quality technician can track required samples and field staff can take samples under the technician's guidance, the samples will need to be processed by a certified laboratory. SPU has a water quality laboratory that is used by other utilities in the region, and other private laboratories are also available.

Scada Maintenance and Modifications

Expert support is needed when Scada components fail or when system changes require programming changes and revision of Scada screens. This level of expertise is often provided through contract support from the vendor that originally designed and started up the system.

Electrical Maintenance and Modifications

Some basic electrical work can be performed by the utility's trained field operations and maintenance staff, but more involved work requires a licensed electrician, typically on an as-needed contract.

Cathodic Protection Systems Maintenance and Modifications

Cathodic protection systems are in place on the large diameter steel mains in Shoreline, and are recommended in existing and proposed steel storage tanks. A cathodic protection engineer should verify that all large diameter steel mains in Shoreline are bonded and under adequate levels of protection against external corrosion. After the cathodic protection systems are known to be operating as needed, periodic inspection of the systems is required to ensure continued satisfactory operation. This function is typically contracted out to a cathodic protection engineer.

Meter Reading

The proposed level of staffing provides for meter reading by field operations and maintenance staff. Shoreline may consider contracting this function out to an adjacent utility that has an established meter reading function.

Permits and Inspections

New services will require permits and inspections, which may be a function to be addressed by the City's existing building inspection staff. Other permits will be required such as for the use of hydrants by contractors or other special purposes. Construction inspection of new mains and other capital projects can be provided by existing City inspection staff if available, or can be contracted out to inspection and testing services providers.

Extraordinary Maintenance

Some maintenance functions occur infrequently or are highly specialized, and are typically contracted out, such as cleaning or painting large structures such as storage tanks.

Locating

One-call locating service is often contracted out.

Main Tapping

While smaller service taps such as routine residential connections may be installed by utility staff, larger connections are often made by specialty tapping services.

Large Meter Maintenance

Small residential meters are more economical to replace rather than repair, but larger sized meters are typically tested, repaired and returned to service. This function is commonly carried out by larger water utilities, but Shoreline may find it more cost effective to contract this function out to a utility that has an existing meter testing and repair facility.

Professional Services

Engineering and financial services are typically contracted for tasks such as preparation of comprehensive water system plans, rate setting, long range planning, or for evaluation of complex operational changes.

Further Engineering Review & Evaluation

Shoreline may need additional engineering expertise to provide ongoing assistance in discussions with SPU regarding separation issues, and to provide hydraulic modeling expertise in addition to that provided by SPU. Engineering support will also be required for evaluating and modeling the operation of the system as outlined below.

Separation Issues

The separation alternatives as presented by SPU are not yet at a detailed level. As discussions continue with SPU, specific components of the separation plans may need to be reviewed and modeled.

Hydraulic modeling of the overall operation of the proposed Shoreline system will be an important aspect as the separation process develops. Evaluation of the conditions under which emergency or wholesale connections operate will be carried out using the hydraulic model. The hydraulic model will also be used to evaluate fire flow availability at specific locations within the service area.

SPU's proposed separation alternatives include new or renovated storage facilities for SPU as a Shoreline expense. Engineering assistance may be needed as replacement or renovation proposals are considered.

Additional Review of Distribution Grid Deficiencies

The Shoreline Fire Department has extensive experience in working with the distribution system in Shoreline. Areas identified by the Fire Department should be hydraulically modeled and reviewed to verify that low flows are a result of undersized mains rather than closed line valves, improperly set pressure regulating valves, or other operational problems. Any additional areas not already identified as having undersized mains should be added to the list of known distribution main deficiencies to be considered for replacement in the main replacement program.

The pumped Dayton 660 zone is adjacent to some points in the 590 zone that may have low pressure. Hydraulic modeling of expansion of the 660 zone would be required to determine the extent and feasibility of expanding the zone to encompass potential low pressure areas. This report includes the proposed addition of a second large pump at the Dayton Pump Station. Evaluation of any expansion of the 660 pressure zone would be carried out prior to installation of the new pump. If needed, the size of the proposed pump could be increased to accommodate expansion of the 660 zone.

The hydraulic model for the Shoreline system can be expected to be in need of further calibration, as discussed earlier in the report. Models are typically calibrated by flowing hydrants and by comparing modeled results with actual pressures and flows. A well-calibrated

model is essential for efficient operation of a water system, including prediction of available fire flows and prioritizing individual main replacement projects.

Storage Issues

With only Richmond Highlands Tank 2 in service, Shoreline's 590 zone would have insufficient storage capacity to meet the Department of Health minimum storage recommendations. This engineering review provides an estimate of the additional storage Shoreline would need to construct to meet the recommended reliability standards, but additional engineering evaluation should also be conducted to optimize the capacity of a new storage facility with regard to payment of wholesale rate storage demand charges to SPU. Shoreline has the option of having less than the minimum recommended amount of standby storage capacity if the ratepayers are willing to accept the reduced level of reliability. Consideration of source availability, reliability standards, and demand charges will all play a role in ultimately deciding on what amount of storage is desired for Shoreline.

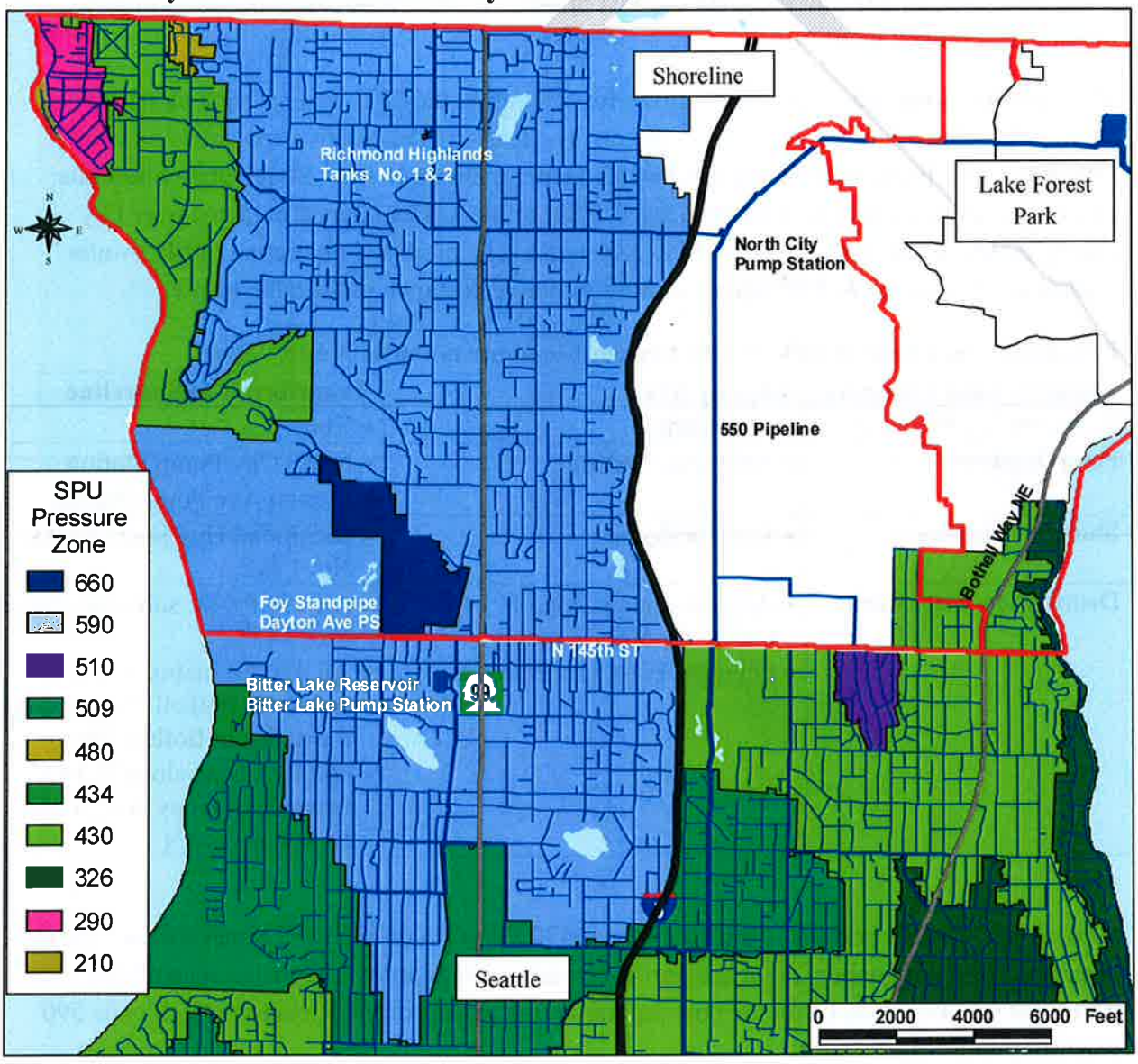
Water Supply to 590 Pressure Zone south of N 145th Street after Shoreline Separation
DRAFT
May 9, 2012

Background

SPU and the City of Shoreline (Shoreline) are in discussions about transferring water distribution system assets within the City of Shoreline from SPU to Shoreline. The area served by SPU includes nearly all of Shoreline west of I-5 along with a small area to the east. (Shoreline east of I-5 is primarily served by the Shoreline Water District, which is not involved in the discussions.)

The SPU water system assets located inside the City of Shoreline are shown in the figure below.

SPU Water System inside Shoreline City Limits



SPU has significant water transmission and distribution system assets inside the City of Shoreline. A major transmission pipeline, the 550 Pipeline, crosses through Shoreline east of I-5. SPU serves nearly all of Shoreline west of I-5 through the Richmond Highlands 590 pressure zone (PZ) and associated sub-zones. The Richmond Highlands 590 PZ is served by three pump stations (two located inside Shoreline) and three storage tanks (all located in Shoreline). In Shoreline east of I-5, SPU serves only a small portion of the Maple Leaf 430 PZ between 25th Avenue NE and Bothell Way NE. A 12-inch feeder main supplying the Olympic Hills 510 PZ is mostly located inside Shoreline but only serves customers in Seattle.

Proposed Separation along N 145th Street

As part of the transfer discussions, SPU has required that Shoreline operate its water system post-transfer as a wholesale customer. SPU will install billing meters at the point(s) of delivery to the Shoreline system and will supply water at the 550 Pipeline gradient (except through a possible emergency intertie).

Shoreline has proposed several alternatives for separating the SPU water system along the Seattle-Shoreline boundary on N 145th Street. The least-cost alternative appears to be where SPU keeps Foy Pump Station and the 24-inch feeder main on N 145th Street while Shoreline constructs new parallel mains where needed. (Shoreline has no interest in taking over Foy Standpipe and it will remain part of SPU's system.) The proposed separation of SPU water system assets north of N 145th Street in this alternative is shown in the table below.

Proposed Separation of SPU Water System Elements north of N 145th Street

Water System Elements	Kept by SPU	Transferred to Shoreline
Transmission Pipelines	• 550 Pipeline	• None
Pump Stations	• Foy Pump Station	• North City Pump Station • Dayton Ave Pump Station
Storage Facilities	• Foy Standpipe	• Richmond Highlands Tanks No. 1 & 2
Distribution Watermains	• All watermains along N 145th except for 660 PZ mains • Olympic Hills 510 PZ feeder	• All 590 PZ (& subzone) mains N of 145th • All 430 PZ mains N of 145th and W of Bothell Way (except the mains in Bothell Way) • 660 PZ mains along N 145th between Phinney Ave N and Evanston Ave N

Separating the small portion of the Maple Leaf 430 PZ north of NE 145th Street will not affect operations of the main portion of the pressure zone inside Seattle. The main focus of this document will therefore be on the post-separation operations of the Richmond Highlands 590 zone south of N 145th Street.

Richmond Highlands 590 PZ North of N 145th Street

The portion of the zone north of 145th ST would be operate as a separate water system with North City Pump Station as the primary source of supply, and Richmond Highland Tank(s) as its storage facilities. City of Shoreline requested SPU to assess through hydraulic modeling whether North City Pump Station and the feeder backbone would provide adequate level of domestic and fire protection service throughout the zone. The concern would be if fire flows and pressures in the south end of the zone (near 145th ST) could be compromised under certain conditions without supply from the south.

A hydraulic model with the proposed separation piping was set up and used to assess fire flows and pressures during peak demands while only relying on North City PS and Richmond Highlands Tanks. Fire flow of 3,000 gpm was assumed to be required along Aurora Ave, based on information from the recent Aurora Ave improvement projects. The model was run as a 24-hour simulation of the peak day (including peak hour demands), as well as a steady state run with domestic demands set at the peak day level (see peaking factors above), with a 3,000 gpm fire flow near Aurora Ave and NE 145th ST. Whole sale service demands by Olympic View WSD were also included and scaled up with the same peaking factors as retail demands within the zone, a conservative assumption as whole sale services typically exhibit little or no peaking within the peak day.

The model indicated that pressure and fire flow service levels could still be met with only North City PS and Richmond Highlands tanks. This is largely due to the large pumping capacity of the pump station, and the large diameter feeder mains in Aurora Ave, NE 185th ST, and Freemont Ave. Additionally, the higher fire flows are generally required in close proximity to the feeder mains.

It should be noted that an exhaustive fire flow analysis based on actual or planned structures throughout the zone has not been performed as part of this effort.

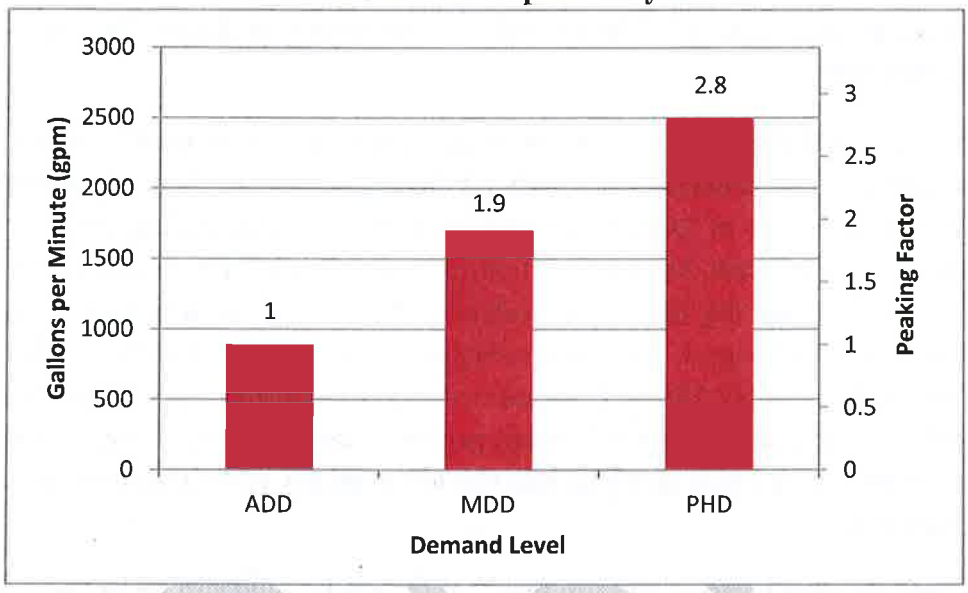
However, an emergency intertie will be provided somewhere along N 145th Street between Seattle's Foy 590 zone and Shoreline's Richmond Highlands 590 PZ. As discussed above, this intertie would not be expected to be needed in non-emergency situations due to the ability of North City Pump Station to meet Peak Hourly Demand or Maximum Day Demand plus fire flow.

Proposed Foy 590 PZ South of 145th ST

Separating the water system along N 145th Street will leave approximately one-third of the Richmond Highlands 590 zone in the SPU water system. (For brevity and to distinguish this area from the current Richmond Highlands 590 zone, this area will be referred to as the proposed

Foy 590 PZ.) The proposed Foy 590 PZ contains approximately 5,000 active water services estimated to be 8,600 equivalent residential units (ERUs). The Year 2011 average daily consumption of this area is 890 gpm. The maximum day demand (MDD) for the area is estimated to be 1,700 gpm and the peak hourly demand (PHD) is estimated to be 2,500 gpm. These estimated amounts and associated peaking factors are shown in the figure below.

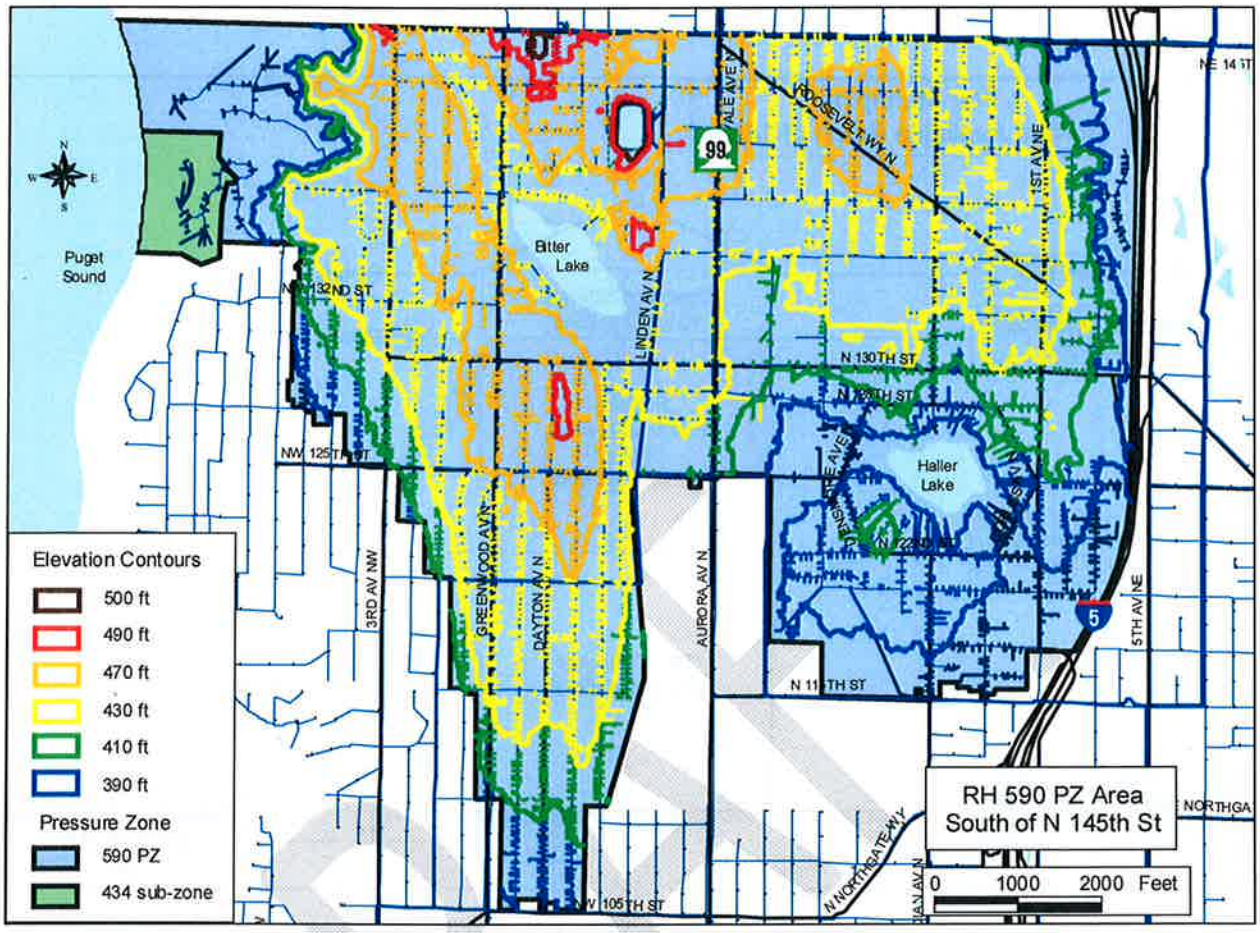
Water Demands in Proposed Foy 590 PZ



Topography of Proposed Foy 590 PZ

The topography of the Foy 590 zone is shown in the figure below. Service Elevations range from 180 to 500 feet, with the highest-elevation services (490 feet and above) located near N 145th Street and Phinney Ave N and N 127th Street and Dayton Ave N. All of the proposed Foy 590 PZ is served water at 590 feet of head except for a small 434 subzone in the northwest part of the area.

590 Area S of N 145th Street (Proposed Foy 590 PZ)

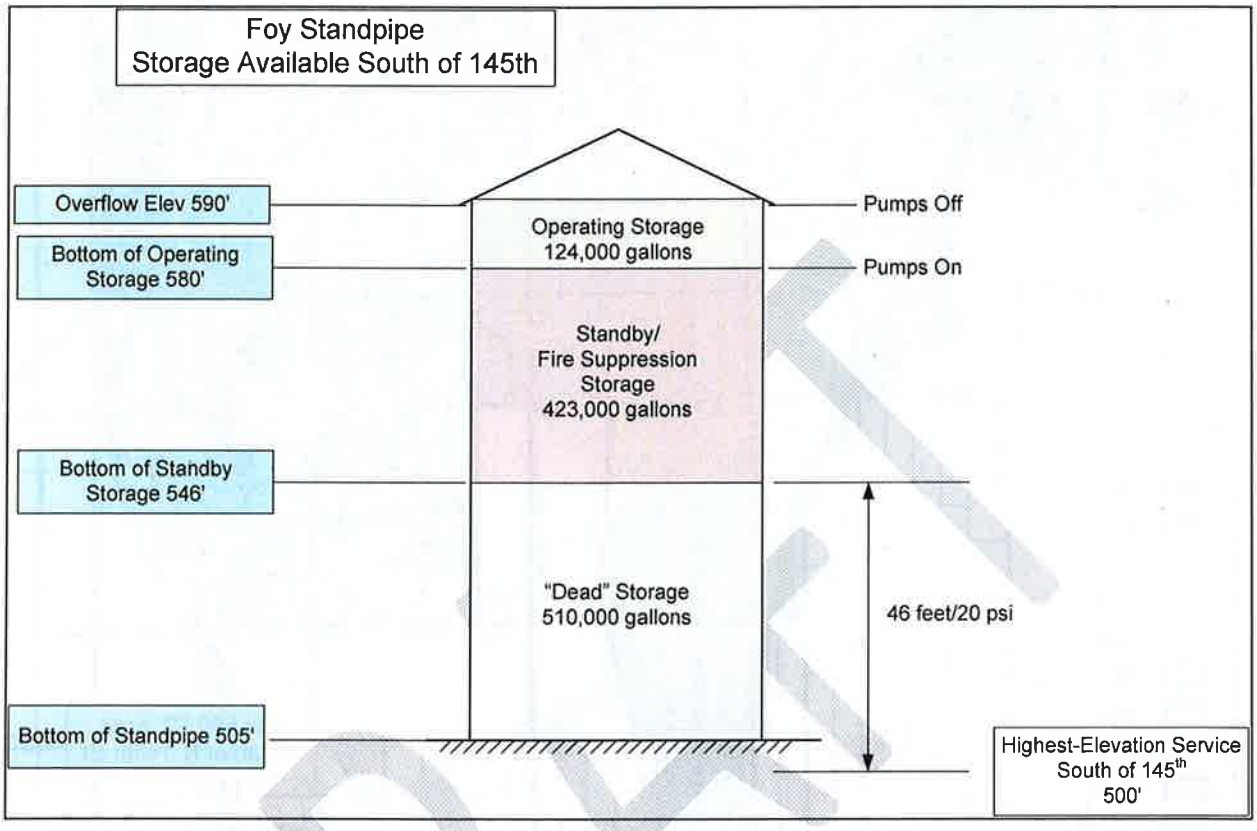


Water Storage for Proposed Foy 590 PZ

Foy Standpipe, which will remain part of SPU's water system, is a possible option for providing storage to the Proposed Foy 590 PZ. Foy Standpipe is a cylindrical steel tank with a diameter of 46 feet, which equals a storage capacity of 12,400 gallons per foot. Foy Standpipe was originally constructed in 1933. It has a lead-based exterior coating and vinyl interior lining and was last recoated in 1980. In addition to internal and external recoating, Foy Standpipe will need to be seismically upgraded if it is to remain in service as the only storage facility in the Foy 590 zone.

The available storage in Foy Standpipe for the proposed Foy 590 PZ is shown in the figure below. Operating storage, which provides for pump starts/stops, is between elevations 580 and 590 and totals 124,000 gallons. Below operating storage is equalizing/fire suppression storage, which would be between elevations 546 and 580, and totals 423,000 gallons (or approximately 50 gallons per ERU). Below equalizing/fire suppression storage is "dead" storage, which is below the level that would provide at least 20 psi static pressure to the highest-elevation service. Equalizing storage would not be required for the proposed Foy 590 PZ because the combined

capacities of the pumps at Foy and Bitter Lake Pump Stations exceed the peak hourly demand of the zone.



In addition to Foy Standpipe, standby storage would be available to the proposed Foy 590 PZ in Bitter Lake Reservoir through the emergency Bitter Lake Pump Station diesel pump and from Lake Forest Park Reservoir via the 550 Pipeline. SPU plans to retrofit the Bitter Lake diesel pump with remote start capability in 2012. Gravity supply from Lake Forest Park Reservoir is currently available through a manually-operated valve, but could be made automatic by installing a check valve at or near Foy Pump Station.

Pumping to Proposed Foy 590 PZ

In the current discussions between SPU and Shoreline, Foy Pump Station would be kept by SPU along with Bitter Lake Pump Station, which is located inside Seattle city limits. Because of the lower lift required (40 feet versus 81 feet), Foy Pump Station would be the primary supply to the proposed Foy 590 PZ.

Foy Pump Station contains three pumps, two rated at 4,000 gpm and one at 6,000 gpm. Foy Pump Station normally pumps from 550 to 590 feet, but the impellers can be changed on the two smaller pumps so they can pump from 430 to 590 feet. Bitter Lake Pump Station contains three pumps, each rated at 4,000 gpm. One pump was converted in the 1990s to diesel power and will be retrofitted with remote start capability in 2012. Bitter Lake Pump Station pumps from Bitter

Lake Reservoir (maximum elevation 509 feet) to 590 feet. The existing pumping capability to the proposed Foy 590 PZ is shown in the table below.

Existing Pumps Available to Supply the Proposed Foy 590 PZ

Pump	Design Flow (gpm)	Supply	Head (ft)	Horsepower
Foy #1	6,000	550 Pipeline/ Maple Leaf 430 PZ	165	300
Foy #2	4,440		165/290*	230/400
Foy #3	4,440		165/290*	230/400
Bitter Lake #1	4,000	Bitter Lake Reservoir	162	200
Bitter Lake #2 (Diesel powered)	4,000		162	365
Bitter Lake #3	4,000		162	200

*Either Foy pump #2 or #3 can be fitted with a larger impeller for pumping from the 430 zone.

Foy Pump Resizing Analysis

A modeling analysis was performed to determine possible efficiencies from resizing one or more Foy Pumps. The analysis compared three sizes of pumps:

- Existing 230-hp Foy Pumps #2/3
- 100-hp Aurora 410 10x12x12B (11" impeller) pump
- 50-hp Aurora 410 8x10x12 (11" impeller) pump

All of the analyses involved pumping from the 550 Pipeline to the proposed Foy 590 zone and maintaining the water level in Foy Standpipe in the top ten feet. The pumps were compared for 24-hour simulations under average day and maximum day demand. For each simulation, the number of pump starts and stops were counted along with the total run time, and average annual power costs were determined based on the estimated horsepower and average day run time. The results of the comparison are shown in the table below.

Pump	Demand Level	Daily Starts/ Stops	Average Run Time (min)	Total Run Time (min)	Annual Power Cost ($.10/kWh)
Existing Foy #2/3 230 hp	ADD	9	29	260	$27,000
	MDD	15	24	370	
Aurora 100 hp	ADD	8	45	360	$16,500
	MDD	10	70	700	
Aurora 50 hp	ADD	7	78	546	$12,400
	MDD	5	208	1040	

Under average day demand, the existing 230-hp Foy pumps would have slightly more daily starts/stops (9) than would a 100-hp pump (8) or 50-hp pump (7). Under maximum day demand, the existing 230-hp pump would start and stop 15 times, compared to 10 for a 100-hp pump and 5 for a 50-hp pump. The existing 230-hp Foy pumps would have higher estimated annual pumping costs ($27,000) than would a 100-hp pump ($16,500) or a 50-hp pump ($12,400).

Based on the annual power savings and reduced starts/stops, it is recommended to replace Pumps #1 and #2 at Foy Pump Station with 50-hp pumps.

Pump #3 can be kept as-is for fire flow and emergency supply, because of its ability to pump from both the 550 and 430 gradient, as well as the fact that it has a newer motor starter.

Keeping the existing 400-hp motor on Pump #3 dictates keeping the existing medium voltage (2300V) electrical service.

However, 50-hp motors for the new smaller pumps at 2300V are not generally available; consequently, those would need to be 480V motors. The new smaller pumps would also need to be equipped with new solid state, reduced voltage starters. To account for the voltage difference, step-down transformers should be included in the new pump starter assemblies for the new smaller pumps.

Review of Hydraulic Model for SPU Acquisition

PREPARED FOR: City of Shoreline

COPY TO:

PREPARED BY: CH2M HILL

DATE: May 24, 2012

PROJECT NUMBER:

The City of Shoreline (City) has requested that CH2M HILL review and comment on the hydraulic performance of the water distribution system (WDS) within the City as demonstrated with a hydraulic model of the WDS. This WDS is currently owned, operated, and maintained by Seattle Public Utilities (SPU). The City is considering acquisition of this portion of the SPU water distribution system. This technical memorandum (TM) summarizes the analysis performed with the hydraulic model and the system performance for a range of demand conditions.

Water Distribution System Hydraulic Model Components

The hydraulic model of the WDS to be acquired by the City was provided by SPU and is the hydraulic model of the SPU 590 Pressure Zone. This includes the entire 590 Pressure Zone and those pressure zones that are supplied by the 590 Pressure Zone, including lower hydraulic gradient zones to the northwest and the higher 660 Pressure Zone, north of NE 145th Street. The 590 Pressure Zone is supplied from the SPU 550 pipeline by the North City and Foy pump stations. There are three water storage tanks that float on the 590 hydraulic gradient within the 590 Pressure Zone including the Richmond Highlands Tanks 1 and 2 (#1 is not in service) and the Foy Standpipe. The Bitter Lake Reservoir is also located within the 590 Pressure Zone, but its storage can only be accessed through pumping from the Bitter Lake Pump Station. The Dayton Pump Station is an inline pump station that pumps water from the 590 Pressure Zone to the 660 Pressure Zone. A screen capture of the hydraulic model in EPANet is shown in Figure 1.

The WDS pipes that would be acquired by the City included in the hydraulic model range from 1” in diameter to 30” in diameter. The roughness of the inside of each pipe is categorized by the Hazen Williams C-factor. Older, unlined pipes that have more corrosion, tuberculation, or buildup on the inside of the pipe have a lower C-factor while newer, “slicker” pipes have a higher C-factor. Figure 2 shows the distribution of modeled C-factors for the pipes within the area of the WDS acquired by the City. This distribution of C-factors is a reasonable distribution for the age of pipe within this area as shown from GIS and in the Engineering Review (EES Consulting, 2012). However, recent calibration of the hydraulic model to verify the C-factors has not been completed.

FIGURE 1
EPANet Hydraulic Model

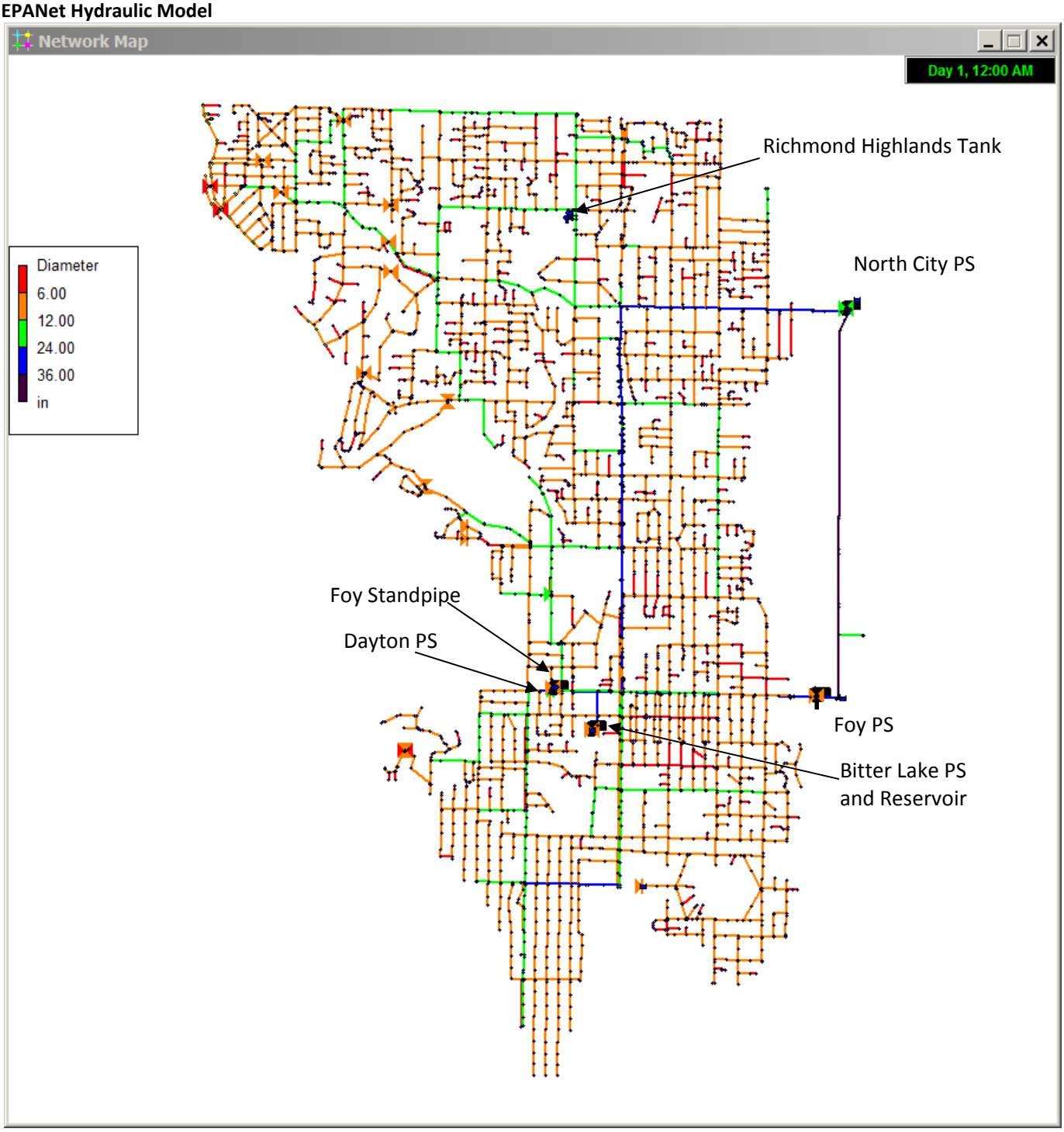
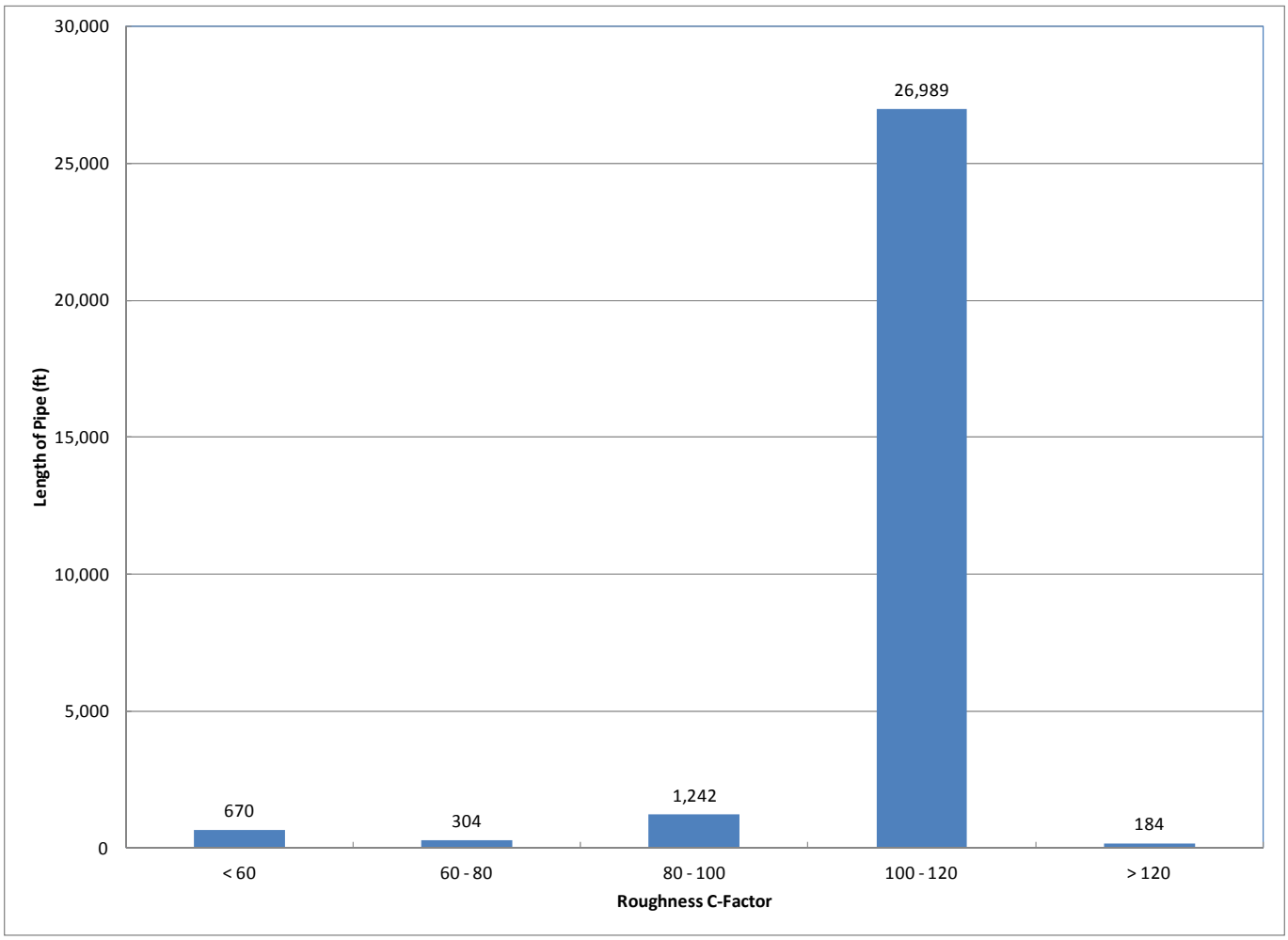


FIGURE 2
C-factor Distribution



Supply to the Olympic View Water District (OLWD) is provided through the City's WDS to the OLWD wholesale connections. This operation is anticipated to continue when the City acquires the WDS, and the supply from SPU to OLWD would be "wheeled" through the City's system. During discussions with City staff, SPU, and EES Consulting staff, it was indicated that OLWD may require as much as 2,000 gpm at their northwest connection in the future. Water supplied to this connection is conveyed across the City's system and may have an impact on the operation of the City's system. Discussion with OLWD of redevelopment plans for the area served by this connection should be held to determine the future OLWD demand.

Hydraulic Simulation Evaluation

The currently recommended alternative for acquisition of the SPU system is Alternative B3 outlined in the Engineering Review (EES Consulting, 2012). Under this alternative, the City's system would be supplied solely by the North City Pump Station, and the Foy Pump Station and Standpipe would be retained by SPU. A backup supply point would be provided at Aurora Avenue and NE 145th Street, and this supply point would be fed by the Foy Pump Station. New piping along NE 145th Street is also recommended under this alternative to provide a looped system at the southern end of the system and to distribute the supply from the Aurora and NE 145th connection point, should it be needed. The new piping and separation features (closed pipes/valves) were input into the hydraulic model by SPU staff, and the facilities were evaluated by CH2M HILL. SPU staff had indicated during a meeting on May 15, 2012 that one 4-inch connection had not been closed. This connection was closed, and another 6-inch connection along NE 145th Street that was also open was closed for the separation analysis.

Three hydraulic scenarios were run to evaluate the system performance. These scenarios included average day demand (ADD), maximum day demand (MDD), and peak hour demand (PHD). For each scenario, one pump at the

North City Pump Station was on, and the Richmond Highlands Tank was set at a level of 30 ft (585 ft HGL), 5 ft below overflow. The pump at the Dayton Pump Station was also on during this scenario.

A summary of the demand condition for the City's area is shown in Table 1. The MDD peaking factor was set at 1.8 x ADD, and the PHD peaking factor was set at 2.7 x ADD. These peaking factors are those that have historically been applied for the SPU system analysis and are within the range of expected peaking factors for urban areas in Western Washington State.

TABLE 1
Modeled Demand by Demand Scenario

Demand Condition	Entire Modeled Demand (mgd)	City Area Demand (mgd)
ADD	4.44	3.25
MDD	7.98	5.85
PHD	11.98	8.77

For the ADD scenario, the pressure within the City's area ranged from 25 psi to 176 psi. The lowest pressures are on pipes receiving supply from the 590 Pressure Zone that are adjacent to piping in the 660 Pressure Zone. The spatial distribution of pressures for ADD conditions is shown in Figure 3. Under the ADD scenario, the Richmond Highlands tank fills.

The pressure within the City's area ranged from 24 psi to 174 psi for the MDD scenario. The spatial distribution of pressures is shown in Figure 4. Under the MDD scenario, the Richmond Highlands tank slightly drains. Similar to the ADD scenario, the lowest pressures are on pipes receiving supply from the 590 Pressure Zone that are adjacent to piping in the 660 Pressure Zone

For the PHD scenario, the pressure within the City's area ranged from 22 psi to 174 psi, and spatial distribution of pressures is shown in Figure 5. For the PHD scenario, the Richmond Highlands tank contributes just over 2,500 gpm to meeting the PHD with one pump on at the North City Pump Station. The pressures lower than 30 psi for the PHD scenario are also on pipes receiving supply from the 590 Pressure Zone that are adjacent to piping in the 660 Pressure Zone.

To evaluate the impacts of providing up to 2,000 gpm to OLWD under MDD and PHD conditions, two additional scenarios were run. The pressure results for the MDD and PHD scenarios with 2,000 gpm supplied to OLWD in the northwest of the City's system is shown in Figure 6 and Figure 7. As shown in Figure 6 and 7, there is a slight reduction in pressures across the northern portion of the City's system when providing additional supply to OLWD.

A distribution of the pressures in pressure categories for the ADD, MDD, PHD, and both the MDD and PHD plus 2,000 gpm OLWD scenarios is shown in Figure 8. As seen in Figure 8, there is less than 1 percent of pressures below 30 psi, and these are at the higher elevations of the area, close to the boundary of the 660 Pressure Zone. The shift of pressure to lower pressure classes is evident as the demand scenarios increase, and generally more than 65 percent of the nodes are within 40 and 80 psi.

FIGURE 3
ADD Pressures

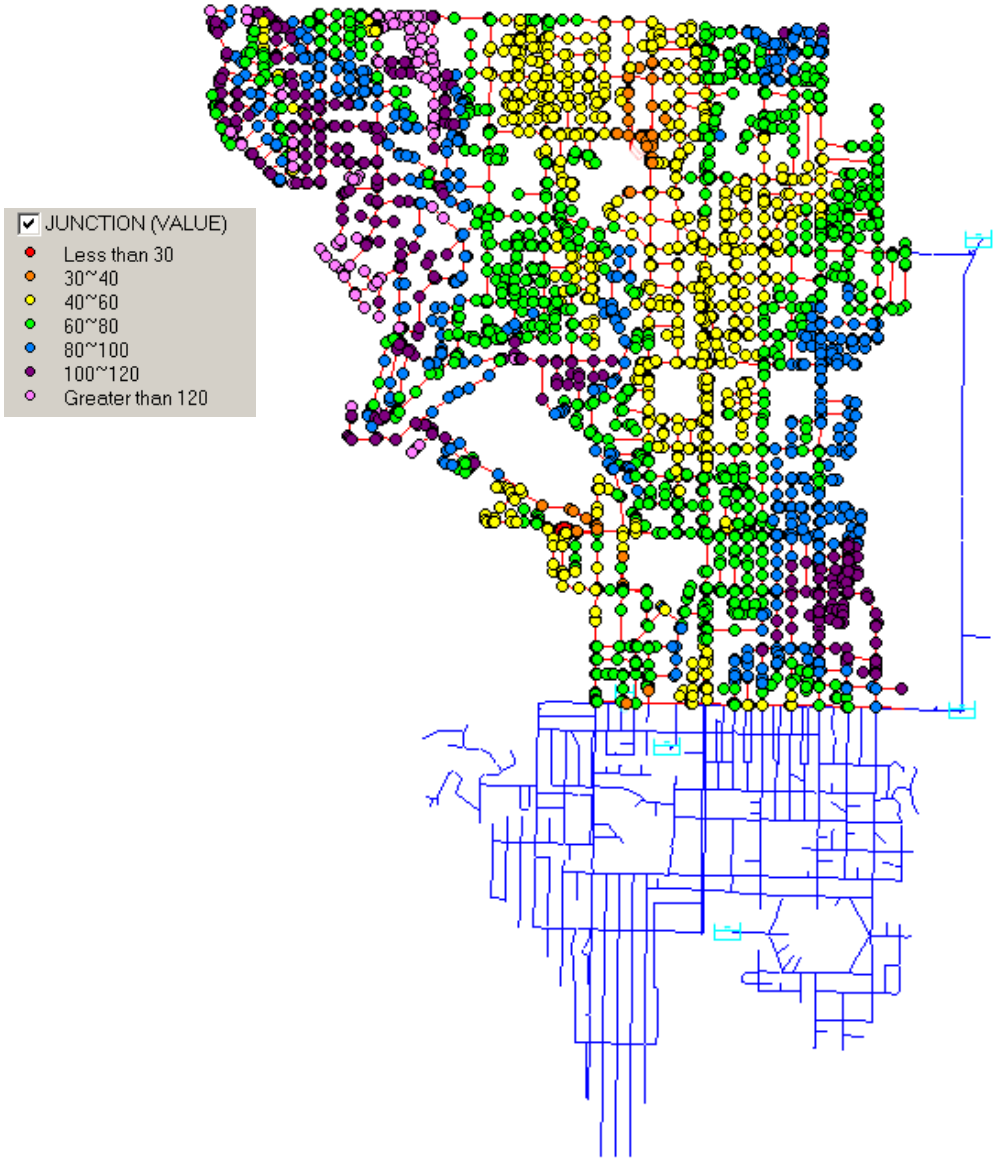


FIGURE 4
MDD Pressures

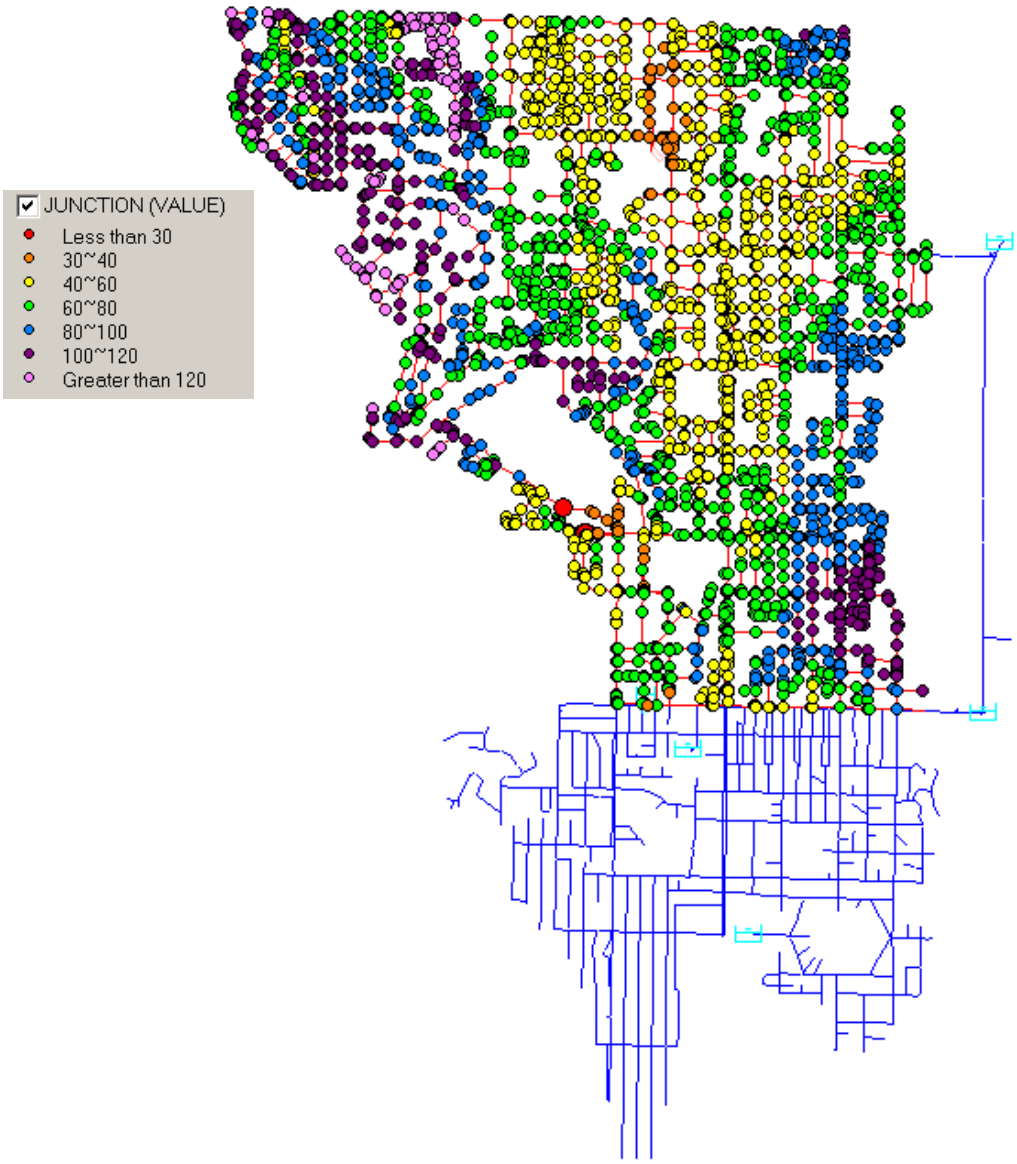


FIGURE 5
PHD Pressures

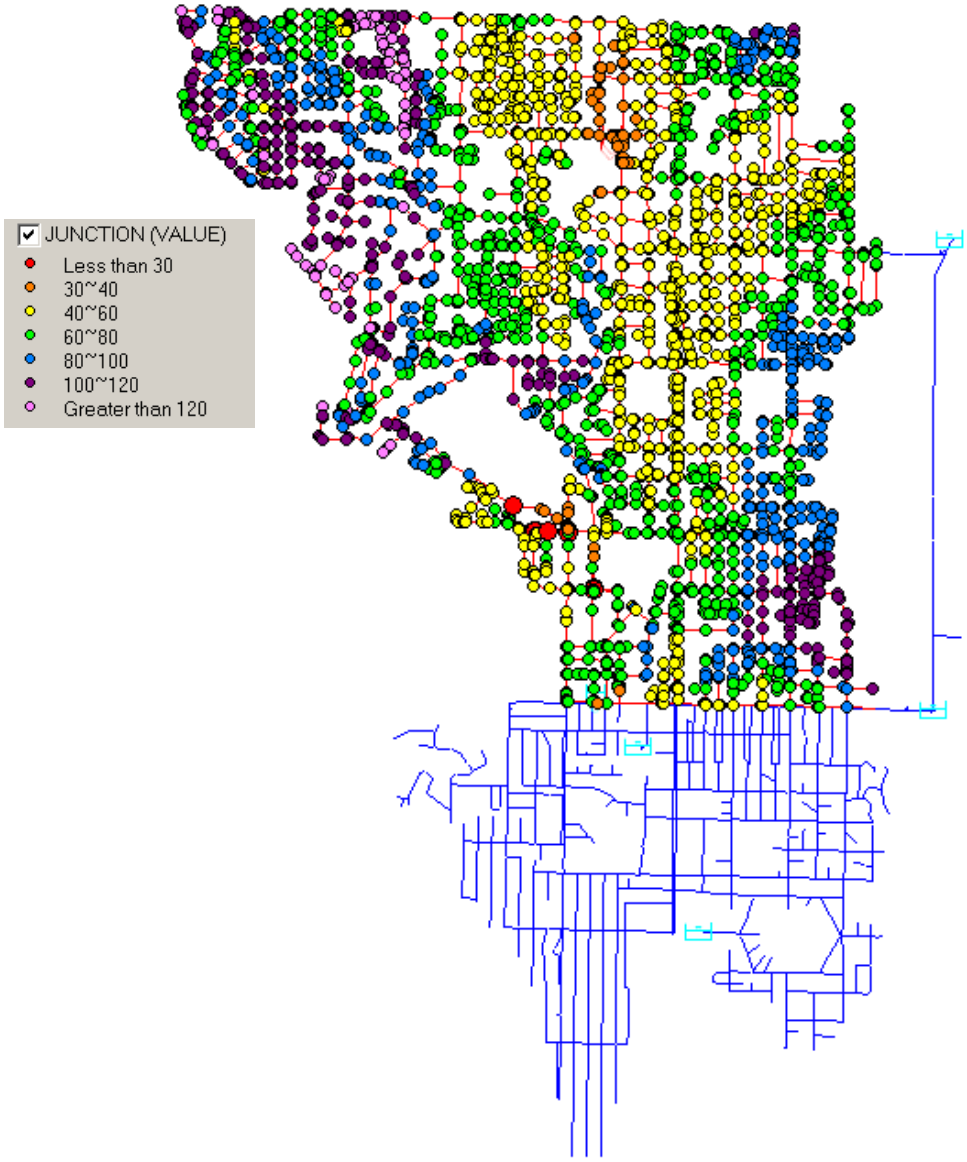


FIGURE 6

MDD Pressures with 2,000 gpm Supply to Olympic View Water District

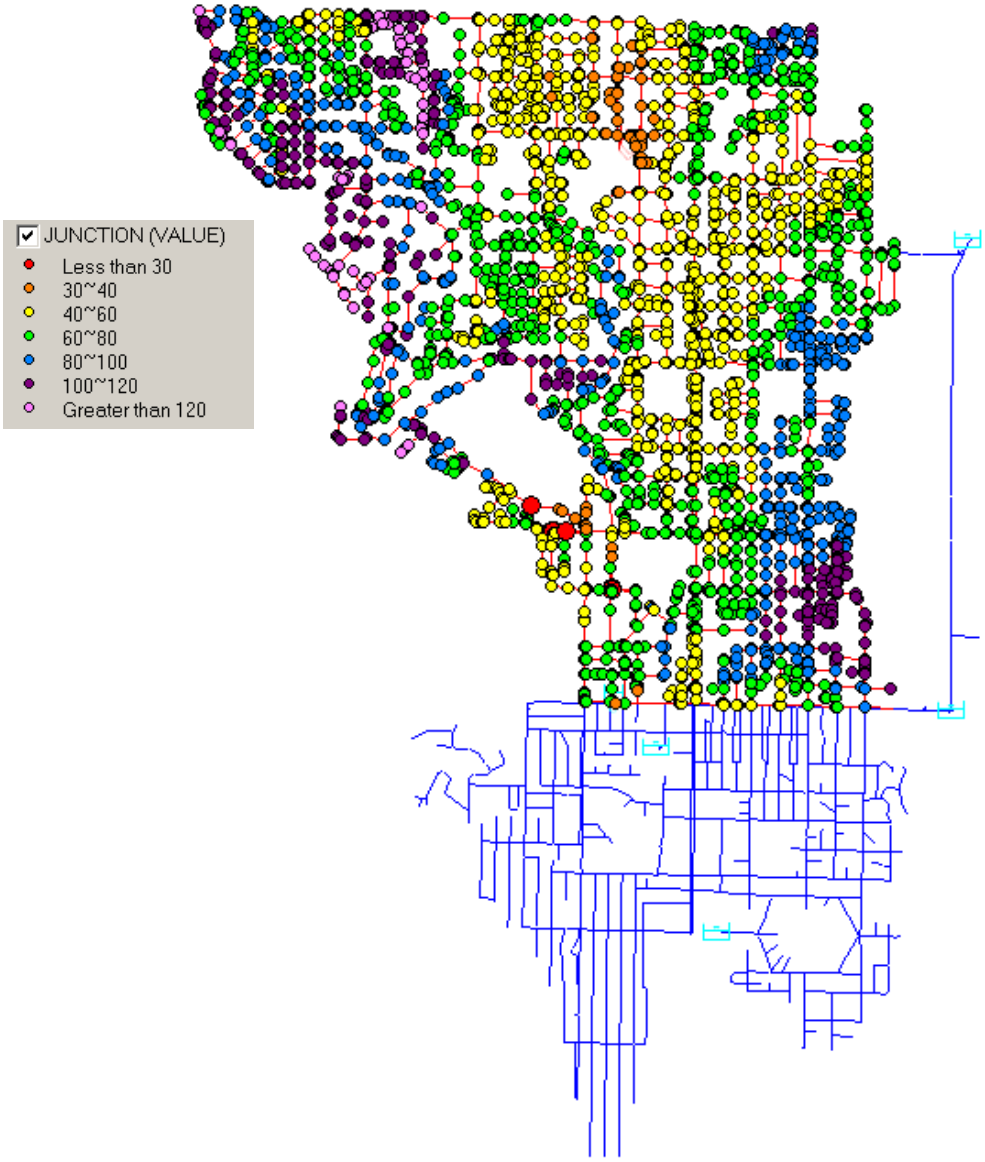


FIGURE 7
PHD Pressures with 2,000 gpm Supply to Olympic View Water District

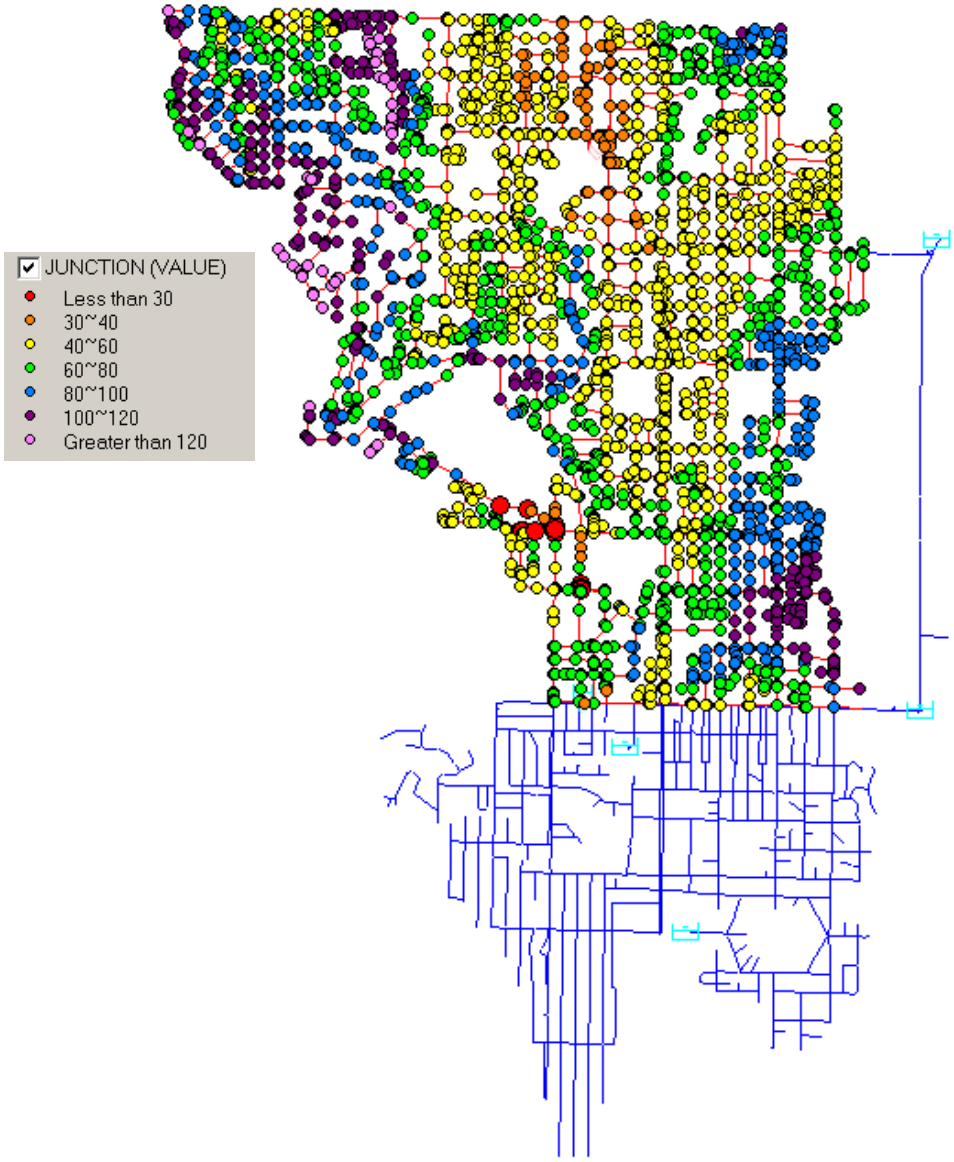
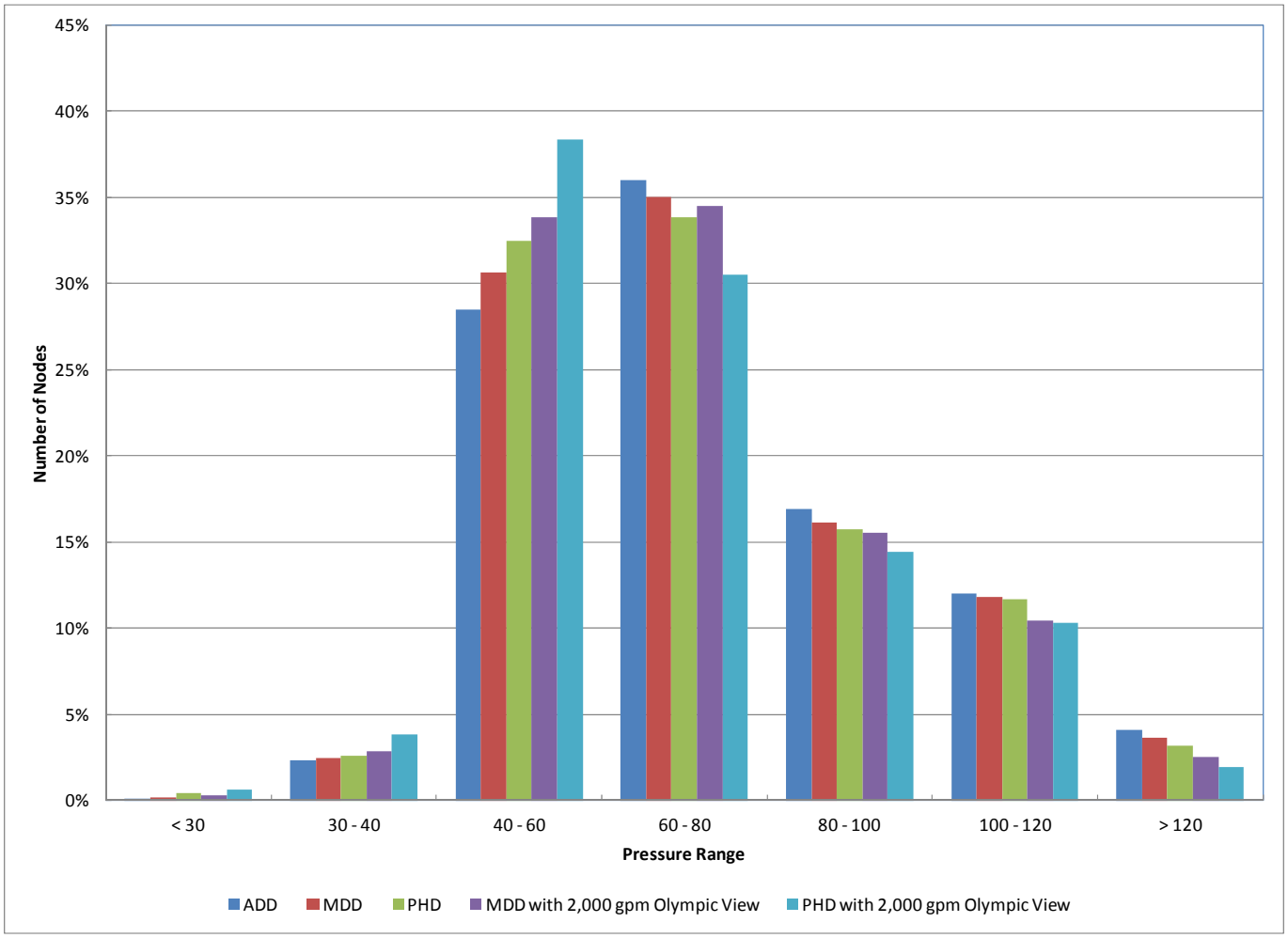


FIGURE 8
Pressure Distribution for Modeled Scenarios



In addition to the steady state evaluations shown above, a system-wide fire flow analysis was run for the 590 Pressure Zone. In general, the model predicted that distribution system could provide fire flow over required fire flow except where limited by smaller diameter pipe and on dead-end lines.

Risk Considerations

Hydraulic Model

The accuracy of a hydraulic model depends on data accuracy. It is important that the input data that describes the pipe system is correct to accurately model a system. This means that the connection of one pipe to another and the proper diameter and length are shown correctly in the model. It is also important that the status of all valves in the system be provided. Unknown closed valves can often restrict flow in the field that is not predicted by a hydraulic model. The relative importance of hydraulic model inputs is shown below:

Level of Importance	Input Data
1	Pipe lengths, diameters, and pipe connectivity Valve status
2	Reservoir water surface elevations Large source pump flows Large booster pump flows
3	Pipe roughness factors (lining type, installation date, etc)
4	Large PRV/BPV pressure settings (assuming valve elevations are known) Average day nodal demand distribution
5	Small source pumps Small booster pumps Small PRV/BPV flow information
6	Pressure information

The piping and connectivity in the SPU hydraulic models is based upon GIS data and is routinely updated with system modifications, and demands are generated annually based on previous years billing information and spatial linkage to billing information. Water surface elevations and pump discharge flow and pressure information is available and evaluated with SPU SCADA information. Roughness of pipe within the area is based upon age of pipe and pipe material; however, field calibration of the current 590 Pressure Zone model provided has not been conducted recently. Calibration will support identification of any closed valves and will validate the C-factors and performance of any recent changes in system configuration or system improvements.

The level of confidence for applying a hydraulic model for various levels of calibration is shown below in Table 2. Higher levels of calibration provide additional confidence in the model results and the opportunities for application of the hydraulic model for system evaluation increase. It is recommended that the City consider a hydrant flow testing program to provide field data for model calibration to provide additional confidence in the model's capability to predict system response and performance.

TABLE 1
Model Accuracy

Calibration Level	Data Accuracy	Modeling Results and Level of Confidence
High	±5 percent for entire system	Useful model tool for planning and design. Water system facilities can be sized to a high level of refinement if planning or design criteria are valid
Medium	± 10 percent for major system sub-areas Estimated information for remaining system	Useful model tool for planning and design. Planning essentially equivalent to high level of calibration. Some applications will need to consider a "safety factor" based on calibration level and design criteria used.
Low	± 25 percent for a portion of a system. Estimated information for a major source or booster.	Usefulness of dynamic simulation will be limited for important facilities. Design applications are not impaired for steady-state modeling.

Supply

The current plan for the separation scenario has one primary supply point (North City Pump Station) to the City from SPU. Currently, backup power is not provided at the North City Pump Station, but the City has plans to install

backup power at the North City Pump Station and Dayton Pump Station as part of the separation scenario. If the North City Pump Station or supply pipeline from the North City Pump Station is not available, emergency supply could be supplied by the Foy Pump Station through the Aurora and NE 145th Street interconnection. SPU staff have also indicated that the 550 pipeline can be run at a higher hydraulic gradient and the 590 Pressure Zone can be supplied directly from the 550 pipeline at a higher hydraulic gradient. These two scenarios have not been evaluated yet with the hydraulic model but operations have occurred under these circumstances in the past for SPU. However, it is unclear how long this operation could be sustained. Sufficient pressure and supply under may not be able to be sustained for the period of time required for regular supply to be returned to service. It is recommended that the time of outage for various emergency scenarios be developed for a future analysis as the acquisition process proceeds. The emergency scenario should be evaluated as an extended period simulation to determine if there are impacts that are identified that may not evident in a steady state evaluation. By identifying any impacts from the emergency analysis, improvements for the distribution system or modifications in operation for the emergency period may be identified for implementation as part of the acquisition to mitigate the risk of a single point of regular supply.

Summary of Findings

The procedure followed to develop the hydraulic model follows a sound procedure and is based upon years of refining information about system components and operation. Even though the model has not been recently calibrated, it can be applied to evaluate the system performance for the separation scenario in general terms. The following activities and recommendations can be completed as the acquisition moves forward to better define and evaluate hydraulic conditions in the WDS.

Future Growth. The current application of the hydraulic model has been complete with existing system demands. The City should consider identifying growth or redevelopment areas within the City that impact water demand and also confirm growth planned by adjacent customers (OLWD) who are served through the City's system to determine if the existing system facilities can meet growth projections or if facility upgrades are needed to maintain the desired Level of Service.

System Performance. The hydraulic model of the 590 Pressure Zone was developed based upon GIS information and demand is based upon annual customer billing data. Facilities are represented accurately in the model and their performance is validated with SCADA information. The application of the hydraulic model for the separation scenarios indicate that there are some pressure limited areas at the boundary of the 590 and 660 pressure zones.

Calibration. Calibration of the hydraulic model should be conducted to confirm C-factors and validate the model's capability to predict system pressures and available fire flow.

Emergency Scenario Evaluation. With the current separation plan, the City has one primary source of supply from SPU. Emergency operating scenarios evaluating the capability to supply the City's system from the southern Aurora and NE 145th Street connection have not yet been evaluated with the hydraulic model. It is recommended that the City evaluate these conditions to identify any additional system improvements for redundancy.

Review of SPU Water System Acquisition

PREPARED FOR: City of Shoreline

COPY TO:

PREPARED BY: CH2M HILL

DATE: May 22, 2012

PROJECT NUMBER:

The City of Shoreline (City) requested CH2M HILL to review and comment on estimated capital improvement costs associated with their planned acquisition of the SPU water system acquisition. This technical memorandum (TM) summarizes the current approach to the separation of the water distribution system that serves the City from the overall Seattle Public Utilities (SPU) system and presents factors that may be considered for the separation. The costs of the recommended separation plan presented in the Shoreline Water System Engineering Review (EES Consulting, 2012) are also summarized, and the range of variability than can be expected for each of those costs is presented.

Background

Six acquisition alternatives were presented in the Shoreline Water System Engineering Review (EES Consulting, 2012). Of these six scenarios presented, Alternative B3 was recommended for implementation. As described in the Engineering Review, Alternative B3 consists of the follow elements:

- Transfer of the North City Pump Station and the Dayton Pump Station to the City
- Transfer of the Richmond Highlands tanks to the City
- Wholesale Interconnection constructed at Aurora and 145th Street
- Wholesale Interconnection constructed at NE 145th Street at 30th Ave NE
- Pipeline improvements (8-inch and 12-inch) constructed along NE 145th Street from Greenwood Avenue to I-5 to provide connectivity across the southern end of the City's new service area
- Pipeline improvements (8-inch)in NE 145th Street from 25th Ave NE to Bothell Way for Southeast Shoreline
- Rehabilitation of the Foy Standpipe for SPU use
- Retention of the Foy Pump Station by SPU

In addition to the transfer of existing facilities to the City, upgrades to the pump stations would be required to provide flexibility in operation and reliability of operation in the event of power loss. Also, additional storage will be needed to meet Washington Department of Health (DOH) storage guidelines. The development of a SCADA system will also be required to monitor and operate the water distribution system. These upgrades specifically include:

- North City Pump Station Standby Power and Variable Frequency Drives
- Dayton Pump Station Standby Power and Variable Frequency Drives
- New 2-MG water storage tank
- SCADA system

Main replacements identified in the Engineering Review were based upon past reports prepared to evaluate this portion of the SPU system. A 2000 report prepared by SPU identified main replacements to alleviate fire flow

deficiencies. A 2004 RH2 report identified mains for replacement based upon age of pipe. Between the two reports, up to 139,000 feet of the 615,000 feet of pipe in the system was recommended for replacement.

Separation Approach Evaluation

Overview

The alternative selected (B3) for the separation of the SPU and City's water system appears to be a good approach for division of the two water systems and makes the most use of existing facilities. The new pipelines along the southern border of the City at NE 145th Street create a looped system for that area that is desirable for water system operation. The new pipelines also provide a means for distribution of supply from the Foy Pump Station if the wholesale connection at NE 145th Street and Aurora is activated.

Risk Considerations

1. Single Supply Point

SPU staff has indicated their preference that the southern connection off 145th operate only as an emergency connection. This would allow Foy Pump Station be primarily controlled by SPU facilities without the need to factor in the City's facilities and demand. If the southern wholesale connection at Aurora is only used for emergency, only one sustained source of supply is available to the City and to other wholesale customers (Olympic View) of SPU who are served through the City's system. A single point of supply from the SPU system is not a critical risk, but most SPU wholesale customers have more than one wholesale meter point. We recommend that the City consider conducting a risk evaluation for facilities and pipelines to determine if they are willing to accept the level of risk associated with one primary supply. This analysis can be conducted at a later date as the acquisition process moves forward. One primary location of source of supply is not uncommon, but the risks associated with it need to be considered.

2. Water Usage Trends

The trend of water usage in the City's service area shows a 14 percent decrease in demand over the last 5 years. There are three elements to risks associated with water usage trends. First, the data may overstate the magnitude of the downward trend in water demand. This is due to the fact that both 2010 and 2011 were cool summer years while 2009 was a hot summer. So comparing water usage from two cool (and therefore low demand) summers against a hot (and therefore high demand) summer may overstate reductions in demand. A second element of risk related to water usage is land use based. The City should consider the current mix (single family residential, multi-family, mixed use, commercial) of the customer base and how that may (or is forecast and planned to) change over the next 5 - 20 years. Changes in the customer base can affect water demand and should be incorporated into facility planning and sizing.

3. Supply to Olympic View Water District

Supply to the Olympic View Water District is provided through the City's water distribution system. The demand for Olympic View Water District is anticipated to increase with proposed development in the Olympic View Water District's service area. This increase in demand should be taken into account when evaluating the capacity and reliability of the North City Pump Station and pipelines that convey water to Olympic View Water District. The analysis of the possible increase in demand for the Olympic View Water District can be conducted at a later date as the acquisition process moves forward.

4. Hydraulic Modeling

Hydraulic modeling of the separated system has been evaluated, and comments were provided in the Hydraulic Analysis TM (CH2M HILL, May 2012). Analysis showed that the separation scenario meets hydraulic requirements.

Separation Cost Evaluation

Costs presented in the Engineering Review associated with the transfer of facilities, facility upgrades, and pipeline replacement are summarized in Table 1. Costs for obtaining equipment, staffing, and new operations office facilities were also included in the Engineering Review but were not included in the cost review conducted for this evaluation.

In the Engineering Review, the costs presented in Table 1 include 10% contingency for water distribution mains, 25% contingency for other projects (pump stations and storage tanks), 5% surveying and permitting, 12% engineering, 8% construction inspection, and 10% sales tax. No contingency costs were included in the metering costs since the metering costs are facilities charges from SPU for meter installation.

TABLE 1
Summary of Separation Capital Costs
Review of SPU Water System Acquisition

Cost Component	Estimated Cost
Separation Costs	
Pipeline	$2,474,000
Pump Stations	$500,000
Foy Standpipe	$1,765,000
Metering	$460,000
Total	$5,204,400
Facility Upgrade Costs	
North City Pump Station Standby Power	$339,200
North City Pump Station VFDs	$192,000
Dayton Pump Station Standby Power	$188,800
Dayton Pump Station VFDs	$14,400
SCADA System	$400,000
New 2 MG Water Storage Tank	$4,072,000
Total	$5,206,400
Pipeline Replacement Costs	32,695,157
Total Facility Costs	$43,105,957

Costs were developed from Shoreline Water System Engineering Review (EES Consulting, April 2012)

The following observations were made of the cost estimate shown in Table 1:

- The pipeline costs used to develop the capital costs for the pipeline replacement are within the range of planning level costs for pipelines. Costs were validated against recent bid tabs for Mercer Island, Northshore Utility District, City of Bellevue, and independent planning-level costs developed by CH2M HILL cost estimators that are based upon recent projects.
- The pump station cost included under Separation Costs in Table 1 is the upgrade cost estimated for the Foy Pump Station to replace two of the duty pumps and to complete electrical upgrades. It is unclear if this cost is only a construction cost estimate or also includes contingency and other associated costs in the estimate.
- The water storage tank cost under Separation Costs is based upon a cost for seismic retrofit and recoating the Foy Standpipe. The Engineering Review notes that the costs shown for the Foy Standpipe will need to be updated once SPU's storage requirements are confirmed.
- The costs for providing the Standby Power for operation of one pump at North City Pump Station should be confirmed based on the following considerations as the acquisition process moves forward and more detailed information is developed:
  - The facilities needed to provide required fire flow volumes and durations

  - The anticipated increased demands from Olympic View Water District.
- The new 2 MG water storage tank estimate is within the range of expected planning level costs for a 2 MG standpipe as determined through an independent planning-level cost developed by CH2M HILL cost estimators for this Technical Memo.
- Pipeline replacement costs are developed by identifying replacement candidates based upon the age of pipe. The pipeline replacement costs are shown both as a lump sum cost and as an annual cost for a main replacement program. As a main replacement program is developed, it will be important to prioritize the replacements by year to develop the annual costs and then also discount to present year costs to identify the investment required for the main replacement program.
- Most of the costs shown in Table 1 have contingency (10% for water distribution mains, 25% for other projects), 5% surveying and permitting, 12% engineering, 8% construction inspection, and 10% sales tax included in the cost. It may be clearer to show the construction cost estimate alone and then include a line item for each additional cost component.

Consider Increased Cost Uncertainty related to Level of Design Development

The costs presented in Table 1 for pipelines were primarily based upon recent bid tabs for pipeline replacements for Tacoma Public Utilities. Costs for pump stations were based upon unit costs for facilities developed by CH2M HILL in 1999 for water system planning work. These costs were escalated using the ENR cost factors (1999: 6928, 2011: 9060) to 2011 dollars. The unit costs developed by CH2M HILL in the 1999 report are considered to be Class IV cost estimates and are based upon cost curves. A Class IV estimate is used for preliminary budget approval and can expected to have a variability of -15% to -30% on the low side to +20% to +50% on the high side. Class IV estimates are completed when 1% to 15% of the project definition or project engineering is complete.

A variation on the cost evaluation is presented in Table 2. For the costs shown in Table 2, the sum of the Separation Costs and the Facility Upgrade costs presented in Table 1 were taken back to the construction cost and then the variable contingency percentages shown above (-15% and +50%) were included along with the other cost factors (surveying and permitting, engineering, construction inspection, and sales tax) to generate a range of projected costs for the Separation Costs and Facility Upgrade Costs in Table 1. The pipeline replacement costs were not included in this estimate. These costs are summarized in Table 2 and Figure 1 for Alternative B3 by taking into account the variability of a Class IV cost estimate. The cost information shown includes a 4% escalation from 2011 to 2020.

TABLE 2
Projected Variability in Cost Estimates for Alternative B3
Review of SPU Water System Acquisition

Alternative	Total Estimated Cost ($M)[a]	-15% of Estimated Cost ($M)[b]	+50% of Estimated Cost ($M)[c]
B3-2011 Dollars	$9.23	$8.20	$12.65
B3-2020 Dollars[d]	$13.13	$11.68	$18.00

[a]Costs represent the $5,204,400 Separation Cost and the $5,206,400 Facility Upgrade Costs with no contingency but including), 5% surveying and permitting, 12% engineering, 8% construction inspection, and 10% sales tax.

[b]Includes -15% contingency on Construction Cost Component of Estimated Cost. Also includes 5% surveying and permitting, 12% engineering, 8% construction inspection, and 10% sales tax

[c]Includes +50% contingency on Construction Cost Component of Estimated Cost. Also includes 5% surveying and permitting, 12% engineering, 8% construction inspection, and 10% sales tax

[d] 2020 costs were projected using a 4% escalation.

Summary of Findings

A summary of findings and recommendations presented in this TM are presented below. The analysis and evaluation presented in the Engineering Review followed an approach of sound engineering principles that

evaluated each component considered for acquisition and considered multiple factors in the evaluation. While there are recommendations on additional evaluations presented for consideration by the City, these evaluations can be conducted as the acquisition process proceeds and additional information is developed or identified.

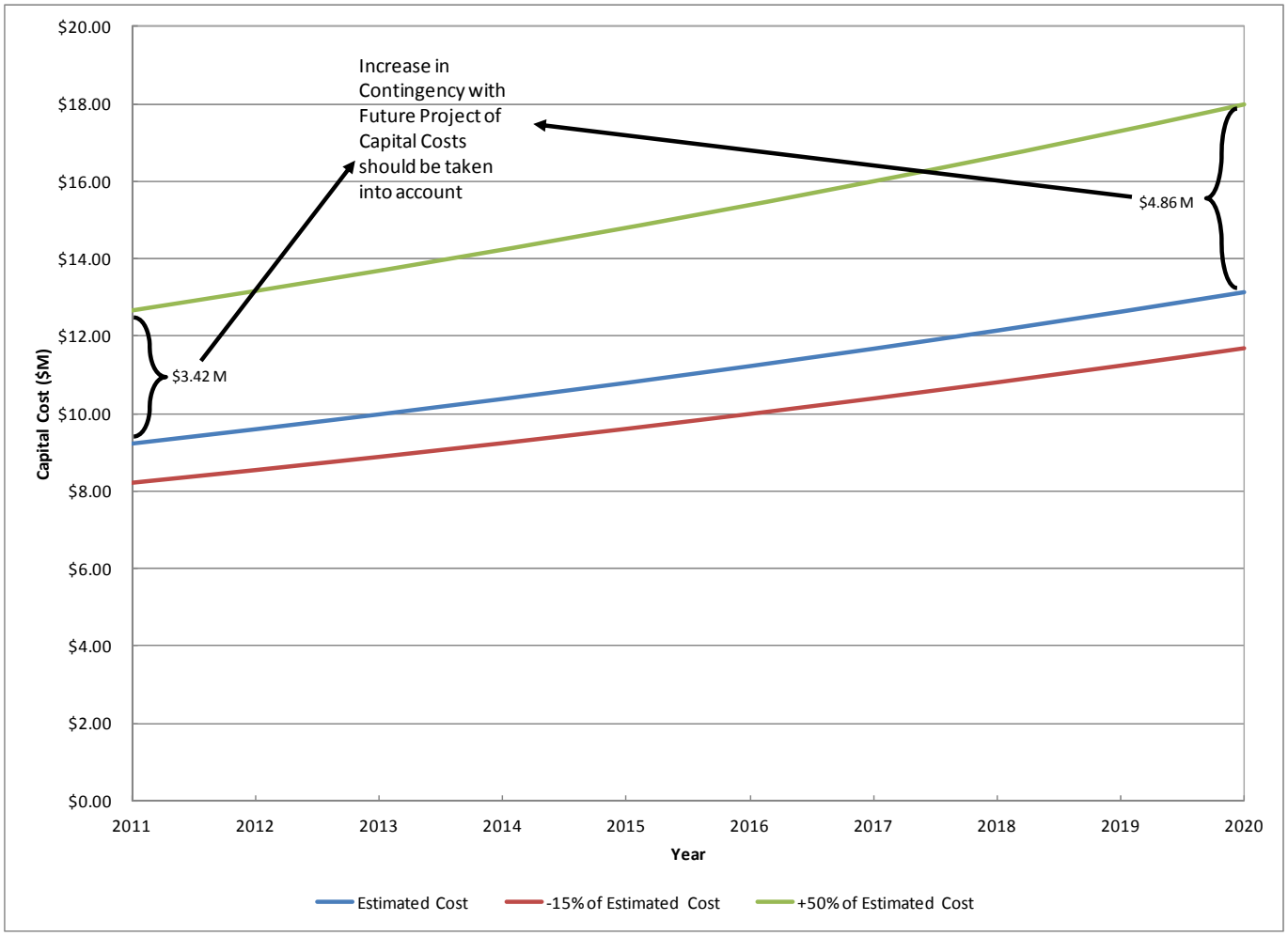
Hydraulic Separation: The approach outlined in Alternative B3 for the separation of the SPU and City makes the best use of existing facilities and requires pipeline improvements to provide looping and additional interconnectivity in the City system. However, only one regular supply to the SPU system is provided. The hydraulic model of the 590 Pressure Zone was developed by SPU based upon GIS information and demand is based upon annual customer billing data. Facilities are represented accurately in the model and their performance is validated with SCADA information. The application of the hydraulic model for the separation scenarios indicate that there are some pressure limited areas at the boundary of the 590 and 660 pressure zones. Additional modeling related to sizing of facilities to meet water demand, and a risk evaluation would help the City determine if one regular supply with one emergency connection to the SPU system is sufficient for their needs. This additional modeling can be conducted at a later date.

Capital Improvement Projects: The projects included as improvement projects both for the initial separation and to provide reliability and redundancy are appropriate for the separation. The Olympic View Water District future demand projects as well as projections within the City should be considered when evaluating the size of future storage and pumping facilities as well as the size of standby generation equipment.

Distribution Main Replacement: As the acquisition process proceeds, the main replacement program should be developed as a prioritized replacement program and the annual main replacement cost associated with the prioritized replacements be developed and discounted to current dollars for evaluation of the investment required today to fund the main replacement program.

Cost of Improvements: The construction costs of most projects included in the Capital Projects list was within an acceptable range of estimated costs. Based on the planning level of the costs, additional contingency could be considered, and it is often helpful to identify the construction cost alone and then include the added costs for contingency, surveying and permitting, engineering, construction inspection, and sales tax.

FIGURE 1
Capital Cost Projection with Contingency



City of Shoreline

Shoreline Water System
Financial Analysis

May 2012

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Contents

Introduction 1

General Financial Assumptions 2

Development of Post-Acquisition Revenues 9

Development of Post-Acquisition Costs 17

Base Case Financial Results 21

Sensitivity of Financial Results 23

Summary and Conclusions 31

Appendix A-1

Introduction

The City of Shoreline (the City) has entered into an Agreement with Seattle Public Utilities (SPU) to purchase SPU's water facilities inside the City boundaries in the year 2020. Currently water service is provided to the City residents directly by SPU. The acquisition will allow the City to operate its own water utility on behalf of its residents. It is important to note that about one-third of the residents in the City are served by the Shoreline Water District (SWD) and this acquisition will not impact SWD customers.

Prior to finalizing the purchase agreement, the City is conducting due diligence on the acquisition and will put the issue up for a city-wide vote. As part of the due diligence, the City retained EES Consulting to provide three inter-related analyses. The first is an Engineering Review to assess the SPU assets that are included in the acquisition, develop operating costs and procedures for the new utility, and develop the short-term and long-term capital needs of the utility. The second piece is a long-term financial analysis to determine the projected revenues and costs associated with operating the water utility, along with the associated financial risks. The final component is a Business Plan to address how the tasks and responsibilities required of the new water utility will be carried out.

The findings of the financial analysis are presented in the report. While an initial financial analysis was conducted to determine the feasibility of entering into the agreement with SPU, this report provides a more comprehensive and detailed analysis based on updated information as well as incorporating the findings from the Engineering Review.

This report contains six sections. The first section addresses the general financial assumptions, including cost escalation, financing and growth assumptions. In the next section the development of the revenue forecast is discussed. Costs for operations as well as capital requirements are then presented. The base case financial results are then provided, followed by a section on sensitivity analysis for the results. Finally, the results are summarized and recommendations are provided.

General Financial Assumptions

To determine the financial results associated with the acquisition, the analysis looks at the expected revenues and costs for the period 2020 through 2040. To get to the initial operation date, assumptions were also required to get from revenues and costs in terms of 2012 levels into terms for the year 2020. In order to accomplish this, several basic assumptions were needed to project both revenues and costs into the future. These basic assumptions include the financing of debt and the escalation rates for both revenues and costs. It is assumed that January 1, 2020 is the start date for the new utility and all revenues and costs are projected for full calendar years. This start date simplifies the analysis, however, we would not expect a start date other than January 1st to impact the overall findings of the results.

Financing

Based on the $25 million agreed upon acquisition price plus any additional capital required for the start-up of the utility, Shoreline plans to issue revenue bonds to cover the costs. For a municipal utility, these bonds are tax-exempt. The bonds will be fully backed by the revenues of the new utility, and will not impact the City's own borrowing capabilities. When issuing bonds, the new utility will need to provide adequate financial analysis to support the payment of the bonds and the analysis will be reviewed by the various rating agencies. We have been involved in similar bond issuances for numerous utilities and the financial analysis undertaken for this report are similar to what is required for purposes of issuing bonds.

It was assumed that the borrowing cost for the bonds will be 5%. This is higher than current rates, however, given that the acquisition will not occur for another 8 years, the 5% level reflects the 20-year average of historic rates. To reflect the risk associated with bond rates, alternative rates are included in the sensitivity analysis.

It was assumed that the acquisition cost would be 100% debt financed over a 30 year period.

Standard terms for revenue bonds require that operating revenues exceed operating costs by an amount sufficient to cover the bond payments under all circumstances. This extra amount to cover the bond payments is referred to as the debt service coverage ratio (DSC). A DSC of 1.2 is generally required for municipal revenue bonds, and if the utility dips below that level they can be in default of the bond covenants. For that reason it is important to plan for a DSC level well above 1.2. SPU has recently raised its DSC target to 1.7. This may be a reasonable DSC target for the City as well. In the case of this analysis, revenues are set equal to the projected rates from SPU and therefore the DSC is calculated from the projected revenues and costs. Looking at the resulting level of the DSC is one indication of whether the financial results provide for financially sound utility.

SPU Rates

To determine the revenues associated with the new water utility, it was assumed that rates will be at the same level as SPU would charge Shoreline non-SWD customers without the acquisition. The

City has committed to keeping rates at or below the level that would otherwise by charged by SPU. For the financial analysis using projected SPU rates provides the base amount of revenues expected. If there are surplus revenues, they could be used to lower future rates for Shoreline (Non-SWD) residents.

Currently Shoreline (Non-SWD) residents pay rates that are 21% higher than SPU customers within the City of Seattle. A portion of this premium is due to the 6% franchise fee that is collected in rates and paid to the City. SPU has announced rates for the 2012 through 2014 period that include significant rate increases. These approved rates are the starting point for determining the revenues for the water utility, and are shown in the following table.

Table 1
SPU Water Rates for the City of Shoreline

	1/1/2011	1/1/2012	1/1/2013	1/1/2014
Residential Charges				
Monthly Charge Per Meter (3/4")	$15.80	$16.05	$16.35	$16.70
Off-peak per CCF	$4.39	$4.90	$5.46	$6.05
Peak Up to 5 CCF	$4.83	$5.26	$5.74	$6.22
Peak Next 13 CCF	$5.62	$6.25	$6.94	$7.69
Peak Over 18 CCF	$14.31	$14.31	$14.31	$14.31
Commercial Charges				
Monthly Charge Per Meter (1")	$16.30	$16.30	$16.85	$17.20
Off-Peak per CCF	$4.39	$4.90	$5.46	$6.05
Peak per CCF	$5.62	$6.25	$6.94	$7.69
Residential Percent Change				
Monthly Charge Per Meter (3/4")		*1.6%*	*1.9%*	*2.1%*
Off-peak per CCF		*11.6%*	*11.4%*	*10.83%*
Peak Up to 5 CCF		*8.9%*	*9.1%*	*8.4%*
Peak Next 13 CCF		*11.2%*	*11.0%*	*10.8%*
Peak Over 18 CCF		*0.0%*	*0.0%*	*0.0%*
Commercial Percent Change				
Monthly Charge Per Meter (1")		*0.0%*	*3.4%*	*2.1%*
Off-Peak per CCF		*11.6%*	*11.4%*	*10.8%*
Peak per CCF		*11.2%*	*11.0%*	*10.8%*

On-peak rates cover the period May 16 - September 15 while off-peak rates cover the period September 16 – May 15. These rates have taxes built into the rate levels. This includes 5.029% for the state utility tax and 6% for the current Shoreline franchise fee.

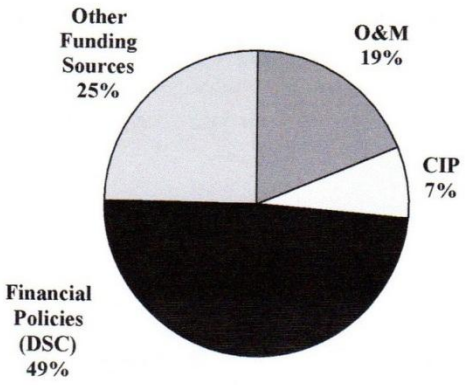
Rates do not increase uniformly for each rate component, but average nearly 9% for all three years. Generally the increases in the monthly customer charge are small. The means the bulk of the increases occur to the consumption charges, which are billed on a per CCF basis. Note that CCF stands for 100 Cubic Feet and is equivalent to 748 gallons. Several of the consumption rates

increase by an average of over 10% per year. This rate increases are especially dramatic given the low level of inflation at the current time.

In its *2012-2014 Water Rate Study*, dated December 2011, SPU discusses the need for these large rate increases and provides the following chart on page 5 of its report to show the driving factors behind the increase in its revenue requirements.

The chart shows that the smallest driver of rate increases is the Capital Improvements Plan (CIP) of the utility. O&M represents the operations and maintenance costs of the utility. Together, the capital and operating costs of the utility only drive about one quarter of the total increase in the revenue requirements. Another quarter is driven by a reduction in other funding, primarily water tap fees. About half of the total increase is due to the need to meet more conservative financial policies drive by the DSC or debt service coverage ratio which ensures that the utility has more than enough funds to cover its debt obligations.

Figure 1
SPU Revenue Requirements Drivers



The increase in the revenue requirements is only a portion of the need for a rate increase. Rates are basically equal to the revenue requirements divided by the quantity of water sold. In SPU's case, the expected water use dropped significantly and is a contributing factor towards the rate increases. The following table is taken from page 7 of the SPU report and shows that reduced consumption on its own represents a rate increase above 5% in 2012 and around 1% on average for 2013 and 2014.

Table 2
SPU Impacts of Demand on Rate Increase

	2012	2013	2014
Revenue Requirement Increase	3.9%	7.7%	8.1%
Demand Impact	5.4%	0.9%	0.3%
Rate Assistance Impact	-0.6%	0.1%	0.1%
Average Rate Increase	8.7%	8.7%	8.5%

In looking at the projections of SPU rates for Shoreline we used the rates for 2012 through 2014 as the starting point. It was not expected that the rate increases during that time would continue indefinitely. Therefore we looked at the increases of SPU rates for the period of 2004 through 2011 as a source for predicting future retail rate increases. The average over that period was roughly 5% per year. Looking at the entire period from 2001 through 2014, the average rate increase was 7% per year.

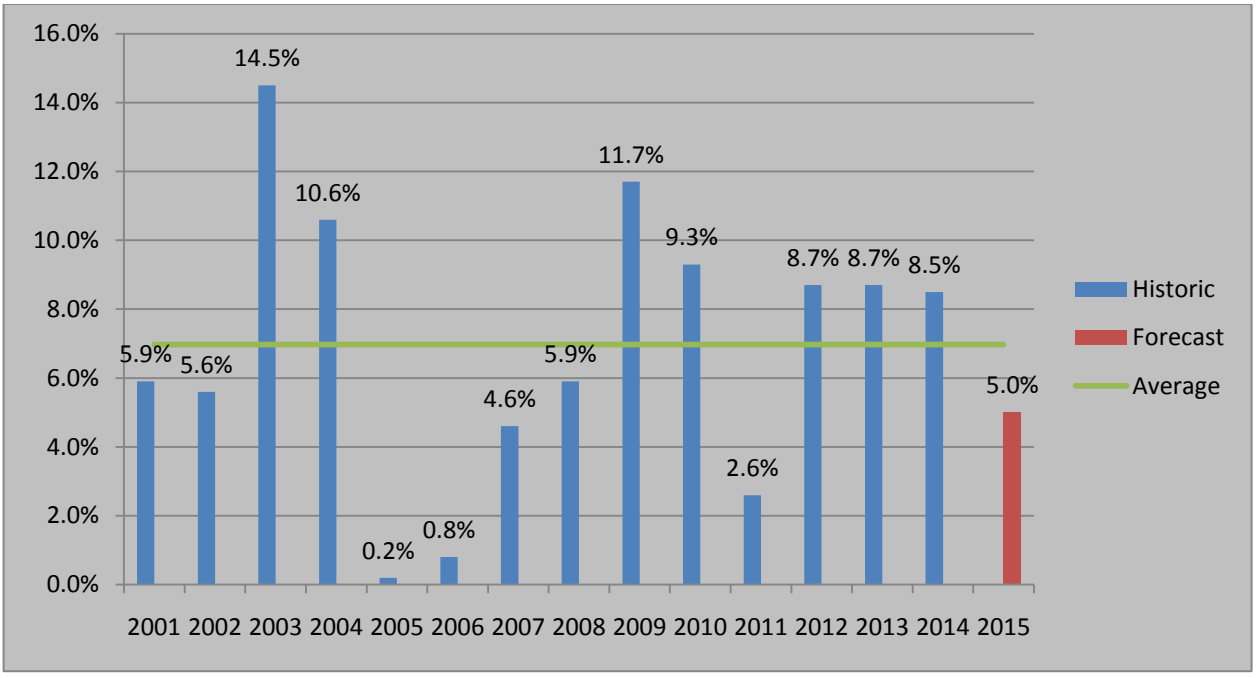
Another source we looked at included a compilation of data from water utilities in Washington. The Washington Public Utility Districts Association (WPUDA) provides a Sourcebook each year with general information on the PUDs in the state. For the water PUDs, the average increase in water rates for the years 2004-2010 was 5.7%. This compares to the average increase in operating costs of 5.4% for the same utilities over the same time period.

Further, SPU stated on page 7 of its *2013 Water System Plan Official Yield Estimate and Long-Range Water Demand Forecas*t, dated December 2011, that the rates for retail water are expected to go up by 0.4% above the rate of inflation.

Given these various data sources, the escalation for SPU's retail rates is assumed at 5% per year for the period 2014 through 2040. This assumption is adjusted to reflect both higher and lower increases in the sensitivity analysis.

Annual rate increases compared to the forecast of future rate increases for SPU can be found in Figure 2. Given past increases, the forecast for future rate increases appears to be conservative.

Figure 2
SPU Historic and Forecast Rate Increases



Cost Escalation

Based on SPU's own statements and the differences in the WPUDA rate and cost increases, it is assumed that the 5% projected retail rate increases is 0.4% higher than the increases in the costs for both CIP and O&M. Therefore, the cost escalation for 2012 through 2040 is assumed to be 4.6% per year. Both the capital costs and the annual O&M costs developed in the Engineering Review were in 2012 dollars and are escalated to reflect the year in which they are spent.

Wholesale Water Costs

The new water utility will likely purchase wholesale water from SPU. Wholesale rates for the years 2012 to 2014 are available, as shown below. While wholesale rates had a significant increase in 2012, the increases in 2013 and 2014 are fairly small.

Table 3
SPU Wholesale Water Rates

	1/1/2011	1/1/2012	1/1/2013	1/1/2014
Wholesale Charges				
Off-peak per CCF	$1.29	$1.52	$1.53	$1.53
On-peak per CCF	$1.91	$2.25	$2.26	$2.27
Wholesale Percent Change				
Off-peak per CFF		*17.8%*	*0.7%*	*0.0%*
On-peak per CCF		*17.8%*	*0.4%*	*0.4%*

Over the 3-year period, wholesale water rates have increased an average of about 6% compared to the average increase in retail rates of nearly 8.7%. During the 2004-2011 period, wholesale rates increased an average of 3.2% per year. Because SPU wholesale rate increases have been consistently lower than SPU retail rate increases, it is assumed that wholesale rates will increase by 3.5% per year in the future.

Retail Rate Comparison

While it is not used in the development of the financial analysis, a comparison of customer bills was done for the Shoreline (non-SWD) residents at SPU rates compared to other nearby water utilities. A table showing the actual rates for each utility can be found in the Appendix. The following tables show the comparison of bills for both the residential and commercial class. In each case, the average use per customer for SPU customers in Shoreline was used to calculate the bill. For residential customers the average usage was 8.2 CCF per month in the on-peak period and 5.4 CCF per month in the off-peak period. For commercial customers the average usage was 75.7 CCF per month in the on-peak period and 42.4 CCF per month in the off-peak period.

Table 4 Annual Residential Bill Comparison of Seattle-Area Utilities				
	Average Monthly Basic Charge	Average Monthly bill Off-peak	Average Monthly bill On-peak	TOTAL ANNUAL BILL
SPU Shoreline residents 2012	$16.05	$26.46	$46.30	$589.48
SPU Shoreline residents 2013	$16.35	$29.48	$50.91	$635.70
SPU Shoreline residents 2014	$16.70	$32.67	$55.71	$684.59
City of Bothell	$10.51	$11.56	$20.05	$298.80
City of Edmonds	$20.60	$11.56	$17.55	$409.84
Tacoma Water	$25.15	$7.39	$12.31	$410.15
SPU Seattle residents	$13.25	$21.82	$38.18	$486.25
Northshore Utility District	$30.00	$14.85	$22.55	$569.00
City of Bellevue	$29.61	$15.98	$24.27	$580.28
City of Everett	$32.04	$14.42	$21.89	$587.40
Shoreline Water District	$37.95	$14.20	$21.57	$655.28
Lake Forest Park Water District	$37.00	$16.20	$24.60	$672.00

For residential customers, SPU has relatively low monthly basic charges but the highest rates during the on-peak period. Overall the 2012 Shoreline rates yield average bills that are higher than most of the nearby utilities. By 2014 those rates will exceed all of the surrounding rates, however, this does not account for the likely rate increases for the other utilities.

Table 5 Annual Commercial Bill Comparison of Seattle-Area Utilities				
	Average Monthly Basic Charge	Average Monthly bill Off-peak	Average Monthly bill On-peak	TOTAL ANNUAL BILL
SPU Shoreline residents 2012	$16.30	$186.14	$425.43	$3,386.42
SPU Shoreline residents 2013	$16.85	$231.50	$525.36	$4,155.66
SPU Shoreline residents 2014	$17.20	$256.52	$582.13	$4,587.09
Tacoma Water	$41.91	$63.47	$113.32	$1,463.99
City of Edmonds	$50.71	$90.74	$162.00	$1,982.40
City of Everett	$53.40	$59.81	$272.00	$2,207.28
City of Bothell	$31.97	$105.15	$320.97	$2,508.73
Shoreline Water District	$34.73	$147.13	$262.68	$2,644.50
Lake Forest Park Water District	$68.00	$127.20	$227.10	$2,742.00
SPU Seattle residents	$13.40	$153.49	$350.49	$2,790.67
City of Bellevue	$52.40	$127.62	$319.45	$2,927.61
Northshore Utility District	$60.00	$158.37	$293.24	$3,159.90

For commercial customers, the SPU rates also have the lowest customer charge and the highest usage charges. Combined, the Shoreline rates for commercial customers are higher than all of the other utilities included in the comparison.

Development of Post-Acquisition Revenues

Overview

Revenues for the new Shoreline water utility are calculated on the basis of many different inputs to best reflect the complexity of the rates. Revenues for Shoreline customers were projected starting with 2011 actual billings, and are forecast through the year 2040. Forecasts were completed for each rate class based on the number of customers times the basic charge plus the projected use per class times the usage charge. This approach takes into account different growth rates for each customer class.

Rates projected for SPU are the baseline for revenues for all years. During the 2011-2019 period Shoreline (Non-SWD) residents will remain on SPU rates. While we did not complete a full financial evaluation for those years, we did calculate the revenues at SPU rates so that we would have a good basis for the starting revenues in the year 2020 when the acquisition takes place.

SPU rates are established as the baseline with the goal of having rates for the new Shoreline water utility that are no higher than SPU rates. To the extent that there are surplus revenues after the acquisition, the Shoreline water utility would have the option of reducing rates or improving capital facilities, or some combination of the two.

Components of the Revenues Projections

In order to provide the detailed revenue forecast a series of separate components were forecast individually and then appropriately combined to determine the results. The specific components are as follow:

- Number of customers by class
- Average use per customer by class
- Total water sales by class (Number of customers times average use per customer)
- Basis service charge by class and by meter size
- Consumption charges per CCF by class, including seasonal and block rates

The results provide revenues for 2011 through 2040 for each of the following customer classes:

- Residential Single-family
- Multi-family
- Commercial
- Master Meter Residential Developments (RRMD)
- Fire Service
- Other Revenue

The following sections discuss the components of the revenue forecast followed by a summary of the results.

Development of the Customer Forecast

SPU provided Shoreline with the actual number of customers served by SPU within the City of Shoreline for the years 2006-2011. The forecast was developed using the 2011 actual customers and allowing for growth over the 30-year period.

Several different sources were looked at to determine the appropriate customer growth rates for Shoreline. In terms of growth between 2006 and 2011 actual data, the number of customers was relatively flat for the residential (single-family and multi-family) and commercial classes. Because this was a period with a strong recession, these results are not surprising. However, we would not expect customer growth to continue to be flat as we enter into the recovery period and over a longer term. In fact, customers for 2011 are higher than in 2010 for both the multi-family and commercial classes.

SPU provided its own load forecast completed in the *2013 Water System Plan Appendix A-1, Official Yield Estimate and Long-Range Water Demand Forecast*. Within this forecast SPU has projected average annual population growth of 0.20% per year for single-family households and 1.7% for multi-family households. Employment is projected to grow at an average annual rate of 1.5%. These projections apply to the entire SPU retail area and specific growth rates or forecast numbers are not provided for Shoreline. We do not expect Shoreline to grow in exactly the same manner as the City of Seattle.

To determine projections specific to Shoreline, we looked at projections from the Puget Sound Regional Council (PSRC) 2006 Forecast. Because the PSRC forecast is a few years old, we used the growth rates rather than the actual numbers to provide the forecast of customers. This allows for the correct starting point for 2011 based on the actual results for the year. The PSRC projects single-family growth of 0.21% from 2010 to 2020, 0.18% from 2020 to 2030 and -0.11% from 2030 to 2040. For multi-family households the projected growth rates were 1.21% for 2010 to 2020, 1.22% for 2020 to 2030, and 1.42% for 2030 to 2040.

Although the SPU forecast is more current, it is more specific to the City of Seattle. Therefore, we used the PSRC forecast growth rates to reflect the growth in water customers for single-family and multi-family customers. The growth rate is comparable to SPU's for single-family but has lower growth for multi-family customers than expected by SPU. This is consistent with expectations as Shoreline is not as urban as Seattle and will likely have less multi-family housing. One exception is that while the PSRC forecast has an annual decline in single-family customers from 2030-2040, we have changed this to reflect zero growth in customers.

For commercial customers, SPU does not list a specific growth rate for commercial customers. However, it is forecasting a growth rate of 1.5% for employment and overall commercial usage of around 1% per year on average. The PSRC has an employment projection specific to Shoreline with average annual growth rates of 0.59% for 2010 to 2020, 0.49% for 2020 to 2030 and 0.62% for 2030 to 2040. Another source of data is from the King County Countywide Growth Planning Polices (12/2010) which shows a growth projection of 5,000 new jobs in Shoreline for the period

2006 – 2031. When compared to current employment levels of roughly 28,000 this represents growth of 0.66% per year.

While commercial customers may not grow at exactly the same rate as employment levels, they will be highly correlated. Given the various sources of data, an average growth rate of 0.66% based on the King County forecast is applied to commercial customers for the entire period. This is newer and just above the level of the PSRC forecast growth rate, but lower than the SPU forecast growth rate.

For the MMRD and Fire Service Classes, the number of customers is expected to remain constant.

Table 6
Forecast of Customer Growth Rate by Class

	2015	2020	2025	2030	2035	2040
Residential	0.21%	0.21%	0.18%	0.18%	0.00%	0.00%
Multi-Family	1.21%	1.21%	1.22%	1.00%	1.42%	1.42%
Commercial	0.66%	0.66%	0.66%	0.66%	0.66%	0.66%
MMRD	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Fire	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Other	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Total	0.24%	0.24%	0.21%	0.21%	0.07%	0.07%

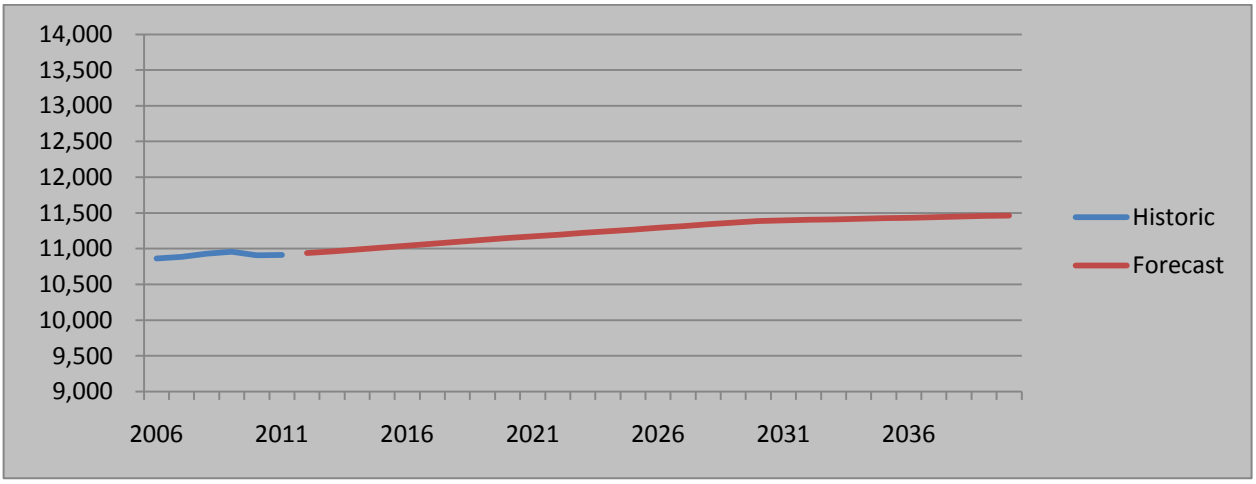
Table 7
Forecast of Customers by Class

	2011 Actual	2015	2020	2025	2030	2035	2040
Residential	9,671	9,753	9,858	9,946	10,035	10,035	10,035
Multi-Family	236	248	263	279	296	318	341
Commercial	399	410	423	437	452	467	483
MMRD	4	4	4	4	4	4	4
Fire	136	136	136	136	136	136	136
Other	465	465	465	465	465	465	465
Total	10,911	11,016	11,149	11,268	11,389	11,425	11,464

Note that in all cases we expect that growth will follow economic cycles and are not likely to be equal from year to year. However, for planning purposes, it was assumed that growth rates would be applied evenly among the time periods.

Figure 3 provides both historic and forecast number of customers for the service area.

Figure 3
Historic and Forecast Total Customers



Development of the Water Use Forecast

SPU provided Shoreline with the consumption by month for each class for the years 2006-2011. Water sales are reported in hundred cubic feet (CCF), which is the same unit of measure used for billing purposes. One CCF is equal to 748 gallons of water. The CCF sales figures were divided by the number of customers in each class to develop the average CCF use per customer. Generally, average use is forecast independently to see the trends in usage separate from the growth in the number of customers. The average use per customer was then multiplied by the number of customers for each year to develop the total sales by class forecast.

Actual average use per customer fluctuated from year to year based on weather conditions. For that reason it is difficult to measure the actual growth rate for the 2006-2011 period. The years 2006 and 2009 appear to have particularly high use while 2008 and 2011 have particularly low use. In looking at the 3-year average for 2006-2008 as compared to 2009-2011, we see that average annual usage per customer decreased by -1.2% for single-family, stayed flat for multi-family, and increased by 0.4% for commercial. As this was during a recessionary period, we would not necessarily expect these trends to continue indefinitely.

Because of weather variations, we used the 3-year average use per customer for 2009-2011 as a smoothed out usage level to better reflect average conditions. This adjusted amount was used as the starting point for 2011 for developing the load forecast.

The SPU forecast did not provide growth rates for usage per customer but did provide growth rates for total use by class. For single-family the total usage is forecast to decrease by about 1% per year. Average use would decline by roughly 1.2% as they are forecasting customers to grow by 0.2%. Multi-family total use is projected to increase by 1% per year. Given the customer growth rate of 1.7%, this means average usage per customer would decline by about 0.7% per year. For commercial, total sales are also forecast to increase by about 1% per year. In all three classes, use

per customer is slower through 2020 and then picks up (or levels off in the case of declining use) starting in 2030.

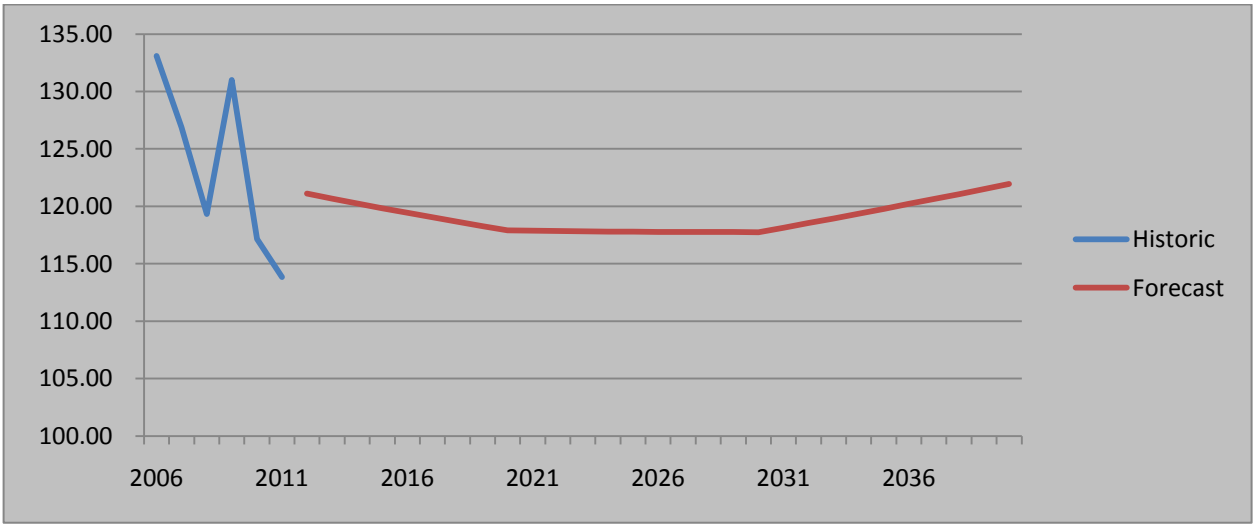
The SPU forecast was used as a guide is setting the growth rates for Shoreline. Single-family usage per customer was projected to decline by 1% per year from 2012 to 2020 and by 0.5% from 2020 to 2030. It was assumed that consumption would be flat after 2030. These annual reductions in average use result in CCF per customer that is over 20% lower than the usage in 2006. Multi-family and MMRD growth rates were forecast to be half of those for multi-family. Commercial use per customer was forecast to increase by 0.5% per year for 2012 to 2020, 0.25% for 2020 to 2030 and remain flat after 2030. This would reflect a shift from smaller to bigger commercial customers. Usage for the MMRD class was projected to decline by half the rate as the single-family and multi-family customers. In all cases it was assumed that a continued percentage increase or decrease in usage was not sustainable due to the exponential nature of percent changes as well as the fact that there is some natural minimum level of consumption expected.

Table 8
Forecast of Use per Customer Growth Rate by Class

	2015	2020	2025	2030	2035	2040
Residential	-1.00%	-1.00%	-0.50%	-0.50%	0.00%	0.00%
Multi-Family	-0.50%	-0.50%	-0.25%	-0.25%	0.00%	0.00%
Commercial	0.50%	0.50%	0.25%	0.25%	0.00%	0.00%
MMRD	-0.50%	-0.50%	-0.25%	-0.25%	0.00%	0.00%
Fire	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Other	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Figure 4 provides a chart of the historic and forecast for the average CCF per customer.

Figure 4
Historic and Forecast Average Use per CCF



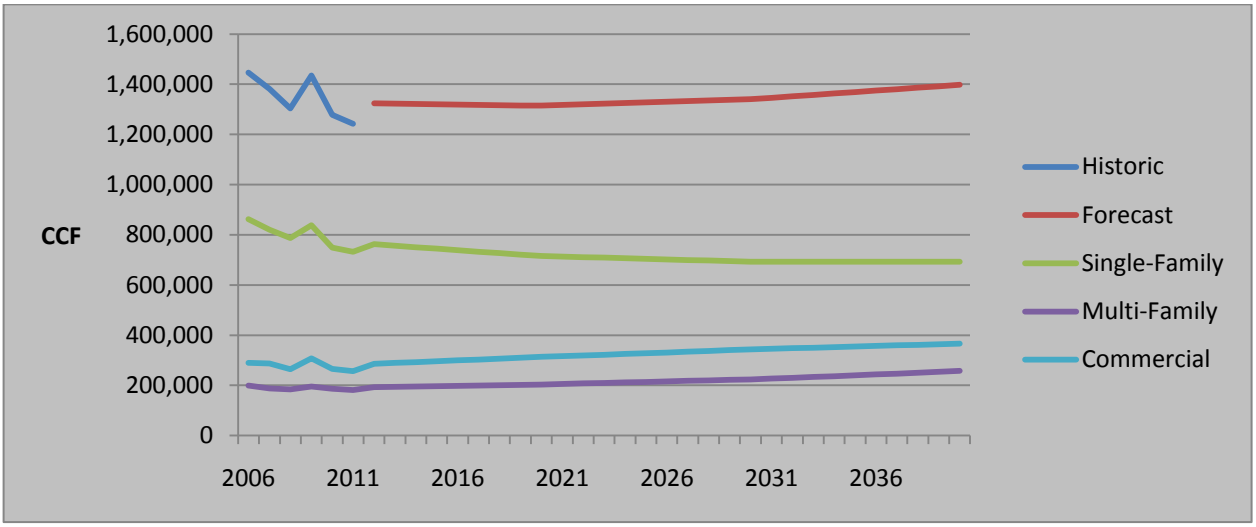
The results of the number of customers times the average use per customer yield resulting sales by customer class that decline by about 0.3% for single-family, increase by 1% for multi-family and increase by 0.8% for commercial. The total system water sales forecast is relatively flat with a small average annual growth rate of 0.2% through 2040.

Table 9
Forecast of Total Annual CCF by Class

	2011 Actual	2015	2020	2025	2030	2035	2040
Residential	732,074	744,585	715,651	704,201	692,934	692,934	692,934
Multi-Family	180,889	196,654	203,655	213,702	223,756	240,106	257,651
Commercial	256,160	295,905	313,512	328,055	343,274	354,741	366,592
MMRD	38,208	43,792	42,708	42,177	41,652	41,652	41,652
Fire	199	798	798	798	798	798	798
Other	34,735	38,366	38,366	38,366	38,366	38,366	38,366
Total	1,242,265	1,320,100	1,314,689	1,327,298	1,340,779	1,368,597	1,397,992

The historic and forecast sales volumes in CCF are provided in Figure 5. Both the total and the amounts by customer class are included in the chart.

Figure 5
Historic and Forecast Total Annual CCF



Development of the Revenue Forecast by Class

SPU recently completed a cost of service study and established rates for the 2012 to 2014 period. The new rates represent significant rate increases. Because the rate increases differ by component and rate class, we calculated the revenues for Shoreline customers using the new rates for each year. Revenues consist of both base service charges and commodity charges.

While we were provided with monthly usage by class for Shoreline (Non-SWD) residents, we did not have a breakdown of usage in the different summer season blocks. In developing revenues for 2012-2014, we first multiplied actual 2011 usage by the 2011 rates to true-up to the reported 2011 actual revenues. Based on actual single-family usage, 57% of consumption fell into the 8-month off-peak season of September 16-May 15. The summer period has a three-tier structure with block 1 up to 5 CCF per month, block 2 for the next 13 CCF, and block 3 for over 18 CCF per month. We determined that 26.5% would occur in block 1 based on 5 CCF times the number of customers, another 14% would be within block 2 and the remaining 2.5% would be in block 3. For the multi-family class, the loads were split between 61% off-peak, 3% in block 1, 35% in block 2 and 1% in block 3. For the commercial class there are no block rates and usage was split 53% off-peak and 47% on-peak.

After developing the breakdown of consumption by rate period/block, we could then split the 2012 annual forecast of consumption into the appropriate seasons and blocks. Usage was then multiplied by the SPU rates for 2012-2014 for each season and block. The resulting revenues are $9.4 million in 2012.

Based on average rates per CCF for Shoreline (Non-SWD) residents as a whole, the rate increases resulting from the new SPU rates are an average of 6.3% in 2012, 8.4% in 2013 and another 8.2% in 2014.

Table 10
Short-Term Forecast of Total Annual Revenues by Class

	2011 Actual	2012	2013	2014
Residential	$5,489,547	$6,059,065	$6,476,517	$6,912,932
Multi-Family	$958,677	$1,128,424	$1,254,018	$1,389,194
Commercial	$1,452,391	$1,743,212	$1,948,133	$2,167,805
MMRD	$224,812	$292,744	$313,827	$335,951
Fire	$139,497	$163,411	$176,060	$189,419
Other	$193,997	$186,754	$201,210	$216,478
Total	$8,458,920	$9,573,610	$10,369,764	$11,211,779

Note that these revenues, along with all future revenues projected, include the 5.029% state utility tax and the City of Shoreline franchise fee, which will be converted to a City utility tax after the acquisition.

Long-Term Revenue Projections

To project the long-term revenues of the water utility, the 2014 revenues by class were used as the starting point. Revenues were based on the CCF forecast by class times the average rate per CCF forecast. Because we do not have SPU rates by component beyond 2014, we applied the expected 5% rate increase per year to the average rate per CCF equally for each customer class. The revenues reflect both the growth in CCF sales and the projected rate increases over time.

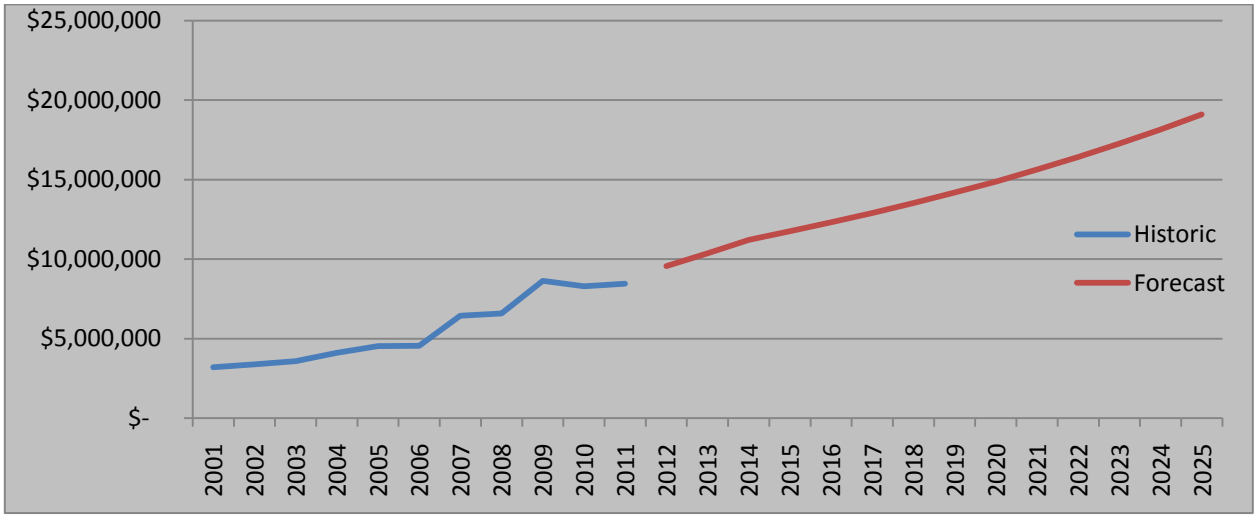
Table 11
Long-term Forecast of Total Annual Revenues by Class

	2020	2025	2030	2035	2040
Residential	$8,833,686	$11,093,886	$13,932,385	$17,781,646	$22,694,386
Multi-Family	$1,941,465	$2,600,103	$3,474,583	$4,758,586	$6,517,080
Commercial	$3,113,707	$4,158,315	$5,553,374	$7,324,444	$9,660,338
MMRD	$436,868	$550,632	$694,021	$885,766	$1,130,487
Fire	$253,839	$323,971	$413,478	$527,714	$673,512
Other	$290,101	$370,250	$472,544	$603,099	$769,724
Total	$14,869,667	$19,097,157	$24,540,385	$31,881,254	$41,445,526

Revenues are projected to be $14.8 million in 2020, increasing to $41.5 million by the year 2040. These numbers are very high in the later years but they must be looked at in terms of the costs that are also increasing significantly over the same time period. And because they are in nominal dollars, they include the general inflationary increases that make future dollars much higher than they are in today's terms.

Figure 6 provides a chart of the historic and forecast revenues for the period 2001 through 2025. Note that the revenue increased by 2.6 times over the ten years between 2001 and 2011. This compares to the projected revenues which increase by 1.9 times for the 10 years between 2011 and 2021.

Figure 6
Historic and Forecast Annual Revenues



Development of Post-Acquisition Costs

Overview

Annual costs for operating the new Shoreline water utility are made up of five major components, including the cost of the initial acquisition, costs of ongoing capital projects, costs of wholesale water purchases, operating & maintenance costs (O&M) and taxes. Costs associated with each of these components were developed based on current estimates in 2012 dollars. Most of the costs were taken directly from the Engineering Review, and included a combination of capital costs and annual O&M cost items. To develop the long-term forecast of costs for the period 2020 through 2040, the basic financial assumptions were applied as needed to estimate costs in each year.

Acquisition and Initial Capital Costs

The negotiated price for the acquisition is $25 million in the year 2020. This price does not need to be escalated to account for inflation as it reflects the price to be paid at the time the transaction occurs. While there are details that still need to be worked out in the contract, it is expected that there may be some adjustments to this purchase price to reflect any new capital that is spent over the next 8 years, any retirements in assets, and any changes in the assets that are to be included. Current projections for capital investments and depreciation translate into an additional $1.6 million, leading to a total cost of $26.6 million.

The Engineering Review includes additional facilities and capital that are required at the time of the acquisition, including separation costs. The recommended separation alternative has a cost of $5.9 million in 2012. Other initial capital costs include $4.1 million for a storage tank, $1.1 million for pump station & controls, and $2.2 million for buildings, equipment and inventory. It is assumed that all of these capital items will be acquired and constructed in 2019 using a construction loan, with interest accruing during 2019. Given the expected inflation and interest during construction, the cost to be financed in the year 2020 is $18.2 million.

The combined acquisition cost and initial capital totals $43.2 million. Given the assumed interest rate and financing terms, the debt service payment associated with the acquisition is $2.8 million per year.

Table 12 Acquisition and Initial Capital Costs		
	2012 Value	**2020 Value**
Acquisition Price	$25,000,000	$26,600,000
Separation Cost	$5,938,300	$8,542,269
2 MG Storage Tank	$4,856,100	$6,985,520
Pump Stations & Controls	$1,184,400	$1,703,189
Utility Buildings	$1,043,590	$1,501,208
Heavy Equipment & Vehicles	$933,900	$1,343,419
Tools & Inventory	$275,880	$396,854
Total	$40,831,770	$47,072,459
Annual Debt Service		$3,062,131

Operating & Maintenance (O&M) Costs

The annual O&M costs come directly from the Engineering Review and include labor costs, materials and supplies, employee benefits and administrative costs. In 2012, these costs are estimated at $3.9 million. Inflation is added to each item, with costs escalating to $5.5 million in 2020 and to $13.7 million by 2040. While costs were developed assuming that the City conducts all of the required tasks internally, it might be cost-effective to outsource certain activities. The City may consider this option as the acquisition date approaches, however, it would only include outsourcing to the extent it would be reduce costs or provide enhanced service for the same costs.

Table 13 Forecast of Annual O&M Costs						
	2012	**2020**	**2025**	**2030**	**2035**	**2040**
Labor	$1,227,799	$1,759,465	$2,203,125	$2,758,656	$3,454,268	$4,325,282
Materials & Supplies	$659,681	$945,339	$1,183,712	$1,482,191	$1,855,935	$2,323,920
Employee Benefits	$491,120	$703,787	$881,251	$1,103,463	$1,381,708	$1,730,114
Administrative	$1,093,585	$1,567,134	$1,962,296	$2,457,100	$3,076,673	$3,852,474
Total	$3,472,185	$4,975,725	$6,230,383	$7,801,411	$9,768,584	$12,231,790

Wholesale Water Purchases

As the City is purchasing the distribution system only it is not acquiring any of the water resources to provide water to the new utility. The new utility will be able to purchases water from SPU on a wholesale basis, as do many of the other water utilities in the region. The pricing and contract terms are expected to be the same as for SPU's other wholesale customers. Rates for wholesale

water supply are developed by SPU in its *2012-2014 Water Rate Study* and differ between peak and off-peak periods. The rates between 2012 and 2014 are provided in Table 11.

Table 14
SPU Forecast of Wholesale Water Rates

	2012	2013	2014
On-Peak	$2.25	$2.26	$2.27
Off-Peak	$1.52	$1.53	$1.53

Wholesale customers are expected to contract for a quantity of water that is sufficient to cover the variation from year to year. The projections of water use are relatively flat for the new water utility, with sales of roughly 1.31 million CCF in 2020 and increasing to 1.40 million CCF by 2040. We have assumed that the contract water amount is 1.52 million CCF, which includes a 10% adder for growth and variability and water losses of 5%. Based on historic usage, the water amount is split with 44% during the peak months and 56% during the off-peak months.

Based on the contract amount and the SPU rates, the total purchase amount is $2.8 million based on 2014 rates. Given price increases, this amount is forecast to be $3.4 million in the initial year 2020.

Table 15
Forecast of Wholesale Water Costs from SPU

	2014	2020	2025	2030	2035	2040
Annual Cost	$2,815,664	$3,443,399	$4,128,903	$4,953,646	$6,005,443	$7,285,781

Taxes

The water utility will face two taxes on revenue from operating the water utility. There is a state tax rate of 5.029% that will be applied to all revenue. There is also a 6% franchise fee currently collected by SPU and paid to the City of Shoreline. We have assumed that post-acquisition the City will replace the 6% franchise fee with a 6% utility tax once the new water utility begins operations. SPU rates for Shoreline are currently 21% higher than rates within the City of Seattle. This adder includes the 6% franchise fee. The state utility tax is also included in the SPU rates.

Based on the expected revenues the state tax is expected to be nearly $750,000 in 2020 and the franchise fee is expected to be nearly $900,000. The tax rates are assumed to remain constant over time but the payments will increase as the revenues grow.

Table 16 Forecast of Tax Expenses						
	Rate	**2020**	**2025**	**2030**	**2035**	**2040**
State Tax	5.029%	$747,796	$960,396	$1,234,136	$1,603,308	$2,084,296
Shoreline Utility Tax	6.000%	$892,180	$1,145,829	$1,472,423	$1,912,875	$2,486,732
Total		$1,639,976	$2,106,225	$2,706,559	$3,516,183	$4,571,027

Annual Capital Improvements Program (CIP)

In addition to the upfront capital improvement projects previously discussed, it is expected that additional CIP will be required each year. The Engineering Review estimates such CIP to be $1.37 million per year in 2012 dollars. The three largest categories include service replacements, distribution main relocations and extensions, and vehicle replacements. It is assumed that this amount will escalate each year with inflation, to reach a sum of nearly $2 million in 2020.

The other ongoing CIP item is replacement of certain existing distribution mains. The Engineering Review estimates this cost at $32.9 million in 2012 dollars, or $47.1 million in 2020 dollars. This amount represents 23% of the total system and it is expected that costs would be spread out over time. If the cost is spread out over 23 years, as recommended in the Engineering Review, the annual cost would be roughly $2 million per year in 2020, and would escalate with inflation after that time.

While the annual CIP of $2 million is expected to be required every year, the main replacement program will have some options in terms of timing and funding. Given the fact that rates must be set sufficiently high to meet the required debt service coverage level required by the bonds, it is expected that there will be cash left over each year that can be used to fund the CIP program. Given the current revenue and cost projections and the initial debt service payment of $3.06 million, operating revenues after debt service for the year 2020 are $1.8 million, which provides a 1.6 DSC level. This amount can be used to fund the annual CIP. This is slightly below the level of the $2 million in ongoing CIP, however, that amount may be too high for the initial year. Because the amount includes replacement of vehicles, tools and Scada improvements, all of which will be brand new in 2020, it is not likely they will need replacement or improvements in the first several years.

Funding for the distribution mains replacement can be funded with any additional cash available, through additional debt, or some combination of both. It is recommended that the funding of this project be initially based on the amount of funds available without raising rates above the level of SPU. Once the City begins operations of the water utility, it can better assess whether that level of funding is adequate. If additional funds are shown to be needed based on a prioritized list of replacements that need to be made immediately, then additional debt can be issued to cover a large portion of the replacements at once rather than doing an incremental amount each year.

Base Case Financial Results

While the previous sections provided the detail that went into the forecasting of revenues and costs for the new water utility, the financial results for the base case scenario are presented here.

Table 15 summarizes the budget items for 2020 through 2040. Operating Revenues include revenues from retail sales as well as a small amount for other income. Operating expenses include labor, materials, administrative costs and taxes. The debt service is the amount for the initial purchase price plus any upfront capital needs.

The net cash flow equals the revenues minus the operating expenses and debt service payments, and ranges from $1.8 million in 2020 to $14.5 million in 2040. That net cash flow allows the utility to meet its DSC requirements, and the cash can be used to fund capital projects during the year. The cash will first be used to fund any ongoing annual CIP projects. Any surplus amounts are available to develop a capital or reserve fund, pay for mains replacement, or lower rates for customers.

For purposes of the analysis, it was assumed that all surplus funds go towards the mains replacement program and the cumulative amount paid is shown. In this case it is $78 million over the 20-year period. When compared to the recommended mains replacement budget, escalated over time, the base case allows for 111% of the program to be funded.

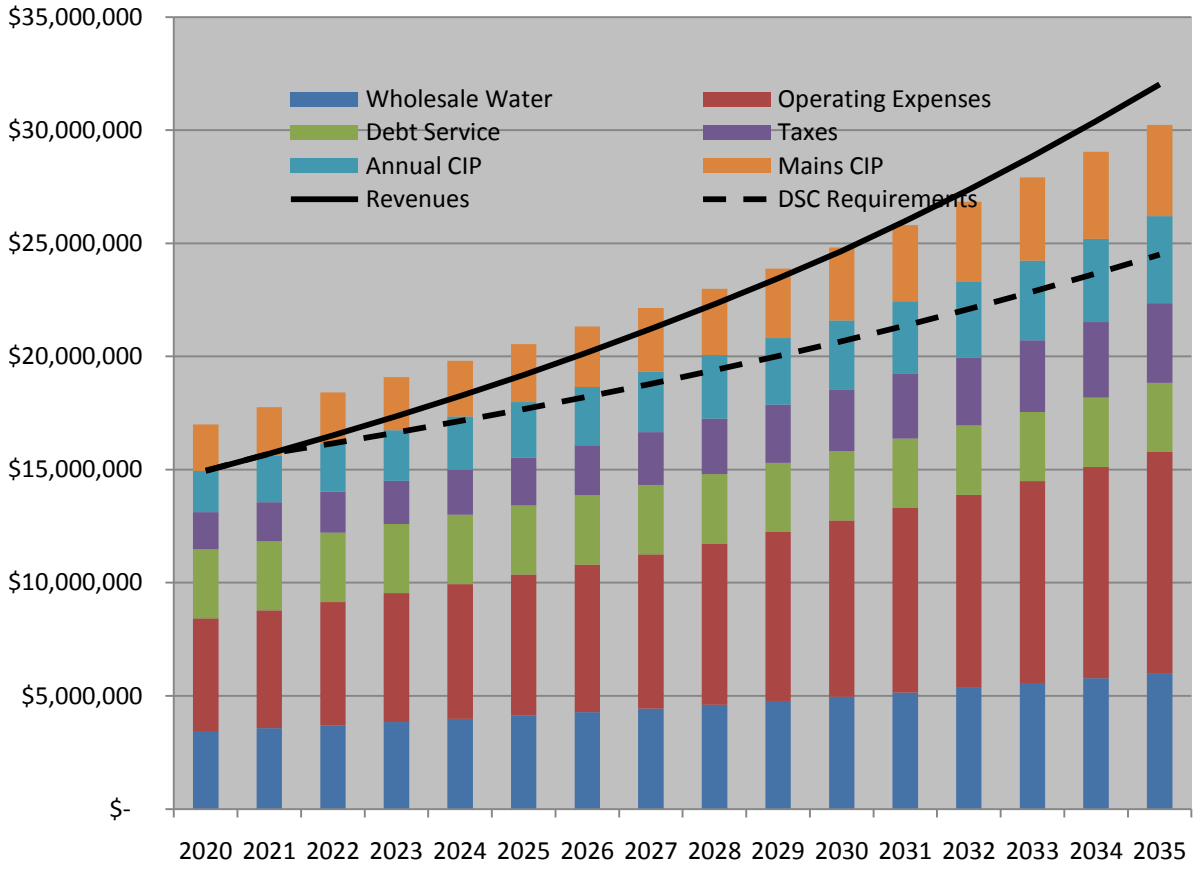
Table 17
Summary of Base Case Results

	2020	2025	2030	2035	2040
Operating Revenues	$14,941,318	$19,188,604	$24,657,097	$32,030,211	$41,635,638
Operating Expenses	$10,059,099	$12,465,512	$15,461,617	$19,290,210	$24,088,598
Debt Service	$3,062,131	$3,062,131	$3,062,131	$3,062,131	$3,062,131
Net Cash Flow Before CIP	$1,820,088	$3,660,961	$6,133,349	$9,677,870	$14,484,909
Annual CIP	$1,820,088	$2,452,550	$3,070,975	$3,845,339	$4,814,965
Net Available for Mains Replacement	$0	$1,208,411	$3,062,374	$5,832,531	$9,669,945
Debt Service Coverage	1.6	2.2	3.0	4.2	5.7
Cumulative Mains Replacement	$0	$3,173,192	$14,549,968	$37,808,642	$77,988,181
Cumulative Percent	0%	5%	21%	54%	111%

The results show that the new water utility would have sufficient funds to meet its DSC obligations and fund the recommended CIP program in 2020 and beyond. The first year is the tightest year financially, with both DSC and the net amount available for CIP growing over time. Full results on an annual basis are included in the Appendix.

The results are also shown by year in the following chart. The chart compares the forecast of revenues to the forecast of costs. The costs are broken down into wholesale water purchases, operating costs, debt service for the acquisition, separation and upfront costs, plus the State and City utility taxes. The difference between the revenues shown and the costs in the chart reflect the amounts that can be used to meet the DSC requirement and fund CIP programs. To the extent that this difference is not needed for CIP, it could be used to reduce rates or provide reserve funds. While in the early years the entire difference is needed to meet DSC requirements and CIP, in the later years the difference grows substantially and there is likely to be more options for using the available funds.

Figure 7
Base Case Revenue vs. Cost Comparison
2020-2035



While it can be seen that the revenues increase faster than the costs this is due to three factors. First, the debt service amount is fixed over time and does not increase. Second, the wholesale water rates grow less than the retail rates, as has been the case for SPU since 2004. Because the bulk of the water resource costs are fixed capital-related costs, we believe the lower increase is appropriate. Finally, the SPU rates are expected to increase a little more than costs. This has been the case historically and is driven in part by SPU's declining load levels which are projected to continue.

Sensitivity of Financial Results

As with any long-term planning study, there is uncertainty and risk surrounding the analysis because the future is unknown. While we provided detailed research and analysis to support the assumptions contained in this report, there are many factors outside the control of the City that will influence the projected revenues and costs. For that reason we conducted a sensitivity analysis to determine what the financial results would be under various different assumptions. This was completed by looking at individual changes in assumptions first to see which had the largest impacts. Then both a high and low case with changes to multiple assumptions were created to determine the combined financial risks to the utility.

It is important to keep in mind that the majority of factors driving increased costs or reduced revenues will also impact SPU. For example, if costs grow faster than projected, it is likely that SPU will also see increased costs and have to increase their rates. Similarly, if retail rates are lower than projected, it is likely that SPU could do this because costs for operating the utility declined, which would also mean the Shoreline water utility might see lower costs.

The sensitivity cases were all performed with both a low and high case surrounding each financial assumption. The following is a list of the sensitivity adjustments made:

- Separation Option B5 (most costly case)
- All capital and O&M costs 10% higher or lower
- Wholesale charges 10% higher or lower
- Bond rate higher or lower
- Escalation of rates and costs higher or lower
- Load growth higher or lower
- Cost escalation equal to rate escalation
- Low case for multiple factors
- High case for multiple factors

Once all of the cases were completed the results were placed in order of net revenues before CIP for the year 2020 for the comparison in Table 16 and labeled cases A through N. The various cases are described in more detail following the table and are grouped according to the preceding list. The full results by year for each case are included in the Appendix.

One other option was evaluated to determine the impact over the base case. The City undertook an *Operation Efficiency Report* to determine if there were any savings associated with operating the water utility in conjunction with the wastewater utility to be acquired in 2017 and with other City functions. This report resulted in savings in both the initial capital requirements and annual operating costs.

Table 18 Summary of Sensitivity Analysis						
			2020 Net Before CIP	2020 Debt Service Coverage	2025 Debt Service Coverage	% of Mains Replacement Completed
Base	Base Case		$1,820,088	1.6	2.2	111%
Efficiency	Base with Efficiency Savings		$2,349,171	1.8	2.4	136%
A	Low Costs - 10% less CIP and O&M		$2,450,837	1.89	2.5	165%
B	All Low Case		$2,368,017	2.0	2.3	104%
C	Low Wholesale - 10% less		$2,164,428	1.7	2.3	127%
D	Low Bond Rate - 4%		$2,171,289	1.8	2.5	122%
E	Load growth 0.5% higher		$2,103,326	1.7	2.4	161%
F	High Escalation - 7% retail, 5% wholesale, 6.6% costs		$2,104,303	1.6	2.5	131%
G	Equal Escalation - 5% retail, 5% costs		$1,631,974	1.5	2.1	78%
H	Load growth 0.5% lower		$1,539,663	1.5	2.0	67%
I	Low Escalation - 3% retail, 2.5% wholesale, 2.6% costs		$1,443,337	1.5	1.8	68%
J	High Wholesale - 10% more		$1,475,748	1.5	2.1	97%
K	Separation Option B5		$1,281,965	1.4	1.9	97%
L	High Bond Rate - 7%		$1,057,394	1.3	1.8	91%
M	High Costs - 10% more CIP and O&M		$1,189,339	1.4	1.9	70%
N	All High Case		$442,241	1.1	1.8	108%

The cases range from providing a net amount before CIP of $442,000 to $2.5 million in the first year. In four cases, the DSC falls below 1.5 in the first year. While there is positive cash flow in those cases, the low DSC might be problematic. This issue could be resolved by shaping the debt service so that the first year would not result in a full 12 months of payments to better match the delay in cash flow from the changeover in billing from SPU to Shoreline. In all cases, the conditions improve each year and within the first five years the DSC is more than adequate. Because the funding of mains replacement is funded with any surplus revenues beyond the annual CIP, the cumulative funding for the program runs from 68% to 165%.

As with any utility, there will be some cost items than can be managed in the event that net revenues are insufficient. Operating and CIP budgets can be reduced, CIP items can be deferred, additional bonds can be issued to fund capital rather than funding it all from cash, or allocations of costs to cover City provided services can be deferred.

Further, if the efficiencies identified by the City are achieved, all cases see reduced costs of roughly $500,000 in the first year and an increase in the DSC of 0.2 points.

All Capital and O&M Costs 10% Higher or Lower (Cases A and M)

These cases represent two of the most extreme cases. In the low case all O&M and CIP costs are reduced by 10% initially. In the high cases all O&M and CIP costs are increased by 10%. Thereafter the O&M and CIP costs increase at the base case escalation rates. The adjustments are made to labor, materials and administrative costs for O&M as well as to separation costs, upfront capital, ongoing CIP and mains replacement costs.

In the low case, costs are reduced by $600,000 and the DSC increases to 1.8 in the year 2020. Apart from the efficiency savings, the case provides the largest cost savings to the utility.

In the high case, costs are increased by over $600,000 and the DSC is 1.4 in 2020. This is the second most extreme case and would require the utility to enact other cost saving measures.

The following charts reflects what would occur under cases A and M and can be used for comparison to Figure 7.

Figure 8
Case A Revenue vs. Cost Comparison
2020-2035

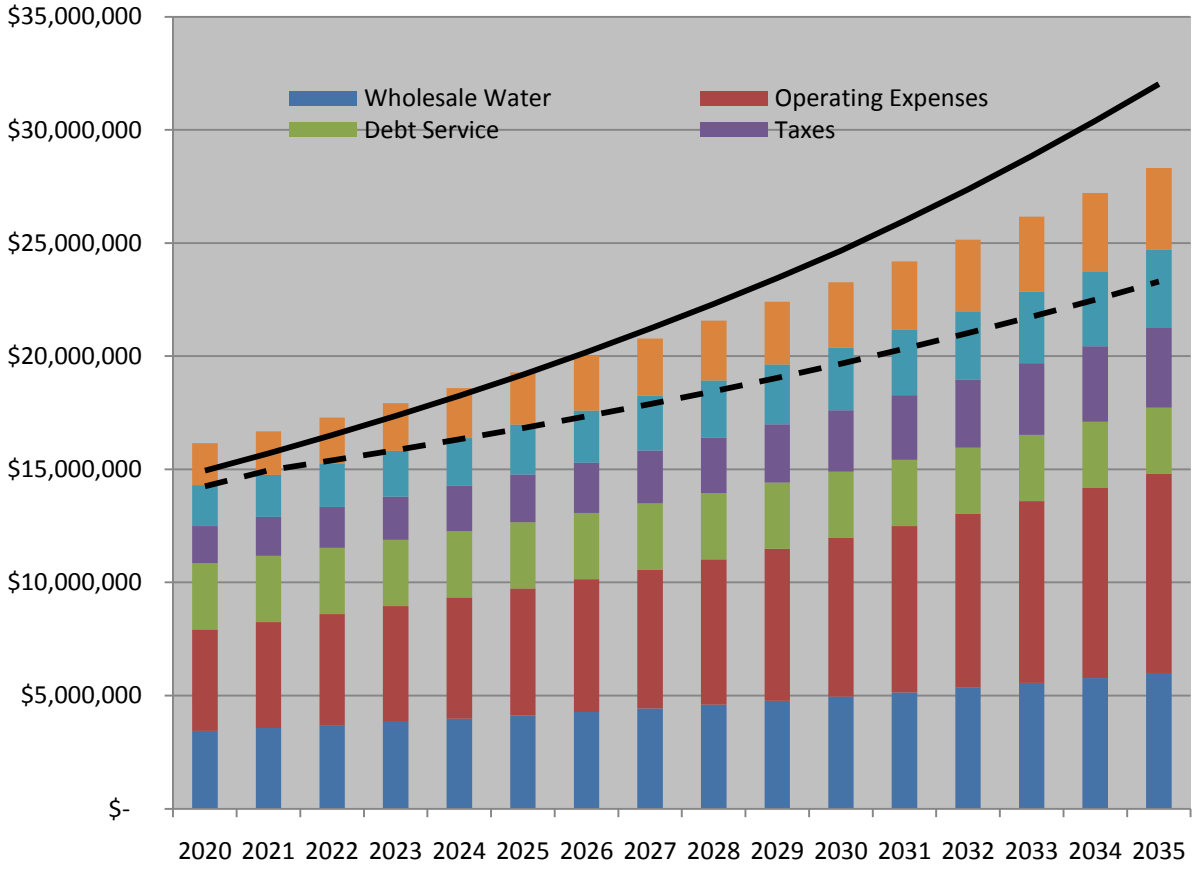
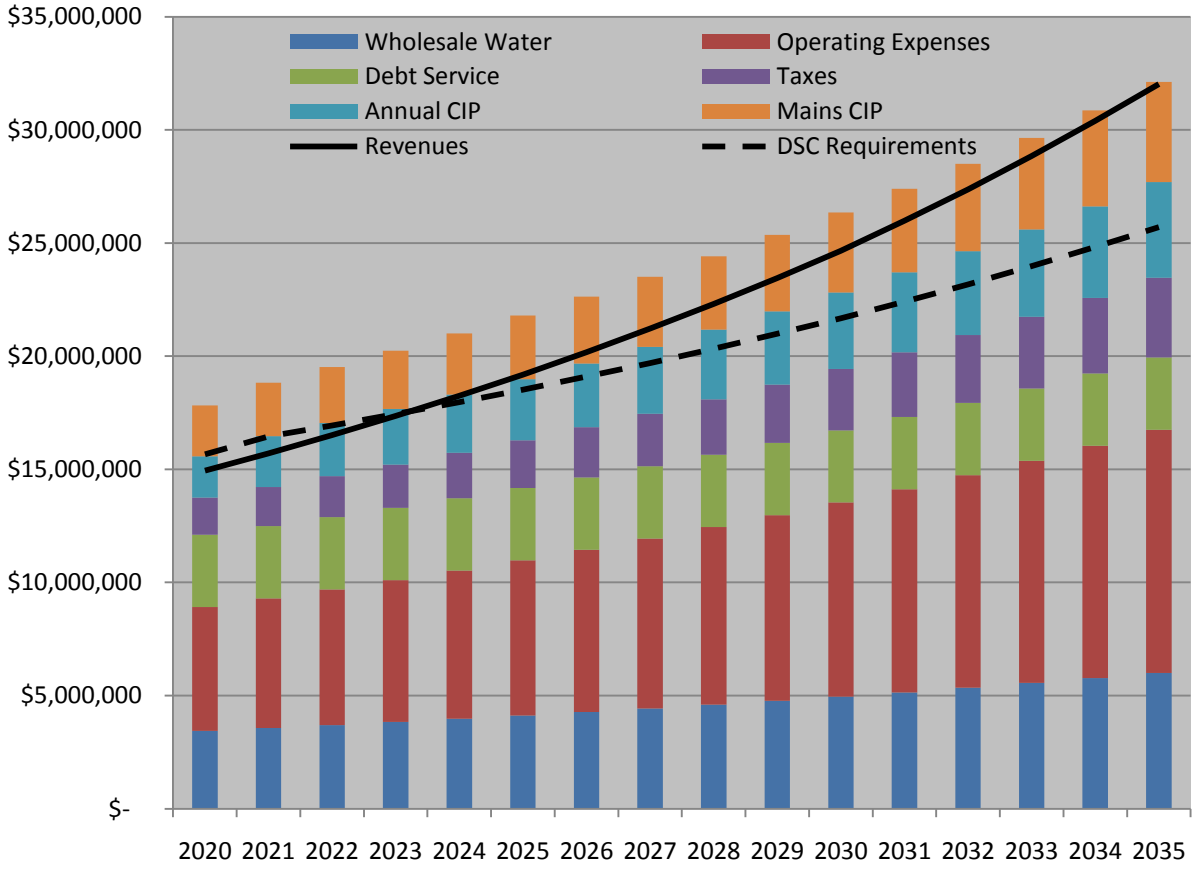


Figure 9
Case M Revenue vs. Cost Comparison
2020-2035



Low Case for Multiple Factors (Case B)

A low case was created to reflect the low assumptions for multiple factors, including O&M, CIP and water supply costs reduced by 10%, low escalation for retail rates (3%), wholesale rates (2.5%) and costs (2.6%), borrowing costs of 4%, and load growth reduced by 0.5%. This combination reflects a prolonged economic downturn affecting all factors and is not considered to be very likely.

With the low case, the Net Before CIP increases by $500,000 to $2.4 million in 2020 with debt service reduced to $2.5 million. The DSC increases to 2.0.

Wholesale Charges 10% Higher or Lower (Cases C and J)

The starting costs for wholesale purchases are changed in these cases to be either 10% lower or 10% higher. Thereafter the costs would escalate at the base case assumptions. This changes costs in 2020 by about $350,000 in either direction. Even with the high wholesale rates, the DSC level is 1.5 which is adequate for the first year.

Bond Rate Higher or Lower (Cases D and L)

A low bond rate of 4% and a high bond rate of 7% were looked at for these cases compared to the base assumption of 5%. With the lower bond rate the debt service decreases by over $300,000 to $2.7 million per year. In the high case, the payment increases by $800,000 to $3.8 million per year.

With the high bond rate case the DSC is only 1.3 in 2020 and the utility would need to undertake further cost saving measures in the first few years. The analysis assumes that the higher bond rates would occur for the entire 20-year period. In reality, the utility would likely have opportunities to refinance debt during that 20-year period when bonds rates became lower than 7%.

Load Growth Higher or Lower (Cases E and H)

A change in the growth rate of plus or minus 0.5% was applied to the CCF for each rate class in these cases. Change in the load growth had one of the smallest impacts with Net Before CIP changing by about $300,000 in either direction. In both cases the 2020 DSC was sufficient at 1.5 or above.

Escalation of Rates and Costs Higher or Lower (Cases F and I)

Under the low escalation case, the escalation for retail rates was reduced to 3.0%, the escalation for wholesale rates was reduced to 2.5% and the escalation of costs was reduced to 2.6%. Under the high case, the escalation for retail rates was increased to 7.0%, the escalation for wholesale rates was reduced to 5% and the escalation of costs was increased to 6.6%. The changes were not symmetrical because it was believed that there was more room for costs to go up than to go down.

Note that it is likely that the cost increases or decreases would be driven by economic conditions that might also impact borrowing rates. However, for these cases the bond rates remained at the base case of 5%.

In these cases the Net Before CIP changed by roughly $400,000 in either direction. Because the revenues and costs both move in the same direction, the impacts are not as great as some other factors in the first year. The impacts do become more pronounced over time. Both cases provide a sufficient DSC level.

Cost Escalation Equal to Rate Escalation (Case G)

To reflect a case where the costs facing the utility escalate at the same rate as the SPU rates and the resulting revenues, the cost escalation was increased to 5% per year. This escalation factor applied to all O&M costs as well as all CIP amounts. This case increased costs in the first year by roughly $200,000 and provided an adequate DSC of 1.5. The biggest impact is that less funds would be available for the mains replacement program over time.

Separation Option B5 (Case K)

With this case option B5 rather than B3 is used for the separation of the facilities. This involves a capital cost of $11.7 million rather than $5.9 million.

This case increases the debt service payment by roughly $600,000 per year, from $3.0 to $3.6 million per year. This reduces the 2020 Net Before CIP to $1.3 million and the DSC to 1.4. The additional cost means that less funds are available for the mains replacement program.

High Case for Multiple Factors (Case N)

The high case was created to reflect the high assumptions for multiple factors, including O&M, CIP and water supply costs increased by 10%, high escalation for retail rates (7%), wholesale rates (5%) and costs (6.6%), borrowing costs of 7%, and load growth increased by 0.5%. This combination reflects a period of hyper-inflation as was seen in the 1970's, or a period of prolonged strong economic conditions affecting all factors and is not considered to be very likely.

With the high case, the costs increase by the maximum amount of $1.4 million in 2020 with Net Before CIP at only $440,000. The DSC would fall to 1.1 and serious cost cutting measures would be required to make the utility viable.

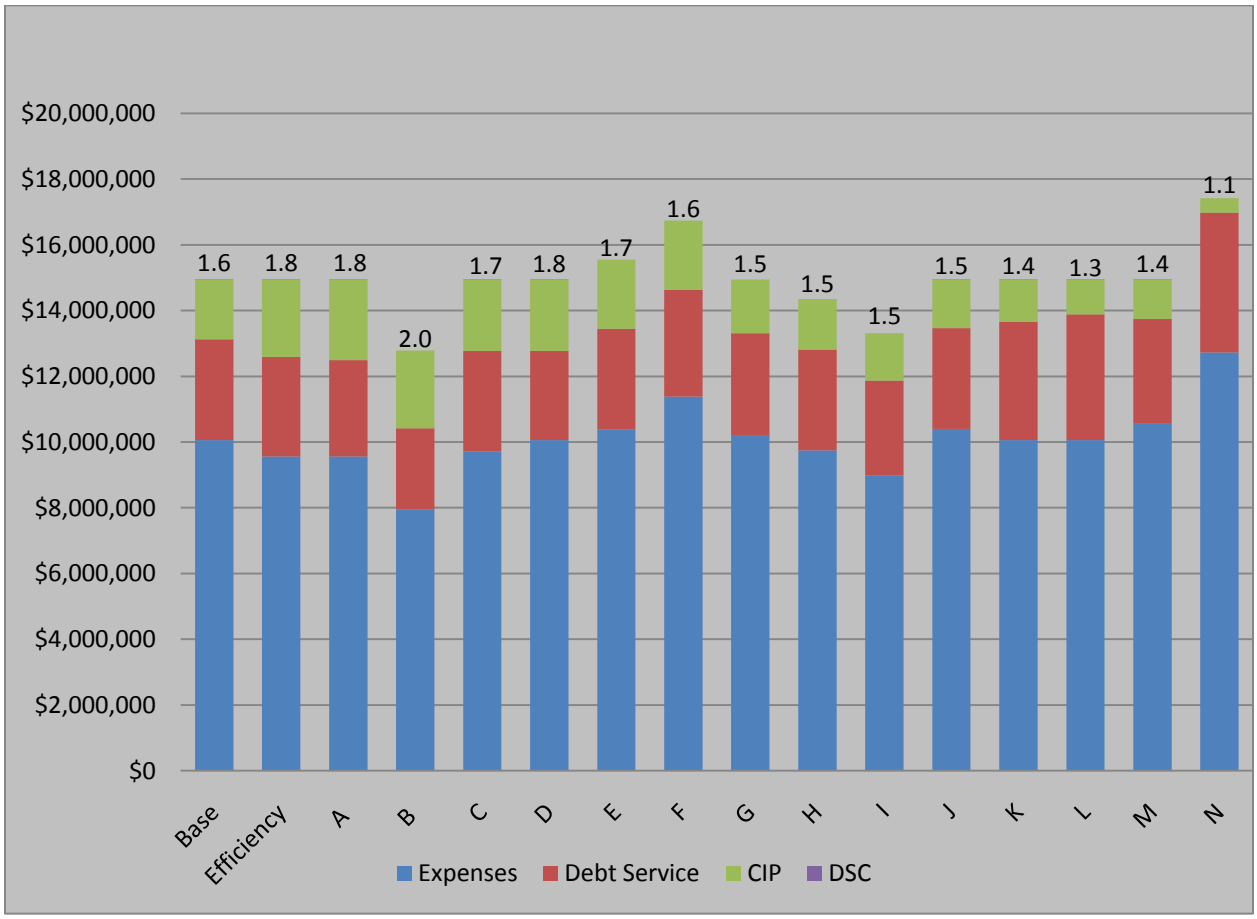
Summary

The following chart provides a graphic comparison of the sensitivity cases in terms of the costs for 2020. In all cases the expenses sum to the total expected revenues for the year. The operating expenses (represented in blue) include the labor, maintenance and overhead costs as well as the wholesale water purchases. This amount varies in most of the cases as it is driven by the assumed escalation rates, changes to load levels and any changes to the starting values. The debt service (shown in red) varies based on the starting cost and escalation for the separation and upfront capital costs and depends on the assumed bond rate for each case. The final cost is the CIP (shown in green) and any funds remaining after operating expenses and debt service is assumed to be spent first for ongoing annual CIP requirements followed by mains replacement. When all costs are added, they equal the revenue forecast for each case. Therefore the total amount for each bar is the revenue amount. Finally, the 2020 debt service coverage ratio (DSC) is shown at the top of each column.

For the majority of the cases, the revenues in 2020 are expected to be in the range of $14 to $15 million. The exceptions are cases B and I where there is low escalation to the retail rates. For cases F and N revenues are above $17 million due to high escalation of retail rates. For nearly all cases, there is an adequate amount remaining to pay for CIP and to meet the DSC levels required to meet bond covenants. Three cases (K –M) contain revenues that exceed costs, however, the resulting DSC is marginally high enough to cover the expected risk. The final case N, where all assumptions are based on the high case, still has a slightly positive net revenue but the DSC of 1.1 is insufficient to meet the 1.2 DSC level generally required in bond

covenants. However, with the expected efficiency savings shown in the City's report, that case would improve and results would become within the acceptable range.

Figure 10
Comparison of Sensitivity Cases
2020 Cost Breakdown



In summary, while there are many risks facing the new water utility, in nearly all cases the utility is forecast to have sufficient revenues with rates set at the same level as with SPU. In the most extreme case revenues are still expected to be above costs, although there would be insufficient funds to meet DSC and CIP requirements in the first year prior to the identified efficiency savings. It is expected that in this extreme case the utility would likely see the expected efficiency savings as well as undergo short term cost cutting measures to ensure adequate financial results. After the first year, the DSC improves and there is additional funding for CIP in all of the cases.

Summary and Conclusions

A detailed financial analysis was completed to forecast the expected revenues and costs associated with the City of Shoreline acquiring the water system within City boundaries from SPU in 2020. The revenues and costs were presented to the City's SPU Steering Committee and were adjusted to reflect input provided by Committee members. The base case results showed that the acquisition would provide sufficient revenues to meet the costs of the utilities for the period 2020 through 2040, assuming that rates would be at the same level as SPU rates for Shoreline.

To assess the range of risks associated with uncertainty in revenues and costs, a sensitivity analysis was completed to determine whether revenues would still be sufficient in alternative scenarios. While a few cases presented problematic debt service coverage ratios, the analysis resulted in a positive cash flow for all cases analyzed. In the cases with insufficient debt service coverage ratios, reducing costs in the initial years, shaping the debt service for the bonds, or deferring costs are all likely options to resolve the debt service coverage issue.

Based on the completed analysis, the acquisition is expected to be feasible at rates that are equal to those that SPU would charge in Shoreline. The estimated revenues allow for a substantial capital improvement plan (CIP), including the replacement of a large portion of mains that is not expected to occur with continued SPU ownership. In the later years, the City may also have the potential to lower rates below what would be charged by SPU.

Appendix

City of Shoreline

Shoreline Water System
Preliminary Business Plan

May 25, 2012

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Contents

Introduction 1

Responsibilities & Organizational Plan 3

Start-up & Transition Issues 6

Wholesale Water Contract 9

Engineering & Operations 13

Administrative & General 16

Introduction

The City of Shoreline (the City) has entered into a verbal Agreement with Seattle Public Utilities (SPU) to purchase SPU's water facilities inside the City boundaries in the year 2020. Formal consideration of the Agreement by Shoreline City Council is anticipated to occur in July of 2012. Currently water service is provided to the City residents directly by SPU. The acquisition will allow the City to operate the water utility on behalf of its residents. It is important to note that about one-third of the residents in the City are served by the Shoreline Water District and this is not expected to change as a result of the acquisition.

Prior to finalizing the purchase agreement, the City is conducting due diligence on the acquisition and will put the issue up for a city-wide vote. As part of the due diligence, the City retained EES Consulting to provide three inter-related analyses. The first is an Engineering Review to assess the SPU assets that are included in the acquisition, develop operating costs and procedures for the new utility, and develop the short-term and long-term capital needs of the utility. The second piece is a long-term financial analysis to determine the projected revenues and costs associated with operating the water utility, along with the associated financial risks. The final component is a Business Plan to address how the tasks and responsibilities required of the new water utility will be carried out.

The findings of the Business Plan are presented in the report.

This report contains five additional sections. The next section addresses the overall responsibilities and organization a plan for the new water utility. This is followed by a discussion of the start-up and transition issues. The final three sections contain details of the proposed plan associated with the three major functions of wholesale water purchases, engineering and operations and administrative and general.

History

In 1995 the City of Shoreline was first incorporated as a City to improve services and have control over decisions that affected their community. One of the goals since the incorporation has been to consolidate services and create greater efficiency, as well as providing "one-stop shopping" for its residents. Acquisition of the SPU water system is one of those services where consolidation was considered.

The City has had discussions regarding the SPU water system in the City since at least 1999 and has evaluated numerous options for how SPU in Shoreline should be operated in the future including acquisition, re-negotiating the franchise agreement, and applying additional surcharges to Shoreline rate payers to fund capital improvements within the City.

In 2009, the City Council has had a specific goal of acquiring the SPU water system in Shoreline, but added a specific objective as the negotiations began:

Acquire the system at a price that, when added to other costs to operate and maintain the system, would fall within a rate structure equal to or less than what SPU would forecast over a reasonable period of time.

The goal of the City Council is based on the desire for the citizens of Shoreline to have a direct say in how rates are set and how the utility is managed. Currently those decisions are made by the City of Seattle. The City also wishes to reinvest in the water system at a higher rate than is planned by SPU. A higher investment in the system will improve fire protection, improve the long-term sustainability of the system and better facilitate economic development. Operation of the water utility by the City will also streamline the permitting process by providing a single government coordination point, allow the City to improve infrastructure in areas where the City wants to encourage growth, and improve coordination between utility work and street work.

Under the current structure, Shoreline residents have no ability to impact the service they receive from SPU. They cannot vote for the Seattle City Council members that oversee SPU and they have little, if no, negotiating strength in terms of capital spending or rate setting. A portion of the rates charged by SPU include a tax paid to the City of Seattle that provides no financial benefit for Shoreline residents. At the same time, because Shoreline residents are outside the City of Seattle, they are subject to an additional 14% charge above the rates for residents within the City of Seattle.

After adopting the goal of acquiring SPU, the City began more detailed negotiations with Seattle on a value for the SPU system within the City. Negotiations were based on preliminary estimates for the costs to own and operate the system.

On November 9, 2011 the City announced it had entered into a tentative agreement with the City of Seattle to purchase the SPU water system located in the City for $25 million. The acquisition is to take place in the year 2020.

Public Process

A public process is included as an important part of the acquisition process. The City Manager formed a citizen's Steering Committee to provide a recommendation on whether the City should move forward with the acquisition. The Steering Committee is made up of 26 members with varying interests and expertise surrounding water utilities. Meetings were held regularly and started in January of 2012, with completion expected at the end of June.

The Steering Committee was presented with all of the due diligence completed by the City, including the Engineering Review, the Financial Analysis and the Business Plan.

Bond rating agencies and the City Attorney have advised that the acquisition is subject to voter approval. A city-wide election is planned for the November 2012. It is expected that the ballot language will be developed and approved by the City Council in August.

Responsibilities and Organizational Plan

For the new water utility to assume responsibility for operating the acquired service from SPU, it must be prepared to serve all of the necessary functions of a fully operational water utility. For purposes of this report, it is assumed that the responsibilities will be met through a combination of hiring new staff and using City personnel for some of the functions. The City may also choose to look at the potential for outsourcing some of the functions through a competitive bid process, for which the City has a long history when it reduces costs and adds value. However, this process would be detailed closer to the time of the acquisition.

This section will first identify the activities that must be undertaken by the City to meet its responsibilities for providing water service to the acquired customers. This includes laying out the overall governance structure and organization structure.

Functions of the New Utility

There are numerous responsibilities associated with running a water utility. The three major functions of a water utility include the provision of water supply, the transmission of water and the distribution of water, all of which must be done with a high level of reliability in order to protect public health. The new water utility will consist primarily of distribution, and will include some transmission mains. The provision of water supply and transmission of that water to the distribution system will be purchased on a wholesale basis. Based upon the available water supply in the area, it is assumed the wholesale purchase will be from SPU.

The functions of the new water utility fall under the categories of water operations and administrative and general. Table 1 summarizes the main responsibilities under the different categories.

Table 1
Water Utility Responsibilities

Water Operations Tasks	Administrative and General Tasks
• Acquire and manage wholesale water purchases • Provide and manage wholesale service to other utilities (Olympic View and SWD) • Plan for new load and facilities • Operate water system infrastructure • Repair and maintain infrastructure • Install and replace infrastructure • Meter reading • Material management of equipment and supplies • Monitor, protect and maintain water quality • Conservation programs • Meet regulatory compliance	• Billing of customers and collections • Accounting • Financial analysis for rates, financing • Maintenance of information systems • Customer service and interface • New connections • Marketing and business development • Media and communications • Purchasing • Contract administration • Human resources • Payroll • Legal

It is envisioned that these tasks will be carried out with a combination of existing City staff and new staff hired specifically for the water utility. The proposed staffing levels for the new water utility were originally developed in the Engineering Review, with those staffing levels based on a stand-alone utility approach. In the Engineering Review, it was expected that certain functions would be performed by existing City staff, with costs for those services estimated at $1.1 million in 2012 dollars. This cost is listed as Administrative O&M in the report and is also included in the Financial Analysis. Subsequently, the City completed an Operational Efficiency Report that looked at the recommendations within the Engineering Review and made adjustments to reflect existing and planned equipment and staff within other departments of the City. The staffing and organization structure in the Business Plan reflects the staffing levels and positions contained in the Operational Efficiency Report.

While the Business Plan reflects a case where all tasks are performed by new or existing staff, the City will consider alternatives and select the most appropriate and cost-effective methods prior to the operation date. As the acquisition will not occur until the year 2020, the City has eight years to plan for and evaluate the best options for completing each task. For all functions, the City will consider alternatives fully prior to making long-term commitments. This includes a comparison of internal vs outsourcing costs and a competitive procurement process. Note that it may be appropriate to consider different approaches during the initial transition period relative to the long-term operations. For example, the City may choose to outsource O&M functions initially, and

slowly transition to using City employees for O&M functions, or the City may choose to put in place a more formal outsourcing programs from the very beginning.

General Organizational Structure

Currently the City has a seven-person elected City Council as its governing body. Within those seven members, a Mayor and Deputy Mayor are chosen. The City Manager reports directly to the City Council and oversees all City staff. Several Directors manage the various City departments and report to the City Manager. The new water utility staff will fall within that current City structure.

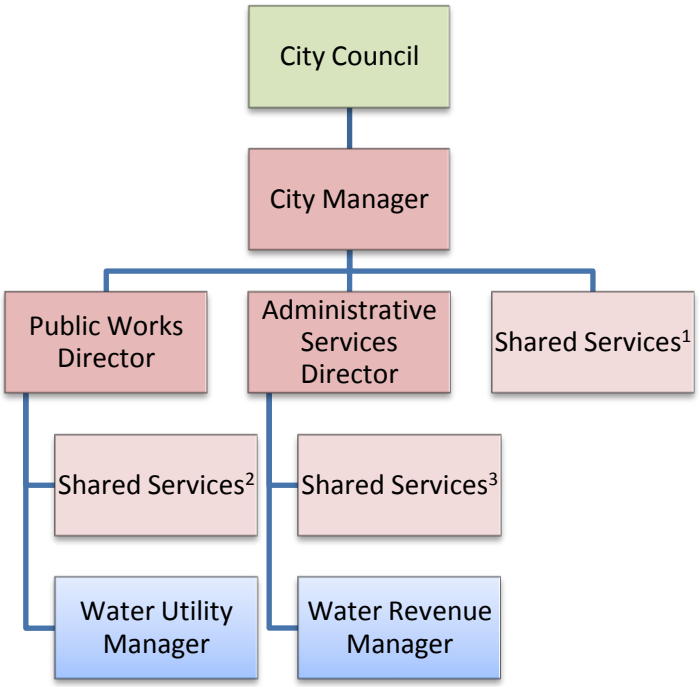
The City Council is responsible for establishing City policies and laws, adopting the annual budget, approving appropriations, contracting for services and granting franchises. These responsibilities will apply as appropriate to the new water utility. This will include the setting of water rates, approval of operating and CIP budgets, approving major planning documents and signing contracts for services.

Staffing for the new water utility includes two key manager level positions. It is expected that the Water Utility Manager would report to the Public Works Director while the Water Revenue Manager would report to the Administrative Services Director. It is expected that while the Directors may not handle day-to-day tasks for the utility, they would provide overall management, assist in major decision-making and oversee strategic and long-term planning.

Many of the functions required for the water utility, particularly within the administrative and general function, can be carried out with existing City departments and staff. Because those functions are needed for other City responsibilities, it is best to use the existing expertise for efficiency, coordination and consistency. Those functions will be referred to as Shared Services within this report. The City currently conducts an overhead allocation of these various Shared Services to different departments and the water utility will be included in this allocation at the time of initial operation. As noted above, the Engineering Review and the Financial Analysis both included costs to reflect the overhead allocation of administrative costs.

The following chart presents how the new managers will fit within the existing City organizational structure. The two new manager positions are shown in blue. Various Shared Services are also included in the chart.

Figure 1
Proposed Management Structure



1. Legal, Human Resources, Media & Communications, Marketing
2. Engineering, Conservation
3. Accounting, Budgeting, Finance, Collections, Purchasing, Payroll, IT

Note that the organization structure and responsibilities of new staff are shown in the more detailed sections for the Water Operations Tasks and Administrative and General Tasks.

Start-Up/Transition Issues

There are many tasks that need to be completed prior to initial operation of the new water utility. While the ongoing responsibilities of the utility have been addressed, this section addresses those items that need to be completed between now and 2020. There are three separate periods to consider as they each have different requirements.

Tasks/Staffing for 2012-2016 Period

The primary tasks between now and the beginning of 2016 are to continue the evaluation and planning for the new utility, as well as develop and sign the acquisition agreement with SPU. These tasks are being overseen by the Public Works Director, with assistance from other City departments as appropriate. The feasibility and public process is occurring in 2012 to enable the City Council to make a final determination on whether to proceed with finalizing the SPU agreement.

Once that takes place, the details within the final agreement will all need to be negotiated with SPU with final approval required from the City Council. At the same time it is expected that the wholesale water contract will be negotiated with SPU and approved together with the acquisition agreement.

During this period, Shoreline, SPU, and the SPU wholesale customers supplied through the Shoreline system will need to review existing wholesale contracts and any changes necessary to continue to provide wholesale service to these customers through Shoreline.

Once the agreements are signed, the majority of the preparatory work will not be required until the 2016-2020 period. The City will, however, want to take the upcoming water utility needs into account when planning for other City departments that will be impacted. Also, preparation for the Ronald Wastewater assumption in 2017 will also need to take into account the future water utility, especially in terms of the proposed new maintenance facility that will eventually house the water utility operations department as well as the surface water, streets and new wastewater operating departments.

Tasks/Staffing for 2016-2020 Period

Starting in 2016, the utility will have four years to complete more detailed planning, design work, construction, and other preparations for the new utility. The first two years will consist of the planning phase while the second two years will include the construction and implementation.

The separation and upfront facilities will require a final determination of what is needed along with engineering and design of the facilities. This includes the separation requirements, metering, storage tanks and pump station equipment. Most of the engineering & design work would be completed and approved by DOH by 2018 in order to have time for construction before 2020.

In order to begin the purchasing of equipment and construction, the City will need to arrange financing for the various upfront projects, along with the acquisition cost. This may be completed with short-term construction loans that would be rolled into the acquisition cost when revenue bonds are issued. It may also be accomplished by issuing bonds that capitalize the payments and interest during the construction period, with payments starting at the time of initial operation. The City will need to assess what the best option is and then ensure the funds are available when needed.

Also during this period the City would need to develop a Comprehensive Plan for approval by the Department of Health (DOH). As DOH approval would be needed for the facility designs, the Comprehensive Water System Plan should be agreed to by DOH no later than 2018. The development of the plan would be overseen by City staff but could likely be completed by an engineering firm. Until decisions are made on outsourcing vs internal staffing, facilities needed and operating procedures, this plan cannot be finalized. It would be necessary, however, to have plan approval prior to the beginning of construction.

After design is complete and financing secured, the construction can begin. This is likely to occur during 2018 and 2019. At the same time the City can begin major purchasing for the SCADA system, billing system and heavy equipment needs. Tool, materials and supplies can be purchased in the latter half of 2019 as the lead time is not as great.

During 2018 the City should also solicit bids for outsourcing any functions that might be appropriate. There needs to be time to evaluate alternatives and negotiate contracts well in advance of operations. This would be completed by existing City staff. Outsourcing would be considered only if it is both cost-effective and provides the desired level of service. A decision is needed prior to any hiring of staff.

For those functions where outsourcing is not chosen, staffing will begin sometime during the 2018-2019 period, with the Water Utility Manager being the first staff member hired. The Manager can then help oversee the construction projects, purchasing, hiring of remaining operating staff and training. The Revenue Manager could be hired a little later in the process, but still in advance of the initial operation to allow for hiring of customer service staff, training and setting up policies and procedures.

In the final months before initial operation, the City may want to have staff that has been hired to shadow the crews at SPU, assuming SPU concur. At the same time the billing should be set up and run parallel to SPU to ensure that it is working properly. Transferring of information from SPU will also need to occur at this time and through the initial operation date.

The City will need to develop a public communication plan prior to initial operation to inform customers of the changeover in service, provide information about the new utility, promote a positive image for the new utility, and to provide all the necessary signage, advertising and informational brochures. Distribution of information will most likely be through bill stuffers in the

SPU bills leading up to the change, as well as through the City's own resident mailings (i.e. "*Currents*").

Initial Operation Period (2020-2021)

When starting up a new utility, DOH will require a Satellite Management Agency (SMA) be responsible at the initial operating date. That could mean either hiring some other water utility with SMA authority to be responsible for daily operations, or Shoreline may be able to become a SMA itself by hiring certified operators and applying for SMA status with DOH. For the first year of operation, the City may also want to have an agreement with SPU to provide assistance and further training of staff to ensure a smooth transition.

Overview of Timeline

The following table summarizes the timeline associated with the transition and the tasks that need to be completed during different time periods.

Table 2 *Proposed Water Acquisition Timeline*	
2011 November	Verbal agreement to Purchase SPU Water Assets
2012 January – June July November	Engineering Review, Financial Analysis, Business Plan Steering Committee Meetings/Recommendations Shoreline/Seattle Agreement Advisory Vote on Acquisition
2013 January – December	Execute Contract for Acquisition.
2016-2017	Planning & Engineering for Separation and Upfront Capital Projects Evaluate Outsourcing vs Internal Staffing for Various Tasks Develop and Finalize Comprehensive Plan Arrange Financing for Separation and Upfront Capital Projects
2017 October	Acquisition of Ronald Wastewater District Complete
2018-2019	Purchase and Construction of Separation and Upfront Capital Projects Hiring and Training of Staff Purchasing of Tools, Equipment, Materials and Supplies Shadowing of Staff and Billing Functions Execute Wholesale agreement at time of “closing” 12/31/2019
2020 January	Complete Acquisition and Begin Operations

Wholesale Water Contract

Water supply for the new water utility is one of the largest cost items forecast for the utility and reflects about one-third of the annual cost of the utility. Water resources are not part of the assets to be acquired by the City and the City must enter into an agreement for wholesale water supplies to meet customer needs.

Overview of Regional Water Supply Sources

Currently all Shoreline residents are supplied by SPU's water resources, either through direct service from SPU or from service through the Shoreline Water District, which purchases wholesale water from SPU. While SPU is the obvious source for purchasing water on a wholesale basis once the City forms the new water utility, it is important to understand the overall water resource situation in the region and to determine if any alternatives to SPU exist.

SPU, the City of Everett and Tacoma Water are the three primary water suppliers in the region. Each serves its own large service area, as well as providing water on a wholesale basis to many smaller distributing utilities or purveyors. Some of the smaller utilities have groundwater wells to supply some or all of their water needs, however, this is not considered a viable option for the City's water supply.

SPU uses the Tolt River at the north end of its system and the Cedar River at the south end of the system to serve much of western King County. The City of Everett uses the Sultan River and Spada Lake to serve much of Snohomish County. Tacoma Water uses the Green River and substantial groundwater supply to serve a number of surrounding communities in Pierce County as well as some utilities in South King County. Figure 2 provides an overview of the water sources in the region. Figure 3 provides the boundaries for many of the water utilities in the region. The figures were taken from the Water Supply Forum report.

According to the report, water supplies in the region are adequate to meet all water needs in the region through the year 2050 under all scenarios considered. Under some of the scenarios, supplies are adequate through 2060. Specific conditions, such as growth beyond current projections or failure to adaptively manage the impact of climate change could result in shortages before 2050. Water supply projects to meet water shortages have been identified.

Figure 2
Major Water Supply Sources

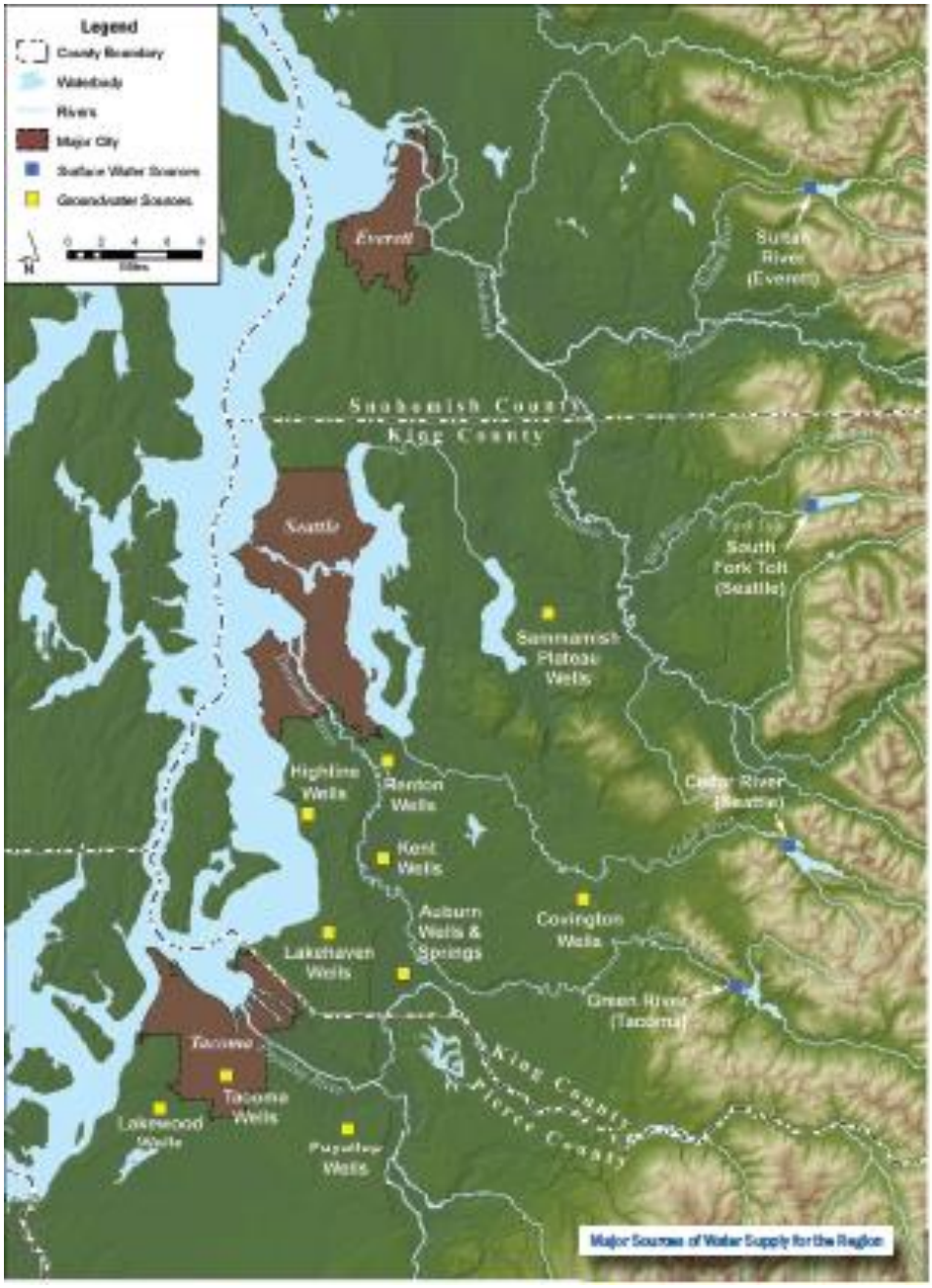
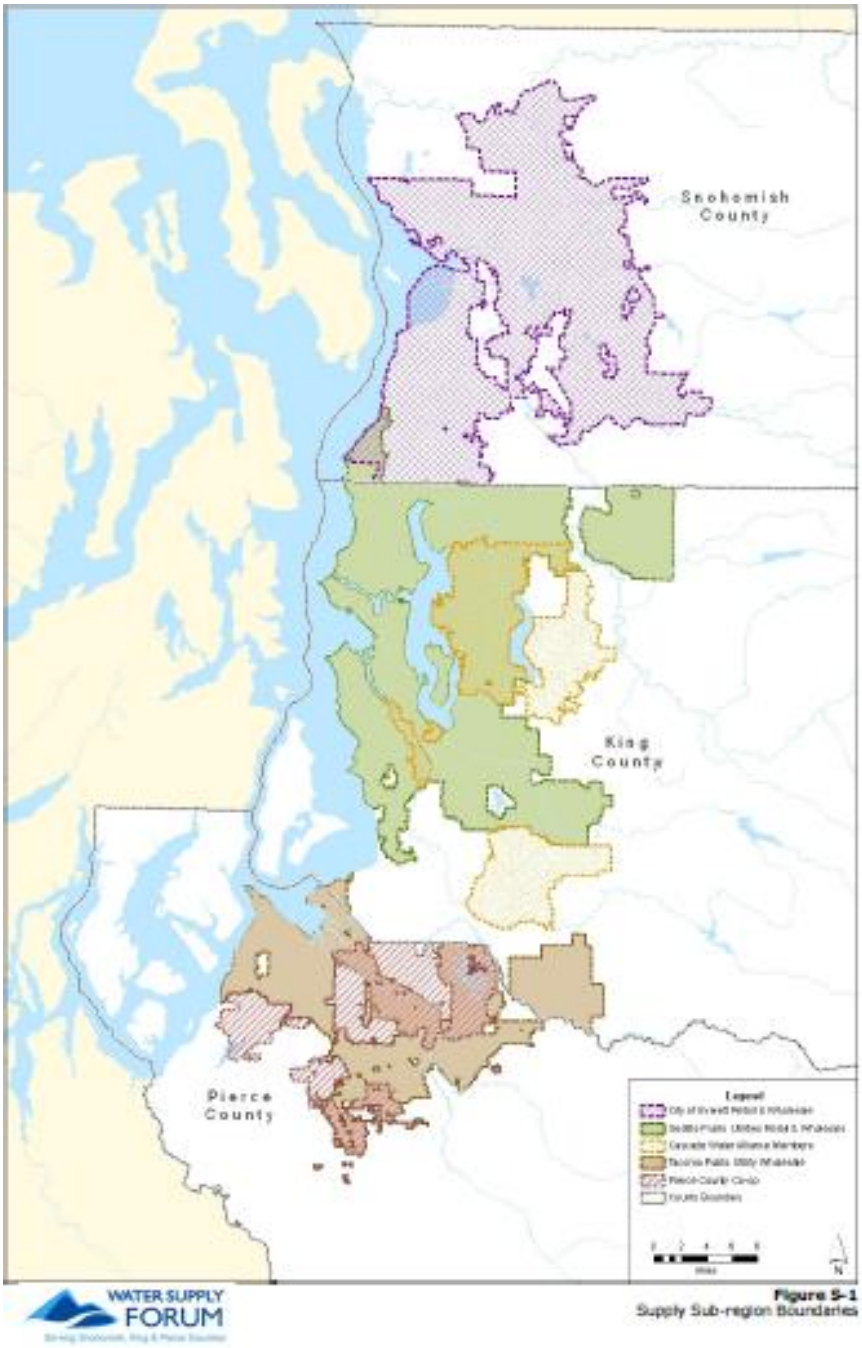


Figure 3
Supply Sub-Regions



In addition to SPU there are potential alternative sources of water supply, however, there is no transmission in place to transmit the water to Shoreline at the present time. The Cascade Water Alliance (CWA) is a wholesale purchaser from SPU but has some available water supply. They have not scheduled development of a long-term permanent supply but water rights have been obtained. Transmission to Shoreline may be problematic with this alternative supplier. The City of Everett has obtained a substantial water right from a local mill but the development of this water source has not yet been scheduled. The City of Everett has not yet declared its intent for the use of this water right. Again, transmission would also be problematic.

Wholesale Water from SPU

SPU is a wholesale provider to 25 other utilities, including the Cities of Bellevue, Bothell and Edmonds, the Shoreline Water District, the Olympic View Water & Sewer District, the Lake Forest Park Water District and the Northshore Utility District. SPU sets wholesale rates using a cost of service study and rates are standardized and publicly available.

SPU is a highly professional utility with a strong water quality ethic. They are a skilled operator on a large scale with sound short and long range planning. They provide high quality sources of supply and have adequate water availability beyond 2050. On the other hand, the utility can be politically driven and they have a strong negotiating position in terms of water supply.

As Shoreline residents are already served by SPU, there is no question about the adequacy of water supplies for wholesale use by the City as the acquisition does not change the amount of water needed. It just changes the water supply from retail to wholesale service.

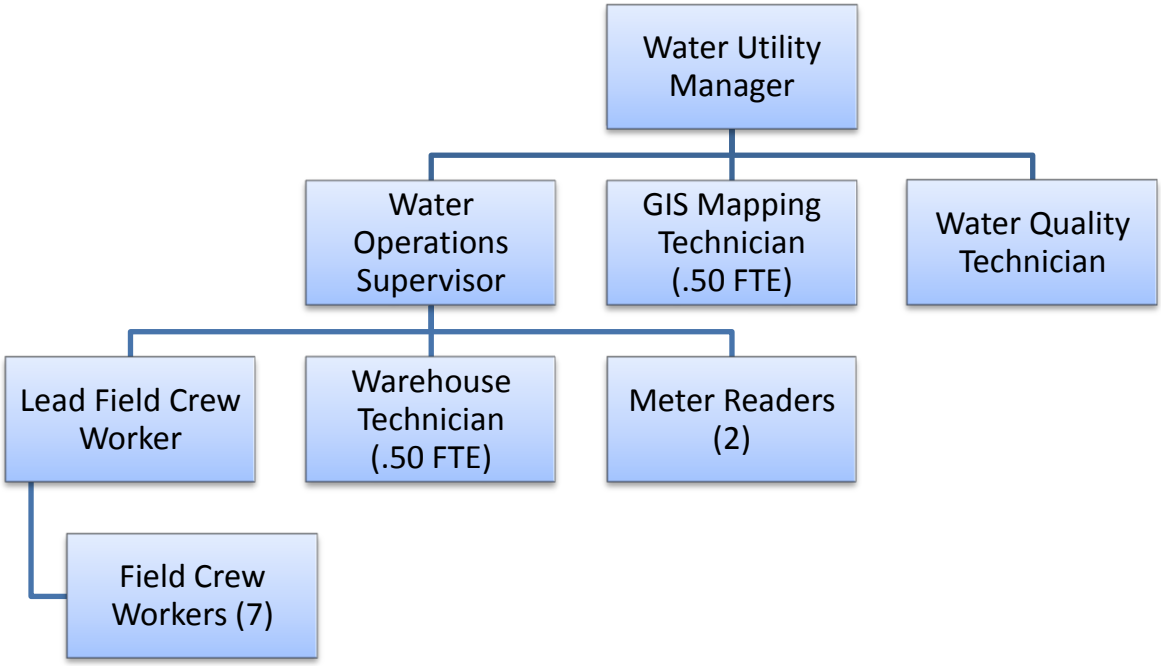
A standard wholesale contract is used by the majority of SPU's wholesale water customers and SPU has indicated the City would be served under that standard contract and would consider additional clauses for provision of access to SPU system storage where needed. For example, the SE area will have to rely entirely on SPU's storage (having none of it own), and the area to the west of I-5 may also need access to some SPU storage in order to have sufficient standby storage and emergency backup.

Engineering and Operations

Most of the new employees needed for the water utility will work on the operations side. This department will be managed by the Water Utility Manager, reporting to the Public Works Director (PWD). The operations tasks required for the new utility are not currently performed by existing City departments, however, there may be some overlap and cross-training between the existing City staff with further gains through the Ronald Wastewater assumption when that occurs.

The following figure represents the proposed organizational structure for the new operations staff. While the City is assuming it will hire staff for these tasks in developing its plan, operations is an area that could be outsourced in whole or in part on a short-term or long-term basis. The evaluation and review of outsourcing options for some or all of these functions is appropriate to consider closer to the date of operation.

Figure 4
Organizational Structure for Operations Side



It is expected that the operations staff will be located at a new 29,000 square-foot maintenance facility that will accommodate the water, wastewater and surface water and streets operations. This facility can be built at an existing 3-acre site owned by the City, or at another similar sized site owned by King County, but negotiating with the City for ownership.. The facility will be sufficient for the expected staff as well as all necessary heavy equipment, rolling stock and parts inventory. The facility will also house the Public Works maintenance yard.

Oversight of the wholesale water purchase contract will be the responsibility of the Water Utility Manager. Bills will need to be reviewed for accuracy and data will need to be provided to SPU as requested to meet the terms of the contract. The rate setting process will also need to be reviewed when SPU proposes to change wholesale rates.

Planning responsibilities will also fall to the Water Utility Manager, with assistance as needed from water operations staff and the existing Engineering Department, currently reporting to the PWD. This includes planning for routine CIP, large projects and the mains replacement program. It is expected that outside engineering assistance may be needed for larger projects. One key planning requirement is the completion of a Comprehensive Plan on a periodic basis, as required by the Department of Health. In addition, other plans, such as an emergency response plan, hazard mitigation plan etc. may have to be completed. This will be overseen by the Water Utility Manager, however, it is likely to be developed by an outside engineering firm that specializes in such plans.

A Supervisory Control and Data Acquisition (SCADA) system is included in the upfront capital costs and will be operated by new staff. The system is expected to be more automated than SPU's current system and should be designed to alert assigned staff to any system alarms. It will also be connected to facilities to allow for communications to and from facilities to facilitate operations. The SCADA system will be purchased shortly before initial system operations and the City will be able to take advantage of any technological improvements within the next eight years.

The GIS Mapping Technician will maintain GIS data used to assist in both planning and operations.

The routine operation, maintenance, installation and replacement of water system infrastructure will be performed by the Water Operations Supervisor and the 8 field crew workers. In addition, the City will need to develop mutual aid agreements with nearby water utilities to ensure adequate coverage in the event of an emergency. SPU has agreed to consider such an agreement.

Meter reading will be performed by two meter readers. Data collected by the meter readers will be forwarded to the billing department for bill processing.

While purchasing is expected to be done through the City's existing purchasing department, the Warehouse Technician will handle material management of equipment and supplies.

Water quality testing will be performed by the new water quality technician. This includes routine bacteriological and chlorine residual sampling, as well as other organic and inorganic samples required by the EPA. Sampling will also be required in conjunction with new construction projects to check for contamination. Samples will need to be processed by a certified laboratory.

While most of the identified operations tasks will be completed by the new water utility staff, engineering and conservation planning will fall to existing departments in the City that report to the PWD. Engineering is mentioned above and is primarily related to the planning process. Water conservation activities can likely be performed through the *Saving Water Partnership*, which is an organization of SPU and other water utilities buying wholesale water from SPU. The partnership works together to provide education and other conservation measures to water customers.

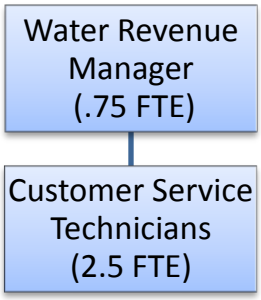
In addition to the tasks performed by water operations staff or existing City departments, there are some cases where it will be appropriate to hire outside services. Some of the services likely to be contracted for include SCADA maintenance and modifications, cathodic protection system maintenance and modifications, extraordinary maintenance, locating, main tapping, and large meter maintenance.

Administrative and General

The water utility will require a significant number of administrative functions that cover a broad spectrum of expertise ranging from accounting to communications. While the water operations side will require a significant number of new employees, the administrative side will be primarily supported by existing City departments.

The management of the administrative functions will include a new Water Revenue Manager, reporting to the Administrative Services Director. Three employees will report to the Water Revenue Manager, who is expected to devote .75 FTE to the water utility, with the remaining time devoted to the wastewater utility or other City functions. It is expected that the three new staff will also provide some support of the wastewater or other City functions, resulting in 2.5 FTEs assigned to the water utility. The reporting structure is relatively simple, as shown in Figure 5.

Figure 5
Organizational Structure for Administrative Side



The new staff will be responsible for customer service. Technicians will be available to assist customers in person and by phone with issues related to billing, new service (connections and permits) as well as accepting payments. Staff will be located at City Hall to provide the best access and visibility to customers. Outsourcing of customer service is not a viable option.

Billing is also a new function and the plan is to rely on the new staff for implementation. Water billing will be coordinated with surface water utility and wastewater utility billing. Whether or not a new billing system will be needed at the operation date will depend on the circumstances at the time. The City would gain a billing system with the Ronald wastewater assumption, however, whether that system will be optimal will need to be considered in the future. Considerations for a billing system will be the ability for billing of multiple services, integration with the City's other IT systems, and technological advances.

The other administrative and general functions will be provided through the Shared Services from the City. It has been assumed that an estimated $1.1 million will be assigned to the water utility to cover the labor, rent, materials and overhead associated with these functions in the base case financial assumptions. There may be some cases where the City will need to expand

staffing to accommodate the extra work resulting from the water utility in the area of Shared Services which has been taken into account in developing the $1.1million estimate.,. Many of the Shared Services required are for departments reporting to the Administrative Services Director (ASD). A few of the departments needed report to the City Manager.

All tasks related to accounting, collections, financial reporting and financing will be completed by departments within the City and reporting to the ASD. These functions are already needed for City operations are will be kept in house. Long- and short-term projections of sales, revenues and costs will be needed. For the issuing of the revenue bonds to finance the acquisition, it is expected that existing staff will work with outside bond counsel to facilitate the financing process. The analysis required for rate setting will be coordinated by the Revenue Manager and the appropriate City staff, with outside consulting services as needed.

Budgeting will be completed by the appropriate water staff and integrated with the City's total budget by existing City staff. IT services will also be provided by the City and will integrate the billing and accounting functions as needed. Other miscellaneous functions to be provided are collections, purchasing and payroll. All of these functions fall under the ASD.

Other Shared Services fall within departments reporting to the City Manager. This includes Human Resources, which will be required to facilitate hiring, manage benefits and coordinate training programs. Legal assistance also falls in this category. The third function in this category is communications, which encompasses media relations, marketing and public relations. It is expected that there will need to be a major effort in communication surrounding the operation date to ensure that new customers are aware of the change in service and are provided with all of the necessary information related to the change.

Conclusion

This preliminary Business Plan has been developed to address how the tasks and responsibilities required of the new water utility will be carried out once acquired. Given the acquisition date of 2020, the City has eight years to plan for and evaluate the best options for completing each task listed in this plan. This plan is therefore a high level summary and it will be updated on a continually basis as the City moves forward towards acquisition.

EMC RESEARCH MARKET & OPINION RESEARCH SERVICES

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3857 N. High Street
Suite 302
Columbus, OH 43214
(614) 268-1660 TEL

EMCresearch.com

Overall Topline Results

Telephone Survey in the City of Shoreline

n=501; MoE ± 4.4 points

Fielded May 9 – 17, 2012

EMC Research #12-4648

Hello, my name is _____. May I speak to **(NAME ON LIST)**. Did I pronounce that correctly? Hello, my name is _____and I'm taking a survey for the EMC Research. This is not a sales or telemarketing call, it is a research study of how Shoreline residents feel about some of the issues facing them. Your answers are strictly confidential and will be used for research purposes only.

Gender

Male	47%
Female	53%

1. For statistical purposes only, what year were you born? (RECORD YEAR - VALID RANGE: 1900-1995: TERMINATE **>= 1995)** IF "Refused" ==> "Are you age…" **(READ RESPONSES)**

2. [AGE - CODE AGE FROM PREVIOUS QUESTION]

18 to 24	7%
25 to 34	11%
35 to 44	17%
45 to 59	32%
60+	33%

3. Do you feel things in the City of Shoreline are generally going in the right direction, or do you feel things have gotten pretty seriously off on the wrong track?

Right direction	74%
Wrong track	13%
(Don't know)	13%

Please rate the job Shoreline City government is doing in each of the following areas. Use a scale of excellent, good, only fair or poor. If you aren't sure one way or the other, please just say so.

[BEFORE EACH UNTIL UNDERSTOOD: How would you rate (Insert QX)? [PROMPT IF NECESSARY: Would you say it is excellent, good, only fair, or poor]

SCALE: 1. Excellent 2. Good
3. Only fair 4. Poor
5. Don't Know/Not sure 6. (DO NOT READ: Not Applicable/NA)

[RANDOMIZE]

SCALE:	Excellent	Good	Only fair	Poor	Don't know/ Not sure	(Not Applic-able)	Pos.	Neg.	*Net Pos.*
4. the job the City is doing overall	13%	57%	21%	4%	4%	0%	**71%**	**25%**	***+46%***
5. the job the City is doing managing the public's money	11%	33%	24%	7%	23%	1%	**44%**	**32%**	***+12%***
6. the job the City does keeping citizens informed	21%	48%	19%	6%	5%	1%	**69%**	**26%**	***+43%***
7. the job the City does delivering services efficiently	18%	50%	17%	4%	11%	0%	**68%**	**21%**	***+47%***
8. the job the City does focusing on the priorities that matter most to residents	10%	41%	24%	7%	18%	0%	**51%**	**31%**	***+20%***

[END RANDOMIZE]

9. From what you know, who provides your water service? **(DO NOT READ LIST)**

Seattle Public Utilities or SPU	38%
Ronald Wastewater District	18%
Shoreline Water District or SWD	18%
The City of Shoreline	2%
Shoreline	1%
Other	2%
Not sure/ Don't know	21%

I'm going to read you a list of utilities and I'd like you to rate the job they do providing services. Use a scale of excellent, good, only fair or poor. If you aren't sure one way or the other, please just say so.

[BEFORE EACH UNTIL UNDERSTOOD: How would you rate the job (Insert QX) does providing services?]

[PROMPT IF NECESSARY: Would you say it is excellent, good, only fair, or poor]

[RANDOMIZE]

SCALE:	Excellent	Good	Only fair	Poor	Don't know/ Not sure	(Not Applic-able)	Pos.	Neg.	*Net Pos.*
10. Seattle Public Utilities or SPU	13%	48%	16%	1%	19%	3%	**61%**	**17%**	***+44%***
11. Shoreline Water District or SWD	12%	42%	10%	2%	32%	3%	**54%**	**12%**	***+42%***
12. Ronald Wastewater District or RWD	15%	56%	10%	4%	13%	1%	**72%**	**14%**	***+57%***
13. Century Link	3%	16%	11%	6%	59%	6%	**18%**	**17%**	***+2%***
14. Seattle City Light	24%	53%	14%	5%	3%	0%	**77%**	**19%**	***+58%***
15. Comcast	9%	35%	22%	16%	17%	2%	**44%**	**37%**	***+7%***
16. City of Shoreline Storm Water Utility	10%	38%	10%	4%	35%	2%	**49%**	**14%**	***+34%***
17. Frontier Communications	4%	17%	9%	5%	59%	6%	**21%**	**14%**	***+7%***

[END RANDOMIZE]

18. SPU, or Seattle Public Utilities, currently provides water service to Shoreline residents who live in the area west of I-5, which is about two thirds of the City. Shoreline has reached a tentative agreement to purchase the Seattle Public Utilities Water System. Under the agreement, the city would own and operate the SPU water system for customers in Shoreline.

    In general, do you support or oppose having the City of Shoreline purchase the SPU water system in Shoreline? (IF SUPPORT/OPPOSE) And would that be strongly (SUPPORT/OPPOSE) or somewhat (SUPPORT/OPPOSE)?

		TOTAL
Strongly Support	23%	**51%**
Somewhat Support	28%	
Somewhat Oppose	7%	**17%**
Strongly Oppose	9%	
(Don't know)	32%	**32%**

(IF Q18=1 OR 2, ASK Q19; IF Q18=3 OR 4, ASK Q20; IF Q18=5, SKIP TO Q21-Q28)

19. What is the main reason you **SUPPORT** the purchase? (TAKE ONE RESPONSE)

Local Control/City Control/Accountability	34%
Lower cost/taxes/rates	19%
Better Job/Service	12%
Good idea	9%
Independence	3%
Economical/Efficient	2%
Better maintenance	1%
Other	9%
No/None/Nothing	2%
Don't know/Not sure	8%
Refused	0%

(SKIP TO Q21-Q28)

20. What is the main reason you **OPPOSE** the purchase? (TAKE ONE RESPONSE)

Cost/Taxes	32%
Like it the way it is	24%
Better Service/Quality	14%
Don't trust Shoreline/Government	9%
Spend Money Else Where	4%
Other	11%
No/None/Nothing	3%
Don't Know/Not Sure	4%
Refused	0%

(RESUME ASKING EVERYONE)

Now I am going to tell you a little more about the City's proposed purchase of SPU's water system. For each statement, please tell me how important it is to know that information. Use a scale of 1 to 7, where 1 means that information is not at all important and 7 means that information is extremely important. You can use any number from 1 to 7.

(**REPEAT AFTER EACH UNTIL UNDERSTOOD:** How important do you think it is to know that information, with 1 being not at all important and 7 being extremely important?)

(RANDOMIZE)	Not at all 1	2	3	4	5	6	Extremely 7	DK	Mean
21. Purchasing this system will give the City of Shoreline and its citizens direct control over water utility service instead of relying on Seattle's public utility to look out for our interests.	7%	2%	2%	8%	17%	21%	40%	3%	**5.41**
22. No increase in taxes or water rates will be required to purchase the system. It will be paid by bonds, which are repaid by the revenue generated from providing water service. The Shoreline City Council has set a requirement that it will only purchase the system if the operating costs result in rates that are equal to or lower than the SPU rates.	4%	2%	2%	4%	13%	18%	55%	3%	**5.85**
23. Shoreline customers of SPU currently pay a 14% water rate surcharge for living outside Seattle's city limits as well as a 15% utility tax, which goes to the City of Seattle's general fund. If the City of Shoreline operated water utility services, Shoreline ratepayers would no longer pay a tax to the City of Seattle & their money would no longer go towards subsidizing lower rates for other SPU customers.	5%	2%	2%	5%	10%	17%	54%	4%	**5.69**
24. Owning the water system means Shoreline can use revenues to reinvest in the system for things that Seattle Public Utilities isn't focused on, like infrastructure improvements to help improve Shoreline's commercial districts and increase water flow for firefighting purposes throughout the City.	5%	1%	3%	6%	18%	23%	41%	3%	**5.56**
25. Owning the water system locally means the City will pay more attention to maintaining it than SPU does now. We can improve the longevity and quality of our system based on our own needs.	6%	2%	3%	6%	17%	21%	40%	3%	**5.40**
26. The City of Shoreline would be able to run the Water Utility more efficiently by sharing the City's existing equipment and administration functions.	5%	2%	4%	10%	24%	22%	28%	5%	**5.09**
27. Owning the water utility would make permitting easier, cheaper and quicker. People will be able to work just with the City of Shoreline instead of having to go to multiple government entities for permits.	6%	2%	4%	7%	19%	20%	39%	3%	**5.36**
28. Future decisions about water rates will be made by Shoreline's elected officials instead of elected officials in Seattle.	6%	1%	5%	6%	15%	21%	43%	3%	**5.45**

(END RANDOMIZE)

29. Given what you have heard, would you support or oppose having the City of Shoreline purchase the SPU water system in Shoreline? (IF SUPPORT/OPPOSE) And would that be strongly (SUPPORT/OPPOSE) or somewhat (SUPPORT/OPPOSE)?

		TOTAL
Strongly Support	53%	**79%**
Somewhat Support	26%	
Somewhat Oppose	4%	**10%**
Strongly Oppose	6%	
(Don't know)	11%	**11%**

30. As you may know Ronald Wastewater District or RWD provides 100% of the sewer service for Shoreline residents. The City has an agreement in place with RWD to acquire sewer services in 2017 so the City is already planning to create the capacity to manage and operate the wastewater system. This means that if the City acquires the SPU water system, many of the resources necessary to manage and operate the water system will already be in place. Knowing this, would you support or oppose having the City of Shoreline purchase the SPU water system in Shoreline? (IF SUPPORT/OPPOSE) And would that be strongly (SUPPORT/OPPOSE) or somewhat (SUPPORT/OPPOSE)?

		TOTAL
Strongly Support	49%	**78%**
Somewhat Support	29%	
Somewhat Oppose	3%	**8%**
Strongly Oppose	5%	
(Don't know)	14%	**14%**

Finally, I'd like to ask you a few questions for statistical purposes only.

31. Do you own or rent the place in which you live?

Own/(Buying)	77%
Rent	19%
[Don't know/NA]	4%

32. How many years have you lived in the City of Shoreline?

< 5 years	14%
5-10 years	20%
11-20 years	27%
21-30 years	17%
31-40 years	8%
41-50 years	5%
50+ years	8%

33. Do you have a cell phone or not?

Yes	83%
No	15%
(Refused)	1%

[IF Q33=2 RESPONDENT DOES NOT HAVE CELLPHONE SKIP TO END]

34. How much do you rely on your cell phone? Would you say you rely on your cell phone **[READ RESPONSES]**

All the time - it's your only phone	18%
A great deal - it's your primary phone	27%
Some - you use it occasionally	24%
Very little - you mostly have it for emergencies	28%
(Don't know)	0%
(Refused)	2%

THANK YOU!

DRAFT

Judi Gladstone
SPU, supporting negotiations of agreement to sell assets in the City of Shoreline, RES
May 29, 2012
Version #1

RESOLUTION _____

A RESOLUTION supporting the sale of certain water system facilities and transfer of a portion of retail water service to the City of Shoreline.

WHEREAS, Seattle owns and operates certain water system facilities for the distribution of potable water to retail customers within a portion of the corporate limits of the City of Shoreline; and

WHEREAS, the City of Shoreline desires to establish its own municipal water utility, which requires its City Council to adopt an ordinance that specifies the proposed plan and the estimated costs, which is then submitted to voters for ratification or rejection, which they intend to do for the November 2012 election; and

WHEREAS, the City of Shoreline and Seattle Public Utilities have been discussing a sale of certain water system facilities owned by Seattle and a transfer of responsibility for retail water service currently provided by Seattle within a portion of the City of Shoreline to the City of Shoreline for its purposes in operating its own municipal water system; and

WHEREAS, the City of Shoreline has requested an expression of support for the sale of facilities and transfer of service responsibilities; NOW THEREFORE,

BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF SEATTLE, THE MAYOR CONCURRING, THAT:

Section 1. Seattle supports the sale of certain water system facilities and transfer of responsibility for water service to the City of Shoreline in 2020 in the area defined as City of Shoreline retail water service area and shown on Exhibit A, attached and incorporated herein ("Transfer Area") with the understanding of the following major terms:

1. The base purchase price for the water system facilities and related real property owned in fee will be $26.6 million to be paid prior to transfer in 2020, which may be adjusted

according to the terms of any final agreement to address certain changes in circumstances, including but not limited to, additions or deletions to the inventory of water system facilities or real property included in the base purchase price due to operational needs in the Transfer Area up to the date of transfer.

2. Seattle and City of Shoreline will agree to a separation plan that will require capital improvements to allow the Seattle retail distribution system to operate independently of any newly created City of Shoreline retail distribution system and agreement by City of Shoreline to incur all costs associated with the separation plan, including costs incurred by Seattle.

3. City of Shoreline will agree to reimburse Seattle for costs incurred in processing the sale and transfer, e.g. data transfer, customer notices, etc, on a time and materials basis.

4. Seattle and City of Shoreline will enter into an agreement for Seattle to provide water supply to City of Shoreline as a wholesale water customer from the closing of the sale through 2062.

5. City of Shoreline agrees to grant a new franchise for Seattle's remaining water system facilities within the City of Shoreline through 2062, which will include substantially similar provisions for utility protection and relocation as the current franchise.

6. Any final agreement will be subject to a public hearing and adoption by ordinance of the Seattle City Council.

Adopted by the City Council the ____ day of _____, 2012, and signed by me in open session in authentication of its adoption this_____ day of _____, 2012.

_____

President _____of the City Council

THE MAYOR CONCURRING:

_____

Michael McGinn, Mayor

Filed by me this ____ day of _____, 2012.

_____

Monica Martinez Simmons, City Clerk

(Seal)