



City of Lacey, Washington

Lacey City Council Worksession Agenda

Refer to the bottom of the agenda for meeting information.

Thursday, October 26, 2023

6:00 PM

Council Chambers and Online

1. Call to Order

2. Roll Call

3. Land Acknowledgement

We, the City of Lacey, are on the ancestral land of the Tribal People of the Treaty of Medicine Creek, including the Nisqually Indian Tribe and Squaxin Island Tribe. We acknowledge, and remember those Tribal People not recognized today who were absorbed or relocated into other tribes for survival. We recognize the ancestors and their descendants who are still here. We recognize and respect the Tribal People of the Treaty of Medicine Creek as the traditional stewards of this land since time immemorial and their role today in taking care of these lands in perpetuity. We recognize and have the responsibility to call attention to the histories of dispossession, forced removal, and abridged treaty rights that allowed our nation, state, and city to develop as it has today. We recommend that community members read the Medicine Creek Treaty of 1854.

4. Approval of the Agenda

5. Agenda Items

A. Water Systems Plan

Brian McAllister, Utility Engineer

B. Public Records Training and Summary Report

Jeff Myers, Attorney, Law, Lyman, Daniel, Kamerrer & Bogdanovich P.S.

Elissa Fontaine, City Clerk

C. Quasi-Judicial Process

Jeff Myers, Attorney, Law, Lyman, Daniel, Kamerrer & Bogdanovich P.S.

6. Adjourn

Meeting Information:

Attendance (Remote or In-Person)

The public may attend the meeting in-person, or you may view or listen to the meeting using one of the following platforms:

In-Person: Council Chambers at Lacey City Hall
420 College Street SE, Lacey, WA 98503

Zoom: <https://us02web.zoom.us/j/85188268703>

Website: <https://cityoflacey.org/government/public-meetings/>

Facebook: <https://www.facebook.com/cityoflacey>

YouTube: <https://www.youtube.com/watch?v=qck44o2K0Zs>

Phone: (888) 788-0099 or (877) 853-5247 (Webinar ID 851 8826 8703)

Verbal Public Comment

Verbal public comment is not scheduled for Worksessions. Verbal public comment may be provided at Regular City Council Meetings. Regular Council Meetings are held the first and third Thursdays of the month.

Written Public Comment

Public comments may be submitted for Worksessions by email to PublicComment@ci.lacey.wa.us. The commenting period will close two hours before meeting time. Written comments will be provided to the City Council electronically prior to the Worksession meeting. Comments will not be addressed during the Worksession meeting; however, comments received will be added to the official record.





LACEY CITY COUNCIL WORKSESSION

October 26, 2023

SUBJECT: City of Lacey Water System Plan

RECOMMENDATION: Authorize Public Works Water Resources Staff to submit the Draft Water System Comprehensive Plan to the Washington State Department of Health for review and approval.

STAFF CONTACT: Rick Walk, City Manager *RW*
Scott Egger, Public Works Director *SE*
Peter Brooks, Water Resources Manager *PCB*
Ed Andrews, Water Supervisor *EA*
Brandon McAllister, Utility Engineer *BM*

ORIGINATED BY: Public Works Department

ATTACHMENTS: 1. Executive Summary of the Draft Water System Plan

FISCAL NOTE: NONE

WORK PLAN GOAL AND STRATEGY: Coordinated and Collaborative Planning

PRIOR REVIEW: Public Hearing (06/22)
Planning Commission Briefing (06/21, 04/22)
Utilities Committee Briefing (11/21)
Council Work Session Briefing (05/21)
Utility Rates Open House (09/21)

BACKGROUND:

Lacey staff and our consulting team have prepared an update to the City's Comprehensive Water System Plan (WSP). Our current Plan was approved and adopted in 2013. These plans are required by the Washington Department of Health for Group 'A' public water systems operating under their regulatory authority. The Washington Administrative Code (WAC) chapter 246-290 outlines the required elements of these plans.

The purpose of this Plan is to ensure the utility's infrastructure and operational practices are able to meet current and future needs. Developing a long-term planning strategy for the City's water service area is critical to maintaining the level of service customers expect, while allowing for continued growth of the community. Updated every 10 years, the Plan evaluates the existing water system and its ability to meet the anticipated requirements for water supply, quality, transmission, storage, and distribution over a 20-year planning period. Water system improvement projects have been developed to meet the changing demands of regulatory impacts, population growth, and necessary infrastructure repair and replacement. The Plan also identifies planning-level costs of the recommended improvement projects and forecasted operating expenses, along with a financial plan to ensure the utility's continued viability.

The Water System Plan contains the following major elements:

- **Description of the Existing System-** This includes a general description of the utility's structure and management, the local area, environment, neighboring systems, and the history of Lacey's system. It also details the system's service area, the size and type of infrastructure components, and its general configuration.
- **Policies and Criteria-** Policies in this section pertain specifically to the water utility and cover topics including service extensions, system reliability, emergency planning, fire protection, design and construction criteria, water use efficiency, operations, and finance.
- **Demand Forecast-** Using historical consumption records and applying growth projections provided by Thurston Regional Planning Council, future water demands are estimated for the next 20 years. The average daily demand is anticipated to increase from 7.7 MGD to 10.0 MGD over that time.
- **Water Use Efficiency-** In this section of the plan the amount of water produced is compared to metered sales, this is used to look for any apparent losses that cannot be accounted for. Water conservation is also discussed with a formal setting of target goals and proposed conservation measures to ensure valuable resources are being used efficiently.
- **Source Analysis and Water Quality-** This is a critical component of the plan where the City's existing water sources and water rights are evaluated to determine our actual production capacity. That is then compared against the demand forecast to evaluate the need for additional supply. Current projections show that the City has sufficient water rights for the 20-year planning horizon. Water quality parameters, regulatory requirements, and treatment needs are also discussed in detail.
- **Wellhead Protection-** This portion of the plan focuses on identifying any potential risks that may compromise the use of a water source and provides recommendations that can help minimize the risk of contamination.

- **System Analysis-** Here the City's water distribution network is evaluated to ensure adequate flow and pressure are available to all areas of the system, under existing water demands and future projections. Storage needs are also analyzed to ensure the system can adequately handle fire and/or emergency conditions.
- **Capital Improvement Program-** The CIP includes a comprehensive listing of the projects proposed to address deficiencies identified throughout the plan. This includes a mix of projects needed to address increases in growth, regulatory requirements, repair/replacement, and general system improvements totaling \$145M in the first 10 years.
- **Operation and Maintenance-** The organizational structure, including roles and responsibilities are included here. This chapter also includes summaries of how the water system is operated, various maintenance programs, and a staffing analysis.
- **Financial-** The final component of the plan evaluates the utility's financial health to ensure regular operating expenses are covered and appropriate reserves are in place. This also includes a funding strategy for the Capital Improvement Program and utility rate forecasting.

To date, City Council briefings have focused primarily on the capital improvement program, operating expenses, and revenues in order to facilitate utility rate and general facility charge adjustments in 2021 and 2022. These rate setting efforts were also accompanied by a virtual open house designed to inform the public about the proposed capital improvement program and the necessity of the projects and improvements being proposed in the draft Water System Plan.

The Planning Commission was then briefed on the Water System Plan and the documents were made available for a public comment period on the City's website with postings on the City's social media sites to alert the public to its availability and their ability to provide comment. Additionally, letters were emailed to adjacent water purveyors and other interested parties inviting them to review and comment on the draft plan; the list of recipients included:

- | | |
|--------------------|--------------------------|
| • City of Olympia, | • TRPC |
| • City of Tumwater | • Washington Water |
| • Thurston County | • Nisqually Indian Tribe |
| • TPUD | • Squaxin Island Tribe. |
| • LOTT | |

At the end of the public comment period the Planning Commission held a hearing and voted to refer the draft Water System Plan to the City Council.

The Water System Plan is now ready to be submitted to the Department of Health for their review and approval. Their initial review period is anticipated to take approximately 90

days. Once the Department of Health indicates they are prepared to approve the City's Water System Plan, Council will be asked to formally adopt the plan and Health will issue an approval letter.

RECOMMENDATION:

Authorize Public Works Water Resources Staff to submit the Draft Water System Comprehensive Plan to the Washington State Department of Health for review and approval.

Executive Summary

Authorization

On October 1st, 2018, Murraysmith, Inc. (Murraysmith) was authorized by the City of Lacey (City) to prepare this update to the City's 2013 Water System Comprehensive Plan, which received Washington State Department of Health (DOH) approval in May 2013.

Purpose and Compliance

This Water System Comprehensive Plan (Plan) has been developed in accordance with Chapter 246-290 of the Washington Administrative Code (WAC), as presented in the Washington State Department of Health (DOH) regulations for Group A Public Water Systems. The City of Lacey water system identification number is 43500Y.

The purpose of this Plan is to develop a long-term planning strategy for the City's water service area. Now updated every 10 years, the Plan evaluates the existing system and its ability to meet the anticipated requirements for water source, quality, transmission, storage, and distribution over a 20-year planning period. Water system improvement projects have been developed to meet the changing demands of regulatory impacts, population growth, and necessary infrastructure repair and replacement. The Plan also identifies planning-level costs of the improvement projects and provides a financial plan for funding the projects.

The following sections follow the outline of the chapters in the Plan and include a summary of the Introduction, Water System Description, Policies and Criteria, Water Demand Forecast, Water Use Efficiency, Source Analysis and Water Quality, Wellhead Protection, System Analysis, Capital Improvement Plan, Operations and Maintenance, and the Financial Plan.

This Plan has been developed over several years from 2018 through 2021. As such, the foundation for this Plan was developed based on information available in 2018-2019. During this period, the Lacey Water System has seen improvements to the distribution system piping, well rehabilitation, and the start of storage reservoir construction.

ES.1 Introduction (Chapter 1)

Chapter 1 introduces the purpose and need, outline of the Plan, approval process, and general information related to the water system.

ES.2 Water System Description (Chapter 2)

The City of Lacey Retail Water Service Area (RWSA) is delineated, as shown in **Figure ES-1**. It encompasses the majority of the City limits and expands into the Urban Growth Area (UGA) in accordance with the North Thurston County Coordinated Water System Plan (CWSP). The RWSA extends beyond the UGA in several areas to serve customers that were previously served by water systems that the City of Lacey has acquired. Additionally, several smaller water systems exist within the RWSA boundary that are not part of the Lacey RWSA. Adjacent purveyors to the City include the City of Olympia to the west, Thurston County PUD to the north, Pattison to the south (recently acquired by Thurston County PUD), Meadows to the east, and many other, smaller, Group A and B private water systems.

The City of Lacey owns and operates a water source, transmission, distribution, and storage system. The system serves a population of approximately 74,700 and currently consists of nine (9) pressure zones, 20 groundwater wells, approximately 430 miles of pipe, seven (7) reservoirs, six (6) booster stations, and fifteen (15) pressure reducing valve stations (PRVs). **Figure ES-2** is a water system schematic showing the City's water system facilities and pressure zones.

The study area for this plan includes the City's existing retail and wholesale water services areas, which are the same as the City's future service area. The City's retail water services area includes most of the City of Lacey's city limits, which comprises roughly 60-percent of the service area, with the remaining area located in unincorporated Thurston County.

ES.3 Policies and Criteria (Chapter 3)

The City manages its water utility in accordance with established water system policies. The policies provide a consistent framework for the design, operation, maintenance, and service of the water system for appropriately implementing programs, designing new infrastructure, and serving additional customers. The policies defined in this plan pertain solely to the water system; the City has additional land use, development, and finance policies that may specify additional requirements for development or extension of a water service.

The City's policies and criteria are summarized in **Chapter 3**, and include the following major categories:

- Service Area, Extension, and Service Ownership
- System Reliability and Emergency Management Plan
- Fire Protection
- Coordination and Cooperation with Other Agencies
- Water System Planning, Design, and Construction.
- Environmental Stewardship
- Water Use Efficiency
- Operational
- Financial

K:\TAC_Projects\18\2264 - Lacey 2019 Water System Plan\CAD\Figures\18-2264-WA-FIG Hydraulic Profile_6-24.dwg FIGURE 2.2 6/24/2021 3:11 PM TOM.HUBERT 23.0s (LMS Tech)

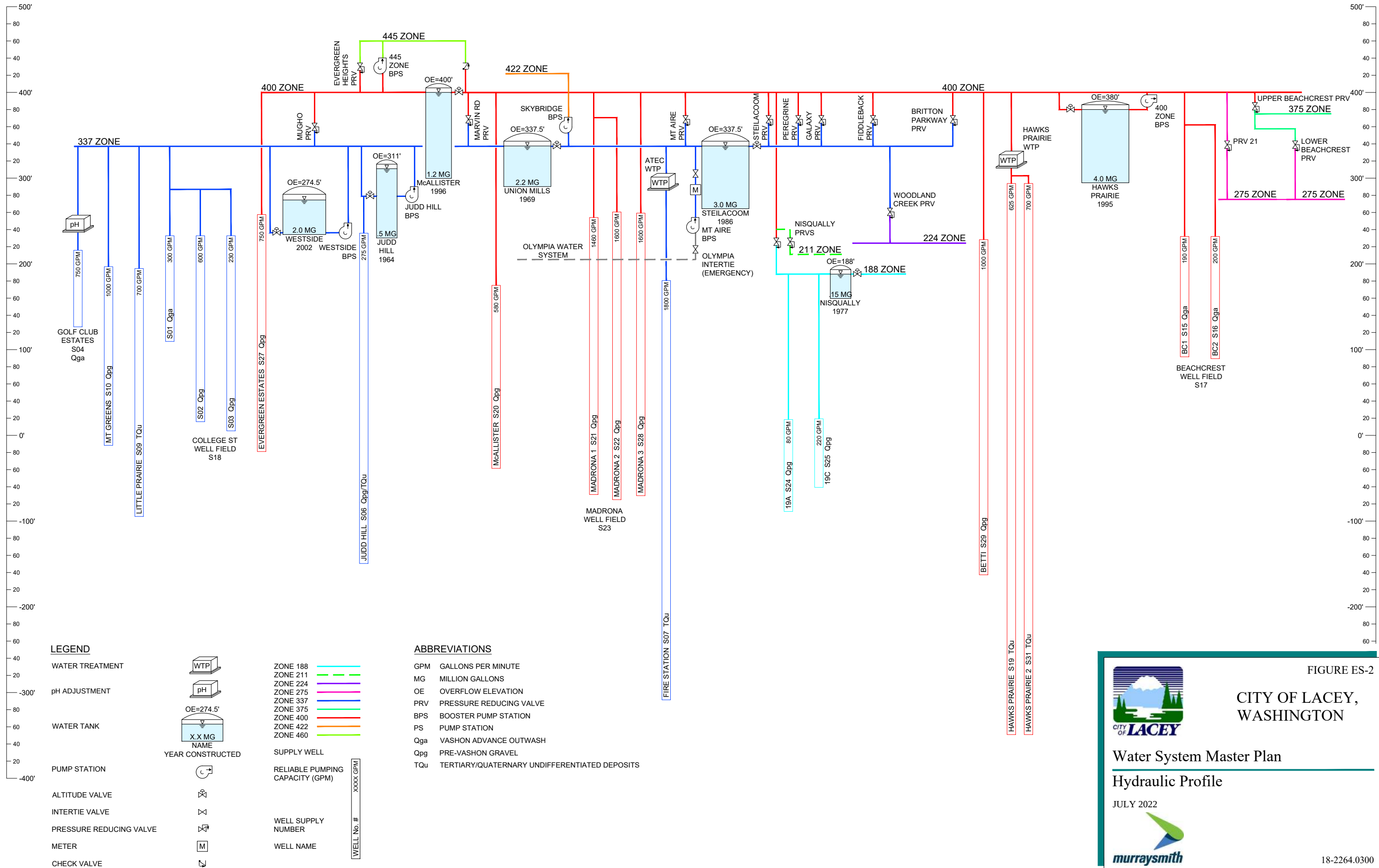


FIGURE ES-2
CITY OF LACEY,
WASHINGTON

Water System Master Plan Hydraulic Profile

JULY 2022



18-2264.0300

ES.4 Water Demand Forecast (Chapter 4)

Quantifying a realistic future water demand is necessary for planning infrastructure projects and securing adequate water supply to meet future growth. The City of Lacey's future water demand is estimated for the Retail Water Service Area (RWSA). The water demand for the RWSA is estimated based on current use and anticipated growth within the City's currently defined RWSA.

The historical average, maximum, and peak water demands are important parameters when performing system and supply analyses. For this reason, the City production data, which accounts for all water demand, was used to calculate the Average Day Demand (ADD) and Maximum Day Demand (MDD) for each year. The City tracks water use according to the following customer types: Single-Family Residential (includes domestic and irrigation), Multi-Family Residential (includes domestic and irrigation), Commercial – Domestic, Commercial – Irrigation, Commercial – Exempt, Duplex, and Mobile Home. The historical distribution system leakage was estimated from the City's historical production and consumption data. The City's average leakage from 2012 to 2018 was eight percent, down from 12-percent in the 2013 Plan.

The consumption per customer class, expressed in terms of ERUs, was used for forecasting future demand from service connections. Demand projection parameters were established to provide a reasonable prediction for future demands without being overly conservative. **Table ES-1** identifies the key demand projection parameters, and **Table ES-2** summarizes the projected ADD, MDD, and number of ERUs for each service area in the planning scenario.

Table ES-1
Demand Projection Parameters

Parameter	Planning Value	Notes
ERU Value	181	Historical 75 th Percentile
Distribution System Loss	10% of Production	DOH Criteria
Authorized Non-Revenue and Temporary Meter Use	2.9% of Consumption	Historical Maximum
MDD/ADD Peaking Factor	2.03	Historical 75 th Percentile
Peak Hour Demand Factors	System wide: 1.42 337 Zone: 1.33 400 Zone: 1.75	Historical Maximum from 2018

Table ES-2

Summarized ADD, MDD, and ERUs for Each Individual Service Area

Pressure Zone	2020	2030	2040
188			
Average Day Demand, mgd	0.09	0.10	0.10
Maximum Day Demand, mgd	0.19	0.20	0.21
ERUs	509	537	570
211			
Average Day Demand, mgd	0.00	0.00	0.00
Maximum Day Demand, mgd	0.00	0.00	0.00
ERUs	7	7	7
224			
Average Day Demand, mgd	0.03	0.06	0.08
Maximum Day Demand, mgd	0.06	0.11	0.16
ERUs	161	308	425
275			
Average Day Demand, mgd	0.06	0.07	0.07
Maximum Day Demand, mgd	0.12	0.14	0.15
ERUs	323	392	413
337			
Average Day Demand, mgd	5.32	6.19	6.97
Maximum Day Demand, mgd	10.80	12.56	14.15
ERUs	29,407	34,176	38,506
375			
Average Day Demand, mgd	0.03	0.03	0.03
Maximum Day Demand, mgd	0.06	0.06	0.06
ERUs	155	161	169
400			
Average Day Demand, mgd	2.09	2.34	2.75
Maximum Day Demand, mgd	4.24	4.76	5.59
ERUs	11,546	12,944	15,208
422			
Average Day Demand, mgd	0.00	0.00	0.00
Maximum Day Demand, mgd	0.01	0.01	0.01
ERUs	19	20	21
445			
Average Day Demand, mgd	0.03	0.03	0.04
Maximum Day Demand, mgd	0.06	0.07	0.08
ERUs	168	191	209
Total			
Average Day Demand, mgd	7.65	8.82	10.04
Maximum Day Demand, mgd	15.54	17.91	20.41
ERUs	42,295	48,736	55,528

ES.5 Water Use Efficiency (Chapter 5)

Since 1997, the City has partnered with the LOTT Clean Water Alliance, a collaboration between the water and wastewater providers of Lacey, Olympia, Tumwater, and Thurston County to promote water and wastewater conservation. The City and LOTT programs aim to reduce water consumption through a variety of measures, both at the individual customer level and system wide. Key successes have included an effective leak detection system and water saving kits that are distributed to customers.

DOH requires cities to establish water use efficiency (WUE) goals per WAC 246-290-830. WUE goals should be developed to “enhance the efficient use of water by the water system’s customers”. The City’s prior WUE goals were developed in 2011 and subsequently updated in the 2013 Plan to reduce the average day flow per ERU to 180 gpd and to reduce and maintain a distribution system leakage (DSL) of less than 10-percent. The City’s recent water usage is approximately 181 gpd/ERU and is approximately 7.4-percent, on a three-year average. These numbers are better than what is typically seen in similar systems. Therefore, the City has proposed updated goals to:

- Reduced the average annual ERU water usage for residential customers by 1 gpd/ERU per year to a value of 170 gpd/ERU.
- Maintain the DSL at less than 10-percent.

ES.6 Source Analysis and Water Quality (Chapter 6)

The City relies on its groundwater wells to meet all of its current supply needs. All three aquifers supplying the City’s water system are considered stable and reliable. The City’s existing water rights consist of a total allowable annual withdrawal (Qa) of 16,799 acre-feet per year (AFY), with a total allowable instantaneous withdrawal (Qi) of 23,511 gallons per minute (gpm). Of those water rights that are developed, the City has a Qa of 13,538 AFY and a Qi of 19,539 gpm. Some of the current rights are impacted and/or limited by individual well performance issues and distribution system limitations. Additionally, six sources are tied to mitigation requirements.

Table ES-3 summarizes the supply sources by pressure zone, including the Reliable Pumping Rate and the Reliable Supply. The Reliable Pumping Rate may be lower than the Instantaneous Right for a given well due to well performance, water quality, or hydraulic system limitations. The Reliable Supply relates to the DOH definition of a supply source having backup power.

Table ES-3
Existing Source of Supply Summary

Well Name	Source	Zone	Annual Water Right, Qa (AFY)	Instantaneous Water Right, Qi (gpm)	Reliable Pumping Rate (gpm)	Backup Power?	Reliable Supply (gpm)
Nisqually-19A	S24	188	270	350	80	No	0
Nisqually-19C	S25	188	-	250	225	No	0
188 Zone Total			270	600	305		0
Well 01	S01	337	344	665	0	Yes	0
Well 02	S18	337	1,290	600	600	Yes	600
Well 03				206	206	Yes	206
Well 04	S04	337	623	2,400	740	No	0
Well 06	S06	337	918	600	275	Yes	275
Well 07	S07	337	-	2,150	1,800	No	0
Well 09	S09	337	21	1,300	700	No	0
Well 10	S10	337	22	1,200	950	No	0
337 Zone Total			3,218	9,121	5,271		1,081
Beachcrest-1	S17	400	310	260	190	No	0
Beachcrest-2				260	200	No	0
Hawks Prairie-1	S32	400	2,092	800	650	Yes	650
Hawks Prairie-2				800	650	No	0
McAllister	S20	400	157	800	465	No	0
Madrona-1	S21	400	5,423	1,599	1,333	No	1,333
Madrona-2	S22			1,599	1,333	Yes	
Madrona-3	S28			1,600	1,333	No	
Evergreen Estates	S27	400	1,000	1,100	750	Yes	750
Betti	S29	400	1,068	1,000	980	Yes	980
400 Zone Total			10,050	9,818	7,884		3,713
SYSTEM TOTAL			13,538	19,539	13,460		4,794

The City also has undeveloped and pending water rights. Undeveloped water rights include a total additional annual water right of 3,261 AFY and a total additional instantaneous water right of 3,972 gpm. Pending water right applications, if approved, would add a total annual water right of 3,956 AFY and an instantaneous water right of 3,600 gpm. **Table ES-4** summarizes the 2040 Source of Supply with Planned Improvements, but not including the Brewery water rights (Qa of 761 AFY and Qi of 2,172 gpm), which may not become financially viable for the City of Lacey.

Table ES-4
2040 Source of Supply Summary with Planned Improvements

Well Name	Source	Zone	Annual Water Right, Qa (AFY)	Instantaneous Water Right, Qi (gpm)	Reliable Pumping Rate (gpm)	Backup Power?	Reliable Supply (gpm)
Nisqually-19A	S24	188	270	350	80	No	0
Nisqually-19C	S25	188	-	250	225	No	0
188 Zone Total			270	600	305		0
Well 01	S01	337	344	665	530	Yes	530
Well 02	S18	337	1,290	600	600	Yes	600
Well 03				206	206	Yes	206
Well 04	S04	337	623	2,400	740	No	0
Well 06	S06	337	918	600	275	Yes	275
Well 07	S07	337	-	2,150	1,800	No	0
Well 09	S09	337	21	1,300	700	No	0
Well 10	S10	337	22	1,200	950	No	0
<i>Well 04 Supp.</i>	-	337			<i>1,180</i>	<i>Yes</i>	<i>1,180</i>
337 Zone Total			3,218	9,121	6,981		2,791
Beachcrest-1	S17	400	310	260	190	Yes	190
Beachcrest-2				260	200	Yes	200
Hawks Prairie-1	S32	400	2,092	800	650	Yes	650
Hawks Prairie-2				800	650	No	0
McAllister	S20	400	157	800	465	No	0
Madrona-1	S21	400	5,423	1,599	1,599	Yes	1,599
Madrona-2	S22			1,599	1,599	Yes	1,599
Madrona-3	S28			1,600	1,600	Yes	1,600
Evergreen Estates	S27	400	1,000	1,100	1,000	Yes	1,000
Betti	S29	400	1,068	1,000	980	Yes	980
<i>Marvin Road</i>	-	400	1,500	1,000	800	Yes	800
<i>Meridian Campus</i>	-	400	1,000	800	640	Yes	640
400 Zone Total			12,550	11,618	10,373		9,258
SYSTEM TOTAL			16,038	21,339	17,659		12,049

General Note: Text and numbers in *italics* indicate a change from the current Source of Supply.

Reclaimed water is a critical part of the City's water supply system because of the mitigation requirements associated with six water right permits. Reclaimed water needs at the Woodland Creek Groundwater Recharge Facility (WC GRF) to allow for the full use of the six water rights requires 227.75 million gallons, annually. The supply of Class A reclaimed water from LOTT has

been unreliable, and subsequently, there is concern that full use of these water rights may not be fully reliable.

The City of Lacey desires to be proactive in developing supply sources ahead of growing demands. In order to stay ahead of demands, the City expects to bring new supply sources online whenever the MDD plus fire replenishment hits 90-percent of the Reliable Pumping Rate. Instantaneous and annual supply rates are compared against projected demands, along with planned rehabilitation improvements and development of water rights in **Table ES-5** and **Table ES-6**, respectively.

Table ES-5
Instantaneous Supply Analysis with Improvements

		2020	2030	2040
MDD+FF w/o conservation (MGD)		15.9	18.2	20.7
Current	Qi (MGD)		28.1	
	Firm System Supply ⁽¹⁾ (MGD)		16.8	
	90% of Firm System Supply ⁽²⁾ (MGD)		15.2	
	Excess/Deficiency ⁽³⁾ (MGD)	-0.7	-3.0	-5.5
With planned improvements	Qi (MGD)		28.1	
	Firm System Supply ⁽¹⁾ (MGD)		20.8	
	90% of Firm System Supply ⁽²⁾ (MGD)		18.7	
	Excess/Deficiency ⁽³⁾ (MGD)	2.8	0.5	-2.0
With developed water rights	Qi (MGD)		30.7	
	Firm System Supply ⁽¹⁾ (MGD)		22.8	
	90% of Firm System Supply ⁽²⁾ (MGD)		20.6	
	Excess/Deficiency ⁽³⁾ (MGD)	4.7	2.4	-0.1

¹ Firm system supply does not include the largest pump in service. As of the writing of this document, this is Well 7 with a reliable pumping rate of 2.59 MGD.

² Demand value that triggers City's goal to bring additional source(s) online.

³ Negative values indicate supply is deficient for meeting City's goal.

Table ES-6
Annual Supply Analysis with Improvements

		2020	2030	2040
ADD w/o conservation		7.7 MGD (8,626 AFY)	8.8 MGD (9,858 AFY)	10.0 MGD (11,202 AFY)
Current	Qa	12.1 MGD (13,538 AFY)		
	90% of Qa ⁽¹⁾	10.9 MGD (12,184 AFY)		
	Excess/Deficiency ⁽²⁾	3.2 MGD (3,558 AFY)	2.1 MGD (2,326 AFY)	0.9 MGD (982 AFY)
With planned improvements	Qa	12.1 MGD (13,538 AFY)		
	90% of Qa ⁽¹⁾	10.9 MGD (12,184 AFY)		
	Excess/Deficiency ⁽²⁾	3.2 MGD (3,558 AFY)	2.1 MGD (2,326 AFY)	0.9 MGD (982 AFY)
With developed water rights	Qa	14.3 MGD (16,038 AFY)		
	90% of Qa ⁽¹⁾	12.9 MGD (14,434 AFY)		
	Excess/Deficiency ⁽²⁾	5.2 MGD (5,808 AFY)	4.1 MGD (4,576 AFY)	2.9 MGD (3,232 AFY)

¹ Demand value that triggers City's goal to bring additional source(s) online .

² Negative values indicate supply is deficient.

As a Group A Community Water System, the City of Lacey must comply with the drinking water standards of the federal Safe Drinking Water Act (SDWA) and its amendments. The quality of the City's drinking water sources is of primary concern to the City. The City's water is supplied by groundwater aquifers and is tested regularly for the presence of contaminants at frequencies prescribed by DOH regulations. The City is in compliance with all DOH reporting requirements, including publication and distribution of an annual Consumer Confidence Report (CCR) that keeps consumers informed as to the quality of the City's water supply and delivery systems.

The City's groundwater supply sources are of relatively high quality. The City has chlorinated all supply sources since 2007, and Well 4 (S04) adds sodium hydroxide to elevate the pH of the water. Additional treatment is provided at two other locations: the ATEC Facility treats source S07 for iron and manganese, and the Hawks Prairie Water Treatment Facility (HPWTF) treats sources S19 and S31 for manganese, iron, sulfides, and converts ammonia through breakpoint chlorination. Treatment for these constituents is common for groundwater supplies.

In 2019, the City completed a desktop corrosion control evaluation of the water system that was triggered by sampling in 2016-2017 and found very low-level lead measurements that were just above the limits exempting the City from the study. The study established baseline monitoring and resulted in the plan to add treatment to raise the pH at three wellfields across the City: Beachcrest (S17), Westside (S01 and S18), and Madrona (S21, S22, and S28). These three treatment systems are required by DOH to be operational by the years 2022, 2023, and 2024, respectfully. Following successful operation of all three treatment systems, lead and copper sampling will be completed to comply with DOH requirements.

Recommendations associated with water source and quality comprise a significant portion of the identified capital projects. More detailed information can be found in **Chapter 6** and **Chapter 9**. These recommended projects are included in the following general categories:

- Water right source/quality evaluations – These projects include evaluations that relate to the availability/reliability of City sources of supply and quality of supply. Identified projects include: evaluating the best use of the Brewery Wellfield Rights, development of a Reclaimed Water Plan, studying Groundwater Monitoring Trends, Well Exploration Study, and Water Right Mitigation Aquifer Recharge Study.
- Well source development/expansion – These projects include the development of new wells, either for an undeveloped water right or as a supplemental well to facilitate the withdrawal of additional groundwater where the water right is not fully being withdrawn. Identified projects include: Marvin Road Well, S04, Meridian Campus, S07, S06, and an anticipated Future Well Replacement Project.
- Water quality studies and treatment – These projects include evaluations to determine if treatment is needed and implementation of already-defined projects associated with the Corrosion Control Study. Identified projects include: pH adjustment at Beachcrest (S17), Madrona, and Westside wellfields; S09 iron/manganese potential treatment; a Hardness and Scale Evaluation following the pH adjustment projects; investigation into the S29 reports of dissolved gas; planning for potential additional pH treatment in the future; and evaluating the capacity of the Hawks Prairie Treatment Facility.
- Water quality monitoring – While not related to capital projects, there are several potential monitoring requirements on the horizon that may impact the City’s requirements. Currently, the Environmental Protection Agency (EPA) is considering perchlorate, and chromium (total/hexavalent chromium) for potential regulation. The City should continue to pay attention to these potential monitoring and regulation changes.

ES.7 Wellhead Protection (Chapter 7)

The City relies on multiple groundwater sources to provide a safe and reliable potable water supply for its growing community. The City is committed to protecting the environment and preventing groundwater contamination through a wellhead protection program. Wellhead protection programs are required by the United States Environmental Protection Agency (EPA) and the Washington State DOH. As part of this Plan, the wellhead protection delineation was updated for the Betti Well, Source 29. Additionally, Contaminant Source Inventory Update was completed to inventory and map potential and confirmed contaminant sources within the delineated wellhead protection areas (WHPA).

Recommendations include:

- Adopt the new WHPA for the Betti well and consider using the local groundwater model developed for the LOTT Groundwater Study for future refining of the Betti well capture areas.
- Consider investigation into the sources and flows contributing to UIC dry wells to determine if concern can be reduced due to pretreatment, or if pretreatment should be added.
- Consider educational outreach to owners of home heating oil tanks regarding tank maintenance and appropriate spill cleanup.
- Promote hazardous waste risk reduction strategies that target onsite handling and waste management, particularly proper disposal practices.
- Institute a process for updating WHPA GIS layers used by Lacey, DOH and Thurston County.
- Request funding to construct two new WHP monitoring wells in Hawks Prairie, to protect the Beachcrest wells and the Betti well.
- Improve knowledge about Lacey-specific geology and interpretations of confining layers.
- Improve regulation of Deep UIC wells used for stormwater management.
- Improve implementation of WHP requirements through enhanced tracking of permitting required for tenant improvements and parcel information.
- Consolidate wellhead protection data management with data collected for other groundwater monitoring programs implemented by the City.

ES.8 System Analysis (Chapter 8)

The City's water distribution system was evaluated for capacity deficiencies in the storage facilities, pump stations, pressure reducing valve (PRV) stations, and pipelines. System improvements were analyzed according to the policies and criteria described in **Chapter 3**. The evaluation of the pipeline capacities was conducted using the City's hydraulic model.

With the projects already under construction and those nearing construction that increase the overall storage volume, the City does not need any additional storage reservoirs in the planning period, as identified in **Table ES-7**.

Table ES-7
System-Wide Storage Analysis Summary

Planning Year	System-Wide Storage Analysis		
	2020	2030	2040
Total Storage (mg)	12.68	15.93	15.93
Live Storage⁽¹⁾ (mg)	7.90	10.91	10.91
Operational Storage (mg)	0.37	0.51	0.51
Equalizing Storage (mg)	1.61	1.84	2.11
FSS/Standby Storage ⁽²⁾ (mg)	9.51	2.75	3.84
Total Required Storage (mg)	11.49	5.10	6.46
Storage Surplus/(Deficit)^(1,3) (mg)	(3.59)	5.81	4.45

¹ Live storage at 20 psi at the highest served customer in the service area.

² Based on system-wide nested FSS and Standby Storage.

³ More than sufficient storage at 30 psi for operational and equalizing storage system-wide.

The limiting capacity of the City's physical water system was determined for the 2040 planning year with the assumption that all planned supply, storage, and distribution projects will be completed. This limiting capacity assessment estimates the number of ERUs that can be served by the system and is summarized in **Table ES-8**.

Table ES-8
2040 Limiting Capacity

	ERU Value	Equation / Notes	Calculation
Sources (ADD)	95,900	$N = \frac{\text{Reliable System Supply}}{\text{ADD ERU value}}$	$\frac{17.35 \text{ mgd}}{181 \text{ gpd/ERU}}$
Sources (MDD)	61,700	$N = \frac{\text{Firm System Supply}}{\text{MDD ERU value}}$	$\frac{(25.23-2.57) \text{ mgd}}{367 \text{ gpd/ERU}}$
Treatment	Not limiting	The City treats groundwater for disinfection, corrosion control, and aesthetics. The City has designed treatment capacity with sufficiency capacity to serve its sources.	
Equalizing Storage (ES)	57,500	$N = \frac{ES}{0.1 * \text{MDD ERU Value}}$	$\frac{2.11 \text{ mg}}{0.1 * 367 \text{ gpd/ERU}}$
Standby Storage (SB)	70,800	$N = \frac{\text{Reliable System Supply} + \text{Available SB}}{2 * \text{ADD ERU Value}}$	$\frac{17.35 + (3.84 + 4.45)}{2 * 181 \text{ gpd/ERU}}$
Distribution	Not Limiting	Not considered capacity limited because the City has planned projects to address all identified deficiencies and design standards confirm all new development meets City standards.	
Transmission	Not Limiting	Assumed to be addressed as part of source and pumping capacity.	
Water Rights (Qa)	82,900	$N = \frac{Qa}{\text{ADD ERU value}}$	$\frac{15.00 \text{ mgd}}{181 \text{ gpd/ERU}}$
Water Rights (Qi)	92,200	$N = \frac{Qi}{\text{MDD ERU value}}$	$\frac{33.86}{367 \text{ gpd/ERU}}$
Limiting Water System Physical Capacity in 2040 (ERUs)	57,500	Slightly exceeds projected 2040 ERUs	
Projected ERUs for 2040 planning year	55,500		

ES.9 Capital Improvement Plan (Chapter 9)

The Capital Improvements Plan presents a cohesive summary of all projects outlined in the previous chapters that help the City continue to provide consistent, efficient water supply to its customers. Some additional projects, such as an annual Watermain Replacement Program were identified for inclusion in the CIP. Programs listed in the CIP consider water supply and storage requirements, improvements to the hydraulic system, and upgrades or replacement of aging facilities. The recommended projects are presented in **Table ES-9**.

Planning-level cost estimates were developed for each of the recommended projects for budgeting purposes. Cost estimates are presented as total project costs in September 2020 dollars. For future budgeting purposes, the latest Engineering News Record (ENR) Construction Cost Index (CCI) can be used to project current estimates to the year of implementation. The cost estimates for the Lacey area used the ENR Seattle CCI. The September 2020 CCI is 12,772.

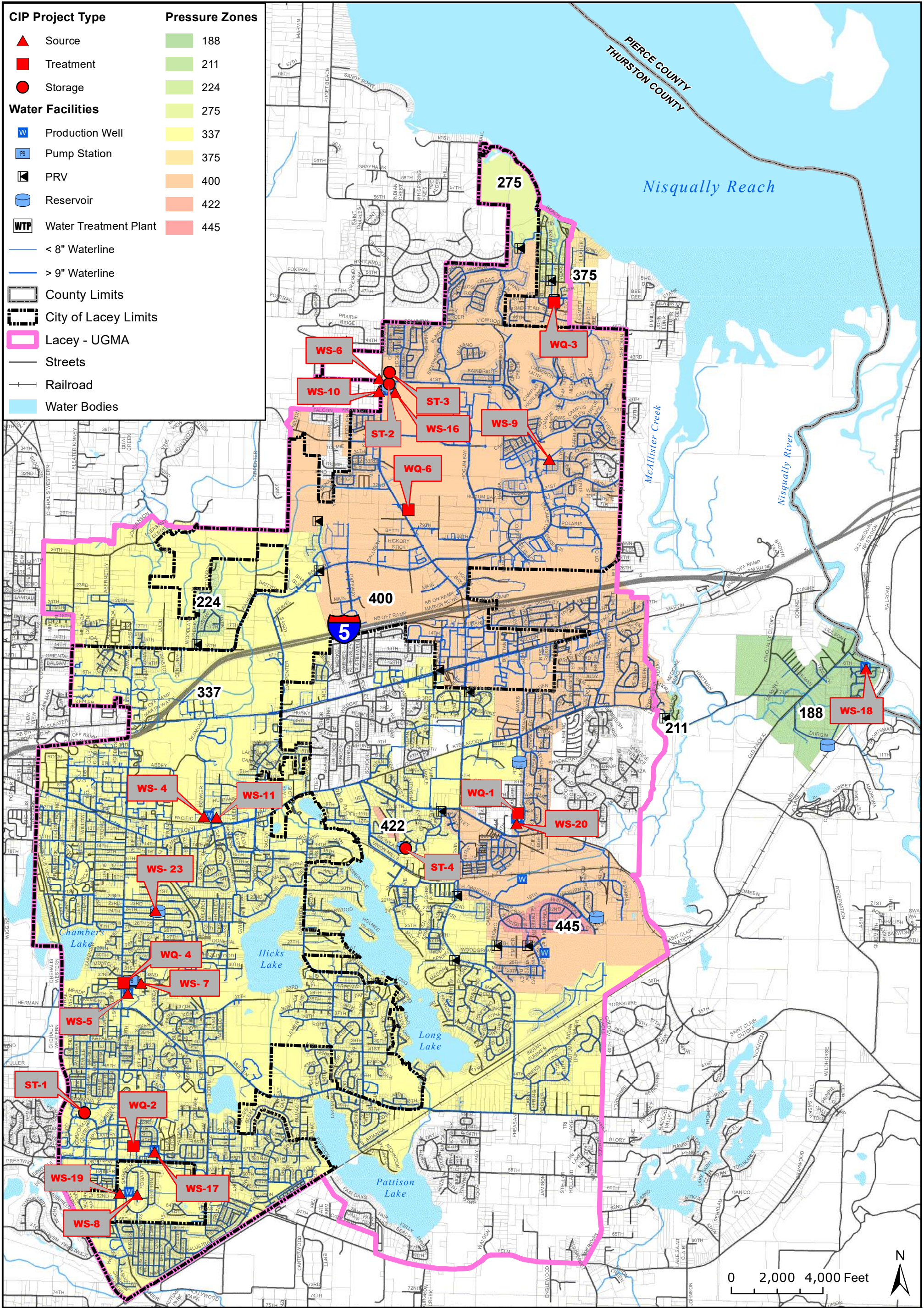
The capital projects identified are categorized into water supply (WS), water quality (WQ), storage (ST), pump stations (PS), PRV Stations (PRV), pipelines (P), and general improvements (G). The CIP projects have been assigned a project identification number (Project ID) and are also shown on **Figure ES-3** and **Figure ES-4**.

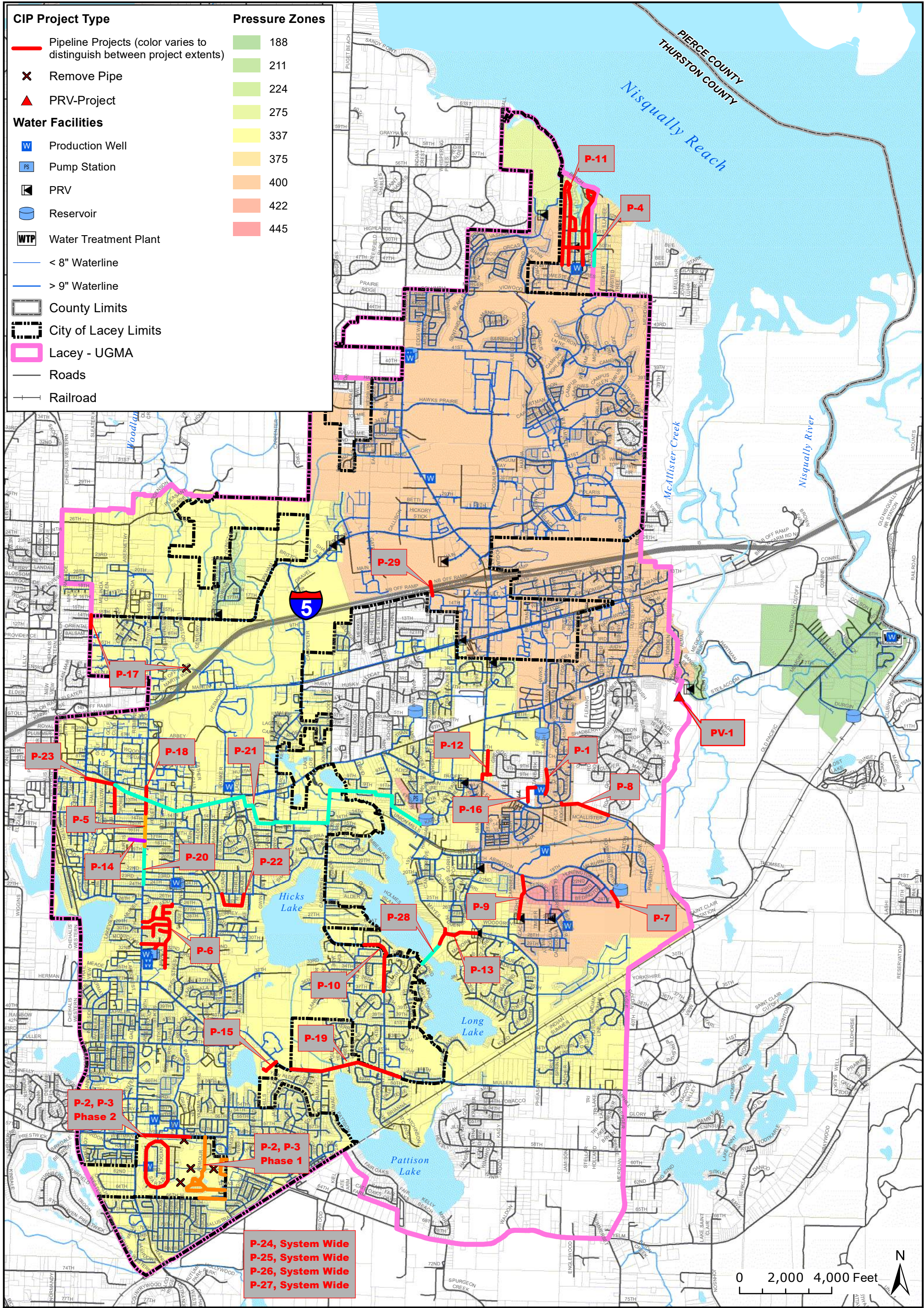
Table ES-9
Capital Improvement Projects

Capital Improvement Project		Total Project Cost	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029	FY 2030-2039
WATER SUPPLY													
General Water Supply													
WS-1	Brewery Wellfield Development	\$ 3,350,000	\$ -	\$ 20,000	\$ 30,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ -	\$ 3,000,000
Water Rights													
WS-2	Reclaimed Water Plan	\$ 737,000	\$ 200,000	\$ 137,000									\$ 400,000
WS-3	Groundwater Monitoring Trends (Hawks Prairie Water Rights)	\$ 250,000			\$ -	\$ 125,000	\$ 125,000						
Wells		\$ -											
WS-4	Well S07 Rehabilitation	\$ 200,000	\$ 200,000										
WS-5	Well S03 Rehabilitation	\$ 115,000	\$ 115,000										
WS-6	Marvin Rd Well - Phase 1	\$ 5,000,000			\$ -	\$ 500,000	\$ 1,000,000	\$ 1,000,000	\$ 2,500,000				
WS-7	Well S01 Rehab & Replacement (supplemental)	\$ 3,515,000	\$ 215,000	\$ 150,000	\$ 150,000	\$ -			\$ 150,000	\$ 350,000	\$ 2,000,000	\$ 500,000	
WS-8	Well S04 Improvement - Supplemental Well	\$ 3,160,000	\$ 160,000	\$ 500,000	\$ -	\$ -	\$ 500,000	\$ 1,500,000	\$ 500,000				
WS-9	Meridian Campus Well & Treatment Facility	\$ 12,200,000						\$ 150,000	\$ 1,500,000	\$ 2,000,000	\$ 4,000,000	\$ 4,050,000	\$ 500,000
WS-10	Marvin Rd Well - Phase 2	\$ 3,250,000											\$ 3,250,000
WS-11	Well S07 Replacement / Expansion	\$ 6,600,000		\$ 100,000	\$ 1,000,000			\$ 1,000,000	\$ 500,000	\$ 2,000,000	\$ 2,000,000		
WS-12	Well Rehabilitation Program	\$ 10,500,000			\$ 300,000	\$ 600,000	\$ 600,000	\$ 600,000	\$ 600,000	\$ 600,000	\$ 600,000	\$ 600,000	\$ 6,000,000
WS-13	Well Exploration Study	\$ 2,000,000									\$ 1,000,000	\$ 1,000,000	
WS-14	Water Right Mitigation Aquifer Recharge Study	\$ 3,200,000								\$ 100,000	\$ 100,000		\$ 3,000,000
WS-15	Stand-by Generators	\$ 3,000,000	\$ -	\$ -	\$ -	\$ 750,000	\$ -	\$ 750,000	\$ -	\$ 750,000	\$ 750,000	\$ -	\$ -
WS-16	Hawks Prairie Well Field	\$ 960,000	\$ 750,000	\$ 210,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
WS-17	Source 10 Rehab	\$ 300,000	\$ 50,000	\$ 250,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
WS-18	Source 24/25 Rehab	\$ 300,000	\$ -	\$ 300,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
WS-19	Source 4 Rehab	\$ 350,000	\$ -	\$ 175,000	\$ 175,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
WS-20	Source 21 Rehab	\$ 350,000	\$ -	\$ 150,000	\$ -	\$ 200,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
WS-21	On-Call Hydrogeologist	\$ 1,135,000	\$ 50,000	\$ 185,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 500,000
WS-22	Future Well Replacement	\$ 4,000,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,000,000
WS-23	Well S06 Replacement/Second Well	\$ 8,100,000	\$ -	\$ 100,000	\$ 1,000,000	\$ 1,000,000	\$ 3,000,000	\$ 2,000,000	\$ 1,000,000	\$ -	\$ -	\$ -	\$ -
TOTAL WATER SUPPLY PROJECTS		\$ 72,572,000	\$ 1,740,000	\$ 2,277,000	\$ 2,705,000	\$ 3,275,000	\$ 5,325,000	\$ 7,100,000	\$ 6,850,000	\$ 5,900,000	\$ 10,550,000	\$ 6,200,000	\$ 20,650,000
WATER QUALITY AND TREATMENT													
WQ-1	Madrona pH Adjustment & Improvements	\$ 8,090,000	\$ 220,000	\$ 470,000	\$ 1,400,000	\$ 3,000,000	\$ 3,000,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
WQ-2	Well S09 Treatment Study	\$ 5,300,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 150,000	\$ 150,000	\$ -	\$ -	\$ 5,000,000
WQ-3	S17 Well house & Treatment	\$ 5,980,000	\$ 230,000	\$ 200,000	\$ 4,000,000	\$ 1,550,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
WQ-4	Westside Wells pH Treatment	\$ 7,300,000	\$ 50,000	\$ 250,000	\$ 3,500,000	\$ 3,500,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
WQ-5	Hardness and Scale Evaluation	\$ 150,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 150,000	\$ -	\$ -	\$ -	\$ -	\$ -
WQ-6	S29 Water Quality Evaluation	\$ 100,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 100,000	\$ -	\$ -	\$ -	\$ -	\$ -
WQ-7	Groundwater Monitoring Wells	\$ 150,000	\$ -	\$ -	\$ -	\$ -	\$ 50,000	\$ 100,000	\$ -	\$ -	\$ -	\$ -	\$ -
WQ-8	Waterline Swabbing Ports	\$ 2,800,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 200,000	\$ 200,000	\$ 200,000	\$ 200,000	\$ 2,000,000
WQ-9	Future Treatment/Disinfection Rehab	\$ 9,250,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 250,000	\$ 3,500,000	\$ 3,500,000	\$ 2,000,000
WQ-10	HPWTF Capacity Evaluation	\$ 3,150,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 150,000	\$ 3,000,000
TOTAL WATER QUALITY AND TREATMENT PROJECTS		\$ 42,270,000	\$ 500,000	\$ 920,000	\$ 8,900,000	\$ 8,050,000	\$ 3,050,000	\$ 350,000	\$ 350,000	\$ 600,000	\$ 3,700,000	\$ 3,850,000	\$ 12,000,000
STORAGE													
ST-1	337 Zone Reservoir	\$ 10,325,000	\$ 825,000	\$ 4,100,000	\$ 5,400,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
ST-2	Hawks Prairie Sister Standpipe	\$ 7,950,000	\$ 950,000	\$ 6,700,000	\$ 300,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
ST-3	Hawks Prairie Reservoir Repair	\$ 6,600,000	\$ -	\$ 300,000	\$ 500,000	\$ 3,000,000	\$ 2,800,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
ST-4	Union Mills Tank Coating & Repairs	\$ 3,525,000	\$ -	\$ -	\$ -	\$ 125,000	\$ 500,000	\$ 2,900,000	\$ -	\$ -	\$ -	\$ -	\$ -
ST-5	Tank Maintenance & Coating Program	\$ 3,600,000	\$ -	\$ -	\$ -	\$ -	\$ 100,000	\$ 500,000	\$ 500,000	\$ -	\$ -	\$ 500,000	\$ 2,000,000
ST-6	Judd Hill Reservoir Replacement	\$ 5,250,000	\$ -	\$ -	\$ -	\$ 250,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 5,000,000
TOTAL STORAGE PROJECTS		\$ 37,250,000	\$ 1,775,000	\$ 11,100,000	\$ 6,200,000	\$ 3,375,000	\$ 3,400,000	\$ 3,400,000	\$ 500,000	\$ -	\$ -	\$ 500,000	\$ 7,000,000
PUMP STATIONS													
No pump station capital improvement projects													
PRV STATIONS													
PV-1	Nisqually PRV Monitoring and Control	\$ 250,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 250,000	\$ -	\$ -	\$ -	\$ -	\$ -
TOTAL PRV STATION PROJECTS		\$ 250,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 250,000	\$ -	\$ -	\$ -	\$ -	\$ -

Table ES-9 (Continued)
Capital Improvement Projects

Capital Improvement Project		Total Project Cost	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029	FY 2030-2039
PIPELINES													
Capacity Improvements													
P-1	Fitz Hugh Water Main	\$ 625,000	\$ 500,000	\$ 125,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
P-2	Capitol City Golf Course Fire-Flow	\$ 6,300,000	\$ 1,210,000	\$ 3,980,000	\$ 1,110,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
P-4	48th/50th Ave Fire-Flow	\$ 200,000	\$ 20,000	\$ 180,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
P-7	Oak Preserve/19th Ave Upsize	\$ 225,000	\$ -	\$ -	\$ -	\$ 225,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
P-8	400 PZ Transmission Main, Pacific, Chatham, Milbanke	\$ 1,530,000	\$ -	\$ 50,000	\$ 600,000	\$ 880,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
P-9	400 PZ Transmission Main, Mugho & Bedington	\$ 685,000	\$ 50,000	\$ 635,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
P-12	Spruce St SE & 9th Ave SE	\$ 750,000	\$ -	\$ -	\$ -	\$ 750,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
P-13	West end of Carpenter Pk Resort Rd SE	\$ 550,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 550,000	\$ -	\$ -	\$ -	\$ -	\$ -
P-14	17th Ave SE and College St SE	\$ 250,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 250,000	\$ -	\$ -	\$ -	\$ -	\$ -
P-15	Lakes Elementary School	\$ 250,000	\$ -	\$ -	\$ -	\$ -	\$ 250,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Repair/Rehabilitation Improvements													
P-6	Ultima / Belair Area	\$ 2,200,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 20,000	\$ 1,000,000	\$ 1,180,000	\$ -	\$ -
P-10	Carpenter Rd. - South of Fairgrounds	\$ 825,000	\$ 25,000	\$ 800,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
P-11	Beachcrest Area	\$ 3,100,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 100,000	\$ 1,500,000	\$ 1,500,000	\$ -	\$ -
P-21	Concrete pipe condition assessment	\$ 250,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 250,000	\$ -	\$ -	\$ -	\$ -	\$ -
P-22	25th Loop Water	\$ 330,000	\$ 325,000	\$ 5,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
P-23	Golf Club Water	\$ 1,830,000	\$ 10,000	\$ 320,000	\$ 1,000,000	\$ 500,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
P-24	Annual Waterline Replacement	\$ 31,000,000	\$ -	\$ -	\$ -	\$ -	\$ 1,500,000	\$ 1,500,000	\$ 1,500,000	\$ -	\$ -	\$ 1,500,000	\$ 25,000,000
General Improvements													
P-3	Capitol City Sewer Connection Fees	\$ 4,000,000	\$ -	\$ 2,100,000	\$ 1,900,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
P-5	College St. & 16th Ave RAB Water Improvements	\$ 1,010,000	\$ -	\$ 10,000	\$ -	\$ -	\$ -	\$ -	\$ 500,000	\$ 500,000	\$ -	\$ -	\$ -
P-16	Madrona Connection to 337 Zone	\$ 700,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 700,000	\$ -	\$ -	\$ -	\$ -
P-17	St. Placid I-5 Abandon and Replace	\$ 250,000	\$ -	\$ -	\$ -	\$ 250,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
P-18	College St. Watermain Replacement (18th Ave to Pacific Ave)	\$ 750,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 750,000	\$ -	\$ -	\$ -	\$ -
P-19	Mullen Rd Water	\$ 2,000,000	\$ 1,200,000	\$ 800,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
P-20	College and 22nd Water	\$ 500,000	\$ 500,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
P-25	Annual Valves	\$ 1,950,000	\$ 150,000	\$ -	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 1,000,000
P-26	Annual Pipeline Improvements	\$ 13,300,000	\$ -	\$ -	\$ -	\$ -	\$ 100,000	\$ 1,000,000	\$ 100,000	\$ 1,000,000	\$ 100,000	\$ 1,000,000	\$ 10,000,000
P-27	Transportation & Development Related Improvements	\$ 9,415,000	\$ 240,000	\$ 175,000	\$ 500,000	\$ 500,000	\$ 500,000	\$ 500,000	\$ 500,000	\$ 500,000	\$ 500,000	\$ 500,000	\$ 5,000,000
P-28	Long and Hicks Lake Crossings	\$ 6,000,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 6,000,000
P-29	Redundant I-5 Crossing	\$ 4,000,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 250,000	\$ 500,000	\$ 1,000,000	\$ 2,250,000	\$ -
TOTAL PIPELINES PROJECTS		\$ 94,775,000	\$ 4,230,000	\$ 9,180,000	\$ 5,210,000	\$ 3,205,000	\$ 2,450,000	\$ 4,150,000	\$ 4,520,000	\$ 5,100,000	\$ 4,380,000	\$ 5,350,000	\$ 47,000,000
GENERAL													
G-1	AMR System	\$ 6,800,000	\$ -	\$ -	\$ -	\$ 6,800,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
G-2	Water Comprehensive Plan Update	\$ 925,000	\$ 265,000	\$ 60,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 200,000	\$ 400,000
G-3	Risk and Resilience/ERP	\$ 150,000	\$ 110,000	\$ 40,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
G-4	Risk and Resilience Study Implementation	\$ 1,900,000		\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 1,000,000
G-5	Meter Reader DCU Improvements	\$ 65,000	\$ 25,000	\$ 40,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
G-6	Asset management program development	\$ 640,000	\$ -	\$ -	\$ 300,000	\$ 20,000	\$ 20,000	\$ 20,000	\$ 20,000	\$ 20,000	\$ 20,000	\$ 20,000	\$ 200,000
G-7	Septic Abatement	\$ 10,000,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 10,000,000
TOTAL GENERAL PROJECTS		\$ 20,480,000	\$ 400,000	\$ 240,000	\$ 400,000	\$ 6,920,000	\$ 120,000	\$ 120,000	\$ 120,000	\$ 120,000	\$ 120,000	\$ 320,000	\$ 11,600,000
TOTAL COSTS		\$ 267,597,000	\$ 8,645,000	\$ 23,717,000	\$ 23,415,000	\$ 24,825,000	\$ 14,345,000	\$ 15,370,000	\$ 12,340,000	\$ 11,720,000	\$ 18,750,000	\$ 16,220,000	\$ 98,250,000





ES.10 Operations and Maintenance (Chapter 10)

A detailed review of the City's water system operation and maintenance was included in this Plan. The operational staff of the City must manage routine maintenance tasks, essential operation tasks, new system modifications to the existing infrastructure, and emergencies. Primary operation of the City's Water System is maintained via the SCADA computerized control system. This system continuously monitors alarms and process values at all of the water facilities and makes process decisions to turn on wells and booster stations based on operator-entered set points.

The City's system meets daily demands through its groundwater supplies and storage facilities. The City operates its system based upon the draw and fill of the City's reservoirs as well as system pressure. As the water level in the reservoirs and/or system pressures drop, different wells and booster pumps are called to operate. Likewise, the wells are shut off when the reservoir water level and/or system pressure rises to the set point determined by operations staff.

The City's operation and maintenance program was reviewed relative to other systems in the Pacific Northwest and found to be sufficient. However, while the program appears sufficient, current staffing appears to be insufficient to achieve proactive maintenance goals. This proactive maintenance helps to facilitate the greatest possible lifespan of the various infrastructure components. Based on labor projections, the water O&M staff are currently understaffed by approximately two full time employees (FTEs). Additionally, the City is currently in the process of adding three treatment systems, which is projected to require approximately one additional FTE for routine operation, totaling a near-term need of three FTEs.

Additional recommendations related to O&M include:

- Increased staff cross-training to provide adequate coverage for new facilities,
- Consider reservoir mixing evaluation for the Union Mills, Steilacoom, and Nisqually reservoirs, which all have a single inlet/outlet,
- Establish a maximum decline in the specific capacity of wells to trigger rehabilitation efforts,
- Inspect and clean the inside of reservoirs every five years, per AWWA standards,
- Well source rehabilitation projects – Well rehabilitation varies based on the need of the supply well and can include cleaning the screened portion of the well and rehabilitation/replacement of the pump, pump components, and column pipe. Identified wells include: S07, S03, S01, S10, S24/25, S04, S21, Hawks Prairie Wellfield, and a regular Well Rehabilitation Program.

ES.11 Financial Plan (Chapter 11)

The financial plan presented in **Chapter 11** identifies the total cost of providing water service and presents a financial program that allows the water utility to remain financially viable during execution of the Capital Improvement Program (CIP). The viability analysis considered the historical financial condition of the utility, the sufficiency of utility revenues to meet current and future financial and policy obligations, and the financial impact of executing the CIP.

The results of the financial plan indicate that the City's current adopted rates will not be sufficient to fund utility financial obligations for the entire 10-year (2020-2029) planning horizon. Annual rate increases of 5.25 percent for the period 2022-2027 are needed to execute the entire CIP. If the City chooses not to fund the septic abatement projects, the City could implement the 5.00 percent rate increases instead for the period 2022-2027.