EXECUTIVE SUMMARY

ES.1 INTRODUCTION

This executive summary presents a brief overview of the City of Camas (City) Water System Plan Update (Plan). The Plan meets state, county, and local requirements. It complies with the requirements of the Washington State Department of Health (DOH) as set forth in the Washington Administrative Code (WAC) 246-290-100, Water System Plan. This Plan is an update of the City's 2010 Plan. The City's DOH water system identification number is 108002.

The purpose of the Plan is to develop a long-term planning strategy for the City's Retail Water Service Area (RWSA), which is shown in Figure ES.1. The Plan evaluates the ability of the water system to meet demand growth over a twenty year planning period. Water system improvements are recommended to meet the expanding water system (primarily in the North Shore), growing demands, and infrastructure repair and replacement. The Plan also identifies planning level costs for capital improvement projects and a financial plan for funding the projects.

A State Environmental Policy Act (SEPA) Checklist has been prepared for this Plan. The City anticipates the Plan does not have probable significant adverse impacts on the environment in accordance with WAC 197-11-340(2). The SEPA Checklist is included in Appendix B. The City will submit this Plan to DOH, the Washington State Department of Ecology (DOE), Clark County, and adjacent Utilities as part of the Agency Review process. See Appendix B for comment letters by these Agencies. The City's Adopting resolution will be included in Appendix A, upon Plan approval by the City Council.

ES.2 PLANNING CONSIDERATIONS

Chapter 2 summarizes the City's water planning considerations that influence the Plan, including background on the study area, policies, criteria, and related documents. The City maintains a Duty to Serve customers within the RWSA:

> *The City will exercise reasonable diligence and care to furnish and deliver a continuous and sufficient supply of pure water to the customer, and to avoid any shortage or interruption of delivery of same.*

The City's Water Service Area is shown in Figure ES.1.

Water system planning is based on a careful analysis of a water utility's responsibility to comply with applicable regulatory requirements while providing service to existing and future customers. These laws are monitored and enforced by a number of federal, state,

and local agencies. The Plan incorporates several regional and local plans of the southwest region of Washington, such as Clark County, that affect the water utility.

The City has adopted many resolutions regarding water system planning that are included in the City Code. 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 Plan summarizes many of these policies and provides criteria needed to evaluate the water system.

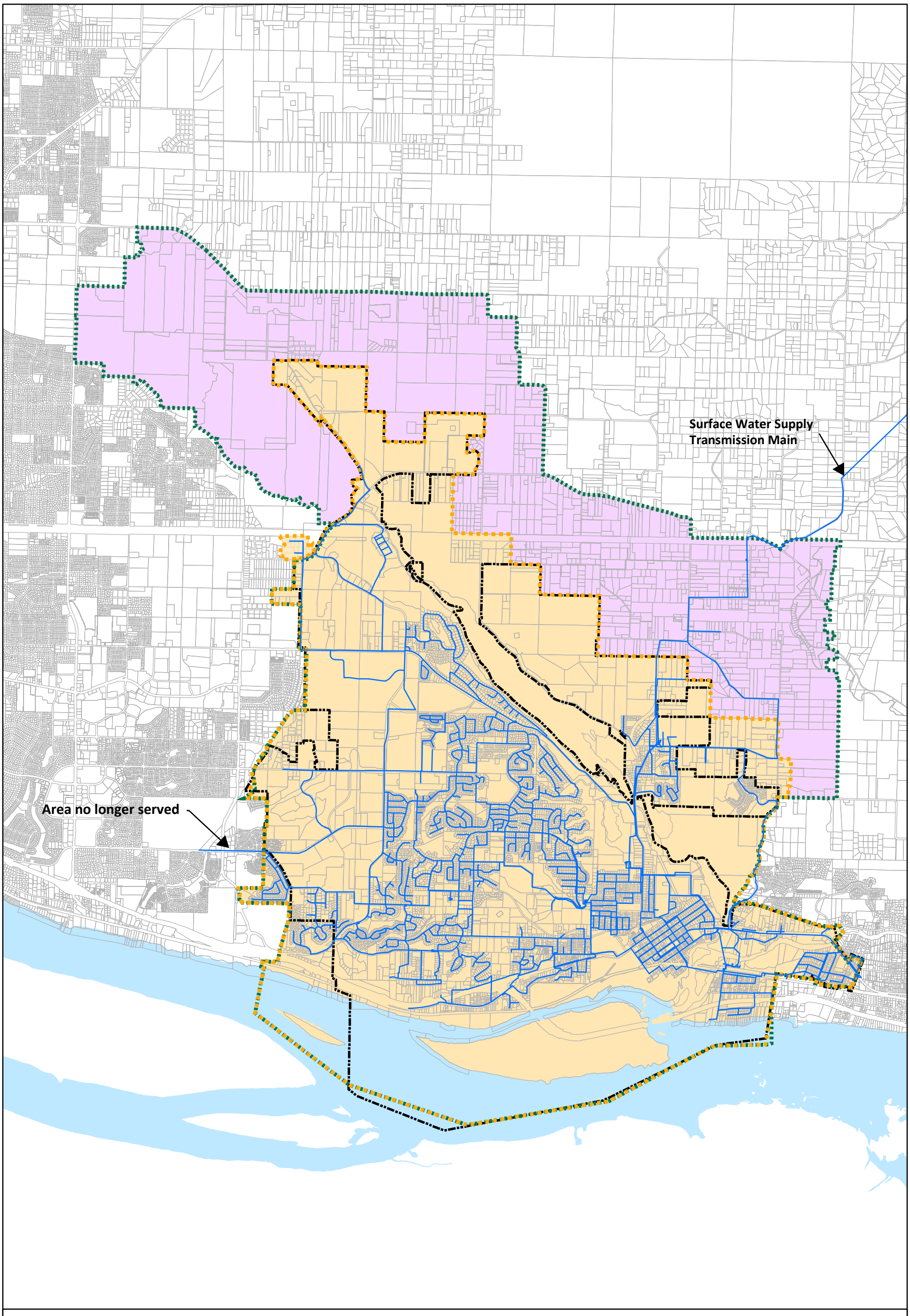
ES.3 EXISTING SYSTEM

The City owns and operates a multi-source municipal water system- summarized in Chapter 3 - which includes supply, treatment, storage, and distribution of potable water to residential and commercial customers. The City currently obtains its water from ten groundwater wells and two surface water sources that are treated to provide high quality water to customers. The City owns over 143 miles of pipelines in its water transmission and distribution system. Service is provided to customers across five major pressure zones and 18 subzones. Eight booster pumping stations are used to move water between pressure zones. Seven storage facilities with a combined total of 8.45 million gallons (MG) provide storage for normal and emergency conditions, such as fire suppression. Additionally, distribution system includes numerous meters, isolation valves, and hydrants. Major elements of the water system are shown in Figure ES.2.

ES.4 OPERATIONS AND MAINTENANCE

The water system is operated and maintained (O&M) by the City staff, with contractor provided services that City staff are not trained or equipped to perform. O&M of the water system requires the combined effort of the Public Works Department, Engineering Department, and Finance Department. The City's water system operators are experienced and well trained, exceeding the minimum state requirements (WAC 246-292-050). The City provides opportunities for its staffs' professional growth and training to maintain up-to-date knowledge.

The City has a well operated and maintained system, as documented in Chapter 4. As part of the Plan, a high-level condition assessment identified repair and replacement projects for above ground assets (i.e., pump stations, wells, and reservoirs, etc.). The majority of projects were necessary due to aging electrical equipment and normal replacement of pumps and motors. The City also plans to replace two reservoirs, built prior to 1940, that have reached the end of their usable life.



Legend

- Existing Water Main
- Retail Water Service Boundary
- Future Water Service Boundary
- City Limits
- Retail Water Service Area
- Coordinated Water System Boundary / Future Service Area / Service Area
- Parcels
- Waterbody

N

0 0.5 1 Miles

SERVICE AREA

FIGURE ES.1

CITY OF CAMAS
WATER SYSTEM PLAN UPDATE

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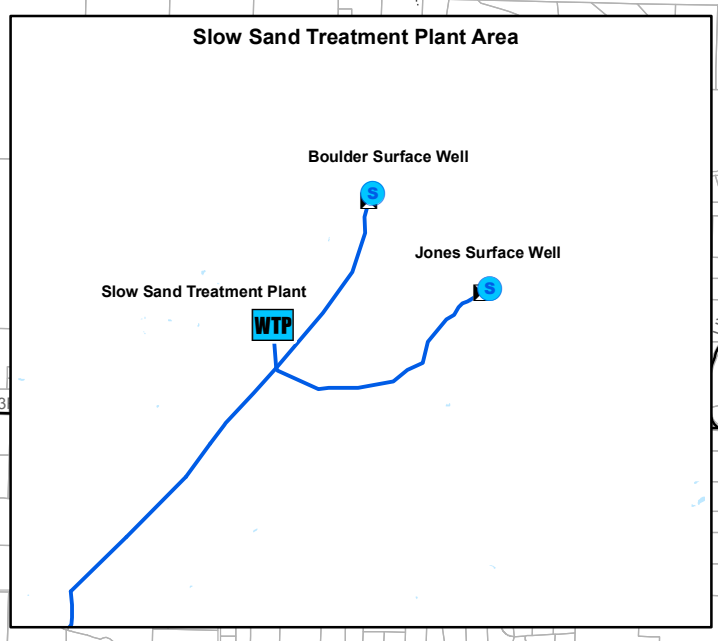

To Slow Sand Treatment Plant Area

Surface Water Supply Transmission Main

Slow Sand PRV

Area no longer served

Lacamas BPS

Lacamas Tank

Butler Reservoir/ Gregg BPS

Gregg Reservoir

Well 9

Angelo BPS

Crown Road BPS

Upper Prune Hill Reservoirs and BPS

Lower Prune Hill Reservoirs and BPS

Forest Home BPS

Washougal Intertie

Well 13

Washougal Wellfield Wells 7, 8, 10, 11, 12

Well 5

Well 14

Well 6

Legend

- Water Service Area
- Waterbody
- PRV
- Intertie
- Potable Wells
- Surface Water Supplies
- Slow Sand Treatment Plant
- Pump Station
- Water Tank
- Existing Water Main
- Pressure Zones

0 2,000 4,000 Feet

SYSTEM FACILITY MAP

FIGURE ES.2

CITY OF CAMAS
WATER SYSTEM PLAN UPDATE

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ES.5 WATER REQUIREMENTS

Projecting realistic future water demand is necessary for planning infrastructure projects and securing adequate water supply to meet future growth. Chapter 5 projects the water system requirements, i.e., demand, for the next 20 years. Demographic projections were used to predict where and how much growth will occur in the water system based on the City's comprehensive planning. The resulting future accounts were converted to projected demands using the historical water use patterns and parameters.

Demand projections were generated for the planning period of 2015 to 2035 for the City's established RWSA. The projections were divided into three planning scenarios: Short-term, 6-year (2015 - 2021), Medium-term, 10-year (2022 - 2025), and Long-term, 20-year (2026 - 2035).

Demand projections were expressed as average day demand (ADD), and maximum day demand (MDD). The ADD is typically used in operational evaluations. The MDD represents the single largest day water demand during the year and is a key parameter for infrastructure sizing.

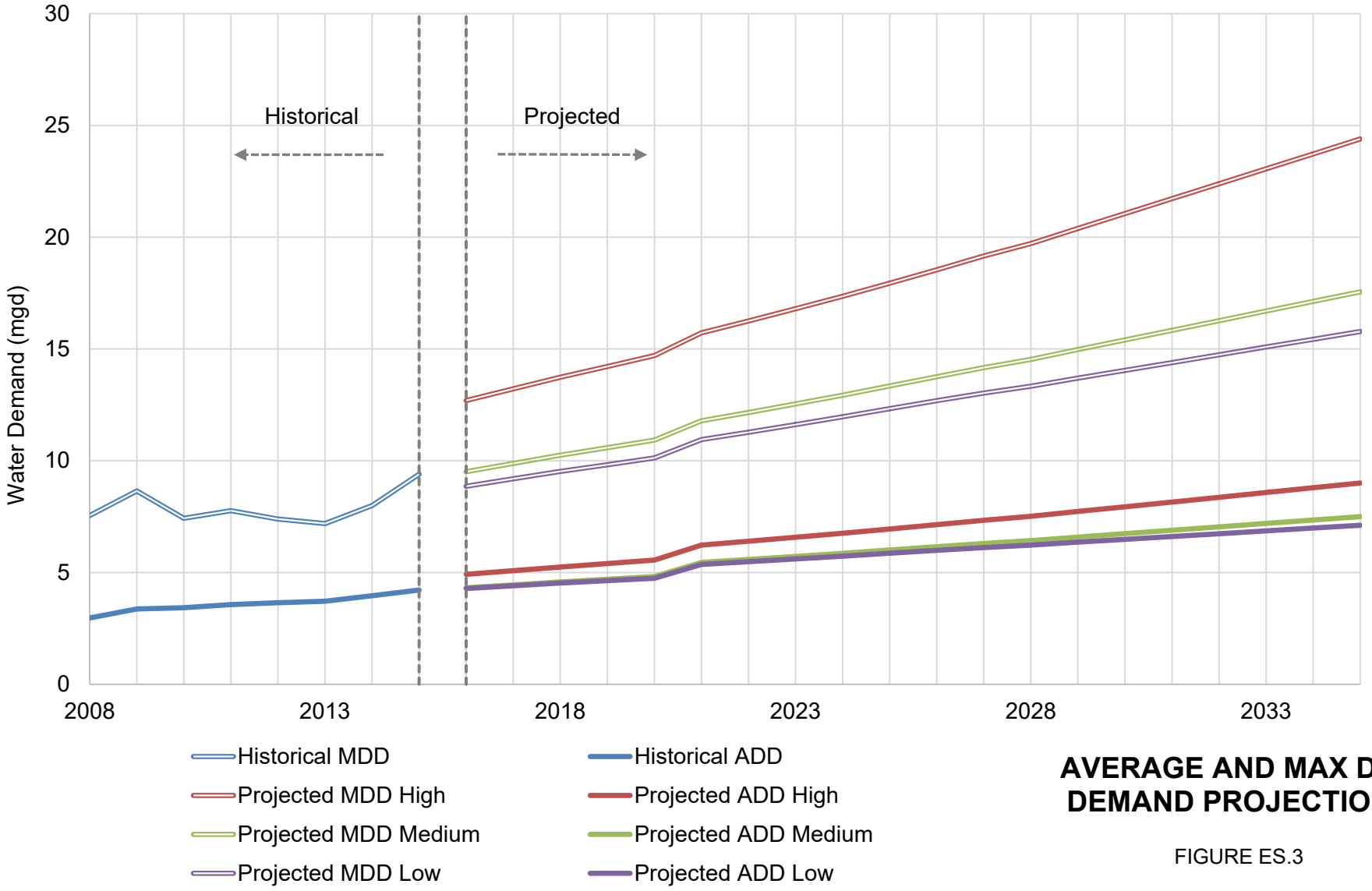
Changes in water use, conservation activities, system growth, and other factors may result in higher or lower than projected water use. Planning for the potential changes allows the City to better manage potential risks from these changes. Therefore, three demand scenarios were developed and shown in Figure ES.3: Low, Medium, and High demand scenarios. The low demand scenario represents future demand with conservation; the medium demand scenario is a conservative projection between the low and high projections; the high demand scenario generally reflects the highest demands in the last eight years.

ES.6 WATER USE EFFICIENCY

The City promotes efficient water use to conserve and protect their existing water supplies for present and future residents. Chapter 6 summarizes the City's Water Use Efficiency (WUE) efforts. The WUE Program goals established in 2013, which have been maintained, are:

- **Demand-Side Goal:** Reduce customer consumption per equivalent residential unit (ERU) by 1 percent or approximately 2 gallons per day (gpd) per year over the next 6 years.
- **Supply-Side Goal:** Continue to reduce distribution loss to at or below 10 percent for the next 5 years.

To meet these goals, the City promotes water conservation and efficient use of water through a variety of activities with the aim of reducing customer water use (conservation) and water loss through leak detection activities. The City's new Advanced Meter Reading (AMR) meters support both WUE aims.



AVERAGE AND MAX DAY DEMAND PROJECTIONS

FIGURE ES.3

CITY OF CAMAS
WATER SYSTEM PLAN UPDATE

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ES.7 WATER QUALITY

The City is defined as a Group A – Community Water System and must comply with the drinking water standards of the federal Safe Drinking Water Act (SDWA) and its amendments, as regulated by the United States Environmental Protection Agency (USEPA). DOH adopted the updated federal standards under WAC 246-290, of which the most recent version became effective April 8, 2016. The City is in compliance with all requirements, as described in Chapter 7. Alternatively to the Chapter, the City publishes an annual Water Quality Report that keeps consumers informed as to the quality of the City's water supply and water delivery systems.

The City does not anticipate issues with meeting future regulatory requirements based on the limited available information.

ES.8 WATER RESOURCES

To meet future demands, the City will be required to fully use its water resources and develop new sources to continue to provide a high level of service. Chapter 8 presents a water right strategy for future water rights and supply needs.

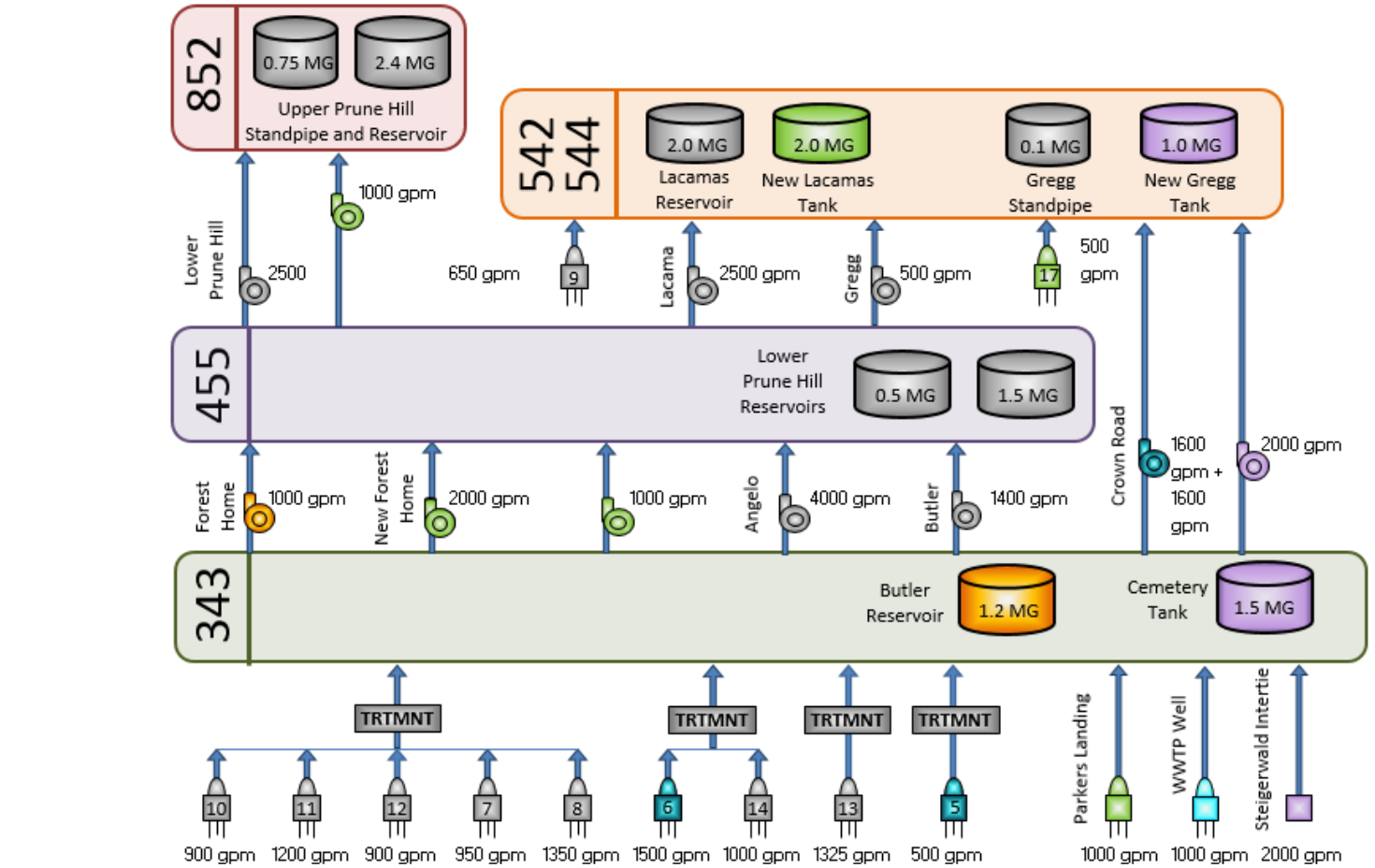
The City water supply strategy largely continues previously planned water supply projects and new water sources. Previously planned projects will be needed to meet growth, including Well 17 and the Parkers Landing Well. In addition to previously planned projects, the City anticipates completing the Washougal Wellfield Renewal Project to increase the ability to pump and reliability of the wellfield. Future supplies beyond the City's existing or planned wells will be from the Steigerweld Regional Supply.

In addition to new supplies, it is recommended that they continue its WUE program efforts to reduce the risk of very high peak demands.

ES.9 SYSTEM ANALYSIS

The City's water distribution system was evaluated for its ability to meet the City's performance criteria under 2021, 2025, and 2035 future conditions. The distribution system was evaluated for its pumping reliability and redundancy and the availability of storage using a desktop system analysis. Service pressures and available fire flows for both MDD and ADD conditions were evaluated using the City's updated hydraulic model.

Chapter 9 presents the results of the system analysis and discusses in detail recommended improvements to meet the City's level of service goals. These recommendations form the basis of the City's capital improvement program (CIP) outlined in Chapter 10. Supply, pumping, and storage project will be necessary during the planning horizon to meet the City's projected substantial growth in water demand, as shown in Figure ES.4.



RECOMMENDED SUPPLY, PUMPING, AND STORAGE IMPROVEMENTS

FIGURE ES.4

CITY OF CAMAS
WATER SYSTEM PLAN UPDATE

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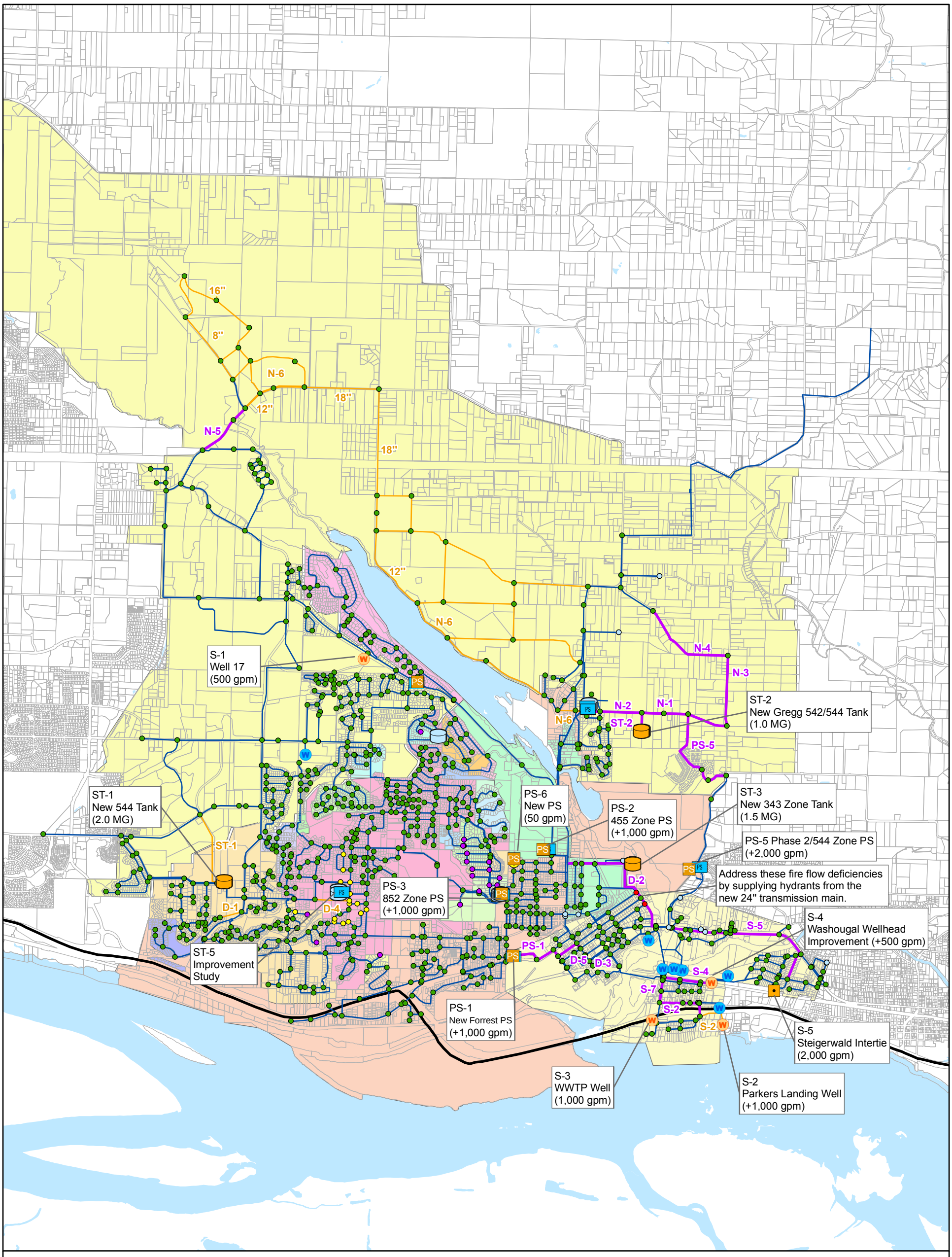
The existing distribution system was evaluated for pressure during peak demand use and during fire flow events. Capacity improvements recommended to address pressure and fire flow deficiencies. Overall, the City had relatively few distribution system improvements, which are shown in Figure ES.5. The majority of deficiencies occur on dead-end mains or areas of high elevation. Additional flows can be supplied to these areas through small, local projects likely completed when the parcels redevelop or a nearby project occurs. It is recommended that the City address these as a programmatic manner that provides funds to address one or two of these areas per year. Additional distribution system improvements are recommended in conjunction with supply or pump station projects.

Within the planning period the City expects significant expansion of the water system in the North Shore area. Future pipelines were sized for the North Shore area.



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ES.10 CAPITAL IMPROVEMENT PLAN

Chapter 10 summarizes the City's comprehensive CIP for the water system that is based on the analyses presented in previous Chapters. The purpose of the CIP is to provide the City with a guideline for planning and budgeting of its water system. The CIP consists of schedule and cost estimates in present dollars for each project, as shown in Table ES.1.

The CIP cost estimates presented in this chapter are American Academy of Cost Engineers (AACE) Class 4 estimates. Class 4 estimates are budget level estimates. Actual costs may vary from these estimates by -30 percent to +50 percent. These costs were determined based on the City's and Consultant’s perception of current conditions at the project locations.

This Plan contains time fames that are the intended framework for future funding decisions. However, these timeframes are estimates and may change depending on factors involved in the growth, project implementation, and availability of funding. The framework does not represent actual commitments by the City.

ES.11 FINANCIAL PLAN

FCS GROUP provided a financial program that allows the City's water utility to remain financially viable during the planning period, which is summarized in Chapter 11. This financial viability analysis considers the historical financial condition, current and identified future financial and policy obligations, O&M needs, and the ability to support the financial impacts related to the completion of the capital projects identified in this Plan. Furthermore, this Chapter provides a review of the water utility’s current rate structure with respect to rate adequacy and customer affordability.

The results of this Financial Plan indicate that rates must increase to provide revenue sufficient to cover all utility financial obligations, including the addition of new debt and partial cash funding of the capital program through 2026. A rate increase of 5.0 percent in 2018, followed by annual rate increases of 2.5 percent through 2026 should provide for continued financial viability while maintaining generally affordable rates.

Table ES.1 CIP Project Summary
Water System Plan Update
City of Camas

Capital Improvement Program Summary

Project No.	SDC Area	Project Name	Developer Share	Total CIP Cost Estimate	CIP Phasing										Project Type		
					2017	2018	2019	2020	2021	2022	2023	Short-term (2017-2022)	Mid-term (2023-2026)	Long-term (2027-2036)	Capacity	Upgrade	R&R
Supply				**$28,937,000**	**$2,852,000**	**$2,296,000**	**$759,000**	**$3,595,000**	**$440,000**	**$723,000**	**$2,813,250**	**$10,665,000**	**$7,684,000**	**$10,588,000**			
S-1	Common	Well 17	0%	$1,815,000	$150,000	$1,665,000	$ -	$ -	$ -	$ -	$ -	$1,815,000	$ -	$ -	100%	0%	0%
S-2	Common	Parkers Landing Well	0%	$4,560,000	$ -	$456,000	$684,000	$3,420,000	$ -	$ -	$ -	$4,560,000	$ -	$ -	100%	0%	0%
S-3	Common	WWTP Well	0%	$3,651,000	$ -	$ -	$ -	$ -	$365,100	$547,650	$2,738,250	$912,750	$2,738,250	$ -	100%	0%	0%
S-4	Common	Washougal Wellfield Improvements	0%	$4,446,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$4,446,000	$ -	100%	0%	0%
S-5	Common	Steigerwald Regional Source	0%	$10,823,000	$60,000	$75,000	$75,000	$75,000	$75,000	$75,000	$75,000	$435,000	$300,000	$10,088,000	100%	0%	0%
S-6	Common	Watershed Forest Management	0%	$1,070,000	$70,000	$100,000	$ -	$100,000	$ -	$100,000	$ -	$370,000	$200,000	$500,000	0%	0%	100%
S-7	Common	544 Zone Watershed Source Improvements	0%	$2,572,083	$2,572,083	$ -	$ -	$ -	$ -	$ -	$ -	$2,572,083	$ -	$ -	0%	0%	100%
Distribution System Improvements				**$6,024,000**	**$515,000**	**$55,000**	**$861,000**	**$2,064,000**	**$778,000**	**$55,000**	**$55,000**	**$4,328,000**	**$2,070,000**	**$1,476,000**			
D-1	South	Transmission main from NW 11 Cir to NW Brady Rd	0%	$269,000	$ -	$ -	$ -	$ -	$269,000	$ -	$ -	$269,000	$ -	$ -	0%	0%	100%
D-2	Common	343 Zone Supply Transmission Upsizing	0%	$2,505,000	$ -	$ -	$626,250	$1,878,750	$ -	$ -	$ -	$2,505,000	$ -	$ -	50%	50%	0%
D-3	South	NE Birch St upsized transmission main	0%	$65,000	$ -	$ -	$ -	$ -	$65,000	$ -	$ -	$65,000	$ -	$ -	0%	0%	100%
D-4	South	New transmission main along NW 16th Ave	0%	$519,000	$ -	$ -	$ -	$129,750	$389,250	$ -	$ -	$519,000	$ -	$ -	0%	0%	100%
D-5	South	New Distribution along NW 6th Ave/ NE Adams St	0%	$926,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$926,000	100%	0%	0%
D-6	South	Dead-end Looping Program	0%	$1,045,000	$ -	$55,000	$55,000	$55,000	$55,000	$55,000	$55,000	$275,000	$220,000	$550,000	0%	0%	100%
D-7	Common	PRV Adjustment Study	0%	$180,000	$ -	$ -	$180,000	$ -	$ -	$ -	$ -	$180,000	$ -	$ -	0%	0%	100%
D-8	Common	Well 6/14 Transmission Line	0%	$515,050	$515,050	$ -	$ -	$ -	$ -	$ -	$ -	$515,050	$ -	$ -	0%	0%	100%
D-9	Common	Parallel Boulder Creek Intake	0%	$1,850,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$1,850,000	$ -	100%	0%	0%
Pump Station				**$11,526,000**	$ -	**$925,000**	**$463,000**	**$28,000**	$ -	$ -	**$544,500**	**$1,416,000**	**$4,141,000**	**$5,969,000**			
PS-1	South	New Forest Home PS	0%	$3,117,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$779,250	$2,337,750	0%	50%	50%
PS-2	Common	New 455 Zone PS Capacity	0%	$1,258,000	$ -	$ -	$ -	$ -	$ -	$ -	$314,500	$ -	$1,258,000	$ -	0%	50%	50%
PS-3	Common	Lower Prune Hill PS Expansion	0%	$1,388,000	$ -	$925,000	$463,000	$ -	$ -	$ -	$ -	$1,388,000	$ -	$ -	0%	50%	50%
PS-4	25% South/75% North Shore	North Shore PS Capacity Phase I	75%	$1,184,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$1,184,000	$ -	100%	0%	0%
PS-5	25% South/75% North Shore	North Shore PS Capacity Phase II	75%	$3,631,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$3,631,000	100%	0%	0%

Table ES.1 CIP Project Summary
Water System Plan Update
City of Camas

Capital Improvement Program Summary

Project No.	SDC Area	Project Name	Developer Share	Total CIP Cost Estimate	CIP Phasing										Project Type		
					2017	2018	2019	2020	2021	2022	2023	Short-term (2017-2022)	Mid-term (2023-2026)	Long-term (2027-2036)	Capacity	Upgrade	R&R
Pump Station				**$11,526,000**	**$ -**	**$925,000**	**$463,000**	**$28,000**	**$ -**	**$ -**	**$544,500**	**$1,416,000**	**$4,141,000**	**$5,969,000**			
PS-6	South	NW Couch St PS	0%	$920,000	$ -	$ -	$ -	$ -	$ -	$ -	$230,000	$ -	$920,000	$ -	0%	0%	100%
PS-7	South	NW 10th Ave Study	0%	$28,000	$ -	$ -	$ -	$28,000	$ -	$ -	$ -	$28,000	$ -	$ -	0%	0%	100%
Storage				**$21,087,000**	**$2,947,000**	**$4,289,000**	**$ -**	**$711,000**	**$1,205,000**	**$5,331,000**	**$ -**	**$14,483,000**	**$ -**	**$6,604,000**			
ST-1	Common	New 544 Zone Reservoir	0%	$7,236,000	$2,946,660	$4,289,340	$ -	$ -	$ -	$ -	$ -	$7,236,000	$ -	$ -	100%	0%	0%
ST-2	Common	New Gregg Tank	75%	$3,984,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$3,984,000	100%	0%	0%
ST-3	South	343 Zone Reservoir	0%	$7,108,000	$ -	$ -	$ -	$710,800	$1,066,200	$5,331,000	$ -	$7,108,000	$ -	$ -	25%	0%	75%
ST-4	Common	Lower Prune Hill Reservoir Rehabilitation	0%	$2,620,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$2,620,000	0%	25%	75%
ST-5	Common	Upper Prune Hill Pressure Improvements Study	0%	$139,000	$ -	$ -	$ -	$ -	$139,000	$ -	$ -	$139,000	$ -	$ -	0%	50%	50%
General				**$550,000**	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	**$275,000**	**$275,000**			
G-1	Common	Water System Plan Update	0%	$550,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$275,000	$275,000	0%	0%	100%
Repair and Replacement				**$44,327,000**	**$320,000**	**$470,000**	**$470,000**	**$470,000**	**$1,164,000**	**$390,000**	**$1,951,750**	**$3,284,000**	**$7,807,000**	**$33,236,000**			
R-1	South	Supply R&R Projects	0%	$1,256,000	$120,000	$ -	$ -	$ -	$148,000	$ -	$93,500	$268,000	$374,000	$614,000	0%	0%	100%
R-2	South	Pump R&R Projects	0%	$1,505,000	$ -	$ -	$ -	$ -	$546,000	$ -	$145,750	$546,000	$583,000	$376,000	0%	0%	100%
R-3	South	Pipeline R&R Projects	0%	$40,266,000	$ -	$195,000	$195,000	$195,000	$195,000	$390,000	$1,712,500	$1,170,000	$6,850,000	$32,246,000	0%	0%	100%
R-4	South	Meter Replacement Program	0%	$1,300,000	$200,000	$275,000	$275,000	$275,000	$275,000			$1,300,000	$ -	$ -			
North Shore Expansion				**$25,353,000**	**$3,100,000**	$ -	**$2,225,000**	**$2,225,000**	**$2,225,000**	**$2,225,000**		**$12,000,000**	**$4,450,000**	**$8,903,000**			
NS-1	North Shore	Annual North Shore Distribution Program	75%	$22,253,000	$ -	$ -	$2,225,000	$2,225,000	$2,225,000	$2,225,000		$8,900,000	$4,450,000	$8,903,000	100%	0%	0%
NS-2	North Shore	Leadbetter Road Transmission Main	75%	$3,100,000	$3,100,000	$ -	$ -	$ -	$ -	$ -	$ -	$3,100,000	$ -	$ -			
CIP Total				**$139,654,067**	**$9,733,897**	**$8,035,170**	**$4,778,125**	**$9,092,650**	**$5,812,275**	**$8,723,825**	**$5,364,500**	**$46,175,942**	**$26,427,250**	**$67,050,875**	**$69,050,875**	**$4,858,500**	**$61,007,133**
Annual Cost				$6,983,000	$9,734,000	$8,035,200	$4,778,100	$9,092,700	$5,812,300	$8,723,800	$5,364,500	$7,696,000	$6,606,800	$6,705,100			