

**City Council
Study Session
Finance & Internal Services SFA
July 14, 2025 - 5:30 PM
City Hall Council Chambers**

AGENDA

CALL TO ORDER

PUBLIC PARTICIPATION

- A. The Auburn City Council Study Session Meeting scheduled for Monday, July 14, 2025 at 5:30 p.m. will be held in person and virtually.

Virtual Participation Link:

To view the meeting virtually please click the below link, or call into the meeting at the phone number listed below. The link to the Virtual Meeting is:

<https://www.youtube.com/user/watchauburn/live/?nomobile=1>

To listen to the meeting by phone or Zoom, please call the below number or click the link:

Telephone: 253 205 0468

Toll Free: 888 475 4499

Zoom: <https://us06web.zoom.us/j/81633024648>

ROLL CALL

AGENDA MODIFICATIONS

ANNOUNCEMENTS, REPORTS, AND PRESENTATIONS

- A. King County Solid Waste Division Long-Term Disposal Presentation (Thomas) (30 Minutes)

FINANCE AND INTERNAL SERVICES DISCUSSION ITEMS

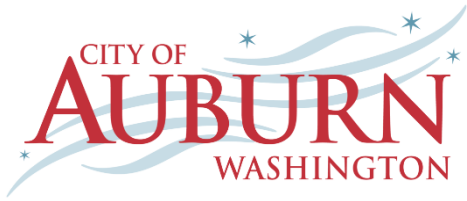
- A. 1st Quarter 2025 Financial Report (Thomas) (20 minutes)
Financial Report through March 31, 2025

AGENDA ITEMS FOR COUNCIL DISCUSSION

- A. General Speed Enforcement Locations with Automated Traffic Safety Cameras (Gaub) (30 Minutes)
- B. Ordinance No. 6980 (Gaub) (15 Minutes)
An Ordinance adopting the City's Amended 2024 Comprehensive Water Plan
- C. Discuss Council Support for Auburn School District Bond Levy (Council)

ADJOURNMENT

Agendas and minutes are available to the public at the City Clerk's Office and on the City website (<http://www.auburnwa.gov>).



AGENDA BILL APPROVAL FORM

Agenda Subject:

King County Solid Waste Division Long-Term Disposal Presentation
(Thomas) (30 Minutes)

Meeting Date:

July 14, 2025

Department:

Finance

Attachments:

LTD Study City Briefing
AUBURN 7-14-2025

Budget Impact:**Administrative Recommendation:**

For discussion only.

Background for Motion:**Background Summary:**

The King County Solid Waste Division (KCSWD) is evaluating long-term disposal options for King County's waste. Currently, solid waste generated within King County (excluding Seattle and Milton) goes to the Cedar Hills Landfill in Maple Valley, which is expected to close in 2040.

Councilmember: Kate Baldwin

Staff: Jamie Thomas

Long-Term Disposal Study

City of Auburn | July 14, 2025



King County's Solid Waste Division

Vision

Achieve Zero Waste of Resources and enhancing the environment through collaboration and innovation

Service area

37 cities (all but Seattle and Milton) and unincorporated areas in King County

We operate

- Eight transfer stations
- Two rural drop boxes
- Nine closed landfills
- One currently operating landfill



Agenda

Study Purpose and Background
Study Overview and Engagement
Criteria Analyzed
Key Results
Next Steps

Purpose of the Long-Term Disposal (LTD) Study

To help inform the decision making for County and ILA Partners

Cedar Hills Regional Landfill expected to reach capacity by 2040

To help plan for various waste amounts, including Re+ waste impacts

To help plan for 2040-2060

Our Engagement So Far

- Multiple MSWAC/SWAC Updates
- Open Houses
- 5 Subgroup Meetings on LTD Study
 - Overview
 - Refuse-derived Fuel, Gasification, Pyrolysis
 - Waste Export by Rail (WEBR), Mass Burn with WEBR
 - WEBR, Mass Burn with WEBR deeper dive
- Sound Cities Association Public Issues Committee Briefing
- Regional Policy Committee Briefings

Beyond the Scope of the LTD Study

- Hyper local impacts on environment and communities
 - The SEPA EIS and a siting study will take a closer look at these impacts
- How Re+ will look
 - This study is focused on disposal, not waste prevention and diversion. Re+ is considered in the analysis.
- Rate Impacts
 - Rates were not forecasted for 2040, but capital and operating costs were analyzed
- Cost benefit analysis of combining different disposal methods
 - Only 2 options are viable
- Partial Early Export
 - Previous analysis shows it is too expensive to export and landfill at Cedar Hills at the same time.

Five Disposal Options Studied

Waste Export by Rail (WEBR)

Mass Burn with WEBR (Mass Burn)

Pyrolysis

Gasification

Refuse-Derived Fuel

Study Criteria

Economic Impact

How expensive to implement?

Environmental Impact

What are the impacts to climate, water, air, health, etc.?

Social Impact

What are the impacts to local neighborhoods?

Capacity

How does each method handle different waste tonnages and types?

Logistics

How easily does each method fit into King County systems?

Operating History

What is the historical record of performance, safety, and compliance?

Key Takeaways

Refuse-Derived Fuel

- Technically capable of processing tonnage amounts
- High competition against better RDF feedstock, like Construction & Demo waste
- There are no guaranteed markets that will buy Municipal Solid Waste-based RDF

Gasification & Pyrolysis

- Most existing facilities are smaller demonstration/pilot plants
- Facilities have not been successful in processing MSW without many challenges
- Unable to process even low-end tonnage amounts

Advisory Committees unanimously agreed to remove these options from consideration. Analyses will remain in the final report.

Key Takeaways

Mass Burn with WEBR (1 of 2)

- Capital: \$1.2 billion; Operational: \$54 million + \$23 million ash disposal; Cost per Ton of \$231 (2040\$)
- Difficult to site and permit
- Life Cycle Analysis (LCA) shows benefit in non-renewable energy demand, acidification potential, and smog formation potential.
- LCA shows detriment in global warming, water consumption, and cancer potential.

Key Takeaways

Mass Burn with WEBR (2 of 2)

- Financially disincentivizes lowering tonnage throughput (not very compatible with Re+)
- Reduces waste 75% by weight. Ash residuals would need to be transported to ash monofill (WEBR)
- Recent closures of Mass Burn facilities on West Coast
- Energy from Mass Burn generally prohibited from being used within the State due to Clean Energy Transformation Act, MSW not renewable resource under state law

Key Takeaways

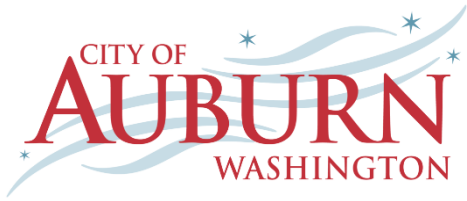
Waste Export by Rail

- Capital: \$3.3 million; Operational: \$72 million; Cost per Ton of \$108 (2040\$)
- Can utilize existing infrastructure, so no need to site and build a new facility
- LCA shows benefit in water consumption. Neutral in cancer potential.
- Can more easily accommodate changing tonnage amounts (more compatible with Re+)
- Washington State Rail Plan 2019-2040: King County tonnage and expected rail use growth should not significantly impact rail capacity
- Railroads prefer contracts of 5-10 years. Future pricing projections are difficult and exposes County to risk

Next Steps

- Q2 2025: Begin SEPA Process
 - Dates TBD: Scoping Comment Period (4 in-person, 1 virtual)*
 - Dates TBD: Draft EIS Comment Period (4 in-person, 1 virtual)*
- Q2 2025: Begin City Briefings*
- 2025-2026: Regular EIS updates to Advisory Committees*
- Q4 2026: Final EIS
- **Q1-Q2 2027: Seek Advisory Committee recommendations**
- Q2 2027: Exec Office decision

John Walsh
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AGENDA BILL APPROVAL FORM

Agenda Subject:

1st Quarter 2025 Financial Report (Thomas) (20 minutes)
Financial Report through March 31, 2025

Meeting Date:

July 14, 2025

Department:

Finance

Attachments:

2025 Q1 Financial Update,
Financial Report through March
2025 (FINAL)

Budget Impact:**Administrative Recommendation:**

For discussion only.

Background for Motion:**Background Summary:**

The financial report summarizes the general state of Citywide financial affairs and highlights significant items or trends that the City Council should be aware of. The attachment provides year-to-date financial activity through March 31, 2025, based on financial data available as of May 10, 2025.

Councilmember: Kate Baldwin

Staff: Jamie Thomas

City of Auburn 1st Quarter 2025 Financial Report

CITY COUNCIL STUDY SESSION

JULY 14, 2025

General Fund Revenue Overview

Summary

- Collected 15% more revenue YTD compared to budget but **collected 16% less than YTD last year**
- Underspent the YTD budgeted expenditures by 7% and but **spent 16% more than YTD last year**
- \$4.0 million more has been spent in 2025 than revenue collected

Revenue	2024 YTD Actual	2025 YTD Budget	2025 YTD Actual	Variance to Budget Favorable (Unfavorable)	%	Variance to 2024 Favorable (Unfavorable)	%
Property Tax	\$ 1,050,494	\$ 1,100,600	\$ 1,190,817	\$ 90,217		\$ 140,323	
Sales Tax	5,669,407	5,551,200	5,778,793	227,593		109,386	
Utility Tax	3,829,113	3,660,544	4,190,016	529,472		360,903	
B&O Tax*	3,101,343	2,152,946	3,413,483	1,260,537		312,140	
Other Tax	1,342,960	1,243,022	1,290,170	47,148		(52,790)	
Licenses and Permits	646,587	704,900	657,664	(47,236)		11,077	
Intergovernmental	1,927,291	1,120,122	919,800	(200,322)		(1,007,491)	
Charges for Services	2,548,349	2,605,247	2,991,733	386,486		443,384	
Other	2,014,717	1,048,539	1,761,927	713,388		(252,790)	
Transfers In	4,270,722	31,500	-	(31,500)		(4,270,722)	
Total Revenue	\$ 26,400,983	\$ 19,218,620	\$ 22,194,403	\$ 2,975,783	15%	\$ (4,206,580)	-16%
Total Expenditures	\$ 22,633,612	\$ 28,175,250	\$ 26,166,558	\$ 2,008,692	7%	\$ (3,532,946)	-16%

Tax Revenue

2025 budgeted taxes account for \$78.5 million, or 76% of the General Fund budget

- Compared to 67% in 2024 – making the General Fund more reliant on taxes than other funding sources

Property Tax (32% of taxes)

- \$25 million 2025 budget
- Collected 100% at year-end

Retail Sales and Use Tax (29% of taxes)

- \$22.6 million 2025 budget
- \$228,000 (4%) over 2025 YTD budget
- \$109,000 (2%) over 2024 YTD actual

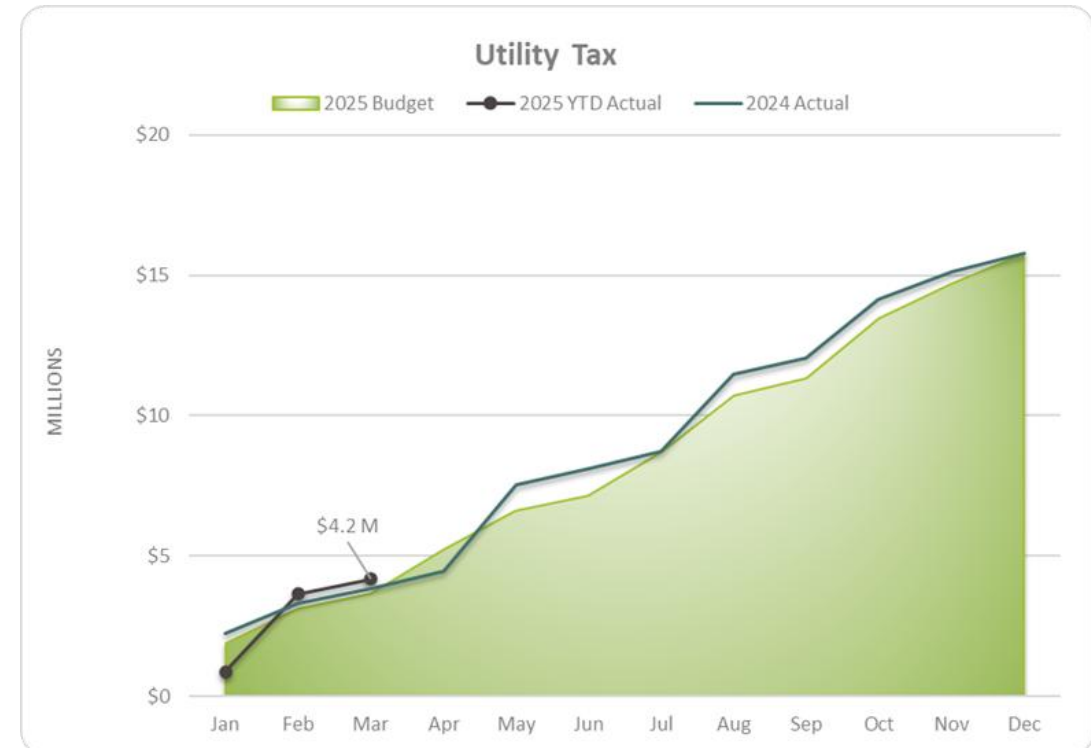
Tax Revenue

Comparison of Retail Sales Tax Collections by Group Through March 2025				
Component Group	2024	2025	Change from 2024	
	YTD Actual	YTD Actual	Amount	Percentage
Construction	\$ 643,986	\$ 611,356	\$ (32,630)	(5.1) %
Manufacturing	137,690	121,039	(16,651)	(12.1) %
Transportation & Warehousing	74,690	84,567	9,877	13.2 %
Wholesale Trade	405,833	380,173	(25,661)	(6.3) %
Automotive	1,169,340	1,243,828	74,488	6.4 %
Retail Trade	1,751,600	1,754,392	2,791	0.2 %
Services	1,397,566	1,476,200	78,633	5.6 %
Miscellaneous	88,702	107,238	18,537	20.9 %
YTD Total	\$ 5,669,407	\$ 5,778,793	\$ 109,385	1.9 %

Tax Revenue

Utility Tax (20% of taxes)

- \$15.8 million 2025 budget
 - Water, Sewer, Storm, Solid Waste Utility Tax rate 9% (\$7.8 million of total budget)
 - Electric, Natural Gas, Cable, and Telephone Utility Tax rate 5% (\$8.0 million of total budget)
- **\$529,000 (14%) over** 2025 YTD budget
 - Higher than expected water, sewer, storm collections
- **\$361,000 (9%) over** 2024 YTD actual
 - Higher than expected water, sewer, storm collections



Tax Revenue

Business and Occupation Tax (B&O) (13% of total taxes)

- \$10.0 million 2025 budget
- \$3.4 million collected YTD: \$2.1 million in gross receipts tax (62%) and \$1.3 million in square foot tax (38%)
 - Includes Q4 2024 and some 2024 Annual Filings
- **\$1.3 million (59%)** over 2025 YTD budget
- **\$312,000 (10%)** over 2024 YTD actual

Other Taxes (7% of total taxes)

- \$5.1 million 2025 budget
- Criminal justice sales tax, admissions tax, gambling tax, leasehold excise tax, franchise fees
- **\$47,000 (4%)** over 2025 YTD budget
 - Due to higher sales tax collection – criminal justice sales tax
- **\$53,000 (4%) below** 2024 YTD actual
 - An extra \$87,000 had been collected during the same time frame in the prior year for delinquent taxes

Licenses and Permits

Accounts for 3% of the total General Fund Resources

\$3.0 million budgeted in 2025

- \$950,000 is building permit revenue

\$47,000 (7%) under 2025 YTD budget

\$11,000 (2%) over 2024 YTD actual

- Due to more business license revenue collection offsetting slight decreases in building permit and license revenue collection



Intergovernmental

Revenues include: Federal/State/Interlocal Grants, Muckleshoot Indian Tribe (MIT) Compact, State Shared Revenue

- State Shared Revenue:
 - Streamlined Sales Tax, Motor Vehicle Excise Tax (MVET), Marijuana/Liquor excise taxes, Criminal Justice Sales Tax

\$200,000 (18%) under 2025 YTD budget

- Lower collection of grants and less MVET tax collected than budgeted

\$1.0 million (52%) under 2024 YTD collections

- Timing of contribution payment from the MIT compact, lower collection of grants and reduced state shared revenue contributions

Charges for Services

General Government - \$1,500 above budget (.1%)

- Increased passport fees due to the Real ID program

Public Safety - \$90,000 below budget (30%)

- Extra duty services

Development Services - \$384,000 above budget (116%)

- Plan check fees for two large projects

Culture and Recreation - \$91,000 above budget (13%)

- Reduced revenue from green fees and pro shop sales (\$191,000) is offset by increased recreation class program revenue

Other

Fines and Penalties

- \$198,000 over 2025 YTD budget (34%)
 - B&O fines and penalties (\$144,000)

Interest and Investment Earnings

- \$478,000 over 2025 YTD budget (345%)
- \$189,000 over 2024 YTD actual (44%)

General Fund Expenditures by Department

Department	2024 YTD Actual	2025 YTD Budget	2025 YTD Actual	Budget vs Actual	
				\$	%
Council, Mayor, Admin	702,632	825,166	717,580	107,586	13%
Office of Equity	175,123	271,647	99,712	171,935	63%
Municipal Court	265,572	341,043	360,702	(19,659)	-6%
Community Development	1,597,614	1,718,227	1,732,199	(13,972)	-1%
Human Services	58,100	633,659	498,518	135,141	21%
Public Works	1,244,139	1,610,593	1,581,097	29,496	2%
Streets (M&O)	1,053,765	1,417,109	1,373,749	43,360	3%
Parks, Art, and Recreation	3,660,307	4,124,509	4,140,726	(16,217)	0%
Police	8,679,621	11,306,082	9,960,347	1,345,735	12%
SCORE	1,216,494	1,475,100	1,463,808	11,292	1%
Internal Services (HR, Finance, Legal, Nondepartment)	3,980,246	4,452,115	4,238,121	213,994	5%
Total	\$ 22,633,613	\$ 28,175,250	\$ 26,166,559	\$ 2,008,691	7%

ARPA Update

Title	Budget	2025	Lifetime Spend	
		Q1 Spend	(includes this quarter)	Remaining
Completed Projects	2,884,452	-	2,745,358	-
Neighborhood Street Light Program	1,300,000	397,707	802,037	497,963
Neighborhood Traffic Calming	200,000	187,463	200,000	-
Recreation Access Grants	150,000	-	886	149,114
Human Services Grants Includes Admin	1,000,000	-	445,882	554,118
Theater	389,700	-	-	389,700
Tyler Tech MUNIS Financial Implementation	301,500	-	-	301,500
Paving Gravel Roads	135,000	-	137,836	-
2023 Local Street Preservation	501,886	-	48,167	453,719
Translation Services	25,000	-	1,685	23,315
Cyber Security Locks	50,000	-	-	50,000
Auburn Way South Median Landscape Replanting/Irrigation	50,000	-	40,187	9,814
Auburn Way South Roundabout	150,000	392	53,231	96,769
Emergency Housing Voucher Program	2,000,000	87,432	663,314	1,336,686
DEI Dashboard (Inclusive Auburn)	130,000	-	92,805	37,195
Duct cleaning in applicable buildings	150,000	-	184,219	-
Encampment Cleanup	500,000	-	456,403	43,597
Downtown Sidewalk Replacement on Main Street and B Street Plaza Surface Replacement	1,819,409	16,173	629,001	1,190,408
Cameras in qualified census tracts	150,000	-	211,158	-
Community Violence Intervention Programs (Drone, SPIDRTech)	236,248	-	204,436	31,812
Arts Culture Center Renovations	100,000	-	-	100,000
Auburn Ave Theater Demolition	490,000	500	438,272	51,728
Signing Bonuses for Police Lateral Hires	200,000	21,699	240,881	-
Other Projects (not started)	1,838,037	-	-	1,838,037
Total:	14,751,231	711,366	7,595,756	7,155,475

Non-General Fund Highlights – Capital

Real Estate Excise Tax (REET)

Total 2025 Budget: \$1.8 million

YTD Collections: \$735,000

\$377,000 less than 2024 YTD actual

\$344,000 over 2025 YTD budget



Questions

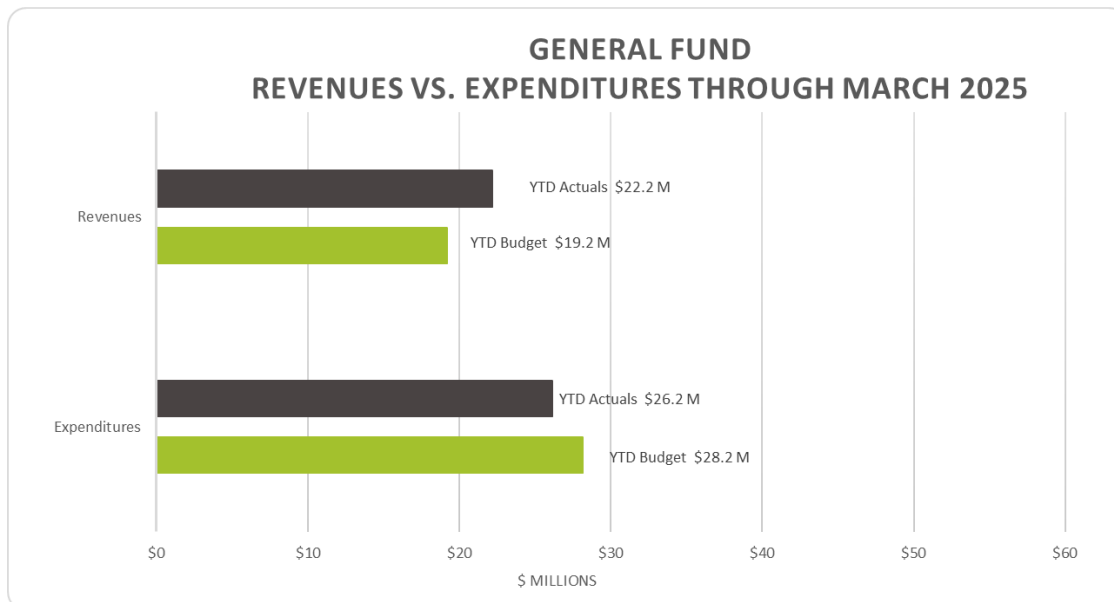
This report provides an overview of the City's overall cash-basis financial position for the fiscal period ending March 31, 2025, reflecting data available as of May 10, 2025. References to budget, actual and prior year amounts reflect year-to-date numbers, unless otherwise stated. Year-to-date budget expectations are generally based on the two prior years of data.

General Fund Overview

Although 2024 ended favorable to both revenue and expenditure projections, the new year has begun with a higher degree of uncertainty. The City anticipates that the favorable variances at the seen in prior years will diminish in magnitude this year. With the adoption of Ordinance #6948 last November, the 2025 annual budget consists of \$103.4 million in revenues and \$109.1 million in expenditures - a planned decrease in General Fund balance of \$5.8 million.

Through the first quarter of 2025, the General Fund outperformed revenue expectations by \$3.0 million or 16%. However, the General Fund has collected \$4.2 million or 16% less revenue year-to-date than the same period in 2024, mainly due to the final transfer in of ARPA monies last year. A large contributor to the favorable variance to budget outcome is Business and Occupation (B&O) tax revenue; through the first quarter the City collected \$3.4 million in B&O taxes, which includes back dated collections. Despite strong first-quarter performance, the City anticipates B&O revenues will decline from a high point of \$11.6 million in 2024 as payments related to prior periods decrease. The City also approved an expansion of the photo enforcement program to fund transportation projects throughout the City; the program overall has generated \$502,400 in revenue year-to-date. The City saw expenditures increase from the same period last year by \$3.5 million or 16%. This is due to planned increases in overhead costs, professional services (citywide projects and improvements), and insurance premiums.

Overall, General Fund revenues collected through Q1-2025 totaled \$22.2 million as compared to the year-to-date budget of \$19.2 million, and were \$3.0 million, or **16% above** budget expectations. General Fund expenditures totaled \$26.2 million compared to the year-to-date budget of \$28.2 million, resulting in a \$2.0 million or **7% underspend**.



Revenue: The following factors had the most significant impact on the budget vs. actual revenue collected:

- Business and Occupation Tax: Revenues collected throughout Q1-2025 totaled \$3.4 million, exceeding the year-to-date budget by \$1.3 million. Some of this favorable variance is due to the collection of tax obligations incurred in prior years, which is not expected to continue at the same level in the future. **[pages 8-9]**
- Interest and Investment Earnings: Throughout Q1-2025, interest and investment earnings have totaled \$617,100 in collections and hold a \$478,400 favorable variance to budget. This is largely due to current investments outperforming expectations throughout this timeframe despite lower interest rates. The City had a large investment mature during this time, contributing to the favorable variance. **[pages 19-20]**
- Development Services: Revenues collected throughout Q1-2025 have totaled \$716,000, compared to a year-to-date budget of \$332,000. Development service revenue collections are the highest they have been in the last eight years, outperforming prior year totals through the same timeframe by \$317,000. This is due to plan check fees assessed on two large projects being completed within City limits. Also contributing to the favorable variance, zoning and subdivision fees are higher than budget expectations by \$17,100. **[pages 16-17]**
- Utility Tax: Q1-2025 revenues collected totaled \$4.2 million and were \$529,500 higher than budget expectations. Collection of backdated utility taxes from solid waste haulers provided roughly 58% of the favorable variance. Likewise, City utility interfund taxes provide a favorable variance to budget of \$123,100, mainly due to higher solid waste tax collections resulting from increased service levels. **[pages 9-10]**
- Retail Sales Tax: The sales tax report for distributions through March 2025 reflects amounts remitted to the City of Auburn based on sales between November 2024 and January 2025. Collections totaled \$5.8 million, a 2% increase from last year totals through the same period, with particularly large year-over-year increases in the service and automotive industries. Compared to the year-to-date budget, sales tax revenues have a favorable variance of \$227,600 or 4%. **[pages 6-8]**

Expenditures: Most of the City's departments operated within year-to-date expectations throughout the first quarter of 2025, with some variances due to the timing of professional services payments, as well as expenses related to projects facilitated by ARPA funding. Overall, the favorable variance to the year-to-date expense budget is \$2.0 million. Contributing to the favorable variance was a savings in salaries and benefits expenses of roughly \$1.4 million; as of the compilation of this report, there were 37 vacant regular full-time positions in the City. Equally, services and charges were below budget expectations through the first quarter by roughly \$138,600. This is partially due to the timing of spending on non-ARPA related projects in progress within the City.

Enterprise Funds Overview

The City's enterprise funds account for operations with revenues primarily provided from user fees, charges, or contracts for services. In the prior year, the maturation of certain investments meant that while the enterprise funds continued to see year-over-year increases in interest earnings, these increases were at a lower growth rate than previous periods. Through Q1-2025, interest earnings for the City's enterprise funds were \$803,000, a \$53,000 increase from Q1-2024.

The **Water Utility Fund** ended Q1-2024 with operating income of \$1.2 million, a marginal decrease of \$9,000 compared to the same period last year. This variance is due primarily to increased personnel costs (\$60,000) and interfund charges (+\$414,000), which offset increases in charges for service (+\$337,000) and interest earnings (+\$79,000). Operating revenues through Q1-2025 were higher than expected compared to our budget projections (+\$403,000), which was driven by favorable variances in charges for service (+\$161,000) and interest earnings (+\$238,000). Operating expenditures were also lower than budget expectations, resulting in a favorable budget variance of \$367,000. This favorable variance was driven by lower than anticipated personnel costs and external utility charges, as well as timing differences for anticipated professional services contracts. [pages 24-25]

The **Sewer Utility Fund** ended Q1-2025 with operating income \$125,000 lower than Q1-2024, coming in at \$1.2 million. While operating revenues increased \$174,000 compared to the same period last year, operating expenditures also increased (+\$300,000). The increase in operating expenditures was driven primarily by increased interfund charges (+\$255,000). In total, operating income for this fund was \$1.1 million higher compared to our budget projections, due to favorable variances in both operating revenues (+\$772,000) and operating expenses (-\$290,000). [page 25]

The **Stormwater Utility Fund** ended Q1-2025 with operating income of \$834,000, \$50,000 lower than operating income through the same period last year. Operating revenues increased \$203,000 compared to the prior year, mainly due to an increase in charges for storm service (+\$217,000). Operating expenditures for this fund also increased compared to the prior year (+\$253,000), due mainly to increased personnel costs as well and interfund charges. This fund outperformed operating income budget projections by \$295,000 through Q1-2025, due to favorable budget variances in both operating revenues (+\$164,000) and expenditures (-\$130,000). [page 25]

The **Solid Waste Utility Fund** ended Q1-2025 with operating income of \$1.7 million, a \$3.3 million decrease compared to Q1-2024. This variance is due to the timing difference of payments made to the City's solid waste provider in Q1-2024. Operating revenues increased \$563,000 from Q1-2024 to Q1-2025, due primarily to increased charges for service (+\$596,000). In all, operating income for this fund came in \$250,000 higher than expected, driven by a favorable budget variance in charges for service (+\$332,000) and offset slightly by higher than anticipated expenditures (+\$87,000). In general, we expect that increases to charges for service in this fund throughout the year will have corresponding increases in payments to the City's solid waste vendor. [pages 25-26]

Internal Service Funds Overview

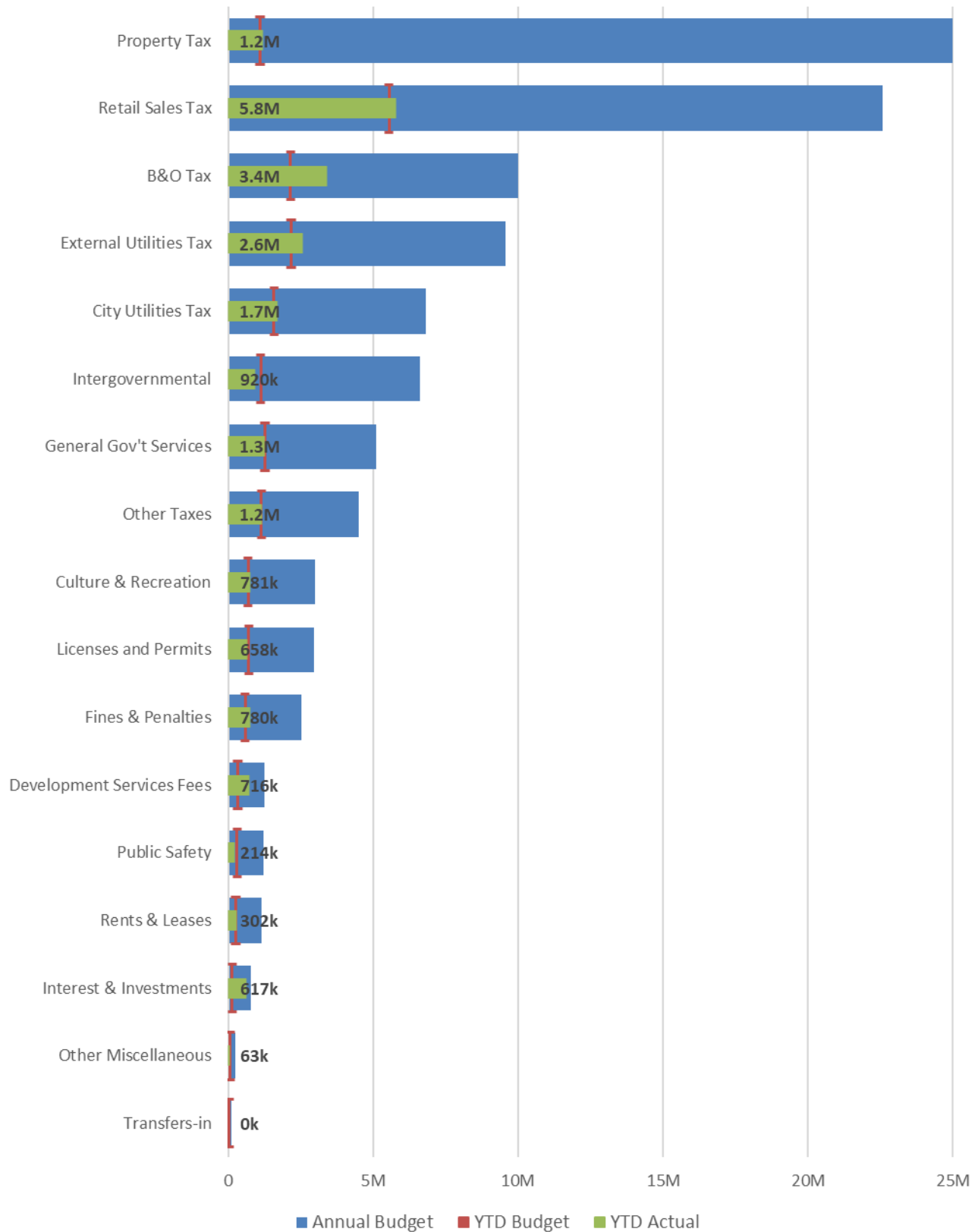
Internal service funds provide services to other City departments and include functions such as Insurance, Worker's Compensation, Facilities, Innovation & Technology, and Equipment Rental. No significant variances were reported in these funds during Q1-2025. [page 26]

General Fund Details

The following chart is a detailed breakdown of the General Fund's different sources of revenue and expenditures, broken down by department:

General Fund Summary of Sources and Uses	2025			2025 YTD Budget vs. Actual		2024	2024 YTD Actual vs. 2023 Actual	
	Annual Budget	YTD Budget	YTD Actual	Favorable (Unfavorable) Amount	Percentage	YTD Actual	Favorable (Unfavorable) Amount	Percentage
Operating Revenues								
Property Tax	\$ 25,002,800	\$ 1,100,600	\$ 1,190,817	\$ 90,217	8.2 %	\$ 1,050,494	\$ 140,323	13.4 %
Retail Sales Tax	22,579,330	5,551,200	5,778,793	227,593	4.1 %	5,669,407	109,385	1.9 %
Affordable Housing Sales Tax Credit	148,000	47,400	47,903	503	1.1 %	47,917	(14)	(0.0) %
Sales Tax - Pierce County Parks	131,100	32,100	33,546	1,446	4.5 %	32,978	568	1.7 %
Criminal Justice Sales Tax	3,067,500	757,900	784,634	26,734	3.5 %	750,485	34,149	4.6 %
Brokered Natural Gas Tax	314,000	134,400	78,519	(55,881)	(41.6) %	95,328	(16,810)	(17.6) %
City Utilities Tax	6,828,200	1,582,200	1,705,971	123,771	7.8 %	1,560,380	145,591	9.3 %
Business & Occupation Tax	9,991,700	2,152,946	3,413,483	1,260,536	58.5 %	3,101,343	312,139	10.1 %
Admissions Tax	252,500	85,000	129,758	44,758	52.7 %	258,571	(128,813)	(49.8) %
Electric Tax	4,695,800	1,098,900	1,179,218	80,318	7.3 %	1,097,323	81,895	7.5 %
Natural Gas Tax	1,417,400	344,800	375,249	30,449	8.8 %	323,043	52,206	16.2 %
Cable Franchise Fee	888,000	222,000	177,098	(44,902)	(20.2) %	195,621	(18,523)	(9.5) %
Cable Utility Tax	917,400	229,350	186,009	(43,341)	(18.9) %	208,503	(22,494)	(10.8) %
Cable Franchise Fee - Capital	51,200	12,800	9,057	(3,743)	(29.2) %	10,197	(1,139)	(11.2) %
Telephone Tax	606,240	159,527	246,283	86,756	54.4 %	230,267	16,016	7.0 %
Solid Waste Tax (external)	987,500	111,367	418,767	307,400	276.0 %	314,269	104,498	33.3 %
Leasehold Excise Tax	286,000	17,800	15,438	(2,362)	(13.3) %	17,868	(2,430)	(13.6) %
Gambling Excise Tax	287,500	68,021	92,736	24,715	36.3 %	29,320	63,416	216.3 %
Taxes sub-total	\$ 78,452,170	\$ 13,708,312	\$ 15,863,279	\$ 2,154,967	15.7 %	\$ 14,993,317	\$ 869,962	5.8 %
Business License Fees	\$ 585,100	\$ 173,600	\$ 189,859	\$ 16,259	9.4 %	\$ 158,848	\$ 31,011	19.5 %
Building Permits	950,200	214,300	223,266	8,966	4.2 %	234,452	(11,185)	(4.8) %
Other Licenses & Permits	1,414,300	317,000	244,539	(72,461)	(22.9) %	253,287	(8,748)	(3.5) %
Intergovernmental (Grants, etc.)	6,614,122	1,120,122	919,800	(200,322)	(17.9) %	1,927,291	(1,007,492)	(52.3) %
Charges for Services:								
General Government Services	5,114,176	1,278,544	1,280,053	1,509	0.1 %	1,131,944	148,109	13.1 %
Public Safety	1,215,556	303,889	214,183	(89,706)	(29.5) %	269,302	(55,119)	(20.5) %
Development Services Fees	1,235,100	332,000	716,004	384,004	115.7 %	398,853	317,151	79.5 %
Culture and Recreation	2,981,200	690,814	781,493	90,678	13.1 %	748,250	33,242	4.4 %
Fines and Penalties	2,522,706	581,346	779,743	198,397	34.1 %	1,069,818	(290,075)	(27.1) %
Fees/Charges/Fines sub-total	\$ 22,632,460	\$ 5,011,615	\$ 5,348,939	\$ 337,324	6.7 %	\$ 6,192,045	\$ (843,105)	(13.6) %
Interest and Investment Earnings	\$ 782,500	\$ 138,679	\$ 617,105	\$ 478,426	345.0 %	\$ 427,829	\$ 189,276	44.2 %
Rents and Leases	1,155,180	259,600	302,492	42,892	16.5 %	289,213	13,280	4.6 %
Contributions and Donations	15,000	782	5,167	4,385	560.8 %	2,352	2,815	119.7 %
Other Miscellaneous	208,000	61,882	37,995	(23,888)	(38.6) %	196,211	(158,216)	(80.6) %
Transfers In	126,000	31,500	-	(31,500)	(100.0) %	4,270,722	(4,270,722)	(100.0) %
Insurance Recoveries - Capital & Operating	25,000	6,250	19,425	13,175	210.8 %	29,294	(9,869)	(33.7) %
Other Revenues sub-total	\$ 2,311,680	\$ 498,693	\$ 982,184	\$ 483,491	97.0 %	\$ 5,215,621	\$ (4,233,437)	(81.2) %
Total Operating Revenues	\$ 103,396,310	\$ 19,218,620	\$ 22,194,402	\$ 2,975,782	15.5 %	\$ 26,400,982	\$ (4,206,580)	(15.9) %
Operating Expenditures								
Council & Mayor	\$ 1,951,839	\$ 540,356	\$ 502,612	\$ 37,744	7.0 %	\$ 376,608	\$ 126,005	33.5 %
Administration	1,040,288	284,810	214,968	69,843	24.5 %	326,024	(111,056)	(34.1) %
Human Resources	2,750,455	712,943	694,663	18,280	2.6 %	596,959	97,704	16.4 %
Municipal Court & Probation	3,445,971	341,043	360,702	(19,660)	(5.8) %	265,572	95,131	35.8 %
Finance	5,610,750	1,484,845	1,437,566	47,279	3.2 %	1,216,178	221,388	18.2 %
City Attorney	4,789,178	1,318,755	1,138,641	180,114	13.7 %	1,460,591	(321,950)	(22.0) %
Community Development	7,298,660	1,718,227	1,732,199	(13,973)	(0.8) %	1,597,614	134,586	8.4 %
Human Services	2,505,743	633,659	498,518	135,141	21.3 %	58,100	440,418	758.0 %
Office of Equity	1,014,008	271,647	99,712	171,935	63.3 %	175,123	(75,412)	(43.1) %
Jail - SCORE	5,900,000	1,475,100	1,463,808	11,292	0.8 %	1,216,494	247,314	20.3 %
Police	40,161,732	11,306,082	9,960,347	1,345,735	11.9 %	8,679,621	1,280,726	14.8 %
Public Works	5,418,201	1,610,593	1,581,097	29,496	1.8 %	1,244,139	336,959	27.1 %
Parks, Arts & Recreation	16,793,773	4,124,509	4,140,726	(16,217)	(0.4) %	3,660,307	480,419	13.1 %
Streets	5,061,298	1,417,109	1,373,749	43,360	3.1 %	1,053,765	319,984	30.4 %
Non-Departmental	5,405,976	935,572	967,251	(31,679)	(3.4) %	706,518	260,732	36.9 %
Total Operating Expenditures	\$ 109,147,872	\$ 28,175,250	\$ 26,166,558	\$ 2,008,691	7.1 %	\$ 22,633,612	\$ 3,532,947	15.6 %

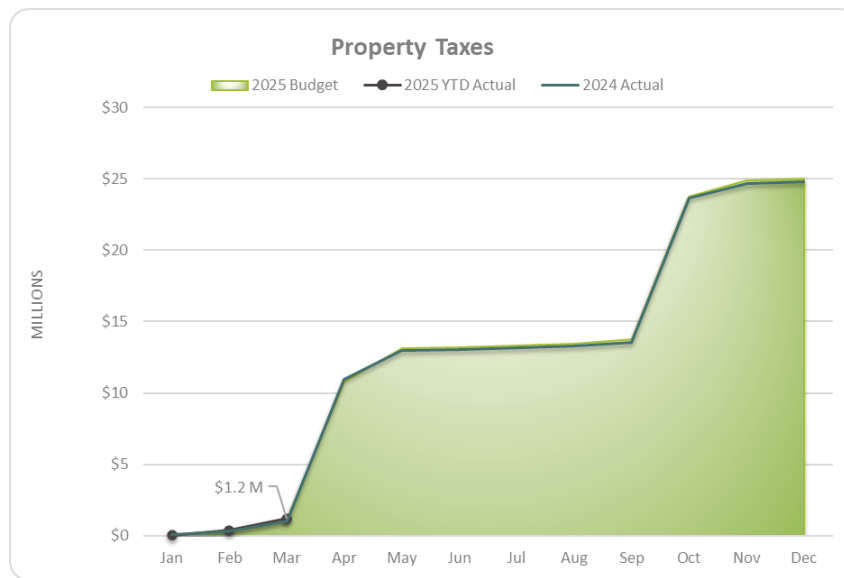
General Fund Revenues Budget Vs Actual



Revenue

Tax revenues, including property, sales/use, utility, business & occupation, gambling, and admissions taxes provide over 76% of all resources supporting general governmental activities. Licenses, charges for services, intergovernmental revenue (grants, state shared revenue, etc.) and fines contribute a further 22% of total revenue to the General Fund. The remaining 2% is comprised of a combination of different sources that are considered to be one-time resources. The following section provides additional information on the most significant tax resource streams.

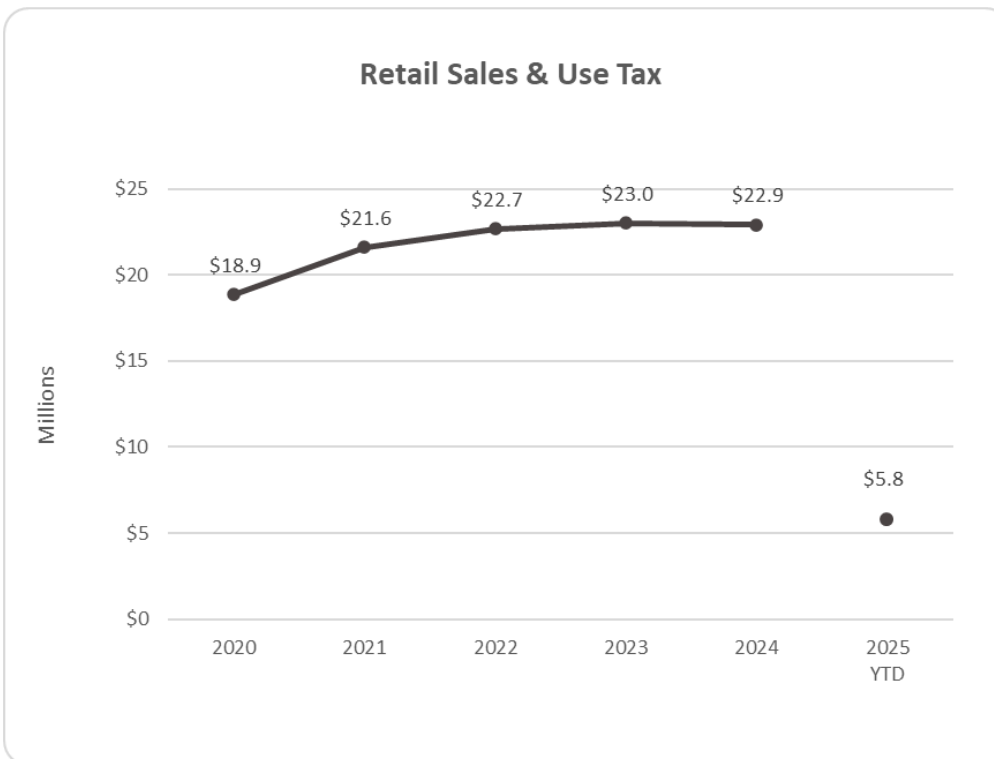
Property Tax collections through the first quarter totaled roughly \$1.2 million, approximately \$90,000 or 8% above budget projections. As depicted in the graphic below, the majority of property taxes are collected during the months of April and October, coinciding with the due dates for county property tax billings.



Retail Sales Tax collections throughout Q1-2025 totaled \$5.8 million, representing taxes remitted to the City of Auburn based on sales from November 2024 through January 2025. Overall, these revenues increased by \$109,400, or 2%, from Q1-2024 collections due to higher performances in the services (+\$78,633) and automotive (+\$74,488) industries. Offsetting the overall increases, decreases in the construction (-\$32,630), wholesale trade (-\$25,661), and manufacturing (-\$16,651) industries diminished the year-to-date increase from prior year totals. In comparison to the year-to-date budget, these revenues are also favorable by nearly \$227,600 or 4% through the first quarter. Historically, the City collects more sales tax revenues during the second half of the year, mainly due to the upcoming holiday seasons.

The City set a retail sales tax budget of \$22.6 million for the fiscal year of 2025, a budgeted decrease of \$326,000 from the prior year actuals. Based on year-to-date performance, collections may exceed this amount by year-end. In its March 2025 economic forecast, King County estimated¹ that sales tax revenues will have an annual growth of 0.30% from 2024 actuals. By comparison, the City budgeted an annual decline of sales tax revenues of -1%. Auburn generally experiences a higher growth rate than the County does, and has seen consistent growth year-over-year except for last year, but the rate of growth is volatile and has generally been in decline since 2019.

¹ King County, WA. 2025. The Office of Economic and Financial Analysis.
<https://kingcounty.gov/en/legacy/independent/forecasting>.



The following table breaks out the City's retail sales taxes by major business sector.

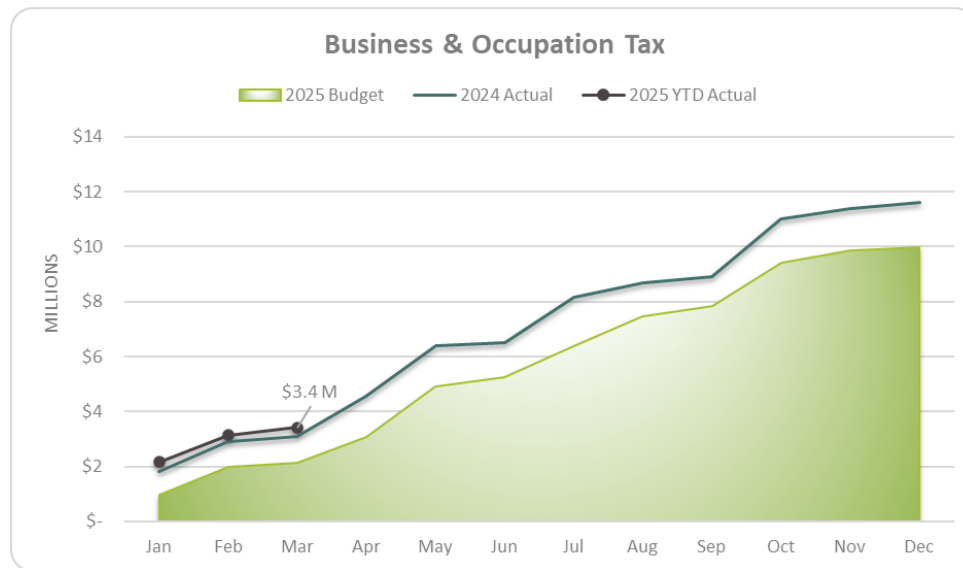
Comparison of Retail Sales Tax Collections by Group Through March 2025				
Component Group	2024	2025	Change from 2024	
	YTD Actual	YTD Actual	Amount	Percentage
Construction	\$ 643,986	\$ 611,356	\$ (32,630)	(5.1) %
Manufacturing	137,690	121,039	(16,651)	(12.1) %
Transportation & Warehousing	74,690	84,567	9,877	13.2 %
Wholesale Trade	405,833	380,173	(25,661)	(6.3) %
Automotive	1,169,340	1,243,828	74,488	6.4 %
Retail Trade	1,751,600	1,754,392	2,791	0.2 %
Services	1,397,566	1,476,200	78,633	5.6 %
Miscellaneous	88,702	107,238	18,537	20.9 %
YTD Total	\$ 5,669,407	\$ 5,778,793	\$ 109,385	1.9 %

Business & Occupation (B&O) Taxes are collected from businesses based on either the value of gross receipts or square footage of occupied warehousing space, subject to certain constraints. While the City receives collections throughout the year, B&O taxes are generally received on a quarterly basis.

By reconciling against the State's Business Licensing System, the City has been able to identify taxes collectable from prior periods, significantly contributing to the performance of this revenue which will bring the anticipated collection amount well over the budgeted totals for this year. Overall collection through the first quarter of the year totaled \$3.4 million versus a year-to-date budget of \$2.2 million. Of the \$3.4 million collected, roughly \$1.7 million or 49% consists of back taxes being paid. Current 2025 collections outpace 2024 collections through the same period by \$1.3 million (59%), although recovery of back taxes is anticipated to decrease over time.

Comparing collections to prior year-to-date totals, the City has collected roughly \$71,500 or 4% more revenue related to gross receipts, while square footage collections are \$240,600 or 23% higher than prior year totals.

Business & Occupation Tax Through March 2025								
Revenue	2025			Favorable (Unfavorable)		2024	2025 YTD Actual vs. 2024 Actual	
	Annual Budget	YTD Budget	YTD Actual	Amount	Percentage	YTD Actual	Amount	Percentage
Gross Receipts	\$ 6,973,700	\$ 1,502,647	\$ 2,115,403	\$ 612,756	40.8%	\$ 2,043,904	\$ 71,499	3.5%
Square Footage	3,018,000	650,299	1,298,079	647,781	99.6%	1,057,439	240,641	22.8%
Total	\$ 9,991,700	\$ 2,152,946	\$ 3,413,483	\$ 1,260,536	58.5%	\$ 3,101,343	\$ 312,139	10.1%



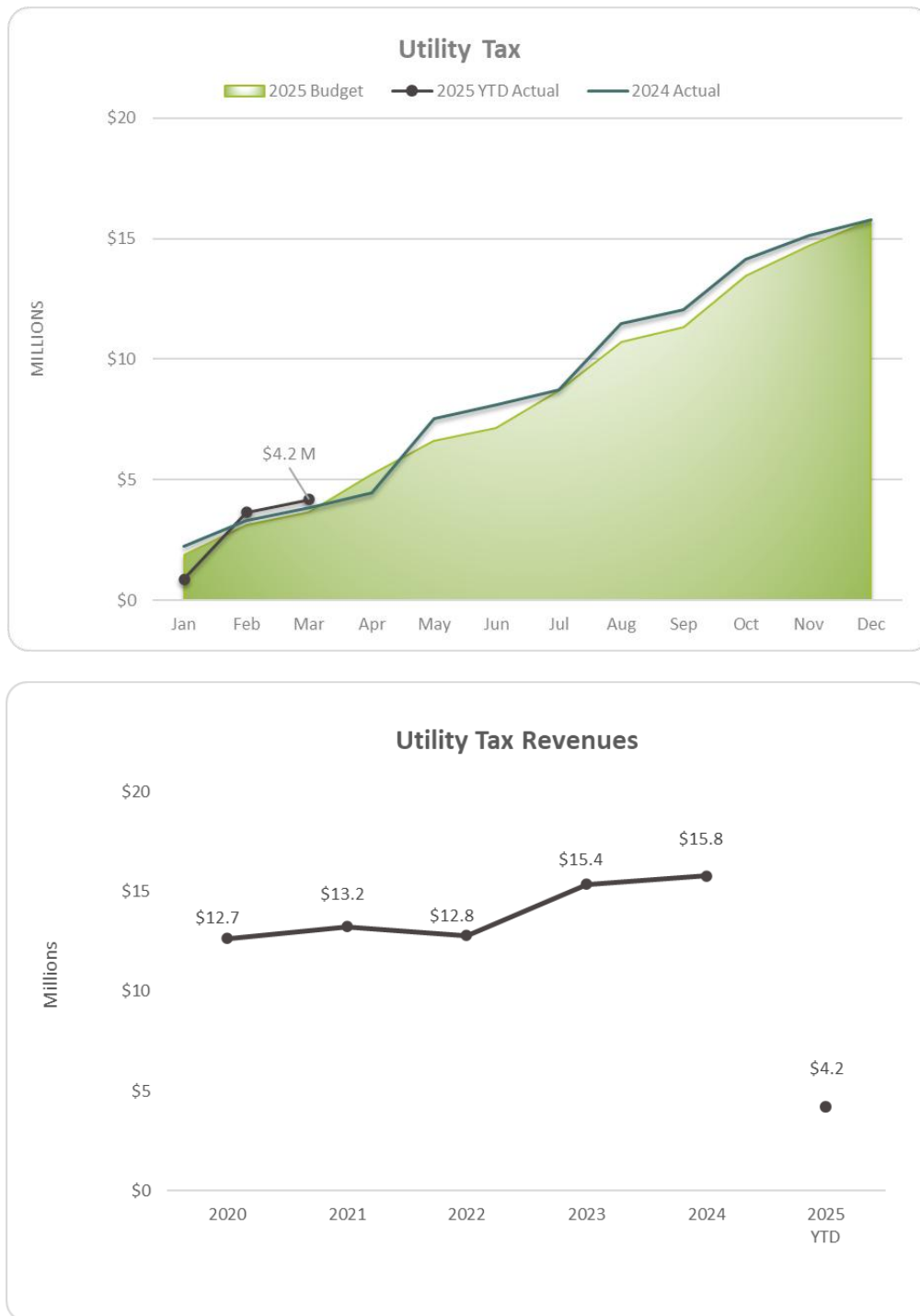
Utility Taxes consist of an 11.5% tax on the gross revenues of water, sewer, storm drainage and solid waste utilities and a 6.0% tax on electric, natural gas, and telephone utilities operating within the City. Of those utilities taxed at 11.5%, the General Fund receives 9.0% while the remaining 2.5% is dedicated to funding City streets projects. The utilities taxed at 6.0% contribute 5.0% to the General Fund and 1.0% to City streets projects.

Overall, utility taxes increased by \$360,900 or 9% from Q1-2024, and are \$529,500 favorable to budget. Roughly 69% of the utility taxes collected by the City are represented by the city interfund utility taxes and electric utility taxes. These two revenue sources accounted for \$2.9 million of the collected \$4.2 million throughout the first quarter of 2025.

Currently, the largest portion of the overall favorable variance to budget occurs within the external utility taxes category due to a planned rate increase as well as the City collecting backdated utility taxes from solid waste haulers. The City anticipates this level of collection to slow as more utility taxes become current, since the collection of backdated taxes are assumed as a one-time collection and should not expect back taxes to contribute a material amount in the future. Furthermore, telephone taxes have increased from Q1-2024 by \$16,000, which was mainly due to the timing of collections from prior year activity. Telephone taxes are collected in arrears on a quarterly basis, which causes the timing variance from prior year and quarters.

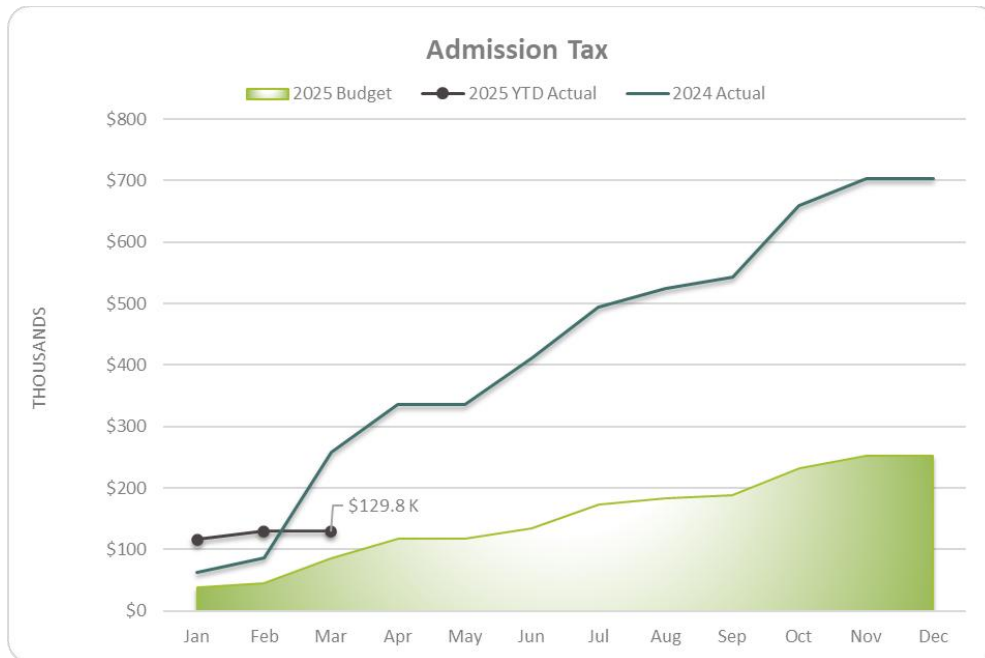
The table and charts below demonstrate the various utility tax revenues and show actual revenues compared to budget. Note that these amounts represent only the General Fund portion of revenues, and do not contain those revenues allocated for funding City streets projects.

Utility Tax by Type (General Fund Portion) Through March 2025								
Revenue	2025			Favorable (Unfavorable)		2024	2025 YTD Actual	vs. 2024 Actual
	Annual Budget	YTD Budget	YTD Actual	Amount	Percentage	YTD Actual	Amount	Percentage
City Interfund Utility Taxes	\$ 6,828,200	\$ 1,582,200	\$ 1,705,971	\$ 123,771	7.8%	\$ 1,560,380	\$ 145,591	9.3%
Electric	4,695,800	1,098,900	1,179,218	80,318	7.3%	1,097,323	81,895	7.5%
Natural Gas	1,417,400	344,800	375,249	30,449	8.8%	323,043	52,206	16.2%
Telephone	606,240	159,527	246,283	86,756	54.4%	230,267	16,016	7.0%
External Utility Taxes	987,500	111,367	418,767	307,400	276.0%	314,269	104,498	33.3%
Brokered Natural Gas	314,000	134,400	78,519	(55,881)	-41.6%	95,328	(16,810)	-17.6%
Cable	917,400	229,350	186,009	(43,341)	-18.9%	208,503	(22,494)	-10.8%
Total	\$ 15,766,540	\$ 3,660,544	\$ 4,190,016	\$ 529,472	14.5%	\$ 3,829,115	\$ 360,902	9.4%



Note: The significant jump from 2022 (\$12.8 million) to 2023 (\$15.8 million) is largely due to higher service revenue following a rate increase effective in 2023, combined with higher service usage and the collection of B&O taxes on businesses that provide utility services.

An **Admission Tax** of 5.0% is placed on charges for general admission, season tickets, cover charges, etc. which are generally collected on a quarterly basis. Admission tax revenues of approximately \$129,800 collected through March 2025 were significantly lower (-50%) than Q1-2024. This is largely due to a one-time payment received in 2024 as part of an agreement. Controlling for this non-recurring payment, admission taxes are still reporting an unfavorable variance to budget of roughly \$22,200 from prior year actuals. However, it holds a favorable variance to budget of \$44,800 through the first quarter.



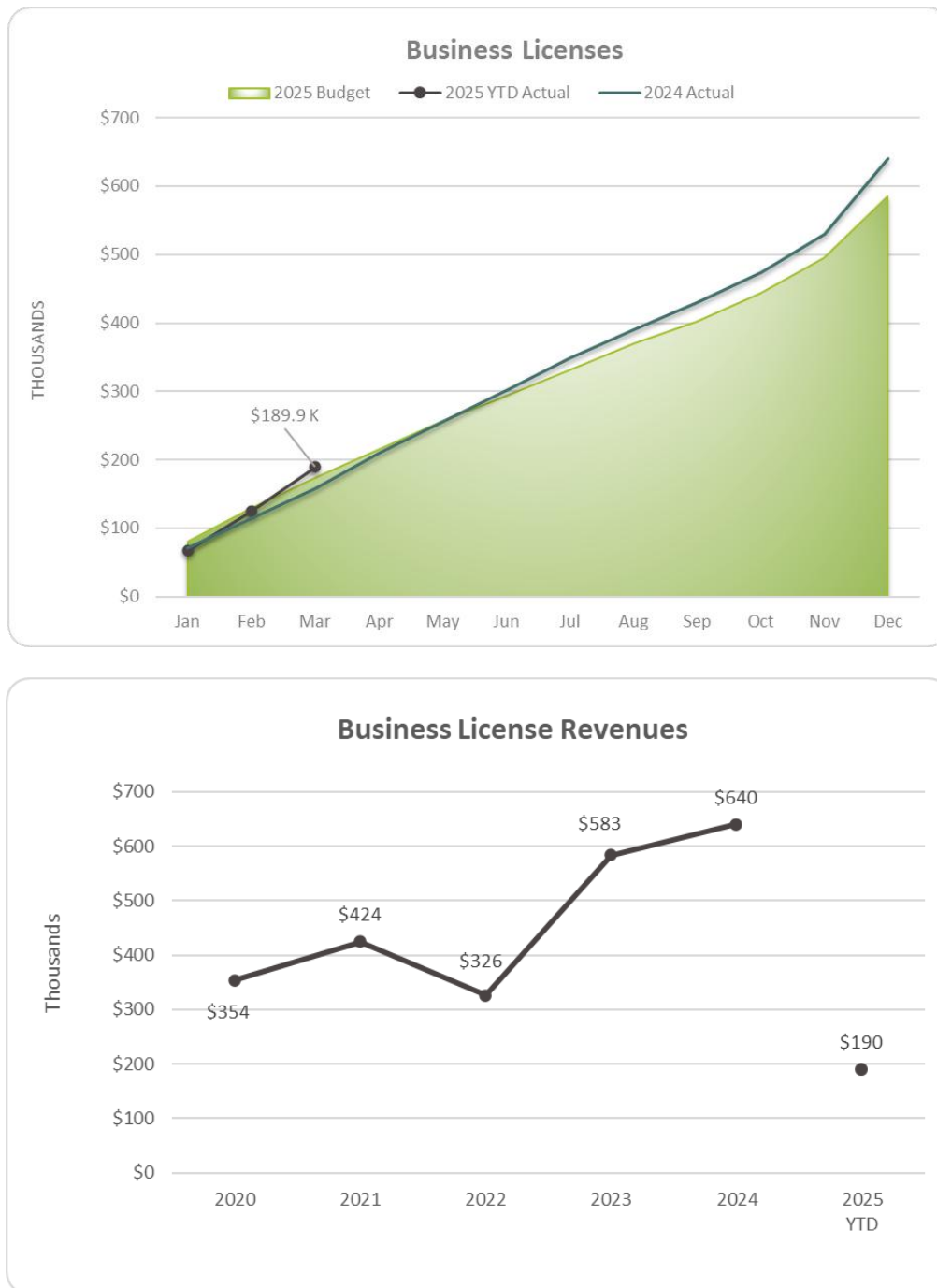
Gambling Tax applies to all card games, punch board games, pull tabs, bingo games, raffles and amusement games played within City limits. The majority of gambling tax revenues are collected from card games (61%) and amusement games (27%). At \$92,700 through the first quarter, collections are \$63,400 higher than 2024 year-to-date totals and report a \$24,700, or 36%, favorable variance to budget. The primary drivers of the favorable variance are higher collections from card games (+\$19,800) and punch boards and pull tabs (+\$5,400). Gambling tax revenues have historically exhibited high volatility both month-over-month and year-over-year: excluding 2021 (due to COVID-19 restrictions), recent revenues through the first quarter of the year average about \$52,000 but have been as high as \$103,900 (2023) and as low as \$29,300 (2024). The City will be monitoring these taxes closely, along with sales tax, as it serves as an indicator to how much disposable income is in the economy.



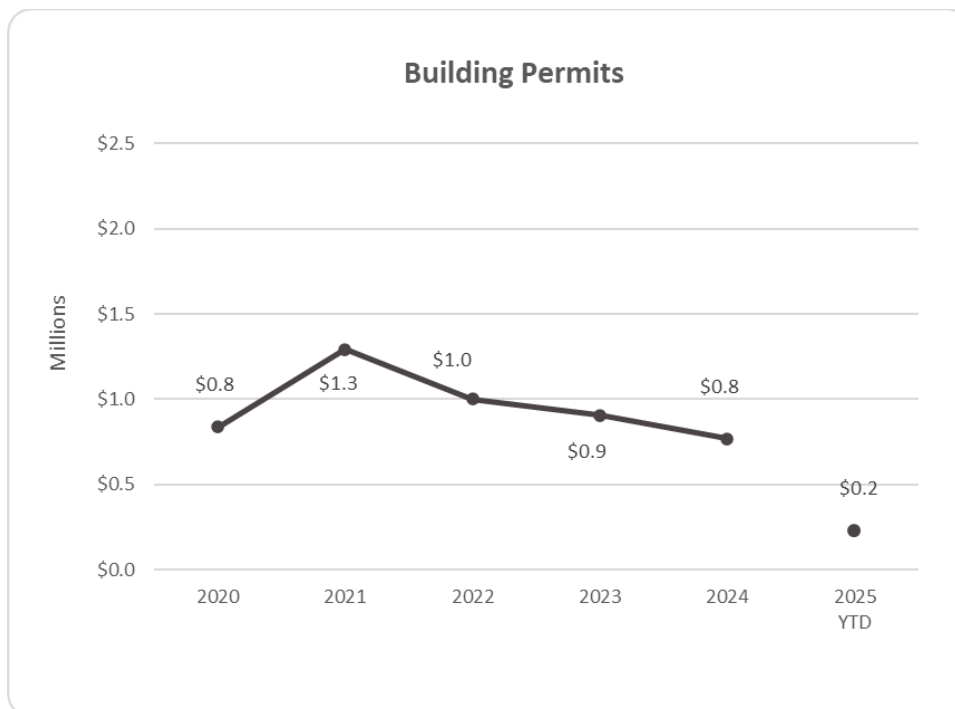
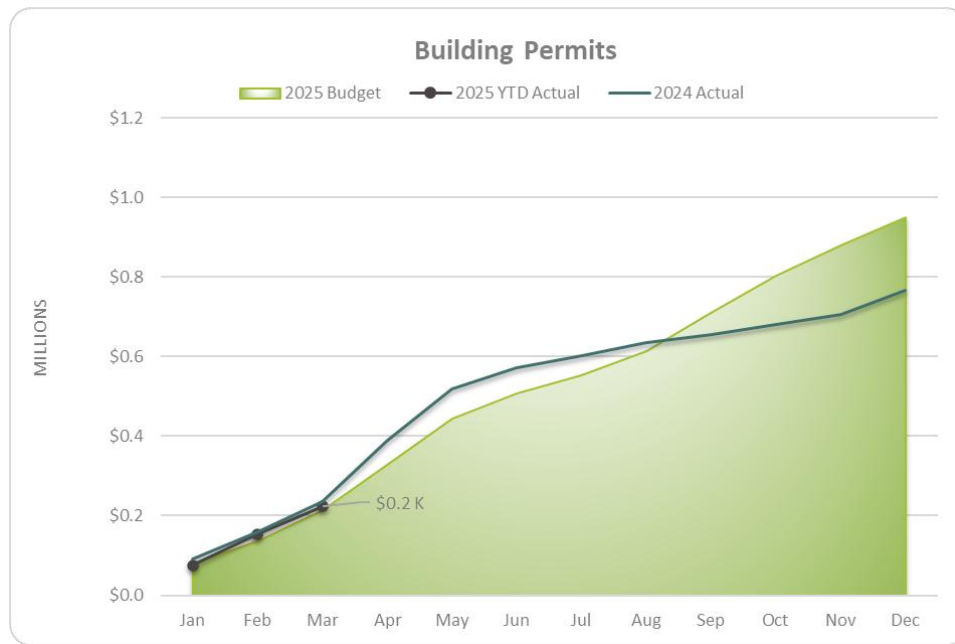
Licenses and Permits include business licenses, building permits, plumbing, electric and other licenses and permit fees. Building permit fees and business licenses typically comprise most of the budgeted revenue in this category, at approximately 34% and 29%, respectively.

The annual **Business License** renewal fee for each business located within the City is \$107, with the renewal cycle for each business beginning on the date the business was originally granted a license.

Year-to-date collections totaled \$189,900 so far in 2025 compared to \$158,900 in 2024, a 20% increase. Historically, business license collections have been a highly volatile revenue source, and as such were budgeted conservatively. Through discovery and B&O tax use of the State's Business Licensing System, these revenues have become more consistent. Comparing budget to actual revenue, business licenses are favorable by \$16,300 or 9% versus budget projections. The City generally sees the highest collection amounts during the first and fourth quarters of the year due to the renewal cycle.

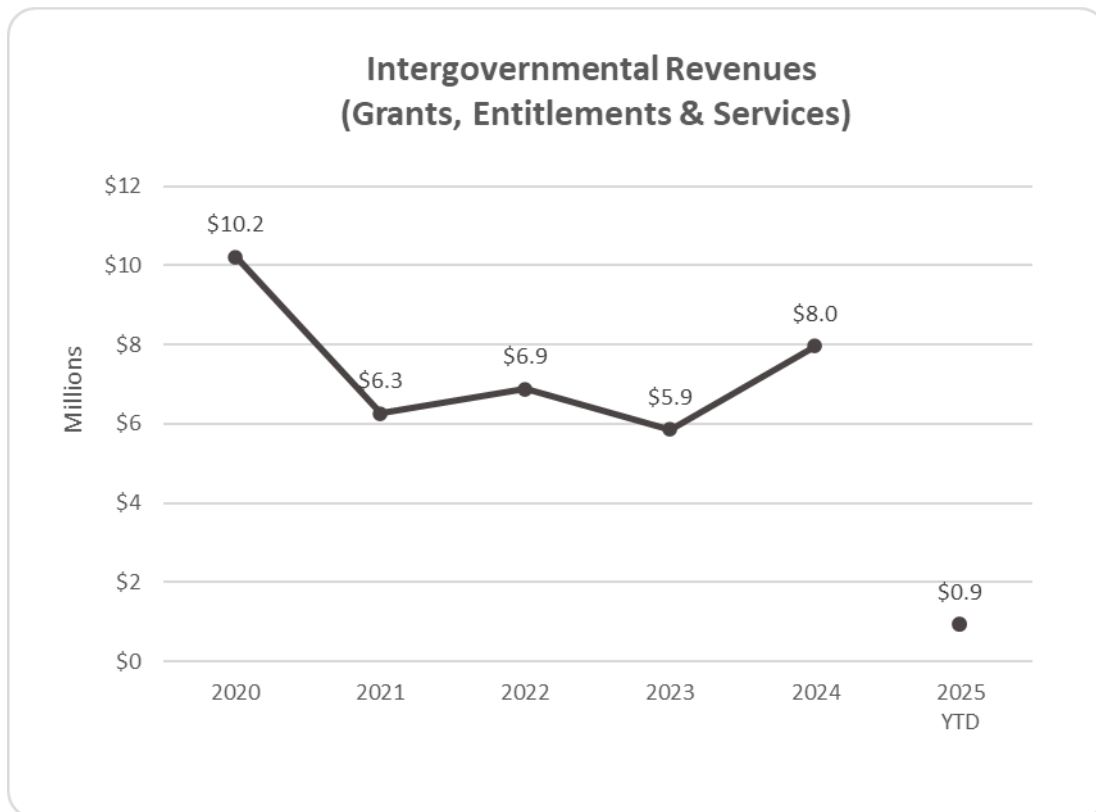


Building Permit revenues collected through March 2025 totaled \$223,300. Building permits are approximately \$11,200 lower than 2024 collections year-to-date, although there is a favorable variance against the budget of \$9,000 (4%). A large contributing factor for this unfavorable variance versus 2024 totals is the decreased valuation of construction permits on mixed use and subdivision builds. The number of permits submitted through the first quarter have also decreased by 35% over the same period last year, representing a decreased workload of construction throughout the City. While there are two highly valued projects currently in progress in the City, they do not offset the decline in the revenue from the previous year.



Intergovernmental revenues include grants and stimulus monies (direct and indirect federal, state, and local), revenue from the Muckleshoot Indian Tribe (MIT) compact as well as state shared revenues. Collections throughout Q1-2025 totaled \$919,800 and were \$200,300 unfavorable to budget expectations. Much of this unfavorable variance is due to the timing of collection on federal grants. Federal grants revenues are generally collected on a cost reimbursement basis; throughout the end of 2024 and into the beginning of 2025, several projects have been delayed, causing the delay in collecting the reimbursement. The City anticipates that the identified projects will be completed and reimbursed for in 2025. Furthermore, the City submitted its proposed 2025 MIT compact request to the casino and anticipates receiving revenues from the request beginning in the second quarter.

Intergovernmental Revenues (Grants, Entitlements & Services) Through March 2025								
Revenue	2025			Favorable (Unfavorable)		2024	2025 YTD Actual vs. 2024 Actual	
	Annual Budget	YTD Budget	YTD Actual	Amount	Percentage	YTD Actual	Amount	Percentage
Federal Grants	\$ 709,000	\$ 177,250	\$ 26,417	\$ (150,833)	-85.1%	\$ 1,330	\$ 25,087	1886.7%
State Grants	97,225	2,500	39,208	36,708	1468.3%	28,846	10,363	35.9%
Interlocal Grants	284,097	64,500	18,571	(45,929)	-71.2%	196,851	(178,280)	-90.6%
Muckleshoot Casino Services	1,800,000	-	-	-		791,885	(791,885)	-100.0%
State Shared Revenues:								
Streamlined Sales Tax	460,900	115,225	128,020	12,795	11.1%	160,025	(32,005)	-20.0%
Motor Vehicle Fuel Tax	1,173,700	276,500	226,600	(49,900)	-18.0%	256,148	(29,549)	-11.5%
Criminal Justice - High Crime	291,200	72,800	75,156	2,356	3.2%	70,778	4,378	6.2%
Criminal Justice - Population	34,500	8,300	8,803	503	6.1%	8,195	608	7.4%
Criminal Justice - Special Prog.	121,100	29,300	30,868	1,568	5.4%	28,858	2,009	7.0%
Marijuana Excise Tax	200,600	50,150	51,991	1,841	3.7%	64,249	(12,258)	-19.1%
State DUI	7,800	1,950	1,913	(37)	-1.9%	2,927	(1,014)	-34.6%
Fire Insurance Tax	121,600	-	-	-		-	-	
Liquor Excise	645,300	154,872	144,076	(10,796)	-7.0%	149,568	(5,492)	-3.7%
Liquor Profit	667,100	166,775	168,177	1,402	0.8%	167,631	546	0.3%
Total State Shared:	3,723,800	875,872	835,604	(40,268)	-4.6%	908,381	(72,777)	-8.0%
YTD Total	\$ 6,614,122	\$ 1,120,122	\$ 919,800	\$ (200,322)	-17.9%	\$ 1,927,291	\$ (1,007,492)	-52.3%



Note: 2020 revenue was higher than normal due to the receipt of \$3.8 million in federal CARES grant money from the Department of Treasury.

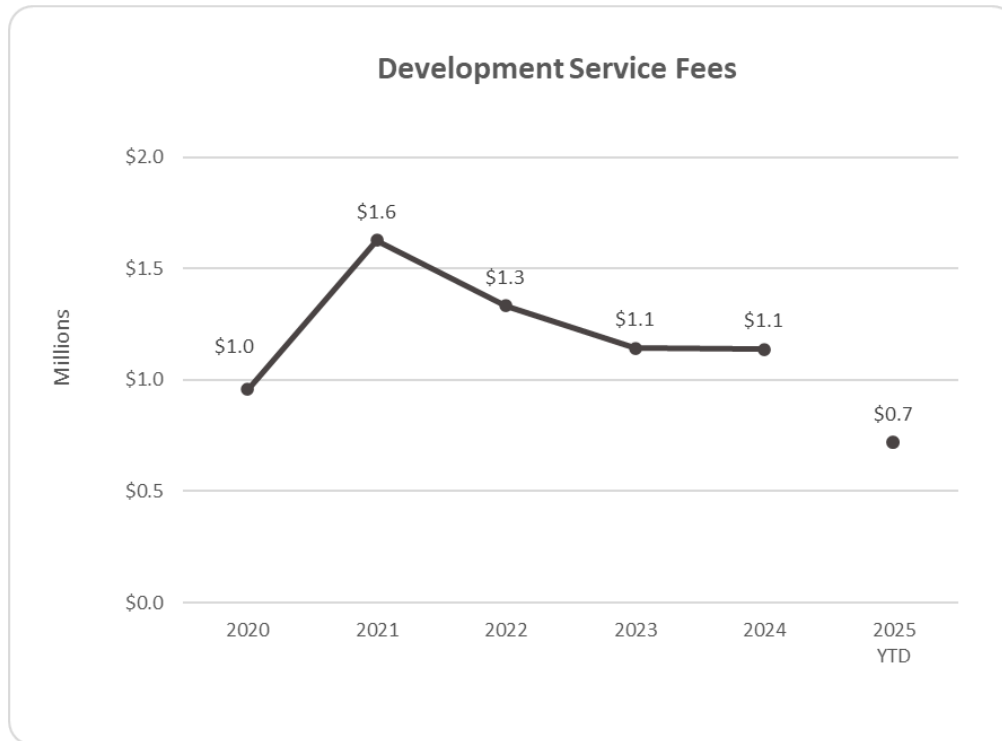
Charges for Services consist of general governmental service charges, public safety charges, development service fees, and culture and recreation fees. Charges for services revenues collected through March 2025 totaled \$2.9 million and were \$399,500, or 15%, more than expected to date. This was mainly due to development service revenues (specifically plan check fees) being higher than anticipated due to the timing of projects within Auburn city limits.

Charges for Services by Type Through March 2025								
Revenue	2025			Favorable (Unfavorable)		2024	2025 YTD Actual vs. 2024 Actual	
	Annual Budget	YTD Budget	YTD Actual	Amount	Percentage	YTD Actual	Amount	Percentage
General Government	\$ 5,114,176	\$ 1,278,544	\$ 1,280,053	\$ 1,509	0.1%	\$ 1,131,944	\$ 148,109	13.1%
Public Safety	1,215,556	303,889	214,183	(89,706)	-29.5%	269,302	(55,119)	-20.5%
Development Services	1,235,100	332,000	716,004	384,004	115.7%	398,853	317,151	79.5%
Culture & Recreation	2,981,200	690,814	781,493	90,678	13.1%	748,250	33,242	4.4%
Total	\$ 10,546,032	\$ 2,605,247	\$ 2,991,732	\$ 386,485	14.8%	\$ 2,548,349	\$ 443,384	17.4%

The *General government* revenue category primarily includes the interfund assessment for support departments (Finance, Human Resources and Legal). Operating costs for these departments are charged to the respective General Fund home department and the portion of those costs that provide citywide benefit are recouped from other funds via interfund charges. General government revenues also include fees for passport services, and quarterly administrative expenses related to South King Housing and Homelessness Partners (SKHHP). The favorable variance of \$1,500 to budget is due to the collections from passport services. Passport services are generally higher due to the implementation of the Real ID program starting May 7th, 2025. Which requires either a Real ID or a valid passport to travel by air.

Public safety revenues mainly consist of collections for law enforcement services, which are extra duty security services whereby police officers are contracted for, and reimbursement is made by the hiring agency. This category also includes reimbursements from the Muckleshoot Indian Tribe (MIT) for a full-time dedicated police officer and associated expenditures, as well as monies collected from the Auburn School District for services rendered. Public safety revenues collected through the first quarter of 2025 totaled \$214,200 and saw a \$55,100 decrease from 2024 first quarter totals. This is largely attributable to lower-than-expected law enforcement services revenue collected. Comparing 2024 vs 2025, law enforcement services have decreased by \$44,400 due to the timing of collections for police services. Adding to the overall unfavorable variance versus prior year, DUI emergency response fees collected have decreased by \$12,700. Overall, public safety collections hold an unfavorable variance to year-to-date budget expectations by \$89,700.

Development services fee collections consist primarily of plan check fees, facility extension charges, and zoning and subdivision fees. Through Q1-2025, development service fees collected totaled \$716,000, which is \$384,000 above budget expectations and \$317,100 higher than prior year-to-date totals. Within this category, favorable variances to year-to-date budget existed in plan check fees (+\$369,700) and zoning and subdivision (+\$17,000). The large variance within plan check fees is the result of assessments on two large development projects within city limits. These variances were offset by unfavorable variances in fees assessed on projects that require extension of public facilities and environmental services (-\$2,300). With the ongoing projects progressing throughout the city, it is anticipated that development service revenues with end the year with a favorable variance to both prior year totals and current annual budget assumptions.



Most *Culture and Recreation* revenues are derived from green fees and pro shop sales at the Auburn Golf Course, recreational classes, ticket sales at the Auburn Avenue Theater (currently being held at other venues during construction), senior programs, and special events. Overall, this category of revenues outperformed budget expectations by \$90,700, or 13%.

Nearly 33% of the year-to-date Culture and Recreation revenues have come from the Auburn Golf Course. Green fee revenues have decreased by \$7,000 or 4% from the same period last year and are unfavorable to budget by \$191,900 year-to-date. This is due to a decrease in the number of rounds played compared to the same time last year. The City projects that green fees collections will increase through the remainder of the year, as the golf course collects 65% of its total revenues during the peak months of May through September. Since 2018, green fee revenues have increased annually, seeing a large spike in 2020 through 2021, followed by modest increases during 2022-2024. The City anticipates continued modest growth in 2025 based on updated green fee rates.

Recreation classes represent 41% of year-to-date culture and recreation collections through the first quarter and have generally remained consistent from prior year-to-date totals with \$321,000 in collections. Ticket sales for performances held at local school venues (previously held at the Auburn Avenue Theater) have decreased by \$6,200 or 13% from prior year totals but carry a favorable variance to budget by \$16,900. This is mainly due to the Performing Arts Center decreasing ticket sales from prior year as the popularity of various shows were not as high as last year. With continued community participation in recreational classes through the remainder of the year the City is expecting a slight increase in revenues throughout 2025.

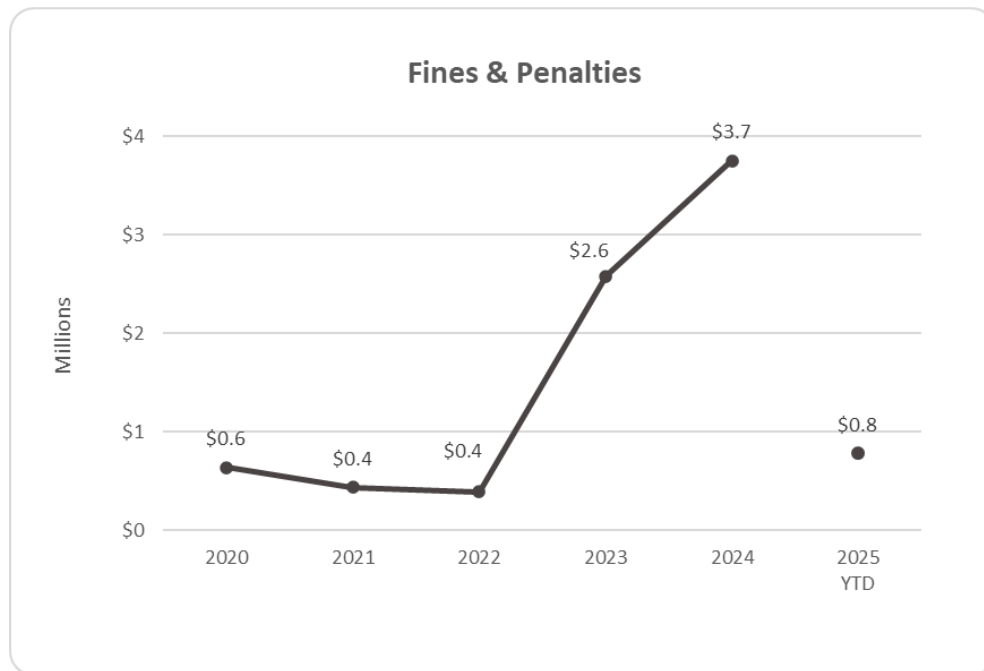


Fines & Penalties include civil penalties (such as code compliance fines), parking and traffic infraction penalties, criminal fines (including criminal traffic, criminal non-traffic, and other criminal offenses) as well as non-court fines such as false alarm fines. The table below shows a detailed breakdown of the different types of fines and penalties collected by the City.

Fines & Penalties by Type Through March 2025								
Revenue	2025		YTD Actual	Favorable (Unfavorable)		2024 YTD Actual	2025 YTD Actual vs. 2024 Actual	
	Annual Budget	YTD Budget		Amount	Percentage		Amount	Percentage
Civil Penalties	\$ 1,000	\$ 46	\$ 345	\$ 299	651.1%	\$ 370	\$ (24)	-6.6%
Civil Infraction Penalties	148,400	36,300	55,978	19,678	54.2%	41,298	14,680	35.5%
Photo Enforcement	1,100	600	-	(600)	-100.0%	157	(157)	-100.0%
Parking Infractions	2,233,506	516,200	518,187	1,987	0.4%	866,789	(348,602)	-40.2%
Criminal Traffic Misdemeanor	31,200	8,400	27,906	19,506	232.2%	7,641	20,265	265.2%
Criminal Non-Traffic Fines	48,200	11,300	17,353	6,053	53.6%	14,332	3,021	21.1%
Criminal Costs	12,200	4,600	2,588	(2,012)	-43.7%	3,377	(789)	-23.4%
Non-Court Fines & Penalties	47,100	3,900	157,385	153,485	3935.5%	135,853	21,531	15.8%
Total	\$ 2,522,706	\$ 581,346	\$ 779,743	\$ 198,397	34.1%	\$ 1,069,818	\$ (290,075)	-27.1%

Total revenues collected through March 2025 were \$779,700 as compared to a budget of \$581,300 and were 34% above budget expectations. This is primarily due to collections of the photo enforcement program (implemented in 2023), which are classified as parking infractions. Furthermore, the City received an influx of non-court fines & penalties throughout the first quarter of the year due to backpay of B&O taxes.

The City contracts with the King County Court to operate its municipal court services. The number of hearings, judgments, and collections activity began decreasing in 2019 and has continued to decline since that time. Although the graph below shows a large spike in revenue in 2023 and 2024, this is almost entirely due to photo enforcement and B&O-related collections. Excluding these sources, the remaining court-related collections have declined to \$104,200, approximately one-third of their average for the period of 2015-2019, prior to contracting with King County. The City is currently conducting a feasibility study of alternatives to contracting with King County.



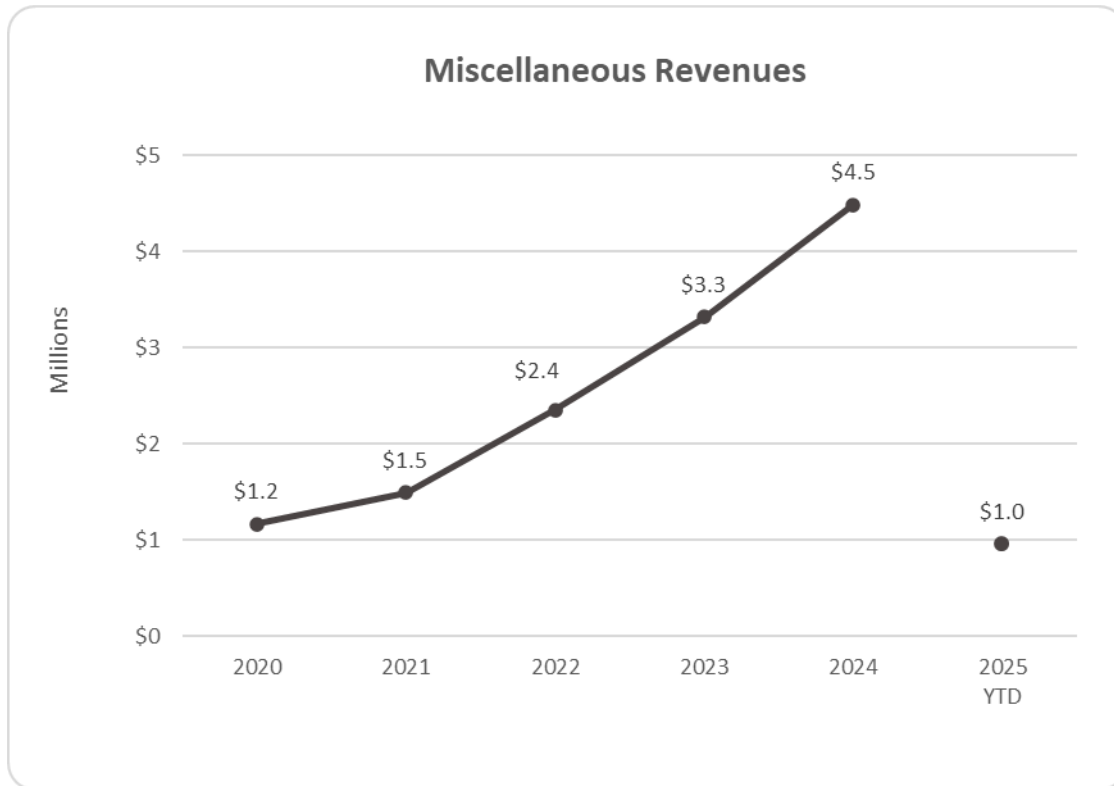
Miscellaneous Revenues consist of investment earnings, income from facility rentals, revenue collected for golf cart rentals at the Auburn Golf Course, contributions and donations, and other income including the quarterly purchasing card (P-card) rebate monies. The most significant miscellaneous revenue categories are listed in the table below.

Miscellaneous Revenues by Type Through March 2025								
Revenue	2025			Favorable (Unfavorable)		2024	2025 YTD Actual vs. 2024 Actual	
	Annual Budget	YTD Budget	YTD Actual	Amount	Percentage	YTD Actual	Amount	Percentage
Interest & Investments	\$ 782,500	\$ 138,679	\$ 617,105	\$ 478,426	345.0%	\$ 427,829	\$ 189,276	44.2%
Rents & Leases	1,155,180	259,600	302,492	42,892	16.5%	289,213	13,280	4.6%
Contributions & Donations	15,000	782	5,167	4,385	560.8%	2,352	2,815	119.7%
Other Miscellaneous Revenue	208,000	61,882	37,995	(23,888)	-38.6%	196,211	(158,216)	-80.6%
Total	\$ 2,160,680	\$ 460,943	\$ 962,759	\$ 501,816	108.9%	\$ 915,604	\$ 47,154	5.2%

Revenues collected year-to-date 2025 in this category totaled \$962,800 and were \$501,800 or 109% favorable to budget. Of the favorable variance to budget, 95% was comprised of interest and investment collections, far exceeding budget expectations due to higher-than-expected interest rates (although lower than prior year) and the maturation of multiple investments during the first quarter.

The rents and leases category includes payments for facility rentals, golf cart rentals, and the restaurant lease at the golf course. Rents and leases were favorable by \$42,900 against year-to-date budget expectations, with a temporary easement of City property contributing significantly to the variance. However, golf carts and other rentals were unfavorable to budget expectations by \$46,900, somewhat mitigating the favorable balance of budget to actual for the category. The rents and leases category generally exhibits seasonality, with the peak being in the spring and summer months. To date, rents and leases are \$13,300 above 2024 collections throughout the same period, as the City has seen increased numbers of events that request the use of City facilities.

The “Other Miscellaneous Revenue” sub-category reported \$158,200 less than the same timeframe last year and was also unfavorable to the year-to-date budget by \$23,900. This category normally includes revenue related to a national opioid settlement distribution program; the City did not receive settlement payments during the first quarter of the year, contributing to the unfavorable variance.



OTHER FUNDS

Real Estate Excise Tax (REET) revenues are taxes on the sale of both commercial properties and single-family residences. These collections are receipted into the Real Estate Excise Tax Fund and transferred to other funds to use for governmental capital projects.

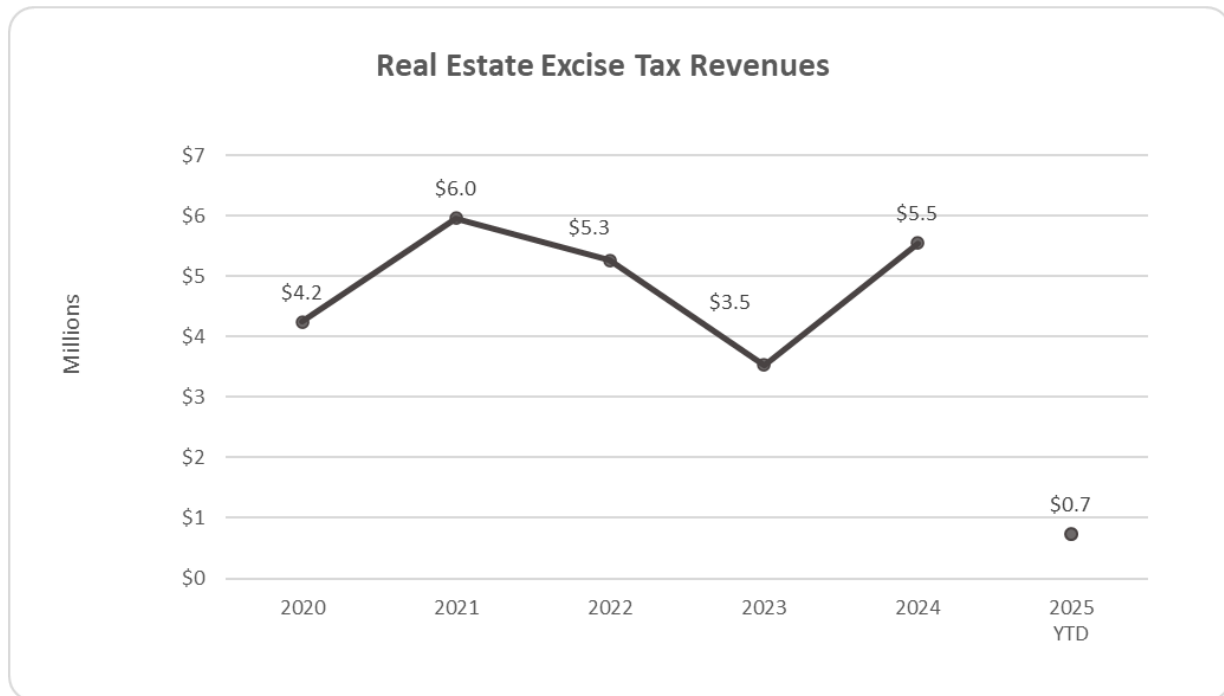
REET revenues collected year-to-date in 2025 total \$735,000 which is \$343,600 or 47% favorable to budget expectations. According to King County assessed valuations of property taxes, the County has increased in property value by 2%. Accompanied with lower interest rates currently, the current climate for real estate sales seem favorable within the State of Washington.

However, year-to-date REET collections in 2025 have decelerated compared to those of last year, and while collections are favorable to budget projections, it is the lowest first quarter total since 2018. This is a sign of a cooling market even though interest rates have declined since the peak in 2023.



Real Estate Excise Tax Revenues Through March 2025								
Revenue	2025			Favorable (Unfavorable)		2024	2025 YTD Actual vs. 2024 Actual	
	Annual Budget	YTD Budget	YTD Actual	Amount	Percentage	YTD Actual	Amount	Percentage
Real Estate Excise Tax	\$ 1,840,500	\$ 391,435	\$ 734,997	\$ 343,562	46.7%	\$ 1,111,752	\$ (376,755)	-33.9%
Total	\$ 1,840,500	\$ 391,435	\$ 734,997	\$ 343,562	46.7%	\$ 1,111,752	\$ (376,755)	-33.9%

Overall collections peaked in 2021 following two years of historic low interest rates maintained by the Federal Reserve in response to COVID-19. However, interest rates were increased throughout 2022 and 2023 to address severe inflation, cooling the market and lowering REET collections in those years. The federal funds rate decreased in December of last year and has remained static throughout the first quarter. With market uncertainty throughout the country, the City is monitoring REET collections meticulously. Generally, REET revenues have reflected the overall market volatility in recent years, with a standard deviation of \$960,600 or 102% of the average annual collections over the time period of 2017 to 2024. The large variance from prior year collections is due to two large purchases of commercial property within City limits last year.



American Rescue Plan Act (ARPA) Fund

In March 2021, the American Rescue Plan Act (ARPA) was signed into law, with the intent of mitigating the economic impacts related to COVID-19. Through ARPA's State and Local Government Fiscal Recovery Fund program, the City was allocated \$14.75 million in funding. Council approved the City's acceptance of ARPA funds in Resolution #5608, and the general spending categories of those funds (as determined by a Council ad hoc committee) in Ordinance #6832.

The City's plan for using ARPA funding is to mitigate the cost of providing public safety services throughout the City. Since receiving the funding, the City has used all \$14.8 million to offset public safety expenditures, as shown in the table below and reported to the Department of the Treasury.

ARPA FUNDING STATUS	
Total ARPA Funding Received	14,751,231
ARPA Funding Used to Mitigate Public Safety Costs	14,751,231
ARPA Funding Remaining	-

As a result of the cost mitigation provided by the ARPA funding, the City has been able to allocate General Fund funding toward projects approved by the Council ad hoc committee. As of March 31, 2025, the City has been able to spend \$711,366 year-to-date and \$7.6 million since 2021 on the following projects:

Title	Budget	2025		
		Q1 Spend	Lifetime Spend (includes this quarter)	Remaining
Completed Projects	2,884,452	-	2,745,358	-
Neighborhood Street Light Program	1,300,000	397,707	802,037	497,963
Neighborhood Traffic Calming	200,000	187,463	200,000	-
Recreation Access Grants	150,000	-	886	149,114
Human Services Grants Includes Admin	1,000,000	-	445,882	554,118
Theater	389,700	-	-	389,700
Tyler Tech MUNIS Financial Implementation	301,500	-	-	301,500
Paving Gravel Roads	135,000	-	137,836	-
2023 Local Street Preservation	501,886	-	48,167	453,719
Translation Services	25,000	-	1,685	23,315
Cyber Security Locks	50,000	-	-	50,000
Auburn Way South Median Landscape Replanting/Irrigation	50,000	-	40,187	9,814
Auburn Way South Roundabout	150,000	392	53,231	96,769
Emergency Housing Voucher Program	2,000,000	87,432	663,314	1,336,686
DEI Dashboard (Inclusive Auburn)	130,000	-	92,805	37,195
Duct cleaning in applicable buildings	150,000	-	184,219	-
Encampment Cleanup	500,000	-	456,403	43,597
Downtown Sidewalk Replacement on Main Street and B Street Plaza Surface Replacement	1,819,409	16,173	629,001	1,190,408
Cameras in qualified census tracts	150,000	-	211,158	-
Community Violence Intervention Programs (Drone, SPIDR Tech)	236,248	-	204,436	31,812
Arts Culture Center Renovations	100,000	-	-	100,000
Auburn Ave Theater Demolition	490,000	500	438,272	51,728
Signing Bonuses for Police Lateral Hires	200,000	21,699	240,881	-
Other Projects (not started)	1,838,037	-	-	1,838,037
Total:	14,751,231	711,366	7,595,756	7,155,475

The project *Downtown Sidewalk Replacement on Main Street and B Street Plaza Surface Replacement* (cp2321) will construct infrastructure improvements in Downtown Auburn along Auburn Ave. from East Main St. N to 1st St. NE and on East Main St. from Auburn Ave to B St. NE, including B St. Plaza. The improvements will support existing and future re-development activities and replace infrastructure that is at or near the end of its useful service life. Construction has begun and is anticipated to be completed by the end of 2025. Total spend of this project so far is \$629,001, with \$16,173 spent in the first quarter.

The project *Neighborhood Traffic Calming* (cp2305) constructed traffic circles on B St SE at 13th St SE and 15th, as well as installed speed cushions on F St SE, G St SE and H St SE between 12th St SE and 21st St SE, and K St SE between 17th St SE and 21st St SE. The purpose of these improvements is to improve safety for all road users, reduce vehicle speed, and discourage cut-through vehicle traffic through the construction of physical traffic calming measures. The project team completed construction in the first quarter of 2025. Total spent on this project was \$222,870 with \$187,463 spent in the first quarter.

Beginning in 2023, the *Emergency Housing Voucher Program* is budgeted at \$2 million over the life of the program. This program assists residents of Auburn who are experiencing homelessness and drug addiction who are willing to enroll in and complete inpatient treatment. The program will cover the costs of clean and sober housing of participants for up to three years if the participant follows the clean and sober housing agreement. There are currently 24 individuals utilizing this program. Life-to-date project spend is \$663,314, with \$87,432 occurring in Q1-2025.

The 2024 *Neighborhood Street Light Program* project (CP2317) includes construction of new sidewalks, installation of new streetlights, replacement of sidewalk panels, installation of rectangular rapid flashing beacons with a new raised crosswalk, and implementation of traffic

calming measures throughout the City of Auburn. The project is currently in the construction phase and is about 75% complete. The project is waiting for the installation of streetlights at two sites and a rectangular flashing beacon with the raised crosswalk at a third site. The project is anticipated to be completed this summer. Total spending to date is \$802,037 with \$397,707 being spent in the first quarter.

Enterprise Funds

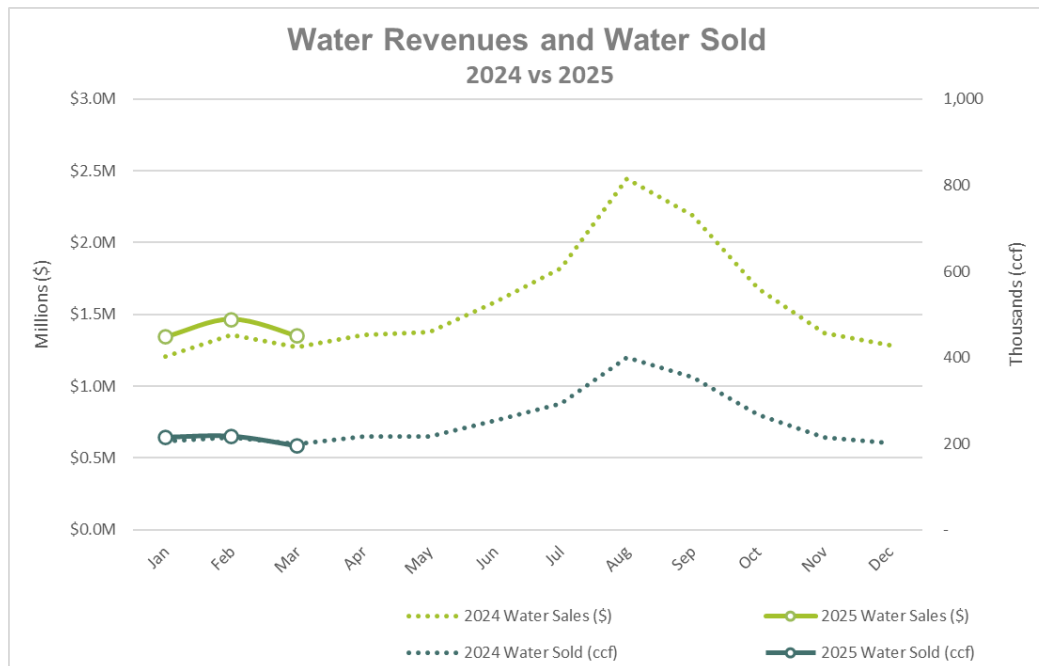
Beginning in 2025, both operating and capital utility activities are included within one enterprise fund. Prior to this year, these activities were divided between operating funds and capital sub-funds. Operating activities include revenues and expenditures associated with the operations of the fund, whereas capital activities relate to construction and capital acquisitions. The net effect of these activities equals the change in the fund's working capital balance. The working capital balance is calculated as current assets minus current liabilities.

In 2025 the City charged all departments the full insurance allocation in the first quarter, rather than spreading the allocation over twelve months. This resulted in higher year-over-year variances in interfund charges in the first quarter, which will level out as the year progresses.

Through March 2025, the **Water Utility Fund** had operating income of \$1.2 million (operating revenues less operating expenditures), relatively flat compared to the same period last year. First quarter activity is consistent with the seasonality of this revenue stream, where revenues remain relatively low early in the year and then increase in the second and third quarters as the weather grows warmer. While operating revenues increased \$415,000 from \$4.1 million in Q1-2024 to \$4.5 million in Q1-2025, operating expenses also increased (+\$424,000). Most of the increase in operating revenues was due to increased rates and consumption; charges for service revenues were \$4.2 million through Q1-2025 compared to \$3.9 million through Q1-2024, an increase of 8.7%. The primary driver of the increased operating expenses from the prior year was interfund charges (+\$414,000), which includes insurance as mentioned above.

Compared to projections, the fund's operating income is \$737,000 favorable to the year-to-date budget. Operating revenues were \$403,000 higher than anticipated through Q1-2025, with interest earnings outperforming budget expectations by \$238,000 along with higher charges for services (+\$161,000). Operating expenditures had a \$334,000 favorable variance to budget, driven by lower-than-expected supplies costs (-\$12,000), as well as lower interfund utility and excise taxes (-\$97,000) and external utility expenditures (-\$105,000).

Billable water consumption through Q1-2025 totaled 625,000 ccf (hundred cubic feet), which is relatively flat (+7,600 ccf, or 1.0% higher) than consumption in Q1-2024. The largest increase in consumption was seen in the manufacturing customer class, as well as in multi-family and irrigation customer classes. These gains were offset by decreases in the commercial and single-family categories.



Compared to the same period last year, the **Sewer Utility Fund** saw a decrease in operating income, finishing Q1-2025 with \$1.2 million in operating income, \$125,000 lower than Q1-2024. Operating revenues were up \$174,000 from the same period last year due to strong performance in charges for City sewer service (+\$155,000, or 5.9%) and slightly higher interest earnings (+\$20,000). These gains were offset by higher increases in operating expenses. Total operating expense increased \$300,000 from \$1.6 million through Q1-2024 to \$1.9 million through Q1-2025. These increases were due primarily to increased interfund charges (+\$255,000) along with increased supply costs (+\$46,000).

Through Q1-2025, this fund performed better than budget expectations with a \$722,000 favorable variance in operating revenues, both in charges for service (+\$454,000) and interest earnings (+\$317,000). Additionally, operating expenditures had a \$290,000 favorable variance compared to budget expectations, due to savings in personnel costs (+\$52,000) and timing differences for B&O and excise tax charges (+\$182,000).

The **Stormwater Utility Fund** had operating income of \$834,000 through Q1-2025, a slight decrease (-\$50,000) from the same period last year. While operating revenues were higher through Q1-2025 compared to Q1-2024 (+\$203,000), operating expenses for this fund were also higher during this same period (+\$253,000). Charges for service revenue increased \$217,000, or 7.0%, from Q1-2024. Primary drivers for the increase in operating expenditures were increased personnel costs (+\$46,000), and interfund charges (+\$186,000).

This fund also outperformed budget expectations, with a \$295,000 favorable to budget variance in operating income, driven mainly lower than anticipated B&O taxes (+\$17,000) and timing differences for other miscellaneous service costs (+\$54,000). Operating revenues also outperformed budget expectations by \$164,000, due to higher than anticipated charges for service (+\$56,000) and interest earnings (+\$108,000).

The **Solid Waste Utility Fund** finished Q1-2025 with operating income of \$1.7 million, which is \$3.3 million lower than operating income reported through same period last year. This variance is due to the timing differences between revenues and expenditures recorded in the prior year. In Q1-

2024, there was a lag in billings paid to the City's external solid waste provider, resulting in less expenditures than anticipated. These timing differences generally occur throughout the year but are resolved by year end. Operating revenues increased \$563,000, driven by an increase of \$596,000 (+7.9%) in charges for service. This increase is a direct result of the service rates adopted in Ordinance #6920.

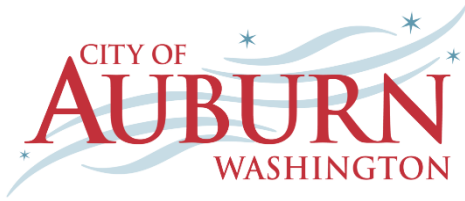
Compared to budget expectations, operating revenues were higher than anticipated (+\$337,000) due primarily to charges for service (+\$332,000). Operating expenses were also higher than expected (+\$87,000) due primarily to higher-than-expected utility and excise taxes (+\$254,000) and partially offset by lower than anticipated payments to the City's solid waste provider (-\$125,000). In total, the fund had a \$250,000 favorable variance in operating income compared to budget expectations through Q1-2025.

Internal Service Funds

No significant variances are reported in the **Insurance, Workers' Compensation, Facilities, Innovation & Technology**, or **Equipment Rental** Funds.

Contact Information

This report is prepared by the Finance Department. Additional financial information can also be viewed at our website: <http://www.auburnwa.gov/>. For any questions about this report please contact Jamie Thomas at jdthomas@auburnwa.gov.



AGENDA BILL APPROVAL FORM

Agenda Subject:

General Speed Enforcement Locations with Automated Traffic Safety
Cameras (Gaub) (30 Minutes)

Meeting Date:

July 14, 2025

Department:

Public Works

Attachments:

Presentation , Automated Traffic
Safety Camera Location Study

Budget Impact:**Administrative Recommendation:**

For discussion only.

Background for Motion:**Background Summary:**

To support its efforts to reduce, and eventually eliminate, crashes causing serious injuries and fatalities, the City is pursuing expansion of its automated traffic safety camera program to include speed enforcement at locations outside school zones. State law requires the enforcement locations to be where speeding causes an increased risk of crashes. State law also requires analysis of the enforcement locations to evaluate equity impacts and alternatives to camera enforcement.

A background of the City's Photo Enforcement Program, and the justification for expanding it, will be presented. The study documenting the identification, evaluation, and selection of the first 3 locations for speed enforcement outside school zones will be presented and discussed.

Councilmember: Tracy Taylor

Staff: Ingrid Gaub

ENGINEERING SERVICES

AUTOMATED TRAFFIC SAFETY CAMERAS - GENERAL SPEED ENFORCEMENT

INGRID GAUB & JACOB SWEETING
CITY COUNCIL STUDY SESSION
JULY 14, 2025

Public Works Department

Engineering Services • Airport Services • Maintenance & Operations Services

AUBURN
VALUES

S E R V I C E
E N V I R O N M E N T
E C O N O M Y
C H A R A C T E R
S U S T A I N A B I L I T Y
W E L L N E S S
C E L E B R A T I O N

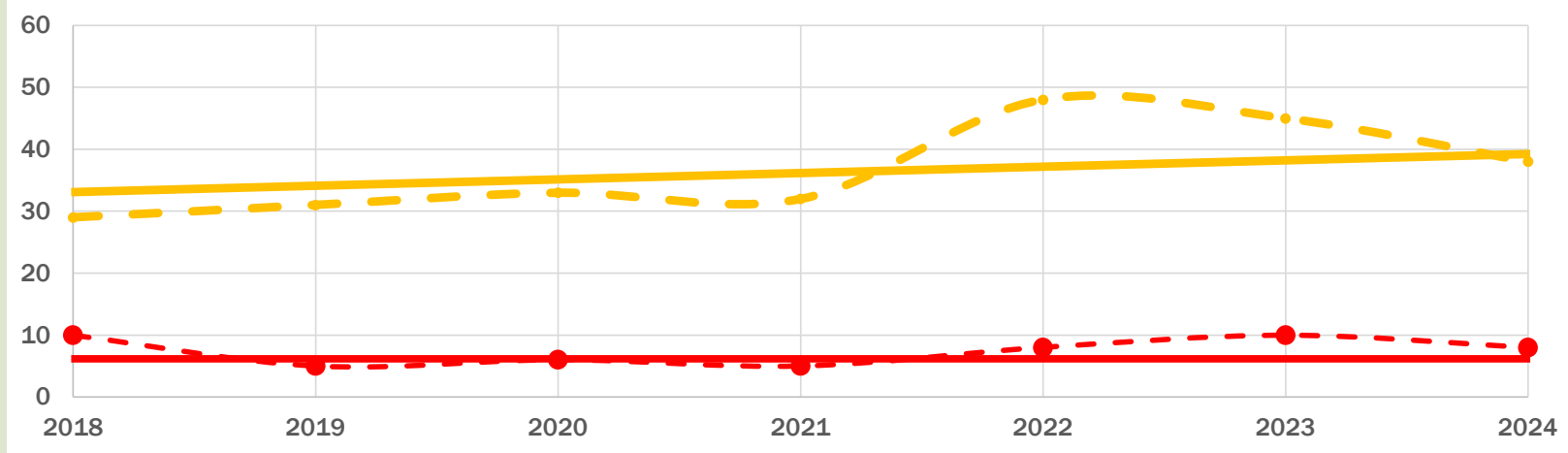
SAFETY VISION AND GOAL

- **Resolution 5789 signed October 2024**
 - **Established vision to eventually eliminate all serious injury and fatal crashes**
 - **Established goal to reduce serious injury and fatal crashes by 30% by 2040**
 - **Adopted 2024 Comprehensive Safety Action Plan**

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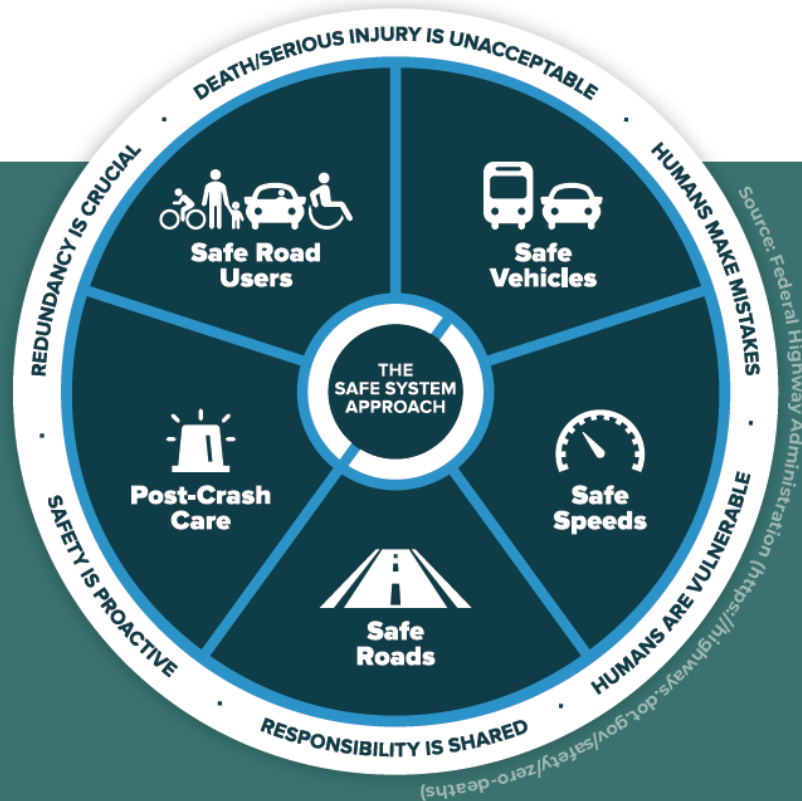
SAFETY VISION AND GOAL – CRASH DATA

	2018 – 2022 Annual Average	2019 – 2023 Annual Average	2020 – 2024 Annual Average	2040 Goal (5-Yr Avg)
Serious Injury/Fatal Crashes	35	38	39	Less than 26
Fatalities	7	7	7	Less than 6



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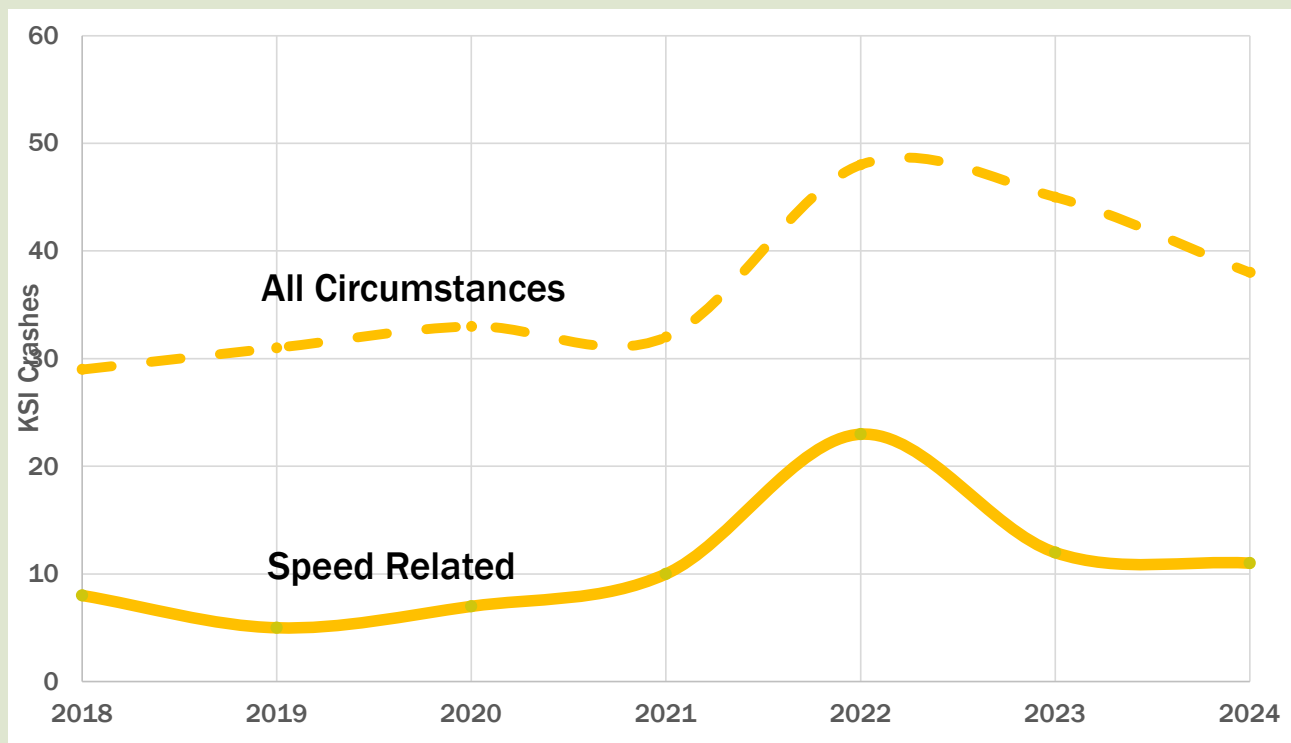
SAFE SYSTEMS APPROACH



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LOSS • CELEBRATION

SPEED RELATED SERIOUS INJURY/FATAL CRASHES



1 out of 3 crashes that cause serious injury or death have speed as a factor.

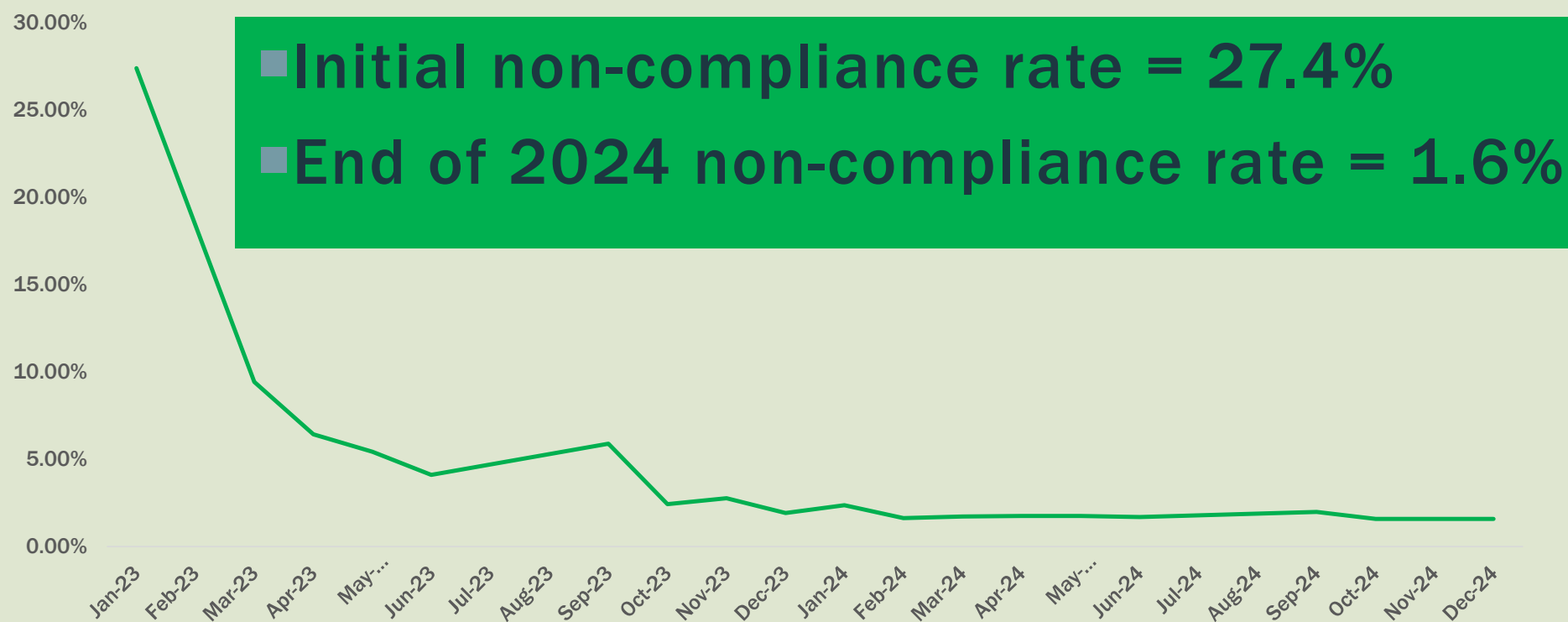
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SAFETY VISION AND GOAL – SAFE SYSTEMS APPROACH

- CTP – Safety Goal, Policy, Action
- CSAP – Safety Countermeasures
 - Education and Outreach
 - Physical Traffic Calming
 - Traditional Enforcement/Emphasized Enforcement
 - Automated Traffic Safety Cameras
 - School Speed Zones
 - General Speed Enforcement

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SCHOOL SPEED ZONE CAMERA PERFORMANCE



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AUTOMATED TRAFFIC SAFETY CAMERA FOR GENERAL SPEED ENFORCEMENT

- **2025/2026 Budget includes expansion of current camera enforcement program to include general speed enforcement cameras**
- **State law allows for general speed enforcement at locations where the City Council establishes:**
 - **Speeding causes increased risk of crashes**
 - **Equity impacts are analyzed**
 - **Alternatives to camera enforcement are analyzed**
- **Current resources and budget would afford installation of cameras at 3 locations**

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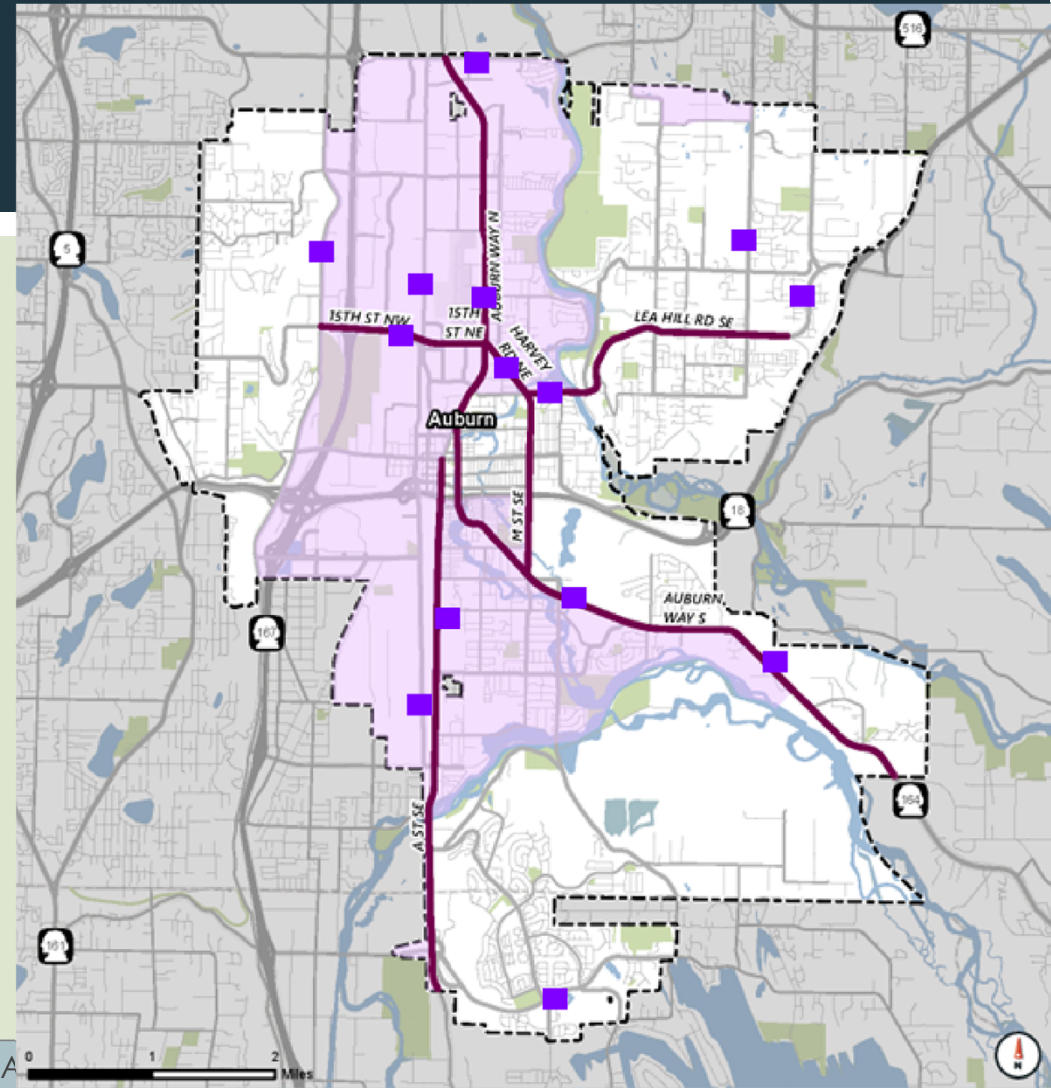
LOCATION IDENTIFICATION, ANALYSIS, SELECTION

- **Site Selection Approach**
 - **Initial Site Selection and Evaluation**
 - **Detailed Speed Studies**
 - **Crash to Speed Correlation Evaluation**
 - **Equity and Alternatives Analysis**
 - **Selected Sites**

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INITIAL LOCATIONS

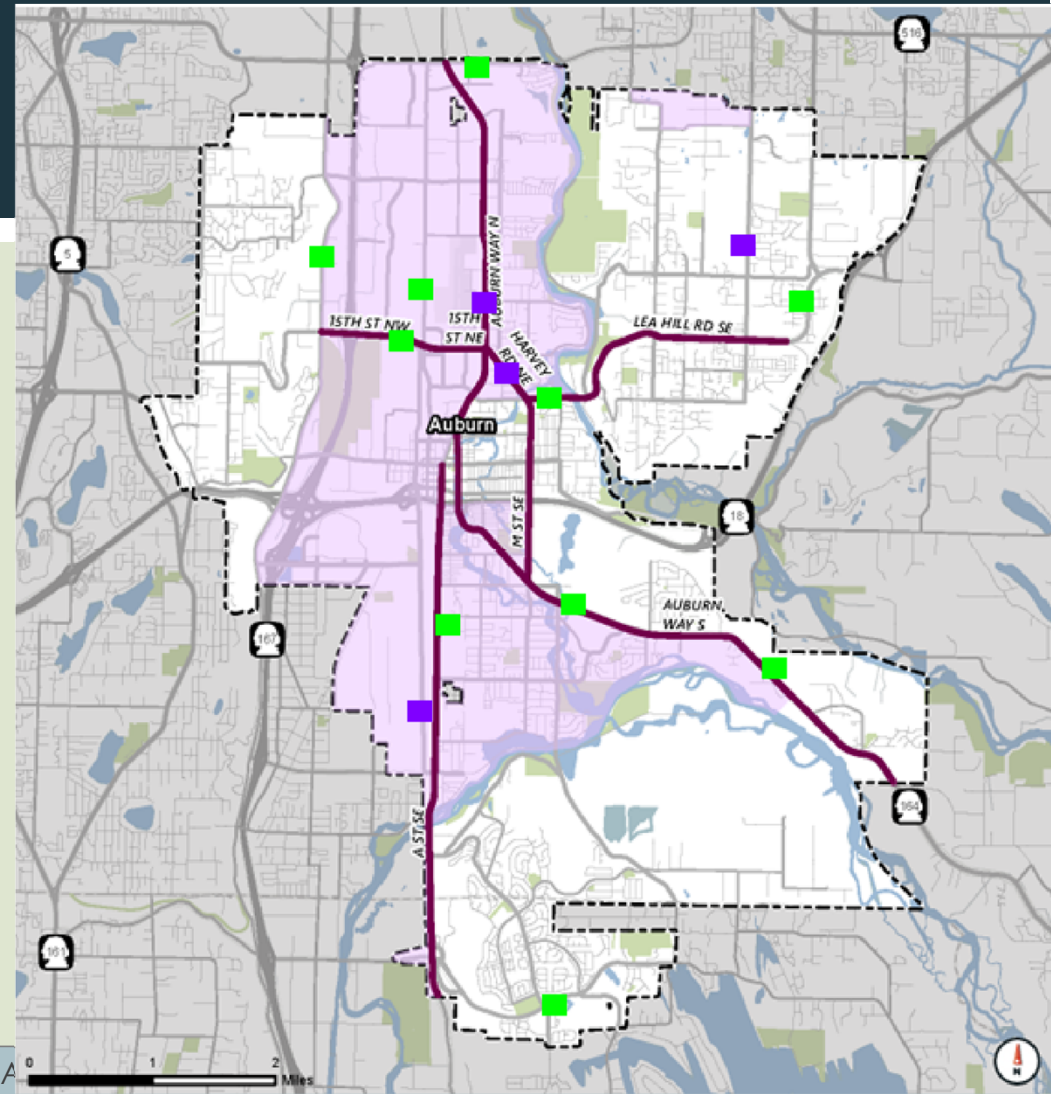
- Crash history
- Speeding complaints
- Information from the Safety Plan
- Previously conducted speed studies
- State Requirements



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INITIAL LOCATION EVALUATION

- Presence of Safety Emphasis Corridor (City Safety Plan)
- Presence on High Injury Network (Regional Safety Plan)
- Traditional Enforcement (Police Department)
- Crash History
- Presence of Other Safety Countermeasures
- 10 Locations Selected for Detailed Speed Studies



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DETAILED SPEED STUDY OF 10 LOCATIONS

Location	Total Vehicle Volume ¹	Vehicles @ <u>Posted + 10</u>	Vehicles @ <u>Posted + 15</u>	Further Evaluation?
S. 277 th St between D St NE & I St NE	45,679	56%	30%	Yes
15 th St NW between M St NW & Ron Crockett Dr	50,277	26%	8%	Yes
Auburn Way S between R St Bridge & Muckleshoot Plaza SE	48,932	55%	24%	Yes
Auburn Way S between Dominick St SE & Moses St SE	33,059	50%	13%	Yes
A St SE between 17 th St SE & 29 th St SE	34,276	10%	3%	Yes
West Valley Highway between 29 th St NW & 37 th St NE	18,524	8%	2%	No
8 th St NE between Harvey Rd and Pike St NE	33,132	1%	<1%	No
132 Ave SE (Lea Hill Rd) between SE 308th St and SE 312 th Ct	18,179	5%	1%	No
Lake Tapps Pkwy between Lakeland Hills W & Town Center Entrance D/W	24,192	1%	<1%	No
B St NW between 16 th St NW & 29 th St NW	15,353	26%	8%	Yes

¹ Two-day total traffic volume

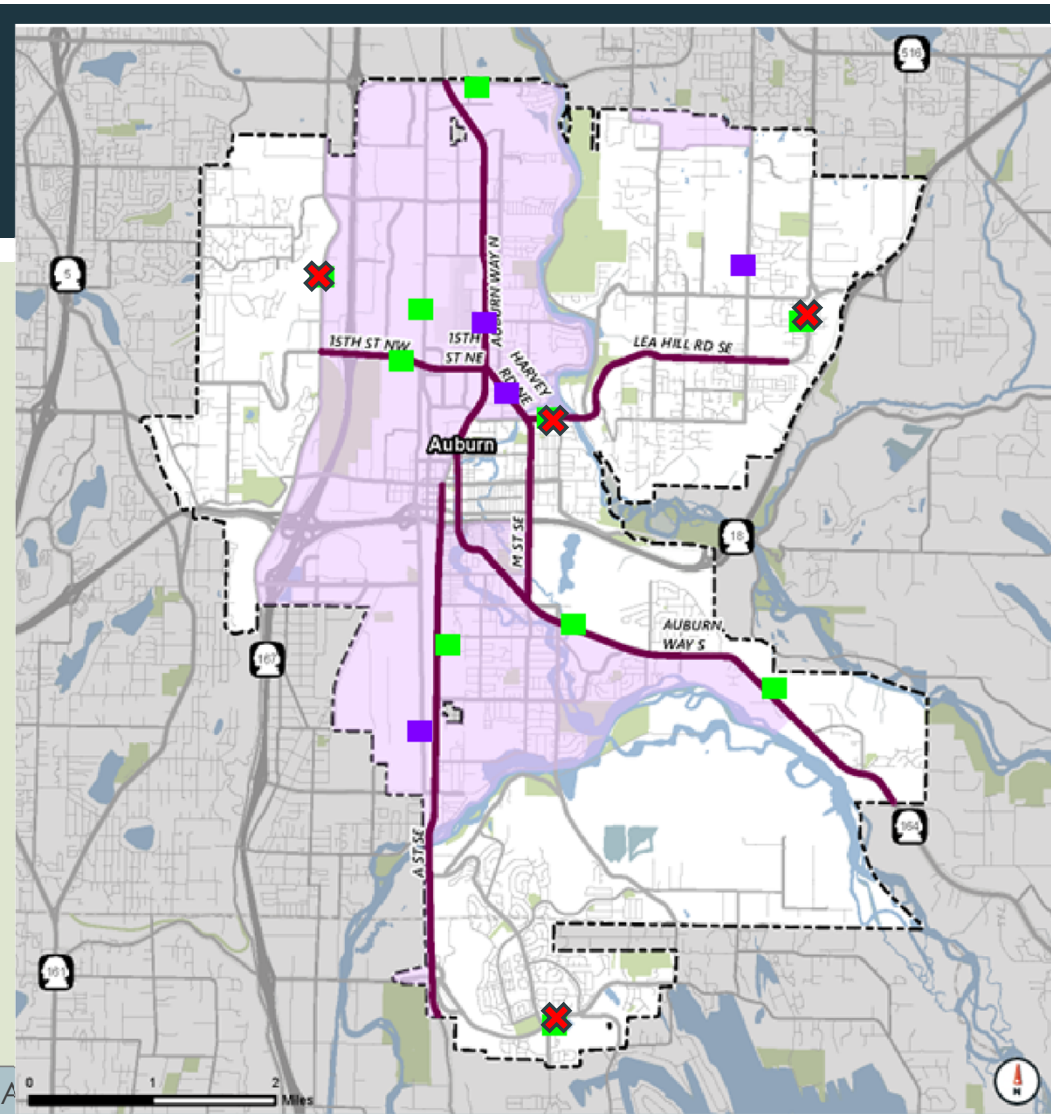
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West Valley Highway between 29 th St NW & 37 th St NE	18,524	8%	2%	No
8 th St NE between Harvey Rd and Pike St NE	33,132	1%	<1%	No
132 Ave SE (Lea Hill Rd) between SE 308th St and SE 312 th Ct	18,179	5%	1%	No
Lake Tapps Pkwy between Lakeland Hills W & Town Center Entrance D/W	24,192	1%	<1%	No
B St NW between 16 th St NW & 29 th St NW	15,353	26%	8%	Yes

¹ Two-day total traffic volume

HIGHER RISK OF CRASHES DUE TO SPEEDING

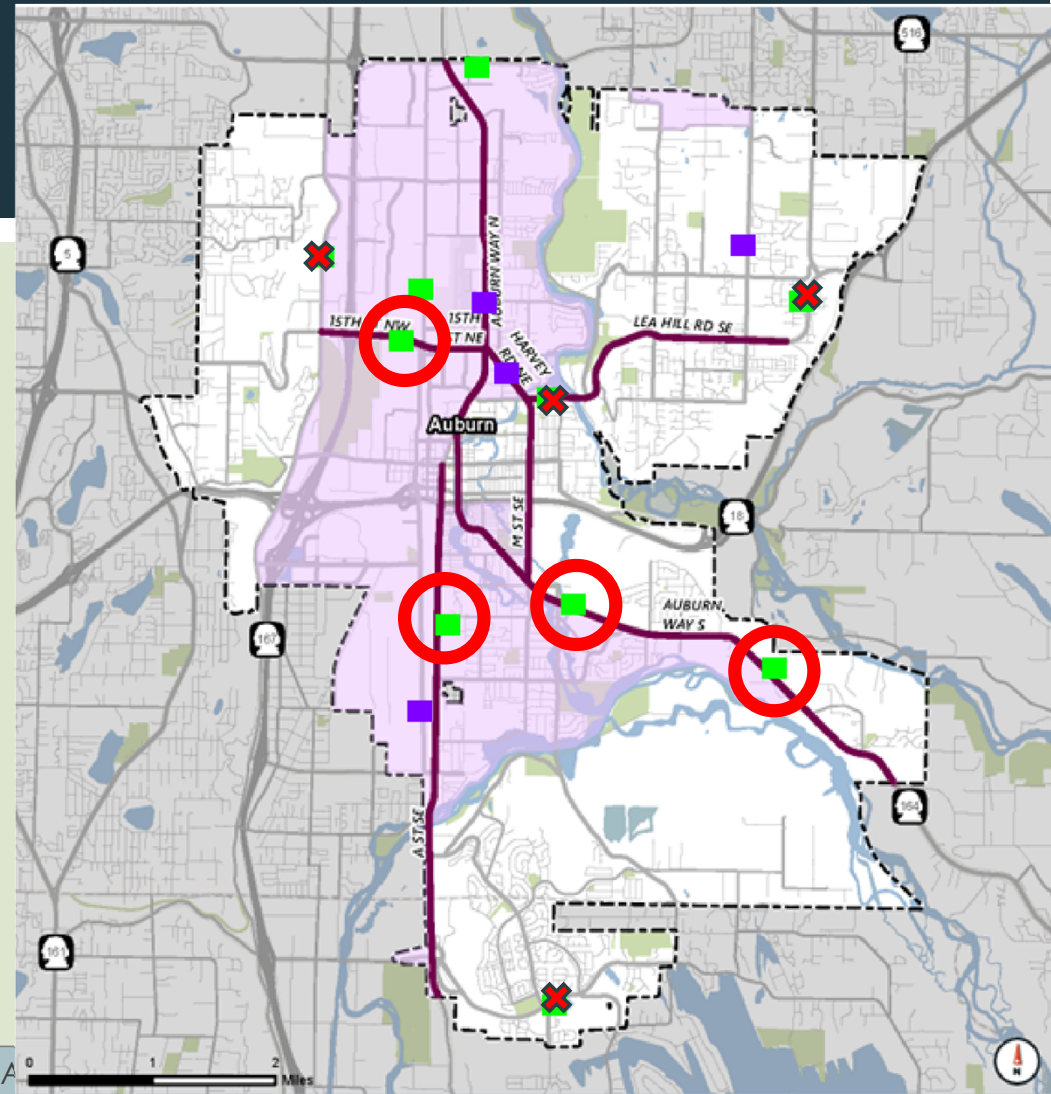
- State Requirement
- CSAP Identified Safety Emphasis Corridors (59% of all KSIs)
 - Predominant Circumstances for KSIs on Each Corridor
 - Speeding
 - DUI
 - Vehicle Not Granting ROW



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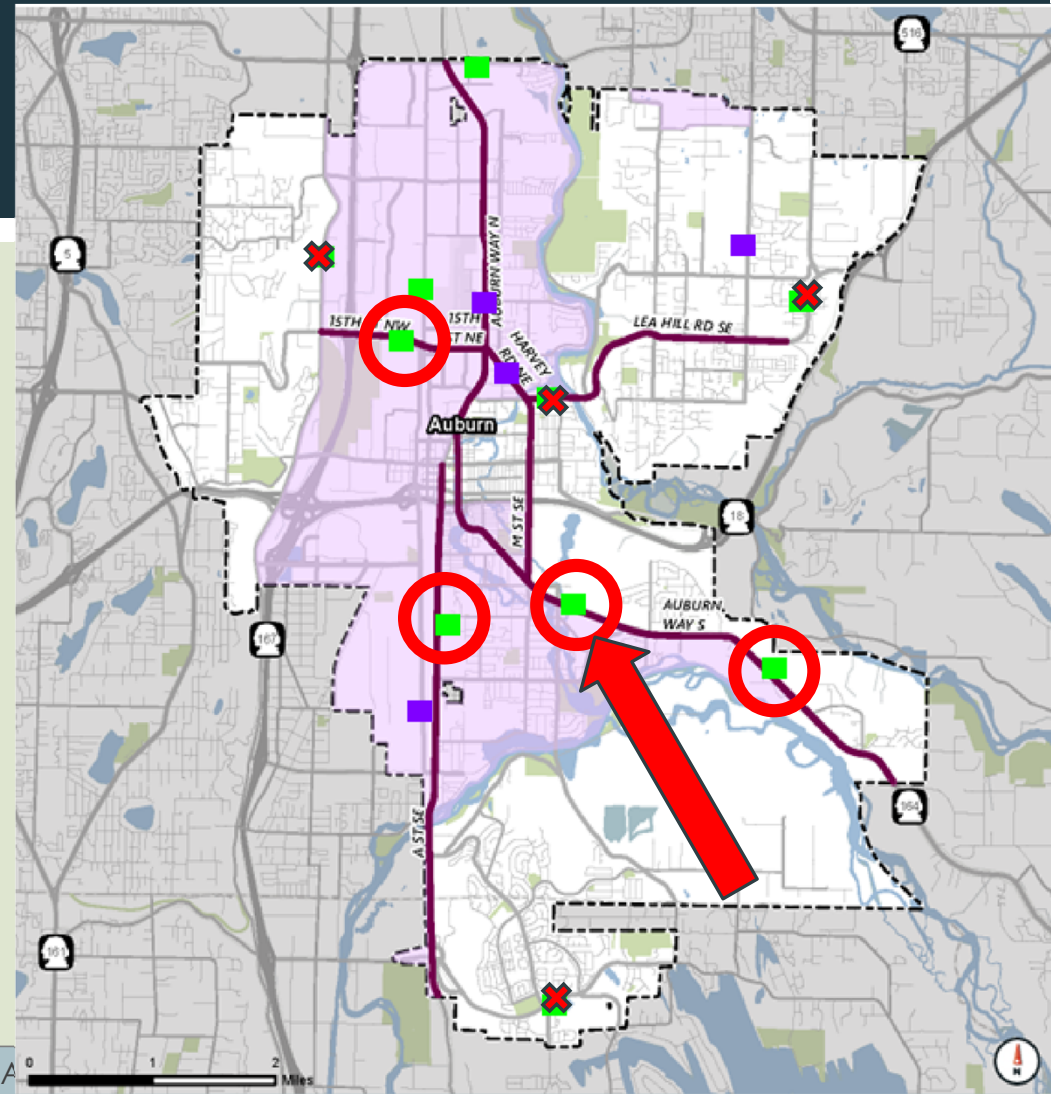
HIGHER RISK OF CRASHES DUE TO SPEEDING

- State Requirement
- CSAP Identified Safety Emphasis Corridors.
 - Predominant Circumstances for KSIs on Each Corridor
 - 4 of the 6 Remaining Locations on Safety Emphasis Corridors
 - 2 locations not on Safety Emphasis Corridors, Not selected to move forward, but could be studied further w/future program expansion



HIGHER RISK OF CRASHES DUE TO SPEEDING

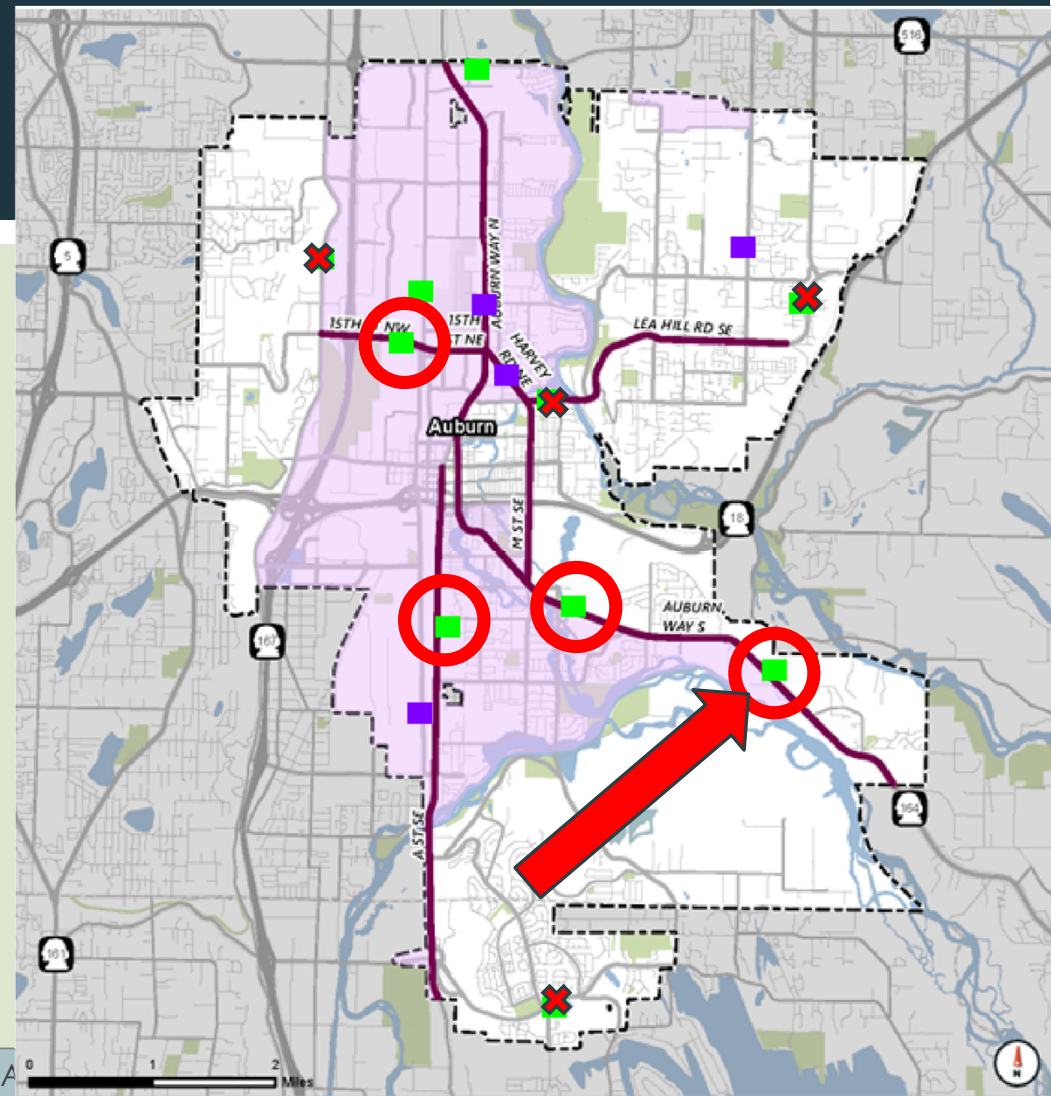
- Eastbound Auburn Way South Between R ST Bridge and Muckleshoot Plaza Signal
- SR18 to Noble Ct
- Corridor Data (2018-2022):
 - 499 Crashes
 - 22 KSI
 - 23% Vehicle Not Granting ROW
 - 18% DUI
 - 27% Speeding
 - 5 Fatalities



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HIGHER RISK OF CRASHES DUE TO SPEEDING

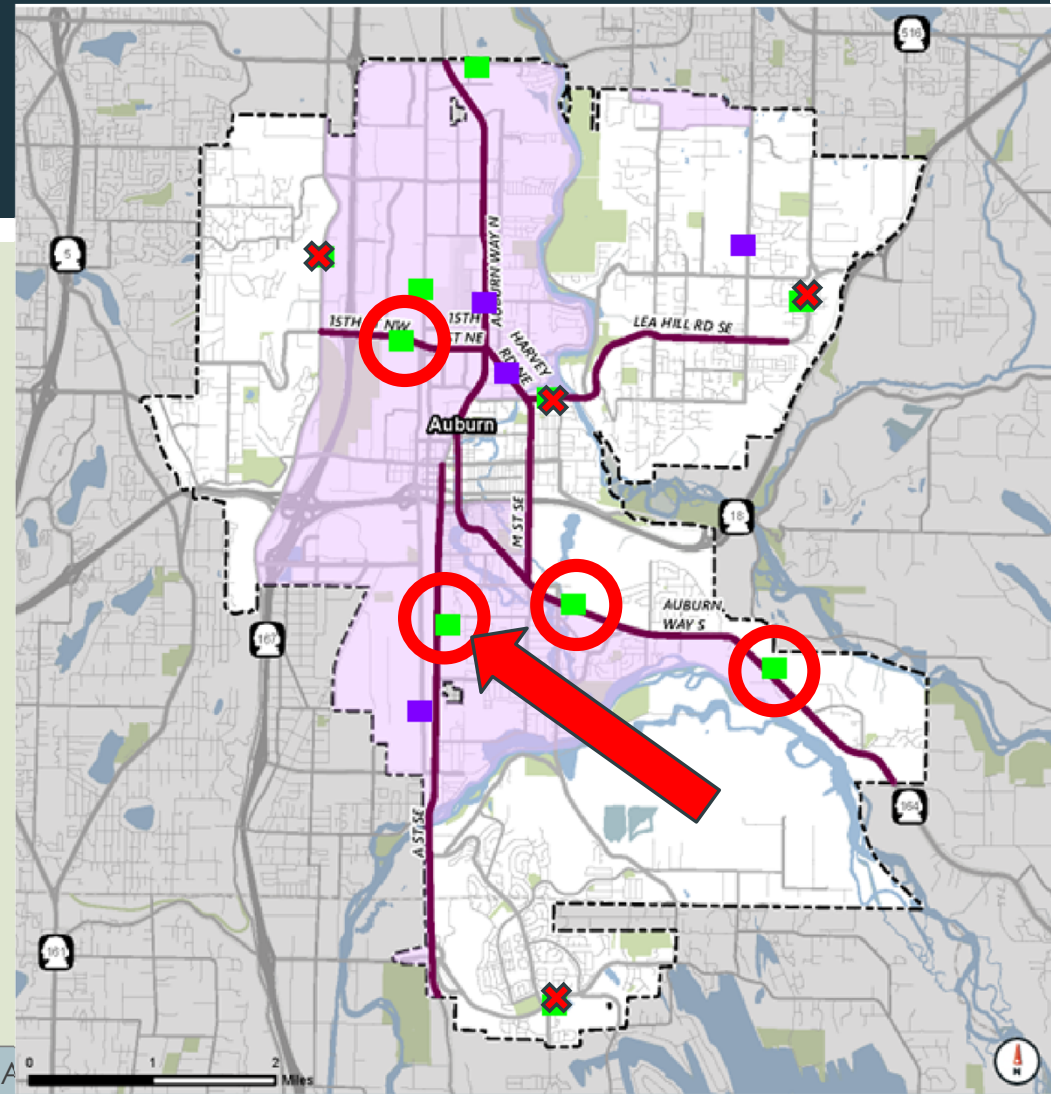
- Westbound Auburn Way South between Dominick and Moses
- Noble Ct to East City Limits
- Corridor Data (2018-2022):
 - 110 Crashes
 - 6 KSI
 - 33% Speeding
 - 33% DUI
 - 6 Fatalities



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HIGHER RISK OF CRASHES DUE TO SPEEDING

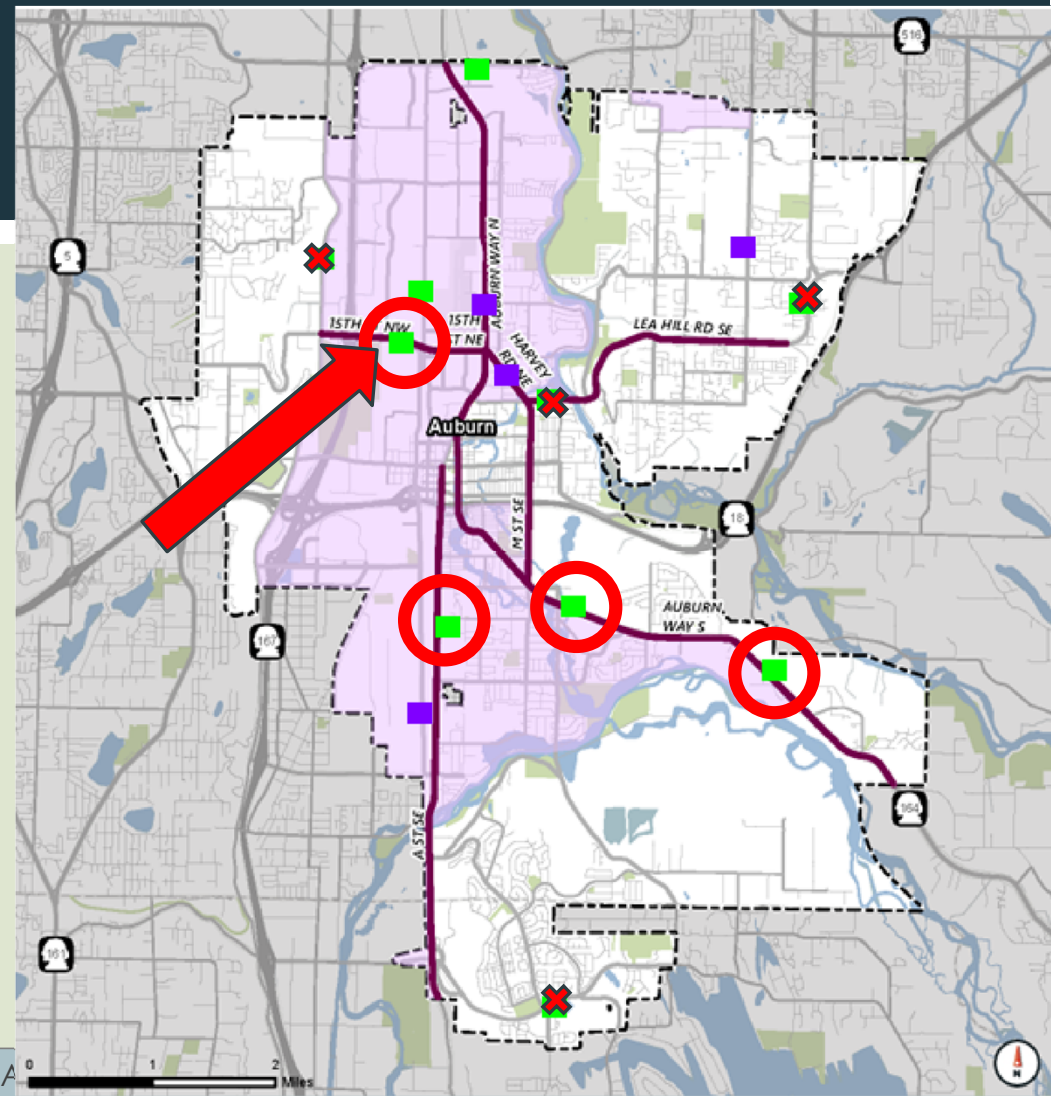
- Southbound A ST SE between 17th and 29th
- Main Street to South City Limits
- Corridor Data (2018-2022):
 - 565 Crashes
 - 22 KSI Crashes
 - 18% Speeding
 - 39% Failure to Grant ROW
 - 4 Fatalities



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HIGHER RISK OF CRASHES DUE TO SPEEDING

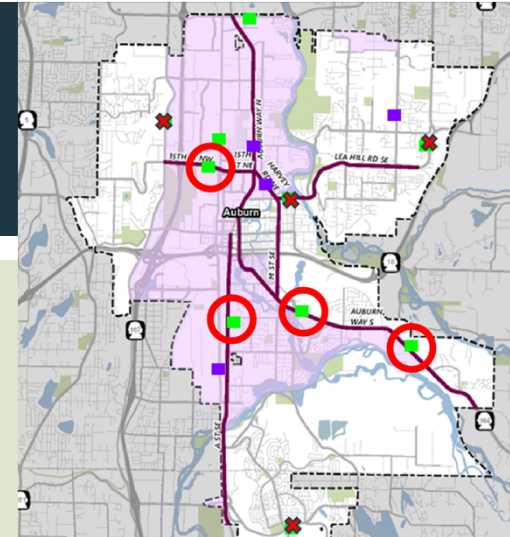
- Eastbound 15th St NW between M St NE and Ron Crockett
- West Valley Highway to Auburn Way N
- Corridor Data (2018-2022)
 - 141 Crashes
 - 12 KSI
 - 33% Speeding
 - 17% Vehicle Not Granting ROW
 - 6 Fatalities



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EQUITY ANALYSIS

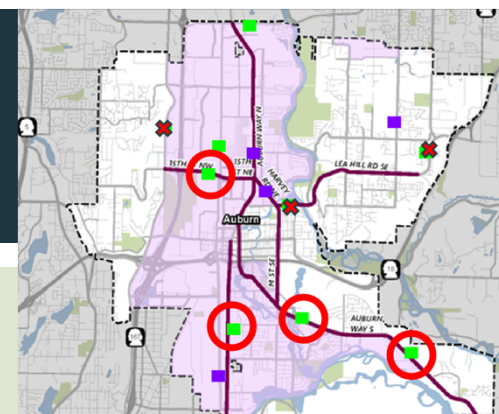
- Impact of camera placement on livability, accessibility, economics, education, and environmental health.
 - Cameras Cause People to Drive Slower
 - Less Drivers Hurt and Killed
 - Less Pedestrians and Bicyclists Hurt and Killed
 - Walking and Biking Safer and More Comfortable
 - Those Who Speed Learn Not to without Impacting Driver Record and Relatively Low Fine



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EQUITY ANALYSIS

Income Demographics of People Driving



Location	Median Household Income ¹	Comparison of Auburn Median Income ²	Note
15 th St NW between M St NW & Ron Crockett Dr	\$88,000	95%	Location is 5% lower than median income
Auburn Way S between R St Bridge & Muckleshoot Plaza SE	\$92,000	>99%	Location is nearly equal to median income
Auburn Way S between Dominick St SE & Moses St SE	\$103,000	111%	Location is 11% higher than median income
A St SE between 17 th St SE & 29 th St SE	\$94,000	101%	Location is 1% higher than median income

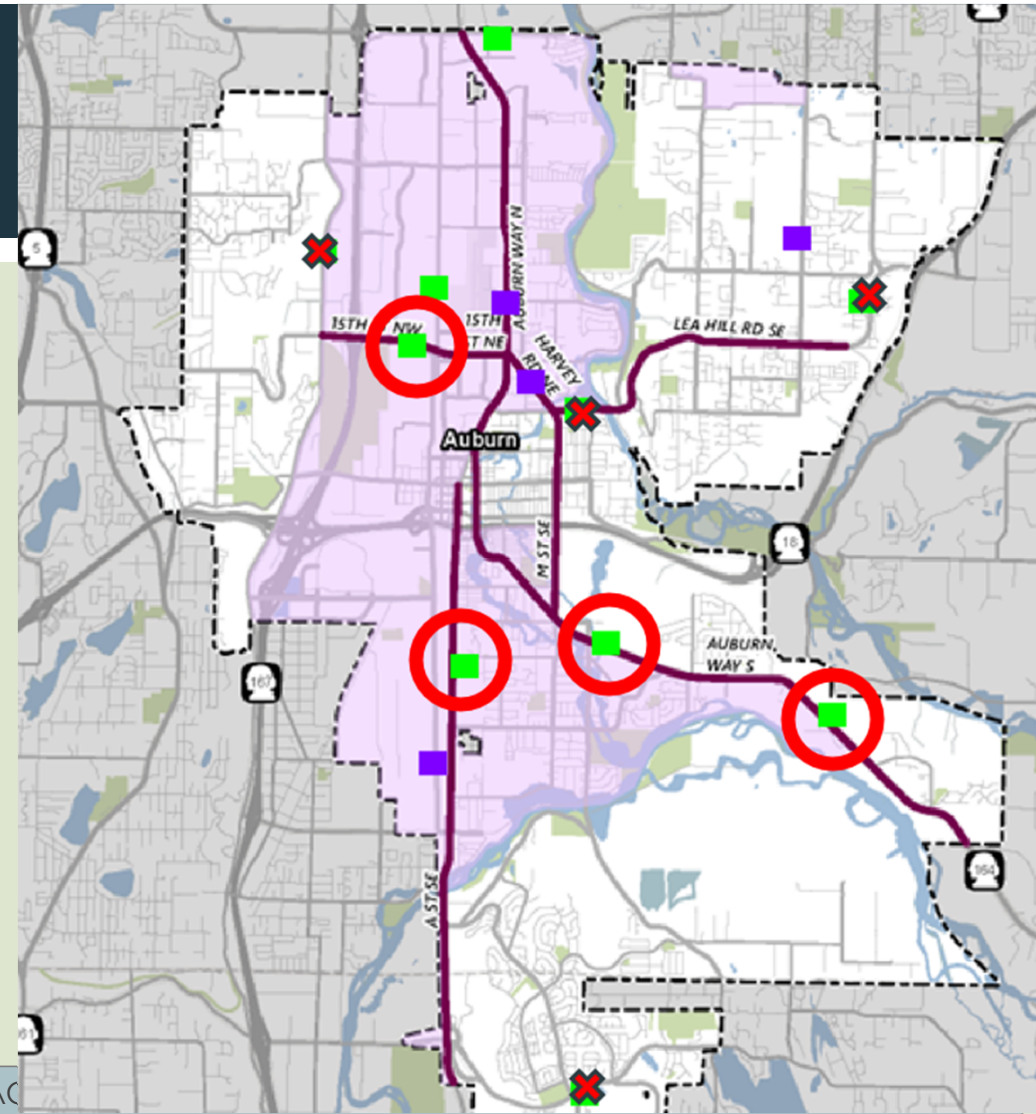
¹ Per Placer AI data collection tool

² Median income in Auburn is \$92,824

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EQUITY ANALYSIS

- People Living Near the Locations
 - All safety emphasis corridors w/potential locations are along disadvantaged communities
 - 2020 Census Data
 - Transportation Insecurity
 - Climate and Disaster Risk Burden
 - Environmental Burden
 - Health Vulnerability



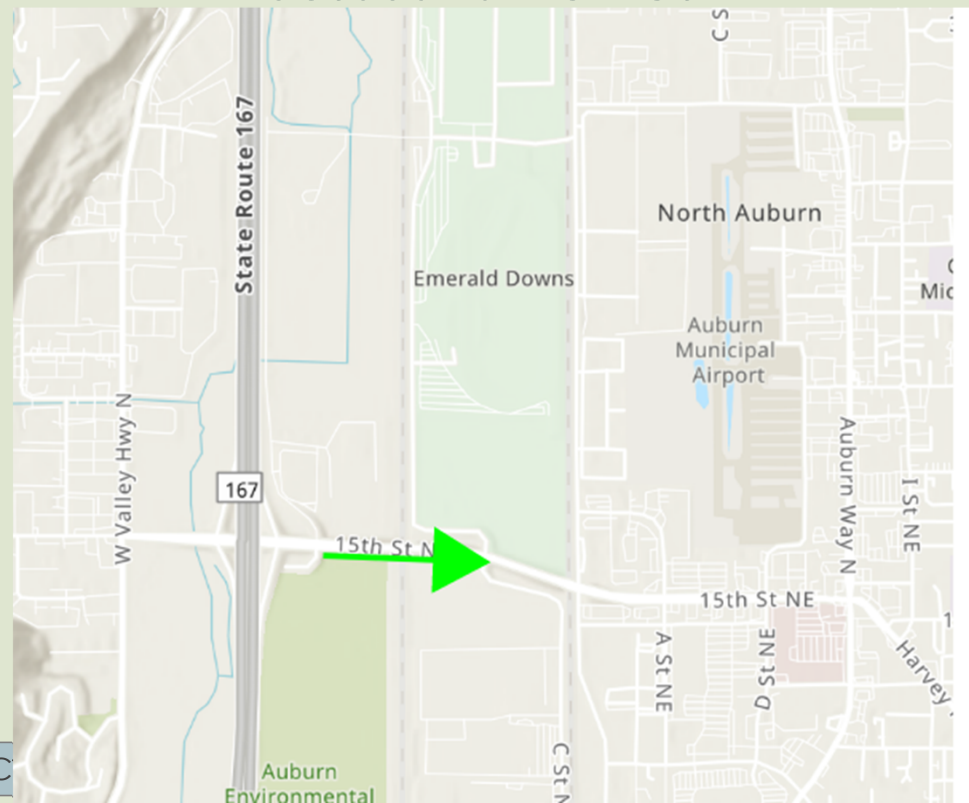
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EQUITY ANALYSIS – TRAFFIC DIVERSION

Westbound Auburn Way South

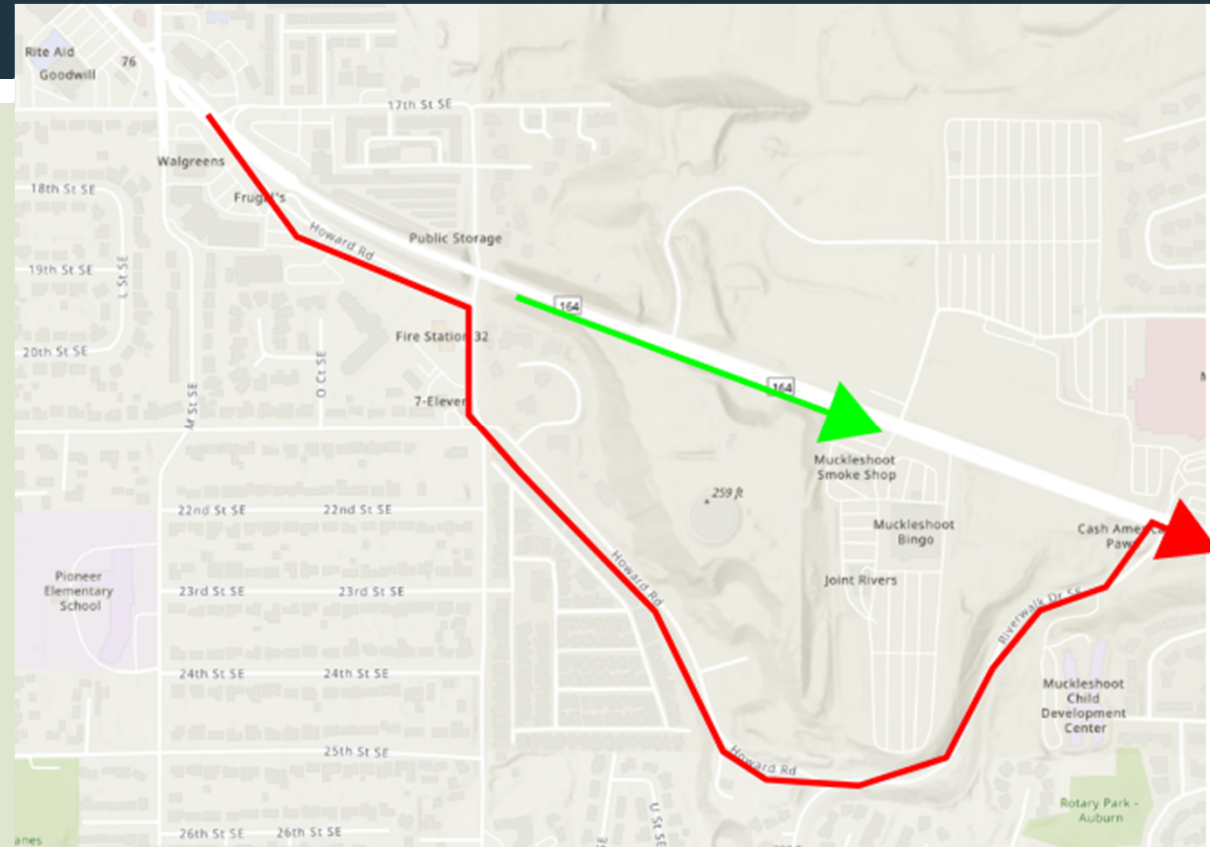


Eastbound 15th St NW



EQUITY ANALYSIS – TRAFFIC DIVERSION

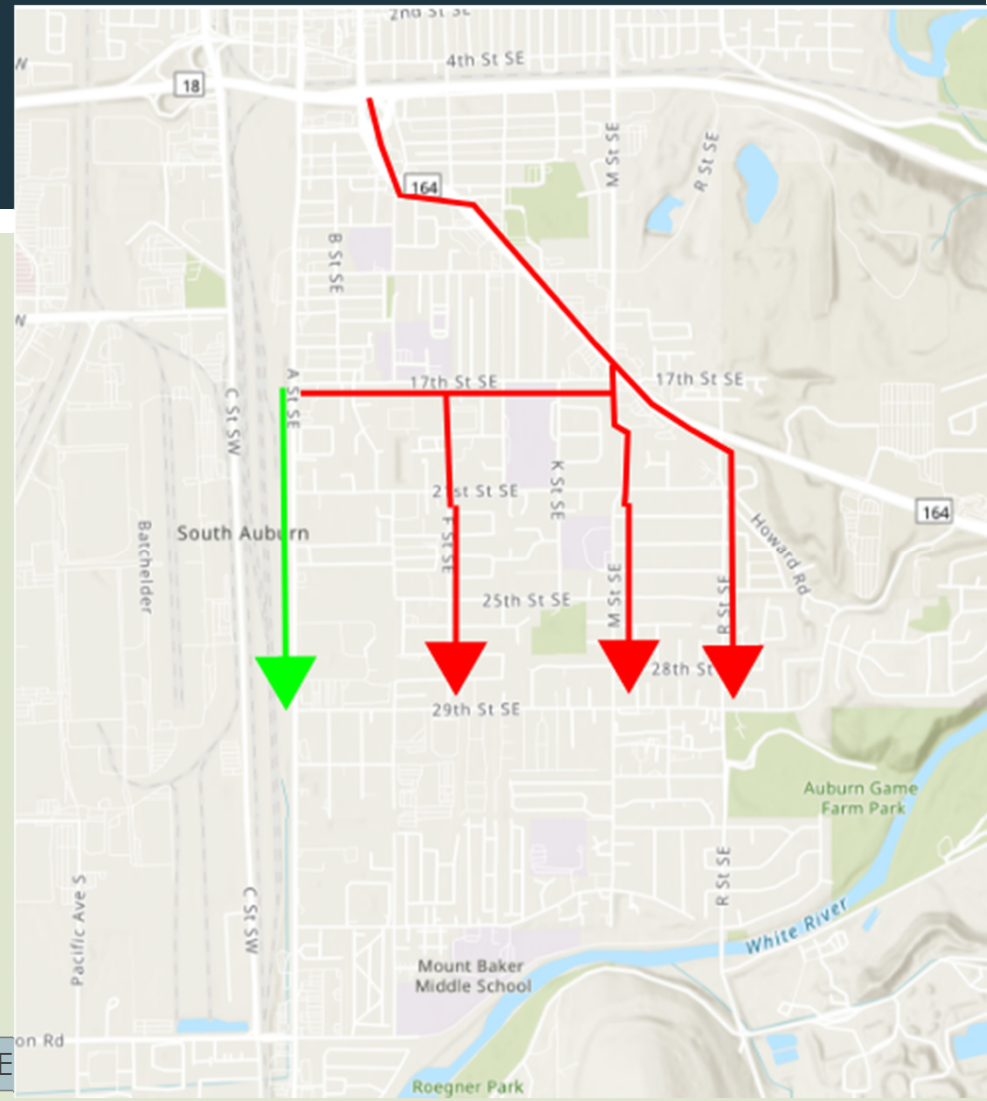
- Eastbound Auburn Way South
 - Some potential diversion to Howard Rd, R St, Riverwalk – mitigation includes:
 - Traffic calming @ Howard Rd
 - Roundabout coming soon at R/21st
 - Recent improvements to Riverwalk



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EQUITY ANALYSIS – TRAFFIC DIVERSION

- Southbound A Street SE
- Some diversion may occur:
 - 17th St SE to F St SE, M St SE, or R St SE – mitigation includes:
 - Traffic Calming and School Zone Cameras In-Place
 - Auburn Way S. to Howard Rd to R St SE – mitigation includes:
 - Traffic calming @ Howard Rd
 - Roundabout coming soon at R/21st
 - Recent improvements to R St SE



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ALTERNATIVES ANALYSIS

- What other approaches have been, or could be, implemented to reduce likelihood of speeding contributing to crashes?
 - Traditional Enforcement Approaches/Barriers
 - Physical Traffic Calming
 - Lane Widths
 - Traffic Circles/Roundabouts
 - Raised Crossings, Speed Cushions
 - Chicanes
 - Other Safety Countermeasures
 - Non-motorized facilities
 - Street Lighting
 - Dynamic Message Signs

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ALTERNATIVES ANALYSIS

■ Eastbound 15th St NW

■ Already Implemented Measures:

- Dynamic Message Sign
- Street Lighting
- Sidewalks
- Road Channelization

■ Traditional Enforcement:

- High volumes and multiple lanes, traditional enforcement has minor impact on driver behavior

■ Physical Traffic Calming: None.

■ Other Potential Mitigation:

- Additional street lighting and non-motorized facilities



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ALTERNATIVES ANALYSIS

■ Eastbound Auburn Way S (R St Bridge to MIT Plaza)

- Already Implemented Measures:
 - Dynamic Message Sign
 - Street Lighting
 - Sidewalks
 - Narrowed Lines
 - Centerline Hardening
 - Intersection Improvements
- Traditional Enforcement:
 - No location for officers to provide enforcement
 - High volumes and multiple lanes, traditional enforcement has minor impact on driver behavior
- Physical Traffic Calming: None.
- Other Potential Mitigation: None.



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ALTERNATIVES ANALYSIS

- **Westbound Auburn Way S (Dominick to Moses)**
 - **Already Implemented Measures:**
 - **Traditional Enforcement**
 - **Traditional Enforcement:**
 - **High volumes and multiple lanes, traditional enforcement has minor impact on driver behavior**
 - **Physical Traffic Calming: None.**
 - **Other Potential Mitigation:**
 - **Additional street lighting and non-motorized facilities**



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ALTERNATIVES ANALYSIS

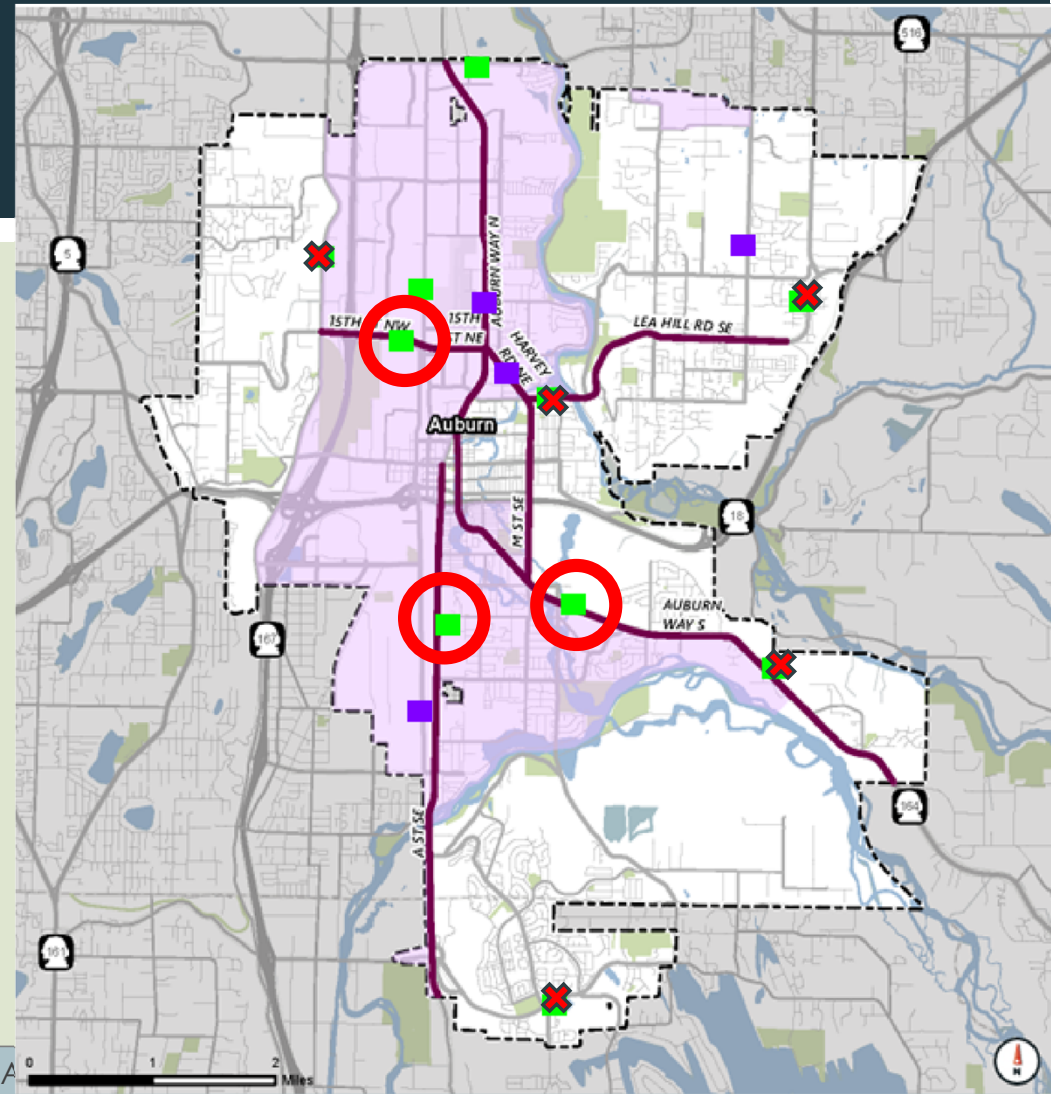
- **Southbound A St SE (17th to 29th)**
 - **Already Implemented Measures:**
 - Traditional Enforcement
 - Sidewalks
 - Street Lighting
 - Traffic Signal Improvements
 - **Traditional Enforcement:**
 - High volumes and multiple lanes, traditional enforcement has minor impact on driver behavior
 - **Physical Traffic Calming: None.**
 - **Other Potential Mitigation: None.**



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RECOMMENDED LOCATIONS & NEXT STEPS

- EB Auburn Way S between R St Bridge and MIT Plaza
- EB 15th Street NE between M St NW and Ron Crockett
- SB A ST SE between 17th and 29th
- Next Steps
 - July 21 – Adopt Ordinance 6983 – Code Update
 - July 21 – Adopt Resolution 5847 to establish first 3 locations
- Questions ?



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Resolution 5847 Exhibit A

City of Auburn – Automated Traffic Safety Camera Program

2025 Program Expansion Study and Overview, Prepared 7/8/2025

Purpose

This document provides the basis for the City Council to establish prioritized locations for general speed enforcement with the expansion of the City’s automated traffic safety camera program in accordance with state requirements.

In 2024, Washington State Legislature [House Bill 2384](#) was passed that updated RCW’s related to automated traffic safety cameras. The changes removed the limitations for agencies like the City of Auburn from only using automated traffic safety cameras in school zones, railroad crossings, and signalized intersections. The revised state regulations continue to allow agencies to operate automated traffic safety cameras to enforce speed limits in hospital speed zones, public park speed zones, school speed zones, school walk zones, roadway work zones, and state highways that are classified as City streets per RCW 47.24 (such as Auburn Way South/SR 164). There are no limits to how many speed enforcement cameras agencies may operate in these areas.

The state regulations revised by House Bill 2384 now allow agencies to utilize automated traffic safety cameras to enforce speeds at other locations deemed by the City Council to experience higher crash risks due to excessive vehicle speeds.

In adopting the 2025-2026 biennial budget, the Auburn City Council approved a program improvement to expand the City’s current photo enforcement from being only in school zones to also enforce speeds outside school zones. The budget included implementation of up to 3 cameras in late 2025 that would be actively enforcing speeds in early 2026.

In 2025, the expanded program will place up to 3 additional speed enforcement cameras at locations that are not school speed zones (General Locations), that meet the criteria established in [RCW 46.63.250\(3\)](#) and with analysis required per [RCW 46.63.220\(3\)](#):

[RCW 46.63.250\(3\)](#): “...The local legislative authority may authorize the use of one additional automated traffic safety camera per 10,000 population to detect speed violations in locations deemed by the local legislative authority to experience higher crash risks due to excessive vehicle speeds...” (Speed and Crash Requirement)

[RCW 46.63.220\(3\)](#): “The local legislative authority must prepare an analysis of the locations within the jurisdiction where automated traffic safety cameras are proposed to be located before adding traffic safety cameras to a new location or relocating any existing camera to a new location within the jurisdiction. The analysis must include equity considerations including the impact of the camera placement on livability, accessibility, economics, education, and environmental health when identifying where to locate an automated traffic safety camera. The analysis must also show a demonstrated need for traffic cameras based on one or more of the following in the vicinity of the proposed camera location:

Travel by vulnerable road users, evidence of vehicles speeding, rates of collision, reports showing near collisions, and anticipated or actual ineffectiveness or infeasibility of other mitigation measures.” (Equity and Alternatives Analysis Requirement)

Auburn’s 2025 population is estimated to be just over 90,000 and therefore, the City of Auburn may operate up to 9 automated traffic safety cameras to enforce speeds at general locations.

Background

The City of Auburn’s current Automated Traffic Safety program is intended to reduce speeding in school zones and improve overall safety for children, teachers, and parents. The need for the program was identified in 2022 when speed studies in 28 different school zones showed that between 7% and 45% of vehicles were significantly exceeding the 20 mph speed limit in active school zones. The program has been successful in reducing non-compliance rates from the initial study in 2022. The initial average non-compliance rate for the school zones where cameras were installed was 27%. By the end of 2024, with the 12 automated traffic safety cameras in place, the average non-compliance rate dropped to under 2%.

In 2024, with Resolution 5789 the City Council adopted the Comprehensive Safety Action Plan (Safety Plan) and established a target zero vision and goal. The vision is to eventually have no serious injury and fatal crashes on the City’s transportation system. The goal is to reduce serious injuries and fatal crashes by 30% by 2040. Community outreach and engagement helped develop the Safety Plan. In total, 351 public comments related to safety concerns were received and considered through various engagement tools and speeding was frequently one of the most significant concerns shared.

The Safety Plan identifies various approaches to support the vision and goal, called safety countermeasures. Automated traffic safety cameras are a proven safety countermeasure that is effective in affecting driver behavior to slow down and therefore reduce the likelihood of serious injury and fatal crashes.

Site Selection Approach

The following steps were taken to select locations prioritized for automated speed enforcement:

- 1) Initial Site Selection and Evaluation
- 2) Detailed Speed Studies
- 3) Crash to Speed Correlation Evaluation
- 4) Equity and Alternatives Analysis
- 5) Selected Sites

Initial Site Selection and Evaluation

The City’s Traffic Engineering staff of the Public Works Department and the Traffic Unit of the Police Department worked together to identify 14 locations to be considered for study. The initial locations were identified based on crash history, speeding complaints, information from the Safety Plan, and previously conducted speed studies. The initial locations were evaluated and considered for further study based on the following criteria:

Table 1: Initial Evaluation Criteria

Criteria No.	Criteria Description
1	Presence on Safety Emphasis Corridor (SEC) as identified in the 2024 Auburn Comprehensive Safety Action Plan
2	Presence on High Injury Network (HIN) as identified in the 2025 Draft Regional Safety Action Plan by the Puget Sound Regional Council (PSRC)
3	Conditions making enforcement by traffic police officers difficult (limited space along corridor, high speeds, high volumes, multiple lanes)
4	History of crashes and speeding complaints (typically reflected by presence on SEC or HIN)
5	Lack of other safety counter measures (lighting, sidewalks, and/or enhanced crossings)

Other evaluation criteria included the posted speed limit, number of lanes, average daily traffic volume, and the roadway classification. Table 2 below lists the evaluation criteria and whether the location was selected to be included in the speed studies performed by the City's automated traffic safety camera vendor, Verra Mobility. The locations chosen for further study are shaded green.

Table 2: Initial Evaluation and Outcome

Location	Direction	Posted Speed (mph)	# of Lanes	Classification	Criteria Present	Study
S. 277 th St between D St NE & I St NE	WB	35	2	Principal Arterial	2, 3,4,5	Y
15 th St NW between M St NW & Ron Crockett Dr	EB	35	2	Principal Arterial	1,3,4,5	Y
Auburn Way S between R St Bridge & Muckleshoot Plaza SE	EB	35	2	Principal Arterial	1,2,3,4,5	Y
Auburn Way S between Dominick St SE & Moses St SE	WB	35	1	Principal Arterial	1,2,3,4,5	Y**
A St SE between 17 th St SE & 29 th St SE	SB	40	2	Principal Arterial	1,2,3,4,5	Y
124 th Ave SE between SE 296 th Way & SE 300 th Way	SB	35	2	Minor Arterial	4	N
West Valley Highway between 29 th St NW & 37 th St NE	NB	40	2	Principal Arterial	2,4,5	Y
Auburn Way North between 15 th St NE & 30 th St NE	NB	35	2	Principal Arterial	1,2,4	N
Harvey Rd between 12 th St & 8 th St NE	NB	35	2	Principal Arterial	1,4	N
8 th St NE between Harvey Rd and Pike St NE	EB	35	2	Principal Arterial	1,2,4	Y
132 Ave SE (Lea Hill Rd) between SE 308 th St and SE 312 th Ct	SB	35	1	Minor Arterial	1,2,3,4	Y
C St SW between 15 th St SW & Ellingson Rd	SB	45	2	Minor Arterial	2,3,4	N*
Lake Tapps Parkway between Lakeland Hills Way & Town Center	WB	45	2	Principal Arterial	2,3,4	Y
B St NW between 16 th St NW & 29 th St NW	SB	35	1	Minor Arterial	2,3,4,5	Y**

* Road construction planned in 2025 w/potential speed limit change would conflict with study.

** Study included through lane and adjacent two-way left turn lane.

Speed Analysis Study

From March 11th to March 25th, 2025, the City's automated traffic safety camera vendor conducted detailed speed studies at the 10 preliminary locations identified for further study in Table 2. The study data was processed to indicate the total volume of vehicles and the percentage of vehicles that were exceeding the speed limit at given thresholds at each location. In summary, the results showed significant variation in the rates of vehicles that were significantly exceeding the posted speed limit, ranging from 56% to 1%. The highest rates of non-compliance occurred on S. 277th Street (56%), two studied locations on Auburn Way South (SR-164) (50% and 55%), 15th Street NW (26%), and B Street NW (26%). To prioritize locations that had the highest rates of significant speeding, locations with the lowest rates of significant speeding were not selected to move forward. Locations selected for further evaluation are shown in green on Table 3 below.

Table 3: Speed Studies Summary

Location	Total Vehicle Volume ¹	Vehicles @ Posted + 10	Vehicles @ Posted + 15	Further Evaluation?
S. 277 th St between D St NE & I St NE	45,679	56%	30%	Yes
15 th St NW between M St NW & Ron Crockett Dr	50,277	26%	8%	Yes
Auburn Way S between R St Bridge & Muckleshoot Plaza SE	48,932	55%	24%	Yes
Auburn Way S between Dominick St SE & Moses St SE	33,059	50%	13%	Yes
A St SE between 17 th St SE & 29 th St SE	34,276	10%	3%	Yes
West Valley Highway between 29 th St NW & 37 th St NE	18,524	8%	2%	No
8 th St NE between Harvey Rd and Pike St NE	33,132	1%	<1%	No
132 Ave SE (Lea Hill Rd) between SE 308th St and SE 312 th Ct	18,179	5%	1%	No
Lake Tapps Pkwy between Lakeland Hills W & Town Center Entrance D/W	24,192	1%	<1%	No
B St NW between 16 th St NW & 29 th St NW	15,353	26%	8%	Yes

¹Two-day total traffic volume

Speed and Crash Requirement

The Safety Plan identifies Safety Emphasis Corridors throughout the City where most of the crashes causing serious injuries and fatalities (KSI Crashes) have occurred. 59% of all KSI Crashes occurred on the 7 identified Safety Emphasis Corridor. For each Safety Emphasis Corridor, the Safety Plan identifies the prominent circumstances involved with the KSI Crashes. The most common identified circumstances include speeding, impaired driving/DUI, failure to yield the right-of-way, and distracted driving. For all corridors, the Safety Plan identifies automated safety cameras as a countermeasure to be considered for improving driver behavior, reducing speeds, and lessening the likelihood of KSI Crashes. General speed enforcement with automated traffic safety cameras at locations on these identified corridors would meet

the Speed and Crash Requirement. Locations not located on these corridors may still meet the Speed and Crash Requirement but would require additional analysis to substantiate that the criteria has been met.

Locations on Safety Emphasis Corridors were prioritized to move forward into the Equity and Alternatives Analysis and are shown in green on Table 4. The two locations that would require additional analysis to evaluate crash history and speed correlation were not selected to move forward into the equity and alternatives analysis with this current program expansion but may be considered with future program expansion(s).

Table 4: Locations on Safety Emphasis Corridors

Location	On Safety Emphasis Corridor?	Next Step
S. 277 th St between D St NE & I St NE	No	Additional analysis would be needed to evaluate crash history.
15 th St NW between M St NW & Ron Crockett Dr	Yes	Equity and Alternatives Analysis
Auburn Way S between R St Bridge & Muckleshoot Plaza SE	Yes	Equity and Alternatives Analysis
Auburn Way S between Dominick St SE & Moses St SE	Yes	Equity and Alternatives Analysis
A St SE between 17 th St SE & 29 th St SE	Yes	Equity and Alternatives Analysis
B St NW between 16 th St NW & 29 th St NW	No	Additional analysis would be needed to evaluate crash history.

Equity and Alternatives Analysis Requirement

Equity considerations include evaluation of the impact of camera placement on livability, accessibility, economics, education, and environmental health. The analysis also evaluates whether other mitigation measures besides traffic cameras have been effective and whether new or additional measures would be feasible and likely to be effective in reducing crashes caused by speeding.

Camera enforcement can have a positive effect on the livability, accessibility, economics, education, and environmental health of the areas in which they are placed. Camera enforcement encourages drivers to obey posted speed limits which creates a safer environment for other vehicles, pedestrians, and cyclists. The reduction of high speeds that are the result of camera enforcement make it more comfortable and therefore more likely that people will be more willing to walk, bike, and use transit which has a positive effect on accessibility, economics and environmental health. Those who receive infractions also benefit from the program as the infraction and associated fee encourage and educate them to learn to slow down which reduces the likelihood that they will be seriously injured or killed in a crash or cause others to be seriously injured or killed.

Since camera placement has a positive impact on the area in which they are placed, consistent with the City's equity policies in its Comprehensive Transportation Plan, the potential placement locations were evaluated from an income demographics standpoint. This evaluation helps ensure that locations selected for placement are not underserving or overserving any particular income demographic. The City's goal is to

balance the automated enforcement, so that the distribution of income demographics served by the cameras reflects the distribution of income demographics in the City. Table 5 summarizes the overall income demographics of the registered owners of the vehicles travelling in the listed locations. This information was collected using the [Placer.AI](#) data service provided to the City.

Table 5: Income Demographics

Location	Median Household Income ¹	Comparison of Auburn Median Income ²	Note
15 th St NW between M St NW & Ron Crockett Dr	\$88,000	95%	Location is 5% lower than median income
Auburn Way S between R St Bridge & Muckleshoot Plaza SE	\$92,000	>99%	Location is nearly equal to median income
Auburn Way S between Dominick St SE & Moses St SE	\$103,000	111%	Location is 11% higher than median income
A St SE between 17 th St SE & 29 th St SE	\$94,000	101%	Location is 1% higher than median income

¹ Per Placer AI data collection tool

² Median income in Auburn is \$92,824

The income demographic information shown on Table 5 suggests that placement of automated traffic safety cameras in one or more of the locations would not weigh more heavily on, or provide more benefit to, income demographics significantly below or above the median household income in Auburn. However, all 4 locations are in, or along, areas identified as “disadvantaged communities” in the Safety Plan. People living in these areas are more likely to rely on active transportation and transit services (where available) and are therefore more likely to be out walking or biking on and along the roadways. It follows that increasing driver compliance with posted speed limits on roads in, and along, these areas will increase safety and comfort to the people who rely on walking, biking, and transit.

In some cases, placement of camera enforcement in one location may cause traffic to divert and potentially speed in another location. In those situations, the area being served by the enforcement would benefit but it could be at the detriment of another location. The short list of study locations from Tables 4 and 5 were evaluated to determine if diversion of traffic on to other corridors would be likely to occur and what the potential impacts and mitigation for the diversion could be. The results are summarized in Table 6 below.

Table 6: Traffic Diversion Evaluation

Location	Diversion Potential	Potential impact of diverted drivers on community and potential mitigation
Eastbound 15 th St NW between M St NW & Ron Crockett Dr	Diversion not expected.	N/A
Eastbound Auburn Way S between R St Bridge & Muckleshoot Plaza SE	Some diversion may occur: Auburn Way S to Howard Rd to R St SE to Riverwalk Dr to Auburn Way S	This alternate route is already utilized to by-pass congestion on Auburn Way S and therefore also experiences congestion during peak commute times and during events at the White River Amphitheater. Some additional diverted traffic may occur, however, mitigation measures have already been constructed or will soon be constructed with planned projects, and no appreciable impact is anticipated: Traffic calming measures have been recently installed on Howard Rd near Auburn Way S. A roundabout at the intersection of R St SE and Howard Rd/21 st St SE is in design and planned for construction in 2026. Sidewalks, street lighting, and other safety improvements have been recently constructed on Riverwalk Dr and at the intersection of Riverwalk Dr and Auburn Way S.
Westbound Auburn Way S between Dominick St SE & Moses St SE	Diversion not expected.	N/A
Southbound A St SE between 17 th St SE & 29 th St SE	Some diversion may occur: 17 th St SE to F St SE, M St SE, or and Auburn Way S. to Howard Rd to R St SE	Traffic calming measures have been recently installed on Howard Rd near Auburn Way S. A roundabout at the intersection of R St SE and Howard Rd/21 st St SE is in design and planned for construction in 2026. Traffic calming measures (speed cushions, raised pedestrians, and signage) have recently been installed on F St SE, G St SE, K St SE, and M St SE. Additionally, school zone photo enforcement is in place on M St SE.

In addition to evaluation of equity criteria, the analysis also looks at potential alternatives to camera enforcement. For each location, the study identifies what measures have already been taken to reduce speeding and lower the risk of serious injury and fatal crashes caused by speeding. The study also considers what other measures could be taken and the feasibility and anticipated effectiveness of those measures. The alternatives analysis information is shown on Table 7.

Table 7: Alternatives to Camera Enforcement

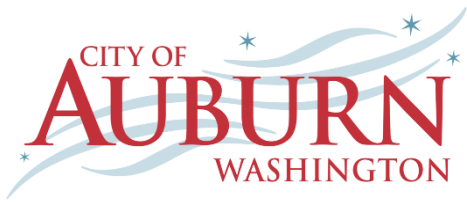
Location	Already Implemented Measures	Potential Other Measures		
		Additional Traditional Speed Enforcement	Physical Traffic Calming	Other Potential Mitigation
Eastbound 15 th St NW between M St NW & Ron Crockett Dr	Dynamic message sign, traditional enforcement, signage, streetlights, road channelization changes	High traffic volumes and low numbers of infractions issued w/traditional enforcement has only minor positive impacts to general driver behavior.	No other feasible measures due to high volumes and need to serve snow plows, freight and transit.	Additional street lighting and pedestrian facilities.
Eastbound Auburn Way S between R St Bridge & Muckleshoot Plaza SE	Lane narrowing, lowered speed limit, dynamic message sign, street lighting, sidewalks, signage, median/centerline hardening	No location for officers to provide traditional enforcement due to roadway characteristics.	No other feasible measures due to high volumes and need to serve snow plows, freight and transit.	No potential mitigation that hasn't already been implemented.
Westbound Auburn Way S between Dominick St SE & Moses St SE	Traditional enforcement	Additional traditional enforcement may be feasible. High traffic volumes and low numbers of infractions issued w/traditional enforcement has only minor positive impacts to general driver behavior.	No other feasible measures due to high volumes and need to serve snow plows, freight and transit.	Additional street lighting and pedestrian facilities.
Southbound A St SE between 17 th St SE & 29 th St SE	Traditional enforcement, sidewalks, street lighting, traffic signal improvements	High traffic volumes and low numbers of infractions issued w/traditional enforcement has only minor positive impacts to general driver behavior.	No other feasible measures due to high volumes and need to serve snow plows, freight and transit.	No potential mitigation that hasn't already been implemented.

Selected Locations

The final selection of locations was based on consideration of all data and criteria as summarized on Table 8. Sites proposed for implementation in 2026 are shown in green on the table.

Table 8: Final Selection for Initial Program Expansion

Location	Direction	Selected for Initial Program?	Reasons Selected or Not Selected
S. 277 th St between D St NE & I St NE	WB	N	Additional crash and speed correlation analysis is needed.
15 th St NW between M St NW & Ron Crockett Dr	EB	Y	Meets all legislative criteria and supports City safety goal.
Auburn Way S between R St Bridge & Muckleshoot Plaza SE	EB	Y	Meets all legislative criteria and supports City safety goal.
Auburn Way S between Dominick St SE & Moses St SE	WB	N	Traditional enforcement feasible. Of the two locations considered on Auburn Way S, this location has better potential for traditional enforcement and mitigation measures such as additional street lighting and pedestrian facilities. Placing cameras at two locations on Auburn Way S. while other locations would not have any was not seen as being the most equitable approach with this initial expansion and may disproportionately impact the adjacent community along this corridor.
A St SE between 17 th St SE & 29 th St SE	SB	Y	Meets all legislative criteria and supports City safety goal.
124 th Ave SE between SE 296 th Way & SE 300 th Way	SB	N	Traditional enforcement feasible and effective.
West Valley Highway between 29 th St NW & 37 th St NE	NB	N	Lower levels of significant speeding.
Auburn Way North between 15 th St NE & 30 th St NE	NB	N	Traditional enforcement feasible and effective.
Harvey Rd between 12 th St & 8 th St NE	NB	N	Traditional enforcement feasible and effective.
8 th St NE between Harvey Rd and Pike St NE	EB	N	Lower levels of significant speeding.
132 Ave SE (Lea Hill Rd) between SE 308 th St and SE 312 th Ct	SB	N	Lower levels of significant speeding.
C St SW between 15 th St SW & Ellingson Rd	SB	N	Construction projects underway. Not fully studied.
Lake Tapps Parkway between Lakeland Hills Way & Town Center	WB	N	Lower levels of significant speeding.
B St NW between 16 th St NW & 29 th St NW	SB	N	Additional crash and speed correlation analysis is needed.



AGENDA BILL APPROVAL FORM

Agenda Subject:

Ordinance No. 6980 (Gaub) (15 Minutes)
An Ordinance adopting the City's Amended 2024 Comprehensive Water Plan

Meeting Date:

July 14, 2025

Department:

Public Works

Attachments:

Presentation, Ordinance 6980,
Exhibit A, Link to Appendices A-
W

Budget Impact:**Administrative Recommendation:**

For discussion only.

Background for Motion:**Background Summary:**

On December 16, 2024, City Council adopted the draft 2024 Comprehensive Water Plan (CWP) by way of the City Comprehensive Plan update through approval of Ordinance No. 6960. The update to the CWP is a state-mandated requirement by the Washington State Department of Health (DOH) to ensure compliance with water system regulations and planning standards. The next phase in the process for the CWP is for it to be submitted to the regulatory agencies, including the DOH, King County, and Pierce County, for final approval.

Following adoption of Ordinance No. 6960, and during preparation of the response letter to be submitted to the regulatory agencies to initiate final approval, it was determined that edits were needed to specific referenced tables in the CWP describing the water right held by the City for the City's Braunwood satellite water system, clarifying the City's position on the topic following a CWP review comment that was received from the Department of Ecology.

In addition, the City of Algona requested to purchase additional reservoir storage to meet their water system needs that was not originally planned for in the CWP. The City of Algona currently owns 280,000 gallons of storage within Auburn's system that was previously purchased. The new request would bring the total to 450,000 gallons.

Ordinance No. 6980 adopts the City's amended 2024 CWP. The purpose of this discussion is to present City Council with details of the edits made to the CWP that are needed to address the Braunwood water right clarification mentioned and to present details pertaining to Algona's additional storage request and the subsequent edits made to the CWP as a result. It is anticipated that Council would then adopt the amended CWP at the Council meeting scheduled for July 21, 2025.

Councilmember: Tracy Taylor

Staff: Ingrid Gaub

ENGINEERING SERVICES

2024 COMPREHENSIVE WATER PLAN UPDATE

RYAN VONDRAK, UTILITIES ENGINEERING
MANAGER & SENAIT GEBREEYESUS, WATER
UTILITY ENGINEER
COUNCIL STUDY SESSION
JULY 14, 2025

Public Works Department

Engineering Services • Airport Services • Maintenance & Operations Services

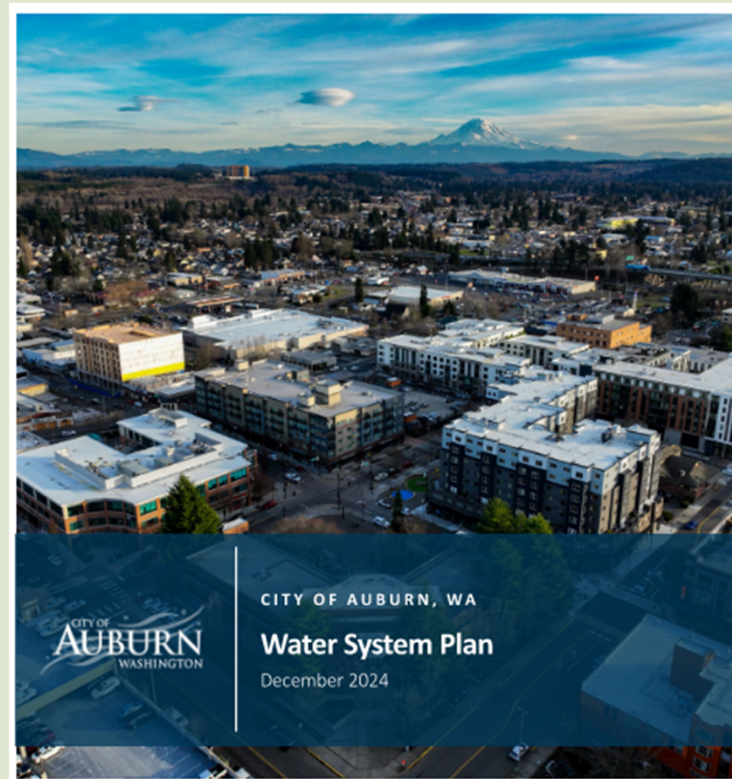
AUBURN
VALUES

S E R V I C E
E N V I R O N M E N T
E C O N O M Y
C H A R A C T E R
S U S T A I N A B I L I T Y
W E L L N E S S
C E L E B R A T I O N

WATER SYSTEM PLAN

Water System Plan (WSP)

- December 2024 – Council Adoption through Ordinance 6960
- Next Step – Submit Plan to Agencies for Approval
- WSP Edits Needed:
 - I. Determined an Edit to WSP Needed (2 Locations) – Braunwood Water Rights
 - II. Algona Additional Storage Request



BRAUNWOOD WATER RIGHTS EDITS– CHAPTER 3

Chapter 3 – System Analysis and Asset Management

- **Table 3-18 Water Right Allocations per Source Footnotes**

3.4 Capacity Analysis

This section provides an analysis of legal and physical capacity of the water system based on the system's available water rights, sources, treatment, storage, and distribution components.

3.4.1 Water Rights

A summary of the City's current water rights is presented in **Table 3-18**. The maximum instantaneous allowable flow for each source (Qi) is in units of gpm. The total annual withdrawal for each source (Qa) is in units of acre-feet per year. The City does not have any interruptible water rights.

Table 3-18 | Summary of Existing Water Rights

Water Right	Primary Qi (gpm)	Primary Qa (acre-feet/year)
Coal Creek Springs	6,732	9,410
Well 1, 6, & 7	2,200	1,120
Well 2, 6, & 7	2,400	1,360
Well 3A & 3B, 6, & 7	2,800	3,600
Well 4, 6, and 7	2,800	3,600
Wells 5, 5A, 5B, & 5C	1,000	720
Well 5A	167	0
Algona Well	500	175
Braunwood Well ¹	20	6.5
West Hill Springs ²	625	1,010
TOTAL	19,244	21,002

Notes:

1. The Department of Ecology considers Braunwood a standalone non-municipal satellite water system that currently serves 12 connections.
2. Water from West Hill Springs operates through water right claim S1-049354CL. A claim is an assertion that a water right was created pre-code (1917 for surface water and 1945 for groundwater).

Amended Table 3-18 Footnote No. 1 Text

BRAUNWOOD WATER RIGHTS EDITS– CHAPTER 3

Notes:

1. Water from the Braunwood well is administered through water right certificate G1-25173C, originally issued for a small domestic water system to serve up to 13 connections. Braunwood is a standalone non-municipal satellite water system that currently serves 12 connections.
2. Water from West Hill Springs operates through water right claim S1-049354CL. A claim is an assertion that a water right was created pre-code (1917 for surface water and 1945 for groundwater).

Original Table 3-18 Footnote No. 1 Text

Notes:

1. The Department of Ecology considers Braunwood a standalone non-municipal satellite water system that currently serves 12 connections.
2. Water from West Hill Springs operates through water right claim S1-049354CL. A claim is an assertion that a water right was created pre-code (1917 for surface water and 1945 for groundwater).

Amended Table 3-18 Footnote No. 1 Text

BRAUNWOOD WATER RIGHTS EDITS- APPENDIX 'I'

Appendix I - Department of Health Water Right Self-Assessment Form

- Additional Comments Section - bottom right of form (enlarged below for clarity)

Water Right Self-Assessment Form for Water System Plan

Mouse-over any link for more information. Click on any link for more detailed instructions.

Water Right Permit, Certificate, or Claim # *If water right is interruptible, identify limitation in yellow section below	WFI Source # If a source has multiple water rights, list each water right on separate line	Existing Water Rights Qi= Instantaneous Flow Rate Allowed (GPM) Qa= Annual Volume Allowed (Acre-Feet/Year) This includes wholesale water sold				Current Source Production - Most Recent Calendar Year Qi = Max Instantaneous Flow Rate Withdrawn (GPM or CFS) Qa = Annual Volume Withdrawn (Acre-Feet/Year) This includes wholesale water sold				10-Year Forecasted Source Production (determined from WSP) This includes wholesale water sold				20-Year Forecasted Source Production (determined from WSP) This includes wholesale water sold			
		Primary Qi Maximum Rate Allowed	Non-Additive Qi Maximum Rate Allowed	Primary Qa Maximum Volume Allowed	Non-Additive Qa Maximum Volume Allowed	Total Qi Maximum Instantaneous Flow Rate Withdrawn	Current Excess or (Deficiency) Qi	Total Qa Maximum Annual Volume Withdrawn	Current Excess or (Deficiency) Qa	Total Qi Maximum Instantaneous Flow Rate in 10 Years	10-Year Forecasted Excess or (Deficiency) Qi	Total Qa Maximum Annual Volume in 10 Years	10-Year Forecasted Excess or (Deficiency) Qa	Total Qi Maximum Instantaneous Flow Rate in 20 Years	20-Year Forecasted Excess or (Deficiency) Qi	Total Qa Maximum Annual Volume in 20 Years	20-Year Forecasted Excess or (Deficiency) Qa
00857 S1*01304 C	Coal Creek Springs	6,732		9,410		4,383	2,349	3,758	5,652	5,715	1,017	8,097	1,313	6,685	47	8,781	629
03560 G1*04731C	Well 1, 6, 8, 7	2,200		1,120		2,100	100	786	334	2,290	0	1,120	0	2,200	0	1,120	0
G1-00277C	Well 2, 6, 8, 7	2,400		1,360	2,480	2,062	338	1,360	0	2,490	0	1,360	0	2,400	0	1,360	0
G1-23629C	Well 3A & 3B, 4, 6, 7	2,800		3,600		592	2,208	0	3,600	2,022	778	574	3,026	2,800	0	717	2,883
G1-20391C	Well 4, 6, and 7	2,800		3,600		2,388	412	681	2,919	2,800	0	3,038	562	2,800	0	3,409	191
G1-23633C	Well 5, 5A, 5B, 6, 8, 7C	1,000		720		730	270	191	529	952	48	437	283	1,000	0	560	160
G1-25518	Well 5A	167		0	187	90	77	0	0	117	50	0	0	167	0	0	0
G1-22769 C	Algebra Well	500		175		0	500	0	175	0	500	0	175	0	500	0	175
S1-049354CL	West Hill Springs	625		1,010		563	62	481	529	625	0	1,010	0	625	0	1,010	0
TOTALS		19,224		20,995		12,909	6,315	7,257	13,738	16,831	2,393	15,636	5,359	18,677	547	16,957	4,038

Column Identifiers for Calculations:

ADDITIONAL COMMENTS:

Current and proposed Qi and Qa quantities for Well 5A (G1-25518) are included with G1-23633C.

Current Well 6 Qa = 1,435 AF which was distributed between G1*04731C, G1-00277C, and G1-20391C.

Current Well 7 Qa = 0 AF.

10-year and 20-year forecasted Qi and Qa includes providing an annual average of 2.5 MGD from Coal Creek Springs to the Muckleshoot Indian Tribe (MIT) for a hatchery.

The Department of Ecology considers G1-25173C to be a non-municipal water right issued to serve the Braunwood satellite system, so it is not listed.

S1-049354CL (West Hill Springs) is a claim filed under RCW 90.14.061; quantities can only be validated per RCW 90.14.081.

Production columns above:		20-Year Forecasted Purchase Forecasted quantity purchased through intertie			
10-Year Forecast	Future Excess or (Deficiency) Qa	Maximum Qi 20-Year Forecast	Future Excess or (Deficiency) Qi	Maximum Qa 20-Year Forecast	Future Excess or (Deficiency) Qa
0	3,920	1,253	2,307	0	3,920
0	3,920	0	1,560	0	3,920
F		G		H	

Quantities for Well 5A (G1-25518) are included with G1-23633C as distributed between G1*04731C, G1-00277C, and G1-20391C.

Qa includes providing an annual average of 2.5 MGD from Coal Creek Springs to the hatchery. Right issued to serve the Braunwood satellite system, so is not listed. Claim filed under RCW 90.14.061; quantities can only be validated per RCW 90.14.081.

SERVICE • ENVIRONMENT • ECONOMY • CHARACTER • SUSTAINABILITY • WELLNESS • CELEBRATION

ALGONA STORAGE REQUEST

- Algona currently owns 280,000 gallons within Reservoir 6
 - ❑ Purchased 180,000 gal in 2012
 - ❑ Purchased 100,000 gal in 2016
- Algona storage amounts established through Interlocal Agreement 1996/2002
- Algona requested an additional 170,000 gal of storage bringing total to 450,000 gal
- Algona additional storage request based on their system needs



ALGONA STORAGE REQUEST

DOH Recommendations

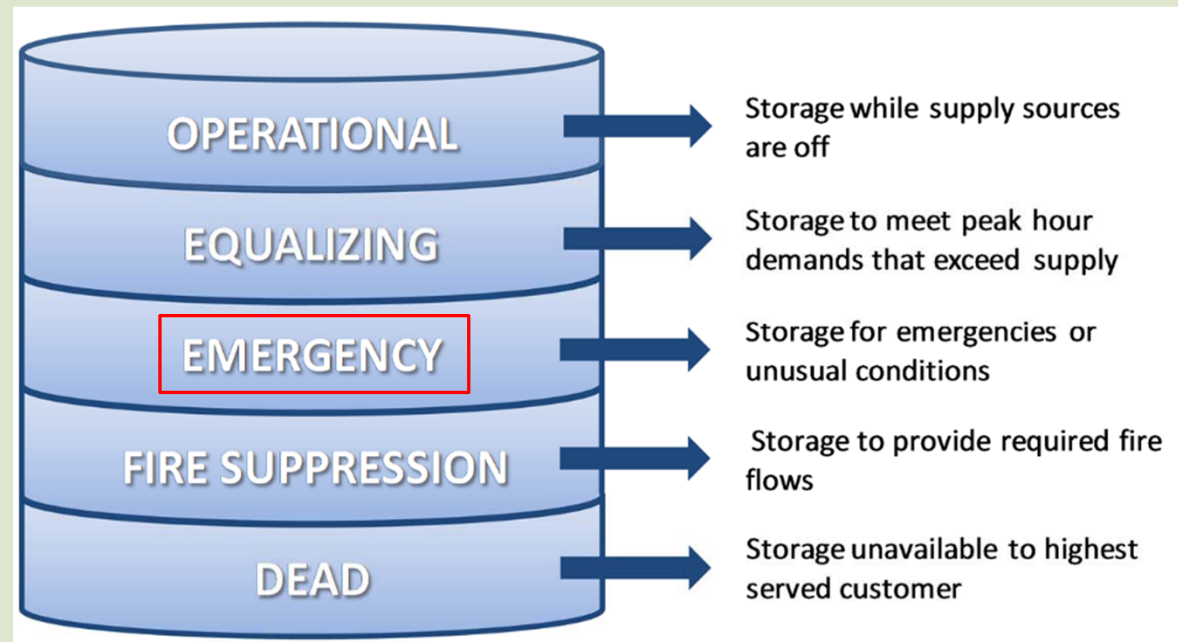
- Standby Storage (same as Emergency Storage) = Max Day Demand for service area = ~320 gallons per ERU
- DOH Minimum = 200 gallons per ERU

Auburn WSP

- 240 gallons per ERU

Algona Compromise

- 235 gallons per ERU



Reservoir Storage Components

ALGONA STORAGE REQUEST

Chapter 3 – System Analysis and Asset Management

- Table 3-31 – Identifies a system-wide water storage need by 2044.

Chapter 8 – Capital Improvement Program

- Table 8-4 – Identifies the Valley Reservoir 3 as a future project
- Algona will need to participate in cost to complete Valley Reservoir 3

Table 8-4 | Storage Improvements Projects

Project Name	Project ID	Project Timing	Added Storage (MG)	Estimated Cost 2024 USD	Brief Project Description
0 to 10-Year Planning Horizon					
Reservoir Repair & Replacements	R-01	2024-2044 (Annual)		\$1,392,000	Annual program for reservoir maintenance and minor improvements.
Reservoir Painting (10-year Cycle)	R-02	2025-2044		\$3,500,000	Required for maintenance and reservoir longevity in both Academy and Lea Hill service areas.
Academy PRV Project	R-03	2027		\$470,000	PRV for storage transfer and rezoning to meet fire flow demands.
Reservoir Capital Improvements	R-04	2027		\$470,000	Improvements to Reservoir 1, Reservoir 4A&4B, Reservoir 8A&8B based on the condition and remaining useful life.
10 to 20-Year Planning Horizon					
Braunwood Reservoir Improvements	R-05	2039-2040		\$250,000	Improvements based on condition and remaining useful life.
Valley Service Area Reservoir No. 3	R-06	2041-2044	2.0	\$11,745,000	Required to meet future storage requirements in the Valley service area.
Subtotal				\$17,827,000	

ALGONA STORAGE REQUEST

Description	2012	2016	2025
Total Reservoir Cost (from WSP)	\$2,562,275.00	\$2,562,275.00	\$11,745,000.00
Cost per Gallon	\$2.5623	\$2.5623	\$5.87
Algona Request	180,000.00	100,000.00	170,000.00
Algona Cost	\$461,214.00	\$256,230.00	\$997,900.00

ALGONA STORAGE REQUEST EDITS– CHAPTER 3

Chapter 3 – System Analysis and Asset Management

- **Section 3.4.2.3 Storage Analysis**
 - **Section 3.4.2.3.1 Components of Storage - Modified previously calculated locally adopted volume of Standby Storage**
 - **Section 3.4.2.3.2 Storage Analysis Results – Updated Standby Storage volumes in tables 3-29 thru 3-31**

- **Section 3.4.2.5 System Capacity Analysis Results**
 - **Table 3-34 – Modified previously calculated locally adopted volume of Standby Storage**

2024 WATER COMPREHENSIVE PLAN

Any Questions?

ORDINANCE NO. 6980

**AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF
AUBURN, WASHINGTON, ADOPTING THE CITY'S
AMENDED 2024 COMPREHENSIVE WATER PLAN**

WHEREAS, the City of Auburn operates a municipal water utility and provides drinking water to its water utility customers; and

WHEREAS, pursuant to RCW 70A.100.050, the City of Auburn is required to develop a Comprehensive Plan for its municipal water utility operations; and

WHEREAS, pursuant to WAC 246-290-100(2), the City must prepare and submit the Comprehensive Water Plan (CWP) for review and approval by the Washington State Department of Health, which has regulatory authority over drinking water systems; and

WHEREAS, the City's 2024 CWP is one of the functional plans incorporated by reference in the Auburn Comprehensive Plan adopted through Ordinance 6960 on December 16, 2024; and

WHEREAS, certain modifications were required to be made to the 2024 CWP to referenced tables describing the City's water right for the City's Braunwood satellite water system and updates to the City's water reservoir storage analysis following a request from the City of Algona to purchase additional storage from Auburn to meet their water system planning needs;

WHEREAS, the modifications to the 2024 CWP require the City Council to approve the amended Plan; and

WHEREAS, the 2024 CWP still requires final approval from the Washington State Department of Health; and

WHEREAS, following approval from the Washington State Department of Health, the amended 2024 CWP will be included by reference and incorporated into the amended City Comprehensive Plan that is scheduled to be approved by Council in December 2025.

NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF AUBURN, WASHINGTON, DO ORDAIN as follows:

Section 1. Adoption of Amended Comprehensive Water Plan. The City of Auburn amended 2024 Comprehensive Water Plan is adopted and approved as set forth in Exhibit 'A' attached and incorporated by reference pending approval from the Washington State Department of Health. City staff is authorized to provide modifications to the approved amended 2024 Comprehensive Water Plan based on comments received from the Washington State Department of Health. Any modifications made to the amended 2024 Comprehensive Water Plan to address Washington State Department of Health comments, shall remain in substantial conformity with the adopted and approved 2024 Comprehensive Water Plan as set forth in Exhibit 'A'.

Section 2. Implementation. The Mayor is authorized to implement those administrative procedures necessary to carry out the directives of this legislation.

Section 3. Severability. The provisions of this ordinance are declared to be separate and severable. The invalidity of any clause, sentence, paragraph, subdivision, section, or portion of this ordinance, or the invalidity of the application of it to any person or circumstance, will not affect the validity of the remainder of this ordinance, or the validity of its application to other persons or circumstances.

Section 4. **Effective date.** This Ordinance will take effect and be in force five days from and after its passage, approval, and publication as provided by law.

INTRODUCED: _____

PASSED: _____

APPROVED: _____

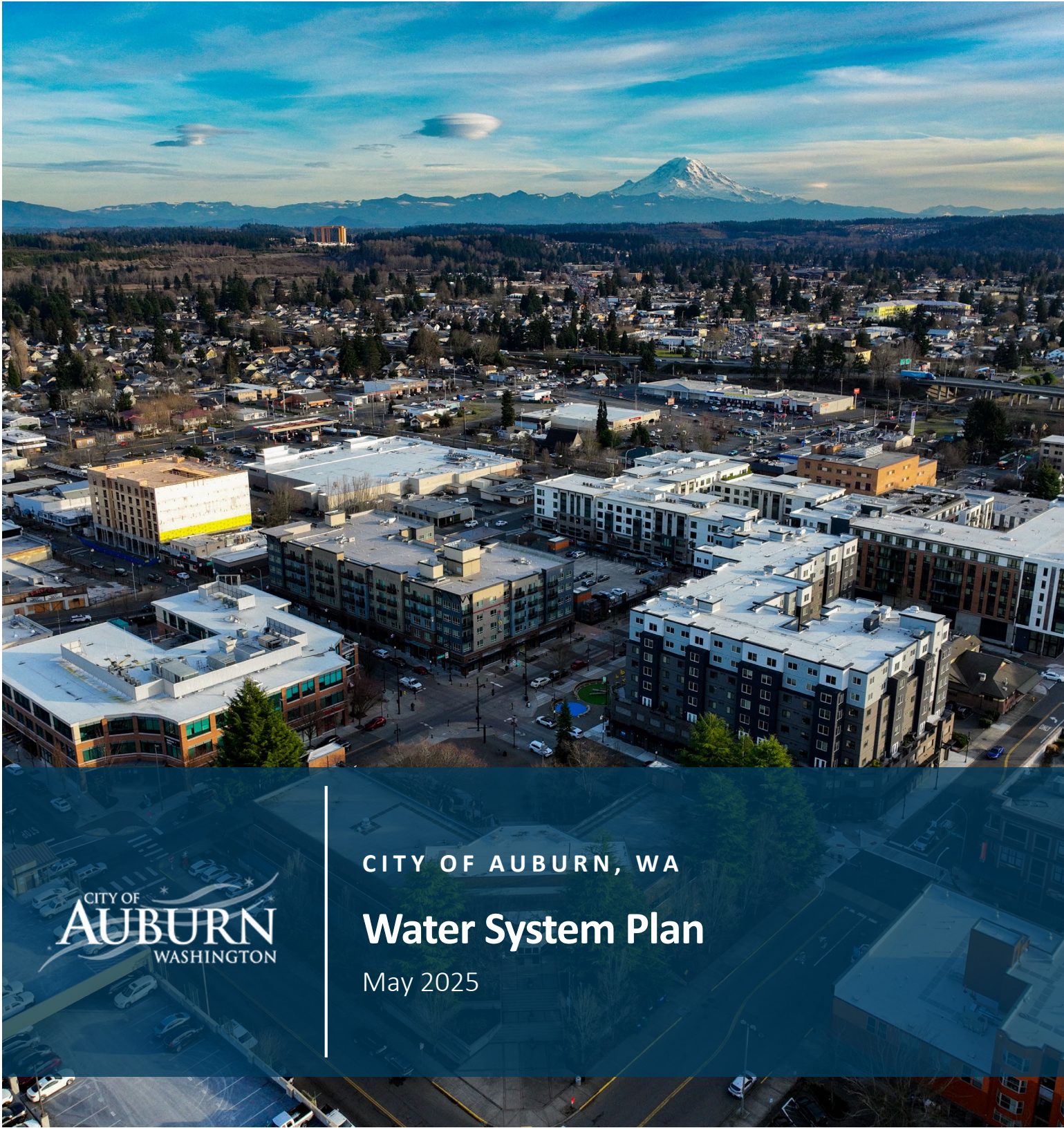
NANCY BACKUS, MAYOR

ATTEST:

APPROVED AS TO FORM:

Shawn Campbell, MMC, City Clerk

Jason Whalen, City Attorney



CITY OF AUBURN, WA

Water System Plan

May 2025

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2024 Water System Plan

City of Auburn, Washington

May 2025

PREPARED BY:

Conсор

Point of Contact: Adam Schuyler

600 University Street, Suite #300

Seattle, WA 98101

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PREPARED FOR:

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City of Auburn, WA Water System Plan May 2025

PREPARED BY:

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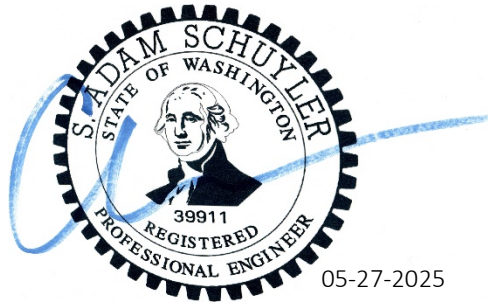
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This Plan was prepared by Ciara Murphy and Kevin Trott under the direction of the following registered professional engineer:



05-27-2025

Adam Schuyler, PE
Conсор
Seattle, WA

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Acronyms & Abbreviations

A	
AACE	American Association of Cost Estimators
AC	Asbestos-Cement
ACC	Auburn City Code
ac-ft/year	Acre-Foot Per Year
ADD	Average Day Demand
ADU	Accessory Dwelling Unit
AFY	Acre Feet Per Year
Algona	City of Algona
AMC	Auburn Municipal Code
AMI	Advanced Metering Infrastructure
APWA	American Public Works Association
ASR	Aquifer Storage and Recovery
AWC	Association of Washington Cities
AWWA	American Water Works Association
B	
BCA	Bilateral Compliance Agreement
Bonney Lake	City of Bonney Lake
BPS	Booster Pump Station
C	
Cascade	Cascade Water Alliance
ccf	Centum Cubic Feet
CCI	Construction Cost Index
CCPP	Calcium Carbonate Precipitation Potential
CCR	Consumer Confidence Report
CCT	Corrosion Control Treatment
CCTF	Corrosion Control Treatment Facility
CDBG	Community Development Block Grant
CDPW	Community Development & Public Works
CEMP	Comprehensive Emergency Management Plan
CERB	Community Economic Revitalization Board
CEU	Continuing Education Units
cfs	Cubic Feet Per Second
cfm	Cubic Feet Per Minute
CFP	Capital Facilities Plan
City	City of Auburn
CIP	Capital Improvement Plan
CMP	Coliform Monitoring Plan
CPR	Conservation Planning Requirements
CSCSL	Confirmed and Suspected Contaminate Sites

CWD	Covington Water District
CWSP	Coordinated Water System Plan
D	
D	Distribution Improvements
DBPR	Disinfectants and Disinfection Byproducts Rule
DBP	Disinfection Byproducts
DHS	Department of Homeland Security
DI	Ductile Iron
DNS	Determination of Non-Significance
DOE	Department of Ecology
DOH	Washington State Department of Health
DSL	Distribution System Leakage
DWSRF	Drinking Water State Revolving Fund
E	
EDCS	Engineering Design and Construction Standards
ENR	Engineering News Record
EOC	Emergency Operation Center
EPA	United States Environmental Protection Agency
EPS	Extended Period Simulation
ERU	Equivalent Residential Unit
EWE	Energy and Water Efficiency
F	
FEMA	Federal Emergency Management Agency
FF	Fire Flow
ft/s or fps	Feet Per Second
G	
G	General Improvements
gal/ERU	Gallons Per Equivalent Residential Unit
GIS	Geographic Information System
gpd	Gallons Per Day
gpm	Gallons Per Minute
GMA	Growth Management Act
G.O.	General Obligation
GWMP	Ground Water Management Plan
GWR	Groundwater Rule
GWUI	Groundwater Under the Influence of Surface Water
H	
HAA5	Haloacetic Acids
HGL	Hydraulic Grade Line
HPC	Heterotrophic Plate Count
HP	Horsepower
HWD	Highline Water District

I	
IA2	Interlocal Agreement 2
IA3	Interlocal Agreement 3
ICS	Incident Command System
IDSE	Initial Distribution System Evaluation
IGEA	Investment Grade Efficiency Audit
L	
LCRMR	Lead and Copper Rule Minor Revisions
LFC	Local Facilities Charge
LIDs	Local Improvement Projects
LMWD	Lake Meridian Water District
LRAAs	Locational Running Annual Averages
LR	Larson Ratio
LSI	Langelier
LWSD	Lakehaven Water and Sewer District
M	
MAG	Electromagnetic
Manual	Public Works Emergency Response Manual
MCL	Maximum Contaminant Level
MCLGs	Maximum Contaminant Level Goals
M/DBP	Microbial/Disinfection By-Product
MDD	Maximum Day Demand
MDRLs	Maximum Disinfectant Residual Level
MFR	Multifamily Residential
MG	Million Gallon
mgd	Million Gallons Per Day
MG/year	Million Gallons Per Year
MIT	Muckleshoot Indian Tribe
M&O	Maintenance and Operations
MRSC	Municipal Research and Services Center of Washington
MSDS	Material Safety Data Sheets
N	
NIMS	National Incident Management System
NOM	Natural Organic Matter
O	
O&M	Operations & Maintenance
OSHA	Occupational Safety and Health Administration
P	
PAA	Potential Annexation Areas
PGG	Pacific Groundwater Group
PHD	Peak Hour Demand
PHG	Public Health Goal

PIC	Forest Villa Manor
PI	Parcel Insight
Plan	Comprehensive Water Plan
PLC	Programmable Logic Controller
PNR	Public Notification Rule
PR	Pressure Reducing
Project ID	Identification Number
PRV	Pressure Reducing Valve
psi	Pounds Per Square Inch
PSRC	Puget Sound Regional Council
PS	Pump Stations
PUD	Planned Unit Development
PW	Public Works
PWB	Public Works Board
Q	
Qaw	White River Alluvium
Qd	Vashon Recessional Deltaic Deposits
Qom	Osceola Mudflow
Qua	Undifferentiated Alluvium
Qu	Undifferentiated Glacial and Interglacial Deposits
R	
R	Storage Improvement
R5	Residential 5 Du/Acre
RAA	Running Annual Average
RWSA	Retail Water Service Area
RWSS	Regional Water Supply System
S	
S	Supply Improvement
SCA	Sanitary Control Area
SCADA	Supervisory Control and Data Acquisition
SDC	Standard Development Charge
SDS	Safety Data Sheets
SDWA	Safe Drinking Water Act
SEATAC	Seattle-Tacoma International Airport
SEPA	State Environmental Policy Act
SFR	Single-Family Residential/Duplex
SMP	Standard Monitoring Program
SOC	Synthetic Organic Chemical
SOS	Save Our Streets
SSS	System-Specific Study
SWTR	Surface Water Treatment Rule

T	
Tacoma	City of Tacoma
TAZ	Transportation Analysis Zone
TCR	Total Coliform Rule
TPU	Tacoma Public Utility
TTHM	Total Trihalomethanes
U	
UCM	Unregulated Contaminant Monitoring
UDF	Unidirectional Flushing
UGA	Urban Growth Area
ULID	Utility Local Improvement District
USGS	United States Geological Survey
USEPA	United States Environmental Protectional Agency
UTC	Utilities And Transportation Commission
V	
VA	Vulnerability Assessment
VFD	Variable Frequency Drive
VOC	Volatile Organic Compound
W	
WAC	Washington Administrative Code
WCIA	Washington Cities Insurance Authority
WD#111	King County Water District #111
WETRC	Washington Environmental Training Resource Center
WFI	Water Facilities Inventory
WHP	Wellhead Protection
WHPA	Wellhead Protection Areas
WHPP	Wellhead Protection Plan
WISHA	Washington Industrial Safety and Health Act
WSP	Water System Plan
WSSIP	Water System Security Improvement Plan
WUE	Water Use Efficiency

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Executive Summary

Introduction

This Water System Plan (WSP) has been developed in accordance with Chapter 426-290 of the Washington Administrative Code (WAC), as presented in the Washington State Department of Health (DOH) regulations for Group A Public Water Systems. This WSP supersedes the City of Auburn's (City) 2015 WSP, approved by DOH on May 11, 2016, and the 2021 Limited WSP Update approved by DOH on December 16, 2021. The City's water system identification number is 03350V.

The purpose of this WSP is to develop a long-term planning strategy for the City's Retail Water Service Area (RWSA). Updated every ten years per DOH, the WSP evaluates the existing system and its ability to meet the anticipated requirements for water source, treatment, transmission, storage, and distribution over a 20-year planning period. Historical data through the year 2022 were used for the analyses throughout the WSP. The ten-year planning period is 2024-2034. The long-term planning period is 2034-2044. Water system improvement projects have been developed to meet the changing demands of regulatory impacts, population growth, and necessary infrastructure repair and replacement. The WSP also identifies planning-level costs of the improvement projects and provides a financial plan for funding the projects.

ES.1 Description of Water System

The City limits are within both King County and Pierce County in the Puget Sound Region of Washington. **Figure ES-1** shows the City's RWSA which encompasses approximately 30 square miles. Several water purveyors adjoin the City's RWSA, including the cities of Algona, Bonney Lake, Federal Way, Kent, Pacific, and Sumner. Also included are the Covington Water District (CWD), Lakehaven Water and Sewer District (LWSD), Lake Meridian Water District (LMWD) (formerly known as King County Water District #111), Highline Water District (HWD), and the Muckleshoot Indian Tribe (MIT). The City also provides internal staffing for the management, operations, and maintenance of the Braunwood Estates satellite system.

The City's water system consists of groundwater wells, springs, and interties with adjacent purveyors as water sources, chlorination and corrosion control treatment facilities, pump stations, pressure reducing valve stations, steel and concrete enclosed reservoirs for storage, and transmission and distribution pipelines to provide potable water to customers. The RWSA is further divided into four service areas (Valley, Lea Hill, Lakeland, and Academy) that include a total of 28 pressure zones. The City's four service areas and the location of key components of the water system are shown in **Figure ES-2**.

Interties provide a tool that water utilities use to move water between systems to meet supply needs, to increase reliability and respond to emergencies. The City maintains wholesale supply interties with three water systems: City of Tacoma (Tacoma), Algona, and LMWD. The City also has a supply contract with the MIT and the Indian Health Service, dating from 1972, for services along a pipeline at SE 368th PL extending from the City limits into the reservation. The City has emergency interties with seven water systems, Algona, Bonney Lake, Kent, Pacific, LWSD, LMWD and Tacoma.

A hydraulic profile of the City's water system is presented in **Figure ES-3**, showing all service areas, pressure zones, supplies, interties, reservoirs, and pump stations.

Figure ES-1 | RWSA Vicinity Map

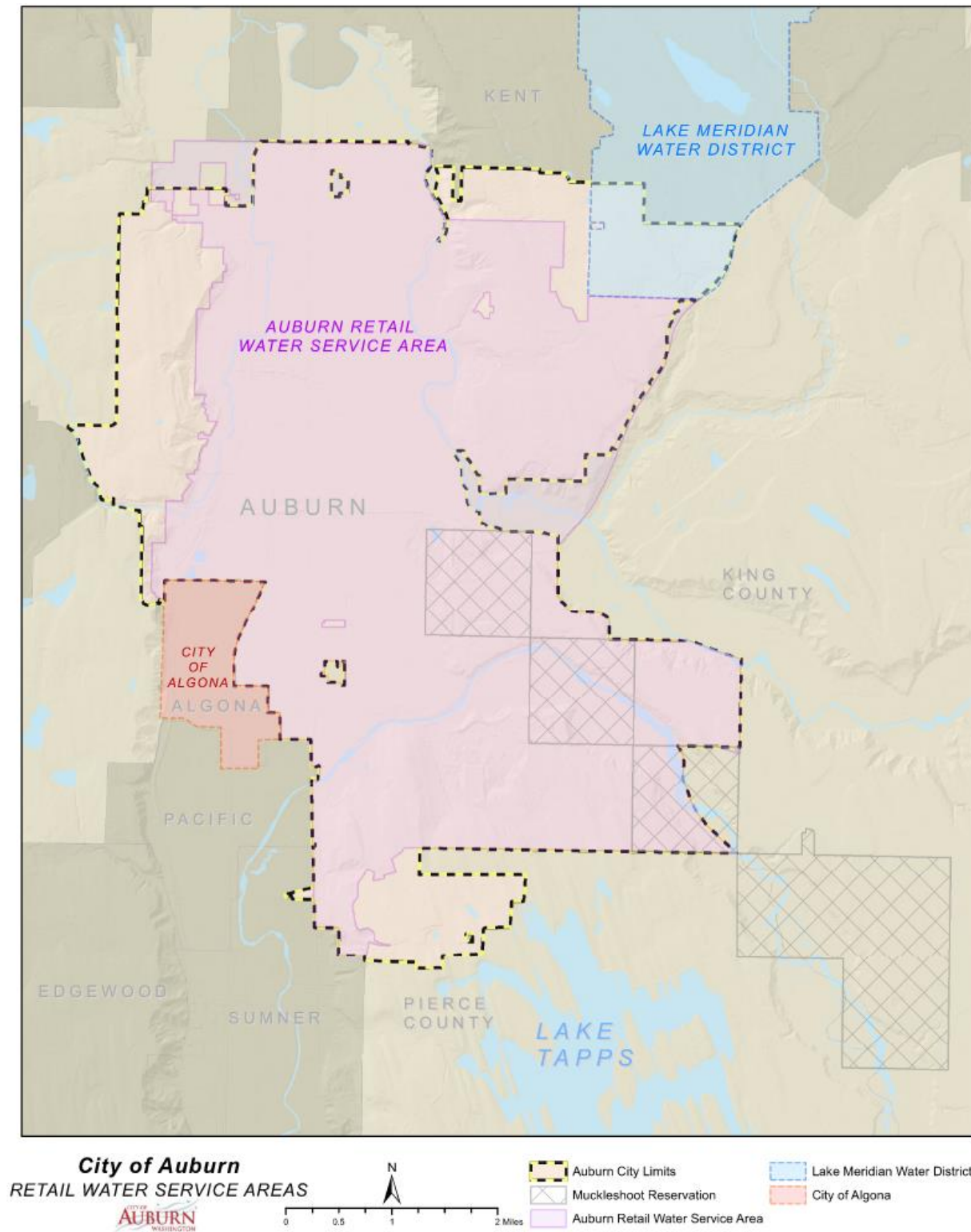


Figure ES-2 | Existing Facilities

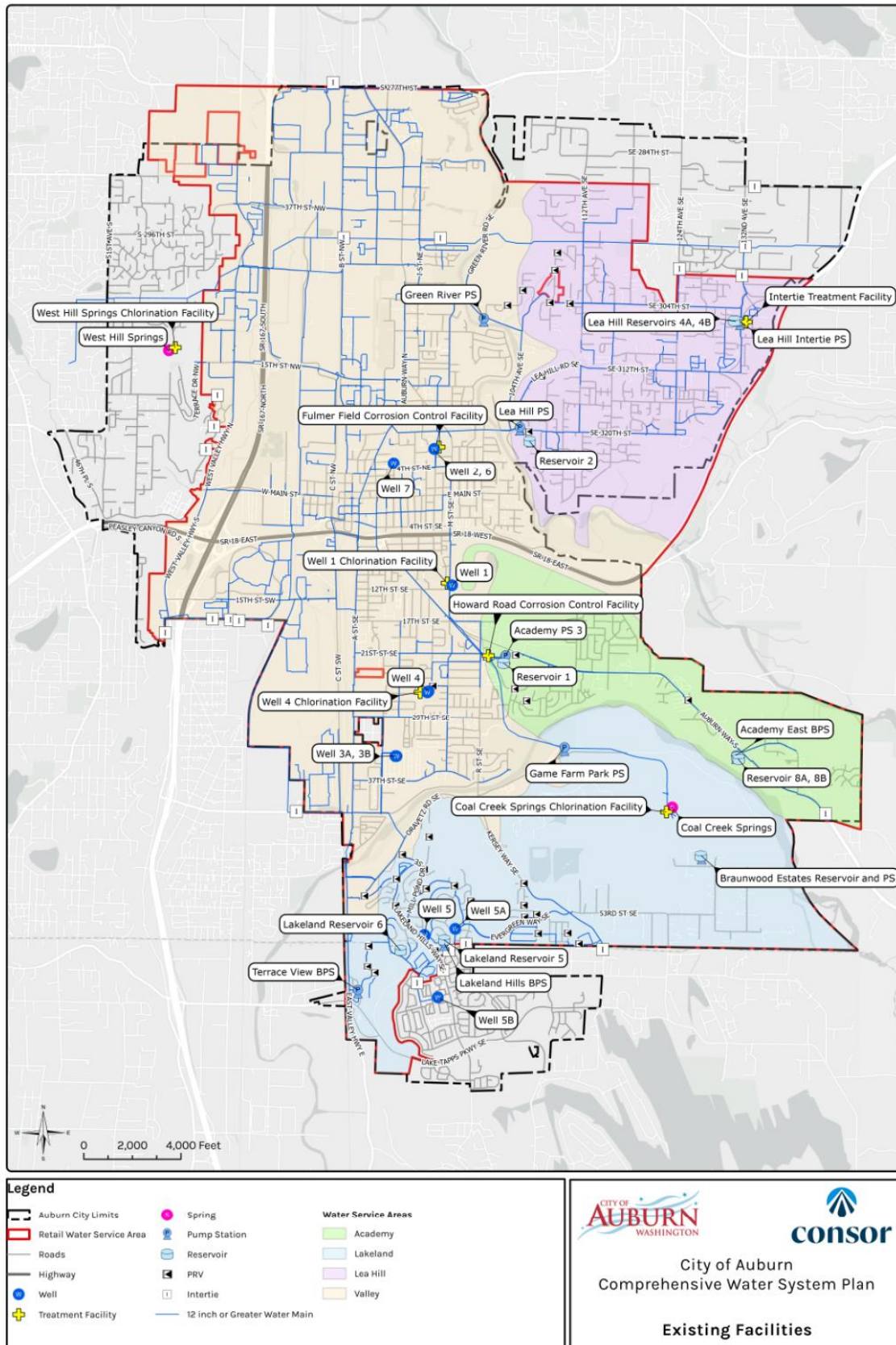
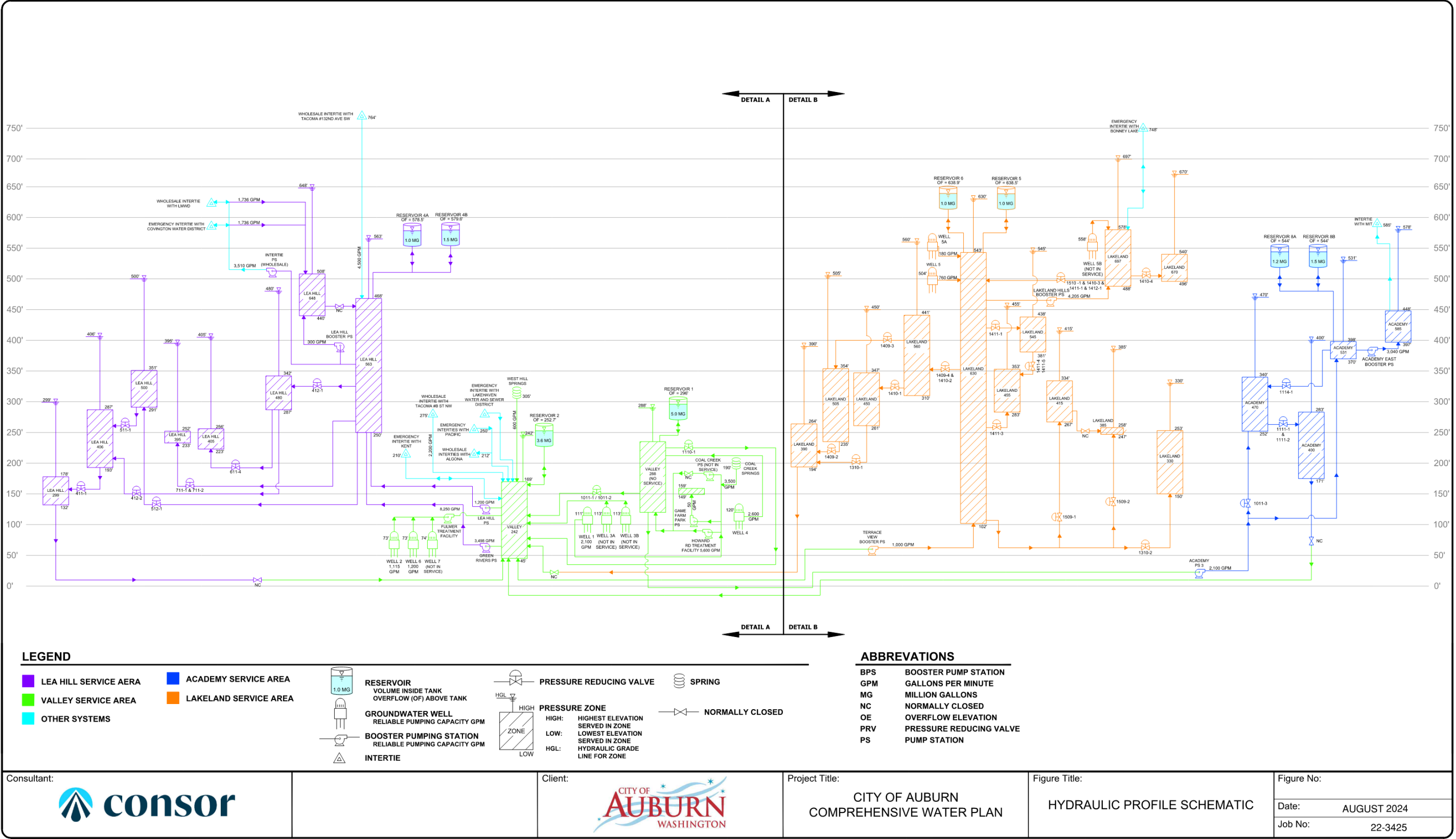


Figure ES-3 | Hydraulic Profile



ES.2 Basic Planning Data

Water Service Connections and Usage

The City's current and future water demand requirements were projected for each customer class (single-family residential/duplex, multifamily residential, commercial, manufacturing/industrial, schools, city accounts, irrigation, and wholesale). The water consumption, or demand, of each customer classification can be expressed in terms of equivalent residential units (ERUs) for forecasting and planning purposes. One ERU is defined as the average quantity of water used by one average, full-time, single-family residence per day. The quantity of water used by other customer classes, or by the entire system, can be expressed in terms of equivalent ERUs. The historical average and maximum water demands are important parameters when performing system and supply analyses. The Average Day Demand (ADD) is typically used in operational evaluations. The Maximum Day Demand (MDD) represents the single largest day water demand during the year and is a key parameter for infrastructure sizing.

The City provided water to approximately 63,450 customers through 15,046 connections as of the end of 2022. Between 2015 and 2022 the ADD ranged from 6.32 million gallons per day (mgd) on the low end in 2020 to 7.67 mgd on the high end in 2016. The MDD has ranged from 11.25 mgd in 2019 to 12.43 mgd in 2020. The total number of connections increased by approximately three percent between 2015 and 2022. The City has two active wholesale water agreements, one with the City of Algona and the other with LMWD that is interruptible.

Water Supply and Production

The City has a diverse water supply consisting of two springs, ten wells and an intertie with the City of Tacoma. Wells 1, 2, 3A, 3B, 4, 6, and 7 are in the lower alluvial aquifer in the Auburn Valley, referred to as the Valley Wellfield. Wells 3A, 3B and 7 are currently offline due to high manganese concentrations. Wells 5, 5A, and 5B are in the Upland Wellfield within the Lakeland Service Area. Once Well 5B came online, the City discovered that the aquifer was not recovering and Well 5B has been offline since 2006. The safe yield of Wells 5 and 5A have been decreased from their design capacity due to a drop in the aquifer's capacity. The City has sufficient water rights to meet current demands as well as 10- and 20-year demand projections, as shown in the Water Rights Self-Assessment Form provided in **Appendix I**. Additional information on the City meeting future demands is mentioned in the Capacity Analysis Section under ES.3 (System Analysis and Asset Management).

West Hill Springs draws from an unnamed confined aquifer. The spring source water flows by gravity into the Valley Service Area, although flows vary depending on aquifer conditions. Coal Creek Springs is the largest active water supply for the City and draws from a confined aquifer, however its flow varies depending on aquifer conditions. The City also owns two additional wells: the Algona Well 1, which is not operational and the Braunwood Well which serves the Braunwood satellite system.

Future Population and Demand Projections

Demographic projections are based on the Puget Sound Regional Council's (PSRC) 2044 forecasts for population and employment within the City's RWSA. Total population is projected to increase by 1.5 percent annually from 2021 to 2044 and total employment is projected to increase by 1.9 percent annually over the same period. Overall, the City is planning for an additional 24,987 residents and 20,525 employed people by 2044 within the RWSA. The Valley Service Area is projected to represent 64 percent of the system's population and 93 percent of the system's employment in 2044.

The projected ADD and MDD, along with wholesale demands, are summarized in **Table ES-1**. To be conservative, an ERU planning value higher than the average was used for demand forecasting. The 75th percentile of the historical ADD per ERU between 2015 and 2022 was used to select the planning ERU value of 182 gpd. The peak demands can be expressed as an MDD/ADD peaking factor, which is the relative magnitude of MDD compared to ADD. The City's MDD/ADD peaking factor was 1.77. Distribution system leakage and authorized unbilled consumption are accounted for in the projections.

Table ES-1 | ADD, MDD, and ERUs Summarized by Service Area with Wholesale Included

	2024	2034	2044
Lea Hill			
Average Day Demand (mgd)	1.00	1.04	1.09
Maximum Day Demand (mgd)	1.77	1.84	1.92
Equivalent Residential Units	5,506	5,729	5,966
Valley			
Average Day Demand (mgd)	5.11	5.84	6.72
Maximum Day Demand (mgd)	9.02	10.31	11.88
Equivalent Residential Units	28,034	32,037	36,920
Lakeland			
Average Day Demand (mgd)	0.51	0.59	0.67
Maximum Day Demand (mgd)	0.91	1.04	1.19
Equivalent Residential Units	2,815	3,217	3,684
Academy			
Average Day Demand (mgd)	0.43	0.48	0.54
Maximum Day Demand (mgd)	0.76	0.85	0.95
Equivalent Residential Units	2,375	2,642	2,946
Total Retail Customers			
Average Day Demand (mgd)	7.05	7.95	9.02
Maximum Day Demand (mgd)	12.47	14.04	15.94
Equivalent Residential Units	38,731	43,626	49,515
Algona (Firm Wholesale)			
Total Average Day Demand (mgd)	0.365	0.386	0.409
Total Equivalent Residential Units, ADD	2,005	2,120	2,246
Total Maximum Day Demand (mgd)	0.692	0.732	0.775
Total Equivalent Residential Units, MDD	3,800	4,018	4,256
Retail with Algona			
Total Average Day Demand (mgd)	7.42	8.33	9.43
Total Maximum Day Demand (mgd)	13.16	14.77	16.71
Retail with Firm Wholesale (Algona and MIT)			
Average Day Demand (mgd)	9.92	10.83	11.93
Maximum Day Demand (mgd)	14.66	16.27	18.21
Retail with Firm & Interruptible Wholesale (Algona, MIT, and LMWD)			
Average Day Demand (mgd)	12.42	13.33	14.43
Maximum Day Demand (mgd)	17.16	18.77	20.71

ES.3 System Analysis and Asset Management

Asset Management

The City actively assesses and plans for the maintenance, repair, and replacement of its assets while preventive maintenance practices keep assets in good condition, thereby extending their useful life. For asset management, the City utilizes CarteGraph in conjunction with the geographic information system (GIS). GIS is updated using as-builts as projects are completed and CarteGraph is auto-populated from this information. CarteGraph is used to track and schedule maintenance activities and track material and labor costs and project timelines.

An inventory of the City's existing water system assets including distribution system components, treatment, reservoirs, supply facilities, pump stations, backup power, and the telemetry system is presented in **Chapter 3**.

Water Quality

The DOH requires that source water be monitored for primary and secondary contaminants. Primary contaminant levels are not to be exceeded for health reasons and secondary contaminants should not be exceeded for aesthetic reasons. Distribution system water quality testing requirements include monitoring of many contaminants for which the DOH determines maximum contaminant levels.

Historically, the City has relied on groundwater supplies from wells and springs, which have been determined are not under the direct influence of surface waters. For these water sources, the City is required to meet the United States Environmental Protection Agency's (EPA's) Groundwater Rule. The treatment objectives of the City are to treat source water to contaminant concentrations below the maximum contaminant levels (MCLs) established by the EPA and WAC. All constituents are currently below their respective MCLs.

The required frequency of monitoring of inorganic chemical and physical parameters varies by source, however, the City typically monitors these constituents every 12 months. Within the study period, the maximum detected concentrations of these parameters did not exceed the MCLs published by the EPA.

All active sources are disinfected with chlorine prior to entering the distribution system except for Well 5. The City has a capital project discussed in **Chapter 8** that will include the addition of a chlorination facility to Well 5. Corrosion control treatment is required on the water produced by Coal Creek Springs, Well 1, Well 2, Well 6, and Well 7 to limit the corrosion of lead and copper in the system. Since the corrosion control treatment facilities were constructed, the lead and copper levels in the City's system have been well below the action level. There were no water quality violations in the distribution system between 2015 and 2022.

Design Standards

The City's most recent Engineering Design and Construction Standards are available on the City's website and are provided as **Appendix P**.

The City's water quality design standards follow the design standards set forth by the EPA and the Washington DOH.

Capacity Analysis

The City's water supply (production) capacity compared with demand projections and DOH and City criteria indicate that the City has the supply facilities necessary to meet demand projections under current and future projections for all required criteria.

The City's Water Rights Self-Assessment Form is provided in **Appendix I** and was used to assess the City's water rights and includes supply that is available to the City through firm wholesale interties with Tacoma. The form includes a comparison of the available water rights to the existing, 10-year and 20-year demand projections for the "High Demand Scenario" provided in **Chapter 2**. The calculations presented in the Water Rights Self-Assessment Form conclude that the City's existing water rights are anticipated to be adequate to meet the current, 10-year, and 20-year projections for Qi and Qa.

The City does not currently have the infrastructure necessary to withdraw from all water rights (i.e., Wells 3A, 3B, 5B, and 7 are not currently operational). Additionally, some sources have underlying aquifer or infrastructure restrictions that limit the capacity of the source (i.e., Well 2, Well 6, and Coal Creek Springs). Several facility improvement projects are necessary for the City to maximize water production capacity to meet future demands, and planned supply related capital projects to meet this need are discussed further in **Chapter 8**.

Table ES-2 provides an overview of pump station supply analysis results expressed as either having a capacity surplus or deficit for open and closed zones. Open zones are pressure zones that are fed by gravity from a reservoir. Pressure zones that do not include a storage facility are analyzed as a closed zone. A closed zone in the Lea Hill Service Area and the Game Farm Park closed zone have a BPS capacity deficit identified in all planning scenarios. The City has planned a capital project to resolve the deficiency at the Intertie Pump Station/Lea Hill BPS. The Game Farm Park Pump Station only provides service to a recreational area with no residential or commercial property connections supplied by this facility. The City has reviewed the deficit with the Fire Marshal and the deficiency is not critical to address, therefore no actions are currently planned to resolve the deficiency at the Game Farm Park Pump Station. As further development progresses in and around the Game Farm Park Pump Station, modifications will be considered to address the deficiency.

Table ES-2 | Summary of Pump Station Capacity Results

	2024	2034	2044
Valley Open Zone Pump Station Capacity	Surplus	Surplus	Surplus
Lea Hill Open Zone Pump Station Capacity	Surplus	Surplus	Surplus
Lakeland Open Zone Pump Station Capacity	Surplus	Surplus	Surplus
Academy Open Zone Pump Station Capacity	Surplus	Surplus	Surplus
Lakeland Closed Zone BPS Capacity	Surplus	Surplus	Surplus
Academy Closed Zone BPS Capacity	Surplus	Surplus	Surplus
Lea Hill Closed Zone BPS Capacity	Deficit	Deficit	Deficit
Game Farm Park Closed Zone BPS Capacity	Deficit	Deficit	Deficit

The City's water storage facilities were analyzed to determine if they have sufficient capacity to meet the existing and future storage requirements. A summary of the results is provided in **Table ES-3**. New sources and pump stations allow for reliable and redundant operation of the system as an interconnected whole, rather than separate Service Areas. As such, excess storage in one service area can be used to

offset a deficit in another area of the system. The results of the storage analysis indicate that there is sufficient capacity to meet the projected 2024 and 2034 storage requirements, however additional storage is projected to be necessary in 2044. The City has a planned capital project to add a new reservoir in the Valley Service Area to address this deficiency.

Table ES-3 | Summary Storage Capacity Analysis

	Total Usable Storage	2024		2034		2044	
		Total Required Storage (MG)	Surplus/ (Deficit) (MG)	Total Required Storage (MG)	Surplus/ (Deficit) (MG)	Total Required Storage (MG)	Surplus/ (Deficit) (MG)
Academy	2.66	1.53	1.13	1.59	1.07	1.66	1.00
Lakeland	1.17 ¹	1.22	0.12	1.34	(0.17)	1.48	(0.31)
Lea Hill	2.12	2.26	(0.14)	2.32	(0.20)	2.37	(0.25)
Valley	7.96	7.58	0.38	8.52	(0.56)	9.67	(1.71)
RWSA	13.91¹	12.59	1.49	13.77	0.14	15.18	(1.27)

Note:

1. Algona has requested an additional storage capacity of 170,000 gallons of storage, anticipated to begin in 2025. The Lakeland and RWSA Total Usable Storage figures reflect this additional storage.

The City's existing distribution system was analyzed to determine if they have sufficient capacity to meet the existing and future demands and fire flow requirements using an updated and calibrated version of the City's hydraulic model. A low-pressure analysis was performed in the hydraulic model to confirm that pressures throughout the system were above 30 psi during under peak hour demand (PHD) conditions for 2024, 2034, and 2044. The results of this analysis indicated that all areas of existing and future system have pressures meeting this condition and were compliant with requirements.

An individual fire flow analysis was performed for each hydrant node in the hydraulic model to determine the available fire flow during MDD plus fire flow (FF) conditions, while maintaining a minimum residual pressure of 20 psi. The results of this analysis indicate that multiple pipeline improvement projects are necessary to address the distribution system deficiencies.

An analysis of the water system's overall physical capacity in terms of ERU using DOH Worksheet 4-1 is provided in **Appendix V**. The analysis indicates that the existing system has sufficient capacity to serve the current and projected water demands through 2034 (10-year planning horizon). Under 2024 and 2034 demand conditions, storage is the limiting system component for growth and development. In 2044 (20-year planning horizon) storage is deficient, which is consistent with the other analysis findings.

ES.4 Water Use Efficiency Program

Source and Service Metering

Each of the City's sources are metered to measure the amount of water produced. The meters are calibrated annually. If a meter cannot be calibrated properly, it is replaced with a new one. Propeller source meters are being replaced with electromagnetic (MAG) meters as part of on-going operation and maintenance (O&M) improvements.

Service meters are installed on every service line to measure the quantity of water used by a customer per WAC 246-290-496 and City Code Chapter 13.06.320. In 2015, the City began installing an Automated Metering Infrastructure (AMI) system, as a part of the Water Meter and Billing System Improvements

project, which was completed in 2018. With the new AMI system, the City automatically receives meter reads via radio transmission and can integrate the data into the billing software.

Distribution System Leakage

Distribution System Leakage (DSL) represents the difference between production and documented water use (retail, wholesale, and authorized unmetered). The City's historical DSL performance complies with the DOH requirement that the three-year average DSL be under ten percent to minimize water waste. To further reduce DSL, the City has ongoing leak detection, meter calibration, and an active repair and replacement program for water system infrastructure.

Water Use Efficiency Program

The City's Water Use Efficiency (WUE) Program provides for efficient water use and supports stewardship of the City's resources. The selected program measures are interrelated and will help the City achieve its goals to both reduce average water use and peak water use per customer. Per the WUE requirements, the following measures implemented as part of the 2024-2034 WUE program:

- Install production (source) meters.
- Install consumption (service) meters.
- Perform meter calibration.
- Implement a water loss control action plan to control leakage if the three-year rolling average exceeds ten percent.
- Educate customers about water use efficiency practices.

Additionally, the following measures that must be evaluated are:

- Rates that encourage water demand efficiency (discussed in **Chapter 9**).
- Reclamation opportunities (discussed in detail in **Chapter 4**).

The DOH requires that the City estimate the amount of water saved through implementation of the system's WUE program over the last six years. Water use per-capita dropped from 112 gpd per capita in 2017 to 105 gpd per capita in 2022. The net water savings over this period equates to approximately 148 million gallons or 29.6 million gallons of savings per year.

The City has chosen to focus on implementing voluntary measures to decrease both the average and peak water usage. The City's goals are as follows:

- Decrease the planning ERU value (gpd/ERU) one percent annually from the current planning ERU value of 182 gpd/ERU,
- Decrease the planning peaking factor from the current 1.77 to 1.68, or less, and
- Maintain three-year average DSL under ten percent.

The City is committed to wastewater reuse and rainwater reclamation, as stated in its official water system policies summarized in **Appendix A**. Currently, there are no reclaimed water users in the City.

Climate Change Resiliency

To estimate the impact of climate change on the City's water demands, results from the Water Supply Forum's 2009 Regional Water Supply Outlook (WSF 2009 Outlook) were used. The impacts of climate change on sources that rely on groundwater are mostly unknown due to the variability between aquifers and site-specific effects. No changes to demand projections were made for the 20-year planning period to account for potential climate change due to the uncertain magnitude and timing of local effects. However, it is recognized that demand has the potential to increase in the future given these changes. In the event the City experiences such an increase, the City will use a model to compute firm yield from streamflow data, replacing historic inflows with projected inflows from three climate change scenarios as described by the WSF 2009 Outlook.

This WSP discusses short and long-term actions the City can take to improve the resiliency of the water system from the impacts of climate change. The short-term measures can improve resiliency within three to five years while the long-term measures may require decades to be fully implemented.

ES.5 Source Water Protection

Sanitary Control Areas (SCAs) have been established for each of the City's water sources per WAC 246-290-135(2). The standard SCA for wells has a minimum radius of 100 feet from the wellhead. The standard SCA for spring sources has a minimum radius of 200 feet from the spring head. All City water sources have SCAs that were established and approved by DOH, and are documented in the susceptibility forms provided in **Appendix T**.

The DOH has developed regulations that require Group A water systems using groundwater sources to develop and implement a Wellhead Protection Program (WHPP) in accordance with WAC 246-290-135. The City maintains its WHPP for 12 groundwater sources. A WHPP was prepared in 2014 for the City's 2015 WSP; this remains the current WHPP for the City.

Susceptibility Assessment Forms have been completed by the City and submitted to the DOH. The DOH's susceptibility assessment rating for each source is summarized in **Table ES-4**

Table ES-4 | Source Susceptibility Assessment Ratings

Source	DOH Issued Susceptibility Rating
Coal Creek Springs	High
West Hill Springs	High
Well 1	Moderate
Well 2	High
Well 3A	Low (Off-line)
Well 3B	Low (Off-line)
Well 4	Low
Well 5	Low
Well 5A	Low
Well 5B	Low (Off-line)
Well 6	High
Well 7	High (Off-line)

The Wellhead Protection Area (WHPA) defines the area around a groundwater source that has the potential to contaminate the source. This area is based on the source's capture zones, which are the zones of the source aquifer and ground surface that can contribute water to the source in six months, one year, five years, or ten years of time of travel. The established WHPAs are shown in **ES.6** Operations and Maintenance Program

The Auburn Water Utility is operated as a utility enterprise under the direction of the Public Works (PW) Director. Specific water utility management responsibilities within the PW Department fall under either the Utilities-Water Section of Engineering Services or the Water Division of Maintenance and Operations Services. The Utilities-Water Section of Engineering Services is responsible for comprehensive water system planning, development of a Capital Improvement Program (CIP), as well as programming the design, construction, and inspection of projects related to the water system. The Water Division of Maintenance and Operations Services is responsible for operating and maintaining the water system, performing daily operation and inspection, water quality monitoring as required by DOH, and line management of the Water Utility.

The mission statement of the City's Water Utility is to provide for the efficient, environmentally sound, and safe management of the existing and future water system within the City's service area. Operations staff provide daily O&M of wells, corrosion control treatment facilities, pump stations, and reservoirs. They also implement the cross connection control program and provide locating services for all City utilities. Distribution staff maintains the complete distribution system including water mains, valves, hydrants, pressure reducing stations, and meters.

Primary operation of the water system is maintained via the Supervisory Control And Data Acquisition (SCADA) computerized control system. Wonderware software works in association with SCADA to provide real time graphical display of system data for staff interpretation and control.

The Water Operations staff maintains an active and ongoing program of water quality monitoring and reporting to ensure a safe, high quality water supply. Two staff members are responsible for water quality monitoring, sampling, control, and record keeping as outlined in the City's Water Quality Monitoring Plan provided in **Appendix O**.

The City has prepared an electronic Public Works Emergency Response Manual (Manual) as a guide for management of emergency situations, with the objective of protecting life and property and restoration of essential services, such as providing clean water, as quickly as possible. The Emergency Response Plan is updated annually at the first of the year. The master response program for the entire City is documented in the Comprehensive Emergency Management Plan (CEMP), which provides guidance to the Emergency Management Organization for mitigation, preparedness, responsibilities, recovery operations, training, and community education activities. The CEMP also describes the functions of local government and incorporation of essential non-governmental organizations into the Emergency Management Organization.

The City has a comprehensive safety program that meets Occupational Safety and Health Administration (OSHA) and Washington Industrial Safety and Health Act (WISHA) regulations. The safety policies and procedures for the water department are documented in this WSP and cover the full range of hazards staff may experience while operating the water system.

Figure ES-4.

A summary of potential contaminant sources for the City's water sources was updated in July 2024 and is included in **Appendix T**.

ES.6 Operations and Maintenance Program

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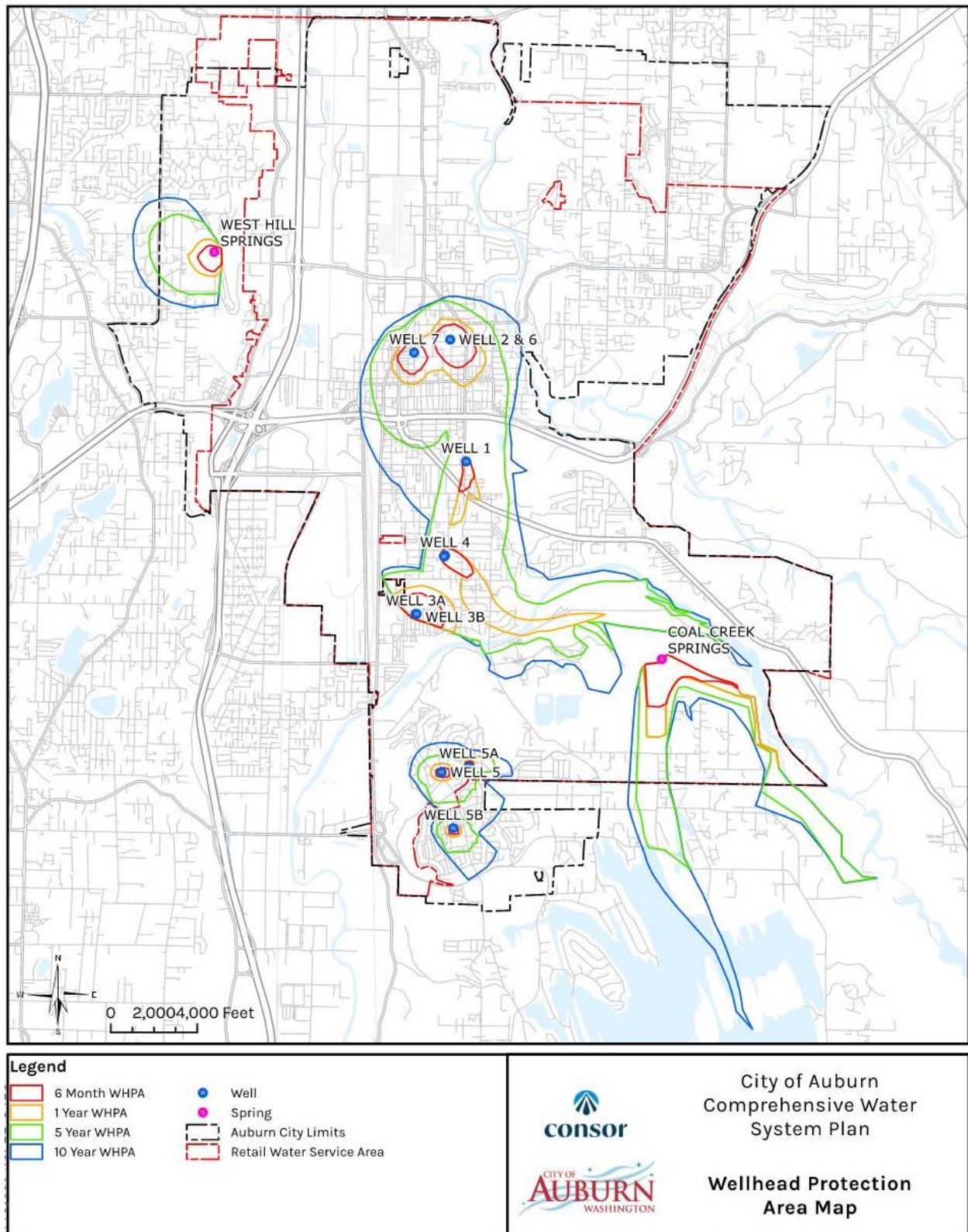
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Figure ES-4 | Wellhead Protection Area Map



The City’s Cross Connection Control Program (provided in **Appendix Q**) protects the public water system from contamination via cross connection hazards. It describes minimum operating policies, provides guidelines for installation, testing, and maintenance of approved backflow prevention assemblies, permitting process, inspection, and survey requirements for existing and new water service connections. The findings of the 2022 Sanitary Survey are also summarized in this WSP, along with the actions completed or in progress to address the deficiencies. The next DOH sanitary survey is scheduled for 2027.

ES.7 Distribution Facilities Design and Construction Standards

The Engineering Design and Construction Standards (EDCS) encompass policies and procedures governing project review and approval. To ensure the highest level of water system reliability, integration of the EDCS into the broader City infrastructure is essential. The integration of the EDCS in this WSP empowers the City to employ an alternative review process for distribution main projects, through the submittal exception process, which permits the City to approve project reports and construction documents without written approval from the DOH.

The City’s Utilities-Water Section of Engineering Services reviews plans, including calculations, reports, and AutoCAD files, to verify conformity with development requirements, City standards, City policies, as well as other federal, state, and local requirements. Compliance with Washington State Department of Transportation (WSDOT) "Standard Specifications for Road, Bridge, and Municipal Construction," and relevant City, State, and Federal regulations is also evaluated during the review process.

ES.8 Capital Improvement Program

The CIP was developed to identify system improvements needed to meet customer demands throughout the 20-year planning horizon. The capital projects identified are categorized as water supply (S), storage (R), pump stations (PS), distribution (D), and general improvements (G). Planning-level cost estimates were developed for each of the recommended projects for budgeting purposes.

The capital projects for the facilities improvements were prioritized based on existing capacity deficiencies, safety concerns, maintenance or capacity requirements, and regulatory requirements. A summary of the total planned CIP cost is provided in **Table ES-5**. All costs are presented as total project costs in March 2024 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 Auburn area used the ENR Seattle CCI. The March 2024 CCI is 15,477. Overall, the City anticipates total projects costs of \$214M over the next 20 years, with more than 50 percent of the cost being for distribution system improvements.

Table ES-5 | Water System Capital Improvement Program Budget 2024-2044

Capital Improvement Category	Total for 20-Year Period From 2024-2044 (2024 USD)
Distribution	\$121,858,681
Supply	\$60,416,013
Storage	\$21,579,621
Pump Station	\$9,230,000
General	\$1,750,000
TOTAL	\$214,834,315

ES.9 Financial Program

Chapter 9 was prepared by FCS GROUP to provide a financial program that allows the City to remain financially viable during the 20-year planning horizon. This viability analysis considers the financial condition of the utility of the past six-year period (2017-2022), current and identified future financial and policy obligations, O&M needs, and the financial impacts of the capital projects identified in **Chapter 8**. A review of the water utility's current rate structure with respect to rate adequacy and customer affordability is also included.

The City's water charges for services increased from \$14.8M in 2017 to \$16.5M in 2022, averaging an annual increase of approximately 2.2 percent per year. Operating expenditures increased by \$1.7M across the six years with an average annual increase of 2.8 percent. Despite total operating expenses outpacing growth in operating revenues, operating income has been positive in all years observed.

The financial forecast indicates that at existing rate levels the utility will become deficient in 2025 as growth in expenses outpaces growth in revenues and the utility takes on additional debt obligations to fund capital infrastructure investments. The City has adopted a 7.50 percent increase for 2025 to resolve the remaining projected deficiency. Rates will need to potentially increase by 9.50 percent annually from 2026 through 2030, before decreasing to 3.00 percent annually through 2033. A detailed rate study is planned for completion in 2025. It is recommended that the City regularly review and update the key underlying assumptions that compose the multi-year financial plan to confirm that adequate revenues are collected to meet the City's total financial obligations.

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Description of the Water System

1.1 Objective

This Water System Plan (Plan) for the City of Auburn (City) has been prepared to serve as a guide for planning and designing future water system infrastructure and to assist the City in the efficient use of its water resources. The Plan identifies system improvements intended to meet the anticipated growth and changing needs of the City while maintaining reliable and quality water service to customers.

The Plan is designed to meet 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 supersedes the City's 2015 Water System Plan, approved by DOH on May 11, 2016, and the 2021 Limited Water System Plan Update approved by DOH on December 16, 2021.

A 10-year approval period is desired for this Plan, and therefore the Plan analyzes the 10-year and 20-year planning periods. This Plan contains a framework for future funding decisions and capital projects. However, the timeframes are estimates and do not represent actual commitments by the City, which may depend on funding, resources availability, and/or other unidentified factors.

1.2 Plan Content

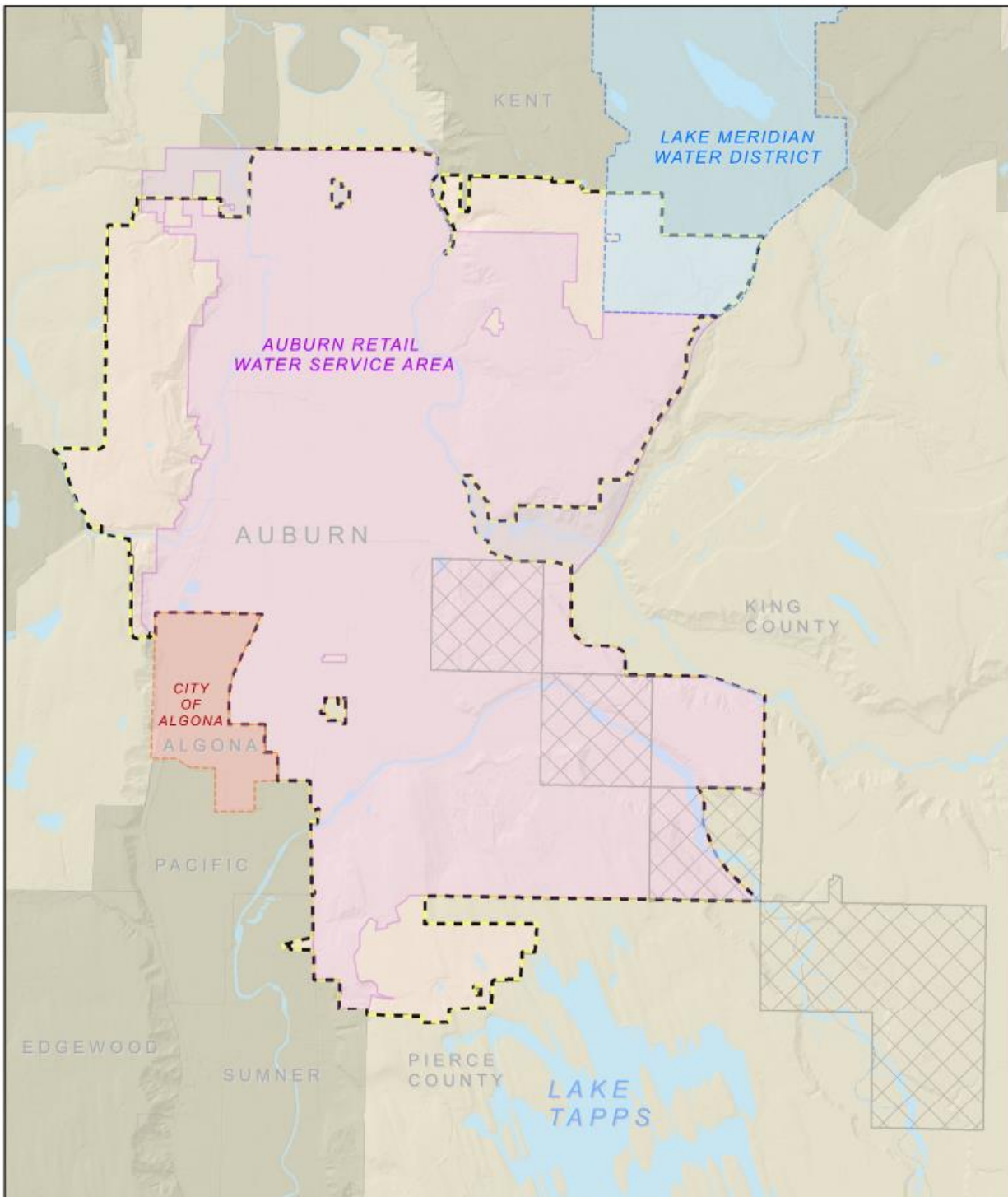
This chapter addresses the following topics:

- 1.3 Ownership and Management
- 1.4 System History and Background
- 1.5 Related Plans and Studies
- 1.6 Service Areas, Maps, and Land Uses
- 1.7 System Policies
- 1.8 Duty to Serve
- 1.9 Local Government Consistency
- 1.10 Watershed Consistency

1.3 Ownership and Management

The City owns and operates its water system and serves most of the City as delineated by the Retail Water Service Area (RWSA). The City also provides firm wholesale water supply to the City of Algona (Algona), and interruptible wholesale water supply to Lake Meridian Water District (LMWD) (formally known as King County Water District #111). The City RWSA boundary is further described in **Section 1.4** and **Figure 1-1** shows the City RWSA with wholesale customers.

Figure 1-1 | RWSA Vicinity Map



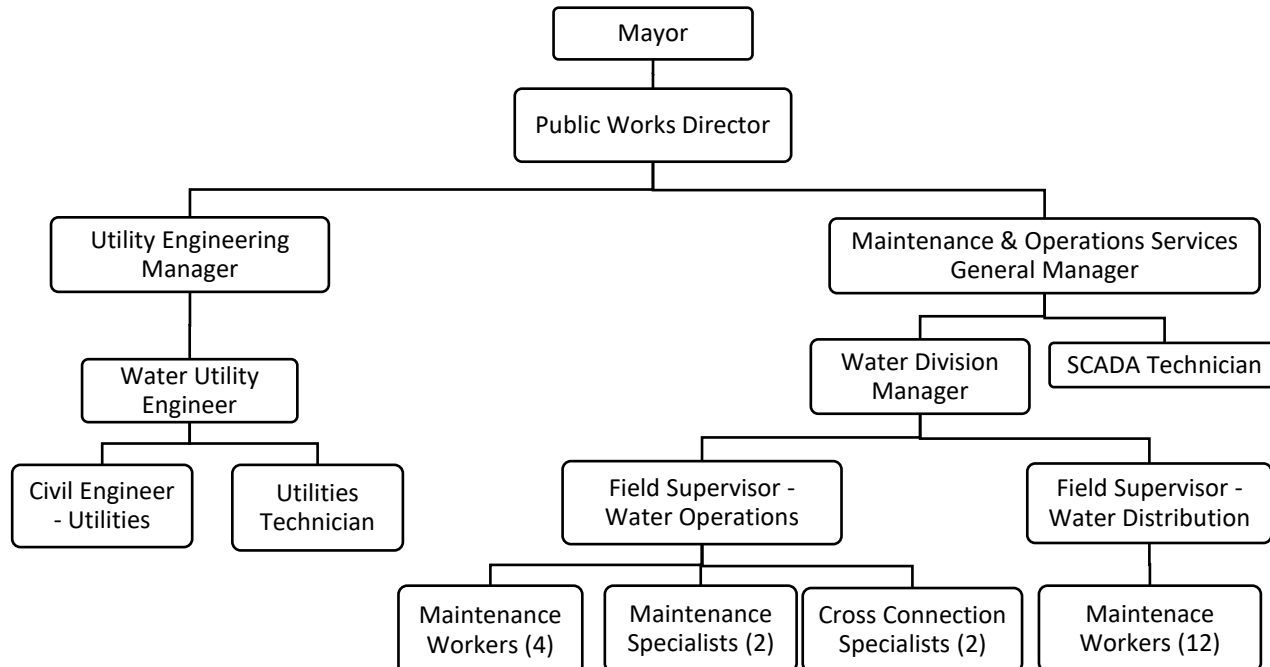
The City provides internal staffing for the management, operations, and maintenance of the water system and the Braunwood Estates satellite system. The DOH’s data on these water systems, managed by the City, is presented in **Table 1-1**. The water management structure is presented in **Figure 1-2** and further elaborated in **Chapter 6**.

Chapter 3 provides details on the existing water facilities, while **Appendix H** includes a copy of the current Water Facility Inventory (WFI) form.

Table 1-1 | Water System Ownership Management

Information Type	Description
System Names	City of Auburn Braunwood Estates (Satellite System)
System Type	Group A - Community Public Water System
County	King County and Pierce County
City of Auburn System ID Number	03350V
Braunwood Estates System ID Number (Satellite System)	03336E
Address	25 W Main St Auburn, WA 98001
Primary Contact	Josh Flanders, Water Division Manager
Owner Contact	(253) 876-1998

Figure 1-2 | Water Utility – Organizational Chart



The City’s water system is publicly owned, under the jurisdiction of the local government. As a result, it is exempt from regulation by the Washington Utilities and Transportation Commission (UTC), which is

responsible for overseeing some private water companies. There are no plans to bring the City's water utility service under UTC's regulatory authority during this planning period.

1.4 System History and Background

1.4.1 Geography

The City is centrally located between Seattle and Tacoma in both King and Pierce Counties, Washington. It encompasses approximately 30 square miles. Adjacent cities include Pacific, Algona, Bonney Lake, Federal Way, Kent, Sumner, and Covington.

1.4.1.1 Topography

The City's RWSA is dominated by a broad valley surrounded by uplifted plateaus. The Green River enters from the eastern City limit and then runs north cutting through the center of the City. Mill Creek, a tributary of the Green River, parallels the western corporate limits. The White River flows through the southern part of the City before turning south to join the Puyallup River. The topography of the service area is a result, in part, of the glaciation of the region.

Most of the City lies on a two to three-mile wide plain bound by Mill Creek on the west and the Green River on the east. Ground elevations in the area range between 50 to 100 feet and slope upward generally to the north. The terrain rises sharply to elevations of 400 to 500 feet on either side of the valley as well as in the southern portion of the City, south of the White River and between the White and Green Rivers.

The topographic features of the RWSA provide for a necessary divide of the water system into four major service areas serving the valley and the surrounding plateaus. The following are the major service areas and associated elevations:

- Valley Service Area (service elevation from 39 to 235 feet)
- Lea Hill Service Area (service elevation from 129 to 513 feet)
- Academy Service Area (service elevation from 171 to 444 feet)
- Lakeland Service Area (service elevation from 122 to 578 feet)

Each service area is further subdivided into smaller hydraulic operating areas based on topographic elevations, called pressure zones. Additional details on the City's major service areas are provided in **Chapter 2**.

1.4.1.2 Climate

The RWSA has a West Coast, marine-type climate caused by the influence of air masses coming from the Pacific Ocean. In late fall and winter, orographic lifting, and cooling cause moist air masses to create clouds and precipitation throughout the area. The average annual rainfall is approximately 40 inches, generally occurring between October and March. The average annual snowfall is 8.6 inches. The temperatures typically range from mid-70 degrees Fahrenheit in the summer to 38 degrees Fahrenheit during the winter, with an overall average of 54 degrees Fahrenheit.

Water consumption is notably impacted by climate conditions, as customers adjust their usage based on weather patterns. In periods of hot and dry weather, consumption rises, driven by activities such as lawn watering and outdoor water use. Conversely, consumption tends to decrease during wet weather.

1.4.1.3 Geology

The geology of the City is the result of glacial and interglacial processes acting over millions of years. During the periods when large continental glaciers, not rivers nor lakes, occupied the Puget Sound area, landslides created deposits and erosion through glacial and interglacial deposits. Generally, the uplands surrounding the City are composed of glacial and interglacial deposits and the valleys are filled with more recent deposits overlying older ones.

Five major geologic units lie within the White and Green River Valleys: White River Alluvium (Qaw), Osceola Mudflow (Qom), Undifferentiated Alluvium (Qua), Vashon Recessional Deltaic Deposits (Qd) and Undifferentiated Glacial and Interglacial Deposits (Qu). Bedrock is known to lie approximately 1,280 feet beneath the valley floors.

The Pacific Groundwater Group (PGG) completed an extensive geological and hydrogeological study within the City's RWSA, known as the Auburn Water Resources Program Study, and the results are documented in several volumes:

- 1996 Preliminary Hydrogeologic Characterization
- Summary of 1997 Hydrogeologic Investigations
- The 1997-1998 Test Well Drilling and Installation Program
- The 1999 Hydrogeologic Characterization Report and Appendices

The general groundwater flow system in the City's vicinity is characterized by recharge within uplands and discharge to the rivers in the lowland valleys. Precipitation and Lake Tapps are sources of groundwater recharge. Lake water flows from the lake bottom into the groundwater system. Contrary to recharge in other upland areas, recharge from Lake Tapps is not totally dependent upon precipitation because water is routed to the lake from outside the area. The main discharge zone for the City's area is the Green River Valley. Some groundwater discharges into the river in the City's vicinity and further downstream.

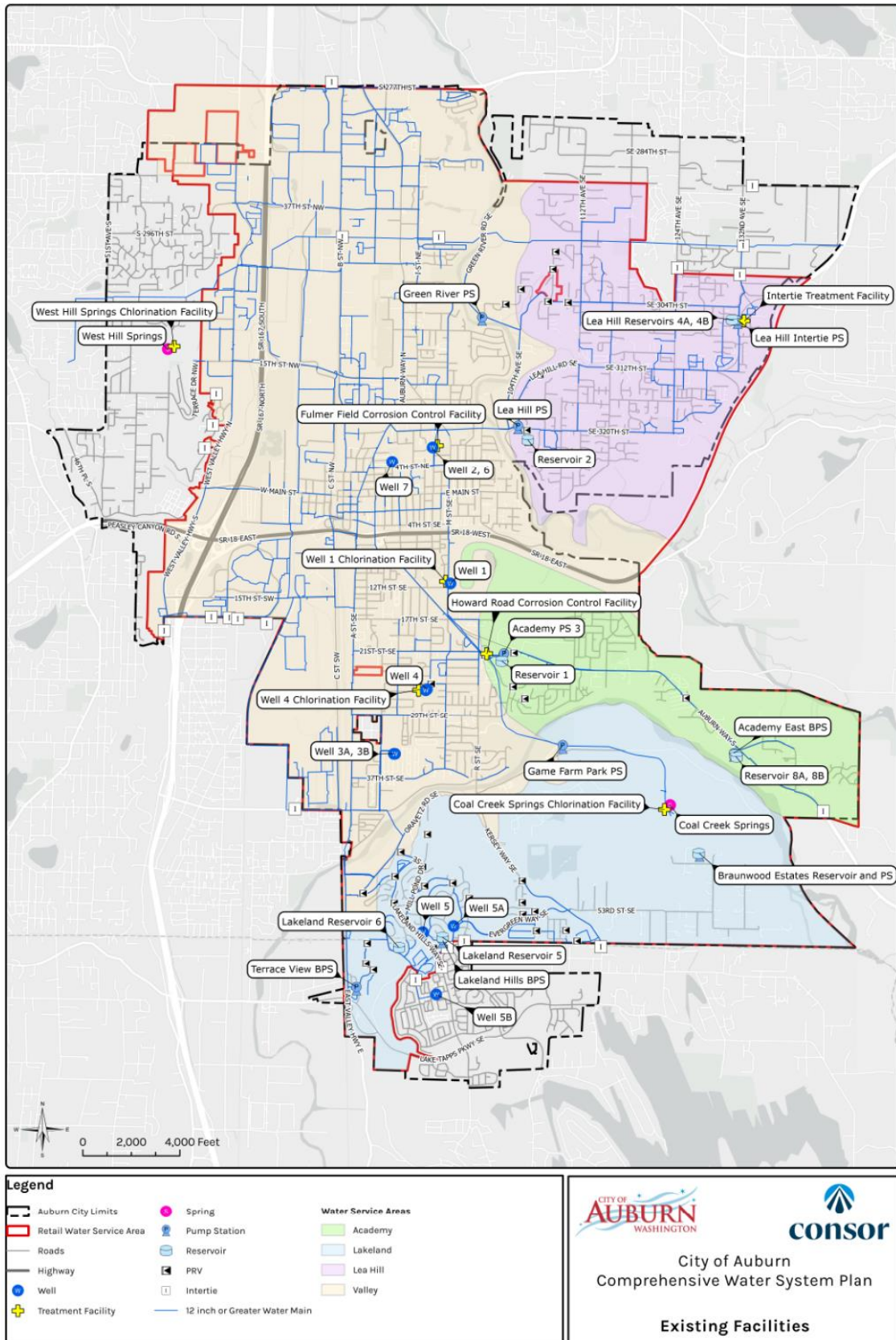
1.4.2 Existing System Overview

The City's water system consists of wells, springs and interties as water sources, chlorination stations and corrosion control facilities for water treatment, pump stations, pressure reducing stations, steel and concrete enclosed reservoirs for storage, and transmission and distribution pipelines to provide potable water to customers. Service is provided to four major service areas (Valley, Lea Hill, Lakeland, and Academy). Each major service area is further divided into pressure zones as required by local topography. The City's four major service areas and the location of key elements of the water system are shown in **Figure 1-3**. A more detailed inventory of assets and system hydraulic profile is presented in **Chapter 3**.

1.4.3 History

The earliest record of a potable water system for the City of Auburn traces back to 1884 with the establishment of the Peasley Canyon supply. Initially serving the City, then called Slaughter, a 4-inch wood-stave pipe connected Peasley Canyon Reservoir to deliver surface water. The year 1907 marked a pivotal moment as the City acquired West Hill Springs for \$2,000, a source that continues to yield approximately 1 million gallons of water per day (600 gpm) and remains active.

Figure 1-3 | Existing Facilities



As the City's population grew to a few thousand by 1922, the demand for water prompted the introduction of groundwater wells alongside the existing West Hill Springs. These wells, strategically drilled in the downtown area, were complemented by pump stations, with one situated at the present site of City Hall. Despite their longstanding service, these early wells and pump stations have since been decommissioned.

The evolution of Auburn's water distribution system saw a transition from wooden pipes to the installation of the first recorded steel water main in 1924 - a 10-inch pipeline connecting West Hill Springs to the valley floor. The Coal Creek Springs water collection system, which included a 24-inch steel main under the White River was constructed in 1925, along with the construction of Reservoir 1 (later replaced in 1975), to meet the escalating water needs of the growing City.

By 1946, the population had increased, prompting construction of the Coal Creek Pump Station, to pump water from Coal Creek Springs to the distribution system.

In 1960, the City embarked on further enhancements by supplementing its two springs with a well system, beginning with Well 1 and then Well 2 in 1969.

In 1961, water system facilities were constructed in the Academy Service Area.

Expansion into the Lea Hill Service Area occurred between 1964 and 1965, coinciding with extensive modifications to the Coal Creek supply system and the implementation of a Supervisory Control and Data Acquisition (SCADA) system.

The early 1980s saw the extension of the water system into Lakeland Service Area.

A key development occurred in 1991 with the acceptance of Braunwood Estates (now called Hidden Valley) as a satellite water system operating independently outside the City's distribution network.

The late 1990s marked significant construction under the Interlocal Agreement 2 (IA2) project, a water supply project between LMWD, Covington Water District (CWD) and the City to provide LMWD and CWD with wholesale water supply, and as a result expanding the water system. Expansion into Pierce County and service agreement modifications characterized the late 1990s and early 2000s.

Table 1-2 summarizes key construction and enhancements related to the City's wells, springs, reservoirs, pump stations, treatment, water pipelines, and system upgrades. Notably, the water pipelines improvements focus on transmission mains, excluding distribution mains installation and replacements (due to the extensive list), with exceptions for distribution improvements mandated by environmental (water quality) regulations. The table provides a documented history of the water system, recognizing occasional gaps.

Table 1-2 | Water Facilities History

Springs	
West Hill Springs	• Before 1907: Established as a potable water supply for the City. • 1915: Construction of 210,000-gallon concrete reservoir to store water from West Hill Springs. • 1924: Installation of the first recorded steel water main (10" pipeline from West Hill Springs to the valley floor). • 1960: Ongoing use, with a replacement of collection boxes. • 1988: Removal of reservoir. West Hill Springs water flows continuously into the system.

	• 2000: Partial fencing of the watershed carried out according to the 2000 Water Comprehensive Plan. • 2017: Flow Control Improvements, including installation of an electromagnetic meter and flow control valve for automatic shutdown. • Current: The spring has a capacity of 600-gpm, with varying supply based on aquifer conditions. Equipped with chlorination station.
Coal Creek Springs	• 1925: Construction of Collection system. • 1925: Installation of 24" wood-stave supply pipeline connecting the Coal Creek Springs collection system to a booster pump station (present Howard Road site) and 14" transmission main to Reservoir 1, including installation of 24" steel pipe under the White River • 1964: Construction of south and middle collectors in the system. • 1964: Replacement of the 24" wood-stave supply pipeline connecting the Coal Creek Springs collection system to a booster pump station (present Howard Road site) with 24-inch concrete pipe. • 1998: Addition of the north collector for enhanced system performance. • 2023: Coal Creek Springs Transmission Main Replacement underway to install a new transmission main suspended from a utility/pedestrian bridge over the white river to replace a portion of the old main crossing the river. • Current: Flows by gravity to Howard Road Corrosion Control Treatment Facility (CCTF) and pumped into Reservoir 1, with typical production capacity of 3,000-gpm. Equipped with chlorination station.
Wells	
Well 1	• 1960: Construction of Well 1, within Valley Service Area. • 1998: Shutdown due to reduced well output and water levels. • 2010: The well was brought back into service temporarily to meet summer demands. • 2015: Phase 1 improvements to bring the facility back online. Construction of transmission main in M St SE, 17th St SE, R St SE & Howard Road SE to convey supplies from Well 1 to Howard Road CCTF. • 2016: Phase 2 improvements to bring the facility back online. Improvements included new well house, pumping system (2,200-gpm), disinfection with sodium hypochlorite, on-site emergency power, and upgraded electrical and SCADA controls. • Current: Operational and pumps to Howard Road CCTF, then boosted to Reservoir 1.
Well 2	• 1969: Construction of Well 2 (3,000-gpm capacity), within Valley Service Area. • 2000: Replacement with a new masonry building, pump (1,600-gpm) and associated equipment. • 2014: Installation of Variable-frequency Drive (VFD). • 2023: Rehabilitation and replacement of well pump and motor. • Current: Operational with the Fulmer Field CCTF, providing chlorination and emergency power.
Well 3A	• 1983: Construction of Well 3A (1,650-gpm) with automatic standby generator, pumps directly into Valley Service Area. • 1984: Installation of chlorination system. • Current: Inactive since mid-1990's (Est. 1995 – 1997) due to elevated manganese levels.
Well 3B	• 1984: Construction of Well 3B (1,650-gpm) adjacent to Well 3A, with chlorination system. • Current: Inactive since mid-1990's (Est. 1995 – 1997) due to elevated manganese levels.
Well 4	• 1985: Construction of Well 4 (2,600-gpm), to pump directly into Reservoir 1 and capable of feeding south end of Valley distribution system through pressure-reducing station. • 2016: Emergency Power Improvements project added a diesel-fueled generator and hypochlorite chlorination equipment.

	• 2018: Upgrade of Well soft starter. • 2023 (ongoing): Well 4 Facility Improvements project underway to replace aging mechanical equipment and electrical improvements. • Current: Pumps directly to Reservoir 1 and to south end of Valley Service Area through PRVs.
Well 5	• 1983: Construction of Well 5 (1,000-gpm) to serve the Lakeland Hills Development. • Current: Maximum production capacity of 650-gpm, not chlorinated and pumps directly into Lakeland Service Area and supplies Reservoirs 5 and 6.
Well 5A	• 1990: Construction of Well 5A (180-gpm) to supplement Well 5. • Current: Equipped with chlorination facilities and a manual transfer switch. Pumps directly into Lakeland Service Area and supplies Reservoirs 5 and 6.
Well 5B	• 2005: Construction of Well 5B (600-gpm) with hypochlorite generation and ATEC media filters, to remove iron and manganese prior to disinfection. • Current: Removed from service in 2006 due to irrecoverable aquifer.
Well 6	• 1998-2000: Construction of Well 6 (3,500-gpm) within Valley Service Area. • 2014: Replacement of pump bowl and installation of VFD. • 2000: Rehabilitation with a new masonry building, well pump (1,600-gpm), and associated equipment. • Current: Operational with the Fulmer Field CCTF, providing chlorination and emergency power.
Well 7	• 1997: Construction of Well 7 (3,500-gpm) within Valley Service Area. • Current: Inactive as of 2012, due to elevated manganese levels.
Reservoirs	
West Hill Springs Reservoir	• 1915: Construction of 210,000-gallon concrete reservoir to store water from West Hill Springs. • Current: Reservoir removal (1988). West Hill Springs water flows continuously into the system.
Academy Reservoir	• 1961: 500,000 gallons steel reservoir, supplied by Academy Pump Station. • Current: Reservoir removed (1978-1980) when Reservoir 8B was constructed.
Reservoir 1	• Est. 1925: Construction of 3.0 million gallons to store water from Coal Creek Springs. • 1975: Replacement of uncovered reservoir with covered 5-MG concrete reservoir. • 2019: Seismic isolation control valve installed on outlet piping. • Current: Primary storage for Coal Creek Springs and can also be filled with water from Well 4. Serves as water supply for the Academy Pump Station and Valley Service Area.
Reservoir 2	• 1975: Construction of a 3.6-MG pre-stressed concrete underground reservoir (dual-purpose facility with tennis court on top) in Lea Hill. • Current: Supplied with several City sources and Reservoir 1. Serves as water supply for Valley Service Area. Design for the addition of a seismic isolation control valve in 2024 with construction expected in 2025.
Reservoir 4A	• 1965: Construction of 1.0-MG steel reservoir in Lea Hill. • 1965: Installation of 12-inch ductile iron pipeline from Porter (8th St NE) Bridge to Reservoir 4A. • 1998: Replacement of exterior and interior protective coatings. • Current: Supplied by Valley Service Area through Lea Hill & Green River Pump Stations. Serves as water supply for Lea Hill Service Area. Addition of a seismic isolation control valve underway with construction anticipated in 2024.
Reservoir 4B	• 1983: Construction of 1.5-MG steel reservoir in Lea Hill. • 1998: Replacement of exterior protective coatings. • 2002-2003: Replacement of interior protective coatings

	• Current: Supplied by Valley Service Area through Lea Hill & Green River Pump Stations. Serves as water supply for Lea Hill Service Area. Addition of a seismic isolation control valve underway with construction anticipated in 2024.
Reservoir 5	• 1981: Construction of 1.0-MG steel reservoir for Lakeland Service Area. • 2015: Painting of the Interior and exterior, installation of seismic isolation control valve and addition of ladder. • Current: Supplied with wells 5, 5A and Terrace View Booster Pump Station. Serves as water supply for Lakeland Service Area.
Reservoir 6	• 2012: Construction of 1.0-MG reservoir in Lakeland Service Area (also provides storage for City of Algona). • Current: Supplied with wells 5, 5A and Terrace View Booster Pump Station. Serves as water supply for Lakeland Service Area and City of Algona.
Reservoir 8A	• 1973: Construction of 1.2-MG steel reservoir in Academy Service Area. • 2002-2003: Recoating of the reservoir's exterior and interior. • Current: Supplied with Reservoir 1 through the Academy Pump Station. Serves as water supply for Academy Service Area. Addition of a seismic isolation control valve underway with construction anticipated in 2024.
Reservoir 8B	• 1980: Construction of 1.5-MG steel reservoir in Academy Service Area. • 2002-2003: Recoating of the reservoir's exterior and interior. • Current: Supplied with Reservoir 1 through the Academy Pump Station. Serves as water supply for Academy Service Area. Addition of a seismic isolation control valve underway with construction anticipated in 2024.
Pump Stations	
Howard Road Site Pump Station	• 1925: Construction of Howard Road Site Pump Station with 5 hydraulic ram-type pumps to move water from coal creek springs to Reservoir 1 & distribution system. • Current: (1962) Operation of ram-type pumps ended.
Coal Creek Springs Pump Station	• 1946: Construction Coal Creek Springs Pump Station to pump water to Reservoir 1 and distribution system (consisted of pump house and an electric pump). • 1947-1952 (exact year unknown): Addition of second pump (2,000-gpm). • 1953: Addition of third pump (3,000-gpm) • 1964: Replacement of two pumps with new 1,500-gpm and 2,500-gpm pumps. • 1999: Replacement of Diesel fuel storage tanks for emergency generators with above-ground, double-walled fuel tanks (easier to inspect for fuel leakage). • Current: Pump station removed in 2003 to make way for Howard CCTF.
Academy Pump Station	• 1960: Construction of Academy Pump Station 1, housing Pumps 1 and 2 (300-gpm and 500-gpm capacity). • 1961: Installation of 2 miles 10" cast iron transmission main from Academy Pump station 1 to Academy reservoir. • 1980: Construction of Academy Pump Station 2, housing Pumps 3 and 4 (750-gpm capacity each), with emergency power generator. • 1980: Installation of 2 miles 14" ductile iron transmission main, connecting Academy Pump Station 2 to Reservoirs 8A & 8B. • 1999: Replacement of Diesel fuel storage tanks for emergency generators with above-ground, double-walled fuel tanks (easier to inspect for fuel leakage). • 2022: Academy Pump Stations 1 and 2 replaced with a single pump station, Academy Pump Station 3, that consists of 4 vertical turbines, variable speed drive pumps with firm pumping capacity of 2,100-gpm. • Current: Pumps water to the Academy Reservoirs (Reservoirs 8A & 8B)
Green River Pump Station	• 1999: Construction of the Green River Pump Station, equipped with 4 pumps (1,170-gpm capacity each), as part of the Interlocal Agreement 2 (IA2) to supply water to CWD & LMWD.

	• 2020: Facility improvements for emergency generator and associated electrical equipment. • Current: Pumps water to the Lea Hill Reservoirs (Reservoirs 4A & 4B).
Game Farm Park Pump Station	• 1988: Construction of the Game Farm Wilderness Park Pump station for water supply and fire protection of the park. • 1992: Installation of 60-gpm domestic pump. • 1993: Installation of 1,000-gpm fire pump. • Current: Pumps water to the Game Farm Wilderness Park from the Coal Creek gravity supply line.
(Lea Hill) Intertie/Booster Pump Station	• 1998-2000: Construction of Intertie Pump Station near Lea Hill Reservoirs, designed to operate in conjunction with Green River Pump Station to serve IA2 partners (using 4 pumps) and to also serve small area at the top of Lea Hill using a “package type” booster-pump station. • Current: Pumps water to small higher elevation service area in Lea Hill. Equipped with a hypochlorite chlorination system.
Lea Hill Pump Station	• 1965: Construction of Lea Hill Pump station with two 600-gpm and one 800-gpm pumps, to boost water from Valley Service Area to Lea Hill Service Area. • 1999: Replacement of Diesel fuel storage tanks for emergency generators with above-ground, double-walled fuel tanks (easier to inspect for fuel leakage). • Current: Pumps water to the Lea Hill Service Area.
Lakeland Hills Booster Pump Station	• 1990: Construction of Lakeland Hills Booster Pump Station, consisting of a three-pump pressure sustaining package system and two large-capacity fire pumps, to pump water from Lakeland Hills Reservoir to Lakeland Service Area. • 2013: Replaced for improved service to boosted Lakeland Service Area, using three low flow pumps (720-gpm capacity each) and two fire flow pumps (3,125-gpm capacity each). • Current: Pumps water to higher elevation service area in Lakeland.
Terrace View Booster Pump Station	• 2010: Construction of Terrace View Booster Pump Station with firm capacity of 1,100-gpm, to supply water from Valley 242 to Lakeland 630 pressure zone. • Current: Pumps Valley Service Area water to Lakeland Service Area. Equipped with hypochlorite feed pump.
Academy East Booster Pump Station	• 2014: Construction of the Academy East Booster Pump Station replaced the single pump Janssen’s Addition Pump Station, equipped with three domestic pumps with firm capacity ranging from 750 to 1,250-gpm. • Current: Pumps water from Reservoirs 8A and 8B into Academy Service Area.
Treatment	
Howard Road Corrosion Control Treatment Facility (CCTF)	• 2004: Construction of the Howard Road CCTF (6,300-gpm capacity), to treat water from Coal Creek Springs and Well 1 and boost to Reservoir 1, using three 2,100-gpm booster pumps. • Current: Pumps water to Reservoir 1.
Fulmer Field CCTF	• 2004: Construction of the Fulmer Field CCTF (9,600-gpm capacity), to treat water from Well 2, 6 and 7 and boost to Reservoir 2 and distribution system, using four 3,200-gpm booster pumps. • 2013-2018: Evaluation of Fulmer Field CCTF (along with Wells 2, 6 and 7) to identify improvements to increase the supply and treatment capacity of the existing facilities and infrastructure. • Current: Pumps water to Reservoir 2 and the Valley Service Area.
Distribution Main Improvements (mandated by Environmental Regulations) & Interties	
Intertie with City of Algona	• After 1996: Construction of wholesale interties (combined 1.1-mgd capacity) at: ○ 1149 Industry Drive SW ○ Boundary Boulevard and Milwaukee Ave

	- o Iowa Drive and West Valley Highway - o 1st Avenue • Emergency Interties at - o Boundary Boulevard and Celery Ave - o Boundary Boulevard and O Street
Intertie with City of Bonney Lake	• 2002: Construction of 8" emergency intertie at Evergreen Way, southwest of Lakeland Hills Way • After 2010: Construction of emergency interties at - o Lakeland Hills Way & 59th Avenue - o Evergreen Way and Nathan Avenue - o Olive Avenue, south of Evergreen Loop
Intertie with City of Pacific	• After 2003: Construction of emergency interties at - o Ellingson Road near Pacific Ave - o A St SE, north of White River
Intertie with City of Kent	• After 2001: Construction of emergency intertie with 78th Avenue S and S 277th Street
Intertie with LMWD	• Est. 1996 – Construction of 12" wholesale intertie at 30502 132nd Avenue SE (5-mgd capacity) • 1996 – 2002: Construction of emergency interties in - o 127th Place SE, south of SE 299th Place - o 124th Avenue SE and SE 300th Way - o SE 300th & 132nd Ave SE - o 1998-2000 at SE 288th St & 132nd Ave SE
Intertie with Lakehaven Water & Sewer District (LWSD)	• Est. 1995: Construction of the Aaby Dr. emergency intertie with LWSD at R St. NW (named Intertie #2). • 2004: Transfer of Aaby Dr. pump station and service from City to LWSD. • 2006: Emergency intertie with LWSD at R St. NW (Intertie #2) was removed from service • After 2010: Installation of water meter and control valve vault for 6" emergency intertie at Aaby Dr. and Knickerbocker Dr. (reinstating Intertie #2)
Intertie with City of Tacoma	• Est. 2012: Construction of wholesale interties at: - o 3240 B St NW (2,200-gpm max. instantaneous flow rate) - o 29598 132nd Ave SE (4,500-gpm max. instantaneous flow rate) - o Combined max. flow rate of 5.12 MGD (3,555 gpm) in a 24 hour period (the interties could flow at a higher rate for a portion of the day so long as the 24-hour average meets the contractual peak period flow)
Distribution Main Improvements (mandated by environmental (water quality) regulation)	• 2015: Replacement of 2,760 linear feet of Asbestos Cement (AC) water main with ductile iron main. • 2022: Removal and replacement of approximately 186 service lines with lead goosenecks and approximately 7,075 linear feet of distribution water main with ductile iron main.
System Upgrades	
Supervisory Control and Data Acquisition (SCADA) system	• 1975: Addition of SCADA/telemetry, to control all reservoirs, wells and pumps from the Maintenance and Operations building. • 2015: Extensive upgrade of the SCADA/telemetry system, to improve control of the water utility facilities and replace obsolete components. • 2024: Updated System Platform to AVEVA. Major components and new hardware were replaced to provide more reliable service.
Metering	• 2016: Installation of two master meters for Muckleshoot Indian Tribe (MIT) Casino, to facilitate City and MIT account administration.

	• 2017-2018: Installation of Advanced Metering Infrastructure (AMI) for all customers. The AMI allowed for more accurate meter reads, daily information for quicker detection of leaks, and improved efficiency of billing operations. • 2020 - 2022: Replacement of deduct meters used for irrigation purposes with separate water service tap on the city's main.
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1.5 Related Plans and Studies

In preparing this Plan, related studies and plans were reviewed to ensure coordination with adopted documents that affect system planning and operations. The related plans are categorized into two groups for clarity: Internal Studies/Plans Specific to the City and External Plans Influencing City-Wide Water Management. A brief synopsis of these studies and plans are presented below.

Internal Studies/Plans Specific to the City:

Wellhead Protection Plan, City of Auburn, 2014: The City developed a Wellhead Protection Plan to identify and protect groundwater sources. The initial plan was created in 2000 by Pacific Groundwater Group (PGG) and subsequently updated by Robinson Noble in 2008 and 2014. The plan maintains existing wellhead protection areas (WHPAs) and contributes to hazard assessments within these zones. It aligns with county ordinances, impacting land use planning and reflecting in critical aquifer recharge areas as outlined in the King County Comprehensive Plan. Additionally, the plan developed a monitoring system for groundwater sampling, which enhanced operational readiness by providing early warnings of potential contaminations.

City of Auburn Water Resources Program, Pacific Groundwater Group, Inc., 1995-1999: Pacific Groundwater Group conducted a comprehensive groundwater study in response to recommendations of the 1995 Comprehensive Water Plan. The study was documented in a series of reports (listed below), collectively known as the Auburn Water Resources Program Study. The Auburn Water Resources Program assessed the long-term potential for the City's continued use of groundwater for its water supply. The study confirmed substantial quantities of groundwater underlying the valley area and provided the basis for the water supply conclusions for this Plan. This comprehensive program, spanning several years, strategically addresses water rights acquisition by delving into technical studies of the local groundwater system. Two key elements of the program were the installation of monitoring wells and river gauges, and the assessment of the existing City wells in the deep aquifer. The installation of monitoring wells and river gauges not only aids in system planning by understanding groundwater dynamics but also enhances operational efficiency through real-time data collection. The program also included the development of a regional ground-water model (MODFLOW), using the United States Geological Survey (USGS) model program. This provided a tool for analyzing potential withdrawal scenarios, offering valuable insights into optimizing water system operations.

- 1996 Existing Data Hydrogeologic Characterization
- 1996 Preliminary Hydrogeologic Characterization
- Summary of 1997 Hydrogeologic Investigations
- 1997-1998 Test Well Drilling and Installation Program
- 1999 Hydrogeologic Characterization Report and Appendices
- Regional Groundwater Model Report

Bilateral Compliance Agreement (BCA), 1996: This agreement, entered with the Department of Health (DOH) due to copper levels that exceeded the action levels in samples collected in 1993, outlined treatment options and schedules for corrosion control facilities. As a result, new corrosion facilities at the Howard Road/Coal Creek Springs Pump Station and Fulmer Field Park were completed in 2004. The completion of

these facilities in 2002 directly impacts operational efficiency, ensuring compliance with health standards and safeguarding water quality in the long term.

City of Auburn – Public Works Emergency Response Manual, 2022: This electronic manual is only one element of the City’s overall Emergency Response Plan, which serves as a guide for management of emergency situations. It was first developed in 1999 in response to the potential impact of Y2K and it is updated annually at the first of the year. The manual is not all-inclusive for every type of disaster that could occur, but it is a valuable tool for dealing with many of the emergency situations that most water utilities could face.

City of Auburn Comprehensive Plan, 2015 and Amendments: This current plan, originally adopted in 2015 in accordance with the State Growth Management Act (GMA) is the City's comprehensive land use plan and policy document. It consists of goals, land use policies, and the Comprehensive Plan maps. The plan may be amended annually as needed. The update of the comprehensive plan is taking place concurrently with the revision of this water system plan.

City of Auburn 2015 Comprehensive Water Plan, City of Auburn Public Works, 2015: The previous Comprehensive Water Plan provided evaluation of needs and recommended improvements to the City system for 2015-2022. In 2021, DOH extended the approval period for the 2015 WSP until May 11, 2026. The plan adopted in 2015 constitutes the basis for this Plan.

Capital Facilities Plan (2023-2028), City of Auburn Finance Department, 2022: Adopted in 2022, this plan is instrumental in both planning and operations. It outlines goals, policies, and implementation programs mandated by the State GMA, providing a roadmap for capital improvements. This directly influences the operational landscape by defining necessary infrastructure enhancements and improvements, aligning with the city's capital improvements program.

Engineering Design and Construction Standards, City of Auburn, 2024: The City updates its Design and Construction Standards as needed, typically on an annual or bi-annual basis. These standards not only guide the planning of new infrastructure but also enhance day-to-day operations by ensuring adherence to the latest industry practices and regulations. The City of Auburn Design and Construction Standards are attached in **Appendix P**.

Water Shortage Contingency Plan, City of Auburn, 2024: The plan establishes actions and procedures for implementing Auburn City Code (ACC) 13.14 during impending or actual water shortages, to maintain levels of service essential for public health and safety, minimize adverse impacts on economic activity, and protect customer’s lifestyle; refer to **Appendix R**.

Water Cost of Service Rate Update Study, City of Auburn, 2022: This study informs strategic decisions related to water rates and influences the operational budget.

System Development Charge Study, City of Auburn, 2014: Completed in 2014, this study examines system development charges, offering insights for future infrastructure development. Its findings directly influence the planning of new systems and infrastructure projects and provide a financial basis for expansion.

External Plans Influencing City-Wide Water Management:

King County 2016 Comprehensive Plan, King County Department of Local Services, 2016: The King County Comprehensive Plan establishes land use zoning for areas outside the City limits, but within the RWSA. Additionally, King County provides critical area ordinances and critical aquifer recharge areas that support

the City's wellhead protection efforts. The current King County Comprehensive Plan was first adopted on December 5, 2016, and was later amended in 2020.

Pierce County Comprehensive Plan, 2015 and Amendments: This is a comprehensive plan and policy document for Pierce County. The plan was developed in accordance with the GMA and is amended every two years. This plan influences planning by offering insights into regional policies.

Pierce County Coordinated Water System Plan, 2021: In 1983, all of Pierce County was declared a Critical Water Supply Service Area. In response to this declaration, Pierce County established the first Coordinated Water System Plan to coordinate planning and establish water service areas. The current Coordinated Water System Plan, adopted in 2021 through Ordinance 2018-39s2, influences both regional water planning and City's operational coordination with other systems in the county.

Pierce County White River Basin Plan, 2013: This plan provides a comprehensive guide to storm drainage and surface water management in portions of the White River Basin. Given that the City of Auburn utilizes this basin, the plan significantly influences operational considerations and emergency response strategies during storm events.

South King County Coordinated Water System Plan (CWSP), 1989: This plan, adopted in 1989, defined the initial service area boundaries for the water systems within the Critical Water Supply Area of South King County. The City of Auburn Comprehensive Water Plan, upon adoption, becomes an element of the CWSP.

South King County Ground Water Management Plan (GWMP), 2003: The GWMP was initiated by Ecology with the intent to develop methods to protect the quality and quantity of ground water, meet future resource needs while recognizing existing water rights and provide effective and coordinated management of ground-water resources. This plan is considered in planning for and operation of the City's water system.

Tribal Land Use Plan, Muckleshoot Indian Tribe, 1978: The adoption of the MIT's Zoning Ordinance in 1979, which influences land use within the Muckleshoot Indian Tribe, affects water-related considerations. This plan plays a crucial role in ensuring collaborative water management efforts that respect tribal land use.

USGS Hydrogeologic Framework, Groundwater Movement, and Water Budget in the Puyallup River Watershed and Vicinity, Pierce and King Counties, Washington: Scientific Investigations Report 2015-5068: A collaborative effort involving various entities (Cities of Auburn, Milton, Puyallup, Sumner, and Tacoma; Pierce Conservation District; DOH; Cascade Water Alliance; Lakehaven Utility District; Summit Water & Supply Company; Mt. View-Edgewood Water Company; and The Russell Family Foundation), this report contributes valuable insights into the hydrogeologic framework, groundwater movement, and water budget in the Puyallup River Watershed. It significantly influences both regional water planning and operational considerations, providing a scientific basis for understanding the water dynamics in the watershed.

Other Plans

In addition to the studies listed above, the current Water Comprehensive Plans from the following neighboring water systems (City of Algona, Bonney Lake, Kent, Pacific, CWD, LWSD, LMWD and Highline Water District (HWD)) were considered during the preparation of this Plan.

1.6 Service Area, Maps, and Land Use

The City's RWSA boundaries were initially defined and documented through the South King County CWSP in 1989. The boundaries of the RWSA have been adjusted since 1989. An area of Pierce County was incorporated into the RWSA through the Pierce County Coordinated Water System Planning process (1997) and interlocal agreements with Bonney Lake (1998 and 2016), LWSD (2004), Kent (2006), and LMWD (2006). Copies of the Water Service Area Agreements are provided in **Appendix G**. The RWSA covers a total area of 16,193 acres; 15,877 acres are in King County and the remaining 316 acres are in Pierce County within Auburn City Limits. A total of 700 acres (4.3 percent) of the RWSA is in unincorporated King County urban and rural areas.

Several water purveyors adjoin the City of Auburn RWSA, as shown in **Figure 1-4**. These include the cities of Algona, Bonney Lake, Kent, Pacific, and Sumner. Also included are the CWD, LWSD, LMWD, HWD, and MIT. Purveyors with wholesale water agreements and interties are discussed in **Section 1.6.1**.

The City currently does not plan to update its service area boundaries unless the need arises in the future. The City will continue to evaluate its service area boundaries and will consider updates if future needs or circumstances warrant changes.

Figure 1-5 reflects the City's current land use designations. The City includes a wide range of residential, commercial, institutional, and industrial land uses. Public and quasi-public land uses include parks, open space, and public recreation as well as institutional uses such as schools. Commercial and industrial uses occur primarily in the valley; however, large areas of residential land use and the Downtown Urban Center (DUC) also exist in the valley area.

The Academy and Lakeland Service Areas are primarily residential, although some commercial development is located along Auburn Way South (SR 164) in the Academy Service Area. The Lea Hill Service Area is also primarily residential although other uses include small amounts of commercial and open spaces, and Green River College.

Areas within the RWSA, but outside the City limits, are governed by unincorporated King County land uses which include agricultural, rural and residential land use types as shown in **Figure 1-5**. The unincorporated King County land uses shown in **Figure 1-5** were obtained from King County's open data portal which reflects the current adopted land use designations established in the Comprehensive Plan. Those land use designations reflect the intended long-range use of land of the 20-year planning horizon of the plan.

Figure 1-6 shows the Urban Growth Area (UGA), which is comprised of both the current City limits and potential annexation areas (PAA).

1.6.1 Wholesale Interties

Interties provide a tool that water utilities use to move water between systems to meet supply needs, to increase reliability and respond to emergencies. The City maintains wholesale supply interties with three water systems: City of Tacoma, Algona, and LMWD. The City also has a supply contract with the MIT and the Indian Health Service, dating from 1972, for services along a pipeline at SE 368th PL extending from the City limits into the reservation.

1.6.1.1 City of Tacoma

In 2012, Tacoma agreed to provide water to the City in the quantity of up to 1.0 mgd average day use, 1.8 mgd peak day use, and 1.62 mgd four-day peak use. Two interties were constructed to supply the City: located at 3200 B Street NW and 29600 132nd Avenue SE in Auburn. This agreement will remain in force as long as Tacoma (or its successors in interest of its water system) remains in the business of providing water, and as long as the City meets the terms and conditions of the agreement.

In 2014, Tacoma **amended and restated the 2012 agreement** with the City to provide a total of 3.5 mgd (2,430 gpm) of average use and 5.12 mgd (3,555 gpm) of peak use combined from the interties. The B Street NW Intertie is limited to a maximum flowrate of 2,200 gpm and the 132nd Avenue SE Intertie is limited to a maximum flowrate of 4,500 gpm. However, the combined use of the interties cannot exceed 5.12 mgd (3,555 gpm) in a 24 hour period.

Figure 1-4 | Adjacent Water Systems

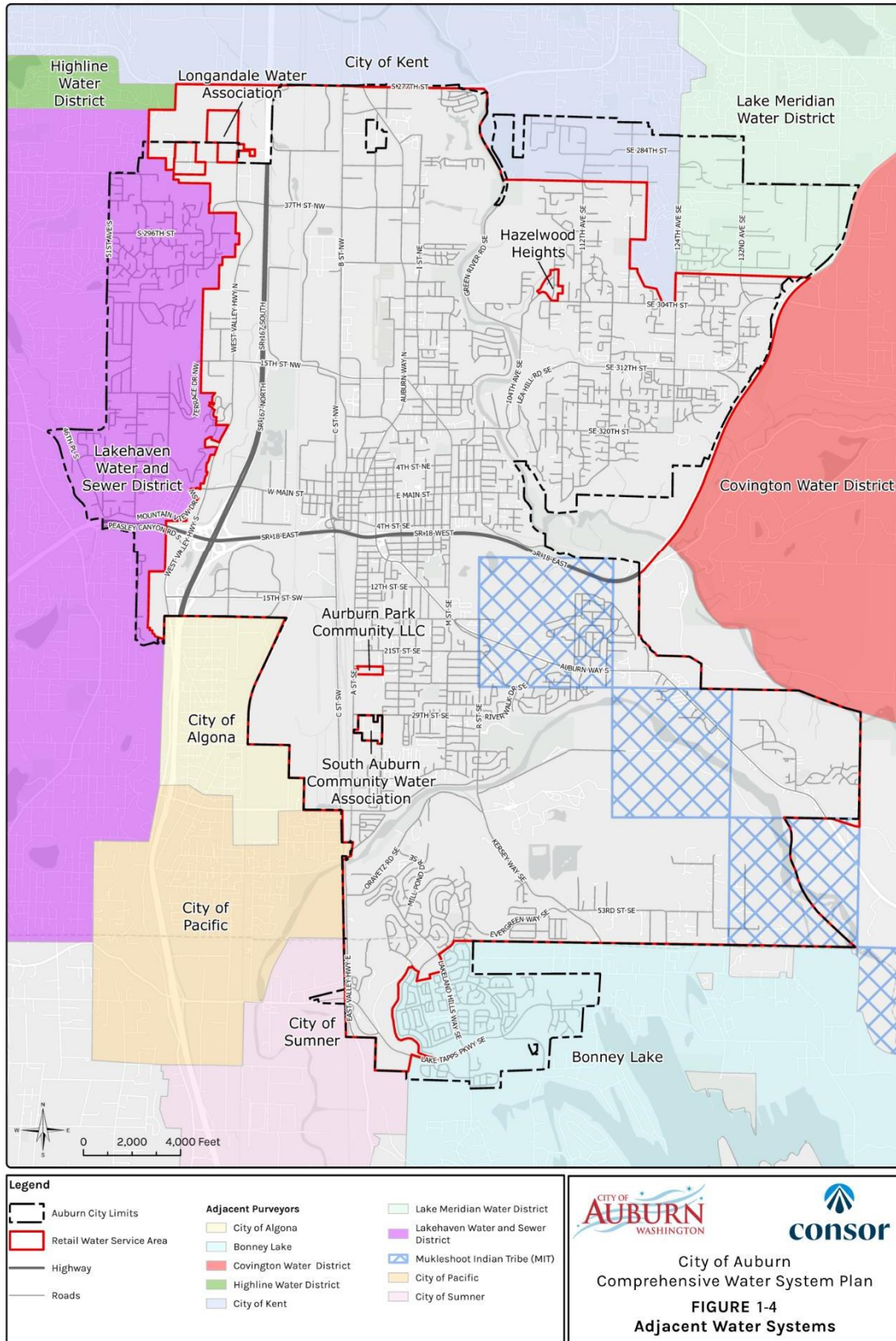


Figure 1-5 | Existing Land Use

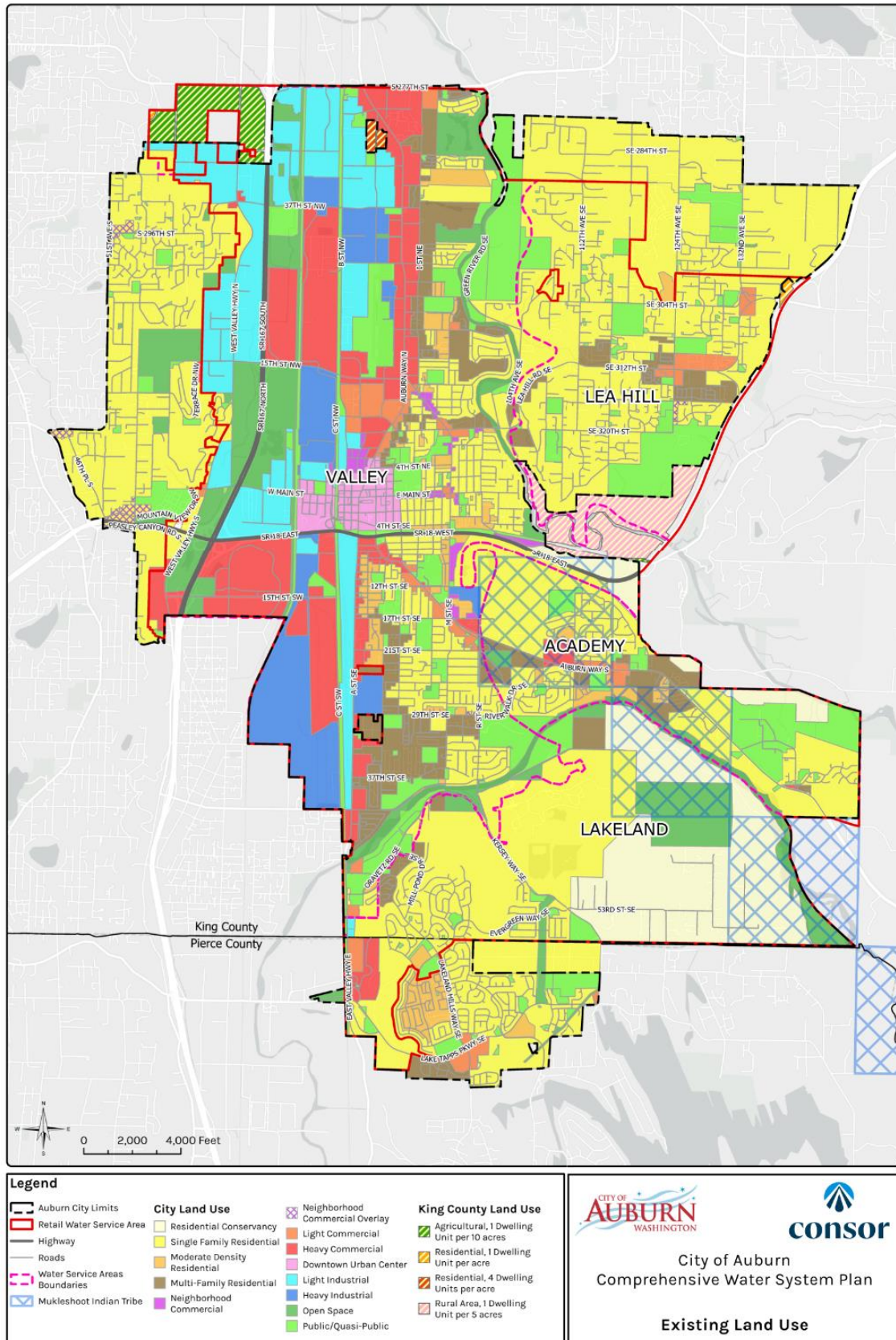
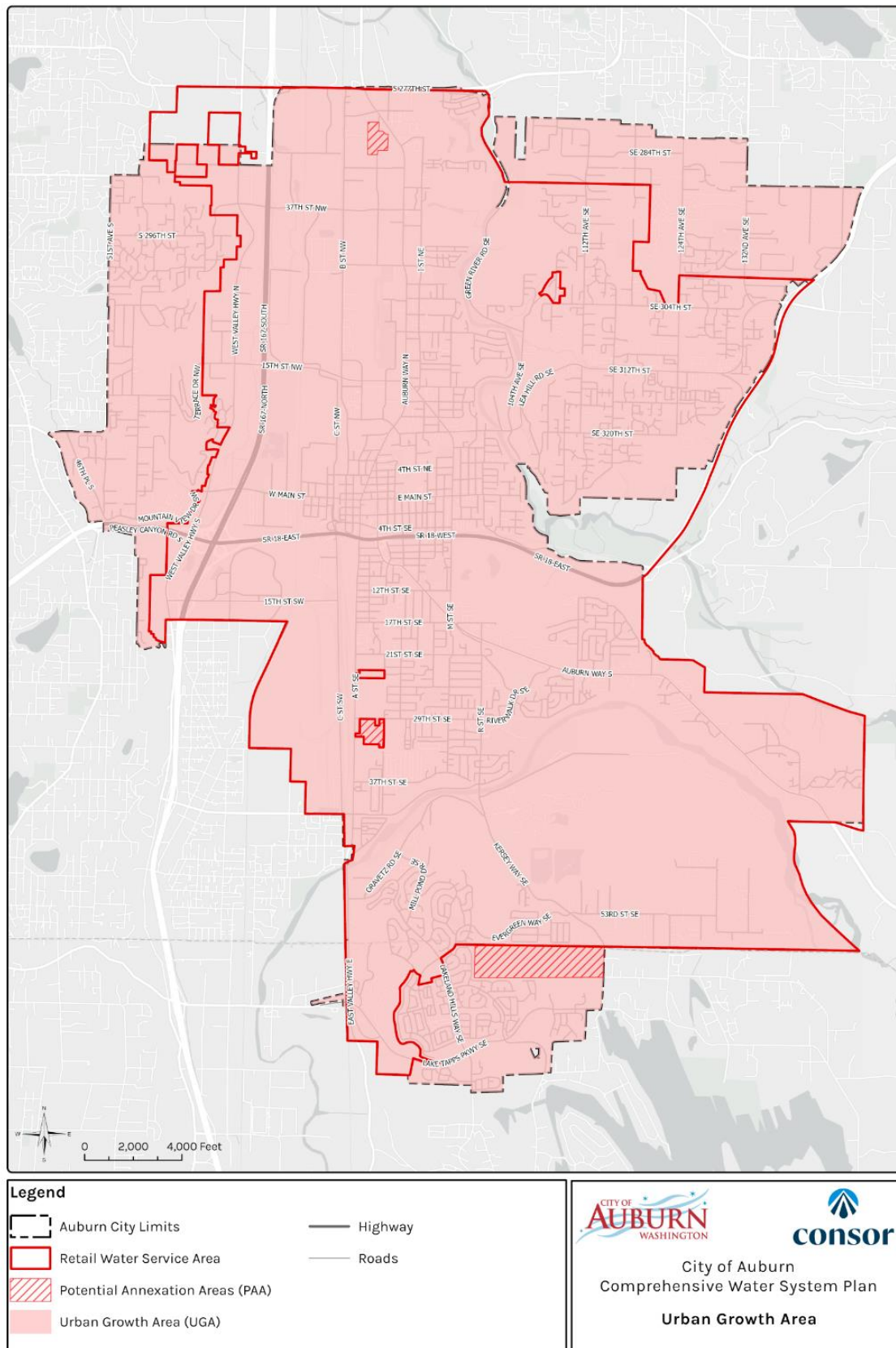


Figure 1-6 | Urban Growth Area



1.6.1.2 City of Algona (Algona)

In 1996, the City and Algona entered into a water supply interlocal agreement (IA3) for the City to provide wholesale water supply to Algona. In 2002, the agreement was superseded with Interlocal Agreement 3A (IA3A). IA3A called for the City to provide for a firm quantified (uninterruptible) wholesale water supply and Algona would provide the City its groundwater rights from the failed well located at the intersection of 3rd Avenue and Washington Boulevard. Per IA3A, Algona also agreed to maintain its 100,000 gallons of system storage and financially participate in an additional 180,000-gallon share of the City's Reservoir 6 storage capacity. Per request in 2016, Algona elected to increase its participation in Reservoir 6 by 100,000 gallons, which accounted for a total share of 280,000-gallon storage capacity. If the City experiences any failure or decreased capacity, the supply of water to Algona may be decreased by the same percentage that is experienced by the City.

Algona is served (per agreement IA3A) through 8-inch meter located at 1st Avenue and by two 8-inch intertie meter stations located at 1149 Industry Drive SW, and at Boundary Boulevard and Milwaukee Avenue. A fourth 8-inch master meter is located near Iowa Drive and West Valley Highway. All the interties are connected to the City's 242 zone.

1.6.1.3 Lake Meridian Water District (LMWD)

An intertie between the City and LMWD was constructed in 1996 as part of Interlocal Agreement 2 (IA2), to enable the District to purchase water from the City. The intertie also allows the City to provide an emergency supply to Kent's East Hill Service Area through LMWD. A provision of the IA2 agreement calls for the district to provide an emergency supply to the City when needed for the Lea Hill Service Area. As part of the IA2, the City agrees to provide up to 2.5 mgd of MDD to LMWD (total maximum day demand of 5.0 mgd).

Per the 2017 Amendment to the IA2, LMWD discontinued regular purchase of water from the City and instead switched their primary supply to CWD. The amendment maintained the intertie with LMWD but modified the conditions of service to interruptible.

1.6.2 Emergency Interties

The City has emergency interties with seven water systems as summarized in

Table 1-3.

Table 1-3 | Emergency Interties

Water System	Receiver	Location	Auburn Pressure Zone	Mode of Operation	Meter Size	Operated by
City of Algona	City of Algona	Boundary Boulevard and Celery Ave	Valley 242	Manual	N/A	City of Auburn
City of Algona	City of Algona	Boundary Boulevard and O Street	Valley 242	Manual	8"	City of Auburn
City of Bonney Lake	City of Bonney Lake	Evergreen Way SE (southwest of Lakeland Hills Way)	Lakeland 697	Manual	8"	City of Bonney Lake
City of Bonney Lake	Two-way	Lakeland Hills Way & 59th Avenue	Lakeland 697	Manual	N/A	City of Auburn/ Bonney Lake
City of Bonney Lake	Two-way	Evergreen Way and Nathan Avenue	Lakeland 697	Manual	N/A	City of Auburn/ Bonney Lake

Water System	Receiver	Location	Auburn Pressure Zone	Mode of Operation	Meter Size	Operated by
City of Bonney Lake	Two-way	Olive Avenue, south of Evergreen Loop	Lakeland 697	Manual	N/A	City of Auburn/Bonney Lake
City of Kent	Two-way	78th Avenue S and S 277th Street	Valley 242	Manual	6"	City of Auburn/Kent
City of Pacific	City of Pacific	Ellingson Road near Pacific Ave	Valley 242	Manual	4"	City of Pacific
City of Pacific	City of Pacific	A St SE (north of White River)	Valley 242	Manual	N/A	City of Pacific
Lakehaven Water & Sewer District (LWSD)	City of Auburn	Aaby Drive and Knickerbocker Drive	Valley 242	Manual	6"	LWSD
LMWD	Two-way	127th Place SE, south of SE 299th Place	Lea Hill 648	Manual	N/A	City of Auburn
LMWD	Two-way	124th Avenue SE and SE 300th Way	Lea Hill 648	Manual	N/A	City of Auburn
LMWD	LMWD	SE 300th & 132nd Ave SE	Lea Hill 648	Manual	8"	City of Auburn
LMWD	LMWD	SE 288th St & 132nd Ave SE	Lea Hill 648	Manual	8"	City of Auburn

1.7 System Policies

The City manages the water utility in accordance with established water system policies that govern various facets of utility operations. The water system policies are established to support a vision or mission and to provide a framework for the design, operation, and ongoing wellbeing of the City's water utility. The policies establish consistency and ensure that adequate levels of service are provided throughout the system. The policies also provide documentation to current water-system customers, as well as those considering service from the City.

The City's Water Comprehensive Plan is based upon the following mission statement for the water utility:

"The City will provide for the efficient, environmentally sound and safe management of the existing and future water system within Auburn's service area."

For areas outside its municipal boundaries, the City maintains water franchises that allow for construction, operation, and maintenance of its facilities. Water system design and construction in the franchise areas are consistent with franchise requirements and the design and construction standards included in this Plan.

The City's water system policies and criteria, provided in **Appendix A**, are grouped within goal statements that are headlined under seven categories: Business Practices, Service Area, Operations and Maintenance, Financial, Planning, Environmental Stewardship, and Design and Construction.

1.8 Duty to Serve

The City recognizes its duty to serve all new service connections within its RWSA when the following thresholds are met per WAC 246-290-106.

- The water system has sufficient capacity to serve water in a safe and reliable manner.
 - To ensure the water system's capacity for safe water delivery, hydraulic analysis is conducted. This involves assessment of peak demand patterns, pressure requirements, and potential system expansions. The goal is to establish and maintain a water supply infrastructure that can reliably and securely accommodate the needs of new connections.
- The service request is consistent with adopted local plans and development regulations.
 - Service requests undergo a comprehensive review to ascertain their alignment with local plans, including the City's Design and Construction Standards.
- The water system has sufficient water rights to provide service.
 - Assessment of water production data is performed for all sources to confirm the water system's capacity and compliance with available water rights.
- The water system can provide service in a timely and reasonable manner.
 - The assessment of the water system's capability to provide service promptly and reasonably encompasses evaluating infrastructure readiness, adherence to construction timelines, and minimizing disruption to existing customers. The City incorporates Washington State DOH recommendations for timely and reasonable service, which is defined as providing water service within 120 days of receiving a complete application, barring any extenuating circumstances.
 - If a customer or applicant is dissatisfied with a decision made by the City Engineer concerning water service, they may file a written objection with the Public Works Director within 15 working days of receiving the decision. The Director will respond within 15 working days. If the response is unsatisfactory, the appellant may request a hearing with the City's hearing examiner within 30 days.
 - The hearing examiner's decision is final, but can be appealed in superior court following RCW 34.05.510 through 34.05.598.
 - For customers in the city's RWSA located within unincorporated areas of King County, if all city-level appeals are exhausted and unresolved, the dispute may be escalated to the King County Utilities Technical Review Committee (UTRC) in accordance with King County Code (KCC) 13.24.080.

The City will plan to provide water service to all customers within its RWSA, in accordance with the WAC requirements and City Code. Revisions to the City's RWSA will be made only by written agreement and in accordance with local, county and state regulations.

1.9 Local Government Consistency

The City has submitted this plan to DOH, King and Pierce Counties, adjacent utilities, and local governments as part of the Agency Review process. Local government consistency review is completed in accordance with WAC 246-290-100(7) and WAC 246-290-108 to confirm consistency between the water system plan and local comprehensive plans, development regulations, and other local codes.

The consistency review also supports planning and development, minimizing conflicts and legal entanglements. The completed and signed Local Government Consistency Determination forms (DOH 331-568) are provided in **Appendix C**.

1.10 Watershed Plan Consistency

The City is in the Duwamish-Green (WRIA 9) and Puyallup-White Watershed (WRIA 10). The City currently has no plans to expand water rights place of use to include any portion of the service area that was not previously within the place of use for the water right when documented in an approved planning or engineering document and as identified in this Plan.

If the City expands water rights place of use, the new area within the water rights place of use service area will be formed in compliance with the terms of WAC 246-290-107 and consistent with the Watershed Plan approved for WRIA 9 or WRIA 10, under RCW 90.54.040(1).

Basic Planning Data

This chapter's objective is to meet the requirements of WAC 246-290-100 (4)(b), incorporating basic planning data into this 2024 Water System Plan (WSP). It provides current population and water demand information; estimates future population and water demand; validates data; and compares future population and water demand estimates with locally adopted plans.

Projecting realistic future water requirements, or demand, is necessary for planning infrastructure projects and securing adequate water supply to meet future growth. Future water demands are a key component of the water system analyses presented in this WSP and in the City's Capital Improvement Program (CIP). Accurate demand projections require a thorough review of historical water use, predicting where and how much growth will occur, and estimating the future water use for existing and new customers.

The following topics are addressed in this chapter:

- 2.1 Water Service Area Population
- 2.2 Water Service Connections and Usage
- 2.3 Water Supply and Production
- 2.4 Distribution System Leakage
- 2.5 Water Supply Characteristics
- 2.6 Water Supply Reliability Evaluation
- 2.7 Future Population Projections and Land Use
- 2.8 Future Water Demand

2.1 Water Service Area Population

The City's current area within the RWSA boundary is smaller than its City limits, with adjacent purveyors serving the portion of the City's population that is outside its RWSA boundary, as shown in **Figure 1-1** presented in **Chapter 1**. As a result, historical City population data does not accurately represent the population served by the City's water system. To calculate the RWSA population, the Housing Unit Method was used, which is presented as an acceptable option for population determination in the Washington State Department of Health's (DOH) Water System Planning Guidebook 2020 Revision. The Housing Unit Method calculates the population based on the number of residential units and the area's average person's per household ratio.

The historical population data for the water system, as calculated using the Housing Unit Method, is presented in **Table 2-1**. These calculated populations are consistent with the numbers the City has reported on its Water Facilities Inventory (WFI), included in **Appendix H**.

Table 2-1 | Historical Population

	2015	2016	2017	2018	2019	2020	2021	2022
Persons per household ¹	2.73	2.75	2.76	2.77	2.79	2.80	2.81	2.82
Single-Family Residential Connections ^{2,3}	11,600	12,128	11,852	11,857	11,883	11,894	11,985	11,980
Multi-Family Residential Connections ²	1,045	1,070	1,035	1,044	1,054	1,054	1,064	1,052
Calculated Multi-Family Units ⁴	10,450	10,700	10,350	10,440	10,540	10,540	10,640	10,520
Calculated Population Served ⁵	60,259	62,704	61,294	61,872	62,535	62,876	63,576	63,450
City Population ⁶	78,210	80,362	82,058	84,352	86,353	87,256	88,080	88,750
City Employment (Non-Residential Population) ⁷	37,298	39,466	29,487	40,855	41,985	39,092	37,871	N/A

Notes:

1. Persons per household per Washington State Office of Financial Management (OFM). 2021 and 2022 values are projected since OFM data is only available for the census period of 2010-2020.
2. Single and Multi-Family connections per City's water system billing records.
3. Single-Family Residential connections include duplexes per the City's design standards.
4. Assumed units per multi-family connection is 10 per the City's WFI, updated on 3/15/2022.
5. Calculated Population Served is calculated as the number of single-family connections plus the number of multi-family units multiplied by the persons per household.
6. City population per the Washington State OFM records.
7. Employment data is from the United States Census OnTheMap data source using a City-defined selection area.

Based on the calculated historical water system population presented in **Table 2-1**, the City's water system has seen growth in population between 2015 and 2022 averaging a one percent increase annually. The number of connections peaked in 2016 (along with the calculated population), however this was during the time when the City was transferring services to AMI metering, resulting in some apparent fluctuations of reported connections during the switchover that could not be easily rectified. The last row in **Table 2-1** provides the City population as reported by the Office of Financial Management (OFM). The City population has had a similar, steady growth to the calculated water system population, with an average annual growth rate of 1.8 percent annually. The City population as reported by the OFM is larger than the calculated water system population because the RWSA is smaller than the City limits as shown in the Water System Map (**Figure 1-3**). Additionally, growth in parts of the City beyond the RWSA has been greater than the rate of growth experienced within the RWSA. The OFM City population information is provided for reference; the calculated population served will be used for the purposes of this WSP.

2.2 Water Service Connections and Usage

Historical water use, or consumption, data was obtained from City records to characterize the demands of the City's customers. Annual water use data for the years 2015 to 2022 was used to develop historical demand patterns and parameters, which represent current and likely future water use. Two key demand parameters were generated from the data: typical water use per customer classification, and typical water use per equivalent residential unit. These parameters were used as the basis of future demand projections.

2.2.1 Historical Accounts

The City's water customers are divided into eight customer classifications, which are:

- Single-family Residential (SFR).
- Multi-family Residential (MFR).
- Commercial.

- Manufacturing and Industrial.
- Schools.
- Municipal (City Accounts).
- Irrigation.
- Wholesale.

The number of connections for each customer classification is summarized in **Table 2-2**. Unmetered, also referred to as non-revenue water, also accounts for a portion of the City's water use, however, this classification is not included in **Table 2-2**. Please note that per the City's standards, SRF connections include duplexes.

Table 2-2 | Historical Number of Connections per Customer Classification

	2015	2016	2017	2018	2019	2020	2021	2022
Single-Family Residential	11,600	12,128	11,852	11,857	11,883	11,894	11,985	11,980
Multi-Family Residential	1,045	1,070	1,035	1,044	1,054	1,054	1,064	1,052
Commercial	1,317	1,386	1,340	1,339	1,333	1,328	1,284	1,244
Manufacturing & Industrial	50	4	4	3	2	2	2	2
Schools	70	64	60	60	60	60	58	55
Municipal (City Accounts)	32	34	33	33	33	33	33	33
Irrigation	459	499	484	499	514	514	620	675
Wholesale	8	8	8	7	5	5	5	5
Number of Connections, Total	14,581	15,193	14,816	14,842	14,884	14,890	15,051	15,046

As summarized in **Table 2-2**, SFR connections make up approximately 80 percent of all accounts. The total number of connections has increased by approximately three percent between 2015 and 2022. Variation in the total number of water service connections in 2016 is linked to the rollout of AMI technology from 2016 to 2017. Throughout this transitional phase, there may have been instances of double counting meters in 2016, leading to an inflated number of connections. Subsequently, there was a notable decrease in 2017 as the number of connections were normalized.

A significant change in manufacturing and industrial accounts occurred between 2015 and 2016 due to some meters being reclassified as commercial connections. Manufacturing and industrial services are classified as businesses engaging in the manufacture of products, materials, equipment, machinery, and supplies with a meter size of two inches or larger and a monthly annual average water consumption equal to or greater than 30,000 cubic feet. There were several accounts that did not meet the criteria for this classification and were changed to Commercial classification rate following 2015. The total number of connections from 2016 to 2017 decreased due to low and high flow meters (two meters) being replaced with one meter; this impacted Commercial, Manufacturing and Industrial, and School connections.

The number of SFR, MFR, and commercial connections peaked in 2016, however, as mentioned in the opening paragraph, this is likely due to the fluctuations in the City's transition to AMI metering. Municipal connections remained constant over this period.

Wholesale connections were reduced in 2019 when Covington Water District (CWD) and Lake Meridian Water District (LMWD), formerly known as King County Water District # 111, discontinued regular purchase of water from the City.

2.2.2 Historical Consumption

The City's historical annual water consumption based on City billing data for each customer classification is presented in **Table 2-3** in million gallons (MG); the table does not include non-revenue (unmetered) water.

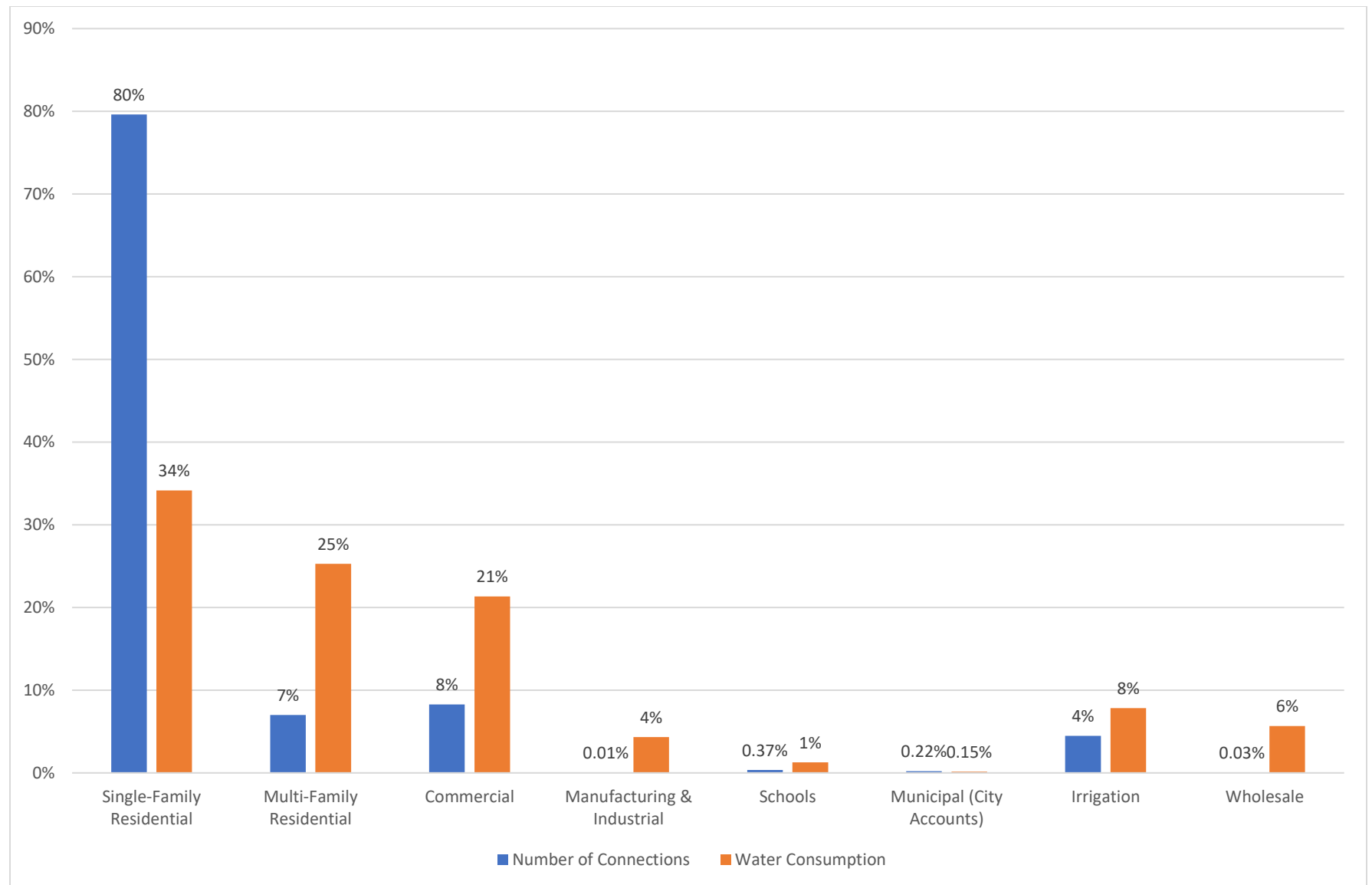
Table 2-3 | Historical Consumption in Million Gallons (MG) by Customer Classification

	2015	2016	2017	2018	2019	2020	2021	2022
Single-Family Residential	774	753	759	836	729	777	796	755
Multi-Family Residential	537	546	523	587	536	553	559	559
Commercial	501	581	595	594	585	461	470	472
Manufacturing & Industrial	170	153	123	124	121	101	94	96
Schools	41	49	56	49	42	30	33	28
Municipal (City Accounts)	5	4	5	5	5	4	4	3
Irrigation	163	162	160	102	102	118	173	173
Wholesale	425	428	153	137	130	131	128	125
Total Consumption, MG	2,616	2,676	2,374	2,433	2,251	2,175	2,257	2,211

Consumption has slightly declined over the period of record. While SFR and MFR consumption varied from year to year, it generally saw a slight increase during the study period which is correlated to the steady increase in the number of connections presented in **Table 2-2**. SFR and MFR consumption peaked in 2018, which is likely due to AMI meters implementation. Manufacturing and industrial demands decreased between 2015 and 2022 which is attributed to the reduced number of connections (reclassification) presented in **Table 2-2** as well as reduced consumption from Boeing which is the City's only current manufacturing and industrial customer. Commercial and school consumption decreased in 2020 through 2022 which is likely correlated with remote working and schooling that resulted during the COVID-19 pandemic. Wholesale demands also decreased over the planning period since LMWD and CWD discontinued purchase of water from the City. Additionally, no wholesale water was supplied to the Muckleshoot Indian Tribe (MIT) for the future fish hatchery; refer to **Section 2.8** for additional information.

Figure 2-1 presents the percentage of customer connections and annual billed water consumption by customer classification in 2022. Comparing the number of connections and water consumption illustrates the differences in water consumption between the different customer classifications. For example, SFR customers represent 80 percent of the connections, yet only 34 percent of the total consumption in 2022. Conversely, MFR customers represent seven percent of the connections, but 25 percent of the total consumption in 2022. Wholesale customers have six accounts in 2022 (0.04 percent of the total connections), but account for six percent of the total consumption in 2022. Similarly, manufacturing and industrial have two connections in 2022 (0.01 percent of the total connections), but account for four percent of the total consumption in 2022.

Figure 2-1 | Comparison of Number of Connections to Annual Water Consumption per Customer Classification in 2022



2.2.2.1 Historical Wholesale Consumption

Wholesale consumption decreased between 2015 and 2022. From 2015 to 2016 wholesale consumption represented 16 percent of the City’s annual water consumption. In 2017 wholesale consumption decreased to six percent and remained relatively constant through 2022.

The City has two wholesale water agreements, one with the City of Algona and the other with LMWD. These agreements are described below, and copies of the agreements are included in **Appendix G**.

The City of Algona relies on the City of Auburn for water supply under the Water System Intertie Agreement, Algona/Auburn Intertie Agreement No. 3A (Agreement 3A). Agreement 3A was amended in 2002 to continue the agreement for the City of Auburn to provide a portion of the City of Algona’s long-term water supply needs. Additionally, in 2016 the City of Algona purchased 100,000 gallons of additional storage in Lakeland Reservoir 6, bringing their total storage capacity to 280,000 gallons. Algona’s consumption increased in 2018. Water consumption averaged 0.33 mgd between 2015 and 2017, and 0.36 mgd between 2018 and 2022. See **Table 2-6** for annual usage totals.

The City’s Interlocal Agreement 2 (IA2) outlines the agreement with LMWD. The City’s agreement with LMWD is on an interruptible basis and allows sales up to 2.5 mgd. This agreement was executed in October of 1996 and amended as Resolution 5332 in 2017. The agreement will remain in full force unless terminated by mutual agreement of the participants. LMWD did not purchase wholesale water during the planning period since they discontinued regular purchase of water from the City of Auburn in 2017 per the amendment to IA2. Instead, LMWD switched their primary supply to CWD, however, LMWD still maintains intertie with the City to use as a wholesale water supply on an as-needed basis.

The first amendment to IA2 also included the termination of CWD’s wholesale agreement with the City; CWD did not purchase wholesale water during the planning period.

2.2.3 Water Use Per Connection and Equivalent Residential Units

The water use, or demand, of each customer classification can be expressed in terms of equivalent residential units (ERUs) for forecasting and planning purposes. One ERU is defined as the average quantity of water beneficially used by one average, full-time, SFR per day. The ERU calculation does not include non-revenue water or distribution leakage. **Table 2-4** summarizes the annual demand per ERU from 2015 to 2022 in gpd.

Table 2-4 | Historical Annual Demand per ERU (gpd per ERU)

	2015	2016	2017	2018	2019	2020	2021	2022
SFR Consumption (MG) ¹	774	753	759	836	729	777	796	755
Number of SFR Connections ²	11,600	12,128	11,852	11,857	11,883	11,894	11,985	11,980
ERU _{ADD} (gpd) ³	183	170	176	193	168	179	182	173

Notes:

1. Per annual residential consumption from **Table 2-3**.
2. Per residential connections from **Table 2-2**.
3. Calculated as annual consumption divided by number of connections.

To be conservative, an ERU planning value higher than the average was used by the City for demand forecasting. The 75th percentile of all the eight-year values was used to select the planning ERU value of 182 gpd. This methodology is consistent with the City’s 2015 Plan. The ERU value of 182 gpd is seven percent lower than the 2015 Plan’s ERU planning value of 195 gpd per ERU.

The conversion of total water consumption to ERUs provides a means to express water consumption by non-residential customers as an equivalent number of SFR accounts. The number of ERUs per account is obtained by dividing the water consumption per account by the water use per ERU (182 gpd for this planning period). **Table 2-5** presents the number of ERUs per account for each customer classification based on the planning value of 182 gallons per ERU.

Table 2-5 | Historical Demand as Equivalent ERUs per Customer Classification

	2015	2016	2017	2018	2019	2020	2021	2022
Single-Family Residential(ERUs) ¹	11,600	12,128	11,852	11,857	11,883	11,894	11,985	11,980
Multi-Family Residential (ERUs)	8,078	8,194	7,864	8,832	8,067	8,295	8,403	8,411
Commercial (ERUs)	7,542	8,709	8,947	8,933	8,806	6,920	7,066	7,096
Manufacturing & Industrial (ERUs)	2,561	2,298	1,857	1,864	1,817	1,510	1,412	1,437
Schools (ERUs)	614	730	842	742	624	448	497	420
Municipal (City Accounts) (ERUs)	69	62	69	72	82	56	67	49
Irrigation (ERUs)	2,454	2,431	2,412	1,528	1,534	1,775	2,608	2,603
Wholesale (ERUs)	6,395	6,414	2,299	2,057	1,949	1,966	1,925	1,884
Annual Demand Equivalent (ERUs)	39,314	40,967	36,141	35,884	34,762	32,863	33,963	33,881

Note:

1. The number of Single-Family Residential ERUs is equivalent to the actual number of connections. For all other customer classifications, the planning value of one ERU is equivalent to 182 gpd.

2.2.4 Largest Water Users

The top 20 largest water users for the City's water system are summarized in **Table 2-6** and **Figure 2-2** with rank assignments based on 2022 consumption. Total consumption values are presented in MG. This list, in conjunction with the information above, provides information on where water is consumed in the system. It is important to note the type of customer classification, because the top 20 water users consume a significant percentage of the total consumption. As mentioned above, SFR connections make up most of the total connections and water consumption for the system, but no individual SFR connections are listed within the top 20 largest water users. Though the City of Algona is comprised of individual SFR's, the City of Algona is one of the top 20 largest water users because it is a wholesale customer supplied via a limited number of connections.

The top 20 water users in the City's water system accounted for approximately 24 percent of the total water system consumption in 2022. LMWD was the largest water user in 2015 and 2016, purchasing over 300 MG per year, but discontinued regular purchase of consumed water from the City in 2017. Copper Gate, Promenade Apartments, and Villas/Reserve are developments that were constructed after 2015, which pushed Tall Cedars and Leisure Manor multi-family users out of the top 20. Boeing and the City of Algona make up almost 50 percent of the top 20 water users' consumption.

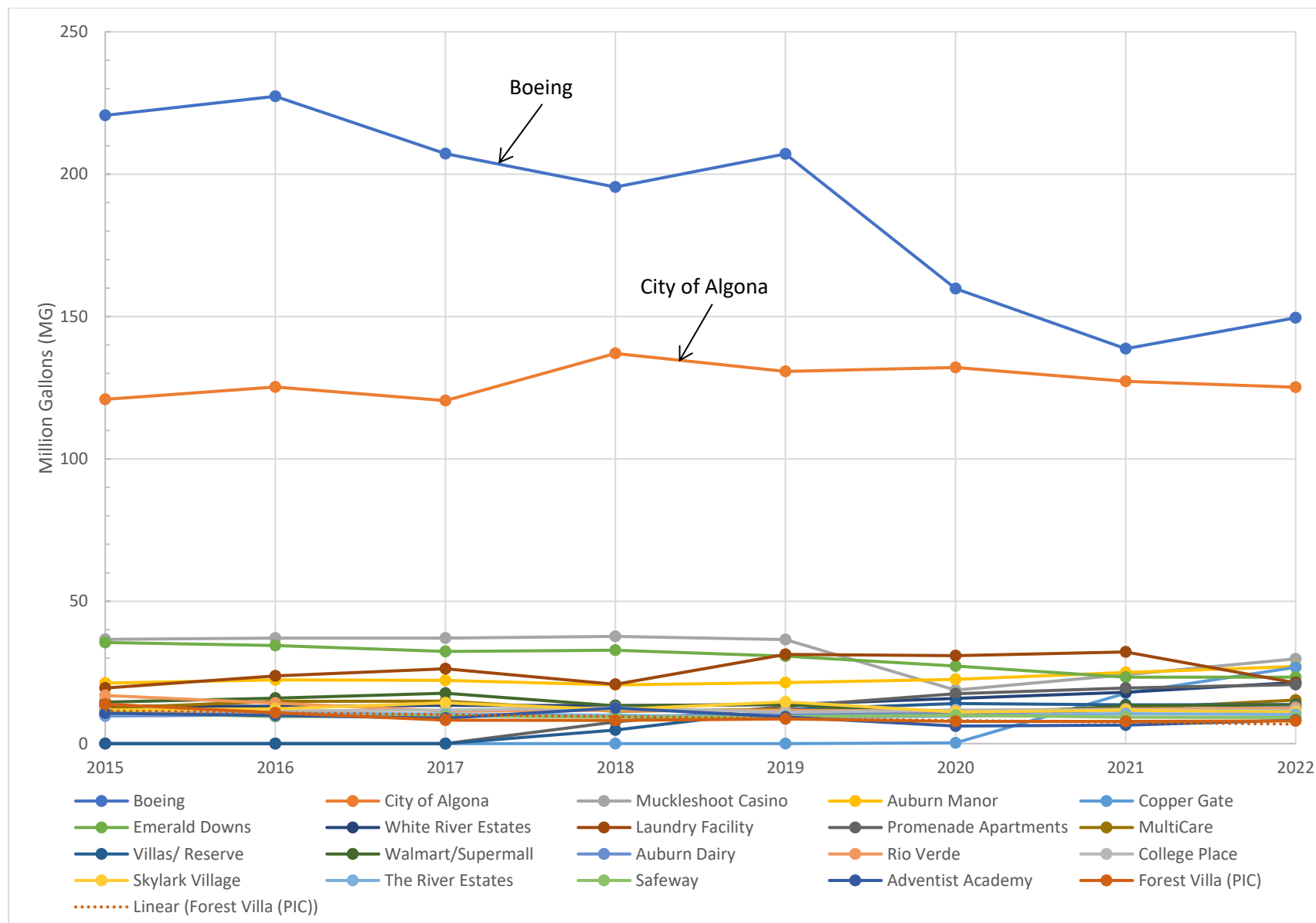
Table 2-6 | Historical Annual Consumption of the Top 20 Largest Water Users in Million Gallons (MG)

Rank ¹	Customer Name	Classification	Service Area	2015	2016	2017	2018	2019	2020	2021	2022
1	Boeing	Manufacturing/Commercial	Valley	220.67	227.34	207.23	195.48	207.15	159.83	138.70	149.57
2	City of Algona	Wholesale	Valley	120.93	125.29	120.46	137.04	130.75	132.07	127.22	125.18
3	Muckleshoot Casino	Commercial	Academy	36.65	37.04	37.08	37.66	36.49	18.79	24.24	29.79
4	Auburn Manor	Multi-Family	Valley	21.25	22.367	22.24	20.61	21.45	22.59	25.03	27.10
5	Copper Gate ²	Irrigation/Multi-Family	Valley	-	-	-	-	-	0.22	17.70	26.80
6	Emerald Downs	Commercial/Irrigation	Valley	35.51	34.48	32.40	32.81	30.69	27.28	23.33	23.36
7	White River Estates	Multi-Family	Valley	13.24	13.09	13.42	13.36	13.66	15.87	18.06	21.47
8	Laundry Facility	Commercial	Valley	19.52	23.73	26.25	20.81	31.31	30.87	32.19	21.32
9	Promenade Apartments ²	Commercial/Irrigation/Multi-Family	Lea Hill	-	-	-	7.58	13.00	17.53	19.48	20.74
10	MultiCare	Commercial/Irrigation	Valley	12.45	14.86	14.95	11.35	12.04	11.48	12.32	15.30
11	Villas/Reserve ²	Commercial/Irrigation/Multi-Family	Valley	-	-	-	4.75	11.84	14.09	13.62	13.66
12	Wal-mart/Supermall	Commercial/Irrigation	Valley	14.54	15.98	17.70	13.31	13.78	9.79	13.26	13.58
13	Auburn Dairy	Commercial	Valley	9.73	10.03	9.73	9.49	10.38	10.63	11.58	12.82
14	Rio Verde	Multi-Family	Valley	16.91	14.21	11.41	11.72	11.72	11.46	12.12	12.48
15	College Place	Multi-Family	Lea Hill	10.81	11.46	11.75	12.59	10.99	11.77	11.89	11.74
16	Skylark Village	Multi-Family	Valley	11.80	12.23	14.30	11.93	14.65	11.13	11.73	11.11
17	The River Estates	Multi-Family	Valley	10.23	10.59	10.38	9.97	9.17	9.59	10.49	10.27
18	Safeway	Commercial	Valley	11.01	9.48	9.81	9.27	9.44	9.95	9.32	9.14
19	Adventist Academy	School/Multi-Family	Academy	10.66	9.92	8.89	12.49	9.33	6.17	6.50	8.26
20	Forest Villa (PIC)	Multi-Family	Academy	13.86	10.83	8.24	8.13	8.63	7.80	7.82	8.00
-	LMWD ³	Wholesale	Lea Hill	302.89	303.02	29.40	-	-	-	-	-
TOTAL CONSUMPTION (MG)³				905.86	918.45	618.85	588.28	613.31	545.32	546.66	571.67

Notes:

1. Rank assignments are based on 2022 consumption data.
2. Service location was constructed after 2015 WSP was published.
3. LMWD was the largest water user in 2015 and 2016 but discontinued purchase of water from the City in 2017. Included to contribute to the total consumption.
4. The annual total is the sum of the top 20 largest users from each year; Tall Cedars and Leisure Manor consumption data is not shown but is included in the total.

Figure 2-2 | Historical Annual Consumption of the Top 20 Largest Water Users in Million Gallons (MG)



2.3 Water Supply and Production

The historical average and maximum water demands are important parameters when performing system and supply analyses. The term “water demand” refers to all the water requirements of a system including metered customers, unmetered water use, and unaccounted for water loss such as leakage and theft. For this reason, the City’s supply data, which accounts for all water demand, was used to calculate the Average Day Demand (ADD) and Maximum Day Demand (MDD) for each year.

2.3.1 Historical Water Supply

The City produces water through its springs, wells, and, when needed, wholesale water purchases. **Table 2-7** summarizes the amount of water produced and purchased by the City between 2015 and 2022 as MG. The City has not purchased water from the City of Tacoma since 2016.

Table 2-7 | Historical Annual Water Supply by Source in Million Gallons (MG)

	2015	2016	2017	2018	2019	2020	2021	2022
Lakeland Well 5	4.9	0.1	0.2	0.5	1.0	0.9	1.2	3.3
Lakeland Well 5A	54	45	64	76	68	65	72	59
Lakeland Well 5B	-	-	-	-	-	-	-	-
Valley Well 1	-	200	336	93	143	143	57	73
Valley Well 2	-	-	-	270	296	235	305	314
Valley Well 3A	-	-	-	-	-	-	-	-
Valley Well 3B	-	-	-	-	-	-	-	-
Valley Well 4	302	430	421	121	96	84	88	66
Valley Well 6	-	-	-	402	445	349	438	468
Valley Well 7	-	-	-	-	-	-	-	-
Coal Creek Springs	1,456	1,613	1,510	1,315	1,208	1,268	1,338	1,225
West Hill Springs	173	198	114	176	136	133	140	157
Algona Well 1	-	-	-	-	-	-	-	-
Total Production (MG) ¹	2,033	2,487	2,506	2,464	2,410	2,313	2,443	2,395
Total Purchased (MG)	732	321	-	-	-	-	-	-
Total Supply (MG)	2,765	2,808	2,506	2,464	2,410	2,313	2,443	2,395

Note:

1. Small differences exist between the total production value and the sum of individual production values by source. This is due to the use of raw unprocessed data for individual sources, which was subsequently processed to identify and remove outliers, correct data entry errors and account for anomalies that could distort the overall results. These adjustments ensure that the . Total Production values presented depict the most accurate information available.

Table 2-8 | 2022 Monthly Water Production by Source (MG)

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
Lakeland Well 5	0.4	0.2	0.2	0.2	0.2	0.2	0.9	0.6	0.1	0.1	0.1	0.1
Lakeland Well 5A	6	5	6	6	6	6	5	6	6	6	-	1
Lakeland Well 5B	-	-	-	-	-	-	-	-	-	-	-	-
Valley Well 1	3	1	-	1	-	3	19	41	5	-	-	-
Valley Well 2	27	25	29	28	29	25	30	29	24	23	21	24

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
Valley Well 3A	-	-	-	-	-	-	-	-	-	-	-	-
Valley Well 3B	-	-	-	-	-	-	-	-	-	-	-	-
Valley Well 4	3	2	2	3	-	2	18	27	8	1	-	-
Valley Well 6	41	37	44	41	43	36	44	44	37	35	31	35
Valley Well 7	-	-	-	-	-	-	-	-	-	-	-	-
Coal Creek Springs	90	71	77	62	83	110	129	159	153	112	89	90
West Hill Springs	13	11	13	12	13	13	13	15	14	14	13	13
Algona Well 1	-	-	-	-	-	-	-	-	-	-	-	-

2.3.2 Average Day Demands and Maximum Day Demands

Table 2-9 summarizes the historical ADD and MDD based on production from 2015 through 2022.

To calculate the ADD, the total annual supply was divided by the number of days in the year.

Historical values of MDD are equivalent to the highest production and purchase in one day each year, usually during the summer when irrigation use is highest. The MDD is a key parameter used for supply capacity, pump station discharge rates, reservoir capacity, and pump sizes. The peaking factor is also a key parameter in developing the future MDD projections.

Table 2-9 | Historical Annual ADD, MDD, Peak Day, and Peaking Factor

	2015	2016	2017	2018	2019	2020	2021	2022
Annual Supply (MG) ¹	2,765	2,808	2,506	2,464	2,410	2,313	2,443	2,395
Average Day Demand (mgd)	7.57	7.67	6.87	6.75	6.60	6.32	6.69	6.56
Maximum Day Demand (mgd)	11.62	12.56	11.76	11.60	11.25	12.43	11.77	11.78
Max Day Date (month/day)	6/28	8/25	8/22	7/27	8/1	7/29	7/27	7/29
MDD/ADD Peaking Factor	1.53	1.64	1.71	1.72	1.70	1.97	1.76	1.80

Note:

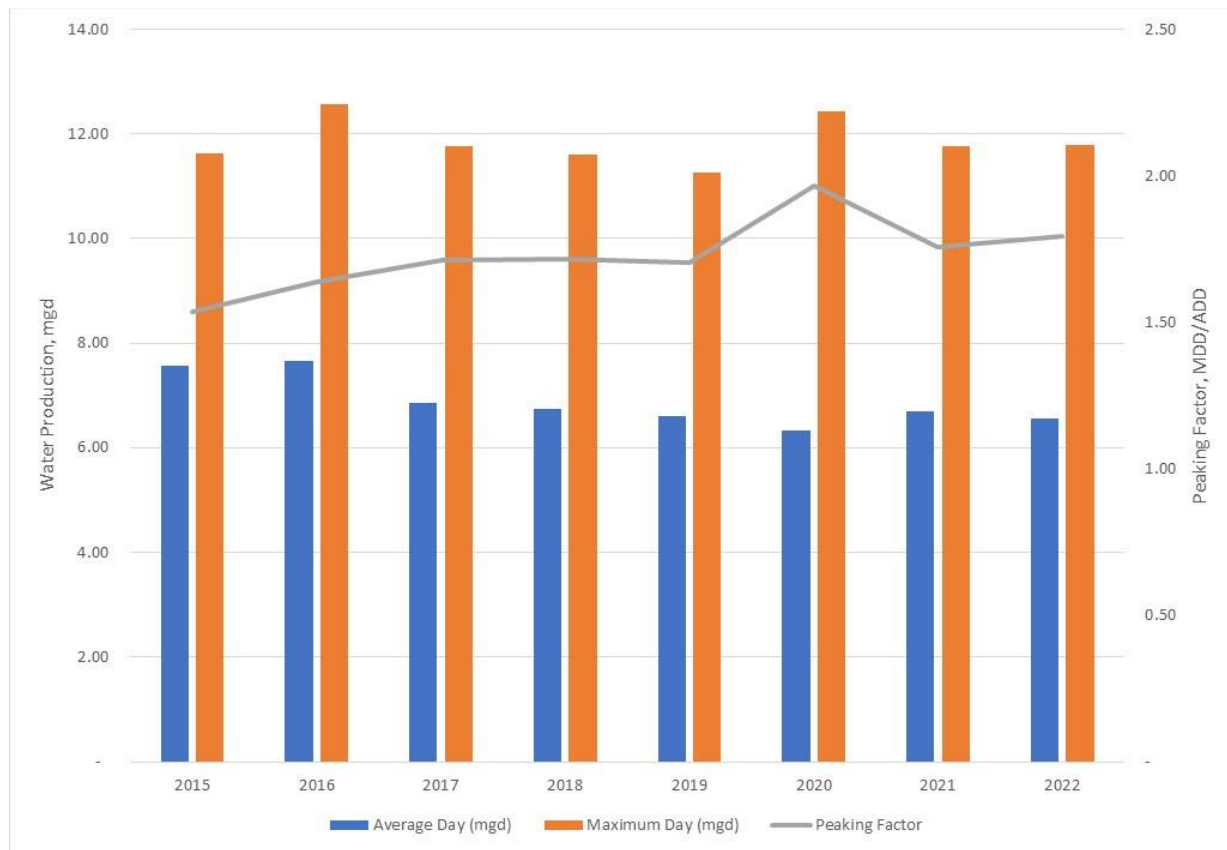
1. Value is from **Table 2-7**.

The last row of **Table 2-9** presents the historical MDD to ADD peaking factor, which normalizes the historical data to compare between years. The minimum MDD factor was 1.53 in 2015, and the maximum MDD was 1.97 in 2020.

Due to variability of the peaking factor, the City has chosen to use the 75th percentile of the historical peaking factors in demand projections, which is 1.77. This factor provides a better representation of the peaking factors observed historically for water supply predictions.

Figure 2-3 shows that from 2015 to 2022 the ADD has decreased, which is correlated with improved water use efficiency, but the MDD and MDD/ADD peaking factor have increased. This is likely due to warmer and drier summer months and a reduction in the ADD after CWD opted out of their original agreement with the City, terminating their purchase of water, and LMWD stopped regular purchase of consumed water from the City, switching to interruptible supply.

Figure 2-3 | Historical Water Production with Peaking Factor



2.3.3 Peak Hour Demand

Peak Hour Demand (PHD) is the amount of water used, excluding fire flow, during the largest use hour of the year. Because the City does not track hourly production data, PHD was estimated based on Equation 3-1 from the DOH Water Design Manual, which is as follows:

$$PHD = (ERU_{MDD}/1440) [(C \times N) + F] + 18$$

Where **PHD** = Peak Hourly Demand, total system (gpm)

C = Coefficient Associated with Ranges of ERUs (1.6 for systems with more than 500 ERUs)

N = Number of ERUs based on MDD

F = Factor Associated with Ranges of ERUs (225 for systems with more than 500 ERUs)

ERU_{MDD} = Maximum Day Demand per ERU (gpd)

The calculated annual PHD for the system is summarized in **Table 2-10**.

Table 2-10 | Historical Peak Hour Demand

	2015	2016	2017	2018	2019	2020	2021	2022
ERU _{MDD} (gpd)	279	298	312	313	310	358	320	327
Number of ERUs based on MDD	41,586	42,115	37,692	37,068	36,253	34,696	36,747	36,025
PHD (gpm)	12,973	14,019	13,135	12,950	12,567	13,881	13,140	13,159
PHD to MDD Factor	1.61	1.61	1.61	1.61	1.61	1.61	1.61	1.61

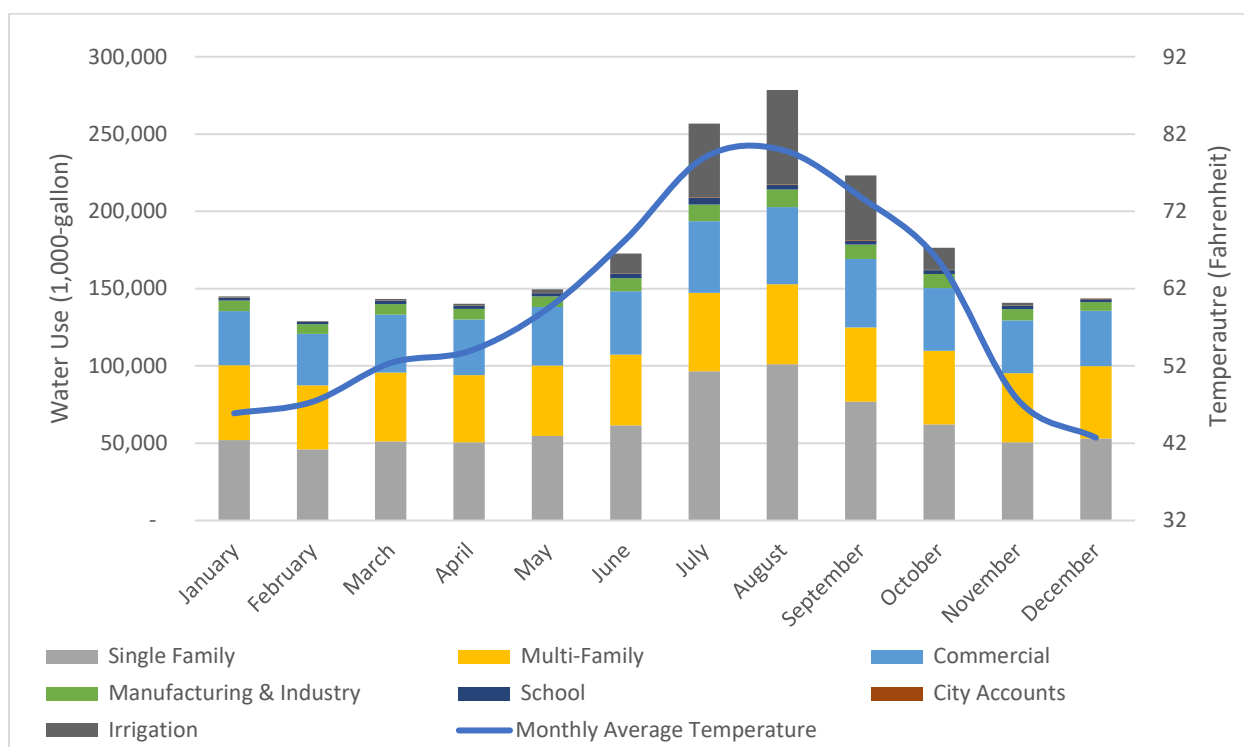
The last row of **Table 2-10** provides the calculated PHD to MDD factor, which normalizes the historical data to compare between years. The calculated PHD factor remained consistent at 1.61 between 2015-2022. Due to this consistency, the City has elected to use the PHD factor of 1.61 in future demand projections.

2.3.4 Seasonal Variations

The pattern of water consumption differs between the customer classifications. Water use increases significantly during the summer when daylight hours are longer, and lawn and landscape watering is prominent. Other outdoor uses, including car washing, pools, and recreation, are also at their highest during summer months.

Figure 2-4 presents the effect that temperature has on water usage by comparing 2022 monthly consumption data per customer classification to the average monthly temperature.

Figure 2-4 | Temperature Effects on Water Usage in 2022



As seen in **Figure 2-4**, SFR and irrigation customers show a significant peak in total consumption during the summer months. Other customer classifications show a smaller similar peak during these months. MFR customers do not show a significant peak during summer monthly because City's policy dictates the use of separate irrigation accounts for all non-SFR accounts. These monthly variations can be used to target water use efficiency efforts and/or to project future water-use patterns for planning purposes.

2.4 Distribution System Leakage

Distribution System Leakage (DSL) represents the difference between production and documented water use (retail, wholesale, and authorized unmetered). It may include inaccurate master and service connection meters, unaccounted-for non-revenue water use, pipeline leakage, and unauthorized use. DSL does not include authorized water usage such as water used for fire protection, flushing, construction, and other

maintenance and operations practices. However, to be credited, this must be accounted for by metering or estimating using credible means.

DSL is calculated as the difference between the total amount of water produced and the sum of water sold and authorized unbilled water usage. DOH requires the three-year average DSL to be under 10 percent to minimize water waste.

The City's estimated DSL for 2015 through 2022 is presented in **Table 2-11**. Revised DSL values have been provided to DOH for 2020, 2021 and 2022 that are lower than the values presented in **Table 2-11**. However, the revised values are not utilized for projections, as the revisions were made after the demand projections and system analysis were completed. Since the values used for demand projections and system analysis are slightly higher than the revised values, the projections are slightly more conservative than would have been necessary otherwise.

Table 2-11 | Historical Distribution System Leakage

	2015	2016	2017	2018	2019	2020	2021	2022
Total Water Supply ¹ (MG)	2,765	2,808	2,506	2,464	2,410	2,313	2,443	2,395
Billed Consumption ² (MG)	2,616	2,676	2,374	2,433	2,251	2,175	2,266	2,214
Authorized Non-Billed Consumption (MG)	7	4	6	13	7	4	5	5
Total Authorized Consumption (MG)	2,623	2,679	2,380	2,446	2,257	2,179	2,271	2,219
DSL (MG)	142	128	126	18	153	133	172	176
Annual Percent DSL	5.1%	4.6%	5.0%	0.7%	6.3%	5.8%	7.1%	7.4%
3-Year Rolling Average (Percent)	6.8%	5.1%	4.9%	3.4%	4.0%	4.3%	6.4%	6.7%
3-Year Rolling Average (MG)	183	139	132	91	99	101	153	161

Notes:

1. From **Table 2-7**.
2. From **Table 2-3**.

For the City's water system, the total three-year rolling average DSL ranged from 3.4 percent to 6.8 percent of the total production meeting DOH requirements and the City's goal. The City's annual average DSL over the period was 5.2 percent. During this period the City maintained a DSL below 10 percent on an annual basis, which is an improvement from the last planning period. Abnormally high authorized non-billed consumption was recorded in 2018 due to unidirectional flushing for the Valley Service Area. Starting in 2021, the billed consumption was updated to track hydrant water used during construction.

The City is committed to maintaining a 3-year rolling average DSL below 10 percent and actively works to identify and eliminate DSL throughout the system through its ongoing leak detection, meter calibration, and repair and replacement programs for water system infrastructure, as detailed in **Chapter 6 – Operations and Maintenance**. Additionally, the City has maintained efforts to reduce non-payment bills and water theft.

2.5 Water Supply Characteristics

The City has a diverse water supply consisting of two springs, ten wells and an emergency intertie with the City of Tacoma; refer to the Existing Facilities Figure provided in **Chapter 1 (Figure 1-3)**. The City's aquifer characteristics are described in several sources; this section draws mainly from the Conceptual Mitigation Plan (CMP) for Water Right Application G1-28404, provided in **Appendix S**.

Wells 1, 2, 3A, 3B, 4, 6, and 7 are in the lower alluvial aquifer in the Auburn Valley, referred to as the Valley Wellfield. This wellfield is mostly confined by the Osceola Mudflow, an important aquitard in the Auburn Valley depicted in Figure 4 of the CMP. Groundwater discharge from the upland aquifers is the primary source of recharge to the lower alluvial aquifer, which hosts all the City's wells. Groundwater generally moves upward in the valley aquifers and moves horizontally at approximately one to four feet per day. Alluvial groundwater from the White River also recharges the Green River alluvial aquifer. Groundwater in the vicinity of Wells 2, 6, and 7 discharges into the Puget Sound via the Green River and the Duwamish River valley. Wells 2, 6, and 7 are located northeast of downtown Auburn and collectively referred to as the Fulmer Wellfield. Wells 1, 3A, 3B, and 4 are in the White River Drainage Basin and Wells 2, 6, 7 and West Hill Springs are in the Green River Drainage Basin.

Wells 3A, 3B and 7 are not currently in use due to high manganese concentrations, however the City plans to install manganese treatment at each of these facilities to bring them back online. The City has a pending water right application for 13,443 acre-feet per year from the existing Wells 6 and 7 and a future Well 8. The City has sufficient water rights to meet current demands, 10-year, and 20-year demand projections, as shown in the Water Rights Self-Assessment Form provided in **Appendix I**. Mitigation obligations due to the proposed water right for Wells 6, 7, and 8 are listed below and are described in detail in the CMP:

- Mitigation of impacts to Green River,
- Mitigation of impacts to White River, and
- Mitigation of impacts to Mill Creek.

Wells 5, 5A, and 5B are in the Upland Wellfield and constructed within the Lakeland Service Area. The upland aquifers are recharged through precipitation and leakage from Lake Tapps and discharge into the White River system. Once Well 5B came online, the City discovered that the aquifer was not recovering. Well 5B has been offline since 2006. The safe yield of Wells 5 and 5A have been decreased from their design capacity due to a drop in the aquifer's capacity. Specific information on the individual wells and their associated water rights are provided in **Section 3.4.1**.

West Hill Springs draws from an unnamed confined aquifer. The spring source water flows by gravity into the Valley Service Area, although flows vary depending on aquifer conditions, and discharges into Mill Creek, which flows into the Green River.

Coal Creek Springs is the largest active water supply for the City and draws from a confined aquifer, however its flow varies depending on aquifer conditions. Coal Creek Springs collection system is located at the base of Lake Tapps Upland and is in the White River Drainage Basin. Further aquifer details are provided within the Wellhead Protection Program (WHPP) provided as **Appendix T**.

The City also owns two additional wells: the Algona Well 1 and the Braunwood Well. Algona Well 1 was acquired by the City in 1996 but has since been taken offline due to operational issues.

The City plans to use a groundwater flow model being developed by the USGS to predict potential impacts to surface water.

2.6 Water Supply Reliability Evaluation

The City's active water sources have maintained current production capacities and are deemed reliable, as they have back-up power sources available. The production of some water sources is limited by pump or intake capacity, as mentioned in **Section 2.5**, however all production is managed to be within available water rights and is managed by the physical capacity of each facility as summarized in **Table 2-12**.

Table 2-12 | Summary of Source Water Pumping or Production Capacity Compared to 2022 Maximum Daily Production

Source	Service Area	Pumping/Production Capacity (gpm)	Maximum Daily Production ¹ (gpm)
Well 5	Lakeland	760	640
Well 5A	Lakeland	180	180
Well 5B	Lakeland	-- ²	--
Well 1	Valley	2,100	2,100
Well 2	Valley	1,600 ⁴	1,470
Well 3A	Valley	-- ²	--
Well 3B	Valley	-- ²	--
Well 4	Valley	2,600	1,796
Well 6	Valley	1,800	1,777
Well 7	Valley	-- ²	--
Coal Creek Springs	Valley	3,500 ³	4,383
West Hill Springs	Valley	600	563
Algona Well 1	--	-- ²	--
TOTAL		13,140	12,909

Notes:

1. Maximum daily production per source is the maximum production rate recorded in 2022.
2. The facility is currently offline. No production capacity is available without facility improvements.
3. Water rights for Coal Creek Springs allow for a Qi of 6,732 gpm. 3,500 gpm is the typical historical production capacity limitation experienced. The City is currently investigating the possible factors influencing the feasible withdrawal from this source.
4. The pump at Well 2 was replaced in 2023 and now has a capacity of 1,115 gpm.

Calculations presented in the Water Rights Self-Assessment Form (**Appendix I**) conclude that the City's existing water rights are anticipated to be adequate to meet the current, 10-year, and 20-year projections for maximum instantaneous flows (Qi) and total annual withdrawal (Qa).

However, the City does not have the infrastructure required to withdraw from all water sources, and some sources have underlying production restrictions that require further evaluation. Several facility improvement projects are required to maximize production and obtain the full water rights. Furthermore, potential demand from LMWD was not included in the assessment, as they have an interruptible wholesale agreement with the City which is a secondary priority to the City's demand. Currently, the City's interties with the City of Tacoma provide additional wholesale water for purchase if necessary to meet demands, however the City has not purchased water from Tacoma since 2016.

The City has established a policy of maintaining the capability to supply the MDD while the largest water source is out of service. The system analysis documented in **Chapter 3** confirms that with projected demands over the 20-year planning period, the City will maintain the capability to meet MDD if the largest pumping source is out of service. This evaluation includes the Tacoma interties as available sources to meet this need and excludes the capacity of facilities that are offline or not operational.

Of the twelve sources, only Wells 5 and 7 are currently without a standby power source. Standby power will be added to Wells 5 and 7 as part of CIP projects discussed in **Chapter 8**. The Fulmer Field Corrosion Control Treatment Facility has backup power.

The Game Farm Park Pump Station, Lea Hill BPS, and Intertie Pump Station are the only pump stations without a standby power source or connection. Backup power will be added to the Lea Hill BPS and the Intertie Pump Station as part of a capital projects discussed further in **Chapter 8**. The Game Farm Park Pump

Station is a small facility that serves a recreational area and does not serve residential or commercial properties, therefore back-up power is not a critical element.

2.6.1 Use Impacts on Instream Flows

New water right appropriations in the Green-Duwamish Basin are subject to instream flow (ISF) regulations as described in the CMP and WAC 173-509. These ISF are senior to the City's recent water rights application G1-28404. This requires mitigation for potential impacts to the Green River when instream flows are not met, such as predicting when streamflow will drop below ISFs as well as determining the lag time associated with impacts to instream flows from groundwater withdrawals. The CMP includes the following detailed description of the streamflow characteristics:

"A review of historical streamflow data indicates that on average streamflow's are below the ISFs at the Auburn gauge approximately 20 percent of the time (Table 3). Streamflow's are generally more often below the minimum ISFs during the summer months, falling below the minimum ISFs 35 percent to 61 percent of the time between June and September. The flows are frequently above the minimum ISFs during the spring and winter months but can drop to below ISFs at any time of the year. For example, in April, streamflow falls below the minimum ISFs approximately 3 percent of the time (4.1.2)."

The City's current rights are senior to the instream rights and therefore not effected by the instream flow limitations, however as stewards of the watershed, the City has an aggressive water use efficiency program described in **Chapter 4** meant to limit the volume of withdrawals, especially during the dry season. The City has a minor surplus of both annual volume withdrawn (Qa) and maximum instantaneous flow rate withdrawn (Qi) to meet MDD through the 20-year planning period. However, several facility improvements are required to make the withdrawals feasible.

2.6.2 Wholesale Interties

The City has three wholesale interties, described below and in further detail in **Section 1.6.2**.

City of Algona

The City has supplied water to Algona on a regular basis since 1996, when interlocal agreement IA3 was negotiated. A superseded agreement, IA3A, was negotiated in October 2002 which reflects the current status. The agreement will remain unless terminated by mutual agreement of the City and Algona. Currently, Algona is served through the metered Boeing Welded Duct Intertie and by two eight-inch, manually operated meter stations located at Boundary Boulevard and Industry Drive North, and at Boundary Boulevard and Milwaukee Avenue.

LMWD

An intertie between the City and LMWD was constructed in 1996 as part of IA2 to enable LMWD to purchase water from the City. The manually operated intertie also allows the City to provide an emergency supply to Kent's East Hill Service Area. The City agreed to provide up to 2.5 MGD average day and 5.0 MGD maximum day use. A provision of the agreement calls for LMWD to send an emergency supply of water to

the City when needed for the Lea Hill Service Area. The IA2 agreement also included several improvements to allow delivery of water:

- The Green River Pump Station and pipelines to deliver additional water into the Lea Hill Service Area
- The Intertie Pump Station and pipelines to deliver water from the Lea Hill Service Area to LMWD
- Construction of two additional wells (Wells 6 and 7).

LMWD discontinued regular purchase of water from the City in 2017 per the amendment to IA2, however LMWD still maintains the intertie with the City to use as a wholesale water supply on an as-needed basis. This interlocal agreement has a term of sixty years, commencing in 2017.

City of Tacoma

In 2012, Tacoma agreed to provide water to the City in the quantity of up to 1.0 MGD average day use, 1.8 MGD peak day use, and 1.62 MGD four-day peak use. Two interties were constructed to supply the City's Valley pressure zone: located at 3200 B Street NW and 29600 132nd Avenue SE in Auburn. In 2014, Tacoma amended and restated the 2012 agreement with the City to provide a total of 3.5 mgd (2,430 gpm) of average use and 5.12 mgd (3,555 gpm) of peak use from the interties. The B Street NW remotely operated intertie is limited to a maximum flowrate of 2,200 gpm and the 132nd Avenue SE Intertie is limited to a maximum flowrate of 4,500 gpm. However, the combined use of the interties cannot exceed 5.12 mgd (3,555 gpm) in a 24 hour period. This agreement will remain in force as long as the City of Tacoma remains in the business of providing water, however the City has not purchased water for consumption from the City of Tacoma since 2016.

2.6.3 Emergency Interties

Emergency interties are an important tool that helps water utilities increase reliability and respond to emergencies. The City has emergency interties with seven water systems, as described in **Section 1.6.2** and summarized in **Table 1-3**.

2.6.4 Potential Interties

The City has an interest in acquiring additional interties that would enhance the reliability of water service in the City and among adjacent purveyors. Tacoma Public Utilities constructed the Second Supply Pipeline Project, which runs through the north end of the City's RWSA between 30th and 37th Streets NE. In addition to the B Street NW and 132nd Avenue SE interties, a third turnout was constructed as part of the pipeline project in the Valley Service Area. The City does not currently plan to develop this turnout but may do so in the future.

2.7 Future Population Projections and Land Use

2.7.1 Demographic Forecast

Demographic forecasts provide an estimate of future population and employment. The City is a member of the Puget Sound Regional Council (PSRC), which develops demographic analyses for the central Puget Sound region (King County, Kitsap County, Pierce County, and Snohomish County). The demographic projections are developed based on local planned development capacities and regional policies adopted by the PSRC Vision 2050. Vision 2050 established the region's strategy for accommodating population and employment growth to maintain the high quality of living, economic prosperity, and a healthy environment

through the year 2050. Through this planning process, the City is required to plan for a specific number of additional housing units and jobs.

Consistent with the Washington State Growth Management Act (GMA), the City uses the Vision 2050 growth values as the basis of the demographic projections.

Demographic projections are based on the PSRC's 2044 forecasts for housing, population, and employment for each Transportation Analysis Zone (TAZ) within the City's RWSA, as the City's policy is to serve all customers within its RWSA. Additional information on the City's existing land use, future zoning, demographic projections, and corresponding rates of growth are detailed in this Section.

2.7.2 Future Land Use and Zoning

Land use and zoning regulations provide important information in determining future water requirements. Land use and zoning determines the area available for various types of development including both SFR and MFR development, as well as commercial and other types of land use that provide the economic base necessary to support residential development. The housing, population and employment projections developed for the 2024 Periodic Comprehensive Plan are based on the employment and housing targets provided by King and Pierce counties that the City must accommodate over the 20-year planning horizon. This consistent approach is encouraged by the Washington State GMA and should result in predictable and stable land uses over longer planning periods.

Future land use and zoning designations for the City's RWSA are shown on the Comprehensive Zoning Map provided as **Figure 2-5**. Land uses in unincorporated King County which are part of the RWSA, but beyond City limits are anticipated to remain consistent with current designations, as the current land use designations reflect the intended long-range use of land for the 20-year planning horizon in the current Comprehensive Plan; additional data for future land use designation for unincorporated King County are not currently available. Zoning designations implement the land use identified in the City's Comprehensive Plan; therefore, the current land use reflects the City's historical zoning. House Bill 1337 and House Bill 1110, both effective as of July 2023, are geared at expanding housing options. As such, the City has adopted future zoning to allow for accessory dwelling units within areas previously dedicated to single-family detached housing. **Table 2-13** summarizes the updating zoning designations and fire flow requirements. Note that the required fire flow in some zoning designations will be determined on a case-by-case basis pending development or re-development type. Fire flow requirements for portions of the RWSA located in unincorporated King County are also captured in **Table 2-13**.

Three of the updated residential zoning designations presented in **Table 2-13** allow for Accessory Dwelling Units (ADUs). Policies related to ADU water service metering and connection fees are included in **Appendix A**. The demographic population projections are expected to be sufficient to account for growth that is realized by the additional ADUs within the service area. The demographic population projections are discussed in **Section 2.7.3** and demand projections are discussed in **Section 2.8.2**. Required fire flow for ADUs will be determined on a case-by-case basis pending development or re-development type.

The City includes a wide range of residential, commercial, institutional, and industrial land uses. Public and quasi-public land uses include parks, open space, and public recreation as well as institutional uses such as schools. Commercial and industrial uses occur primarily in the Valley Service Area; however, large areas of residential land use and the Downtown Urban Center (DUC) also exist in the Valley Service Area.

The Academy and Lakeland Service Areas are primarily residential, although some commercial zoning is located along Auburn Way South (SR 164) in the Academy Service Area. The Lea Hill Service Area is also

primarily residential although other uses include small amounts of commercial and open space, and Green River College.

Areas within the RWSA, but outside the City limits, are governed by King County zoning. Land use was assumed to be consistent with zoning in these areas. The area in the northwest corner of the RWSA, west of SR167 and north of S 287th Street is zoned for Agriculture. A second area is located near Auburn Narrows State Park, which is north and west of SR18. This area includes Rural Residential, as well as Park and Greenbelt zoning. The City does not currently provide service in this area; however, it is willing to provide service to customers meeting the Service Area Policies. There are two additional unincorporated “pockets” of urban residential zoning within the RWSA that the City currently serves, where the southern area also contains a single parcel of Industrial zoning. The King County zoning was used in the demographic analyses.

Table 2-13 | Updated Zoning Districts and Fire Flow Requirements

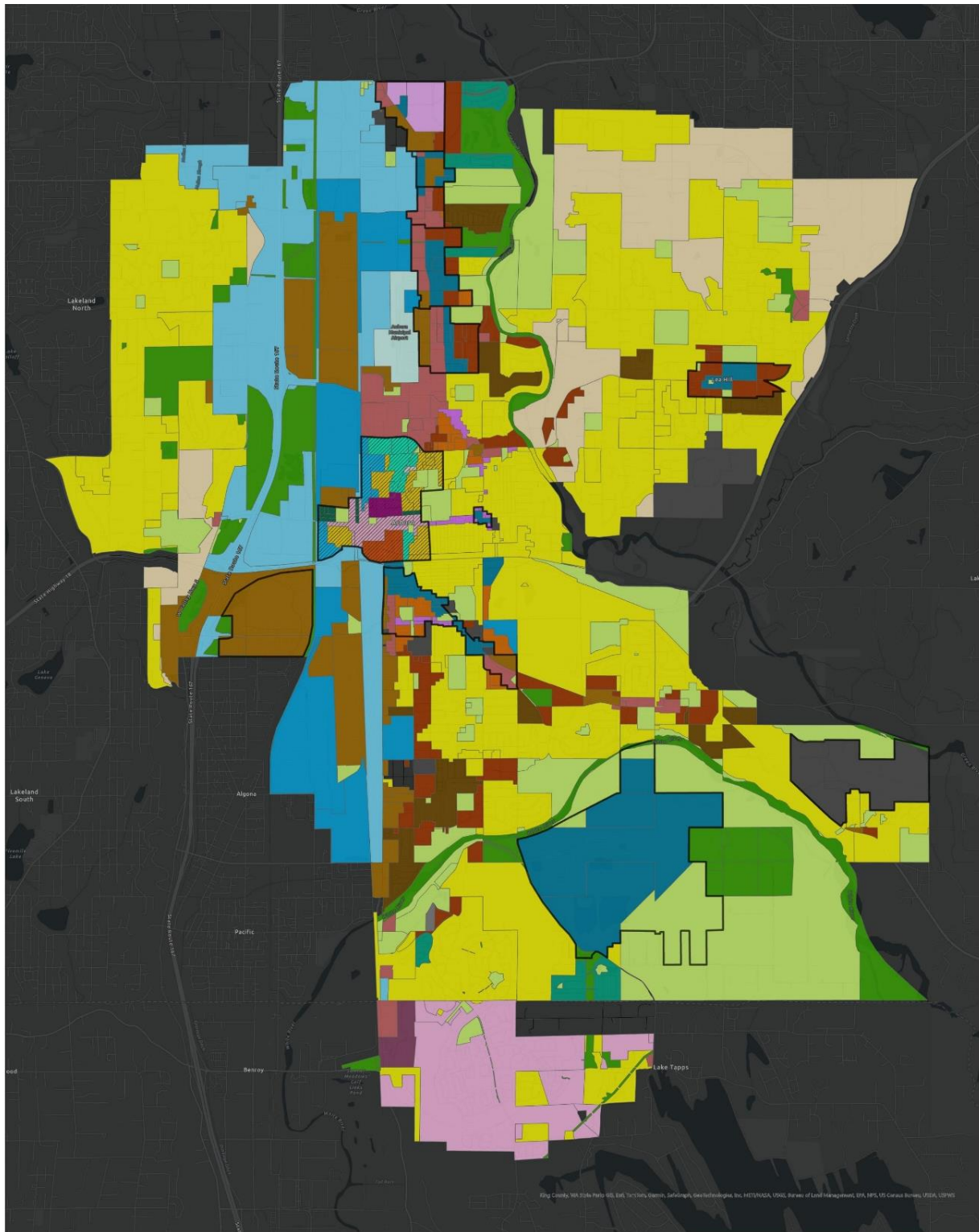
Zoning District	Land Use	Definition	Fire Flow Requirement (gpm)
RC RESIDENTIAL CONSERVANCY	Residential Conservancy	No change	1,500
R-1 RESIDENTIAL 1 DU/ACRE	Neighborhood Residential One	No change	1,500
R-10 PLUS ¹	Neighborhood Residential Two	Single family, townhouse, duplex, triplex, fourplex, two-story stacked flats, cottage housing-4-6 units/lot ADUs	1,500 - 2,500
R-16 PLUS	Neighborhood Residential Two	R-10, plus five-plex, six-plex, 3 story stacked flats, courtyard apartments, apartment buildings and mixed use up to 20 units ADUs	2,500
R-20 PLUS	Neighborhood Residential Three	R-16 plus apartment buildings, and mixed use over 20 units ADUs	2,500
R-NM NEIGHBORHOOD MIXED-USE	Mixed Use	R-16 and C-1 Uses + Mixed-use (horizontal or vertical) encouraged	2,500
R-MHC RESIDENTIAL MANUFACTURED/MOBILE HOME COMMUNITY	Neighborhood Residential Three	No change	2,500
RO RESIDENTIAL OFFICE	Mixed Use	Smaller scale R-NM with emphasis on conversion of existing structure	2,500
C-1 LIGHT COMMERCIAL DISTRICT	Commercial	Generally the same as existing	2,500
C-2 HEAVY COMMERCIAL DISTRICT	Commercial	Generally the same as existing	2,500
AUBURN GATEWAY DISTRICT	Mixed Use	North Auburn Subarea Use	2,500
M-1 LIGHT INDUSTRIAL DISTRICT	Industrial	Generally the same as existing	2,500
M-2 HEAVY INDUSTRIAL DISTRICT	Industrial	Generally the same as existing	2,500
AIRPORT ZONE	Industrial	No change	2,500
P1 PUBLIC USE DISTRICT	Public/Quasi-Public	Public schools, recreational spaces, police stations, fire stations, cemeteries	2,500

Zoning District	Land Use	Definition	Fire Flow Requirement (gpm)
I INSTITUTIONAL USE DISTRICT	Public/Quasi-Public	Private schools, Green River College, large campus development	2,500
OS OPEN SPACE	Open Space	No change	-
DUC - DOWNTOWN URBAN CENTER 125	Downtown Urban Center	DUC with up to 125-ft tall buildings where permitted	2,500
DUC - DOWNTOWN URBAN CENTER 75	Downtown Urban Center	DUC with up to 75-ft tall buildings where permitted	2,500
DUC - DOWNTOWN URBAN CENTER 55	Downtown Urban Center	DUC with up to 55-ft tall buildings where permitted	2,500
DUC - NEIGHBORHOOD RESIDENTIAL	Downtown Urban Center	Mixed-use and R-15	2,500
DUC - HEALTH AND WELLNESS 125	Downtown Urban Center	R-OH-MultiCare Zone	2,500
DUC - FLEX RESIDENTIAL	Downtown Urban Center	RO with permitted specific industrial uses (craft workshops, breweries, coffee, etc.)	2,500
LAKELAND HILLS SOUTH SPECIAL PLAN AREA – PUD ¹	Neighborhood Residential Two		1,500-2,500
AIRPORT LANDING FIELD DISTRICT	Industrial		2,500
AUBURN GATEWAY DISTRICT	Mixed Use		2,500
DUC - I INSTITUTIONAL	Downtown Urban Center		2,500
DUC - M-1 LIGHT INDUSTRIAL	Downtown Urban Center		2,500
I INSTITUTIONAL	Public/Quasi-Public		2,500
PLANNED UNIT DEVELOPMENT DISTRICT ¹		Varies by location	1,500-2,500
TERRACE VIEW DISTRICT	Commercial		2,500
UNCLASSIFIED USE DISTRICT ¹		Varies by location	1,500-2,500
A-10	Agricultural	1 Dwelling Unit per 10 acres, located in unincorporated King County.	1,500
RA-5	Rural Area	1 Dwelling Unit per 5 acres, located in unincorporated King County.	1,500
R-1	Residential	1 Dwelling Unit per acre, located in unincorporated King County	1,500
R-4	Residential	4 Dwelling Units per acre, located in unincorporated King County	1,500

Note:

1. Required fire flow will be determined on a case-by-case basis pending development or re-development type.

Figure 2-5 | Comprehensive Future Land Use and Zoning Map



V1NewZone	DUC - DOWNTOWN	M-2 HEAVY INDUSTRIAL	R-10 PLUS	R-1 RESIDENTIAL OFFICE	DUC - NEIGHBORHOOD
AIRPORT LANDING FIELD DISTRICT	I INSTITUTIONAL	O5 OPEN SPACE	R-16 PLUS	TERACE VIEW DISTRICT	DUC - R-1 LIGHT INDUSTRIAL
AUBURN GATEWAY DISTRICT	LAKELAND HILLS	P1 PUBLIC USE	R-20 PLUS	UNCLASSIFIED USE DISTRICT	DUC - C-1 LIGHT COMMERCIAL
SOUTH SPECIAL PLAN AREA - PUD	SEA HILL OVERLAY	PLANNED UNIT DEVELOPMENT DISTRICT	R-MHC RESIDENTIAL	WEST HILL OVERLAY	DUC - C-2 HEAVY COMMERCIAL
C-1 LIGHT COMMERCIAL	M-1 LIGHT INDUSTRIAL	R-1 RESIDENTIAL 1 DU/ ACRE	MANUFACTURED MOBILE HOME COMMUNITY	DUC - DOWNTOWN URBAN CENTER 75	DUC - FLEX RESIDENTIAL
C-2 HEAVY COMMERCIAL			RC RESIDENTIAL CONSERVANCY		

DUC - HEALTH AND WELLNESS 125	Comp Plan Growth Centers
DUC - DOWNTOWN URBAN CENTER 125	Comp Plan Growth Centers
R-NM NEIGHBORHOOD MIXED-USE	Comp Plan Growth Centers
DUC - DOWNTOWN URBAN CENTER 55	Comp Plan Growth Centers
DUC - I INSTITUTIONAL	Comp Plan Growth Centers



2.7.3 Projected Demographic Growth

Many factors influence population growth including the state of the economy, interest rates, annexation of adjacent areas, and up-zoning for new development. Growth management policies, along with coordination between local governments, should make development more predictable and growth projections more accurate than they have been historically. The City's Comprehensive Plan, as well as this Plan, are key documents to aid the City in preparing for the predicted growth. However, it is common for actual growth rates to vary from those predicted. In addition, growth rates will vary between various parts of the City based on the availability of services and the costs to develop for the zoned use.

Housing, population, and employment projections were used to calculate rates of growth. PSRC's Vision 2050 requires the City to plan for a given number of additional housing units and jobs. The demographic projections for population and employment were allocated based on water meter locations within the four Water Service Areas that comprise the RWSA. Population projections extending beyond the RWSA boundary were modified or eliminated and are not included in the projections.

2.7.3.1 Demographic Projections

Existing and future demographic projections consistent with the City's GMA goals were provided by the City for 2021 and 2044. City planning provided projections of housing, population, and employment growth based on TAZ data. The intermediate 10-year planning horizon (2034) was interpolated assuming consistent compounding growth across the planning period.

The projections were further delineated by Service Area, as growth is expected to vary due to zoning, availability of vacant or re-developable land, existing and proposed infrastructure, etc. Demographic growth rates, rather than total number of people or employed people, were used to develop demand projections. The resulting demographic growth rates as a compounding annual percentage are presented in **Table 2-14**. Total population is projected to annually increase by 1.5 percent from 2021 to 2044 and total employment is projected to increase by 1.9 percent annually over the same period. Overall, the City is planning for an additional 24,987 people and 20,525 employed people by 2044 within the RWSA.

Table 2-14 | Growth Rates by Customer Class and Service Area

	Total Growth from 2021 to 2044 (Housing Units/Population)	Total Growth from 2021 to 2044 (%)	Annual Average Compounding Growth (%)
Single-Family Unit Projections			
Lea Hill	201	5.9%	0.248%
Valley	275	5.3%	0.223%
Lakeland	534	27.0%	1.043%
Academy	436	36.3%	1.355%
Multi-Family Unit Projections			
Lea Hill	254	12.6%	0.518%
Valley	7,862	77.1%	2.515%
Lakeland	1,003	55.7%	1.943%
Academy	124	10.4%	0.433%
Population Projections			
Lea Hill	1,245	8.2%	0.343%
Valley	18,009	44.1%	1.602%

	Total Growth from 2021 to 2044 (Housing Units/Population)	Total Growth from 2021 to 2044 (%)	Annual Average Compounding Growth (%)
Lakeland	4,113	39.4%	1.456%
Academy	1,621	24.6%	0.962%
Employment Projections			
Lea Hill	484	30.6%	1.168%
Valley	18,692	43.8%	1.586%
Lakeland	171	31.1%	1.172%
Academy	1,178	77.8%	0.316%

Table 2-15 summarizes the calculated demographic projections for population or employment projections by Service Area for each category when applying the growth rates from **Table 2-14**.

Table 2-15 | Population and Employment Projections Calculated by Service Area

	2024	2034	2044
Single-Family Population			
Lea Hill	10,498	10,864	11,243
Valley	19,889	23,315	27,330
Lakeland	4,394	5,077	5,866
Academy	5,009	5,512	6,066
Subtotal	39,789	44,767	50,505
Multi-Family Population			
Lea Hill	5,341	5,527	5,719
Valley	25,203	29,544	34,633
Lakeland	3,454	3,991	4,612
Academy	1,535	1,689	1,859
Subtotal	35,533	40,752	46,824
Total Population			
Lea Hill	15,839	16,391	16,962
Valley	45,092	52,859	61,964
Lakeland	7,848	9,068	10,478
Academy	6,544	7,201	7,925
Subtotal	75,323	85,519	97,328
Employment			
Lea Hill	1,720	1,932	2,170
Valley	46,946	54,948	64,313
Lakeland	596	669	752
Academy	1,605	1,656	1,709
Subtotal	50,867	59,205	68,944

The demographic growth for each Service Area is shown in **Figure 2-6**, **Figure 2-7**, and **Figure 2-8**, where single family population, multi-family population, and employment population growth are each presented in a different graph. The figures show the anticipated variability in growth between the Service Areas. For example, employment growth rate (percentage) is projected to be greater in the Valley Service Area than the other Services Areas between 2024 and 2044. Since the Valley Service Area has a much greater magnitude of population and employment than the other Service Areas, minor differences in growth projection percentages results in larger increases in total population and employment numbers. The Valley

Service Area is projected to represent 64 percent of the system’s population and 93 percent of the system’s employment in 2044.

Figure 2-6 | Single Family Population Projections by Service Area

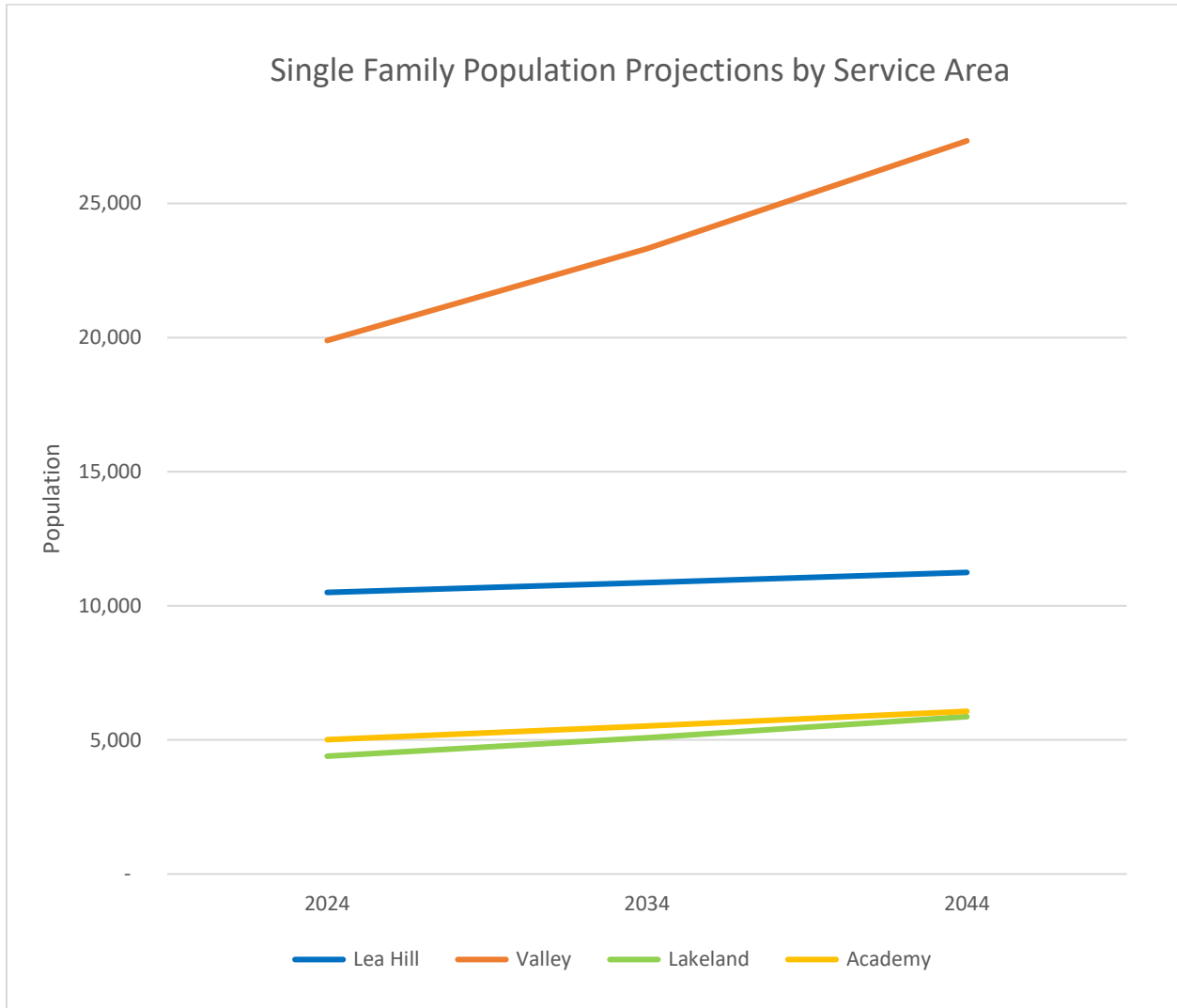


Figure 2-7 | Multi-Family Population Projections by Service Area

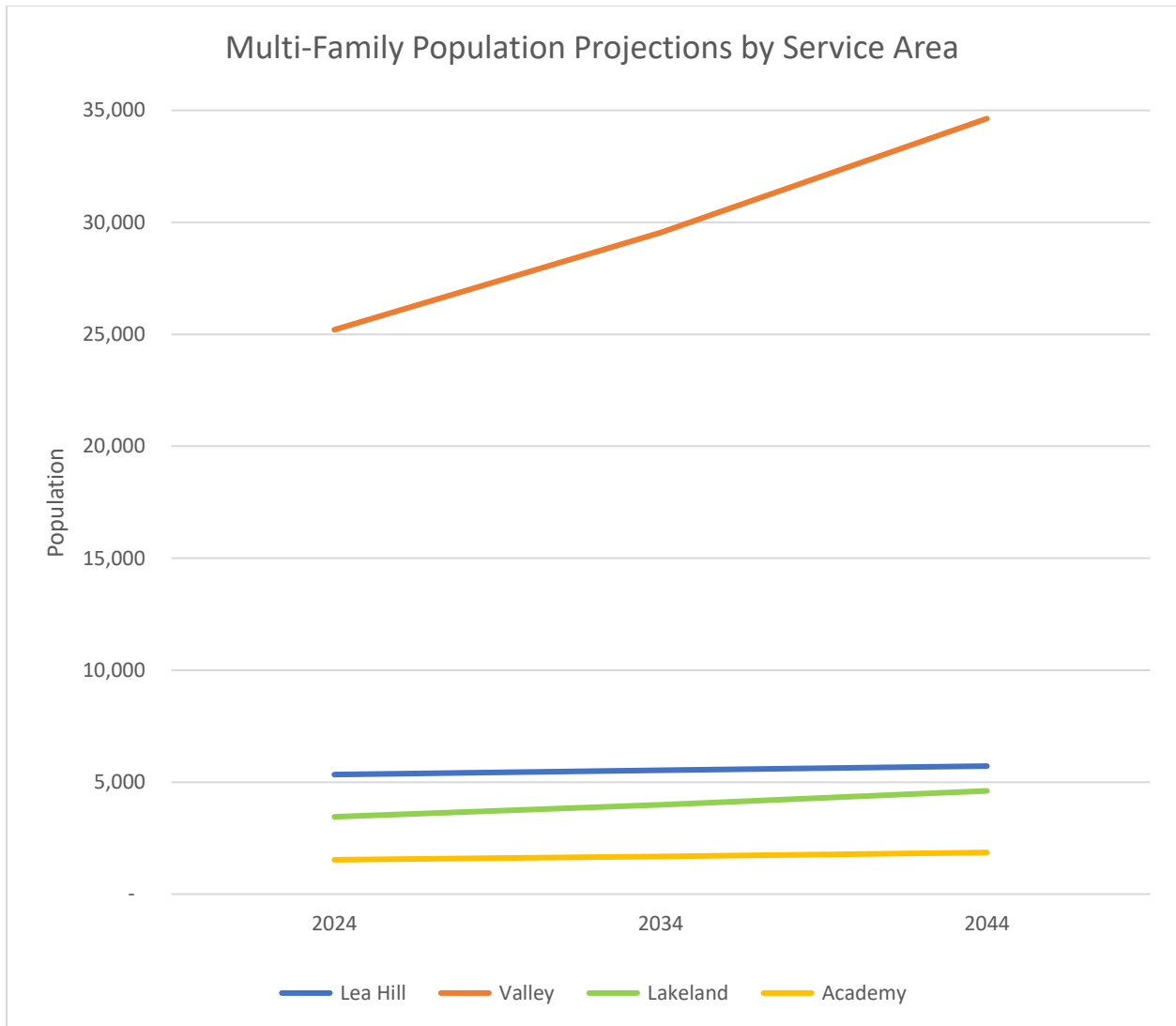
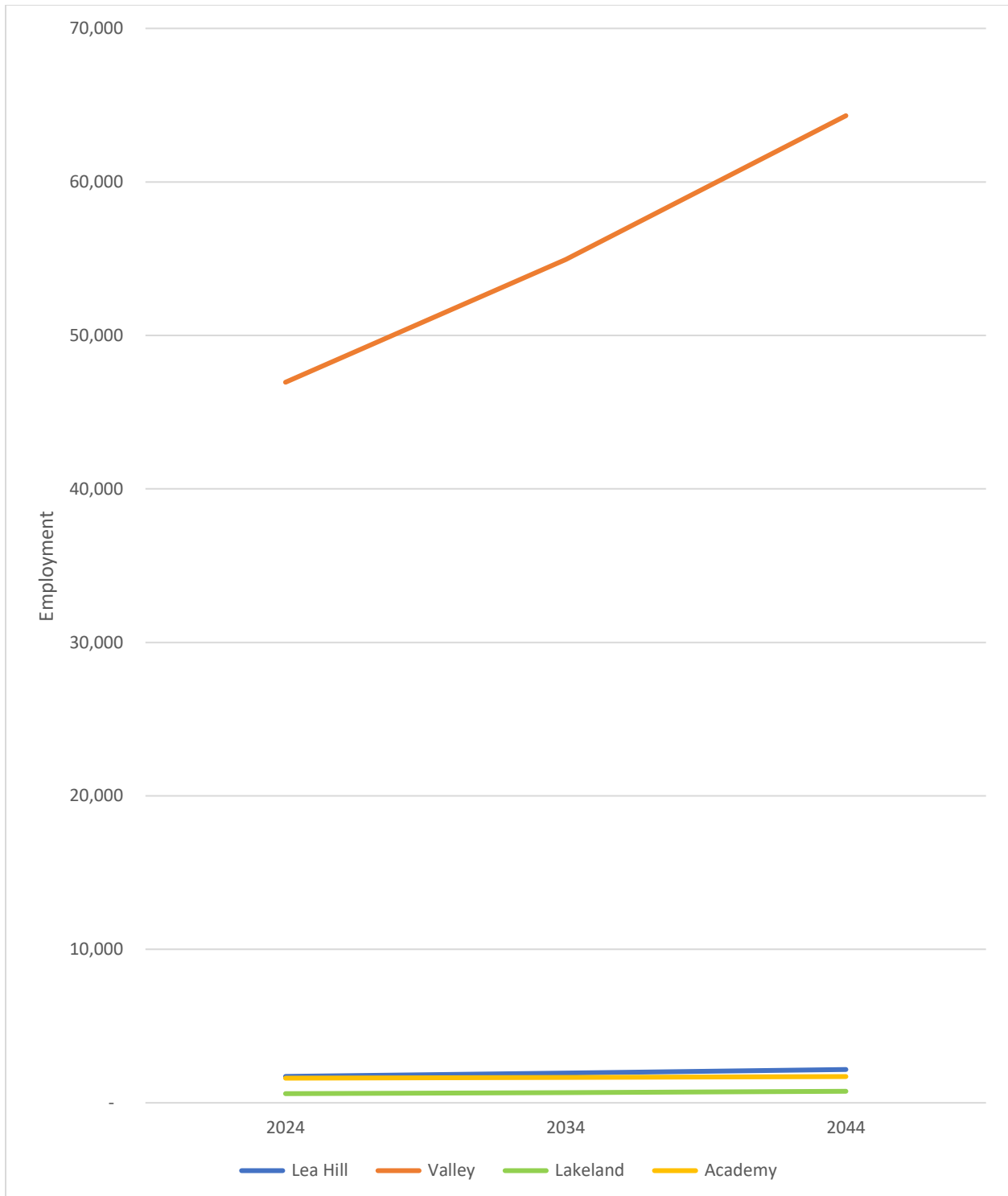
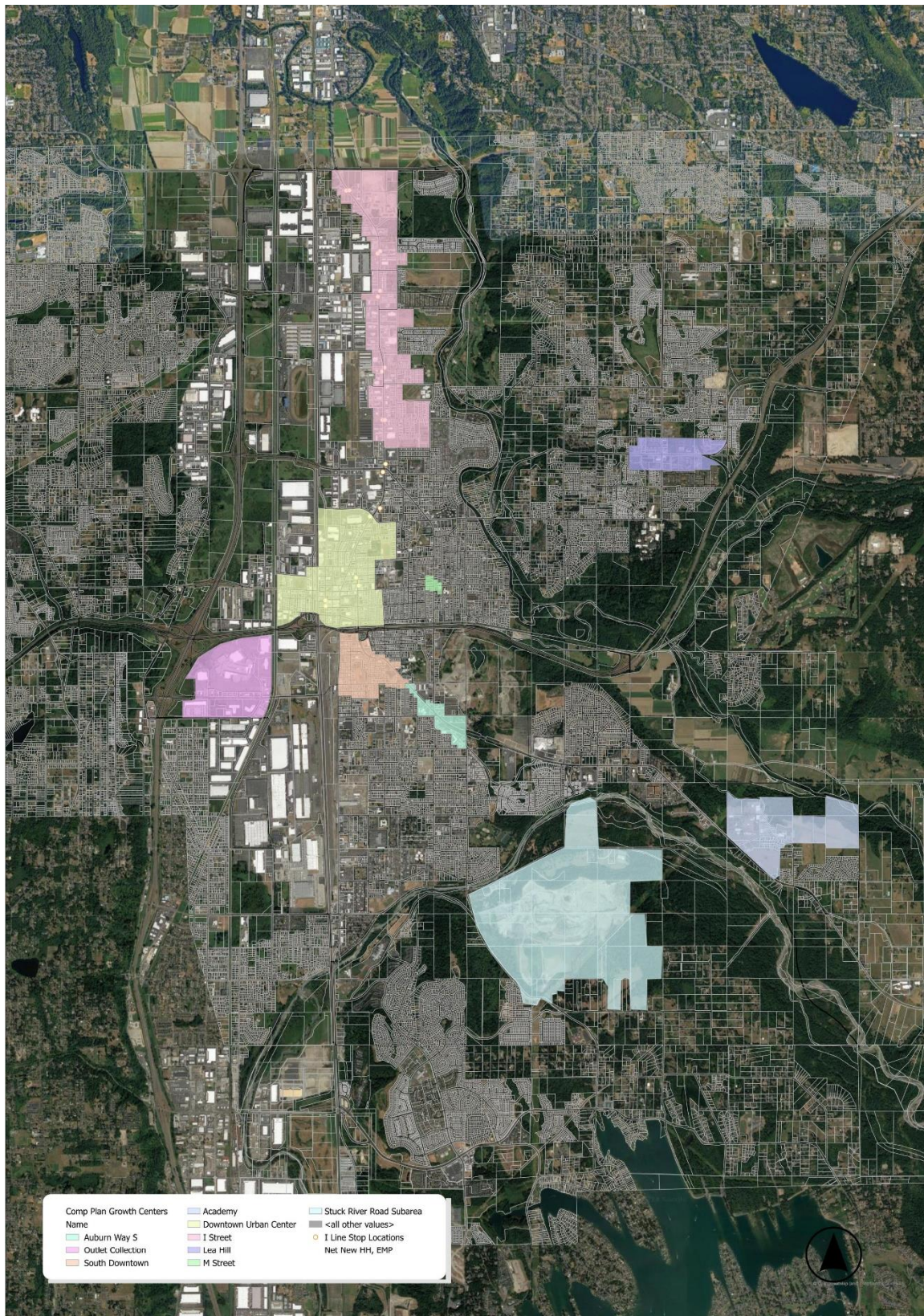


Figure 2-8 | Employment Projections by Service Area



Areas anticipated to have higher than average population and employment growth through 2044, termed “Growth Centers” identified in the City’s Comprehensive Plan, are presented in **Figure 2-9**. Demand in each Service Area was modified during the system analysis to reflect focus growth in the areas identified in **Figure 2-9**, matching the population and employment growth projection data.

Figure 2-9 | Map of Projected Areas with Greatest Population Growth



2.8 Future Water Demand

2.8.1 Projected Number of Connections

The number of water connections was used in determining the ERU, ADD, and MDD projections. The number of water connections in the future was projected using the demographic growth rates presented in **Table 2-14** and the number of existing water accounts presented in **Table 2-2**. The projected future connections by both Service Area and customer classification are presented in **Table 2-16**.

- The respective housing unit growth rates for each Service Area were used to calculate projected SFR and MFR connections.
- The School connections were projected by multiplying the percentage of the City population aged 5-19 (22%) by population growth rates for each Service Area.
- The projected employment growth rates were used to calculate future Commercial, Municipal (City Accounts), and Irrigation connections.
- The City's largest user (Boeing) is not included in **Table 2-16**, their projections are based on individual demand and are presented separately. Boeing also accounts for the only Manufacturing and Industrial connections within the City.
- Wholesale customers are not included in **Table 2-16**, their projections are based on individual demand and are presented separately.

Table 2-16 | Connection Projections by Customer Classification and Service Area

	2024	2034	2044
Lea Hill			
Single-Family Residential	3,265	3,347	3,431
Multi-Family Residential	167	176	186
Commercial	22	24	27
Manufacturing/Industrial	-	-	-
Schools	11	11	11
Municipal (City Accounts)	1	1	1
Irrigation	61	69	78
Valley			
Single-Family Residential	5,954	6,088	6,226
Multi-Family Residential	807	1,035	1,327
Commercial	1,272	1,489	1,743
Manufacturing/Industrial	-	-	-
Schools	37	38	40
Municipal (City Accounts)	32	38	45
Irrigation	532	622	729
Lakeland			
Single-Family Residential	1,354	1,502	1,666
Multi-Family Residential	109	132	161
Commercial	34	39	43
Manufacturing/Industrial	-	-	-
Schools	9	9	9

	2024	2034	2044
Municipal (City Accounts)	-	-	-
Irrigation	21	23	26
Academy			
Single-Family Residential	1,581	1,808	2,069
Multi-Family Residential	47	49	51
Commercial	14	14	15
Manufacturing/Industrial	-	-	-
Schools	2	2	2
Municipal (City Accounts)	1	1	1
Irrigation	34	35	36
Total			
Single-Family Residential	12,153	12,745	13,391
Multi-Family Residential	1,131	1,393	1,725
Commercial	1,342	1,566	1,828
Manufacturing/Industrial	-	-	-
Schools	59	60	62
Municipal (City Accounts)	35	40	47
Irrigation	648	750	868

2.8.1.1 Lea Hill Service Area

The Lea Hill Service Area is located east of the Auburn-Kent Valley and the Green River. The area is mostly residential with supportive neighborhood businesses. Green River College is in the Lea Hill Service Area and has a concentration of multi-family residential units in the vicinity of the college.

The Lea Hill service area is projected to have the lowest growth rate in population with a 0.3 percent per year average increase from 2021 to 2044. This Service Area is projected to have a moderate growth in employment with a 1.2 percent growth per year from 2021 to 2044.

2.8.1.2 Valley Service Area

The Valley Service Area contains a significant amount of developable land designated as multi-family and commercial, including the Downtown Urban Center. The Service Area is projected to have the highest growth rate in population at 1.6 percent per year from 2021 to 2044. The multi-family connections in this area are projected to grow 2.5 percent per year from 2021 to 2044 and employment is projected to grow 1.6 percent per year. These growth projections are based on the City's anticipation of growth trends and the redevelopment of Auburn's Downtown Urban Center, as well as commercial developments in locations with available space throughout the Service Area.

2.8.1.3 Lakeland Service Area

The Lakeland Service Area includes the entire City south of the White River. A sizable portion of this Service Area is designated residential conservancy land use, which is anticipated to be developed within the planning horizon related to the anticipated closure of the Segale Gravel Pit. The area includes proposed special planning areas for Stuck River Road and Mount Rainier Vista anticipated to be developed with a moderate population growth rate of 1.5 percent per year. This Service Area is projected to have a moderate growth in employment with a 1.2 percent growth per year from 2021 to 2044.

2.8.1.4 Academy Service Area

The Academy Service Area is a well-developed portion of the City. It is expected to have a population growth of 1.0 percent per year from 2021 to 2044. This Service Area is projected to have minimal growth in employment with a 0.3 percent per year increase from 2021 to 2044.

2.8.2 Projected Water Demand

Projecting future water demand is one of the key elements of the water system planning process. Identification of system improvements such as supply, pumping, storage, and piping requirements are all related to demand projections. This section summarizes the ERU, ADD, and MDD projections, as well as the potential range in future demands associated with various factors, such as water use per ERU, DSL, and demographic growth rate.

2.8.2.1 Potential Range in Future Water Demand

Several factors and assumptions affect the accuracy of projected future water demands. Recognizing that certain assumptions built into the demand projections will vary in the future, the projections were developed for medium and high demand scenarios to provide a range in demands that may be experienced in the future. The medium projection will be used for the system analysis in **Chapter 3**, while the high projection will be used for the water right evaluation in **Chapter 5**. The system analysis determines future pumping, storage, and distribution system deficiencies and identifies potential improvements to achieve the City's established capacity criteria. The water right evaluation looks at both water rights and overall supply capacity. Only the medium projections are presented within this Chapter. The variables considered in developing the range of demand projections are summarized in **Table 2-17** and are discussed below.

- Future Water Connections: The future water connections are presented in **Table 2-16** and were used for both demand scenarios.
- Water Use Per ERU_{ADD}: Water use per ERU for the average demand day projections are based on the 75th percentile of the historical data, which is the medium demand scenario, presented in **Table 2-4**. This value equals 182 gpd per ERU. The high demand scenario used the highest annual value from the data set presented in **Table 2-4**, which equals 193 gpd per ERU.
- ERUs per Account: The historical ERU per account by customer classification presented in **Table 2-4** was used to develop demand projections. The ERU per Account values are based on the 75th percentile of the historical data and a water use per ERU value of 182 gpd per ERU. These values are used in both projections.
- Distribution System Leakage: Historical annual DSL varied between 0.7 and 7.4 percent of the City's total City production between 2015 and 2022. The average three-year rolling average of historical DSL values of 5.2 percent is utilized in the medium demand scenario and the maximum three-year rolling average of 6.8 percent was used for the high demand scenario.
- Authorized Unbilled Consumption: Historical annual authorized unbilled consumption varied between 0.14 and 0.54 percent of the City's total billed consumption between 2015 and 2022. The 75th percentile value of 0.27 percent is utilized in the medium demand scenario and the maximum values of 0.54 percent is used for the high demand scenario.
- Water Use Per ERU_{MDD}: Water use per ERU for the maximum demand day projections are based on 75th percentile of the historical data, which is the medium demand scenario, presented in **Table**

2-10. This value equals 322 gpd per ERU. The high demand scenario used the highest annual value from the data set presented in **Table 2-10**, which is 358 gpd per ERU.

- MDD/ADD Peaking Factor: The 75th percentile of historical annual peaking factors of 1.77 is utilized in the medium demand scenario. The highest value in the historical annual peaking factor data set was used for the high demand scenario, which is 1.97.

The City's largest user (Boeing) and wholesale customers are not included in **Table 2-17**, their projections are based on individual demand and are presented separately.

Table 2-17 | Proposed Planning Values for Demand Projections

Assumptions	Medium Demand Scenario	High Demand Scenario
Water Demand per ERU _{ADD} (gpd)	182	193
DSL	5.2%	6.8%
Authorized Unbilled	0.27%	0.54%
Water Demand per ERU _{MDD} (gpd)	322	358
MDD/ADD Peaking Factor	1.77	1.97

2.8.3 Large User Demand Forecast

The large user term is used to identify customers consuming the greatest volume of water on an annual basis as presented in **Table 2-6**. Projections for the City's single largest user (Boeing) is separated from the demand forecasts to aid in accurate forecasting and in the system analyses. The forecasts were based on historical water use data from 2015 through 2022 and is presented in **Table 2-18**. The projected demand will use the 75th percentile of water use from the historical period of record. Boeing's consumption has trended down over the historical period of record, therefore, the projected demand is conservative and actual consumption is anticipated to be less than the value presented in **Table 2-18**.

Wholesale connections are also projected separately in **Table 2-22**. The remaining largest users are not presented separately in demand forecasts; their projected consumption is built into the overall Service Area projections by customer classification.

Table 2-18 | Large User Demand Projections

Large User	Customer Class	Service Area	Representative Historical Water Use Statistic ¹	Representative Annual Water Use (MG) ²	Projected ERUs in 2044
Boeing	Manufacturing Commercial	Valley	75 th percentile	210.6	3,168

Notes:

1. Historical water use data from 2015 through 2022
2. Based on representative historical water use statistic.

2.8.4 Projected Retail ERUs

Future water system demands are based on projected ERUs, which in turn are based on the projected water consumption by customer classification and the projected number of accounts discussed earlier in this chapter. **Table 2-19** shows the projected ERUs for the City's individual service areas over the planning period. The projected number of ERUs for each Service Area was calculated by multiplying the projected number of accounts, provided in **Table 2-16**, by the number of ERUs per account, as summarized in **Table**

2-3, for each customer class. Wholesale customer demand in terms of ERUs is not included in the demand projections below and must be added separately as summarized in **Table 2-23**.

Table 2-19 | ERU Projections by Customer Class and Service Area

	2024 ERU	2034 ERU	2044 ERU
Lea Hill			
Single-Family Residential	3,265	3,347	3,431
Multi-Family Residential	1,379	1,452	1,529
Commercial	128	143	161
Manufacturing/Industrial	-	-	-
Schools	127	128	129
Municipal (City Accounts)	2	3	3
Irrigation	319	358	402
Authorized Unbilled	14	15	15
DSL	272	283	295
Valley			
Single-Family Residential	5,954	6,088	6,226
Multi-Family Residential	6,652	8,528	10,933
Commercial	7,554	8,841	10,348
Manufacturing/Industrial	-	-	-
Schools	435	451	467
Municipal (City Accounts)	70	82	96
Irrigation	2,758	3,228	3,778
Boeing (Largest User)	3,170	3,170	3,170
Authorized Unbilled	56	66	78
DSL	1,386	1,584	1,825
Lakeland			
Single-Family Residential	1,354	1,502	1,666
Multi-Family Residential	900	1,091	1,323
Commercial	204	230	258
Manufacturing/Industrial	-	-	-
Schools	102	106	109
Municipal (City Accounts)	-	-	-
Irrigation	108	121	136
Authorized Unbilled	7	8	9
DSL	139	159	182
Academy			
Single-Family Residential	1,581	1,808	2,069
Multi-Family Residential	388	405	423
Commercial	81	84	86
Manufacturing/Industrial	-	-	-
Schools	25	26	27
Municipal (City Accounts)	2	2	2
Irrigation	174	179	185
Authorized Unbilled	6	7	8
DSL	117	131	146
Total			
Single-Family Residential	12,153	12,745	13,391
Multi-Family Residential	9,320	11,477	14,209

	2024 ERU	2034 ERU	2044 ERU
Commercial	7,967	9,298	10,853
Manufacturing/Industrial	-	-	-
Schools	690	711	732
Municipal (City Accounts)	74	87	101
Irrigation	3,359	3,887	4,502
Boeing (Largest User)	3,170	3,170	3,170
Authorized Unbilled	83	96	110
DSL	1,914	2,156	2,447
City of Algona (Wholesale)	Refer to Table 2-22.		

2.8.5 Projected Retail Average Day and Maximum Day Demands

The ADD projections include the projected customer demands by customer classification, authorized unbilled consumption, and DSL by service area. The resulting ADD projections are summarized in **Table 2-20**.

- Customer demands by classification were calculated by multiplying the projected ERUs summarized in **Table 2-19** by the average ERU water use (182 gpd/ERU).
- Authorized unbilled consumption projections were calculated by multiplying the sum of all customer classification use by the medium demand scenario percentage presented in **Table 2-17**.
- DSL consumption projections were calculated by multiplying the sum of all customer classification use and authorized unbilled use by the medium demand scenario percentage presented in **Table 2-17** for DSL.

Table 2-20 | ADD Projections

	2024 (mgd)	2034 (mgd)	2044 (mgd)
Lea Hill			
Single-Family Residential	0.595	0.610	0.625
Multi-Family Residential	0.251	0.265	0.279
Commercial	0.023	0.026	0.029
Manufacturing/Industrial	-	-	-
Schools	0.023	0.023	0.023
Municipal (City Accounts)	-	-	0.001
Irrigation	0.058	0.065	0.073
Authorized Unbilled	0.003	0.003	0.003
DSL	0.050	0.052	0.054
Valley			
Single-Family Residential	1.084	1.109	1.134
Multi-Family Residential	1.212	1.553	1.991
Commercial	1.376	1.610	1.885
Manufacturing/Industrial	-	-	-
Schools	0.079	0.082	0.085
Municipal (City Accounts)	0.013	0.015	0.017
Irrigation	0.502	0.588	0.688
Boeing (Largest User)	0.577	0.577	0.577

	2024 (mgd)	2034 (mgd)	2044 (mgd)
Authorized Unbilled	0.010	0.012	0.014
DSL	0.252	0.288	0.332
Lakeland			
Single-Family Residential	0.247	0.274	0.303
Multi-Family Residential	0.164	0.199	0.241
Commercial	0.037	0.042	0.047
Manufacturing/Industrial	-	-	-
Schools	0.019	0.019	0.020
Municipal (City Accounts)	-	-	-
Irrigation	0.020	0.022	0.025
Authorized Unbilled	0.001	0.002	0.002
DSL	0.025	0.029	0.033
Academy			
Single-Family Residential	0.288	0.329	0.377
Multi-Family Residential	0.071	0.074	0.077
Commercial	0.015	0.015	0.016
Manufacturing/Industrial	-	-	-
Schools	0.005	0.005	0.005
Municipal (City Accounts)	-	-	-
Irrigation	0.032	0.033	0.034
Authorized Unbilled	0.001	0.001	0.001
DSL	0.021	0.024	0.027
Total			
Single-Family Residential	2.214	2.321	2.439
Multi-Family Residential	1.698	2.091	2.588
Commercial	1.451	1.694	1.977
Manufacturing/Industrial	-	-	-
Schools	0.126	0.129	0.133
Municipal (City Accounts)	0.014	0.016	0.018
Irrigation	0.612	0.708	0.820
Boeing (Largest User)	0.577	0.577	0.577
Authorized Unbilled	0.015	0.017	0.020
DSL	0.349	0.393	0.4546

The MDD projections include the projected customer demands by customer classification, authorized unbilled consumption, and DSL by service area and are summarized in **Table 2-21**.

- Customer demands by classification, authorized unbilled consumption projections, and DSL projections were calculated by multiplying the ADD projections as summarized in **Table 2-20** by the MDD/ADD Peaking Factor presented in **Table 2-17**.

Table 2-21 | MDD Projections

	2024 (mgd)	2034 (mgd)	2044 (mgd)
Lea Hill			
Single-Family Residential	1.051	1.077	1.104
Multi-Family Residential	0.444	0.468	0.492
Commercial	0.041	0.046	0.052
Manufacturing/Industrial	-	-	-

	2024 (mgd)	2034 (mgd)	2044 (mgd)
Schools	0.041	0.041	0.041
Municipal (City Accounts)	0.001	0.001	0.001
Irrigation	0.103	0.115	0.129
Authorized Unbilled	0.005	0.005	0.005
DSL	0.088	0.091	0.095
Valley			
Single-Family Residential	1.916	1.960	2.004
Multi-Family Residential	2.141	2.745	3.519
Commercial	2.431	2.846	3.331
Manufacturing/Industrial	-	-	-
Schools	0.140	0.145	0.150
Municipal (City Accounts)	0.022	0.026	0.031
Irrigation	0.888	1.039	1.216
Boeing (Largest User)	1.020	1.020	1.020
Authorized Unbilled	0.018	0.021	0.025
DSL	0.446	0.510	0.587
Lakeland			
Single-Family Residential	0.436	0.483	0.536
Multi-Family Residential	0.290	0.351	0.426
Commercial	0.066	0.074	0.083
Manufacturing/Industrial	-	-	-
Schools	0.033	0.034	0.035
Municipal (City Accounts)	-	-	-
Irrigation	0.035	0.039	0.044
Authorized Unbilled	0.002	0.003	0.003
DSL	0.045	0.051	0.059
Academy			
Single-Family Residential	0.509	0.582	0.666
Multi-Family Residential	0.125	0.130	0.136
Commercial	0.026	0.027	0.028
Manufacturing/Industrial	-	-	-
Schools	0.008	0.008	0.009
Municipal (City Accounts)	0.001	0.001	0.001
Irrigation	0.056	0.058	0.060
Authorized Unbilled	0.002	0.002	0.002
DSL	0.038	0.042	0.047
Total			
Single-Family Residential	3.912	4.102	4.310
Multi-Family Residential	3.000	3.694	4.573
Commercial	2.564	2.993	3.493
Manufacturing/Industrial	-	-	-
Schools	0.222	0.229	0.236
Municipal (City Accounts)	0.024	0.028	0.032
Irrigation	1.081	1.251	1.449
Boeing (Largest User)	1.020	1.020	1.020
Authorized Unbilled	0.027	0.031	0.036
DSL	0.616	0.694	0.788

2.8.6 Wholesale Demands

The City currently has a wholesale water contract with the City of Algona. The City is also planning to supply wholesale water for the MIT's future fish hatchery. As stated in the Retail Water Service Policy, "the City will plan for and provide water service to all retail customers and wholesale customers with firm contracts. As supply permits, the City may provide water to wholesale customers without firm contracts unilaterally or as part of a capital improvement partnership agreement." The wholesale demands for the City are summarized in **Table 2-22**.

Algona's current agreement allows for the sale of up to 525,000 gallons per day on a firm basis for the ADD and up to 1,114,00 gallons per day on a firm basis for the MDD. In 2022, Algona purchased an average of 342,953 gallons per day of water from the City. Algona's 2022 Water System Plan (WSP) projects 2042 ADD to be 404,278 gallons per day and 2042 MDD to be 766,137 gallons per day. Algona's WSP demand projections were used for projecting the wholesale water purchases by Algona, rather than the contractual amount, as presented in **Table 2-22**.

MIT plans to develop a fish hatchery on the White River. An agreement dated from 1986 (included in **Appendix G**) requires that the City provide the tribe with an average annual demand of 3.9 cubic feet per second (cfs) (2.52 mgd) from Coal Creek Springs for MIT's future fishery enhancement purposes. The agreement does not specify an MDD but rather states:

"The Tribe and the City agree to work in harmony toward a mutually satisfactory allocation of the Coal Creek waters. In furtherance of this goal, the City understands that the water requirements for fishery enhancement purposes are greatest in the winter and spring months. Accordingly, the City agrees to increase the amount of water above 3.9 cfs as needed for fishery purposes. The Tribe understands that the City's requirement for water for domestic use is greatest in the summer and fall months. Accordingly, the Tribe agrees to decrease its use of water below 3.9 cfs, as needed for domestic water purposes...It is further understood that the tribe requires a minimum of 3 cfs at all times for fishery enhancement purposes".

The intent of this agreement indicates that the MIT demand will be at a minimum when the City's demands are at their maximum. Based on this understanding, the planned MDD for the MIT is 1.5 mgd and the ADD was 2.5 mgd. For planning purposes, the MIT demand was added to the Algona demand and included in the "Retail + firm wholesale" group of demands.

LMWD has an interruptible wholesale contract that can be terminated at any time and is therefore represented separately. As discussed in the Historical Wholesale Consumption section, LMWD discontinued regular purchase of water from the City in 2017 per the amendment to IA2 but maintains an intertie with the City to use wholesale water supply on an as-needed basis. LMWD may purchase up to 2.5 mgd of wholesale water per IA2. The contract does not have an expiration date and therefore 2.5 mgd of interruptible wholesale demand is projected through 2044.

Table 2-22 | Wholesale Demand Projections

Wholesale Customer	Service Area	Contractual Delivery ¹	2024 (mgd)	2034 (mgd)	2044 (mgd) ²
ADD					
Algona	Valley	Firm	0.37	0.39	0.41
MIT Fish Hatchery	Valley	Firm	2.5	2.5	2.5
LMWD	Lea Hill	Interruptible	2.5	2.5	2.5
MDD					
Algona	Valley	Firm	0.69	0.73	0.78
MIT Fish Hatchery	Valley	Firm	1.5	1.5	1.5
LMWD	Lea Hill	Interruptible	2.5	2.5	2.5

Notes:

1. The City will plan for and provide water services to all retail customers and wholesale customers with firm contracts. As supply permits, the City may provide water to wholesale customers without firm contracts unilaterally or as part of a CIP agreement.
2. Algona's projections are provided through 2042; their projected rate increase was used to project consumption to 2044.

2.8.7 Total Demands

The total projected demands are tabulated for retail customers, firm wholesale, and interruptible wholesale in **Table 2-23**. The demands are presented separately to show the level of obligation to the City's customers. Projected retail ADD, MDD, and ERUs are presented by Service Area for the medium demand scenario. Additionally, the ADD and MDD are presented as the total of the projected retail demand and firm wholesale. The retail with firm wholesale represents the projected demand that is used as the basis for the system analysis and are shown in **Figure 2-10**. The difference between the historical and projected wholesale demands is due to the projected allocation of the supply to the proposed MIT Fish Hatchery, per the 1986 Stipulation Settlement Agreement. Additionally, both CWD and LMWD discontinued regular purchase of water from the City in 2017.

The 2044 retail ADD demand is projected to 9.02 mgd, which represents a 28 percent increase from 2024. Throughout the planning period, approximately 40 percent of the City's demand may be from wholesale purchases when both firm and interruptible supply are considered. The MDD is projected to increase by 24 percent from 2024 to 2044 for the sum of firm wholesale customers and retail customers.

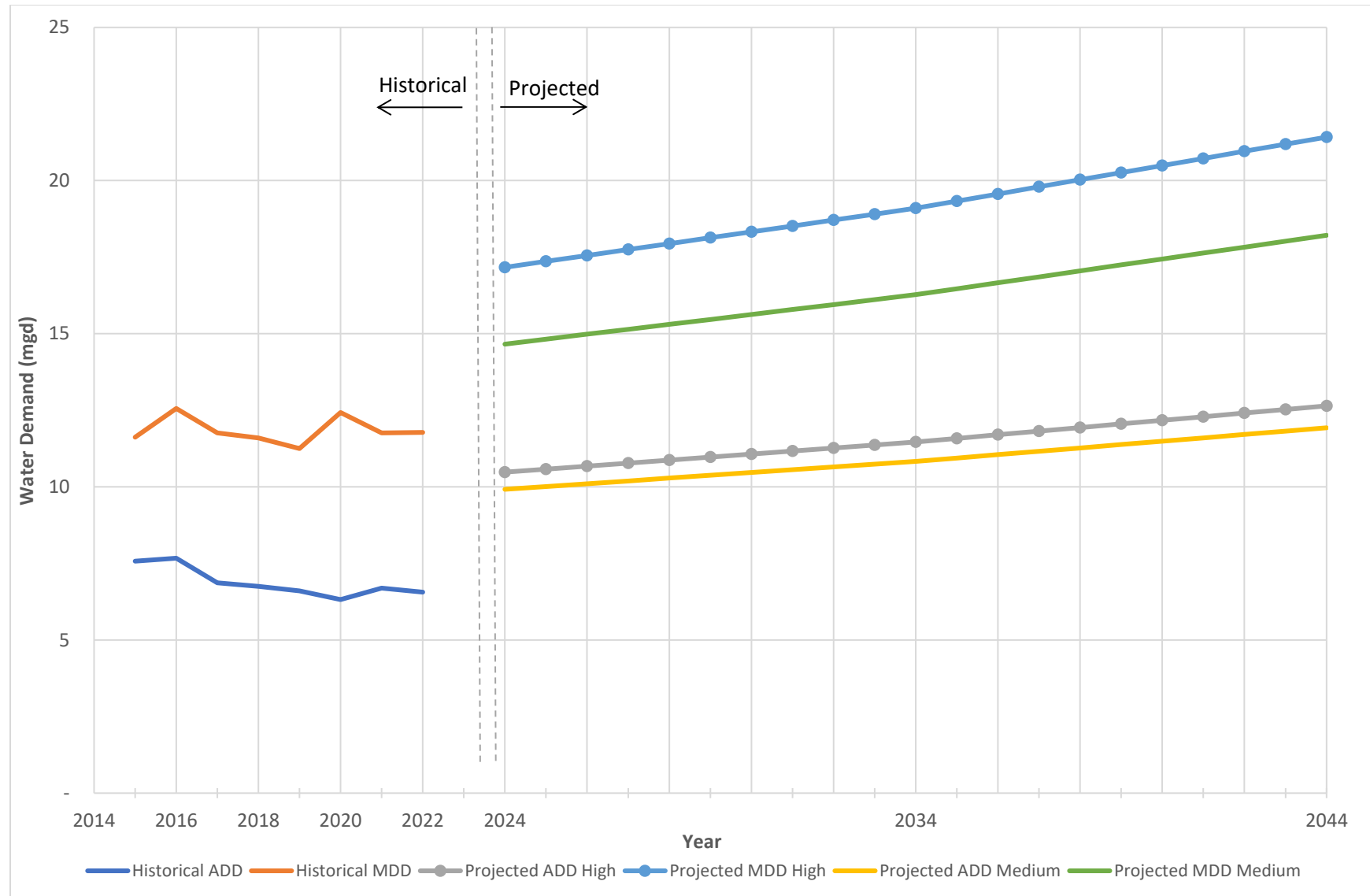
Table 2-23 | ADD, MDD, and ERUs Summarized by Service Area with Wholesale Included

	2024	2034	2044
Lea Hill			
Average Day Demand (mgd)	1.00	1.04	1.09
Maximum Day Demand (mgd)	1.77	1.84	1.92
Equivalent Residential Units	5,506	5,729	5,966
Valley			
Average Day Demand (mgd)	5.11	5.84	6.72
Maximum Day Demand (mgd)	9.02	10.31	11.88
Equivalent Residential Units	28,034	32,037	36,920
Lakeland			
Average Day Demand (mgd)	0.51	0.59	0.67
Maximum Day Demand (mgd)	0.91	1.04	1.19
Equivalent Residential Units	2,815	3,217	3,684
Academy			
Average Day Demand (mgd)	0.43	0.48	0.54
Maximum Day Demand (mgd)	0.76	0.85	0.95
Equivalent Residential Units	2,375	2,642	2,946
Total Retail Customers			
Total Average Day Demand (mgd)	7.05	7.95	9.02
Total Maximum Day Demand (mgd)	12.47	14.04	15.94
Total Equivalent Residential Units	38,731	43,626	49,515
Algona (Firm Wholesale)			
Total Average Day Demand (mgd)	0.365	0.386	0.409
Total Equivalent Residential Units, ADD ¹	2,005	2,120	2,246
Total Maximum Day Demand (mgd)	0.692	0.732	0.775
Total Equivalent Residential Units, MDD ¹	2,150	2,274	2,409
Retail Customer Demand with Algona (Firm Wholesale)			
Total Average Day Demand (mgd)	7.42	8.33	9.43
Total Maximum Day Demand (mgd)	13.16	14.77	16.71
Retail with Firm Wholesale (Algona and MIT Fish Hatchery)			
Total Average Day Demand (mgd)	9.92	10.83	11.93
Total Maximum Day Demand (mgd)	14.66	16.27	18.21
Retail with Firm & Interruptible Wholesale (Algona, MIT Fish Hatchery, and LMWD)			
Average Day Demand (mgd)	12.42	13.33	14.43
Maximum Day Demand (mgd)	17.16	18.77	20.71

Note:

1. The Algona ERU values were calculated using the City of Algona's projected demand and the City of Auburn's ERU_{ADD} and ERU_{MDD} factors.

Figure 2-10 | Projected Retail Plus Firm Wholesale ADD and MDD



System Analysis and Asset Management

This chapter's objective is to identify existing facilities and determine their capacity to reliably satisfy current and projected water demands with safe drinking water. The cost of addressing identified infrastructure deficiencies and operational and maintenance improvements is addressed in priority order in **Chapter 8**.

This chapter addresses the following topics:

- 3.1 Asset Management – Asset Inventory and Analysis
- 3.2 Water Quality
- 3.3 Design Standards
- 3.4 Capacity Analysis
- 3.5 Summary of System Deficiencies

3.1 Asset Management – Asset Inventory and Analysis

This section establishes a date-based inventory of all system-owned water assets and satisfies the requirements of WAC 246-290-100(4)e(iii). The City actively assesses and plans for the maintenance, repair, and replacement of its major assets while preventive maintenance practices keep assets in good condition, thereby extending their useful life.

The City utilizes Cartegraph, an asset management software program, in conjunction with ESRI ArcGIS, a geographic information system (GIS) software program to manage its water assets. GIS is updated using record drawings as projects are completed and Cartegraph is linked to automatically update with new GIS information. Cartegraph is used to track and schedule maintenance activities, as well as materials, labor hours, costs and project timelines. Capital costs for the replacement of assets are assessed on a case-by-case basis.

The City's water system is comprised of groundwater wells, springs, interties with other water systems, treatment facilities, pump stations, storage facilities, pressure reducing stations, and water transmission and distribution pipelines. The City's water system includes 28 pressure zones in four different service areas: Lea Hill, Valley, Academy, and Lakeland. The location of major assets and pressure zones are shown in **Figure 3-1**. The hydraulic profile of the City's water system is presented in **Figure 3-2**, with enlargements provided as **Figure 3-3** and **Figure 3-4**.

Water system vulnerabilities relating to risks from natural hazards, such as power outage, flooding, and earthquake are detailed in the Natural Hazard Vulnerability Summary, which is provided in **Appendix U**.

Figure 3-1 | Map of Water System Assets and Pressure Zones

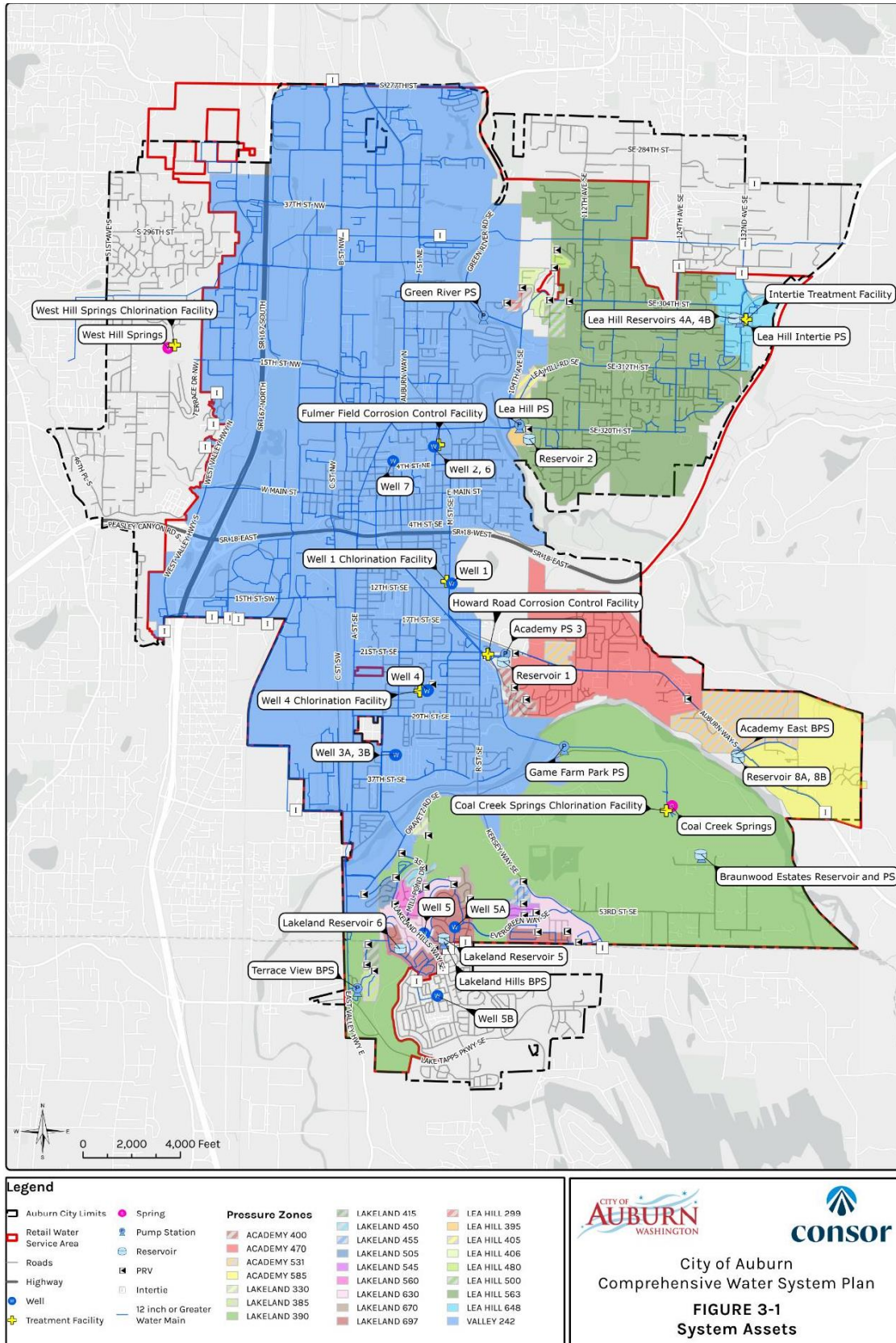


Figure 3-2 | Hydraulic Profile

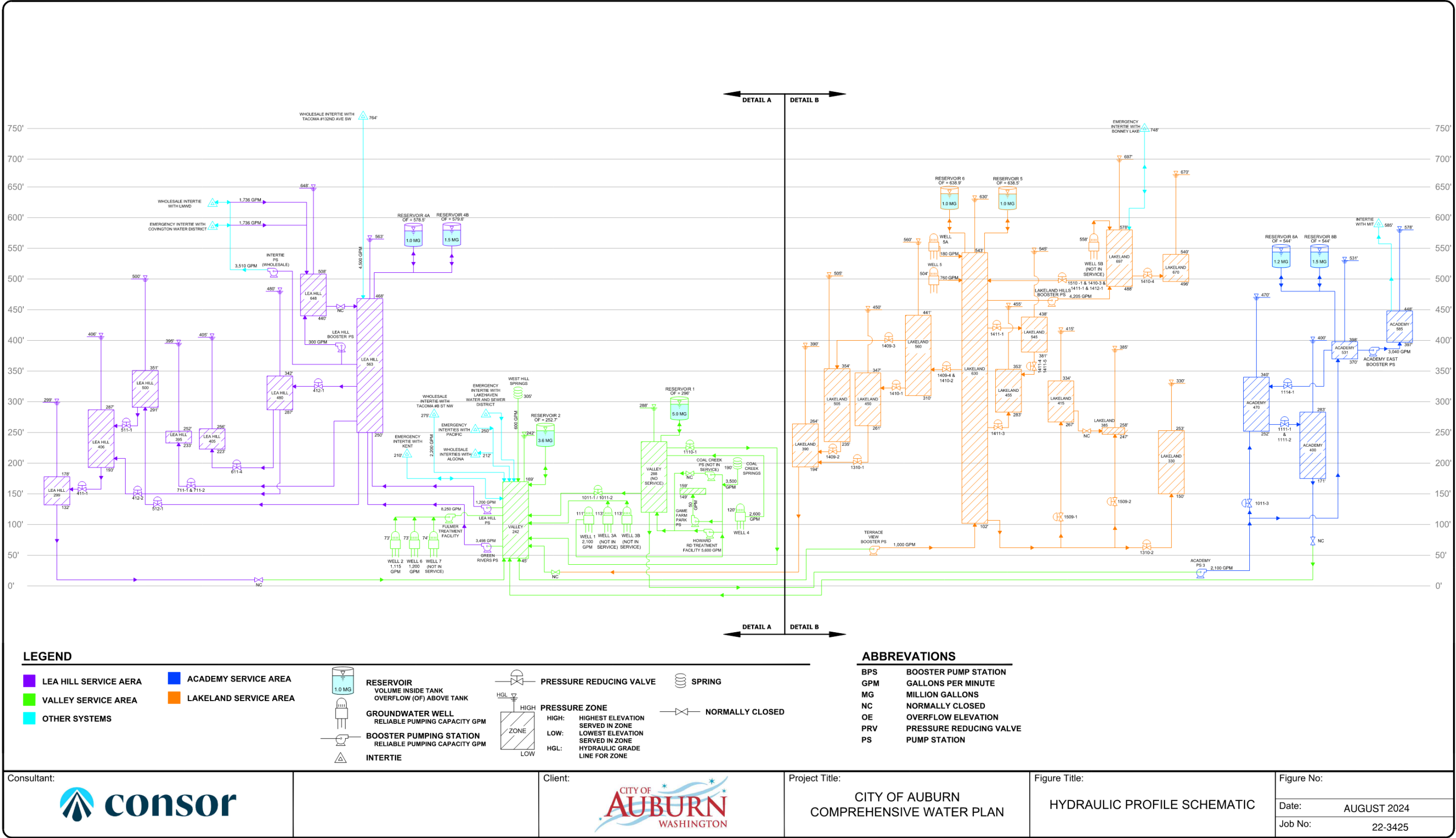


Figure 3-3 | Hydraulic Profile - Detail A

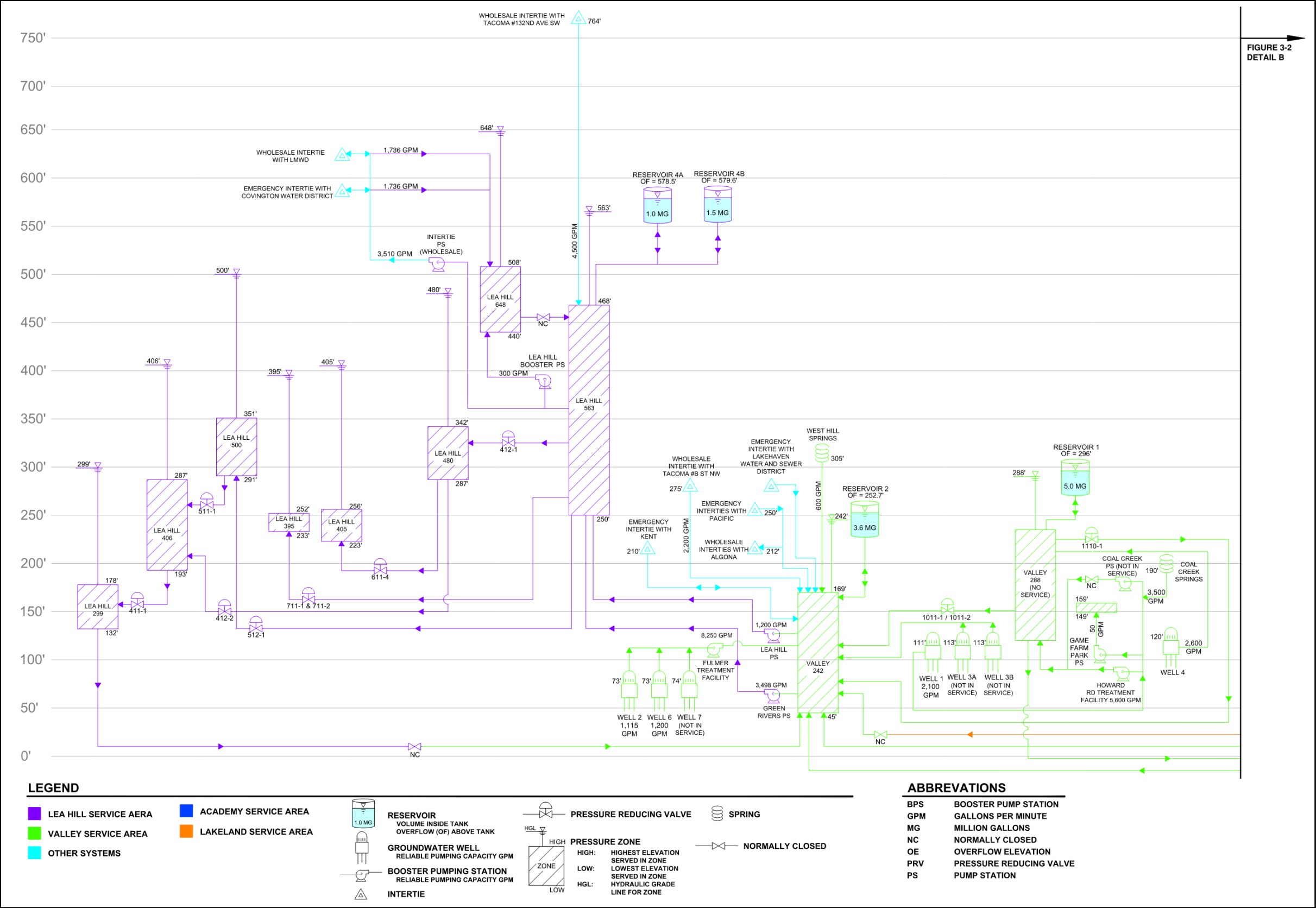
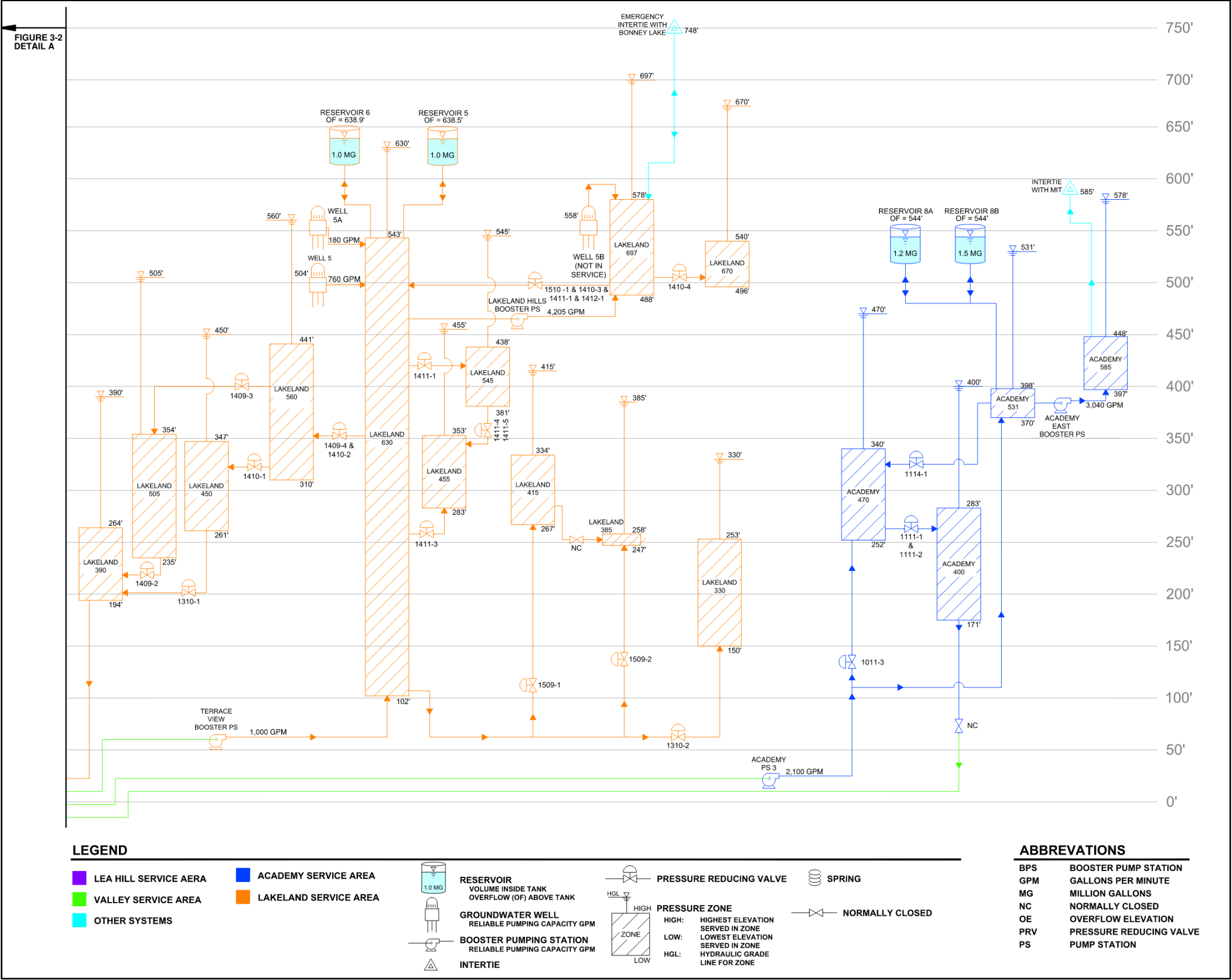


FIGURE 3-2
DETAIL B

Figure 3-4 | Hydraulic Profile - Detail B



3.1.1 Distribution Facilities

The City's water distribution system includes approximately 300 miles of piping. **Table 3-1** summarizes the water piping inventory by size (diameter). The criticality ratings for the system's pipes are presented in **Table 3-1**, as criticality of the pipelines is assessed based on size. Water main and transmission pipelines vary in diameter from 4 to 36 inches, with a predominance of 8 and 12 inches, and range in age with the oldest piping dating back to 1925. Approximately 78 percent of the distribution system is ductile iron pipe.

Table 3-1 | Transmission and Distribution System Piping Inventory by Pipe Diameter

Distribution System Piping Diameter (inches)	Length (linear feet)	Design Life (years)	Criticality Rating (Bigger # = Less Critical) ¹
≤ 6	189,574	100	4
8-10	681,601		4
12-15	532,953		3
16-20	119,997		3
24-30	15,582		2
36-42	35		2
Unknown	1,380		--

Note:

1. Criticality was assessed based on pipe diameter. Larger diameter pipes were identified as being more critical than smaller diameter pipes.

Table 3-2 organizes water system piping by material and age and identifies the anticipated pipe condition. Pipe condition was assessed based on pipe age and remaining useful life. Cast iron pipe that was installed after the 1930's, which constitutes over 48 miles of water mains or 16 percent of the total length of water mains in the City's system, was designated to have a significantly reduced design life of 50 years due to known pipe integrity issues. As such, the City is prioritizing replacement of cast iron pipe and regularly partners with other City projects to replace this piping efficiently and has capital programs to fund replacements as discussed further in **Chapter 8**. Piping that has an unknown material and unknown installation date will be updated in the City's GIS system and Cartegraph as more records research is completed.

In 2014, the City conducted leak detection testing and condition assessment of approximately 2.8 miles of 14 to 24-inch ductile iron and concrete composite pipe. The results indicated that the 20-inch and 16-inch ductile iron mains in the Lea Hill Service Area range from moderate to good condition. The Coal Creek Springs concrete composite main was identified as being in good condition. The 14-inch ductile iron main located in the Academy Service Area was suspected of being in poor condition, however this was later thought to be in decent condition as more information regarding the pipe material was obtained. A portion of the 14-inch piping was replaced as part of a roundabout project within Auburn Way S.

In 2020 the City conducted additional leak detection testing and condition assessment of approximately 13,500 feet of 10 to 16-inch cast iron main. With a focus on four specific sites: Auburn Way South, C Street Southwest, West Hill Springs, and Lea Hill Road. All the pipe on Auburn Way South and Lea Hill Road are in moderate condition. The pipe on C Street Southwest and at West Hill Springs are in poor to moderate condition. The C Street Southwest piping is currently being replaced by the City's "C St SW Preservation" capital project that will begin construction in 2024. The West Hill Springs piping will be replaced in a forthcoming capital project titled "West Hill Springs Transmission Main Replacement" that is identified in **Chapter 8**.

Table 3-2 | Transmission and Distribution System Piping Inventory by Material and Installation Decade

Piping Material	Total Length (linear feet)	Install Decade (10-Year Period)	Length (linear feet)	Design Life (years)	Remaining Useful Life (years)	Condition Rating (Bigger # = Worse Condition) ¹
Cast Iron	253,919	1920	11,877	100	-4	7
		1930	10,602		6	6
		1940	3,079	50	-34	10
		1950	5,937		-24	10
		1960	147,764		-14	9
		Unknown	74,660		--	--
Concrete ²	11,284	1960	11,284	100	36	3
Ductile Iron	1,198,958	1960	48,235	100	36	4
		1970	115,184		46	4
		1980	283,977		56	4
		1990	299,293		66	4
		2000	230,295		76	3
		2010	156,307		86	2
		2020	50,594		96	1
		Unknown	15,072		--	--
HDPE	409	2010	409	100	86	1
PVC ²	19,498	1960	1,630	100	36	4
		1970	2,598		46	4
		1980	1,251		56	4
		1990	1,784		66	4
		2000	2,647		76	3
		2010	2,588		86	2
		2020	1,117		96	1
		Unknown	5,884		--	--
RCP	1,014	1970	884	100	46	3
		2020	130		96	1
Steel	1,030	1920	870	100	-4	6
		1970	160		46	4
Unknown - Anticipated to be Cast Iron based on install date	4,022	1960	4,022	50	-14	4
	28,564	1970	4,001	100	46	4
		1980	3,822		56	4

Piping Material	Total Length (linear feet)	Install Decade (10-Year Period)	Length (linear feet)	Design Life (years)	Remaining Useful Life (years)	Condition Rating (Bigger # = Worse Condition) ¹
Unknown – Anticipated to be Ductile Iron based on install date		1990	12,465		66	4
		2000	4,165		76	3
		2010	4,112		86	2
Unknown	23,089	Unknown	23,089	50	--	--

Notes:

1. Condition was assessed based on remaining useful life of the pipe.
2. The City is investigating pipe materials in 2024 to verify pipe materials in the City's database that may be mislabeled.

The distribution system piping is delineated into pressure zones using Pressure Reducing Valves (PRVs). An inventory of the City's PRVs, as well as their size, remaining useful life, condition, and criticality are summarized in **Table 3-3**. As PRVs approach their anticipated design life, the City's Maintenance and Operations (M&O) staff remove and rebuild the valve to extend the useful life of the asset, when feasible.

Table 3-3 | Pressure Reducing Valve (PRV) Inventory

Valve ID #	PRV Location Description	Valve Size (inches)	Install Date (year)	Design Life (years)	Remaining Useful Life (years)	Condition Rating (Bigger # = Worse Condition)	Criticality Rating (Bigger # = Less Critical)
Lea Hill Service Area							
411-10 - Primary Valve	Cobble Creek Upper at 30216 104 th Ave SE	8	2024	40	40	1	3
411-11 - Secondary Valve		2					4
411-12 - Relief Valve		1.5					4
411-20 - Primary Valve	104th Ave SE/SE 302nd St. Cobble Creek Lower	6	1994		10	4	3
411-21 - Secondary Valve		2					4
411-22 - Relief Valve		1.5					4
412-10 - Primary Valve	298th Pl SE & 109 th Ave SE	6	2011		27	2	3
412-11 - Secondary Valve		2					4
412-12 - Secondary Valve		2					4
412-20 - Primary Valve	300 Block SE & 108 th Ave SE	6	2005	40	21	1	3
412-21 - Secondary Valve		2					4
412-22 - Secondary Valve		2					4
511-10 - Primary Valve	SE 304 th St. & 108 th Ave. SE	6	2016		32	1	3
511-11 - Secondary Valve		2					4
511-20 – Primary Valve	Cobble Creek Lower at 10230 304 th Pl SE	6	1994		10	1	3
511-21 – Secondary Valve		2					4
511-22 – Relief Valve		1.5					4

Valve ID #	PRV Location Description	Valve Size (inches)	Install Date (year)	Design Life (years)	Remaining Useful Life (years)	Condition Rating (Bigger # = Worse Condition)	Criticality Rating (Bigger # = Less Critical)
512-10 – Primary Valve	SE 304 th St & 110 th PI SE	6	2018		34	1	3
512-11 – Secondary Valve		2					4
512-12 – Secondary Valve		2					4
611-30 - Primary Valve	Carriage Square	8	2018		34	1	3
611-31 - Secondary Valve		3					4
611-32 - Secondary Valve		3					4
711-10 - Primary Valve	Amberview North	8	1986		2	5	3
711-11 – Secondary Valve		2					4
711-20 - Primary Valve	Amberview South	8	1986		2	5	3
Valley Service Area							
1110-10 - Primary Valve	25 th St SE & K St SE	10	1987	40	3	6	3
1110-20 - Secondary Valve		4					4
Lakeland Service Area							
1309-10 - Primary Valve	Mill Pond Dr SE & Oravetz Rd SE	10	1980	40	-4	6	3
1309-11 - Secondary Valve		3					4
1309-12 - Secondary Valve		3					4
1309-13- Secondary Valve		1					4
1310-10 - Primary Valve	Mill Pond Dr SE & Mill Pond Loop SE	10	1980		-4	6	3
1310-11 - Secondary Valve		3					4
1310-12 - Secondary Valve		2					4
1310-13 - Secondary Valve		1					4
1409-10 - Primary Valve	Oravetz Rd SE & Lakeland Hills Way SE	8	1990	6		5	3
1409-11 - Secondary Valve		4					4
1409-12 - Secondary Valve		2					4
1409-13 - Secondary Valve		2					4
1409-20 - Primary Valve	47 th St SE & Lakeland Hills Way SE	8	1992		8	5	3
1409-21 - Secondary Valve		4					4
1409-22 - Secondary Valve		2					4
1409-23 - Secondary Valve		2					4
1409-30 - Primary Valve	Lakeland Hills Way SE & 51 st St SE	10	2004	20		3	3
1409-31 - Secondary Valve		3					4
1409-32 - Secondary Valve		2					4
1409-40 - Primary Valve		10	1988			4	5

Valve ID #	PRV Location Description	Valve Size (inches)	Install Date (year)	Design Life (years)	Remaining Useful Life (years)	Condition Rating (Bigger # = Worse Condition)	Criticality Rating (Bigger # = Less Critical)
1409-41 - Secondary Valve	Mill Pond Dr SE & Lakeland Hills Way SE	3					4
1409-42 - Secondary Valve		3					4
1409-43 - Secondary Valve		1					4
1410-10 - Primary Valve	5018 Mill Pond Dr SE	10	1980		-4	6	3
1410-11 - Secondary Valve		3					4
1410-12 - Secondary Valve		2					4
1410-20 - Primary Valve	52nd St SE & East of Mill Pond Dr SE	8	1992		8	5	3
1410-21- Secondary Valve		4					4
1410-22- Secondary Valve		2					4
1410-23- Secondary Valve		2					4
1410-30 - Primary Valve	Nathan Ave SE & Highland Dr SE	8	1992		8	5	3
1410-31- Secondary Valve		4					4
1410-32- Secondary Valve		2					4
1410-33- Secondary Valve		2					4
1410-40 - Primary Valve	5203 Quincy Ave SE	8	1995	40	11	4	3
1410-41- Secondary Valve		4					4
1410-42- Secondary Valve		2					4
1410-43- Secondary Valve		2					4
1509-10 - Primary Valve	Terrace View Lower	10	2007		23	3	3
1509-11- Secondary Valve		3					4
1509-12- Secondary Valve		3					4
1509-20 - Primary Valve	Terrace View Middle	10	2007		23	3	3
1509-21- Secondary Valve		3					4
1509-22- Secondary Valve		3					4
1509-30 - Primary Valve	Terrace View Upper	10	2007		23	3	3
1509-31- Secondary Valve		3					4
1509-32- Secondary Valve		3					4
1509-40 - Primary Valve	Terrace View Dr SE & Alexander Pl SE	10	2007		23	3	3
1509-41- Secondary Valve		3					4
1509-42- Secondary Valve		3					4
1510-10 - Primary Valve	Lakeland Hills Way SE & Evergreen Way SE	8	1994		10	4	3
1510-11- Secondary Valve		4					4
1510-12- Secondary Valve		2					4

Valve ID #	PRV Location Description	Valve Size (inches)	Install Date (year)	Design Life (years)	Remaining Useful Life (years)	Condition Rating (Bigger # = Worse Condition)	Criticality Rating (Bigger # = Less Critical)
1510-13- Secondary Valve		2					4
1411-10 - Primary Valve		6					3
1411-11- Secondary Valve	56 th St SE at Bennett Ave SE	2	2011		27	2	4
1411-12- Secondary Valve		2					4
1411-20 - Primary Valve		6					3
1411-21- Secondary Valve	5310 Bennett Ave SE	2	2010		26	2	4
1411-22- Secondary Valve		2					4
1411-30 - Primary Valve		8					3
1411-31- Secondary Valve	Kersey Way SE & 50 th St SE	2	2015		31	2	4
1411-32- Secondary Valve		2					4
1411-40 - Primary Valve		10					3
1411-41- Secondary Valve	2305 54 th St SE	3	2015		31	2	4
1411-42- Secondary Valve		3					4
1411-50 - Primary Valve		6					3
1411-51- Secondary Valve	5253 Wesley Ave SE	2	2015	40	31	2	4
1411-52- Secondary Valve		2					4
1412-10 - Primary Valve		6					3
1412-11- Secondary Valve	5539 Franklin Ave SE	2	2012		28	2	4
1412-12- Secondary Valve		2					4
Academy Service Area							
1011-30 - Primary Valve		8					3
1011-31 - Secondary Valve	2003 Auburn Way S	3	2006		22	3	4
1011-32 - Secondary Valve		3					4
1111-10 - Primary Valve		6					3
1111-11 - Secondary Valve	Riverwalk Dr SE & Howard Rd SE	2	2006		22	3	4
1111-12 - Secondary Valve		2					4
1111-20 - Primary Valve		6					3
1111-21 - Secondary Valve	2204 27 th St SE	2	1997		13	3	4
1111-22 - Secondary Valve		2					4
1114-10 - Primary Valve		8					3
1114-11 - Secondary Valve	4500 Auburn Way South	3	2006		22	3	4
1114-12 - Secondary Valve		3					4

Figure 3-5 shows the locations of water main breaks and leaks that have required repair since 2014. A total of 93 repairs have been completed during this timeframe and include water main break and leak repairs, water main appurtenance repairs, service lines repairs, and repairs due to damage caused by construction contractors.

Figure 3-5 | Water Main Leak and Break Repair Locations from 2014-2024

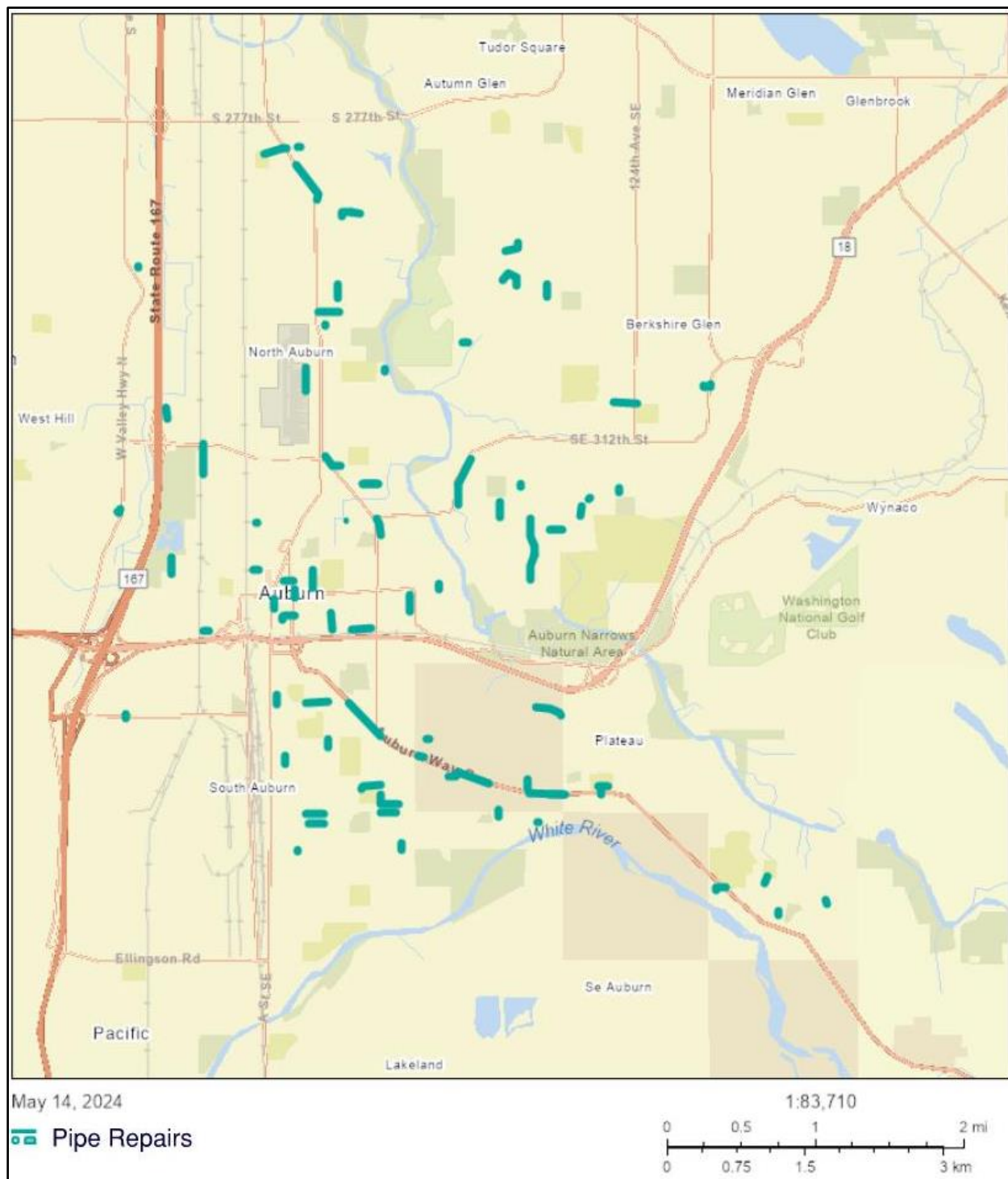
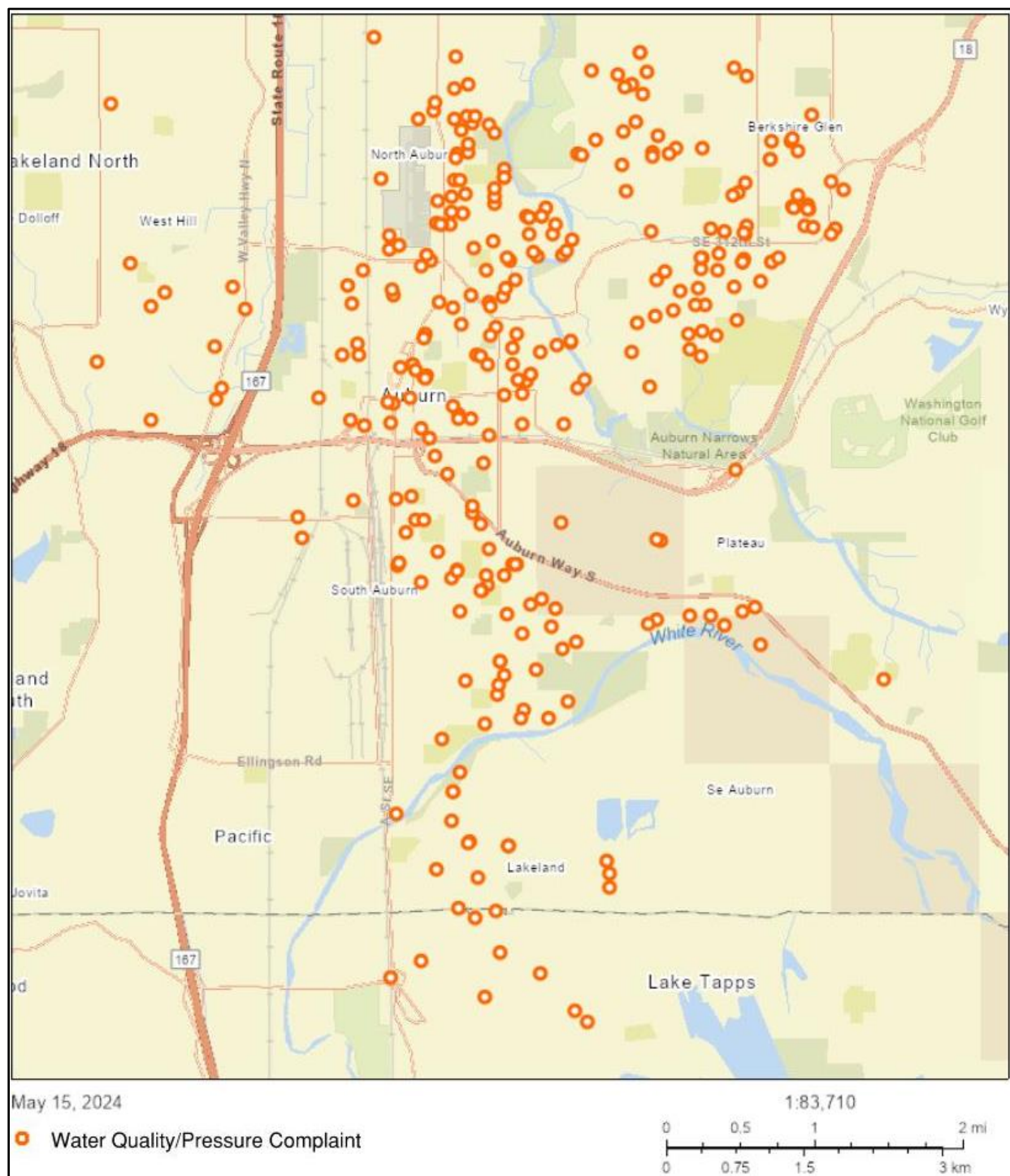


Figure 3-6 shows the locations of low pressure and water quality (odor and discolored water) complaints received since 2014.

Figure 3-6 | Low Pressure, Odor, and Discolored Water Complaints from 2014-2024



A summary of the customer complaints by category is presented in **Table 3-4**. Overall, there has been only one odor complaint within the last ten years. Pressure complaints and water quality complaints have remained fairly consistent, with the fewest number of complaints being made in 2023.

Table 3-4 | Summary Customer Complaints

Category	2014 ¹	2015	2016	2017	2018	2019	2020	2021	2022	2023
Water Quality (Appearance)	0	40	47	23	14	55	48	47	27	9
Odor	3	1	0	0	0	0	0	0	0	0
Pressure	6	9	16	19	12	8	4	11	8	10
Total	9	50	63	42	26	63	52	58	35	19

Note:

1. Data in 2014 is incomplete due to the City transitioning to Cartegraph Asset Management.

3.1.2 Water Source Facilities

The City uses a combination of groundwater wells and springs as supply sources for the water system. The pumping capacity, remaining useful life, condition and criticality of the City's groundwater wells are summarized in **Table 3-5**. The City's two spring sources, Coal Creek Springs and West Hill Springs, are not included in **Table 3-5** since both these sources operate by gravity and have no on-site pumping equipment. Condition ratings are assigned based on the 2013 Water Facilities Evaluation Study.

A detailed description of each water source facility, including both springs and groundwater wells, and planned improvements is provided following **Table 3-5**. A summary of the pumping or production capacity of each source, including the springs, is included in **Section 2.6 of Chapter 2**. Discussion of the City's current water rights for each water source is provided in **Section 3.4.1**.

Table 3-5 | Source of Supply Well Pump Inventory

Facility Name	Capacity (MGD)	No. of Pumps	Pump Type	Install Year	Design Life (years)	Remaining Useful Life (years)	Condition Rating (Bigger # = Worse Condition)	Criticality Rating (Bigger # = Less Critical)
Valley Service Area								
Well 1	3.02	1	Vertical Turbine	2016	40	32	2	2
Well 2	1.61	1	Centrifugal	2023		39	3	1
Well 3A	Not in Service							
Well 3B	Not in Service							
Well 4	3.74	1	Centrifugal	1985	40	30	1	3
Well 6	1.73	1	Vertical Turbine	1999		15	4	1
Well 7	Not in Service							
Lakeland Service Area								
Well 5	0.94	1	Submersible	1983	40	-1	7	3
Well 5A	0.26	1	Submersible	1990		6	7	2
Well 5B	Not in Service							

3.1.2.1 Coal Creek Springs

Coal Creek Springs is a primary water supply for the City due to its production capacity. This source is more economical to operate than other sources as it can provide a large volume of water and does not require pumping for extraction. Much of the spring's collector system, including the south and middle collectors, was constructed in 1964. A third collector (the north collector) was added in 1998 to enhance system performance and to provide increased reliability. Currently, the flow from this collector is by gravity, however a buried manhole structure was installed in the line to provide space for a future pump station that could increase production.

Each collector is connected to an overflow structure before connection to a 24-inch transmission line that conveys flow to the Howard Road Corrosion Control Treatment (CCT) Facility where the water is treated for corrosion and is then pumped to Reservoir 1. Between the Coal Creek Springs headworks and the Howard Road CCT Facility is a single connection that supplies potable water to Game Farm Wilderness Park. This transmission main is in good condition, however a suspected leak on the 24-inch steel transmission main crossing the White River was identified in a facility evaluation study completed in 2014. It was later identified that there was not a leak, but the evaluation results were caused by river turbulence due to portions of the pipe being exposed along the riverbed. The City is currently constructing a project that replaces the river crossing with new transmission piping suspended from a utility and pedestrian bridge; the project will be completed in 2024 and is identified in **Chapter 8**.

In recent years, the production capacity of Coal Creek Springs has been reduced. A maximum instantaneous production rate up to 4,500 gpm is currently feasible, however a more consistent functional production capacity of 3,500 gpm is currently achieved (approximately 52 percent of the water right capacity). The City is currently investigating the cause of reduced production and potential solutions. A capital project is planned to rehabilitate Coal Creek Springs once a solution is identified; the project is discussed further in **Chapter 8**.

3.1.2.2 West Hill Springs

Although the use of West Hill Springs as a potable water supply dates to before 1907, most of the current facilities and equipment were constructed after 1960. More recent improvements include replacement of the collection boxes, as recommended in the 1995 Comprehensive Water Plan, and partial fencing of the watershed, as recommended by the 2000 Water Comprehensive Plan. The spring's existing transmission main is constructed of 10-inch diameter cast iron piping and has experienced two breaks. The City plans to replace approximately 1,250 linear feet of the transmission main with 12-inch diameter ductile iron pipe in an upcoming capital project identified in **Chapter 8**.

3.1.2.3 Well 1

Well 1 was constructed in 1960 and underwent substantial renovation in 2016, significantly improving the overall facility condition. Renovations included transmission piping to Howard Road CCT Facility, site improvements, a new well house, new pumping system, disinfection with sodium hypochlorite, on-site emergency power, and upgraded electrical and supervisory control and data acquisition (SCADA) controls. The new well pumping system is a two-stage, vertical turbine pump with a capacity of 2,100 gpm, driven by a 100-HP motor and controlled by a variable frequency drive (VFD). Supply from Well 1 will be routed along the recently constructed 16-inch transmission main and conveyed to the Howard Road CCT Facility.

3.1.2.4 Wells 2 & 6

Well 2 was constructed in 1970 and the well and well house were replaced in 2000 with a new masonry building and pumping equipment as part of the City's corrosion control strategy. The facility built in 2000 also houses Well 6, which was built in 1999. Within the facility is a two-stage 1,115 gpm centrifugal pump powered by a 125-HP motor, installed in 2023 (Well 2), and a two-stage, vertical-turbine pump driven by a 200-HP motor (Well 6). The pumping capacity of Well 6 has been reduced in recent years to a typical production rate of 1,200 gpm due to fouling of the well screen that requires occasional cleaning. The wells discharge to a 14-inch transmission main to Fulmer Field CCT Facility for treatment prior to distribution.

Since the Fulmer Field CCT Facility is required to re-pump the water from Wells 2 and 6 into the Valley Service Area and to Reservoir 2, Wells 2 and 6 are functional only with operation of the Fulmer Field CCT Facility. Chlorination and emergency power for both Wells 2 and 6 are housed in the Fulmer Field CCT Facility.

In 2023 the City completed an interim replacement of the pump at Well 2. Full replacement of Well 2 is planned as a capital project discussed further in **Chapter 8**. Additionally, rehabilitation work completed in 2013 and 2014 indicated that it would be beneficial to clean and rehab both wells on a regular basis. As such, the City initiated a program for regular cleaning of the wells established on a 3-year cycle which is discussed further in **Chapter 8**.

3.1.2.5 Wells 3A & 3B

Wells 3A and 3B are located at the same site, off 37th Street SE on the extension of E Street SE. The wells are approximately 50 feet apart and were constructed in 1983 and 1984 respectively. Each well is equipped with a four-stage, centrifugal pump driven by a 125-HP motor, each with a maximum pumping capacity of 1,650 gpm when operated individually. A standby generator capable of running one pump at a time is available on site. The system is equipped with an automatic transfer switch.

Currently, Wells 3A and Well 3B are not operated because they produce water that contains high concentrations of manganese. Since the wells were taken offline, the chlorination facilities have been removed. If operated, the wells pump directly into the Valley Service area distribution system. The City plans to construct treatment for these wells as part of the "Wells 3A/3B Treatment" project discussed further in **Chapter 8**.

3.1.2.6 Well 4

Well 4 was originally constructed in 1985, was rebuilt in 2012, and is currently undergoing significant upgrades to mechanical and electrical equipment, including well pump piping, valve replacement, and control panel replacement. Once the upgrades are complete this source will be considered in excellent condition. The well is equipped with a 2,600-gpm, four-stage, centrifugal, turbine pump driven by a 300-HP motor. Well 4 pumps directly to a 16-inch transmission main that can either convey water to Reservoir 1 or to distribution through a PRV. Well 4 is an important supply for the southern end of the City's Retail Water Service Area (RWSA). Operation of the well is normally controlled by the water level in Reservoir 1.

3.1.2.7 Well 5

Well 5 is one of three City wells that were constructed to serve the Lakeland Hills Development within the City's Lakeland Service Area. Well 5 pumps directly into the Lakeland Service Area distribution system. The well was constructed in 1983 and is equipped with a seven-stage submersible turbine pump, driven by a

125-HP motor. The well facility was assessed to be in poor condition in the 2013 Water Facilities Evaluation Study. The City plans to upgrade the facility as part of the Well 5/5A Upgrades project discussed in **Chapter 8**.

3.1.2.8 Well 5A

Well 5A is the second well serving the Lakeland Service Area and was constructed in 1990 to supplement Well 5. The well pumps directly into the Lakeland Service Area distribution system. The well is equipped with a ten-stage submersible turbine pump, driven by a 60-HP motor and has on-site chlorination facilities. A manual transfer switch is provided to allow operation of Well 5A using a portable emergency generator. The well facility was assessed to be in poor condition in the 2013 Water Facilities Evaluation Study. The City plans to upgrade the facility as part of the Well 5/5A Upgrades project discussed in **Chapter 8**.

3.1.2.9 Well 5B

Well 5B was constructed in 2005 with a 600 gpm pump. Once this source came on-line, the City discovered the aquifer was not recovering, so the well was taken out of service in 2006 and has not been operated since. The City has no plans to operate this well within the planning horizon.

3.1.2.10 Well 7

Well 7 was constructed in 1997 and was originally equipped with a 3,500-gpm variable-stage, vertical-turbine pump driven by a 500-HP motor. Well 7 is configured to pump directly to the Fulmer Field CCT Facility through a 16-inch transmission main. The treated water is then re-pumped into the Valley Service Area. If necessary, Well 7 can pump untreated water directly to the Valley Service Area through a PRV. The well was taken out-of-service in 2012 due to high manganese concentrations. The City has planned capital projects to expand the treatment capacity and treat manganese at Fulmer Field CCT Facility to accommodate flows from Well 7 so operation of this facility can be reinstated. The projects to provide treatment and back-up power for Well 7 are discussed in **Chapter 8**.

3.1.2.11 Algona Well 1

In 1996, the City acquired the water rights for Algona Well 1 as a condition of the wholesale agreement with the City of Algona (Algona). Due to pump operational problems, Algona Well 1 was removed from service. The 500-gpm pump and associated piping have been removed from the well house and the building has been demolished, but the well casing is still intact, and the well is plugged. The City has a capital project identified in **Chapter 8** to study the well and options for potential use or relocation.

3.1.3 Water Treatment Facilities

The City's water treatment facilities provide chlorination and corrosion control. An inventory of the water system's treatment facilities, including the treatment type, capacity, remaining useful life, condition, and criticality is provided in **Table 3-6**. Condition ratings are assigned based on the 2013 Water Facilities Evaluation Study. A detailed description of each water treatment facility and planned improvements is provided following **Table 3-6**.

Table 3-6 | Water Treatment Facility Inventory

Facility Name	Treatment Type	Treatment/ Dosing Capacity	Install Date	Design Life (years)	Remaining Useful Life (years)	Condition Rating (Bigger # = Worse Condition)	Criticality Rating (Bigger # = Less Critical)
Coal Creek Springs	Gas Chlorination	0.75-0.80 mg/L	1976	35	-13	3	2
West Hill Springs	Gas Chlorination	0.75-0.80 mg/L	1992		15	5	3
Fulmer Field CCT Facility	Hypochlorite	0.95 mg/L	2002	35	13	5	2
	Corrosion/Air-Stripping	11.88 MGD					1
Howard Road CCT Facility	Corrosion/Air-Stripping	8.06 MGD	2004		15	5	1
Terrace View Booster Pump Station	Re-chlorination	0.75 mg/L	2010		21	3	2
Well 1	Hypochlorite	0.75-0.80 mg/L	2016		27	2	2
Well 4	Hypochlorite	0.75-0.80 mg/L	2016		27	2	3
Well 5A	Hypochlorite	0.75-0.80 mg/L	1990		1	3	2

3.1.3.1 Chlorination Facilities

3.1.3.1.1 Coal Creek Springs Chlorination

The Coal Creek Springs chlorination station was built in 1976 and achieves 4-log treatment of the supply. The chlorination station is housed in a masonry building approximately 300 feet north of the collectors and is in fair condition. As a major source of water for the system, Coal Creek Springs is used to maintain chlorine residuals in the Academy Service Area and south end of the Valley Service Area.

This chlorination station is equipped with two chlorinators. Gaseous chlorine is stored on site in a separate room. Alarms from the chlorination equipment are transmitted back to the Water Control Center at the M&O Facility. A chlorine residual analyzer provides high and low alarms to the M&O Facility. Chlorine is dosed into the water at a range of 0.75-0.80 milligrams per liter (mg/L) and is adjusted based on the chlorine residual measured in the Academy and the south end of the Valley Service Area.

The City has a capital project planned to replace the chlorination building and upgrade the chlorination equipment from chlorine gas to hypochlorite disinfection. This project is discussed further in **Chapter 8**.

3.1.3.1.2 West Hill Springs Chlorination

The West Hill Springs Chlorination Facility was constructed in 1992. Water produced at West Hill Springs continuously flows from the collection boxes to the on-site chlorination station, housed in a wood building, where gas chlorine is metered continuously to treat the water. Chlorine dosage typically ranges from 0.75 – 0.80 mg/L and is adjusted based on the measured chlorine residual in the north end of the Valley Service Area. From the chlorination station, the water flows by gravity into the Valley Service Area.

3.1.3.1.3 Well 1

Liquid sodium hypochlorite treatment was installed at Well 1 in 2016. The chlorine dosage typically ranges from 0.75 - 0.80 mg/L. A residual monitoring system is tied into the City's existing SCADA system. The City plans to replace the liquid hypochlorite system with an on-site chlorine generation system (OSEC) to better accommodate seasonal changes to chemical demands and reduce chemical waste. This project is discussed further in **Chapter 8**.

3.1.3.1.4 Wells 2 and 6

Water produced at Wells 2 and 6 is treated and chlorinated at the Fulmer Field CCT Facility prior to distribution.

3.1.3.1.5 Well 4

Well 4 was equipped with a liquid sodium hypochlorite chlorination system in 2016. The chlorine dosage typically ranges from 0.75 – 0.80 mg/L. The City plans to replace the liquid hypochlorite system with an on-site chlorine generation system (OSEC) to better accommodate seasonal changes to chemical demands and reduce chemical waste. This project is discussed further in **Chapter 8**.

3.1.3.1.6 Well 5

There is currently no chlorination provided for water produced at Well 5. This City has a capital project discussed in **Chapter 8** that will include the addition of a chlorination facility to Well 5.

3.1.3.1.7 Well 5A

Well 5A was equipped with a liquid sodium hypochlorite chlorination station in 1990. The chlorine dosage typically ranges from 0.75 – 0.80 mg/L and is adjusted based on the chlorine residual measured in the Lakeland Service Area.

3.1.3.1.8 Fulmer Field CCT Facility

The Fulmer Field CCT Facility was constructed in 2004. Chlorination at Fulmer Field CCT, along with B Street Intertie, is a major source of chlorine residual in the north end of the Valley Service Area and in the Lea Hill Service Area and is achieved using an on-site chlorine generation system. The existing on-site chlorine generation cell was replaced in 2012, but the system was identified as being in poor condition and sourcing replacement parts for repairs has become increasingly more difficult. A capital project to replace the entire on-site generation system is planned and discussed further in **Chapter 8**.

The Fulmer Field CCT Facility treats the water from Wells 2, 6, and 7 (when operational). Chlorine is introduced into the system prior to the air-stripping towers at a dose of approximately 0.95 mg/L. The chlorine is adjusted based on measured chlorine residual at the station analyzer. The treated water is then stored in the clearwell and boosted into the distribution system and Reservoir 2. If needed, the chlorine can be manually introduced into the clearwell rather than prior to the towers.

3.1.3.1.9 Terrace View Booster Pump Station (BPS)

The Terrace View BPS was equipped with a liquid sodium hypochlorite chlorination system in 2010, adding 6 percent solution to the discharge piping of the station at an approximate dose of 0.75 mg/L.

3.1.3.1.10 Intertie Pump Station

Through the First Amendment to Interlocal Agreement No. 2 for the Lea Hill Intertie project executed in 2017, Covington Water District (CWD) terminated its rights or obligations to Interlocal Agreement No. 2 or the First Amendment and Lake Meridian Water District (LMWD) continues to receive wholesale water from the City, as needed, on an interruptible basis. The chlorination equipment was removed from the Intertie Pump Station since the intertie is not used on regular basis.

3.1.3.2 CCT Facilities

To limit the corrosion of lead and copper in the system, the City treats major supplies. The treatment process increases the pH of the water, which reduces the solubility of lead and copper, allowing the water to comply with the Lead and Copper Rule. The goal of the CCT facilities is to adjust the water leaving the facility to a pH of approximately 7.5.

3.1.3.2.1 Fulmer Field CCT Facility

The Fulmer Field CCT Facility also adjusts the pH of the water from its sources to approximately 8.0 by air-stripping in three 33,000 gallon air-stripping towers to provide corrosion control treatment. Three 10,000 cubic feet per minute (CFM) blowers provide air. As the carbon dioxide is stripped from the water, the treated water is stored in the clearwell and boosted through four booster pumps back into the distribution system and Reservoir 2. The firm capacity of the facility is 11.88 MGD.

3.1.3.2.2 Howard Road CCT Facility

The Howard Road CCT Facility was constructed in 2004. It has a life expectancy of an additional 15 years and is generally in fair condition. This facility is housed in a masonry building and treats the water from Coal Creek Springs and Well 1. The pH of the water from Coal Creek Springs and Well 1 is then adjusted to approximately 7.8 by air-stripping in two 33,000 gallon air-stripping towers. Two 9,300 CFM blowers provide air. The treated water is then stored in the clearwell at the facility and re-boosted through three booster pumps to Reservoir 1 and the Valley Service Area. The firm capacity of the facility is 8.06 MGD.

3.1.4 Storage Facilities

The City currently maintains a total of 15.7 million gallons (MG) of water storage in eight water reservoirs located throughout the system. Storage reservoirs are present in each of the City's Service Areas. The location of each storage reservoir is shown in **Figure 3-1**. A summary of the City's storage reservoirs, as well as the type of storage tank, installation date, remaining useful life, condition and criticality is provided in **Table 3-7**. Condition ratings are assigned based on the 2013 Water Facilities Evaluation Study. The storage volumes provided in **Table 3-7** represent the maximum tank volume; however, the City commonly operates the reservoirs at below the maximum levels. A detailed description of reservoir and planned improvements is provided following **Table 3-7**.

Table 3-7 | Inventory of Storage Reservoirs

Reservoir Name	Storage Volume (MG)	Type	Install Date	Design Life (years)	Remaining Useful Life (years)	Condition Rating (Bigger # = Worse Condition)	Criticality Rating (Bigger # = Less Critical)
Valley Service Area							
Reservoir 1	5.0	Prestressed Concrete	1975	100	45	5	2
Reservoir 2	3.6	Prestressed Concrete	1975		45	3	2
Lea Hill Service Area							
Reservoir 4A	1.0	Steel Standpipe	1965	70	11	3	2
Reservoir 4B	1.5	Steel Standpipe	1983		29	4	2
Lakeland Service Area							
Reservoir 5	1.0	Steel Standpipe	1981	70	27	2	3
Reservoir 6	1.0	Steel Standpipe	2012		58	2	3
Academy Service Area							
Reservoir 8A	1.2	Steel Standpipe	1973	70	19	3	3
Reservoir 8B	1.5	Steel Standpipe	1980		26	3	3

3.1.4.1 Reservoir 1

Reservoir 1 is located at the southeast end of the Valley Service Area and is the primary storage location for water produced at Coal Creek Springs and pumped from the Howard Road CCT Facility. Reservoir 1 can also be filled by water produced at Well 4. The reservoir was constructed in 1975 and is a covered, pre-stressed concrete tank with a capacity of 5 MG. Reservoir 1 is 184.5 feet in diameter and has an overflow elevation of 269 feet. Academy Pump Station 3 draws water from Reservoir 1 to feed the Academy Service Area. Reservoir 1 also serves the Valley Service Area through Control Valve 1. Control Valve 1 is essential to limit flow and maintain adequate supply to the Valley Service Area.

Reservoir 1 was last inspected and cleaned on March 15, 2023. Recommended improvements identified in 2013 Water Facilities Evaluation Study are planned to be completed as part of the “Reservoir Capital Improvements” project discussed further in **Chapter 8**.

3.1.4.2 Reservoir 2

Reservoir 2 is located on the northeast side of the City’s Water Service Area and serves the Valley Service Area. The reservoir was constructed in 1975 and is a buried, pre-stressed concrete tank with public tennis courts on the concrete roof. The reservoir has a maximum storage capacity of 3.6 MG, has a diameter of 143 feet and an overflow elevation of 252.7 feet. Reservoir 2 is filled by the water sources located in the Valley Service Area and is also filled from Reservoir 1 through Control Valve 1.

Reservoir 2 was last inspected and cleaned on March 13, 2023. A capital project is planned to replace the fill and drain valves associated with the reservoir; the project is discussed further in **Chapter 8**. This project will also resolve improvements identified in the 2022 sanitary survey.

3.1.4.3 Reservoirs 4A and 4B

Storage in the Lea Hill Service Area is provided in two steel standpipe reservoirs located in the northeast corner of the City's RWSA, Reservoir 4A and Reservoir 4B. The reservoirs have capacities of 1.0 MG and 1.5 MG respectively. Reservoir 4A was constructed in 1965 with a diameter of 46 feet and an overflow elevation of 578.5 feet. Reservoir 4B was constructed in 1983 with a diameter of 58 feet and an overflow elevation of 579.6 feet. Water is supplied to the Lea Hill reservoirs from the City's Valley Service Area through the Green River Pump Station and Lea Hill Pump Station.

The reservoirs were last inspected and cleaned in June and April of 2018. A capital project is currently installing seismic control valves on the outlet piping from both reservoirs to prevent catastrophic flow during a seismic pipe failure; the project is discussed further in **Chapter 8**. Additionally, required improvements identified in the 2022 Sanitary Survey will be completed as part of the Reservoir Repair and Replacements Program also discussed in **Chapter 8**.

3.1.4.4 Reservoir 5

Reservoir 5 is one of two reservoirs providing storage for the Lakeland Service Area. The reservoir was constructed in 1981 and has a total capacity of 1.0 MG. The reservoir is filled by Well 5, Well 5A, and the Terrace View BPS. Reservoir 5 is steel standpipe with a 53.25-foot diameter and an overflow elevation of 638.5 feet. The reservoir was last cleaned and inspected in 2019 and the interior and exterior were last painted in 2016 as part of routine maintenance.

3.1.4.5 Reservoir 6

Reservoir 6 is in the Lakeland Service Area within the boundary of the Lakeland 697 pressure zone but is connected to distribution piping for the Lakeland 630 pressure zone. Reservoir 6 is a steel standpipe constructed in 2012 and has a total capacity of 1.0 MG. This reservoir has a diameter of 63.4 feet and an overflow elevation of 638.9 feet. The reservoir is filled by Well 5, Well 5A, and the Terrace View BPS. The reservoir was last cleaned and inspected in 2019.

3.1.4.6 Reservoir 8A and 8B

Reservoirs 8A and 8B are steel standpipes that provide storage for the Academy Service Area. The reservoirs are normally operated in parallel, functioning as one large reservoir. Reservoir 8A has a diameter of 52.75 feet and a total storage volume of 1.2 MG and was constructed in 1973. Academy Reservoir 8B has a diameter of 60 feet and a total storage volume of 1.5 MG and was constructed in 1980. Both reservoirs have an overflow elevation of 544 feet. Academy Pump Station 3 fills the reservoirs.

The reservoirs were last cleaned and inspected in October 2019. A capital project is currently installing seismic control valves on the outlet piping from both reservoirs to prevent catastrophic flow during a seismic pipe failure; the project is discussed further in **Chapter 8**. Additionally, required improvements identified in the 2022 Sanitary Survey will be completed as part of the Reservoir Repair and Replacements Program also discussed in **Chapter 8**.

3.1.5 Pump Station Facilities

The City operates and maintains several pump stations to move water throughout the distribution system and to provide water at the required service pressures. An inventory of the City's pump stations is provided in **Table 3-8** and locations are shown in **Figure 3-1**. Condition ratings provided in **Table 3-8** are assigned based on findings from the 2013 Water Facilities Evaluation Study.

Table 3-8 | Pump Station and Booster Pump Station Inventory

Facility Name	Firm Capacity (gpm)	Firm Capacity (MGD)	Install Date	Design Life (years)	Remaining Useful Life (years)	Condition Rating (Bigger # = Worse Condition)	Criticality Rating (Bigger # = Less Critical)
Lea Hill Service Area							
Intertie Pump Station (Wholesale)	3,510	5.05	1999	40	15	3	4
Lea Hill BPS	300	0.432	1999		15	3	3
Lea Hill Pump Station	1,200	1.73	1965		-19	6	3
Green River Pump Station	3,498	5.04	1999		15	3	2
Valley Service Area							
Game Farm Park Pump Station	50	0.07	1988	40	4	7	4
Lakeland Service Area							
Lakeland Hills BPS	4,205	6.06	2012	40	28	2	2
Terrace View BPS	1,000	1.44	2010		26	2	2
Fulmer Field CCT Facility	8,250	11.88	2004		20	3	1
Howard Road CCT Facility	5,600	8.06	2004		20	4	1
Academy Service Area							
Academy Pump Station 3	2,100	3.02	2023	40	39	1	1
Academy East BPS	3,040	4.38	2014		30	2	2

3.1.6 Facility Back-Up Power

An inventory of the City's existing facilities with backup power accommodation is provided in **Table 3-9**. Of the City's twelve water sources, only Wells 5 and 7 are currently without a standby power source. Standby power will be added to both wells as part of capital projects discussed in **Chapter 8**. Back-up power for Wells 2 and 6 is housed at the Fulmer Field CCT Facility.

The Game Farm Park Pump Station, Lea Hill BPS, and Intertie Pump Station are the only pump stations without a standby power source or connection. Backup power will be added to the Lea Hill BPS as part of a capital project discussed further in **Chapter 8**. The Game Farm Park Pump Station is a small facility that serves a recreational area and does not serve residential or commercial properties, therefore back-up power is not a critical element.

Table 3-9 | Back Up Power Inventory

Generator Location	Generator Type and Size	Install or Purchase Date	Design Life (years)	Remaining Useful Life (years)	Condition Rating (Bigger # = Worse Condition)	Criticality Rating (Bigger # = Less Critical)
Fulmer Field CCT Facility	On-site, 1000 kW	2001	25	2	4	3
Howard Road CCT Facility	On-site, 600 kW	2004		5	3	3
Academy East BPS	On-site, 600 kW	2010		11	2	3

Generator Location	Generator Type and Size	Install or Purchase Date	Design Life (years)	Remaining Useful Life (years)	Condition Rating (Bigger # = Worse Condition)	Criticality Rating (Bigger # = Less Critical)
Academy Pump Station 3	On-site, 450 kW	2023		24	1	3
Green River Pump Station	On-site, 515 kW	2004		5	2	3
Lakeland Hills BPS	On-site, 300 kW	2012		13	2	3
Lea Hill Pump Station	On-site, 250 kW	1964		-35	6	3
Terrace View BPS	On-site, 250 kW	2010		11	2	3
Well 1	Portable, 230 kW	2014		15	2	3
Well 3A/3B	On-site, 210 kW	1983		-16	5	3
Well 4	On-site, 450 kW	2016		17	2	3
Well 5A	Portable, 230 kW	1992		-7	4	3
Well 5B	On-site, 400 kW	2005		6	3	4
Coal Creek Springs	On-site, 20 kW	1964		-35	6	3

3.1.7 Facility Monitoring and Control

Primary monitoring and operation of the City’s water system and facilities is conducted via a SCADA computerized control system. A software program called “AVEVA” works in association with SCADA to provide real time graphical display of system data, set points, and alarms for staff monitoring and control. The City’s SCADA system controls are centralized at the Public Works M&O Facility. Major upgrades of the City’s SCADA system were complete in 2015 and again in 2024, and the system regularly undergoes updates as facility upgrades or improvements are completed.

3.1.8 2022 Sanitary Survey Findings

The City has already taken corrective actions and will continue to resolve all deficiencies identified in the 2022 Sanitary Survey, as summarized in **Table 3-10**.

Table 3-10 | Summary of 2022 Sanitary Survey Findings

Issues/Recommended Improvements			Required Action
Sources and Treatment			
Well 3A	Offline due to manganese issues		--
Well 3B	Offline due to manganese issues		--
Well 5	Water supply lines to chlorine solution tanks must be provided with either air gaps or reduced pressure backflow assemblies to eliminate potential cross connections.		This deficiency was mislabeled by DOH, This should have been for Well 4. A letter from the DOH acknowledging the error was received on October 17, 2022.
	Pump to waste line should terminate above grade.		Will be addressed in Well 5/5A Upgrades project included in CIP; refer to Chapter 8 .
Well 5A	Water supply lines to chlorine solution tanks must be provided with either air gaps or reduced pressure backflow assemblies to eliminate potential cross connections.		Completed. On September 21, 2022, a reduced pressure backflow assembly was installed at Well 5A, on the water supply line to the chlorine tank.
	Raise casing to terminate above grade or provision of sump pump or alarms that activate when water accumulates in vault. In the meantime, the vault		City implemented an inspection program in October 2022.

Issues/Recommended Improvements		Required Action
	should be inspected weekly and immediately following significant storm events.	Will be addressed further in Well 5/5A Upgrades project included in CIP; refer to Chapter 8 .
Well 7	Offline due to manganese issues	--
Storage		
Reservoir 2	Reservoir overflow should not be connected directly to any drain, sanitary sewer, or storm sewer.	Will be addressed in Reservoir 2 improvements project included in CIP; refer to Chapter 8 .
Reservoir 4A	Reservoir vents should open downward to prevent windblown debris from entering tank.	Will be completed as part of City's annual Reservoir Repair and Replacement program or Reservoirs 4 and 8 Seismic Rehabilitation project; refer to Chapter 8 .
	Reservoir overflow should not be connected directly to any drain, sanitary sewer, or storm sewer.	Will be completed as part of City's annual Reservoir Repair and Replacement program or Reservoirs 4 and 8 Seismic Rehabilitation project; refer to Chapter 8 .
Reservoir 4B	Reservoir overflow should not be connected directly to any drain, sanitary sewer, or storm sewer.	Will be completed as part of City's annual Reservoir Repair and Replacement program or Reservoirs 4 and 8 Seismic Rehabilitation project; refer to Chapter 8 .
Reservoir 8A	Reservoir overflow screen must be repaired	Completed. On September 13, 2022, the overflow screen at Reservoir 8A was repaired.
	Reservoir vents should open downward to prevent windblown debris from entering tank.	Will be completed as part of City's annual Reservoir Repair and Replacement program or Reservoirs 4 and 8 Seismic Rehabilitation project; refer to Chapter 8 .
Reservoir 8B	Reservoir overflow screen must be repaired	Completed. On September 13, 2022, the overflow screen at Reservoir 8B was repaired.
	Reservoir vents should open downward to prevent windblown debris from entering tank.	Will be completed as part of City's annual Reservoir Repair and Replacement program or Reservoirs 4 and 8 Seismic Rehabilitation project; refer to Chapter 8 .

3.2 Water Quality

The quality of drinking water in the United States is regulated by the EPA. Under provisions of the Safe Drinking Water Act (SDWA) established in 1974, the EPA is allowed to delegate primary enforcement responsibility for water quality control to each state. In the State of Washington, DOH is the agency responsible for implementing and enforcing the drinking water regulations. For the State to maintain the authority to implement requirements under the SDWA, it must adopt drinking water regulations that are at least as stringent as federal regulations. In meeting these requirements, the State has published drinking water regulations that are contained in Chapter 246-290 of the WAC.

As a Group A system, the City is responsible for monitoring and complying with all applicable SDWA and WAC regulations pertaining to source water and distribution system water quality. The purpose of this section is to document the water system’s water quality compared to the above drinking water standards, satisfying the requirements of WAC 246-290-100(4)(e)(ii).

The City also owns and operates the Braunwood satellite system located in southeast Auburn in the Braunwood development, also known as the Hidden Valley Acres development. This system is classified as a Group A - Community Water System by DOH. This system is not discussed further in this chapter since it is a small satellite system that is regularly monitored by the City as required and has not had water quality issues as documented in the City’s annual water quality reports for the system.

This section includes the following:

- Water quality and treatment objectives
- Analysis of source water quality
- Analysis of distribution system water quality
- Recent regulatory changes

3.2.1 Water Quality Treatment and Objectives

The treatment objectives of the City are to treat source water to contaminant concentrations below the MCLs established by the EPA and WAC.

Historically, the City has relied on groundwater supplied from wells and springs, which have been determined to be not under the direct influence of surface waters (DOH 2004 for Coal Creek Springs). For these water sources, the City is required to meet the EPA’s Groundwater Rule (GWR). The City treats water from all groundwater and spring sources, except for Well 5. The City’s water treatment facilities provide chlorination and corrosion control. A summary of the required operator certifications for each type of facility is provided in **Table 3-11**.

Table 3-11 | Summary of Operator Certifications

Treatment Facility	Required Operator Certifications
Corrosion Control Treatment (CCT) Facilities	Water Distribution Manager 4 (WDM-4) and Water Treatment Plant Operator (WTPO)
Chlorination Facilities	WDM-4

The City began using surface water in 2012 through the B-St Wholesale Intertie with the City of Tacoma (Tacoma). This supply, referred to as the Regional Water Supply, originates from the Green River and the Howard Hansen Dam. Since the City receives treated water as a wholesale purchaser, it is not required to meet the Surface Water Treatment Rule. Tacoma maintains compliance with the Interim Enhanced Surface Water Rule, Long Term 1 and Long Term 2 Enhanced Surface Water Treatment Rules; and the Filter Backwash Recycling Rule. The City has not purchased water for consumption from Tacoma since 2016.

3.2.2 Analysis of Source Water Quality

3.2.2.1 Raw Water Quality

The City only samples post-treatment water except for Well 5, which does not currently have treatment or chlorination. Water quality data for Well 5 is provided in **Table 3-12**.

3.2.2.2 Finished Water Quality

Monitoring of inorganic chemical and physical parameters varies by source but is typically required once per 36-month compliance period, however, the City typically monitors these constituents every 12 months (annually) in July. Samples are collected from each source following treatment. A summary of the maximum detected concentrations for monitoring data from 2015 through 2022 is provided in **Table 3-12**. During this time, none of the MCLs published by the EPA were exceeded; all samples were below required limits.

Asbestos sampling is usually required once per 36-month compliance period. However, the City has a waiver that requires sampling once every nine years at three distribution system sample sites. No data was collected during the study period. The City is expected to sample again in 2028. Annual VOC sampling is required for Wells 2 and 6, which are both currently represented by the Fulmer Field CCT Facility. All active sources are disinfected with chlorine prior to entering the distribution system except for Well 5, which serves the Lakeland Service Area.

Monitoring data for 2015 through 2022 for inorganic constituents, physical parameters, SOCs, and VOCs were reviewed and is summarized in **Table 3-12**. All values are post-treatment, except for Well 5 since water from this source is not treated. Wells 3A, 3B, 5B, and 7 were not used during this period and were therefore not sampled.

Table 3-12 | EPA Primary Drinking Water Standards Results from 2015 through 2022

Constituent	MCL	Units	Maximum Detected Concentration From 2015 Through 2022 ¹ (mg/L)						
			Coal Creek Springs	West Hill Springs	Well 1	Well 4	Well 5	Well 5A	Fulmer Field CCT Facility ²
EPA Primary Drinking Water Standards									
Arsenic	0.01	mg/L	0.001	0.001	0.001	0.001	0.001	0.002	0.002
Barium	2	mg/L	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Cadmium	0.005	mg/L	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Chromium	0.1	mg/L	0.007	0.007	0.007	0.007	0.007	0.007	0.007
Mercury	0.002	mg/L	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
Selenium	0.05	mg/L	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Beryllium	0.004	mg/L	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003
Nickel ³	-	mg/L	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Antimony	0.006	mg/L	0.003	0.003	0.003	0.003	0.003	0.003	0.003
Thallium	0.002	mg/L	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Cyanide	0.2	mg/L	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Fluoride	4.0	mg/L	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Nitrite-N	1	mg/L	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Nitrate-N	10	mg/L	1.7	3.6	2.4	1.4	1.9	0.4	1.7
Total Nitrate/Nitrite ⁴	10	mg/L	1.7	3.6	2.4	1.4	1.9	0.5	1.7
EPA Secondary Drinking Water Standards ⁵									
Iron	0.3	mg/L	0.1	0.1	0.1	0.62 ⁶	0.16	0.1	0.1
Manganese	0.05	mg/L	0.01	0.01	0.01	0.01	0.01	0.01	0.032
Silver	0.1	mg/L	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Chloride	250	mg/L	5	8	5	4	6	3	9
Sulfate	250	mg/L	9	15	12	12	11	6	14
Zinc	5	mg/L	0.2	0.2	0.2	0.2	0.2	0.2	0.2
State Regulated Characteristics									
Sodium	20	mg/L	6	8	7	7	10	6	12
Conductivity	700	umhos/cm	150	254	184	152	275	133	224

Constituent	MCL	Units	Maximum Detected Concentration From 2015 Through 2022 ¹ (mg/L)						
			Coal Creek Springs	West Hill Springs	Well 1	Well 4	Well 5	Well 5A	Fulmer Field CCT Facility ²
Turbidity	1	NTU	0.4	1.5	9.6	5.8	1.2	0.4	3.1
Color	15	Color Units	5	5	10	5	5	5	5
Total Dissolved Solids (TDS) ⁷	600	mg/L	N/A	N/A	N/A	N/A	N/A	N/A	N/A
State Unregulated									
Lead ⁸	0.015	mg/L	0.001	0.001	0.001	0.018	0.001	0.001	0.001
Copper	1.3	mg/L	0.02	0.3	0.02	0.2	0.02	0.02	0.02
Hardness ⁹	-	mg/L	66	122	83	100	130	62	100

Notes:

1. Based on monitoring conducted between 2015 and 2022. Wells 3A, 3B, and 5B were not in use during this time period and no monitoring was conducted.
2. The Fulmer Field CCT Facility was monitored in 2015, 2018, 2020, 2021, and 2022, it replaces monitoring of Wells 2, 6, and 7.
3. There is no state or federal MCL, but Washington state has a detection reporting limit of 0.005 mg/L.
4. EPA has set a treatment goal of Total Nitrate at 10 mg/L.
5. EPA does not enforce these "secondary maximum contaminant levels" (SMCLs). They are established as guidelines to assist public water systems in managing their drinking water for aesthetic considerations, such as taste, color, and odor. These contaminants are not considered to present a risk to human health at the SMCL.
6. Iron levels in Well 4 exceeded the Secondary Drinking Water Standards in 2015 but have since all been below the MCL.
7. N/A - not applicable, no testing conducted; testing for total dissolved solids is only required if the specific conductivity is greater than 700 micromhos per centimeter (umhos/cm).
8. On November 30, 2023, the EPA announced the proposed Lead and Copper Rule Improvements, which would lower the Lead Action Level from 0.015 mg/L to 0.010 mg/L if finalized in October 2024.
9. No MCL, as hardness is not a regulated characteristic.

3.2.2.3 Water Quality and Treatment Technique Violations

There were no water quality treatment violations from 2015 through 2022.

3.2.3 Analysis of Distribution System Water Quality

3.2.3.1 Seasonal Water Quality Changes

Water quality within the distribution system is relatively consistent throughout the year. The Valley Service Area distribution water experiences low pH during the winter, however no changes are implemented to offset seasonal variations.

3.2.3.2 Distribution Water Quality Objectives

The City collects 100 samples at 70 dedicated sampling sites for total and fecal coliform monitoring. Sampling is conducted at one quarter of the routine sample locations each week during the first four weeks of a month. The City also monitors weekly for total and fecal coliform at Coal Creek Springs and West Hill Springs at their respective collector vaults, as well as after treatment, and at several additional sites to support operations on a weekly basis. The City uses two types of disinfectant for treatment, chlorine gas and liquid sodium hypochlorite, which both produce free chlorine residuals in the distribution system. Average chlorine residuals throughout the distribution system ranged from 0.57 to 0.71 mg/L from 2015 through 2022, as summarized in **Table 3-13**. Although the range of chlorine residual varies throughout the year, the range of chlorine residual is relatively consistent from year to year. Planned improvements to chlorination facilities at Well 1 and Well 4 are expected to help maintain a more consistent chlorine residual level within the water system.

Table 3-13 | Total Chlorine Residuals Results from 2015 through 2022

Year	Sample Results (mg/L)	
	Average	Range
2015	0.71	0.40 - 1.09
2016	0.64	0.37 – 0.89
2017	0.58	0.32 – 0.79
2018	0.57	0.30 – 0.78
2019	0.59	0.33 – 0.77
2020	0.57	0.33 – 0.80
2021	0.58	0.36 – 0.78
2022	0.59	0.40 – 0.77

The Stage 1 Disinfection By-Product Rule (DBPR) monitoring was superseded in 2012 with Stage 2 DBPR monitoring because the City’s population exceeded 50,000 people. The City conducts monthly sampling within the distribution system to determine the concentration of fluoride. This sampling is in addition to the inorganic source monitoring required by DOH. The City does not add fluoride to their water. The City of Tacoma does fluoridate their water and is wholesale supplier to the City, but the City has not purchased water for consumption from Tacoma since 2016. Sampling is conducted for informational purposes only and to answer customer questions regarding natural fluoride in the City’s water. Should the City purchase water from Tacoma, this information would also be used to monitor the blending of different water sources within the distribution system.

In the event the City purchases water from Tacoma via the Cascade Water Alliance, such as during a shortage or other such operational constraint, the City will monitor and report distribution system disinfection residuals daily. These samples will be taken at the same time and place as the City’s routine coliform sampling.

The City conducted both Stage 1 and Stage 2 DBPR monitoring since the last water system plan (WSP). **Table 3-14** provides a summary of the sample results from 2015 through 2022. The City’s Total Trihalomethanes (TTHMs) and Haloacetic Acid 5 (HAA5) monitoring has been conducted once per year during the month with the warmest water temperature (i.e., July or August). All samples were well below the concentrations that DOH uses to determine whether a water system qualifies for reduced monitoring (0.080 mg/L for TTHMs and 0.060 mg/L for HAA5).

Table 3-14 | Summary of Disinfection By-Product Rule Monitoring Results from 2015 through 2022

Year	TTHM Concentration (µg/L) ²		HAA5 Concentration (µg/L) ²	
	Range for LRAA ¹	Compliance	Range for LRAA ¹	Compliance
2015	2.6 – 19.0	< 80	Not Detected – 4.8	< 60
2016	2.2 – 23.1	< 80	Not Detected – 6.0	< 60
2017	1.7 – 15.0	< 80	1.1 – 6.9	< 60
2018	6.7 – 15.1	< 80	Not Detected – 6.9	< 60
2019	ND	< 80	0.2 – 0.3	< 60
2020	7.5 – 11.95	< 80	Not Detected – 3.66	< 60
2021	6.45 – 17.62	< 80	1.25 – 12.41	< 60
2022	9.03 – 10.41	< 80	Not Detected	< 60

Notes:

1. Local running annual average.

2. Microgram per liter (µg/L).

Corrosion control treatment (CCT) is required for the water produced at Coal Creek Springs, Well 1, Well 2, Well 6, and Well 7. Per the Lead and Copper Rule (LCR), the City is required to collect at least 30 water samples per 36-month compliance period in alignment with reduced lead and copper monitoring requirements of WAC 246-290. Sample results from 2015 through 2022 are presented in **Table 3-15**. Since the CCT facilities were constructed, the lead and copper levels have been well below the action level.

DOH granted the City a (b)(3) exemption on August 17, 2021. This exemption, under 40 CFR Part 141.81(b)(3), eliminates the requirement for the City to conduct optimal water quality parameter (OWQP) sampling throughout the distribution system. Instead, the City continues to focus on lead and copper sampling at designated monitoring sites to meet compliance requirements. A copy of the City's exemption letter from DOH is included as **Appendix F**.

Table 3-15 | Summary of Lead and Copper Sampling Results from 2015 through 2022

Constituent	Range of Results from 2015 through 2022
Copper Concentrations (mg/L)	
Copper Concentration Range	<0.02 – 0.3
Copper 90 th Percentile	0.091
Lead Concentrations (mg/L)	
Lead Concentration Range	<0.001-0.018
Lead 90 th Percentile	<0.001

3.2.3.3 Water Quality and Treatment Technique Violations

There were no water quality violations in the distribution system from 2015 through 2022.

3.2.4 Recent Regulatory Changes

The EPA established a health advisory for drinking water of 70 parts per trillion (ppt) for perfluorooctane sulfonic acid (PFOS) and perfluorooctanoic acid (PFOA), two commonly found Perfluorinated compounds (PFAS). When both compounds are found in the water, the combined health advisory is also 70 ppt. The Washington State Board of Health (Board) adopted rule changes to chapter 246-290 WAC, Group A Public Water Supplies and WAC 246-390, Drinking Water Laboratory Certification and Data Reporting. The newly adopted rules became effective on January 1, 2022.

The rule establishes the administrative processes for setting drinking water quality standards as State Action Levels (SAL) and state MCLs. The rule establishes SALs for five PFAS contaminants: PFOA, PFOS, perfluorohexane sulfonic acid (PFHxS), perfluorononanoic acid (PFNA), and perfluorobutane sulfonic acid (PFBS). The rule requires Group A community and non-transient noncommunity public water systems to test for PFAS. For those Group A water systems that have detections of PFAS, but do not exceed the SAL, the rule requires additional ongoing monitoring, with the frequency of monitoring based upon the detected level in comparison to the SAL. It also establishes reporting, recordkeeping, and consumer confidence report requirements. For those Group A water systems that exceed the SAL, the rule requires follow-up actions such as monitoring, public notification, additional recordkeeping, and reporting requirements. SALs for regulated PFAS compounds are shown in **Table 3-16** with results from the City's latest samples. Most results indicated that the PFAS compounds were not detected (ND), being they were below detectable limits. PFBS was detected at Well 1, Coal Creek Springs, and West Hill Springs, however the levels are far

below regulated levels. In more recent results received in May 2024, all samples were below detection limits for all facilities and the City was approved for a 3-year testing schedule.

Furthermore, in April 2024, the EPA announced the first National Primary Drinking Water Regulation for six PFAS. This established individual MCLs for PFOA, PFOS, PFHxS, PFNA, and Hexafluoropropylene oxide dimer acid (HFPO-DA) and a Hazard Index MCL for PFAS mixtures containing at least two or more of PFHxS, PFNA, HFPO-DA, and PFBS. The EPA also finalized MCLGs for these PFAs, which can be seen alongside the MCLs in **Table 3-16**. The regulation requires that public water systems must monitor for these PFAS and must complete initial monitoring by 2027, followed by ongoing compliance monitoring. Water systems must provide the public with information on the PFAS levels in the drinking water beginning 2027. Public water systems must implement solutions by 2029 to reduce PFAS if monitoring shows that drinking water levels exceed the MCLs.

Table 3-16 | PFAS State Action Levels and Monitoring Data

PFAS Compound	SAL (ng/L)	MCL (ng/L)	MCLG (ng/L)	Maximum Detected Concentration (ng/L) ¹									
				Well 1	Fulmer Field CCT Facility	Well 3A	Well 3B	Well 4	Well 5	Well 5A	Well 5B	Coal Creek Springs	West Hill Springs
PFOA	10	4.0	0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PFOS	15	4.0	0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PFHxS	65	10	10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PFNA	9	10	10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PFBS	345	-	-	2.8	ND	ND	ND	ND	ND	ND	ND	3.1	3.0
HFPO-DA	-	10	10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mixtures containing two or more of PFHxS, PFNA, HFPO-DA, and PFBS	-	1 ³	1 ³	0	0	0	0	0	0	0	0	0	0

Notes:

1. Nanograms per liter (ng/L).
2. Not detected (ND).
3. Hazard Index – unitless.

3.3 Design Standards

The City's most recent Engineering Design Standards are available on the City's website and are provided as **Appendix P. Table 3-17** highlights keys standards that are used to evaluate the capacity of the City's water system, summarizing both DOH criteria and City criteria. The City's water quality design standards follow the design standards set forth by the EPA and DOH, as discussed in **Section 3.2**.

Table 3-17 | System Capacity Analysis Criteria

Evaluation Type		Evaluation Criteria	Agency's Standard
Water Reliability Recommendations	Multiple Source	2 or more supply sources are available	DOH
	Backup Power	Source of supply pump stations have power connections to two independent primary public power sources, have in-place auxiliary power available, and/or maintain adequate gravity standby storage	DOH
	Surface Water Reliability	Firm watershed yield for surface water provides 98% reliability to meet normal, anticipated system demands.	DOH
	Groundwater Reliability	Factor of safety is applied to well pumping test safe yield determination.	DOH
Water Source	Source Capacity	MDD while replenishing Fire Suppression Storage (FSS) within 72-hrs (24-hr source pumping may be assumed).	DOH
		ADD with largest source out of service.	DOH
		MDD in a pumping period of 20 hours or less of pumping.	DOH
		MDD with the largest active water source out of service.	City
Pump Stations	Capacity - Open System (sufficient storage in zone)	ADD with largest pump out of service.	DOH
		MDD with all pumps in service.	
		MDD with largest pump out of service.	City
		Fire Flow is met from storage reservoir.	
	Capacity - Closed System (no/insufficient storage in zone)	PHD with largest pump out of service.	DOH
		MDD + Fire Flow at a pressure of at least 20 psi at all points throughout the distribution system.	
		PHD + Fire Flow with largest pump out of service.	City
		Standby power with capacity to run with any single pump out of service.	

Evaluation Type		Evaluation Criteria	Agency's Standard
Storage Facilities	Total Storage Capacity	Sum of operational, equalization, standby, fire suppression, and dead storage.	DOH
	Operating Storage (OS)	The volume of water before sources turn on.	DOH
		(pump off elev. – pump on elev.) x gal/ft	
	Equalizing Storage (ES)	(PHD – maximum supply capacity) x 150 min	DOH
		Min. pressure of 30 psi.	
		Must be provided when source pumping capacity cannot meet the peak hourly demand.	
	Standby Storage (SB)	Min. standby storage of 200 gallons per ERU.	DOH
		Min. pressure of 20 psi.	
		Standby storage volume equal to one day of MDD for the pressure zone(s) served.	
	Fire Suppression Storage (FSS)	(required fire flow rate) x (duration in minutes)	DOH
Min. pressure of 20 psi.			
Nested storage (same storage for Standby and Fire Suppression Storge) requires written consent of fire protection authority.			
Dead Storage (DS)	Volume that cannot provide minimum design pressure (20 psi) to all customers.	DOH	
	Volume below the outlet pipe and cannot be used because of hydraulic limitations.	City	
Distribution System	Minimum Pressures	PHD at no less than 30 psi.	DOH
		MDD + Fire Flow at no less than 20 psi.	
	Maximum Pressures	Add individual PRVs for ADD pressures more than 80 psi.	DOH
		Max. target pressure of 80 psi in water distribution system.	City
	Maximum Velocity	No more than 8 feet per second (fps) under PHD conditions.	DOH
		No more than 8 fps in distribution mains and 5 fps in transmission mains under PHD conditions.	City
		No more than 18 fps under MDD+FF conditions.	
	Minimum Pipe Size	6-inch diameter in residential areas and 8-inch diameter in commercial areas, unless a hydraulic analysis justifies another size.	DOH
		Single-Family Residential minimum 8-inch diameter and Industrial/Commercial/Multi-Family minimum 12-inch diameter.	City
	Telemetry	Each parcel receiving water service shall have its own meter	City
Meters shall be located as close to the water main from which the service is taken as possible, distance not to exceed 50 feet.			
Meters shall be placed in landscape strips, behind the sidewalk, or at the right-of-way limits in that order of availability.			
Meters in landscaped or unimproved areas shall be set 2 inches above the finished grade.			
Maximum Valve Spacing	Maximum 400-foot spacing and at the intersection of lateral lines in all zones.	City	
Hydrant Spacing	Single-Family Residential maximum 600-foot spacing.	City	
	Industrial/Commercial/Multi-Family maximum 300-foot spacing.		
Fire Flow & Duration	Residential	Minimum 1,500 gpm at 2 hours.	City
	Multi-Family Residential	Minimum 2,500 gpm at 3 hours.	
	Commercial		
	Industrial		

3.4 Capacity Analysis

This section provides an analysis of legal and physical capacity of the water system based on the system's available water rights, sources, treatment, storage, and distribution components.

3.4.1 Water Rights

A summary of the City's current water rights is presented in **Table 3-18**. The maximum instantaneous allowable flow for each source (Qi) is in units of gpm. The total annual withdrawal for each source (Qa) is in units of acre-feet per year. The City does not have any interruptible water rights.

Table 3-18 | Summary of Existing Water Rights

Water Right	Primary Qi (gpm)	Primary Qa (acre-feet/year)
Coal Creek Springs	6,732	9,410
Well 1, 6, & 7	2,200	1,120
Well 2, 6, & 7	2,400	1,360
Well 3A & 3B, 6, & 7	2,800	3,600
Well 4, 6, and 7	2,800	3,600
Wells 5, 5A, 5B, & 5C	1,000	720
Well 5A	167	0
Algona Well	500	175
Braunwood Well ¹	20	6.5
West Hill Springs ²	625	1,010
TOTAL	19,244	21,002

Notes:

1. The Department of Ecology considers Braunwood a standalone non-municipal satellite water system.
2. Water from West Hill Springs operates through water right claim S1-049354CL. A claim is an assertion that a water right was created pre-code (1917 for surface water and 1945 for groundwater).

In addition to the water rights presented above, the City also has a wholesale agreement with the City of Tacoma and can purchase water through two interties as discussed in **Chapter 1, Section 1.6.1**. These two interties are also considered to be supply facilities. The City also has several emergency interties with adjacent purveyors.

3.4.1.1 Analysis Criteria

Supply facilities must be reliable and provide sufficient water at pressures that meet the requirements of WAC 246-290-230. The capacity of supply facilities in a pressure zone with adequate storage must be sufficient to provide water at a rate that is equal to or greater than the MDD of the zone being served. This approach assumes that demands greater than the MDD will be supplied using equalizing storage.

According to Section 3.10.5 and Section 5.4 of the 2020 DOH Water System Design Manual, water system sources must be capable of supplying MDD and replenishing depleted within 72-hours (assuming continuous pumping), provide MDD in a pumping period of 20 hours or less, and provide ADD with the largest source out of order. The City's standards have a more stringent requirement to provide MDD with the largest active source out of service.

3.4.1.2 Analysis Results

The City's water supply (production) capacity compared with demand projections and DOH and City criteria are summarized in **Table 3-19**. It is worth noting that the water supply (production) capacity is not synonymous with the supply water rights. The MDD and ADD values are based on the demand projections included in **Chapter 2** and include wholesale supply projections for the City of Algona. Demand allocation for the Muckleshoot Indian Tribe (MIT) Fish Hatchery and LMWD are not included. LMWD is not included since they do not rely on the City as their main source of water and have an interruptible wholesale agreement. Demand from the MIT Fish Hatchery is also not included since it is unknown when this facility will be constructed, however the analysis presented in **Table 3-19** shows that the City has sufficient surplus supply to support this demand when it comes to fruition. The FSS flow rate is calculated as the sum of the FSS for each service area presented in **Section 3.4.2.3.2**, which totals 797 gpm, divided over a 72-hour period.

The results presented in **Table 3-19** demonstrate that the City has the supply facilities necessary to meet demand projections under current and future projections for all required criteria.

Table 3-19 | Supply Analysis with Largest Source Out of Service

Description	2024 Scenario	2034 Scenario	2044 Scenario
Required Supply (gpm)			
FSS Replenished in 72-hours	797	797	797
Maximum Day Demand ¹ , gpm	8,657	9,751	11,068
Average Day Demand ¹ , gpm	4,899	5,518	6,263
Available Supply (gpm)			
Largest Source (Q _L) – Tacoma Interties	3,555	3,555	3,555
Largest Active Source – Coal Creek Springs ²	3,500	3,500	3,500
Total Sources (Q _T) ^{3,4}	15,610	15,610	15,610
DOH Criteria: MDD while replenishing FSS within 72-hrs (24-hr source pumping may be assumed)			
Surplus / (Deficit) of Supply, gpm	6,156	5,062	3,746
DOH Criteria: ADD with largest source out of service			
Surplus / (Deficit) of Supply, gpm	7,156	6,537	5,792
DOH Criteria: MDD in a pumping period of 20 hours or less of pumping			
Surplus / (Deficit) of Supply, gpm	4,352	3,257	1,941
City Criteria: MDD with largest active water supply source out of service			
Surplus / (Deficit) of Supply, gpm ²	3,453	2,359	1,042

Notes:

1. Current analysis does NOT include a separate allocation for wholesale customers who have not purchased water from the City since 2019 or earlier (i.e., MIT or LMWD).
2. The City's largest active source is Coal Creek Springs since the City has not purchased water from Tacoma since 2016.
3. Total sources are: Well 1, 2, 4, 5, 5a, and 6 (7,955 gpm), Coal Creek Springs (3,500 gpm), West Hill Springs (600 gpm), and two Tacoma Interties (3,555 gpm).
4. Supplies do NOT include emergency interties with CWD (1,736gpm) or LMWD (1,736 gpm).

The City's Water Rights Self-Assessment Form is provided in **Appendix I** and was used to assess the City's water rights water rights and includes supply that is available to the City through firm wholesale interties with Tacoma. The form includes a comparison of the available water rights to the existing, 10-year and 20-year demand projections for the "High Demand Scenario" presented in **Chapter 2**. The calculations presented in the Water Rights Self-Assessment Form conclude that the City's existing water rights are anticipated to be adequate to meet the current, 10-year, and 20-year demand projections.

The City does not have all the infrastructure required to withdraw from all water rights (i.e., Wells 3A, 3B, 5B, and 7 are not currently operational). Additionally, some sources have underlying aquifer or infrastructure restrictions that limit the capacity of the source (i.e., Well 2, Well 6, and Coal Creek Springs). Several facility improvement projects are necessary for the City to maximize water production capacity to meet future demands, and planned supply related capital projects to meet this need are discussed further in **Chapter 8**.

3.4.2 Physical Capacity Analysis

This section includes an analysis of the physical capacity of the City’s distribution system. The specific components analyzed include:

- Pump Station Capacity Analysis
 - Open Pressure Zones: Zones with storage reservoirs
 - Closed Pressure Zones: Zones without storage
- Storage Capacity Analysis
- Hydraulic Analysis of the Distribution System
- System Analysis based on ERUs

To complete the physical capacity analysis, the projected demands calculated in **Chapter 2** were utilized for the 2024 scenario (existing conditions), 2034 scenario (10-year projections) and 2044 scenario (20-year projections). When evaluating facilities under fire flow conditions, the largest fire flow demand was utilized in each Service Area. The fire flow required for single family residential customers is 1,500 gpm for two hours and all other customer types have a requirement of 2,500 gpm for two hours. There are select buildings throughout the system that require fire flow capacity in the water system that exceeds 2,500 gpm for two hours as determined by the Fire Marshal; these individual locations and their fire flow requirements are summarized in **Table 3-20**.

Table 3-20 | Buildings in Auburn with High Fire Flow Requirements

ID #	Location Description	Address	Service Area	Flow Required (gpm)
1	RPS Distribution Center	3702 C St. NE	Valley	4,000
2	Emerald Downs	2300 Emerald Downs Drive	Valley	3,000
3	Panattoni Warehouse	816 44th ST NW	Valley	4,000
4	Span Alaska Transportation Inc.	3815 W Valley Highway N	Valley	3,125
5	AMB Valley Distribution Center	2202 Perimeter Road SW	Valley	4,000
6	Grace Community Church	1106 12th Street SE	Valley	3,750
7	Riverside High School	501 Oravetz Road SE	Valley	3,000
8	Wesley Homes Senior Housing	10805 SE 320th Street	Lea Hill	4,000
9	Auburn Elementary School at Lakeland	1020 Evergreen Way SE	Lakeland	3,125
10	Academy Campus	5000 Auburn Way South	Academy	4,000
11	MIT Casino Expansion	2402 Auburn Way South	Academy	2,625

3.4.2.1 Pump Station Analysis: Open Pressure Zones

This section evaluates the pumping capacity of the water system on a zone-by-zone basis with consideration for pump stations between zones and supply wells pumping directly into the pressure zones

that contain a storage reservoir. All reduced pressure zones are included in the open zone analysis, as they are ultimately fed by gravity from a reservoir. Pressure zones that do not include a storage facility are analyzed as a closed zone.

3.4.2.1.1 Valley Service Area

The Valley Service Area is the largest service area in the water system and consists of two pressure zones: Valley 288 and Valley 242. The Valley 288 pressure zone is a transmission zone that does not directly serve any customers. Valley 242 is the largest pressure zone in the RWSA and is draws supply from the following facilities:

- Wells 2 and 6 via the Fulmer Field CCT Facility
- Coal Creek Springs and Well 1 via the Howard Road CCT Facility with transmission through Valley 288
- Well 4 with transmission through Valley 288
- West Hill Springs

Table 3-21 provides an overview of the total pump station capacity into the Valley Service Area compared with demand projections and DOH and City criteria. The results presented in **Table 3-21** demonstrate that the City has adequate pumping capacity within the open pressure zones of the Valley Service Area to meet current and future demand projections for all required criteria.

Table 3-21 | Pumps Station Capacity for Valley Service Area Open Pressure Zones

Description	Valley 2024 Scenario	Valley 2034 Scenario	Valley 2044 Scenario
Required Capacity (gpm)			
FSS Replenished in 72-hours	222	222	222
Maximum Day Demand, gpm	6,266	7,161	8,252
Average Day Demand, gpm	3,546	4,052	4,670
Available Capacity (gpm)			
Largest Pump (Q_L), gpm	2,800	2,800	2,800
Total Pumping Capacity (Q_t), gpm	19,400	19,400	19,400
DOH Criteria: Reliable Capacity (ADD + largest pump out of service)			
Surplus / (Deficit), gpm	15,854	15,348	14,730
DOH Criteria: Total Capacity (MDD + replenish FSS in 72-hours)			
Surplus / (Deficit), gpm	13,134	12,239	11,148
City Criteria: MDD + largest pump out of service			
Surplus / (Deficit), gpm	10,334	9,439	8,348

3.4.2.1.2 Lea Hill Service Area

Water supply for the Lea Hill Service Area is provided by the Lea Hill Pump Station and the Green River Pump Station. In 2014, the City added wholesale water supply from Tacoma through the 132nd Ave SW intertie, however the City has not purchased water for consumption from Tacoma since 2016. The intertie and pump stations feed the Lea Hill 563 pressure zone, which includes Reservoirs 4A and 4B. Therefore,

the Lea Hill and Green River Pump Stations were evaluated based on the open zone criteria. **Table 3-22** provides a summary of the pump station capacity into the Lea Hill Service Area compared with demand projections and DOH and City criteria. The results presented in **Table 3-22** demonstrate that the City has adequate pumping capacity within the open pressure zones of the Lea Hill Service Area to meet current and future demand projections for all required criteria.

Table 3-22 | Pump Station Capacity for Lea Hill Service Area Open Pressure Zones

Description	Lea Hill 2024 Scenario	Lea Hill 2034 Scenario	Lea Hill 2044 Scenario
Required Capacity (gpm)			
FSS Replenished in 72-hours	222	222	222
Maximum Day Demand, gpm	1,231	1,281	1,333
Average Day Demand, gpm	696	725	755
Available Capacity (gpm)			
Largest Pump (Q_L), gpm	1,166	1,166	1,166
Total Pumping Capacity (Q_T), gpm	6,664 ¹	6,664 ¹	6,664 ¹
DOH Criteria: Reliable Capacity (ADD + largest pump out of service)			
Surplus / (Deficit), gpm	5,968	5,939	5,909
DOH Criteria: Total Capacity (MDD + replenish FSS in 72-hours)			
Surplus / (Deficit), gpm	5,433	5,383	5,331
City Criteria: MDD + largest pump out of service			
Surplus / (Deficit), gpm	4,267	4,217	4,165

Note:

1. The Green River Pump Station has a firm capacity of 3,498 gpm (largest pump out of service) and the Lea Hill Pump Station has a firm capacity of 1,200 gpm (largest pump out of service). The largest pump at Green River and Lea Hill PS have 1,166 gpm and 800 gpm capacity, respectively. Therefore, the firm and total pumping capacity of both pump stations is 4,698 gpm (two pumps out of service) and 6,664 gpm (all pumps in service), respectively.

3.4.2.1.3 Lakeland Service Area

The Lakeland Service Area is supplied from the Upland Well Field (Wells 5 and 5A) and by sources in the Valley Service Area using the Terrace View BPS. The Terrace View BPS supplies the Lakeland 630 pressure zone from the Valley Service Area, which is then distributed through the Service Area. Since the Lakeland 630 pressure zone contains two reservoirs (Reservoirs 5 and 6), the Terrace View BPS was evaluated based on the open zone criteria. **Table 3-23** provides a summary of the pump station capacity into the Lakeland Service Area compared with demand projections and DOH and City criteria. The results presented in **Table 3-23** demonstrate that the City has adequate pumping capacity within the open pressure zones of the Lakeland Service Area to meet current and future demand projections for all required criteria.

Table 3-23 | Pump Station Capacity for Lakeland Service Area Open Pressure Zones

Description	Lakeland 2024 Scenario	Lakeland 2034 Scenario	Lakeland 2044 Scenario
Required Capacity (gpm)			
FSS Replenished in 72-hours	130	130	130
Maximum Day Demand, gpm	629	719	823
Average Day Demand, gpm	356	407	466
Available Capacity (gpm)			

Description	Lakeland 2024 Scenario	Lakeland 2034 Scenario	Lakeland 2044 Scenario
Largest Pump (Q_L), gpm	500	500	500
Total Pumping Capacity (Q_T), gpm	1,500	1,500	1,500
DOH Criteria: Reliable Capacity (ADD + largest pump out of service)			
Surplus / (Deficit), gpm	1,144	1,093	1,034
DOH Criteria: Total Capacity (MDD + replenish FSS in 72-hours)			
Surplus / (Deficit), gpm	871	781	677
City Criteria: MDD + largest pump out of service			
Surplus / (Deficit), gpm	371	281	177

3.4.2.1.4 Academy Service Area

The Academy Service Area is supplied from the Valley Service Area using Academy Pump Station 3. The pump station operates based on levels in Reservoirs 8A and 8B located in the Academy 531 pressure zone. **Table 3-24** provides a summary of the pump station capacity into the Academy Service Area compared with demand projections and DOH and City criteria. The results presented in **Table 3-24** demonstrate that the City has adequate pumping capacity within the open pressure zones of the Academy Service Area to meet current and future demand projections for all required criteria.

Table 3-24 | Pump Station Capacity for Academy Service Area Open Pressure Zones

Description	Academy 2024 Scenario	Academy 2034 Scenario	Academy 2044 Scenario
Required Capacity (gpm)			
FSS Replenished in 72-hours	222	222	222
Maximum Day Demand, gpm	531	591	658
Average Day Demand, gpm	300	334	373
Available Capacity (gpm)			
Largest Pump (Q_L), gpm	700	700	700
Total Pumping Capacity (Q_T), gpm	2,800	2,800	2,800
DOH Criteria: Reliable Capacity (ADD + largest pump out of service)			
Surplus / (Deficit), gpm	2,500	2,466	2,427
DOH Criteria: Total Capacity (MDD + replenish FSS in 72-hours)			
Surplus / (Deficit), gpm	2,269	2,209	2,142
City Criteria: MDD + largest pump out of service			
Surplus / (Deficit), gpm	1,569	1,509	1,442

3.4.2.2 Booster Pump Station Analysis: Closed Pressure Zones

The City operates a closed zone in each of its Service Areas. Closed zones do not have a storage reservoir directly serving the zone and are required to supply the peak hour demand (PHD) and fire flow via a BPS. The BPS serving each closed pressure zone was evaluated using the closed zone criteria as defined by DOH.

3.4.2.2.1 Lakeland Hills BPS

The Lakeland Service Area has two closed pressure zones served by the Lakeland Hills BPS: Lakeland 697 and Lakeland 670. **Table 3-25** provides a summary of the BPS capacity into the Lakeland closed pressure

zones compared with demand projections and DOH and City criteria. The results presented in **Table 3-25** demonstrate that the City has adequate pumping capacity within the closed pressure zones of the Lakeland Service Area to meet current and future demand projections for all required criteria.

Table 3-25 | BPS Capacity for Lakeland Service Area Closed Pressure Zones

Description	Lakeland 670 & 697 2024 Scenario	Lakeland 670 & 697 2034 Scenario	Lakeland 670 & 697 2044 Scenario
Required Capacity (gpm)			
Fire Flow Required, gpm	3,125	3,125	3,125
Maximum Day Demand, gpm	231	261	296
Peak Hour Demand, gpm	372	419	476
Available Capacity (gpm)			
Largest Pump (Q_L), gpm	3,125	3,125	3,125
Total Pumping Capacity (Q_t), gpm	7,330	7,330	7,330
DOH Criteria: Firm Capacity (no storage; PHD + largest pump out of service)			
Surplus / (Deficit), gpm	3,833	3,786	3,729
DOH Criteria: Reliable Capacity (no storage; MDD + FSS + largest pump out of service)			
Surplus / (Deficit), gpm	3,974	3,944	3,909
City Criteria: PHD+ FSS + largest pump out of service			
Surplus / (Deficit), gpm	708	661	604

3.4.2.2.2 Academy East BPS

The Academy Service Area has one closed zone served by the Academy East BPS: Academy 585. **Table 3-26** provides a summary of the BPS capacity into the Academy closed pressure zone compared with demand projections and DOH and City criteria. The results presented in **Table 3-26** demonstrate that the City has adequate pumping capacity within the closed pressure zones of the Academy Service Area to meet current and future demand projections for all required criteria.

Table 3-26 | BPS Capacity for Academy Service Area Closed Pressure Zone

Description	Academy 585 2024 Scenario	2 Academy 585 2034 Scenario	Academy 585 2044 Scenario
Required Capacity (gpm)			
Fire Flow Required, gpm	2,500	2,500	2,500
Maximum Day Demand, gpm	87	98	111
Peak Hour Demand, gpm	140	158	179
Available Capacity (gpm)			
Largest Pump (Q_L), gpm	1,250	1,250	1,250
Total Pumping Capacity (Q_t), gpm	4,290	4,290	4,290
DOH Criteria: Firm Capacity (no storage; PHD + largest pump out of service)			
Surplus / (Deficit) of Supply, gpm	2,900	2,882	2,861
DOH Criteria: Reliable Capacity (no storage; MDD + FSS + largest pump out of service)			
Surplus / (Deficit), gpm	1,703	1,692	1,679
City Criteria: PHD+ FSS + largest pump out of service			

Surplus / (Deficit), gpm	400	382	361
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3.4.2.2.3 Lea Hill BPS

The Lea Hill Service Area has one closed zone served by the Lea Hill BPS: Lea Hill 648. **Table 3-27** provides a summary of the BPS capacity into the Lea Hill closed pressure zone compared with demand projections and DOH and City criteria. The results presented in **Table 3-27** indicate that the Lea Hill BPS is currently deficient and cannot meet the required criteria for existing or future demands.

Table 3-27 | BPS Capacity for Lea Hill Service Area Closed Pressure Zone

Description	Lea Hill 648 2024 Scenario	Lea Hill 648 2034 Scenario	Lea Hill 648 2044 Scenario
Required Capacity (gpm)			
Fire Flow Required, gpm	2,500	2,500	2,500
Maximum Day Demand, gpm	110	124	141
Peak Hour Demand, gpm	178	200	227
Available Capacity (gpm)			
Largest Pump (Q_L), gpm	1,500	1,500	1,500
Total Pumping Capacity (Q_T), gpm	1,800	1,800	1,800
DOH Criteria: Firm Capacity (no storage; PHD + largest pump out of service)			
Surplus / (Deficit), gpm	122	100	73
DOH Criteria: Reliable Capacity (no storage; MDD + FSS + largest pump out of service)			
Surplus / (Deficit), gpm	(810)	(824)	(841)
City Criteria: PHD+ FSS + largest pump out of service			
Surplus / (Deficit), gpm	(2,378)	(2,400)	(2,427)

The Intertie Pump Station shares a building with the Lea Hill BPS and contains pumps which were originally purposed to serve the intertie for wholesale supply to CWD and LMWD. Since CWD and LMWD no longer rely on the City as their primary water source, the City plans to complete facility modifications so the pumps at the Intertie Pump Station can serve the Lea Hill 648 pressure zone. This project is discussed further in **Chapter 8** and will resolve the deficiencies identified in **Table 3-27**.

3.4.2.2.4 Game Farm Park Pump Station

The Valley Service Area has one closed zone served by the Game Farm Park Pump Station: Game Farm Park (no assigned pressure zone name). **Table 3-28** provides a summary of the BPS capacity into the Valley closed pressure zone compared with demand projections and DOH and City criteria. The results presented in **Table 3-28** indicate that the Game Farm Park Pump Station is currently deficient and cannot meet the required criteria for existing or future demands.

The Game Farm Park Pump Station provides service to a park restroom facility, two fire hydrants, and individual RV campsites. As this is a small BPS with the single purpose of providing service to a recreational area, and there are no residential or commercial property connections supplied by this facility, no actions are planned to resolve this deficiency. The DOH and City criteria are geared towards providing reliable service for residents and businesses and are not applicable for this minor facility. The City has reviewed this condition with the Fire Marshal, and no exceptions were taken. As further development progresses in and around the Game Farm Park Pump Station, modifications will be considered to address the deficiency.

Table 3-28 | BPS Capacity for Game Farm Park Closed Pressure Zone

Description	2024 Game Farm	2034 Game Farm	2044 Game Farm
Required Capacity (gpm)			
Fire Flow Required, gpm	1,500	1,500	1,500
Maximum Day Demand, gpm	0.4	0.4	0.4
Peak Hour Demand, gpm	0.6	0.6	0.7
Available Capacity (gpm)			
Largest Pump (Q_L), gpm	1,000	1,000	1,000
Total Pumping Capacity (Q_T), gpm	1,050	1,050	1,050
DOH Criteria: Firm Capacity (no storage; PHD + largest pump out of service)			
Surplus / (Deficit), gpm	49	49	49
DOH Criteria: Reliable Capacity (no storage; MDD + FSS + largest pump out of service)			
Surplus / (Deficit), gpm	(450)	(450)	(451)
City Criteria: PHD+ FSS + largest pump out of service			
Surplus / (Deficit), gpm	(1,451)	(1,451)	(1,451)

3.4.2.3 Storage Analysis

This section evaluates the City's existing water storage facilities to determine if there is sufficient capacity to meet existing and future storage requirements of the system.

3.4.2.3.1 Components of Storage

The City currently maintains a total of 15.7 MG of water storage in eight reservoirs located throughout the service area. Each Service Area has two reservoirs, providing redundancy for cleaning and maintenance. Historically, the City has evaluated each Service Area independently. However, new sources, pump stations, and PRV facilities now allow for reliable and redundant operation of the system as an interconnected whole, rather than as separate Service Areas. The storage analysis reflects the new operational ability by allowing sharing of emergency storage between the Service Areas. The existing infrastructure and customer expectations still require that other storage components, such as FSS, be stored in individual Service Areas.

Water storage requirements are typically defined by the following components: operational storage, equalizing storage, standby storage, fire suppression storage, and dead storage. A description of each storage component and the criteria used to evaluate the capacity of the City's reservoirs is as follows:

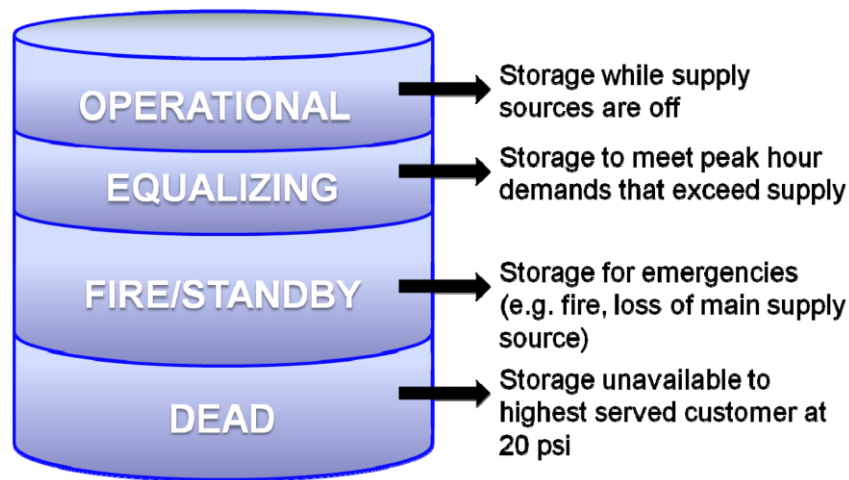
- **Operational Storage:** Operational storage is used to supply the water system under normal demand conditions and provides pump protection to avoid frequent starting and stopping of pumps for pump stations that are used to fill reservoirs. The operational storage is calculated per the DOH Design Manual as the pump supply firm capacity (in gpm) times 2.5-minutes.
- **Equalizing Storage:** When the source pumping capacity cannot meet the periodic daily (or longer) peak demands placed on the water system, equalizing storage must be provided as a part of the total storage for the system and must be available at 30 psi to all service connections. The criteria for determining the equalizing storage requirements for the City's system is based on the equalizing calculation in the DOH Design Manual (refer to equation 7-1).
- **Standby Storage:** Standby storage is the portion of the reservoir used to supply the water system when supply facilities are out of service. DOH allows water systems with multiple sources to require that standby volume be supplied with the largest supply source out of service but recommends a

minimum standby storage of 200 gallons per ERU in the system. The City calculates standby storage as the maximum volume required to supply all ERUs at least 235 gallons (based on the DOH minimum times an 18 percent factor of safety).

- Fire Suppression Storage (FSS): FSS is the portion of the reservoir with sufficient volume to supply water to the system at the maximum rate and duration required to extinguish a fire at the building with the highest fire flow requirement. The required volume of the FSS is the product of the fire flow rate and duration of the system's maximum fire flow requirement.
- Dead Storage: Dead storage is the bottom portion of the reservoir that cannot be used because water is stored at an elevation that is too low to provide sufficient system pressure (below 20 psi at the highest elevation served by the reservoir). This unusable storage occupies the lower portion of many ground-level standpipe-type reservoirs. When the highest service elevation is not the limiting factor, the City defines dead storage as being 1-foot above the reservoir inlet elevation for operational reasons.

The City's reservoir storage requirements depend on the water system's configuration, seasonal and daily variation in water-use patterns, and the reliability of various water system components. This section describes the five components of storage, summarizes the existing system's capacity to meet the storage needs of each Service Area, and makes recommendations to address identified storage deficits.

Figure 3-7 | Illustration of Reservoir Storage Components



3.4.2.3.2 Storage Analysis Results

The storage available in the four Service Areas was evaluated to confirm each is provided with the required usable Operational, Equalizing, Fire Suppression, and Emergency Storage volumes. Reflecting the interconnectedness of the system, excess storage in higher Service Areas (i.e., Lea Hill, Lakeland and Academy) can be used in the Valley Service Area and vice versa through use of the system pump stations. The storage analysis compares the required storage, based on the criteria in **Table 3-17**, and the available storage. The FSS for each region was calculated using 4,000 gpm for four hours except for Lakeland, which used 3,125 gpm for three hours based on buildings with the highest fire flow requirement in each Service Area (see **Table 3-20**).

Table 3-29 summarizes the existing 2024 storage analysis and results. The results indicate a deficit in the Lea Hill Service Area, however, this deficit is offset by surplus storage available in other Service Areas.

Table 3-29 | System-Wide Storage Analysis for the 2024 Scenario

Description	RWSA 2024	Academy 2024	Lakeland 2024	Lea Hill 2024	Valley 2024
Usable Storage (MG)					
Maximum Storage Capacity	15.86	2.72	2.06	2.48	8.60
Algona Reserve Storage Capacity ¹	0.28	--	0.28	--	--
Algona Proposed Storage Capacity ²	0.17	--	0.17	--	--
Dead Storage	1.50	0.06	0.44	0.36	0.64
Total Usable Storage	14.08	2.66	1.34	2.12	7.96
Required Storage (MG)					
Operational Storage	0.05	0.01	0.00	0.01	0.03
Equalizing Storage	0.00	0.00	0.00	0.00	0.00
Standby Storage (Emergency)	9.10	0.56	0.66	1.29	6.59
FSS (Emergency)	3.44	0.96	0.56	0.96	0.96
Total Required Storage	12.59	1.53	1.22	2.26	7.58
Surplus/ (Deficit) Storage	1.49	1.13	0.12	(0.14)	0.38

Notes:

1. The water supply interlocal agreement (IA3) between the City of Algona and the City of Auburn was updated in 2016. Through this updated agreement, Algona elected to financially participate in Lakeland Reservoir 6 to obtain a total share of 280,000-gallons of storage capacity. The agreement stipulates that if the City experiences any failure or decreased capacity, the supply of water to Algona may be decreased by the same percentage that is experienced by the City.
2. Algona has also requested an additional 170,000 gallons of storage capacity (anticipated to begin in 2025) by financially participating in the planned Reservoir 3.

Table 3-30 summarizes the 2034 storage analysis and results (10-year projections). The results indicate a deficit in the Lea Hill, Lakeland, and Valley Service Areas, however, this deficit is offset by surplus storage available in other Service Areas. Additionally, the deficit in the Lakeland Service Area may not be realized based on the City's terms and conditions of the IA3 agreement with Algona.

Table 3-30 | System-Wide Storage Analysis for the 2034 Scenario

Description	RWSA 2034	Academy 2034	Lakeland 2034	Lea Hill 2034	Valley 2034
Usable Storage (MG)					
Maximum Storage Capacity	15.86	2.72	2.06	2.48	8.60
Algona Reserve Storage Capacity ^{1,2}	0.45	--	0.45	--	--
Dead Storage	1.50	0.06	0.44	0.36	0.64
Total Usable Storage	13.91	2.66	1.17	2.12	7.96
Required Storage (MG)					
Operational Storage	0.05	0.01	0.00	0.01	0.03
Equalizing Storage	0.02	0.00	0.02	0.00	0.00
Standby Storage (Emergency)	10.26	0.62	0.76	1.35	7.53
FSS (Emergency)	3.44	0.96	0.56	0.96	0.96
Total Required Storage	13.77	1.59	1.34	2.32	8.52
Surplus/ (Deficit) Storage	0.14	1.07	(0.17)	(0.20)	(0.56)

Notes:

1. The water supply interlocal agreement (IA3) between the City of Algona and the City of Auburn was updated in 2016. Through this updated agreement, Algona elected to financially participate in Lakeland Reservoir 6 to obtain a total share of 280,000-gallons of storage capacity. The agreement stipulates that if the City experiences any failure or decreased capacity, the supply of water to Algona may be decreased by the same percentage that is experienced by the City.
2. Algona has also requested an additional 170,000 gallons of storage capacity by financially participating in the planned Reservoir 3, bringing the total storage capacity to 450,000 gallons.

The 2044 storage analysis was performed to determine the ability of the proposed storage facilities to meet the future storage requirements in 2044, based on projected demands. The analysis results indicate that the existing storage facilities do not have sufficient capacity to meet the future demands of the system based on the demand projections presented in **Chapter 2**. The City is currently planning a new reservoir in the Valley Service area to address these future deficiencies in the 20-year time frame. **Table 3-31** summarizes the buildout 2044 storage analysis.

Table 3-31 summarizes the 2044 storage analysis and results (20-year projections). The results indicate an overall deficit in the RWSA, spurred largely by the projected growth within the Valley Service Area in the 20-year horizon.

Table 3-31 | System-Wide Storage Analysis for the 2044 Scenario

Description	RWSA 2044	Academy 2044	Lakeland 2044	Lea Hill 2044	Valley 2044
Usable Storage (MG)					
Maximum Storage Capacity	15.86	2.72	2.06	2.48	8.60
Algona Reserve Storage Capacity ^{1,2}	0.45	--	0.45	--	--
Dead Storage	1.50	0.06	0.44	0.36	0.64
Total Usable Storage	13.91	2.66	1.17	2.12	7.96
Required Storage (MG)					
Operational Storage	0.05	0.01	0.00	0.01	0.03
Equalizing Storage	0.05	0.00	0.05	0.00	0.00
Standby Storage (Emergency)	11.64	0.69	0.87	1.40	8.68
FSS Storage (Emergency)	3.44	0.96	0.56	0.96	0.96
Total Required Storage	15.18	1.66	1.48	2.37	9.67
Surplus/ (Deficit) Storage	(1.27)	1.00	(0.31)	(0.25)	(1.71)

Notes:

1. The water supply interlocal agreement (IA3) between the City of Algona and the City of Auburn was updated in 2016. Through this updated agreement, Algona elected to financially participate in Lakeland Reservoir 6 to obtain a total share of 280,000-gallons of storage capacity. The agreement stipulates that if the City experiences any failure or decreased capacity, the supply of water to Algona may be decreased by the same percentage that is experienced by the City.
2. Algona has also requested an additional 170,000 gallons of storage capacity by financially participating in the planned Reservoir 3, bringing the total storage capacity to 450,000 gallons.

Since most of the future storage deficiency is in the Valley Service Area, a new storage reservoir is planned in the northeastern portion of the Service Area (Valley 242 pressure zone). The reservoir is a planned capital project to be completed in the 20-year horizon and is discussed further in **Chapter 8**.

The Lea Hill PS has sufficient capacity to transfer standby storage from Valley to Lea Hill. In addition, there are multiple PRVs which can be used to transfer water from the Academy and Lakeland Service Areas back to Valley to utilize excess standby storage in those areas. No other projects are necessary to resolve this deficiency.

3.4.2.4 Distribution and Transmission Capacity Analysis

This section evaluates the City's existing distribution and transmission mains to determine if the water pipelines are sized and looped adequately to provide the required flow and pressures to meet existing and future system conditions. The evaluation used an updated version of the City's computerized hydraulic water system model and InfoWater Pro, a GIS-based modeling software developed by Autodesk (formerly Innovyze). The model was updated to accurately reflect the City's existing water system and verified against

field hydrant test data. Results from the model were used to evaluate the existing system and identify deficiencies.

3.4.2.4.1 Model Update

The following updates were made to the City's hydraulic model prior to conducting the capacity analyses:

- Facility updates
- Pipeline network updates
- Elevation updates
- Demand updates

Each update is described in further detail below.

Facility Updates

Existing facilities within the hydraulic model were reviewed and updated based on information provided by the City. The facilities reviewed included groundwater wells, springs, interties with adjacent water systems, potable water reservoirs, pump stations, treatment facilities, flow control valves, and PRVs. The following documents were used to confirm the accuracy of the facility information within the hydraulic model:

- Interlocal agreements
- Record drawings
- PRV calibration records
- Pump curves
- SCADA data
- Operations and maintenance data

Pipeline Network Updates

The existing pipeline network within the hydraulic model was compared to the City's existing GIS data to locate areas where pipelines may have been missing in the model. In addition, the pipeline material type was added to the model to match data available from GIS to more accurately reflect the existing distribution system.

Elevation Updates

Node elevations within the model were updated using United States Geological Survey (USGS) Digital Elevation Model (DEM). The DEM is a tile of the 3-Dimensional Elevation Program (3DEP) with data that is updated regularly and distributed in geographic coordinates in units conforming with the North American Datum of 1983 (NAD 83). All elevation values are in meters and, over the contiguous United States, are referenced to the North American Vertical Datum of 1988 (NAVD 88). The assigned elevations were converted to feet when applied to the model.

In addition to the general elevation update of the model nodes, the record drawings of the water reservoirs were used to verify the bottom and overflow elevations of the reservoirs within the model. Where necessary based on date, the as-built elevations were corrected to NAVD88 values, as some of the reservoirs were constructed using National Geodetic Vertical Datum of 1929 (NGVD 29). A conversion of 3.51 feet was used to update elevations from NGVD 29 to NAVD 88.

Demand Updates

Demands in the model were updated using the City’s customer billing database. The meters were geolocated based on the customer’s address and assigned to the closest model junction. No demands were allocated to transmission pipelines or facility nodes (i.e., pump station, reservoirs, etc.). Approximately 10 percent of the demand was unable to be allocated using this method. The remaining demand and non-billed usage, like DSL and construction meters, was distributed uniformly throughout the model by applying a scaling factor to match the 2022 production data. The demand sets in the model sought to distribute the demand projections provided in **Chapter 2**. A scaling factor was then applied to all demand nodes to equal the demand projection in years 2024.

As discussed in **Chapter 2**, TAZ data was used to determine growth projections and the future water demand. Based on the TAZ data, each Service Area was split between focused growth areas and non-growth areas. Future demands were allocated equally across all current demand nodes within the focused growth and non-growth areas of each Service Area. Demand peaking factors from **Chapter 2** were used to adjust demands to MDD for the fire flow analyses and PHD for the pressure analysis.

3.4.2.4.2 Model Calibration

To verify and calibrate the hydraulic model, the City collected field hydrant testing data. A map of the hydrant testing locations and testing plan is included in **Appendix K**. The City also collected static pressure at the test locations to verify the hydraulic grade line (HGL) of specific areas of the water system.

In addition to the hydrant tests results, the boundary conditions of the water system facilities at the time of each test were provided. The boundary conditions were used to calculate the demand observed during each test. The boundary conditions were also entered into the model for each hydrant test to accurately simulate the system conditions during the hydrant test. At most locations, hydrants were operated to stress the system to identify required changes to the boundary conditions and pipe roughness factors (C-factors) within the hydraulic model.

A fire flow calibration scenario was set up within the hydraulic model and each of the hydrant test locations was simulated. **Appendix K** provides the field flow data compared to the flow data input into the model and a comparison of the static pressures and pressure drops observed at each hydrant test. **Table 3-32** summarizes the final Hazen Williams C-factors used during the calibration based on piping material.

Table 3-32 | Final C-Factors for Piping Materials

Material	C-Factor
Cast Iron	90-120
Concrete	120
Ductile Iron	120
HDPE	130
PVC	130
RCP	120
Steel	120
Unknown	115

Valley Service Area

A total of 16 hydrant tests were conducted in the Valley Service Area, however the results from one test were excluded as the static pressure was not recorded. The static pressure and pressure drop in the calibrated model is now within 5 psi, or less, of the observed data for each of the hydrant tests.

Lea Hill Service Area

A total of nine hydrant tests were conducted in the Lea Hill Service Area. The static pressure and pressure drop in the calibrated model is now within 5 psi, or less, of the observed data for each of the hydrant tests.

The HGL from the hydrant testing was higher than the reported HGL in the hydraulic model for the Lea Hill 462 pressure zone. The PRV setpoints were referenced to confirm the higher HGL observed during the hydrant testing. As such, the naming for the pressure zone was updated to Lea Hill 480. The update and supporting calculations are included in **Appendix K**.

Academy Service Area

A total of five hydrant tests were conducted in the Academy Service Area. The static pressure and pressure drop in the calibrated model is now within 5 psi, or less, of the observed data for each of the hydrant tests.

The HGL from the hydrant testing was higher than the reported HGL in the hydraulic model for the Academy 350 and Academy 445 pressure zones. The PRV setpoints were referenced to confirm the higher HGL observed during the hydrant testing. As such, the naming for each pressure zone was updated to Academy 400 and Academy 470 respectively. The updates and supporting calculations are included in **Appendix K**.

Lakeland Service Area

A total of ten hydrant tests were conducted in the Lakeland Service Area, however the results from one test were excluded as the recorded static pressure was determined to be incorrect. The static pressure and pressure drop in the calibrated model is now within 5 psi, or less, of the observed data for each of the hydrant tests.

The HGL from the hydrant testing varied from the reported HGL in the hydraulic model for the Lakeland 440, Lakeland 441, Lakeland 446, and Lakeland 485 pressure zones. The PRV setpoints were referenced to confirm the HGLs observed during the hydrant tests. As such, the naming for each pressure zone was updated as follows:

- Lakeland 440 pressure zone was split into two pressure zones: Lakeland 450 and Lakeland 405.
- Lakeland 441 pressure zone was updated to Lakeland 385
- Lakeland 446 pressure zone was updated to Lakeland 415
- Lakeland 485 pressure zone was updated to Lakeland 455.

The hydrant test for Lakeland 575 was not simulated in the model as observed in the field since a static pressure of 101 psi was recorded during the hydrant test. According to the PRV setpoints, the HGL on the test date was anticipated to be an error. The City re-checked the hydrant on February 8, 2024, and a static pressure of 69 psi was recorded. It was concluded that the original hydrant test data was inaccurate, and the test was voided. The Lakeland 575 pressure zone was updated to Lakeland 560 instead based on the PRV setpoints and static pressure reading completed in February 2024. The updates and supporting calculations are included in **Appendix K**.

3.4.2.4.3 Hydraulic Analysis

PHD Analysis

During PHD conditions, the water system must maintain a minimum pressure of 30 psi at all service nodes, a maximum velocity of 8 fps in wall water mains, and a maximum velocity of 5 fps in all transmission mains in accordance with DOH and City standards. The hydraulic model was set up to evaluate pressures and velocities throughout the system under PHD conditions for the 2024 (existing conditions), 2034 (10-year), and 2044 (20-year) scenarios. The results of this analysis are shown in **Figure 3-8**, **Figure 3-9**, and **Figure 3-10** respectively. The results of this analysis indicate that all areas of the water system meet these requirements under existing and future conditions.

Figure 3-8 | 2024 PHD Scenario – Pressure and Velocity

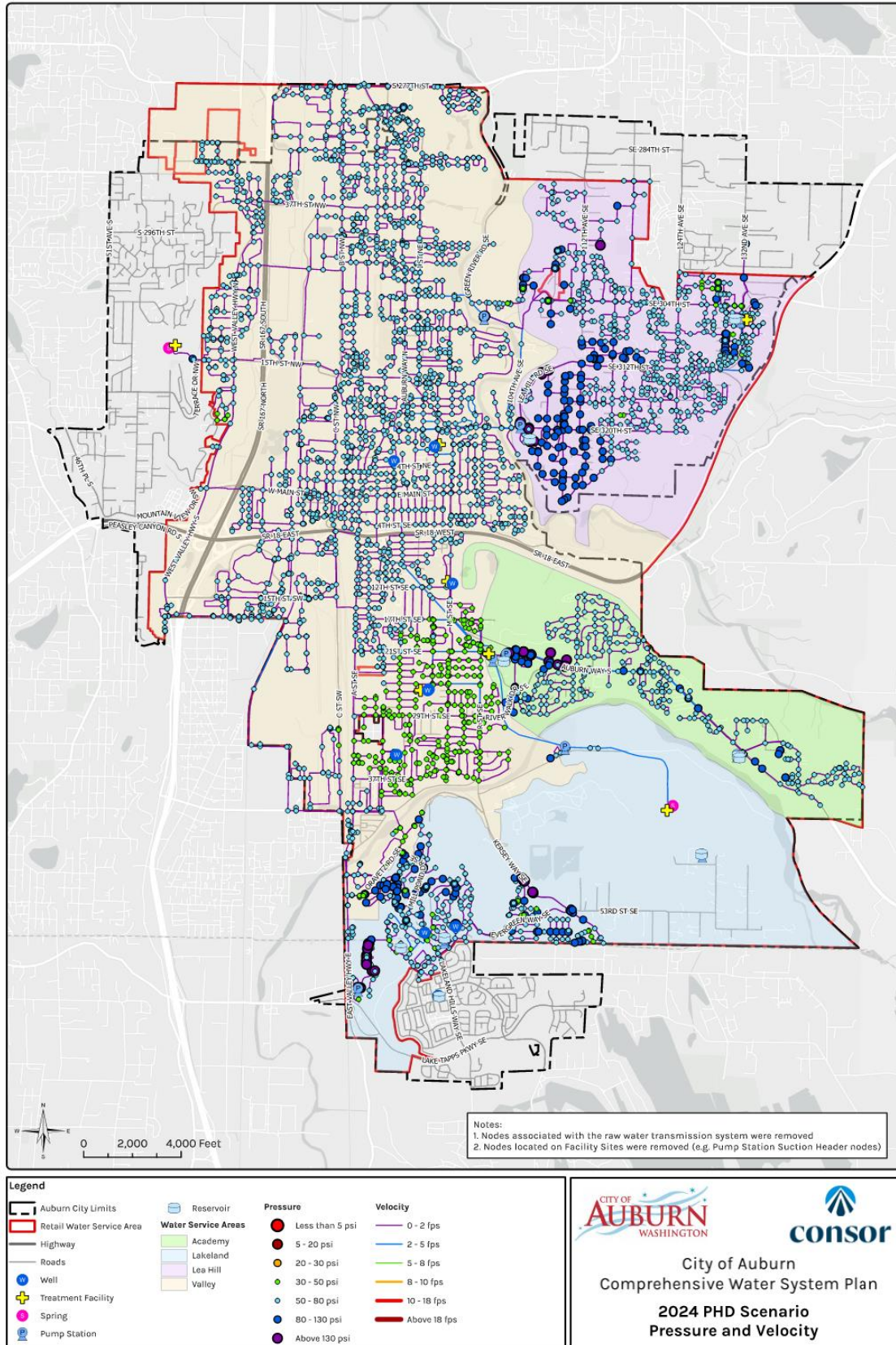


Figure 3-9 | 2034 PHD Scenario – Pressure and Velocity

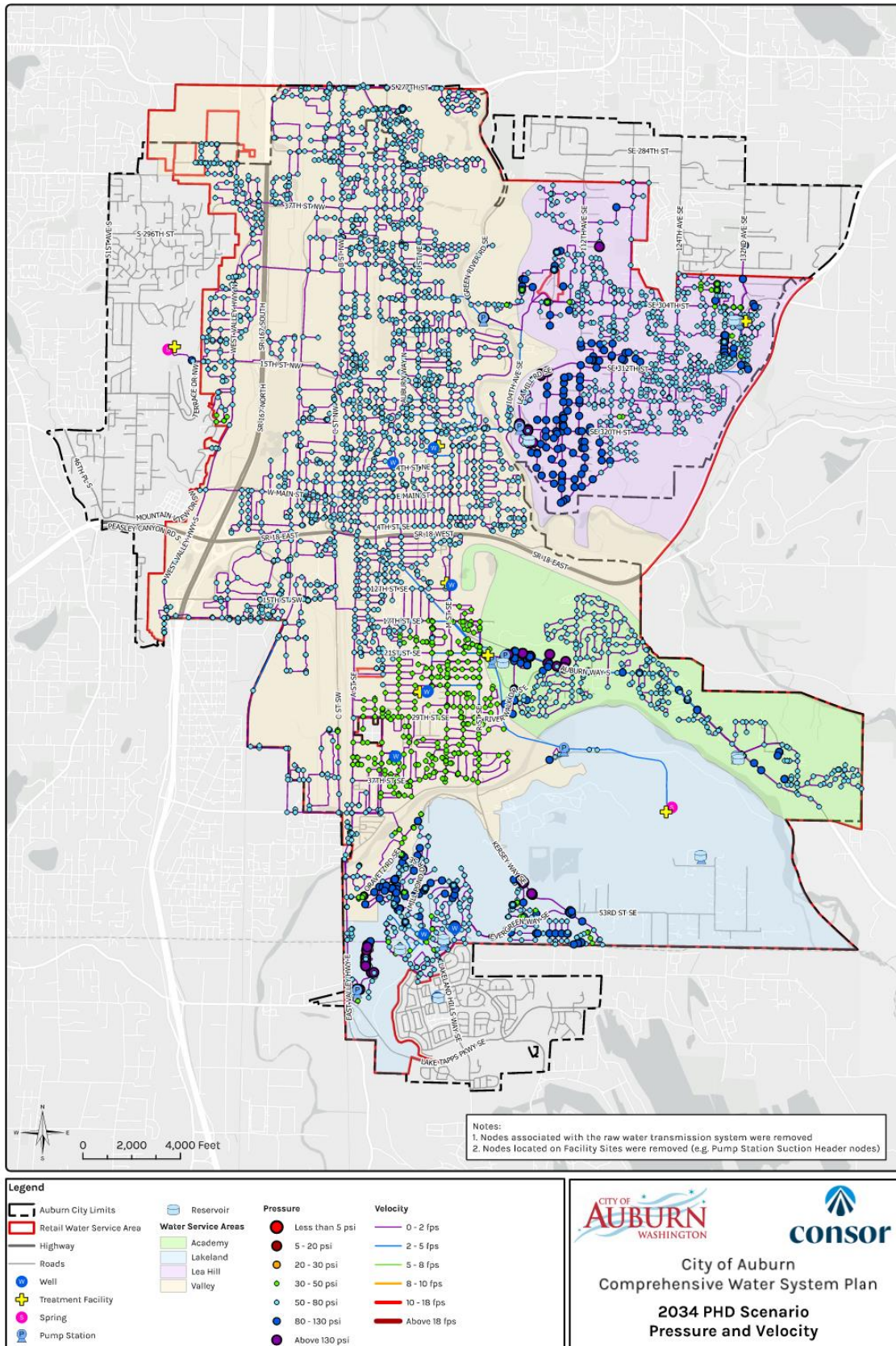
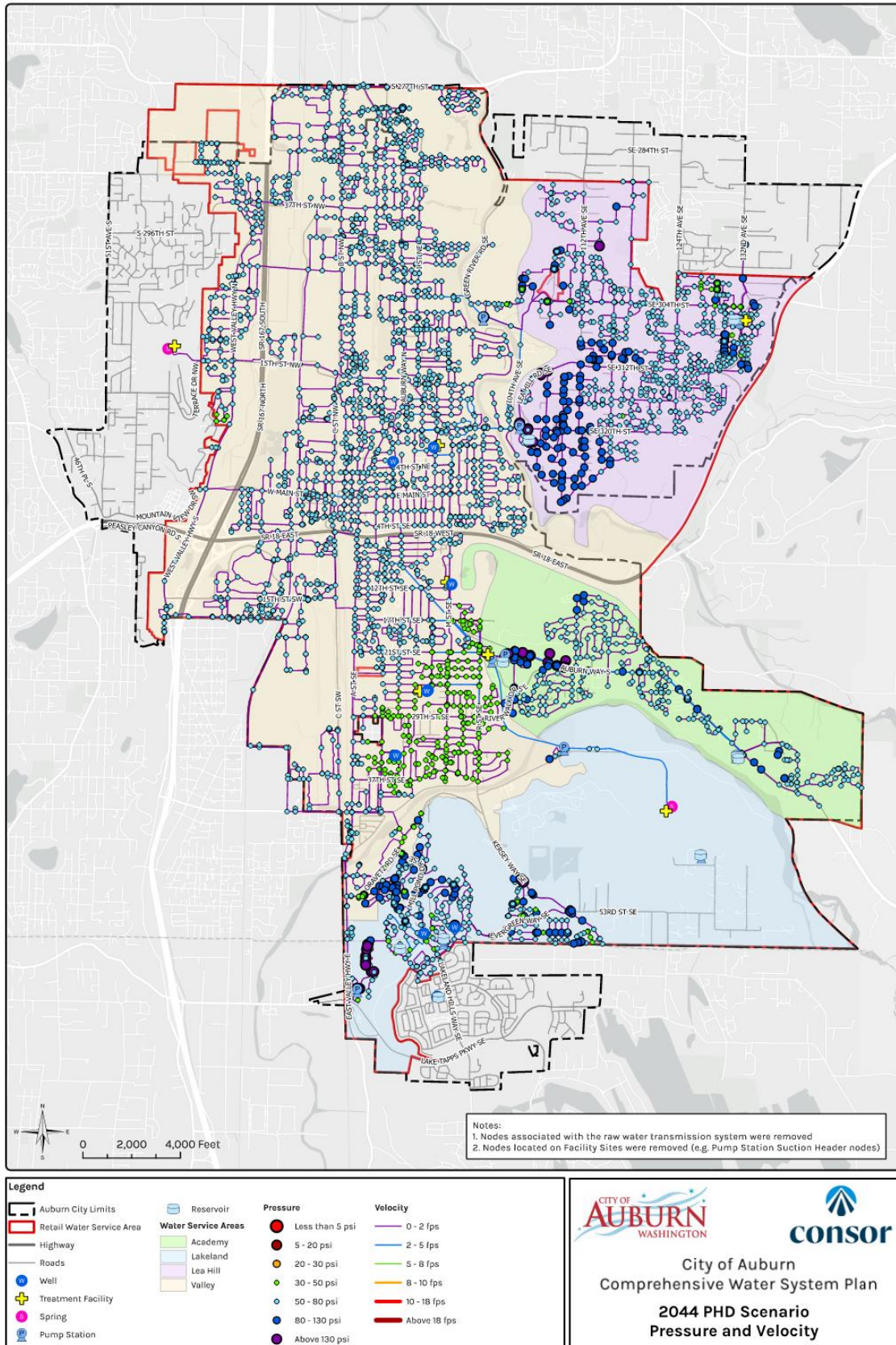


Figure 3-10 | 2044 PHD Scenario – Pressure and Velocity



Fire Flow Analysis

The fire flow analysis assesses each hydrant node in the hydraulic model to determine the available fire flow while maintaining a minimum residual pressure of 20 psi throughout the respective pressure zone. To complete the analysis, the water elevation in each reservoir was set to top of dead storage (below operational, equalizing and standby storage) per DOH recommendations. In addition, the system demands were set to MDD for each scenario (2024, 2034 and 2044). For each node, the modeled available fire flow was compared to its target fire flow requirement as follows:

- Single Family Residential Meters: 1,500 gpm of fire flow required.
- All Other Meters (i.e., multi-family, commercial, etc.): 2,500 gpm of fire flow required.
- Specific Buildings with Higher Fire Flow Requirements: Assessed individually per **Table 3-20**.

Fire flow requirements were assigned to the model nodes based on account classifications of the assigned water meters. Where multiple meters with different account classifications were assigned to the same node, the highest fire flow requirement was assigned to the node. The hydrant locations provided in the City's GIS system do not correspond to the exact location of the hydrant node in the model. Therefore, the nodes that were predicted to have fire flow below what is required were checked based on their proximity to the nearest hydrant to verify whether the appropriate hydrant could provide the required fire. As shown in **Figure 3-11** the results of this analysis indicated that multiple areas of the system under current and future demand conditions have fire flow deficiencies. A summary of the proposed pipeline improvements to resolve the deficiencies is shown in **Figure 3-12** and summarized in **Table 3-33**. **Figure 3-12** also includes on-going projects currently being completed by the City or developers.

Valley Service Area

Multiple deficiencies are identified in the Valley Service Area. The highest priority project assists with raising the HGL of the highest critical node on the west side of the RWSA. This project will increase the available fire flow at most of the western failure locations. The remaining improvements assist with specific failure locations by upsizing water mains experiencing significant headloss.

Additionally, a new PRV facility is proposed to rezone a portion of the Valley 242 pressure zone to the Academy 350 pressure zone to resolve deficiencies in the area. This PRV facility will also allow storage transfer from the Academy Service Area where this is surplus storage to the Valley Service Area to resolve the 2034 storage deficit projections. This project is discussed further in **Chapter 8**.

Lakeland Service Area

There were no failure locations identified within the Lakeland Service Area for the existing and future demand conditions.

Lea Hill Service Area

Multiple deficiencies are identified in the Lea Hill Service Area. The highest priority project in this area is to rezone a portion of Lea Hill 563 pressure zone to the Lea Hill 648 pressure zone. In addition, deficiencies were noted in the northern part of Lea Hill 563, in the vicinity of 112th Avenue, 290th Street, 295th Street, and 293rd Street. These pipelines were replaced recently and provide an available fire flow of approximately 1,350 gpm after the rezoning of the Lea Hill 563 pressure zone is completed. Therefore, a project was not proposed in this area and was confirmed with the Fire Marshal. The remaining improvements assist with specific failure locations by upsizing water mains experiencing significant headloss.

Figure 3-11 | MDD+FF Deficiency Locations for 2024, 2034 and 2044 Scenarios

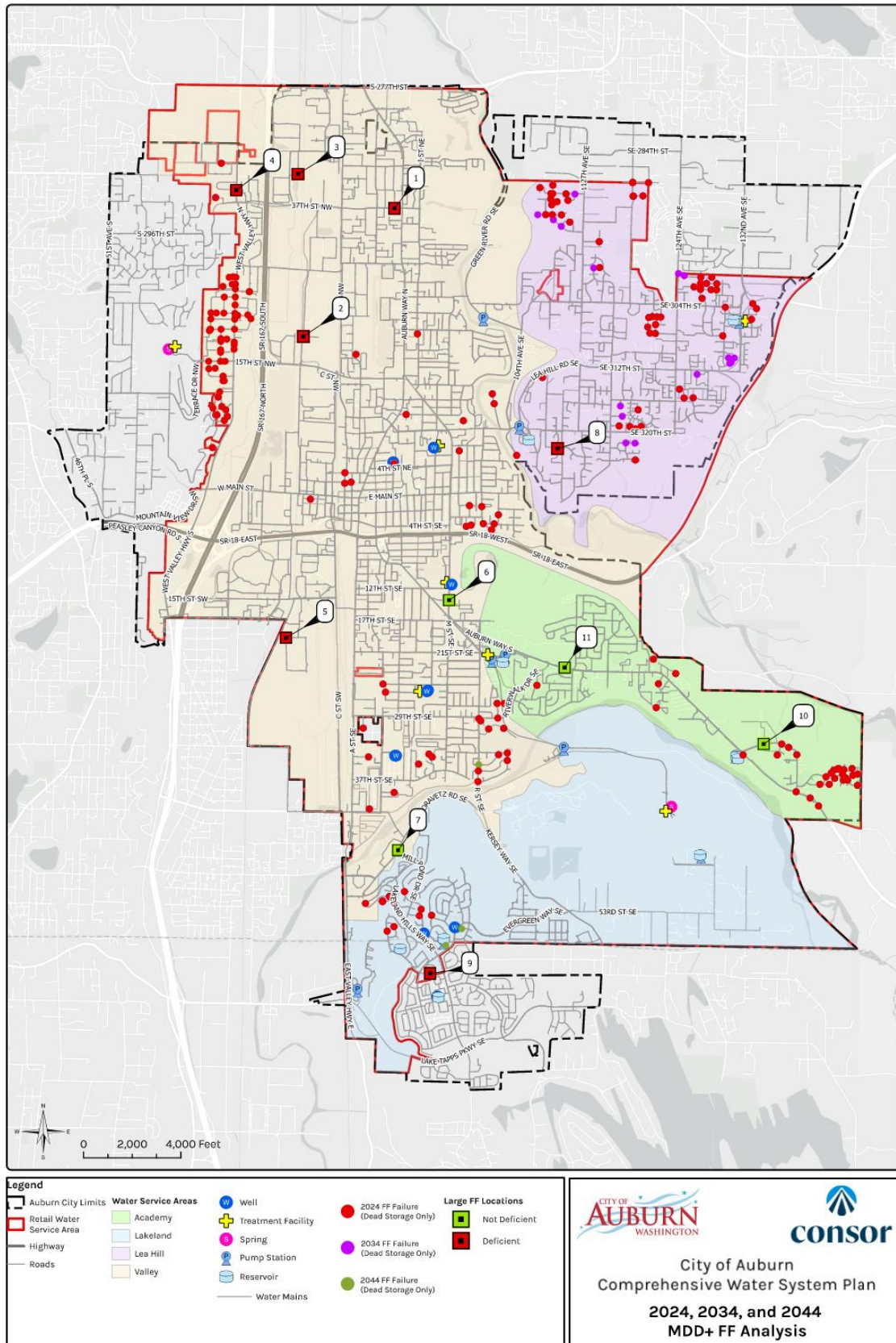
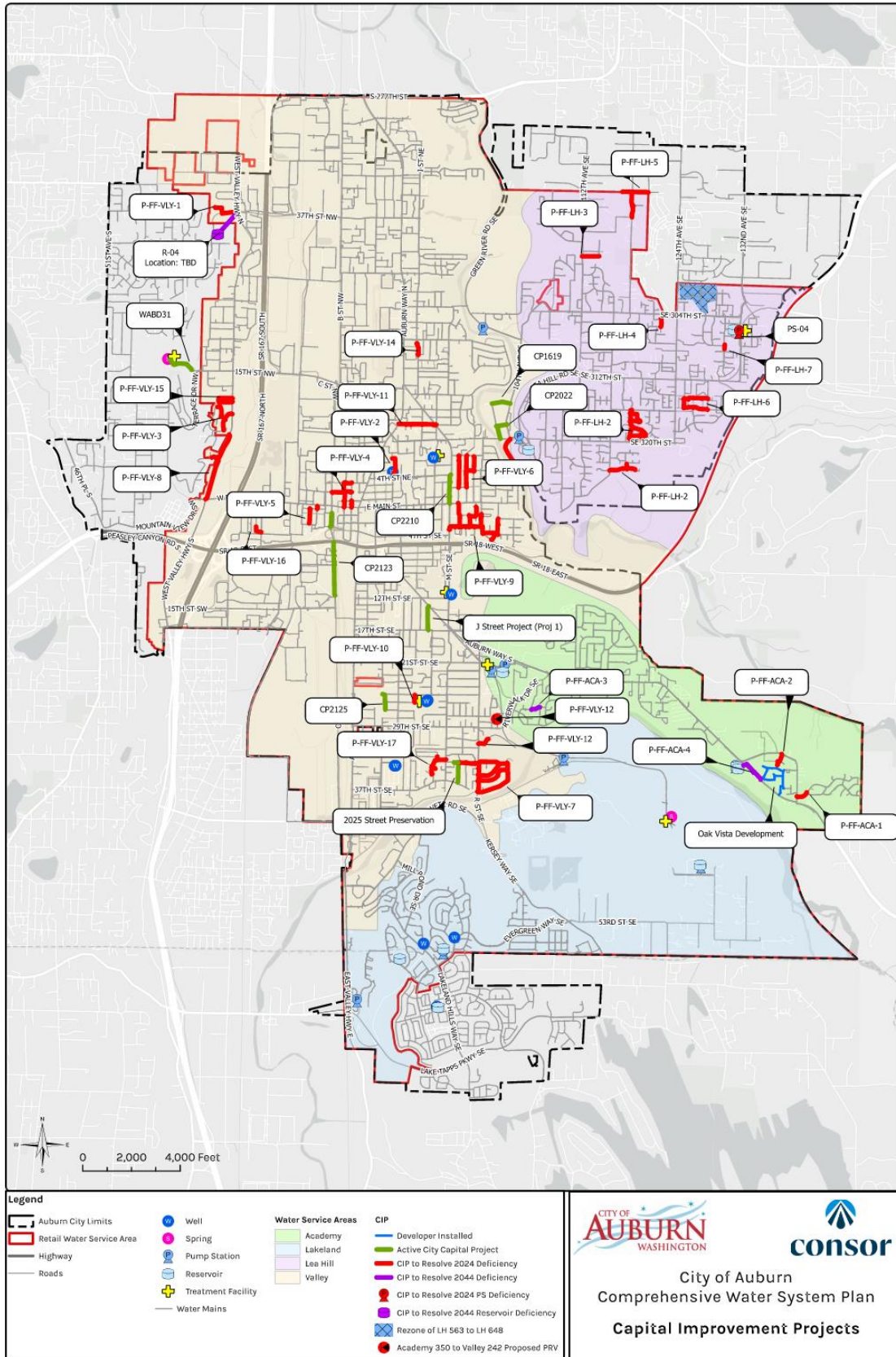


Figure 3-12 | Capital Improvement Projects Addressing Fire Flow Deficiencies



Academy Service Area

Multiple deficiencies are identified in the Academy Service Area. The planned Oak Vista Development provides a significant increase in available fire flow in Academy 585 pressure zone. The remaining improvements assist with specific failure locations by upsizing pipelines with high predicted headloss.

Table 3-33 | Prioritized Pipeline Improvements to Address Fire Flow Deficiencies

Project Priority	Service Area	Project ID	Summary of Deficiency	Summary of Improvements
1	Valley	P-FF-VLY-8	2024 Scenario: Hydrants less than 500 gpm	Replace existing with 3,200 LF of 16-inch diameter piping.
2	Lea Hill	P-FF-LH-3	2024 Scenario: Hydrants less than 1,000 gpm	Replace existing with 690 LF of 12-inch diameter piping.
3	Lea Hill	P-FF-LH-7	2024 Scenario: Hydrants less than 1,000 gpm.	Replace existing with 180 LF of 8-inch diameter piping. Move hydrant connection to higher zone.
4	Lea Hill	P-FF-LH-5	2024 Scenario: Hydrants less than 1,000 gpm	Replace existing with 1,080 LF of 12-inch diameter piping and 1,170 LF of 16-inch diameter piping.
5	Valley	P-FF-VLY-15	2024 Scenario: Hydrants less than 1,000 gpm	Replace existing with 1,320 LF of 12-inch diameter piping.
6	Valley	P-FF-VLY-6	2024 Scenario: Hydrants less than 1,000 gpm	Replace existing with 3,590 LF of 8-inch diameter piping.
7	Valley	P-FF-VLY-7	2024 Scenario: Hydrants less than 1,500 gpm	Replace existing with 7,984 LF of 8-inch diameter piping and 4,380 LF of 12-inch piping.
8	Valley	P-FF-VLY-13	2024 Scenario: Hydrants less than 1,000 gpm	Replace existing with 1,290 LF of 12-inch diameter piping.
9	Valley	P-FF-VLY-12	2024 Scenario: Hydrants less than 1,000 gpm	Replace existing with 1,440 LF of 8-inch diameter piping and 550 LF of 12-inch piping.
10	Lea Hill	P-FF-LH-1	2024 Scenario: Hydrants less than 1,500 gpm	Replace existing with 4,540 LF of 8-inch diameter piping.
11	Lea Hill	P-FF-LH-2	2024 Scenario: Hydrants less than 1,500 gpm	Replace existing with 1,300 LF of 8-inch diameter piping.
12	Lea Hill	P-FF-LH-6	2024 Scenario: Hydrants less than 1,500 gpm	Replace existing with 2,470 LF of 12-inch diameter piping.
13	Academy	P-FF-ACA-2	2024 Scenario: Hydrants less than 1,500 gpm.	Replace existing with 590 LF of 8-inch diameter piping.
14	Academy	P-FF-ACA-1	2024 Scenario: Hydrants less than 1,500 gpm.	Replace existing with 500 LF of 12-inch diameter piping.
15	Lea Hill	P-FF-LH-4	2024 Scenario: Hydrants less than 1,500 gpm	Replace existing with 340 LF of 8-inch diameter piping.
16	Valley	P-FF-VLY-9	2024 Scenario: Multiple hydrants less than 1,500 gpm	Replace existing with 190 LF of 8-inch diameter piping and 5,765 LF of 12-inch piping.
17	Valley	P-FF-VLY-14	2024 Scenario: Hydrants less than 2,500 gpm	Replace existing with 510 LF of 12-inch diameter piping.
18	Valley	P-FF-VLY-2	2024 Scenario: Hydrants less than 2,500 gpm	Replace existing with 910 LF of 12-inch diameter piping.

Project Priority	Service Area	Project ID	Summary of Deficiency	Summary of Improvements
19	Valley	P-FF-VLY-17	2024 Scenario: Hydrants less than 2,500 gpm	Replace existing with 170 LF of 8-inch diameter piping and 1,270 LF of 12-inch piping.
20	Valley	P-FF-VLY-4	2024 Scenario: Hydrants less than 2,500 gpm	Replace existing with 2,610 LF of 12-inch diameter piping.
21	Valley	P-FF-VLY-10	2024 Scenario: 4-inch Cast Iron near 1,500 gpm dead end	Replace existing with 320 LF of 12-inch diameter piping.
22	Valley	P-FF-VLY-3	2024 Scenario: Hydrant less than 1,500 gpm available.	Replace existing with 1,010 LF of 8-inch diameter piping and 660 LF of 12-inch piping. Complete P-FF-VLY-8 has higher priority for initial improvement in this area.
23	Valley	P-FF-VLY-1	2024 Scenario: Hydrants less than 2,500 gpm	Replace existing with 960 LF of 12-inch diameter piping.
24	Valley	P-FF-VLY-11	2024 Scenario: Hydrants less than 2,500 gpm	Replace existing with 1,630 LF of 12-inch diameter piping.
25	Valley	P-FF-VLY-16	2024 Scenario: Hydrants less than 2,500 gpm	Replace existing with 390 LF of 12-inch diameter piping.
26	Valley	P-FF-VLY-5	2024 Scenario: Hydrants less than 2,500 gpm	Replace existing with 750 LF of 12-inch diameter piping.
27	Academy	P-FF-ACA-3	2044 Scenario: Hydrants less than 2,500 gpm	Replace existing with 380 LF of 12-inch diameter piping.
28	Academy	P-FF-ACA-4	2044 Scenario: Hydrants less than 2,500 gpm	Replace existing with 1,040 LF of 16-inch diameter piping.

3.4.2.5 System Capacity Analysis Results

Chapter 2 of this WSP calculated the ADD ERU planning value to be at 182 gallons per day per Equivalent Residential Units (gpd/ERU) and an MDD ERU planning value of 322 gpd/ERU. An analysis of the water system's overall physical capacity in terms of ERU using DOH Worksheet 4-1 is provided in **Appendix V**. Demand projection values include retail customer demands, distribution system losses, authorized unbilled consumption, and wholesale demand from Algona. Projections for the MIT Fish Hatchery and LMWD are not included. LMWD is not included since they do not rely on the City as their main source of water and have an interruptible wholesale agreement. Demand from the MIT Fish Hatchery is also not included since it is unknown when this facility will be constructed or what the actual demands will be.

The results of the ERU analysis included in **Appendix V** are summarized in **Table 3-34**. The analysis indicates that the existing system has sufficient capacity to serve the current and projected water demands through 2034 (10-year planning horizon). Under 2024 and 2034 demand conditions, storage is the limiting system component for growth and development. In 2044 (20-year planning horizon) storage is deficient, which is consistent with the analysis findings summarized in **Section 3.4.2.3** and is planned to be resolved with a new reservoir project included in **Chapter 8**.

Table 3-34 | System Capacity Analysis in ERU Basis

Description of Capacity Parameter	2024	2034	2044
Demands per ERU Basis			
Average Day Demand, gpd/ERU	182	182	182
Maximum Day Demand, gpd/ERU	322	322	322
Peak Hour Demand, gpd/ERU	518	518	518
Projected Retail Customer Demand, ERUs	38,731	43,626	49,515
Algona (Firm Wholesale) Projected ADD, ERUs	2,005	2,120	2,246
Algona (Firm Wholesale) Projected MDD, ERUs	2,150	2,274	2,409
Total ERUs Required for Qa Analysis (ADD), ERUs	40,736	45,746	51,761
Total ERUs Required for Qi and Qs Analysis (MDD), ERUs	40,881	45,900	51,924
Source Capacity (Qi)			
Total Supply Capacity, Qi (20 hours of pumping), gpd	23,092,800	23,092,800	23,092,800
Maximum Day Demand, gpd/ERU	322	322	322
Maximum Supply Capacity, ERUs	71,744	71,744	71,744
Projected MDD Demand, ERUs	40,881	45,900	51,924
Remaining Qi Capacity Surplus/(Deficit), ERUs	30,863	25,845	19,820
Water Rights (Qa)			
Supply Capacity, Qa (Total), gpd	18,749,377	18,749,377	18,749,377
Average Day Demand, gpd/ERU	182	182	182
Maximum Supply Capacity, ERUs	102,938	102,938	102,938
Projected ADD Demand, ERUs	40,736	45,746	51,761
Remaining Qa Capacity Surplus/(Deficit), ERUs	62,202	57,192	51,177
Pumping Capacity (Qs)			
Total Pumping Capacity, Qs (20 hours of pumping), gpd	18,732,000	18,732,000	18,732,000
Maximum Day Demand, gpd/ERU	322	322	322
Maximum Supply Capacity, ERUs	58,196	58,196	58,196
Projected MDD Demand, ERUs	40,881	45,900	51,924
Remaining Pumping Capacity Surplus/(Deficit), ERUs	17,315	12,297	6,272
Storage Capacity			
Maximum Usable Storage Capacity, MG	14.08	13.91	13.91
Available Standby and Equalization Storage Capacity, MG	10.58	10.44	10.42
Standby Storage Requirement, gal/ERU	235	235	235
Equalizing Storage Requirement, gal/ERU	-	-	-
Maximum Storage Capacity, ERUs	45,038	44,442	44,335
Projected Retail System ERUs	38,731	43,626	49,515
Remaining Storage Capacity Surplus/(Deficit), ERUs	6,308	816	(5,181)
System Capacity Analysis Summary			
Limiting Component of System Capacity Surplus/ (Deficit), ERUs	6,308	816	(5,181)

3.4.3 New Source of Supply Analysis

The City has a pending water right application for 13,443 acre-feet from the existing Wells 6 and 7 and a future Well 8. The location of the future Well 8 has not been determined but is expected to be located near Wells 6 and 7. Flows from future Well 8 would be treated at the Fulmer Field CCT Facility. It is anticipated that water quality from Well 8 would be similar to Wells 6 and 7 and may require manganese treatment.

Calculations presented in the Water Rights Self-Assessment Form (**Appendix I**) conclude that the City’s existing water rights are anticipated to be adequate to meet the current, 10-year, and 20-year demand projections for maximum instantaneous flows (Qi) and total annual withdrawal (Qa).

The City has established a policy of maintaining the capability to supply the MDD while the largest water source is out of service. The system analysis documented in this chapter confirms that, with projected demands over the 20-year planning period, the City will maintain the capability to meet MDD with the largest pumping source is out of service with the use of the Tacoma interties as an available source.

Mitigation obligations due to the proposed water right for Wells 6, 7, and 8 are listed below and are described in detail in the Conceptual Mitigation Plan (**Appendix S**):

- Mitigation of impacts to Green River,
- Mitigation of impacts to White River, and
- Mitigation of impacts to Mill Creek.

Water Use Efficiency measures described in **Chapter 4** will be applied to the expanded supplies from Wells 6 and 7 and the new supply from Well 8 if the pending water right is approved.

Aside from the pending water right application, the City has several projects planned over the 20-year horizon to improve supply production or fully utilize their existing water rights, as discussed in **Section 3.1.2**.

3.5 Summary of System Deficiencies

Table 3-35 provides a summary of the system deficiencies described in this chapter. Proposed improvements include pump station improvements, storage improvements, and distribution system improvements. Total project costs and the anticipated source of funding for each project are provided in **Chapter 8**.

Table 3-35 | Summary of System Deficiencies

CIP Improvement	Classification of Deficiency	Description of Project Solution	Location in WSP Where Deficiency is Identified	Location in WSP Where Analysis Demonstrates Deficiency will be Addressed by Project
Supply Improvements	Reliability, Resiliency	• Coal Creek Springs Rehabilitation • Well 2 Replacement • Well 2 and Well 6 Cleaning Program • Wells 5/5A Upgrades • Well 7 Back-up Power • Algona Well 1 Study	Section 3.1.2	Section 3.1.2 and Chapter 8

CIP Improvement	Classification of Deficiency	Description of Project Solution	Location in WSP Where Deficiency is Identified	Location in WSP Where Analysis Demonstrates Deficiency will be Addressed by Project
Treatment Improvements	Reliability	• Wells 3A/3B Treatment • Well 5 Chlorination • Well 7 Treatment • Coal Creek Springs Chlorination Building Replacement • Wells 1 and 4 On-site Chlorination Improvements • Fulmer Field CCT Facility Chlorination Improvements	Section 3.1.3	Section 3.1.3 and Chapter 8
Storage Improvements	Growth, Fire Flow, Reliability, Resiliency	• Reservoir 2 Valve Improvements • Reservoirs 4 and 8 Seismic Rehabilitation • Additional storage in the Valley Service Area	Section 3.1.4 and Section 3.4.6	Section 3.1.4, Section 3.4.6, and Chapter 8
Pump Station Improvements	Reliability, Fire Flow	• Modifications to Lea Hill BPS/Intertie PS	Section 3.4.5	Section 3.4.5 and Chapter 8
Distribution Improvements	Growth, Fire Flow	• Coal Creek Springs Transmission Improvements • West Hill Springs Transmission Improvements • Replacing and upsizing pipelines where needed	Section 3.1.2 and Section 3.4.7	Section 3.1.2, Section 3.4.7, and Chapter 8

CHAPTER 4

Water Use Efficiency Program

The purpose of this chapter is to describe the water system’s program to improve water use efficiency (WUE). WUE contributes to the long-term water supply reliability and promotes good stewardship of the state’s water resources.

This chapter addresses the following topics.

- 4.1 Source and Service Metering
- 4.2 Distribution System Leakage
- 4.3 Water Use Efficiency Program
- 4.4 Water Use Efficiency Savings
- 4.5 Climate Change Resiliency

Table 4-1 lists the requirements of the WUE Rules from the DOH 2020 Water Use Efficiency Guidebook and reflects the City’s level of compliance with these requirements.

Table 4-1 | WUE Rule Requirements

Category	Requirement	City of Auburn Compliance Status
Meters		
	Meter all sources.	Yes, all sources are metered.
	Meter all service connections.	Yes, all services are metered.
Data Collection		
	Provide annual consumption by customer class.	Yes, provided in Section 2.2.2.
	Provide “seasonal variations” consumption by customer class.	Yes, provided in Section 2.5.
	Evaluate reclaimed water opportunities.	Yes, provided in Section 4.3.5.
	Consider water use efficiency rate structure.	Yes, the City has an inverted block rate structure to promote conservation.
	Provide monthly and annual production for each source.	Yes, provided in Section 2.3.1.
Distribution System Leakage		
	Calculate annual volume and percent using formula defined in WUE Rules.	Yes, distribution leakage is calculated and reported in Section 4.2.
	Report annually: annual leakage volume, annual leakage percent, and for systems not fully metered, meter installation progress and leak minimization activities.	Yes, distribution leakage is reported to DOH on an annual basis.
	Develop water loss control action plan (if leakage is over 10% for 3-year average).	N/A, system has a 3-year average water loss of less than 10%.
Goals		
	Establish measurable (in terms of water production or usage) conservation goals and re-establish every 6 years. Provide schedule for achieving goals.	Yes, measurable goals were established via a public process. See Section 4.3.3.
	Use a public process to establish goals.	

Category	Requirement	City of Auburn Compliance Status
	Report annually on progress.	Yes, report submitted annually to DOH.
WUE Program		
	Describe existing conservation plan.	Yes, see Section 4.3.
	Estimate water saved over last 6 years due to conservation program.	Yes, see Section 4.3.1.
	Describe conservation goals.	Yes, see Section 4.3.3.
	Implement or evaluate 1-12 measures, depending on size. Nine measures for City of Auburn.	Yes, see Section 4.3.4.
	Describe conservation programs for next 6 years including schedule, budget, and funding mechanism.	Yes, see Section 4.3.6.
	Describe how customers will be educated on efficiency practices.	Yes, see Section 4.3.4.
	Estimate projected water savings from selected measures.	Yes, see Section 4.4.
	Describe how efficiency program will be evaluated for effectiveness.	Yes, see Section 4.3.1.
	Estimate leakage from transmission lines (if not included in distribution system leakage).	N/A, transmission line leakage included in distribution system leakage as system does not have true transmission lines.
Demand Forecast		
	Provide demand forecast reflecting no additional conservation.	Yes, provided in Section 4.4.
	Provide demand forecast reflecting all “cost effective” evaluated measures.	
Performance Reports		
	Develop annual report including goals and progress towards meeting them, total annual production, annual leakage volume and percent and, for systems not fully metered, status of meter installation and actions taken to minimize leakage.	Yes, reports will be submitted annually to DOH.
	Submit annually by July 1 to DOH and customers and make available to the public.	

4.1 Source and Service Metering

4.1.1 Source Meters

Source meters, also known as production meters, measure the amount of water emitted from the City’s springs and wells. Each of the City’s sources are metered to measure the amount of water produced. The meters are calibrated annually by an outside contractor under the direction of the Water Operations Supervisor to ensure an accurate accounting of water produced. If a meter cannot be calibrated properly, it is replaced with a new one. Propeller source meters are being replaced with electromagnetic (MAG) meters in conjunction with planned capital improvements projects, or as the budget allows.

Table 4-2 | Source Meter Details

Source Meter ID	Manufacturer	Meter Type	Meter Size	Years in Service	Date of Last Calibration
Coal Creek Springs	Siemens	Magnetic	24-inch	26	August 2023
West Hill Springs	Siemens	Magnetic	10-inch	10	Unknown
Algona Well 1	N/A	N/A	Not in use	Not in use	Not in use
Valley Well 1	Siemens	Magnetic	12-inch	14	August 2023
Valley Well 2	Siemens	Magnetic	10-inch	24	August 2022
Valley Well 3A	Sparling	Turbine	Not in use	Not in use	Not in use
Valley Well 3B	Sparling	Turbine	Not in use	Not in use	Not in use
Valley Well 4	Siemens	Magnetic	12-inch	39 ¹	August 2023
Lakeland Well 5	Sparling	Turbine	8-inch	41 ¹	August 2023
Lakeland Well 5A	Siemens	Magnetic	4-inch	34	August 2023
Lakeland Well 5B	Siemens	Magnetic	Not in use	Not in use	Not in use
Valley Well 6	Siemens	Magnetic	12-inch	24 ¹	August 2023
Valley Well 7	Sparling	Turbine	Not in use	Not in use	Not in use

Note:

1. Years in service assumed to be from source's original construction date.

4.1.2 Service Meters

Water meters are installed on every service line to measure the quantity of water used by a customer per WAC 246-290-496 and City Code Chapter 13.06.320. All new direct service connections must be metered at the time-of-service activation per WAC 246-290-496(2)(d). All meters shall remain the property of the City and shall not be removed except by the City. In all cases where meters are lost, damaged or broken by carelessness, negligence, or willful actions of owners/operators of premises, they shall be replaced or repaired by or under the direction of the City. The actual cost of repairs or replacement of meters will be charged against the owners/operators. In case of nonpayment of fees, fines, charges, or penalties, the water shall be shut off and will not be turned on until all charges are paid.

In 2015, the City began installing an Automated Metering Infrastructure (AMI) system, as a part of the Water Meter and Billing System Improvements project, which was completed in 2018. With the new AMI system, the City automatically receives meter reads via radio transmission and can integrate the data into the billing software. The benefits of an AMI system include increased accuracy and efficiency, early leak detection, and improved customer service. The AMI system is anticipated to have a 20-year life, including the system components and batteries in the radios.

In conjunction with the AMI system installation, the City also completed a meter changeout in 2018. Since 2015, the City has installed 15,156 meters, ranging in size from ¾ inch to ten inches. Meter replacement will be on a 20-year program to coincide with the AMI system. Large source meters and three-inch and larger commercial meters will be tested and calibrated annually. Small meters (less than three inches) are not calibrated.

All new service connections under three inches, in addition to repairs, retrofits or replacements of existing services, are typically conducted by Water Distribution Staff unless unusual circumstances arise. Meter

services consist of meters, meter vaults, meter boxes, service lines, valves, setters, re-setters, and other associated equipment.

- Small Meters (3/4 to two inch)
 - Replacement Cost: \$700 - \$1,620
 - New Installation Cost: \$550 - \$1,500
- Large Meters (three to eight inch)
 - Replacement Cost: \$3,300 - \$12,000
 - New Installation Cost: \$2,800 - \$11,500

The City uses master meters when beneficial to the City and its customers. Master meters are used at certain locations such as mobile home parks, the Auburn Business Park (formerly the Federal General Services Administration Property), and Muckleshoot Indian Tribe (MIT) commercial properties.

4.1.2.1 Large Meters

Large meters are used to measure water consumption by customers with significant demand requirements. They are usually employed by the following customer classes.

- Commercial
- Farms or Parks – Irrigation
- Schools
- Multifamily Complexes
- Industrial / Manufacturing Businesses
- Wholesale Customers
- Municipal Buildings

Large meters are defined as water meters three inches or larger and new meters are installed by contractors rather than City maintenance staff. There are a total of 127 large meters in the City's system. All large meters are calibrated for accuracy each year, usually between the months of April and June, as part of the City's System Loss Program. Calibration of large meters is conducted by an outside contractor, but two maintenance staff members under the direction of the Water Distribution Supervisor assist in the process. If a meter cannot be calibrated, it is replaced with a new one by City maintenance staff.

4.2 Distribution System Leakage

Distribution System Leakage (DSL) represents the difference between production and documented water use (retail, wholesale, and authorized unmetered). It may include inaccurate master and service connection meters, unaccounted-for non-revenue water use, pipeline leakage, and unauthorized use. DSL does not include authorized water usage such as water used for fire protection, flushing, construction, and other maintenance and operations practices. However, to be credited, this must be accounted for by metering or estimating using credible means.

The DSL is calculated as the difference between the total amount of water produced and the sum of water sold plus any authorized unmetered water usage. The City's estimated DSL for 2015 through 2022 is presented in **Chapter 2, Table 2-11**. For the City's water system, the 2022 three-year rolling average DSL was 6.7 percent of total production (corrected value submitted by the City to DOH in 2024). This falls below the DOH requirement that the three-year average DSL be under ten percent to minimize water waste.

The City is committed to maintaining DSL below the required ten percent and is actively working to identify and minimize DSL. To minimize DSL, the City has ongoing leak detection, meter calibration, and an active repair and replacement program for water system infrastructure, as detailed in **Chapter 6 – Operations and Maintenance**. The City completes a leak detection study of 25 percent of the water distribution system every year to detect and fix leaks. Additionally, the City has recently increased its efforts to reduce non-payment of bills and water theft. The City recently completed a major SCADA system upgrade in 2024. These investments should significantly increase the City’s ability to measure DSL both temporally and geographically. The resulting information may allow the City to better target its WUE activities to reduce DSL.

4.2.1 Water Audits

The City has implemented AMI throughout the system, completing installations between 2015 and 2018. AMI is a tool that improves the effectiveness of the WUE Program measures, providing detailed water use data for each customer that allows the City to better understand water use patterns and target WUE Program measures to specific customers. Data can be sent in real-time or stored for several weeks or months. Potential AMI capabilities vary depending on the chosen hardware and software however, most systems can aid in the WUE Program. Below is a summary of how the City can use the AMI data.

- Advanced algorithms and metering data will allow the City to identify customer leaks.
- Advanced metering will provide cost savings in the Leak Detection and Repair and Service Meter Replacements programs.
- Advanced metering will aid in the City’s efforts to reduce non-payment of bills and water theft.
- By comparing production and customer water use, DSL can be evaluated in greater temporal and geographic detail. For example, DSL may be calculated by month or for a given service area.
- Advanced metering data will help the City identify groups of customers to target for WUE measures and can be used to track the effectiveness of the measures for the same customers.
- Advanced metering data will allow additional reporting options to educate customers, such as their peak water use.

The City reports DSL annually; refer to **Appendix M** for the previous three annual WUE reports. The newly installed AMI system will provide substantial benefits for the WUE Program and improve savings, further outlined in **Section 4.4** of this chapter.

4.3 Water Use Efficiency Program

In 2003, the Washington State Legislature passed the 2003 Municipal Water Law (MWL) which added a requirement that water purveyors use water efficiently. This law was expanded in January 2007 with the WUE Rule and has since been updated. WUE requirements are listed under WAC 246-290 and include:

- Publicly establishing a water savings goal.
- Evaluating water use efficiency opportunities specific to each community.
- Developing a WUE planning program.
- Meter installation on all customer connections by January 22, 2017.
- Achieve a standard of no more than ten percent water loss, on a three-year rolling annual average.
- Annual reporting on WUE progress.

The City's WUE Program provides for efficient water use and supports continued growth. This program fulfills all the necessary requirements of DOH. The selected program measures will allow the City to meet its WUE goals, resulting in decreased water demand. Measures are interrelated and will help the City achieve its goals to both reduce average water use and peak water use per customer. Public education measures (showing water use in bills, workshops, school outreach, fairs/trade shows, etc.) will continue to be a focus of the WUE Program to increase customer awareness and knowledge of WUE opportunities. Public education is needed to support the City's other WUE measures and to support reductions in both average and peak water use. Continued appliance rebates and shower head giveaways help customers implement what is learned in the public education campaign. With the implementation of AMI, it is expected that the City and customers will be able to identify more water loss reduction opportunities than previously possible. Therefore, customer and City leak detection, water audits, and meter repair and replacement may have a prominent role in the 2024-2034 WUE Program. The program will also continue to provide financial disincentives for excessive water use through metering and WUE pricing. This aspect of the program is likely to help reduce peak water usage further. These measures will result in the City being able to achieve its WUE goals, which includes reduced demand.

The 2024-2034 WUE Program will be a continuation of the City's successful existing WUE Program. The program has also been updated to leverage the City's investments in improved SCADA, leak detection, and AMI. The 2024 Plan complies with regulations as set forth in WAC 246-290-830 and DOH's 2020 Water Use Efficiency Guidebook. This section summarizes the program's goals, demand and supply side measures, reclaimed water, and DSL. The projected demand with the conservation goals, program budget, and cost savings are also presented.

4.3.1 Program Requirements

The WUE requirements emphasize the importance of measuring water usage and evaluating the effectiveness of the City's program. There are three fundamental requirements of a WUE Program that the City follows.

- **Planning Requirements** – Municipal water suppliers are required to:
 - Collect data.
 - Forecast demand.
 - Evaluate WUE measures.
 - Calculate DSL.
 - Implement a WUE Program to meet their goals.
- **Distribution Leakage Standard** – Municipal water suppliers are required to meet a distribution system leakage standard to minimize water loss from their distribution system.
- **Goal setting and performance reporting** – Municipal water suppliers are required to set WUE goals through a public process and report annually to their customers and DOH.

The DOH requires that the City estimate the amount of water saved through implementation of the system's WUE program over the last six years. **Table 4-3** shows the average day demand per-capita from 2017 to 2022. Water use per-capita dropped from 112 gpd per capita in 2017 to 103 gpd per capita in 2022. The net water savings over this period equates to approximately 195.2 million gallons or 39.0 million gallons per year. This was calculated by multiplying the population for each individual year (over the six-year period) by the difference in calculated savings in gpd per capita year after year. The result was then multiplied by the total days in each year. Annual totals were summed for the entire six-year period.

Table 4-3 | Annual Average Day Demand (gpd) per Capita¹

2017	2018	2019	2020	2021	2022
112	109	106	100	105	103

Note:

1. Average day demand per capita was calculated by dividing the Average Day Demand from Table 2-9 by the population served from Table 2-1 and converting to gpd.

4.3.2 Mandatory Measures

The WUE Program includes supply side measures that the City implements to understand and control leakage including new meters, leak detection surveys, and water audits. Per the WUE requirements, the following measures shall be continued for the 2024-2034 WUE program.

- Install production (source) meters.
- Install consumption (service) meters.
- Perform meter calibration.
- Implement a water loss control action plan to control leakage if the three-year rolling average exceeds ten percent.
- Educate customers about water use efficiency practices.

Additionally, the following measures that must be evaluated are:

- Rates that encourage water demand efficiency (discussed in **Chapter 9**)
- Reclamation opportunities (discussed below)

The City has complied with these requirements in the past and will continue to comply with these regulations.

4.3.3 Program Goals

Per the WAC 246-290-830(4)(a), all water purveyors with 1,000 or more connections were required to set efficiency goals through a public process. The City's 2024-2034 Conservation Program builds upon the goals and framework established through the public process conducted in July 2009, during which the City's water conservation goals were developed and posted to the City's website for public review, in alignment with WAC 246-290-830(4)(a). This process ensured transparency and community engagement in shaping measurable conservation objectives.

The goals established in 2009, including a 1 percent reduction per year in Equivalent Residential Unit (ERU) values, continue to guide the City's Conservation Program today. These goals emphasize efficient water usage and public education. The 2024-2034 Program incorporates updates to comply with WUE regulations and address evolving community needs, as detailed in **Section 4.3.4**. The City has chosen to focus on implementing voluntary measures to decrease both the average and peak water usage. The 2024 program has established the following goals.

- Water Use per ERU Goal: Decrease the planning ERU value (gpd/ERU) one percent annually from the current planning ERU value of 182 gpd/ERU, which is the 75th percentile of eight years of

historical data (2015 – 2022). Reevaluate goal when the planning ERU value reaches less than 172 gpd/ERU.

- To be conservative, an ERU planning value higher than the average was used by the City for demand forecasting. The 75th percentile of the eight-years of data was used to select the planning ERU value of 182 gpd. This methodology is consistent with the City’s 2015 Plan. The ERU value of 182 gpd is seven percent lower than the 2015 Plan’s ERU planning value of 195 gpd per ERU.
- MDD/ADD Peaking Factor: Decrease the planning peaking factor from the current 1.77, which is equal to the 75th percentile of eight years of historical data (2015-2022), to a planning peaking factor of less than 1.68, the average peaking factor from 2015-2022.
- Distribution System Leakage: Maintain three-year average DSL under ten percent to minimize water waste.
- Customer Support: Provide the service and support necessary to those water customers expressing a desire to conserve water as a part of their environmental ethic and as a means of minimizing water bills.

The WUE Program measures, as summarized below, are designed to help meet these established goals.

4.3.4 2024-2034 Demand-Side Program Measures

To encourage WUE and support customers, the City has incorporated program measures that target demand reductions. Under the WUE requirements, a program measure may include water efficient devices, actions, business practices, or policies that promote efficient water use. With 14 measures as part of the 2024 Program, the City exceeds the minimum DOH requirement of nine measures. WUE measures can target specific customer classes or a combination of customer classes. The City’s demand-side program measures are summarized below.

1. School Outreach: The City will continue to participate in programs arranged to educate students on efficient water usage as requested by schools.
2. Speakers’ Bureau: The City will seek speaking opportunities to discuss efficient water use with a wide audience spectrum. Topics could include water efficient fixtures and appliances, curbing seasonal peak demands, lawn watering practices, etc.
3. Program Promotion: The City will seek opportunities for social media, television, and/or radio public service announcements for WUE and submit news articles to local papers and Auburn Magazine on efficient water usage especially during the spring and summer months.
4. Theme Shows/Fairs: The City hosts an annual Kids Day fair. The fair includes a wide range of activities for all ages of kids. As part of the fair, the City has fun, water-related activities and provides water efficiency brochures and other materials. The City will conduct outreach at other Theme Shows/Fairs if requested. Water saving device kits are distributed to interested single-family and multiple-family residential customers.
5. Water Audits: The City will conduct a water audit upon the request of a customer, including industrial, commercial, and institutional customers. The audits will review items such as:

recirculation of cooling water, reuse of cooling and process water, reuse of treated wastewater, efficient landscape irrigation, low water using fixtures, fixing leaks, and process modifications.

6. Customer Leak Detection: The City identifies potential leaks through investigation of the water meter upon request of customers. The City runs multiple reports in the AMI system to analyze data and investigate water meters to identify leaks.
7. Bills Showing Consumption History: The City will continue to provide customer bills showing the previous year's water usage. The City provides water usage information from AMI on the customers e-portal.
8. Water Saving Device Kits: The City will participate in distribution of water use efficiency kits through education events such as speakers' bureaus, theme shows, fairs, and through bill insert request forms.
9. WUE Pricing: The City has an inverted block rate structure for single-family residential customers to encourage WUE. The City will consider WUE in future cost of service/rate studies. Studies should determine the most appropriate water structures and rate levels to achieve the City's WUE goals, while generating sufficient revenues for utility operations. It is recommended that the studies consider uniform rates by class, inverted block rates, seasonal rates, and excess use rates.
10. Water Efficient Toilet Rebate Program: The City will continue to provide rebates to customers that replace old toilets with new high-efficiency toilets through their Environmental Protection Agency (EPA) WaterSense Toilet Rebate program.
11. Low-Flow Shower Heads Giveaways: The City gives away free low-flow shower heads at the Utility Billing Counter.
12. School Outdoor Water Use Reduction: The City will target schools to reduce their outdoor water consumption. Water audits and education on the benefits of replacing inefficient irrigation systems or landscaping (including turf) will be conducted.
13. City Water Use Reduction: The City will audit the water use of City accounts to identify both indoor and outdoor water saving opportunities. The Water Utility staff will help educate City account holders on WUE; however, no water budget has been allocated to implement water saving devices at City facilities.
14. Rainwater Harvesting: The City will evaluate implementation of a rainwater harvesting (rainwater reclamation) promotion program as a means to reduce irrigation water usage by commercial, public, and residential customers. The City's Stormwater Utility's requirements to use Low Impact Development (LID) measures, where feasible, strives to keep rainwater on the property, further reducing irrigation demands.

It is important to note that in addition to the water cost savings for the WUE measures, other benefits result, both to the utility and to its customers, from WUE activities. Such additional benefits could include:

- Significant customer energy savings because water heaters are the second largest energy users in the home. Hot water use can be reduced by almost one-third by cost-effective WUE measures, such as water efficient fixtures and appliances. Significant energy savings can also occur for industrial processes requiring water heating and other power uses.

- Efficient landscaping and irrigation techniques save on maintenance costs.
- Reductions in water production decrease energy required by utilities to treat and distribute water and to collect and treat wastewater. Chemical costs are also reduced in water and wastewater operations.
- System measures could provide substantial benefits in addition to water production cost savings including:
 - Identification of non-revenue water could result in recovery of unbilled revenue (inaccurate meters) and reduced unauthorized water usage (theft).
 - Leak detection helps prevent major main breaks, which could result in significant repair costs.
 - Leak detection reduces a utility's liability due to prevention of potential property damage.
 - Repair and/or replacement of service and source meters allows a utility to recover unbilled water revenues.

4.3.5 Reclaimed Water

According to WAC 246-290-100 and the WUE requirements, water systems with over 1,000 connections must collect and evaluate information on reclaimed water opportunities. The City is committed to wastewater reuse and rainwater reclamation, as stated in its official water system policies summarized in **Appendix A**. The City participates in the King County reclaimed water program, which completed a Reclaimed Water Comprehensive Plan in 2012. Additionally, the City has completed the King County Water Reclamation Evaluation Checklist, included as **Appendix L**. Currently, there are no reclaimed water users in the City. The City considers the most likely candidates for use of reclaimed water to be the irrigation customer class. Since the City conveys all sewage to King County's regional sewerage system, there is not an opportunity for the City to sell reclaimed water without significant capital investments to develop a reclaimed water distribution system, and there is not currently an alternative reclaimed water source in the area.

The City will implement reclaimed water as a conservation measure and include these savings in the demand projections when specific opportunities arise. The City, in conjunction with King County, may develop projects or consider participation in water reuse projects and programs developed by adjacent purveyors and others as appropriate. The efforts may include demonstration or pilot projects developed in accordance with applicable federal, state, and local laws and regulations.

4.3.6 WUE Budget

The City has established a budget for each program measure from 2023 to 2029, as required per WAC 246-290-810 4.e, shown in **Table 4-4**. WUE measures are funded through rates.

Table 4-4 | Annual WUE Budget

Measure	2023	2024	2025	2026	2027	2028	2029
School Education (NPDES & Water)	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000
Conservation Public Education/ WQ Report	\$6,350	\$6,350	\$6,350	\$6,350	\$6,350	\$6,350	\$6,350

Toilet Rebates & Low-flow Shower Heads	\$11,000	\$11,000	\$11,000	\$11,000	\$11,000	\$11,000	\$11,000
Large Meter Test/Repair/Replace	\$30,000	\$30,000	\$30,000	\$30,000	\$30,000	\$30,000	\$30,000
WSP Update (WUE)	\$22,000	-	-	-	-	-	-
Total	\$89,350	\$67,350	\$67,350	\$67,350	\$67,350	\$67,350	\$67,350

4.4 Water Use Efficiency Savings

The WUE Program primarily provides cost savings in two ways, reducing demand and reducing DSL. Reducing demand may reduce or delay capital projects for additional supply and expanded distribution infrastructure. Reducing DSL can provide additional revenue, as well as increase the efficiency of supplying existing water uses. Additionally, advanced metering will provide cost savings in the Leak Detection and Repair and Service Meter Replacements programs.

The City has completed a cost analysis of their proposed WUE Program using historical data and projected annual water savings. **Table 4-5** shows projected demands with and without annual water savings. This analysis maintains the target water use efficiency goal of one percent reduction per year in the planning ERU value. This goal will be reached through implementation of the proposed program measures. These reductions in demand can be translated into tangible benefits once realized, such as more time before new sources must be developed, increased ERUs that can be served by the existing water infrastructure, and cost savings in power and water treatment.

Table 4-5 | Demand Forecast With and Without Projected WUE Savings

Year	ADD (mgd)				MDD (mgd)			
	Without WUE	With WUE	Savings	% Savings	Without WUE	With WUE	Savings	% Savings
2024	7.05	6.98	0.07	1%	12.47	12.34	0.12	1%
2025	7.14	6.99	0.14	2%	12.61	12.36	0.25	2%
2026	7.22	7.00	0.22	3%	12.76	12.38	0.38	3%
2027	7.31	7.01	0.29	4%	12.91	12.39	0.52	4%
2028	7.39	7.02	0.37	5%	13.06	12.41	0.65	5%
2029	7.48	7.03	0.45	6%	13.22	12.43	0.79	6%
2030	7.57	7.04	0.53	7%	13.38	12.44	0.94	7%
2031	7.66	7.05	0.61	8%	13.54	12.46	1.08	8%
2032	7.75	7.06	0.70	9%	13.70	12.47	1.23	9%
2033	7.85	7.06	0.78	10%	13.87	12.48	1.39	10%
2034	7.95	7.07	0.87	11%	14.04	12.50	1.54	11%

4.5 Climate Change Resiliency

In 2023, the Washington State Legislature passed House Bill 1181, which requires all group A community public water systems serving 1,000 or more connections to include a climate resilience element in water system plans initiated after June 30, 2025. Though this requirement is not yet in effect, the following section is included to initiate discussion and planning for climate resilience and to supplement the Climate Element being incorporated into the City's 2024 Comprehensive Plan update.

4.5.1 Expected Climate Changes for the City of Auburn

Climate is a key factor driving water use as temperature, precipitation, and other climate-driven weather patterns affect irrigation, and commercial and industrial cooling. Auburn’s maritime climate is characterized by wet cool winters and dry warm summers. The City’s temperate climate is largely protected from continental weather by the Cascade Mountains to the east.

According to the publication *Climate Change Impacts and Adaptation in Washington State*, Washington State is projected to experience decreases in snowpack, increases in stream temperatures, and widespread changes in streamflow timing, flooding, and summer minimum flows. Climate change is expected to cause more frequent summer water shortages, especially in fully allocated watersheds with little management flexibility. The average spring snowpack in Washington is projected to decline by 38 percent to 46 percent by the 2040s¹.

To estimate the impact of this change in climate on the City’s water demands, results from the Water Supply Forum’s 2009 Regional Water Supply Outlook (WSF 2009 Outlook) were used. The impacts of climate change on sources that rely on groundwater are mostly unknown due to the variability between aquifers and site-specific effects, such as recharge rates.

Continued increases in average annual and seasonal air temperatures in the Puget Sound are projected due to climate change, as well as increases in extreme heat. Projected changes in annual precipitation are generally minor, although summer precipitation is projected to decrease and heavy rainfall events are projected to become more severe².

No changes to demand projections were made for the 20-year planning period to account for potential climate change due to the uncertain magnitude and timing of local effects. However, it is recognized that demands have the potential to increase in the future given these changes. In the event the City experiences an increase in demand, to understand the scale of the impact, the City will run a model of the City water system that would compute firm yield from inputted streamflow data, replacing historic inflows with projected inflows from three climate change scenarios as described by the WSF 2009 Outlook. Those climate change scenarios for King County are provided in **Table 4-6**.

Table 4-6 | Predicted Increase in Demand from Baseline Due to Climate Change¹

Climate Change Scenario	2005	2020	2030	2040
Baseline	0.0%	0.0%	0.0%	0.0%
Warm	3.5%	4.4%	4.9%	5.4%
Warmer	4.6%	4.9%	5.8%	7.4%
Warmest	4.8%	6.2%	7.6%	9.5%

4.5.2 Extreme Weather Events and Significant Challenges

To meet the requirements for risk and resilience assessments in America’s Water Infrastructure Act (AWIA) of 2018, the City completed a Risk and Resilience Analysis (RRA) in December 2020 using the EPA’s Vulnerability Self-Assessment Tool (VSAT). VSAT was developed to serve as an all-hazards assessment tool for water and wastewater utilities of all sizes and addresses malevolent acts, dependency/proximity

¹ [Climate Change Impacts and Adaptation in Washington State: Technical Summaries for Decision Makers \(uw.edu\)](#)

² [*2009RegionalWaterSupplyOutlook.pdf \(amazonaws.com\)](#)

threats, and natural hazards. Through this effort, the City has identified the following assets as the most vulnerable to flood hazards.

- Coal Creek Springs aquifer
- Coal Creek Springs and West Hill Springs piping
- Valley Aquifer (Wells 1, 2, 3A, 3B, 4, 6, 7)
- Green River and Lea Hill pump stations
- Distribution System

Climate change exacerbates existing challenges with flooding, landslides, droughts, wildfire, and other natural hazards by potentially changing the frequency, intensity, and duration of these events. Heavier rainfall increases the threat of flooding. In addition to immediate flood threats, flood waters can damage and contaminate wells and water treatment plants resulting in short-term outages and increased risk of waterborne diseases in drinking water. Higher levels of pathogens in runoff from areas around drinking water wells and surface water intakes from flooding of the wells themselves.

In October 2018, the Intergovernmental Panel on Climate Change (IPCC) released the Special Report on Global Warming of 1.5 degrees Celsius (°C). Warming of 1.5°C is projected to decrease summer streamflow in the Puget Sound by 23 percent. Average temperatures in 2015 were 2.7°C warmer than pre-industrial era temperatures which resulted in low summer streamflow and warmer waters³. According to the King County Climate Change GIS map “Summer Runoff: Change, 2040s”, summer (July-September) runoff in the City of Auburn is expected to decrease by 2.4 percent by the 2040s from historical conditions (1970-1999)⁴. The WSF 2009 Outlook believes the region is reasonably well prepared for drought, however further actions could improve drought preparation. During droughts, water supplies may fall short of meeting demands, especially in summer months. In the past, water utilities in the Puget Sound have adapted to fluctuations in water supplies from droughts through reservoir management and system adaptations such as long-term conservation programs and short-term demand curtailments¹.

Warming of 1.5°C is also expected to bring larger and more frequent wildfires, which could disrupt regional water supplies. Significant water quality impairments from a wildfire include increased turbidity and introduction of radionuclides, metals, and fire-retardant chemicals⁵, although impacts to the City’s water quality is not likely as there are not surface water sources. The City can maintain existing emergency interties to mitigate wildfires that affect adjacent systems more severely than the City’s. While the City contains land that is considered Wildland-Urban Interface, the United States Forest Service has classified the City as either Very Low or Non-burnable in its Potential Wildfire Hazard GIS map (2020)⁶.

4.5.3 Assessment of Actions to Protect System

In the face of continued warming, there are actions the City can take to improve the resiliency of the water system from the impacts of climate change. Below are possible short-term and long-term actions for the City to consider. The short-term measures can improve resiliency within three to five years while the long-term measures may require decades to be fully implemented⁵.

³ [NoTimeToWaste_CIG_Feb2019.pdf \(uw.edu\)](#)

⁴ <https://climate-kingcounty.opendata.arcgis.com/maps/bab86832a962416cbdbb35644dadb11b>

⁵ [Phase2SummaryReport20180731FINAL.pdf \(amazonaws.com\)](#)

⁶ <https://hub.arcgis.com/datasets/usfs::wildfire-hazard-potential-version-2020-classified-image-service/explore?location=47.307822%2C-121.937736%2C10.98>

4.5.3.1 Short-Term Actions

Source Inventory: Identify sources that will remain online in the event of a 100-year or 500-year flood. Utilize GIS or other mapping tools to create a map to visualize which sources are at risk of inundation in such events. Develop protocols for isolating these sources. Determine how sources could be used for critical health and safety following an extreme weather event and how these sources relate to emergency shelters and critical facilities, such as hospitals.

Groundwater Supplies: Develop new groundwater supplies or augment existing groundwater supplies to improve drought resiliency and offset challenges posed by the wetter winters and drier summers expected with warming temperatures. Establish models to understand the effects of drier summers and increased risk of drought on groundwater supplies. Evaluate impacts of lower snowpack levels in the Cascade Mountains on aquifer recharge.

Wildfire Mitigation: Evaluate fire-fighting capacity for open space areas such as Game Farm Park and Wilderness Area.

Interaction with Research Community: Build and sustain routine interactions with the research community on the subject of climate change and water supply. Consider opportunities to fund water-industry research with direct application to water supplies in western Washington. Explore opportunities to have imbedded persons, such as employing a scientist with climate change expertise.

Rate Factors: Implement less frequently used rate factors, such as a rate for drought periods, to encourage lower demands.

Floodproofing: Build flood barriers such as levees and dikes to protect critical infrastructure. Elevate critical equipment or place it within waterproof containers or foundation systems.

Power Supplies: Extreme weather events can cause power outages. Consider alternative or on-site power supplies to provide resiliency during such events.

4.5.3.2 Long-Term Actions

Monitor Aquifer Conditions: Establish a program of long-range monitoring of aquifer recharge and water levels as affected by climate change. Assess risk of saltwater intrusion. Establish models to assess source redundancy in extreme drought events.

Green Infrastructure: Apply green infrastructure strategies to collect and manage stormwater. Regional or water-shed scale plans for stormwater management can be more cost effective than individual plans.

Water Use Efficiency: Continue to invest in and evaluate WUE programs to reduce water consumption and improve efficiency. Consider partnering with King County to assess reclamation and reuse programs to augment non-potable water demands.

Water Rights: Invest in permanent or mobile infrastructure to ensure access to all available water rights to maximize available sources.

Source Water Protection

The City relies on groundwater sources to meet current water supply demands. This chapter's objective is to update the City of Auburn's (City's) program to protect and improve source water used by the City. As the City's sources only include groundwater wells and springs which are not under the influence of surface water, a Watershed Control Program is not required.

This chapter addresses the following topics:

- 5.1 Sanitary Control Area
- 5.2 Wellhead Protection Program

5.1 Sanitary Control Area

Sanitary Control Areas (SCAs) have been established for each of the City's water sources per WAC 246-290-135(2). An SCA is the front-line protection against contamination of the water source. The standard SCA for wells has a minimum radius of 100 feet from the wellhead. The standard SCA for spring sources has a minimum radius of 200 feet from the spring head. All City water sources have SCAs that were established and approved by DOH, and are documented in the susceptibility forms provided in **Appendix T**. All properties within the SCA for each water source are under the City's ownership and control.

5.2 Wellhead Protection Program

DOH has developed regulations that require Group A water systems using groundwater sources to develop and implement a Wellhead Protection Program (WHPP) in accordance with WAC 246-290-135. The basic elements required of a WHPP are:

- Assessment of initial groundwater susceptibility (physical susceptibility to contamination) for each water supply source,
- Delineation of the wellhead protection area (WHPA) that directly contributes groundwater to each water supply well,
- Identification of potential sources of contamination within each WHPA,
- Documentation of notification to owner/operators of known or potential hazards, and
- Development of spill prevention plans and water contingency plans that minimize or eliminate the possibility of contamination to the groundwater supply and development of options for maintaining water supply in the event the aquifer contributing to a source is contaminated.

The City maintains its WHPP for 12 groundwater sources. A WHPP was prepared in 2014 for the City's 2015 WSP; this remains the current WHPP for the City. The purpose of the WHPP is to help prevent the City's water supply from becoming contaminated and to develop contingency and emergency response procedures in case one or more sources are lost due to contamination. This is accomplished by providing

WHPAs around public groundwater sources, identifying existing groundwater contamination sources, and managing potential groundwater contamination sources prior to their entry into the drinking water system.

The WHPP provides tasks for the City to implement wellhead protection and the City prioritizes those tasks by criteria such as available staff, time to complete, cost, and urgency due to limited available resources. The City maintains an annual operating budget for implementing tasks related to the wellhead protection program, as well as identifying and monitoring potential new hazards. The City allocates budget annually for the Water Resources Protection Program, as discussed in **Chapter 8**.

5.2.1 Susceptibility Assessment

Susceptibility Assessment Forms have been completed by the City and submitted to the DOH. The forms are provided in **Appendix T**. The DOH's susceptibility assessment rating for each source is summarized in **Table 5-1**.

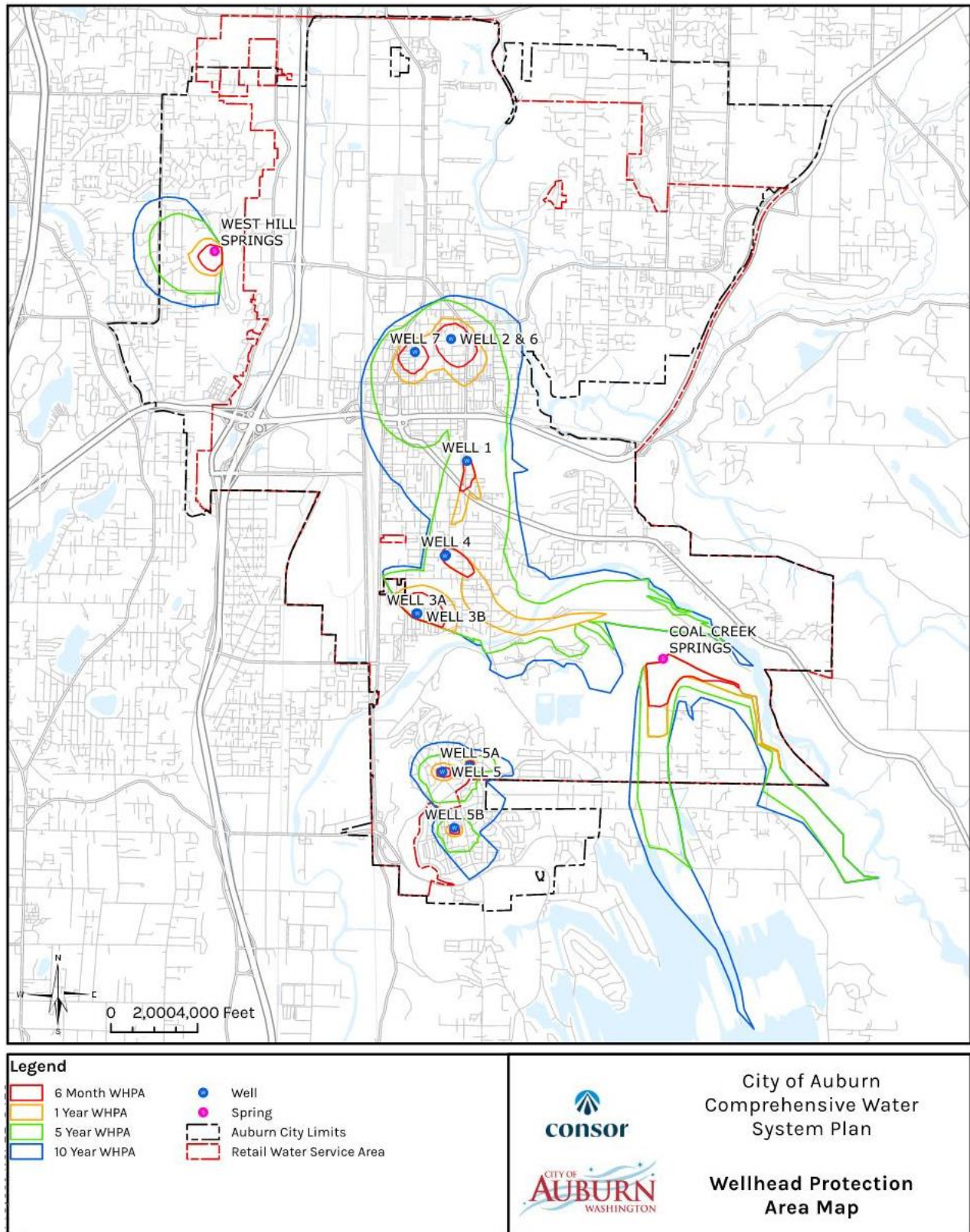
Table 5-1 | Source Susceptibility Assessment Ratings Issued by DOH

Source	Susceptibility Rating
Coal Creek Springs	High
West Hill Springs	High
Well 1	Moderate
Well 2	High
Well 3A	Low (Off-line)
Well 3B	Low (Off-line)
Well 4	Low
Well 5	Low
Well 5A	Low
Well 5B	Low (Off-line)
Well 6	High
Well 7	High (Off-line)

5.2.2 Wellhead Protection Area Delineation

The WHPA defines the area around a groundwater source that has the potential to contaminate the source. This area is based on the source's capture zones, which are the zones of the source aquifer and ground surface that can contribute water to the source in six months, one year, five years, or ten years. The City's 2014 WHPP largely replaced the initial plan created in 2000. The study area, physiographic settings, and WHPAs were defined in the 2000 WHPP and remain valid. Capture zones were delineated using a three-dimensional particle-tracking program with a steady-state head distribution created by a numerical model. The established WHPAs are shown in **Figure 5-1**.

Figure 5-1 | Wellhead Protection Area Map



5.2.3 Contaminant Source Inventory and Notification of Findings

A summary of potential contaminant sources for the City’s water sources was updated in April 2024. The Contaminant Source Inventory (CSI) was updated utilizing Ecology’s Facility/Site ID database. The contaminant sources are organized by water source and time travel zones, and are included in **Appendix T**.

DOH requires notifications be sent to landowners with potential contaminant sources, as well as state and local agencies, of the CSI findings. Letters and WHPA maps were mailed to landowners in June 2024; copies of the notification letter template and maps that were sent to landowners are included in **Appendix T**.

State and local agencies use the CSI findings and WHPAs to help prioritize local and state pollution control outreach, to provide incentives to landowners for risk reduction, and to support local land-use planning decisions. DOH requires that state and local emergency responders be notified of the WHPAs, results of the susceptibility assessment, CSI findings, and the contingency plan. Copies of the notifications sent to emergency responders and regulatory agencies, as well as the WHPA maps, are included in **Appendix T**. A list of state and local agencies that were sent notifications letters, along with the date of the notification is summarized in **Table 5-2**.

Table 5-2 | State and Local Agencies Notified of CSI Findings

Agency	Notification Date
Washington Department of Ecology	June 2024
Washington State Department of Health Southwest Regional Office	June 2024
King County Public Health	June 2024
Auburn Police Department	June 2024
East Pierce Fire and Rescue	June 2024
King County Fire Protection District 31	June 2024
Mountain View Fire and Rescue	June 2024
South King Fire and Rescue	June 2024
Valley Regional Fire Authority	June 2024

5.2.4 Contingency Plan

The City developed a Water Source Loss Mitigation Plan (City of Auburn Standard Operating Procedure 5.2.1) to address how the water system will provide consumers with adequate supply of potable water in the event one or more sources become temporarily or permanently unavailable; this plan is included in **Appendix T**. Should one water source be unavailable, the City has sufficient capacity across the remaining sources and interties to supply potable drinking water to its customers; water supply availability is evaluated in greater detail in **Chapter 3**.

Operations and Maintenance Program

This chapter provides an overview of the City of Auburn's (City) Water Utility organization, operations and maintenance (O&M). The purpose of the chapter is to document existing procedures and to identify areas where improvements or changes could enhance system operation.

The following topics are addressed in this chapter:

- 6.1 Water System Management and Personnel
- 6.2 Operations and Preventive Maintenance
- 6.3 Comprehensive Water Quality Monitoring
- 6.4 Emergency Preparedness and Response
- 6.5 Safety Procedures
- 6.6 Cross Connection Control Program
- 6.7 Sanitary Survey Findings
- 6.8 Customer Complaint Response Program
- 6.9 Recordkeeping and Reporting
- 6.10 Summary of O&M Deficiencies and Recommended Improvements

6.1 Water System Management and Personnel

6.1.1 Mission Statement

The mission statement of the City's Water Utility is to provide for the efficient, environmentally sound, and safe management of the existing and future water system within the City's service area.

6.1.2 Department Overview

The Water Utility is responsible for providing potable water to the City's customers that meets or exceeds the recognized standards of today and the future by efficiently administering, operating, and maintaining the water supply. The Water Utility will also continue to enhance its customer service through public education and information. A primary responsibility of the Water Utility is implementing the Comprehensive Water Plan (Plan).

6.1.3 Internal and External Factors

The objective of the Water Utility is based on compliance with internal and external factors. An internal Work Plan Overview is generated at the beginning of each work year with a review process at the end of the year. The Work Plan Overview describes budget goals, performance measures, engineering tasks,

capital projects, and maintenance and operations tasks. External factors include adoption of goals, recommendations, and standards established by the following regulatory or professional practice agencies:

- Washington State Department of Health (DOH)
- Washington State Department of Ecology (Ecology)
- American Public Works Association (APWA)
- Association of Washington Cities (AWC)
- Department of Homeland Security (DHS)
- American Water Works Association (AWWA)
- Washington Cities Insurance Authority (WCIA)
- Municipal Research and Services Center of Washington (MRSC)
- United States Environmental Protection Agency (USEPA)

6.1.4 Water Utility Division Organization

The Auburn Water Utility is operated as a utility enterprise under the direction of the Public Works (PW) Director. Specific Water Utility Management Responsibilities within the PW Department fall under either the Utilities-Water Section of Engineering Services or the Water Division of Maintenance and Operations Services.

The Utilities-Water Section of Engineering Services is responsible for comprehensive water system planning, development of a Capital Improvement Program (CIP), as well as programming the design, construction, and inspection of projects related to the water system.

The Water Division of Maintenance and Operations Services is responsible for operating and maintaining the water system, performing daily operation and inspection, water quality monitoring as required by DOH, and line management of the Water Utility.

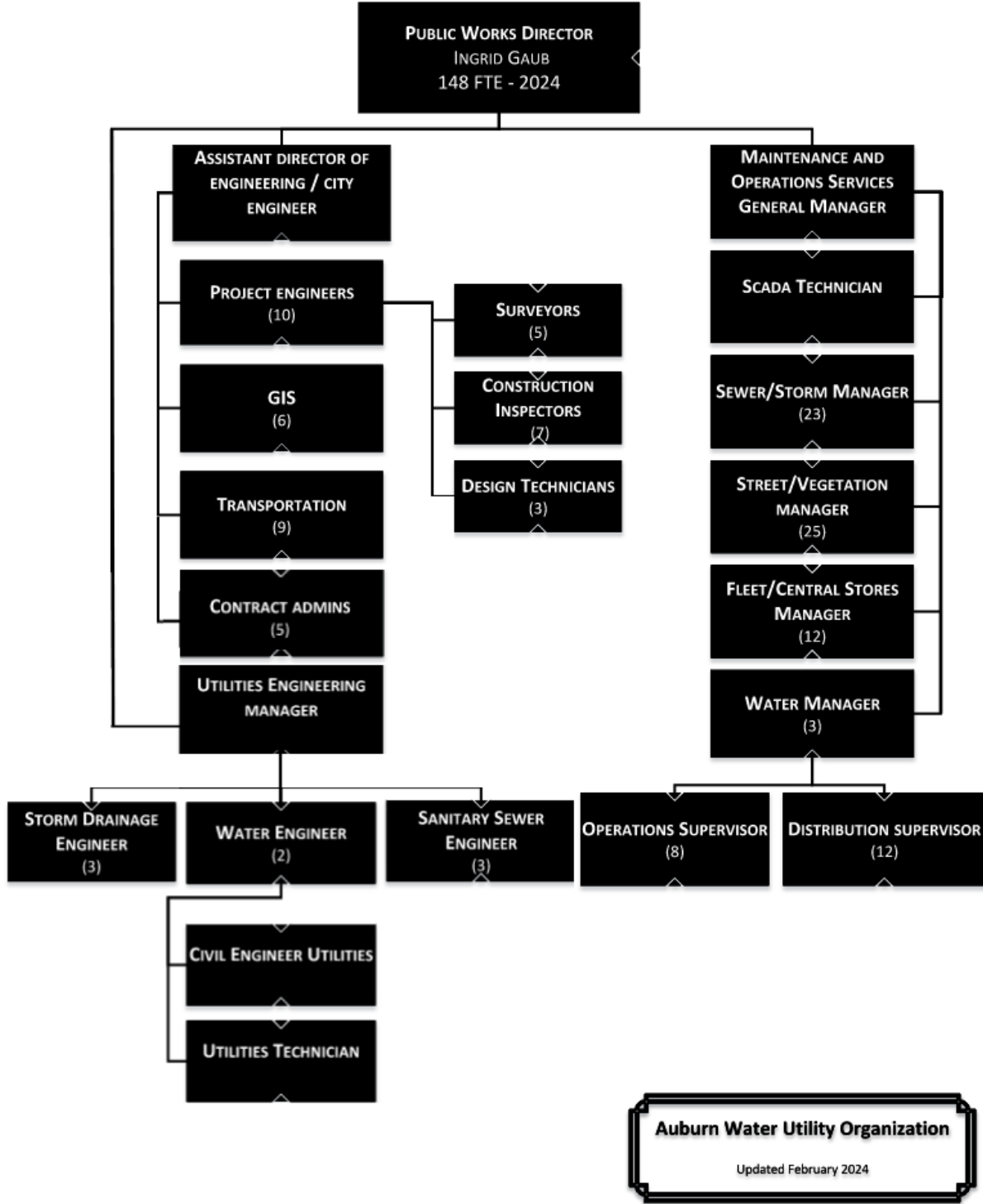
The organization of the Water Utility is shown within the Public Works Organizational chart in **Figure 6-1**. The responsibilities of each staff within the Utilities-Water Section of Engineering Services, including professional and technical support staff from within Engineering Services that are not specifically within the Water Utility are summarized below.

- Utilities Engineering Manager and Water Utility Engineer: Primarily responsible for development of the comprehensive water plans, water capital facility plan, annual project budgeting, technical design, and construction standards, “as-built” drawings, and designs, utilized in the construction of the water systems facilities. They also provide technical computations, water modeling and other analysis required to support system operation. Additional responsibilities include engineering, consultant contracts, capital projects planning, and customer assistance with City code, drawings, and permits.
- Water Quality Programs Coordinator: Assist with the Water Quality and Water Conservation Programs and is responsible for compiling DOH sampling data and verifying DOH sampling was conducted per the sampling schedule.

Figure 6-1 | Auburn Water Utility Organizational Chart



Public Works Department



- City Engineer: Responsible for issuance of the City’s Design and Construction Standards. Responsible for the management and the design and construction of capital projects managed by Project Engineers, including consultant-designed projects and construction contractors. Under the direction of the City Engineer, GIS Specialists are responsible for the transfer of data from “as-built” drawings to the GIS database. GIS is a mapping software that records and locates infrastructure related to the water system. GIS Specialists are also responsible for provision of maps and statistics to staff within the PW Department.
- Utilities Technician: Assist with certain permit-related activities involving the water system. The Technician is also responsible for customer inquiries, assistance with applications, tracking water system usage for reporting, and updating and updating water system records.
- Utilities Civil Engineer: Review City capital improvements and development projects pertaining to water system improvements and provides customer assistance regarding projects and permit activities.

Personnel lists for Engineering and Maintenance and Operation (M&O) staff that are responsible for daily operations are summarized in **Table 6-1** and **Table 6-2**. Operations staff provide daily O&M of wells, corrosion control treatment facilities, pump stations, and reservoirs. They also implement the cross connection control program and provide locating services for all City utilities. Distribution staff maintains the complete distribution system including water mains, valves, hydrants, pressure reducing stations, and meters.

The City has a mayor-council form of government; therefore, the PW Director reports to the Mayor. The City Council provides oversight of the Water Utility regarding policy, planning, and management of the water system.

6.1.5 Communication System

The City maintains a robust communication system to contact Water Utility personnel during normal work hours and after hours. This system is necessary to respond to customer requests, routine maintenance, or emergency situations. Maintenance staff vehicles and other rolling stock are all equipped with radios and personnel carry cellular phones. The Water Utility also has access to an inventory of portable emergency use radio units, should they be required.

A Standby Call-Out Program was initiated in 2006 to ensure that coverage for after-hours response was guaranteed. One staff member in Operations and one staff member in Distribution always carry a dedicated cell phone during their off hours. Standby duration runs for one week before responsibility is rotated to the next staff member on the roster.

Water problems involving service leaks, quality issues, main breaks, broken hydrants, etc., that occur outside normal working hours, are reported through the City’s 911 emergency response system. An “Emergency Call-Out List” is provided to the emergency operators who will attempt to contact the designated standby Water Distribution or Water Operations employee, based on the type of service required. If contact cannot be made, the operator will contact the designated Standby Public Works Maintenance and Operation Manager.

Table 6-1 | Water Operations and Distribution Staff and Certifications

Position	Primary Function(s)	Certification(s) ¹
Water Manager	Management	Water Distribution Manager 4
Water Operations Field Supervisor	Management (Operations)	Water Distribution Manager 4, Water Treatment Plant Operator 1, Cross Connection Specialist
Water Distribution Field Supervisor	Management (Distribution)	Water Distribution Manager 3
Maintenance Lead (Distribution)	Management (Distribution)	Water Distribution Manager 2
Cross Connection Control Specialist	Cross Connection Control & Backflow Assembly Tester	Water Distribution Manager 1, Cross Connection Specialist, Backflow Assembly Tester
Distribution Specialist	Distribution Operations Maintenance	Water Distribution Manager 1
Maintenance Worker II / Locator	Operations & Distribution Maintenance	N/A
Maintenance Worker I	Operations & Distribution Maintenance	N/A

There are 12 staff members on the On-Call Manager Standby List and one of them has call-out responsibility for an entire week until it rotates to the next staff member. The 12 staff positions on the Standby List are:

- Water Manager
- Water Distribution Supervisor
- Water Operation Supervisors
- Sanitary Sewer and Storm Drainage Manager
- Sanitary Sewer Supervisor
- Storm Drainage Supervisor
- Streets and Vegetation Manager
- Street Supervisor
- Vegetation Supervisor
- Fleet/General Service Manager
- Maintenance & Operations (M&O) Support Supervisor
- M&O Services General Manager

There are also three other maintenance staff members on standby that can be called out as needed. The staff members are employed by Sanitary Sewer Division, Storm Drainage Division, and Street Division. The 911 operator also has phone access to the other Public Works staff, if the situation warrants it.

Telemetry alarms that occur after hours are handled by an automated Supervisory Control and Data Acquisition (SCADA) alarm and an automated dialer for notification called WIN911. The SCADA alarm calls standby staff from the WIN911 list. If no one responds within 15 minutes, then WIN911 calls the Water Operations standby staff on the call out list. The system will continue to cycle through the roster of seven employees until contact is made.

6.1.6 Operator Certification Program

The Washington Administrative Code (WAC) 246-292, requires minimum standards for the certification status of water operators. Also, the City has recognized the value of having a knowledgeable and well-trained staff operating the Water Utility and encourages employees to obtain the highest level of certification available. The City currently serves a population of greater than 50,000, which classifies their

distribution system into a group 4 according to WAC 246-292-040. Certifications required per staff role are summarized in **Table 6-1**.

The City pays for annual certification fees, provides time and tuition for certification training courses, and allows time for certification examinations. In addition, the City provides opportunities for staff to obtain continuing education units (CEUs) to maintain certification. Professional growth requirements for certification CEUs are monitored and maintained by the Washington Certification Services.

6.1.7 Education and Training Program

Continuing educational opportunities are fundamental for staff in the Water Utility. The Water Utility training budget is funded to support staff in maintaining their technical awareness and skill sets. Seminars, conferences, and college coursework: 1) broaden their knowledge and 2) allow them to network with other professionals involved in Water Utility work. Subjects include cross connection control, pumps, motors, pressure reducing valves, hydrants, chlorination, generators, forklift training, confined space, first aid, CPR, electrics, and other essential topics.

Most staff are tasked with specific job functions during their normal work shift and the consistent nature of the work allows them to complete their jobs in a very professional and efficient manner. However, all staff are rotated through an active cross training program to cope with employee absences such as vacation, sickness, retirement, and termination.

6.2 Operations and Preventive Maintenance

The City's water system is comprised of pump stations, chlorination stations, corrosion control facilities, reservoirs, springs, and wells. **Figure 1-3** presented in **Chapter 1** provides an overview map of the major existing system facilities. These components all work together to ensure that water is available to meet customer demands. Primary operation of the water system is maintained via the SCADA computerized control system. AVEVA software works in association with SCADA to provide real time graphical display of system data for staff interpretation and control. The SCADA system is often referred to as the Telemetry system based on one of the definitions of Telemetry (the science and technology of the transmission and measurement of data from a distant source). The City's SCADA system is monitored in the Public Works M&O Building, 1305 C Street SW, and responsibility for the system related to the Water Utility falls under the Water Manager and associated staff.

Some of the functions that SCADA monitors, records, and controls include:

- Reservoir levels
- Source meter production
- Pumps
- Motors
- Valves
- Chlorination
- Pressures: Low, High, Discharge, Suction
- Alarms: Intrusion, Fire, Generator Run, Low Fuel, Overflows, Failures, Turbidity

Status reports are continuously received via radio and information regarding system demand is used to determine system activation. The SCADA system includes logic programming which automates the process; however, Operations staff can manually override most computer decisions, if necessary. The alarm infrastructure is linked to WIN911 for after-hour call-out and response.

All data monitored by the SCADA system is electronically recorded by a computer server maintained by the Innovation & Technology (IT) Department. A back-up copy is made each evening to ensure that records are retrievable should hardware or software failures occur. SCADA records are available to all PW staff via the City's computer server. Access and control of the system is relegated to two dedicated computer terminals at the M&O Building. The computer terminal that houses SCADA is password protected and entry into the building is keycard access controlled.

The SCADA software and historical data is maintained on the City's Wide Area Network (WAN). Staff have access to the system via workstations connected to the WAN or remote network applications. A telephone connection provides the auto-dialer for the WIN911 notification to phones or pagers. An Ethernet radio connected to the computer system at the M&O Building sends and receives radio signals to/from the Programmable Logic Controllers (PLCs) at the water facilities. PLCs at the facilities are also able to communicate directly with each other via radio signal.

The City recently completed a SCADA Upgrade Project, completed in 2024, which updated the system platform to the most current version, modernizing the City's SCADA system from its last major upgrade in 2015. Major components were also replaced throughout the system to provide more reliable communication. The new hardware, in conjunction with software upgrades, provides additional control of the city's facilities.

6.2.1 Inspections, Preventive Maintenance, Repairs, and Replacement

Systematic inspection of Water Utility facilities is conducted on a daily or weekly basis by Distribution Specialists under direction of the Water Operations Supervisor as summarized in **Table 6-2**. The inspection process serves the following purposes:

- System Confirmation - proper operation of automated control and monitoring equipment
- Sound Check - listen for unusual noises
- Well Levels - static and dynamic
- Equipment Check - pumps, motors, valves, chlorination, heaters, vents, generators, etc.
- Security Verification - intrusion, vents, hatches, locks, gates, graffiti, etc.

A portion of the maintenance tasks handled by the Operations staff are associated with a Preventive Maintenance Program and some of those activities are arranged to coincide with the Facility Inspection Schedule shown in **Table 6-2**. The maintenance activities are based on equipment manufacturer recommendations and maintenance staff observations for infrastructure located within and outside the facility. Preventive maintenance tasks are essential for reliable operations and preservation of investment so adherence to the program is stressed. Additional maintenance activities handled by Water Operations staff include repairs, replacement, small improvement projects, and response to customer requests.

The Distribution staff is involved in the same activities as Water Operations staff regarding inspection, preventive maintenance, repairs, replacement, and response to customer requests. Water Distribution staff activities are usually in response to damage or leaks involving mainlines, service laterals, meters, meter boxes, and hydrants. Other Distribution tasks include fire flow testing, system flushing, meter installation, and miscellaneous small improvement projects.

Most customer requests are associated with water quality concerns and water pressure issues. Those requests are handled by the Distribution staff and/or Cross Connection Specialists, on a case-by-case basis.

Table 6-2 | Water Operations - Facility Inspection Schedule

Type of Facility	Facility Name	Daily Inspection 5 Day Workweek	Weekly Inspection
Booster Pump Station	Academy Pump Station 3	X	
	Academy East Booster Pump Station	X	
	Green River Pump Station	X	
	Lea Hill Pump Station	X	
	Lea Hill Booster Pump Station		X
	Lea Hill Intertie Booster Pump Station	X	
	Terrace View Booster Pump Station	X	
	Lakeland Hills Booster Pump Station	X	
	Game Farm Park Pump Station		X
	Braunwood Booster Pump Station	X	
Chlorination Facility	Lea Hill Intertie Pump Station (Re-chlorination)	X	
	Terrace View Booster Pump Station (Re-chlorination)	X	
	Coal Creek Springs – Chlorine Gas	X	
	West Hill Springs - Chlorine Gas	X	
	Well 1 – Hypochlorite	X	
	Well 3A – Chlorine Gas (when well is in operation)		Off-line
	Well 3B – Chlorine Gas (when well is in operation)		Off-line
	Well 4 - Hypochlorite	X	
	Fulmer Field Corrosion Control Facility – Onsite Generated Hypochlorite (Treats Well 2, 6, and 7 sources)	X	
	Well 5A - Hypochlorite	X	
Corrosion Control Facility	Howard Road Corrosion Control Treatment Facility (Treats Coal Creek Springs source)	X	
	Fulmer Field Corrosion Control Treatment Facility (Treats Well 2, 6 and 7 sources)	X	
Metals Removal Facility	Well 5B (Treats iron and manganese)		Off-line
Reservoir	Reservoir 1 – Valley Service Area	X	
	Reservoir 2 – Valley Service Area	X	
	Reservoir 4A – Lea Hill Service Area	X	
	Reservoir 4B – Lea Hill Service Area	X	
	Reservoir 5 – Lakeland Service Area	X	
	Reservoir 6 – Lakeland Service Area	X	
	Reservoir 8A - Academy Service Area	X	
	Reservoir 8B - Academy Service Area	X	
	Braunwood Reservoir	X	
Spring Source	Coal Creek Springs	X	
	West Hill Springs	X	

Type of Facility	Facility Name	Daily Inspection 5 Day Workweek	Weekly Inspection
Well Source	Well 1	X	
	Well 2	X	
	Well 3A (Off-line)		Off-line
	Well 3B (Off-line)		Off-line
	Well 4	X	
	Well 5	X	
	Well 5A	X	
	Well 5B (Off-line)		Off-line
	Well 6	X (when on)	X (when off)
	Well 7 (Off-line)		Off-line
	Braunwood Satellite Well	X	
Intertie Supply	Tacoma B Street Intertie		X
	Tacoma 132nd Avenue Intertie		X

6.2.2 Reservoir Maintenance

Reservoirs are a fundamental part of the water distribution system. They act as storage and regulating devices for water flow and maintaining them in prime physical condition is an essential activity. The Water Utility began a rigorous reservoir maintenance program in 1997 and it has evolved into an annual routine function. Each year, two of the reservoirs have their interiors thoroughly inspected by a contractor experienced in reservoir maintenance. The annual inspection process is based on a rotational schedule to ensure inspection of each reservoir on a 5-year timetable.

Since the reservoirs are usually filled with water, a diver must conduct the inspection. The diver is equipped with lights and an audio/video device to record the process. Issues of concern include corrosion, cracks, and condition of coating on the walls, valve, fasteners, etc. The diver is also equipped with a vacuum unit to remove sedimentation. The contractor also performs a visual inspection of the exterior of the reservoir for the same elements noted for the interior. The recording is reviewed by the contractor, a report is generated based on the interior and exterior inspection and a copy of the report and recording are given to the Water Manager and Water Utility Engineer for review.

If the report and recording indicate that a reservoir needs major repair, relining, or repainting, another contractor is acquired for a recommended course of action. If interior work is required, the reservoir must be drained of water. In those situations, a carefully orchestrated timetable and shifting of water resources is necessary to balance maintenance with the needs of the City's customers.

6.2.3 Pump Station Maintenance

Pump Stations are inspected daily or weekly depending on the station by Water Operations staff. The inspection checklist includes confirming that proper operation of the automated controls and monitoring equipment align with the standard operating procedures for the equipment, sound checks for unusual noises, static and dynamic well level checks, equipment checks (pumps, motors, valves, chlorination, heaters, vents, generators, etc.), security checks through visual inspection of the facility grounds for intrusion, graffiti, or issues with vents, hatches, locks, gates, and anything else that may seem unusual or misaligned.

6.2.4 Treatment Facility Maintenance

Treatment Facilities are inspected daily by Water Operations staff. The inspection checklist includes confirming that proper operation of the automated controls and monitoring equipment align with the standard operating procedures for the equipment, sound checks for unusual noises, equipment checks (pumps, motors, valves, chlorination, heaters, vents, generators, aeration towers, etc.), security checks through visual inspection of the facility grounds for intrusion, graffiti, or issues with vents, hatches, locks, gates, and anything else that may seem unusual or misaligned.

6.2.5 Pressure Reducing Valve Stations

Pressure Reducing Valve (PRV) Stations are inspected every month by Water Operations staff. The inspection checklist includes condition of the vault, valves, inlet pressure, outlet pressure, and pilot controls. Staff inspections are supplemented by a more thorough inspection and calibration process conducted annually by a contractor that specializes in PRVs. Repair or replacement maintenance, unless minor, is usually performed by the contractor. The City plans to implement an in-house repair maintenance program.

Rebuilds of PRVs are typically done every three to five years based on the rebuild schedule.

6.2.6 Utility Locating Service

Two Water Utility staff are designated as the Utility Locators for all City utilities and roadway infrastructure (Water, Storm Drainage, Sanitary Sewer, and Street lights and traffic signals) and additional staff may also be present to provide flagging when safety issues arise. The number of location requests varies daily but averages out to a full-time commitment. The Utility Locators report to the Water Operation Supervisor, but location requests may be made indirectly by the Water Distribution, Sanitary Sewer, or Storm Drainage Supervisors.

6.2.7 Fire Hydrant Inspection

In 1999, a fire hydrant inspection goal was initiated. The intent was to inspect, repair, and test at least one third of the utility owned fire hydrants in the system each year. The importance of this program cannot be understated since fire hydrants are the first defense against loss of life or property due to fire. The inspections also improve water quality due to the stagnant water that is purged from the hydrant stubs. A water de-chlorination program, in response to Ecology guidelines, was initiated in 2001 to treat water purged from hydrant stubs. The Water Distribution Supervisor has made public hydrant inspection a year-round routine task of Water Utility operations. Secondary maintenance of public hydrants such as rust removal, painting, street reflector replacement, clearing obstructions, etc., is handled by seasonal part time staff when time permits. Property owners with private hydrants are solely responsible for obtaining annual, satisfactory inspections of their private hydrants from a qualified inspector.

6.2.8 Dead-end Flushing

A key component of water quality control is dead-end line flushing. The City has approximately 548 dead-end mains throughout the distribution system. The water in dead-end mains tends to stagnate due to lack of turnover which can have an impact on water quality for customers in the immediate vicinity. Flushing dead-ends is the only effective way to purge the lines of stagnant water and associated particulate matter. In 2000, an engineering consulting firm was hired to assist the City with the development of a Dead-end Flushing Program. They examined the City's distribution system via GIS data and supplemented the study

with field inspections. A comprehensive operating procedure detailing separate flushing instructions for each dead-end was developed and continues to be used today.

Maintenance staff, under the direction of the Water Distribution Supervisor, follow the program instructions and record their activities. This program has been incorporated into the Unidirectional Flushing program, see **Section 6.2.10**.

6.2.9 Valve Exercising

The AWWA technical manual *M44 Distribution Valves: Selection, Installation, Field Testing, and Maintenance*, suggests that valve exercising should be conducted each year and more frequently for valves 16 inches and larger.

The Water Utility has a Valve Exercising Program, which is in concert with the Unidirectional and Dead-end Flushing programs. Historically, distribution valves have only been exercised on a limited and sporadic basis. Through the Valve Exercising Program, the City's goal is to exercise 25 percent of the distribution valves each year. Hydrant foot valves are not included in the valve exercising program and instead, are exercised as part of the hydrant inspection process.

Opening and closing valves by hand is a repetitive, ergonomically unsafe, and time-consuming task. The City has purchased a portable valve exercising machine and vacuum device to speed up removal of debris that collects in the bottom of valve boxes. Valves requiring repair or replacement are documented and corrected by City Staff or contractors.

Additionally, Distribution staff work with GIS staff to correct inaccurate valve information in the City's GIS data.

6.2.10 Unidirectional Flushing

In 2013, the City implemented a comprehensive Unidirectional Flushing (UDF) program to flush its water system. The program's goals include:

- Improving cleaning of accumulated deposits on pipes,
- Reducing water use, as compared with conventional flushing, and
- Reducing the impact on customers.

The Water Distribution Supervisor is responsible for the UDF program to maintain Water Quality.

The UDF process concentrates flow within a pipe by closing valves and using specific hydrants to isolate each pipeline and create flow in a single direction. The concentrated flows increase velocities within the pipe that results in scouring of accumulated deposits on pipes. UDF may remove sand, gravel, plastic, biofilms, and other accumulated materials that are not removed by conventional flushing. The cleaned mains may have improved water clarity or color, reduced turbidity, and improved chlorine residual.

Flushing times of a half hour or less are typical, which can equate to substantial water savings. Therefore, UDF is a key component of the City's Water Use Efficiency (WUE) program. The reduced flushing time also limits the impact on the Water Utility's customers.

As previously mentioned, the City has incorporated the valve exercising and dead-end flushing programs into the UDF program. Valves not used as part of a flushing sequence along each pipe length are exercised by distribution system staff to complete the Valve Exercising Program. While the UDF program flushes

dead-end mains, more frequent dead-end main flushing may be required for water quality reasons. The UDF program also provides static pressure measurements.

The City's goal is to conduct UDF of approximately 20 percent of the system each year.

6.2.11 System Loss Program

The City has committed to an active System Loss Program to maintain water loss under 10 percent. The achievement is documented each year in the Distribution System Leakage Report. Elements of the Program include Leak Detection, Source Meter Calibration, Large Meter Testing, and Meter Replacement. Each of these is discussed in detail below.

6.2.11.1 Leak Detection

The City is committed to a tight, non-leaking water distribution system. As of 2016, the city implemented an in-house Leak Detection program, with a goal to inspect 90 miles of water main every year.

6.2.11.2 Source Meters

Source meters, also known as production meters, measure the amount of water emitted from the City's springs and wells. They are calibrated by an outside contractor under the direction of the Water Operations Supervisor and if a meter cannot be calibrated properly, it is replaced with a new one.

6.2.11.3 Meter Replacement Program

Between 2017 and 2018, the City replaced all service meters with an Automated Metering Infrastructure (AMI) system, under the Water Meter and Billing System Improvements project. The system automatically receives meter reads via radio transmission and integrates the data into the City's billing software. The benefits of an AMI system include increased accuracy and efficiency; early leak detection; high usage, zero usage, and backflow detection; and improved customer service. This has saved staff time associated with regular meter reading, missed or incorrect reads, final reads for customer account close-out, and confirmation of high reads for potential leaks. An optional interactive customer portal allows customers to view their monthly, daily, and hourly usage to see exactly when they are using water and how much. This allows customers to better understand their water usage, encourages conservation, and potentially saves them money.

The AMI system is anticipated to have a 20-year life. That includes the system components and batteries in the radios. Meter replacement will be on a 20-year program to coincide with the AMI system.

6.2.11.4 Meter Services

Water Distribution staff are responsible for all new service connections under three inches and contractors are usually secured for installation of sizes three inches and larger. Repairs, retrofits, or replacements of existing services are typically conducted by Water Distribution Staff unless unusual circumstances arise. Meter services consist of meters, meter vaults, meter boxes, service lines, valves, setters, and other associated equipment. The City uses master meters when beneficial to the City and its customers. Master meters are currently used at several mobile home parks, the Auburn Business Park, and Muckleshoot Indian Tribe (MIT) commercial properties.

6.2.11.5 Large Meter Testing

Large meters are devices that measure water consumed by customers with significant demand requirements. They are usually employed by the following customer classes:

- Commercial
- Farms or Parks – Irrigation
- Schools
- Multifamily Complexes
- Industrial / Manufacturing Businesses
- Wholesale Customers
- Municipal Buildings

Large meters are defined as water meters three inches or larger. The system contains a total of 151 large meters, all of which are calibrated annually, as part of the City's System Loss Program.

Calibration of large meters is conducted by an outside contractor, but one maintenance staff member under the direction of the Water Distribution Supervisor assists in the process. If a meter cannot be calibrated, it is replaced with a new one.

6.2.12 Distribution System Corrosion Inspection

One program that the Water Distribution Division would like to activate, if additional funds and labor resources are available, is a Distribution System Corrosion Inspection program. A significant percentage of the City's piping system is constructed of metal which is subject to corrosive deterioration. Corrosion is an electrochemical reaction whereby metal is eroded and reduced. It is not possible to stop corrosion of metal pipe, but it can be substantially reduced if proper anti-corrosive measures are taken.

The Distribution System Corrosion inspection will identify which pipes can benefit from corrosion resistance measures, resulting in a longer serviceable life. Popular measures taken to resist corrosion include coatings, poly-bagging, and anode packs, and they are described further below:

- Coatings are electrical insulator types of finishes applied to a surface and is the most common method of corrosion protection. Though coatings are common, they are subject to damage and decay. Damage from soil stress such as contraction and expansion can rip coatings from pipes. Pinholes in the insulation, also known as holidays, can allow seepage between the coating and pipe and accelerate corrosion. Penetration of the pipe occurs even more rapidly when pinholes are present than it would on a bare line.
- Anode packs are metal cylinders that are connected to a metal structure via electrically conductive wires and inserted into the ground adjacent to the structure. The ground is subject to stray electric currents and these currents are the electrical component of the electrochemical nature of corrosion. Anode packs become the sacrificial metal to corrode in lieu of the structure. This type of treatment, when initiated, provides benefits in two ways: 1) it could save substantial amounts of money by reducing unnecessary, early replacement of pipe and 2) it would reduce possible disruptive service to the City's customers that could occur if pipe replacement were necessary. Though anodes packs are effective and economical, their current capacity is limited and they typically have a short lifespan.

- Poly-bagging is the process of wrapping the exterior of buried water mains and appurtenances, typically under the influence of corrosive soils, with polyethylene, creating a protective layer around the mains and appurtenances. Poly-bagging is an effective method for corrosion protection of water mains and they are resistant to tearing or puncturing. Though economical, they are not as environmentally friendly and add another layer to maintenance activities.

6.3 Comprehensive Water Quality Monitoring

The Water Operations staff maintains an active and ongoing program of water quality monitoring and reporting to ensure a safe, high quality water supply. Two staff members are responsible for water quality monitoring, sampling, control, and record keeping. The Water Operations staff also receives assistance from the Engineering Services - Water Quality Program Coordinator. A detailed description of the City's water quality monitoring and results is presented in **Appendix Q**, which includes the following:

- Summary of the City's water quality monitoring programs.
- Summary of recent water quality testing results.
- Summary of the Wholesale Interties Blending Evaluation.

The City's Water Quality Monitoring Program is detailed in a manual entitled "City of Auburn Public Water System Water Quality Monitoring Plan" provided in **Appendix O**. The document includes plans associated with coliform, lead and copper, disinfection by-products and treatment specific monitoring, and the Water Quality Monitoring Schedule. These plans comply with DOH regulations for Group A public water systems. All sampling is conducted in accordance with the annual Water Quality Monitoring Schedule received from DOH. The City samples for inorganic and physical parameters, synthetic and volatile organic compounds, asbestos, nitrate and nitrite, radionuclides, coliforms, residual chlorine, disinfection byproducts, lead and copper, fluoride, and per and poly-fluoroalkyl substances (PFAS). A map of the sampling locations is included with the documents provided in **Appendix O**.

Additional sampling also occurs based on special requests by DOH or by customers concerned about water quality issues involving unusual taste, odor, or color.

The Water Manager maintains hard copies of the water quality analysis laboratory reports. These reports are kept at the M&O Building in files organized by years and analysis type. As specified by DOH regulations, chemical analysis reports are kept indefinitely, and bacteriological reports are maintained for a minimum of five years.

The City will comply with the Follow-Up Action Requirements of WAC 246-290-320 whenever water quality results exceed a prescribed level. The Water Utility also complies with the requirements of WAC 246-290 for public notification, as established by the Safe Drinking Water Act (SDWA) and DOH.

Forms for "Water Boil Notification" and "Drinking Water Problem Corrected Notification" have been developed and are available for immediate distribution, if necessary. A list of the appropriate print, TV, and radio media to contact for public notice is included in the electronic Emergency Response Manual. An additional procedure described in the Emergency Response Manual to address water quality issues involves an "Action Plan for Water System Contamination Via Threat Warning."

The City maintains equipment to perform some basic water quality monitoring functions. However, all testing required for water quality regulatory compliance is contracted to independent testing laboratories. The current primary laboratory used by the City is:

Water Management Laboratory
1515 80th Street East
Tacoma, Washington 98404
206-531-3121

If testing cannot be done on a timely basis, the City also uses the following laboratory:

Analytical Resources, Inc.
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200

6.4 Emergency Preparedness and Response

The City has prepared an electronic Public Works Emergency Response Manual (Manual) as a guide for management of emergency situations, with the objective of protecting life and property and restoration of essential services, such as providing clean water, as quickly as possible. The Manual is only one element of the City's overall Emergency Response Plan, which serves as a guide and was first developed in 1999 in response to the potential impact of Y2K. The Emergency Response Plan is updated annually at the first of the year. It is not all-inclusive for every type of disaster that could occur but is a valuable tool for dealing with many of the emergency situations that most utilities could face.

The Manual contains a detailed table of contents and is tabbed to allow quick access to information. Three copies of the Manual have been published. Copies are located at the M&O Building, in Engineering Services with the Public Works Director, and at the Valley Regional Fire Authority, Station 31. The Manual is also available in digital format on the City's computer server.

The master response program for the entire City is documented in the Comprehensive Emergency Management Plan (CEMP), which provides guidance to the Emergency Management Organization for mitigation, preparedness, responsibilities, recovery operations, training, and community education activities. The CEMP also describes the functions of local government and incorporation of essential non-governmental organizations into the Emergency Management Organization. Copies are in each City Department, the Public Works M&O Building, and the Valley Regional Fire Authority, Station 31. The CEMP is also available in digital format on the City's Emergency Operation Center (EOC) computer server.

An additional emergency response manual that is available for use is the Water Division Intertie Locations and Policy Manual. This manual contains contact names, addresses, and phone numbers for cities and water districts that have intertie connections with the City. Included are photos of the intertie vaults, valves, and meters, along with information for activating or deactivating an intertie. Three copies have been published and are located at the M&O Building, in Engineering Services with the Water Utility Engineer, and at the Valley Regional Fire Authority, Station 31.

The City has been involved with several tabletop exercises to prepare for emergencies and they are an ongoing feature of the City's Emergency Response Program. Staff, depending on their position, have also been trained for emergencies in accordance with the Federal Emergency Management Authority (FEMA)

under the auspices of Homeland Security. The training program, known as the National Incident Management System (NIMS), offers educational classes tailored for the Incident Command System (ICS).

The NIMS and ICS program is a solid blueprint for federal and local emergency command activities, but it does not provide the type of response details needed by PW maintenance staff and managers. Consequently, the PW Emergency Response Manual is the reference tool referred to on a more intimate scale.

6.4.1 Vulnerability Assessment

The City's Vulnerability Assessment (VA) was prepared in 2004 under the guidance of an engineering consultant firm and it was submitted to the USEPA on November 15, 2004. A Water System Security Improvement Plan (WSSIP) was also prepared in conjunction with the VA to prevent or significantly lessen the impact of intrusive activities.

Recommendations noted in the WSSIP have been adequately addressed by completing the SCADA system upgrades and physical security project. As further upgrades are completed at City facilities, the recommendations noted in the WSSIP are considered, as well as other considerations as technology continues to advance.

6.4.2 Wellhead Protection Program

The City's wellhead protection program is key to managing potential sources of groundwater contamination prior to their entry into the drinking water system. The wellhead protection plan (WHP) was updated as part of the Plan and summarized in **Chapter 5**.

Engineering Services staff are charged with implementation of the program. Staff track and follow up on construction projects, spills, and monitor possible contamination sources, as possible.

6.4.3 Water Shortage Contingency Plan

In Auburn City Code (ACC) 13.14 the Mayor may order water use restrictions and conservation measures, when necessary, to protect public health, safety, and welfare during a water shortage or emergency caused by drought conditions, city water utility damage or destruction, or any other cause which threatens to disrupt or diminish the City's water supply below its ability to meet normal demands.

The City has also updated its Water Shortage Contingency Plan, attached as **Appendix R**, which establishes actions and procedures during impending or actual water shortages. These actions and activities maintain levels of service essential for public health and safety, minimize adverse impacts on economic activity, and protect customers' lifestyles. The plan addresses both progressive situations, such as those that are weather-related, and more drastic and immediate situations such as facility emergencies (e.g., a pipeline break). Initial stages of the Water Shortage Contingency Plan may coincide with efforts in the WUE program; however, it is distinct as it is a response to a specific situation, and it may lead to mandatory restrictions and curtailment.

6.5 Safety Procedures

The City has a comprehensive safety program that meets Occupational Safety and Health Administration (OSHA) and Washington Industrial Safety and Health Act (WISHA) regulations. The safety policies and procedures for the water department are documented in 25 policies that are summarized in **Table 6-3**. The

policies cover the full range of hazards staff may experience while operating the water system. These include, but are not limited to, operation of motor vehicles and equipment, chemicals, confined spaces, falls, traffic, and fires. Each policy includes a purpose, organization affected, references, the policy, definitions, procedures to implement the policy, and responsibilities for the implementation. Responsibilities are assigned to individual roles, such as employee, supervisor, or safety manager. The policies and procedures clearly identify contact information of the applicable regulating agencies in case of a serious incident. All policies are available on the City's intranet.

Table 6-3 | Safety Policies and Procedures

Number	Policy Name	Description
300-01	Workplace Health & Safety	Document workplace health and safety policy
300-03	Hearing Conservation	Implement program to protect employee hearing
300-04	Personal Protective Equipment	Establish policy that requires employees to always use personal protective equipment when performing certain tasks or when in an unsafe environment
300-05	Flagger Certification	Flagger certification requirements
300-06	First Aid	Employee first aid training, first aid supplies and emergency stations
300-07	Hazard Reporting	Procedure to report an obvious or potential safety or health hazard
300-08	Incident Reporting	Procedures for reporting non-vehicular incidents
300-09	On The Job Injury	Establish policy to monitor on-the-job injuries
300-10	Safety Inspection of City Owned Facilities	Procedure for inspection of all City-owned and operated facilities
300-11	Central Safety Committee	Establish function and structure of Central Safety Committee
300-13	Emergency Evacuations of City Buildings	Procedure for evacuation of City buildings in the event of an emergency
300-14	Safety Restraints & Seat Belts	Requires mandatory use of safety restraints/seat belts while driving or riding in the City vehicles
300-15	Excavation Trenching & Shoring	Establish policy for shoring and sloping all excavations or trenches over four (4) feet in depth
300-16	Safety Line Procedure All Cranes, Backhoes, & Hoists	Procedures for controlling moving loads being hoisted or swinging ground or truck using hoists, backhoes, cranes, or any mechanical device use in moving loads
300-17	Chemical Hazard Communication (Worker Right To Know)	Establish chemical and global hazard communication program to assure the health and safety of City employees
300-18	Welding, Brazing, & Cutting	Procedure for welding, cutting or brazing work or practices which may result in an injury or death
300-19	Lockout & Tagout	Requirements for the lockout or tagout of energy isolating devices
300-20	Bloodborne Pathogens	Procedure to prevent exposure to blood or other substances and materials that may carry bloodborne pathogens. Procedures for decontamination of equipment and evaluation and treatment of employees who experience exposure.
300-21	Reporting Vehicle Accidents	Procedure for reporting vehicle accidents
300-22	Heat Related Illness	Training for potential heat related illness

Number	Policy Name	Description
300-23	Confined Spaces	Procedures for entering a confined space
300-24	Green Housekeeping Guidelines	Procedures that sustain a "Green Cleaning" environment
300-25	Respiratory Protection Program	Procedures that will prevent employees from inhaling hazardous airborne chemicals
300-26	Fall Protection & Rooftop Safety	Procedures for rooftop safety and use of fall protection
300-27	Powered Industrial Trucks	Training, operation, and safety of powered industrial vehicles

In addition to the policies, all M&O staff receive safety training. The contents of the training are periodically reviewed and updated, if necessary, through departmental and city-wide safety committees. The Human Resources and Risk Management Department maintains information and schedules on safety training.

The City maintains appropriate safety equipment and information. Each vehicle and facility have a fire extinguisher and first aid kit. All staff use personal protective equipment, such as hard hats, safety glasses, safety vests, etc., appropriate to the task. Climbing equipment and lockout/tagout equipment is available and stored at the M&O Building and the Well 7 storage facility. Additionally, each site with chemicals has a Safety Data Sheets (SDS) book that contains the Material Safety Data Sheets (MSDS) for all chemicals on site. A master sheet of all chemicals used by the Water Utility is maintained at the M&O Building.

6.6 Cross Connection Control Program

The City's Cross Connection Control Program (provided in **Appendix Q**) protects the public water system as defined by WAC 246.290.010, WAC 246.290.490, and Auburn City Code (ACC) 13.12 from contamination via cross connection hazards. It describes minimum operating policies, provides guidelines for installation, testing, and maintenance of approved backflow prevention assemblies, permitting process, inspection, and survey requirements for existing and new water service connections. The program is maintained by two Cross Connection Specialists under the direction of the Water Operations Supervisor. The specialists are responsible for identification and elimination of potential and actual cross connections and contamination hazards within the public water system.

6.7 Sanitary Survey Findings

DOH completes periodic inspections of the City's water facilities, their operations, and facility records to identify potential health risks to the public. The sanitary survey, conducted by DOH on August 22, 2022, identified significant deficiencies such as air gaps or backflow assemblies that must be added to the water supply lines at Wells 5 and 5A. Additionally, repair needs were identified for the reservoir overflow screens at Reservoirs 8A and 8B.

DOH identified the need to terminate the pump to waste line at Well 5 above grade and either raise the casing at Well 5A or provide a sump pump or alarms to address potential water accumulation in the vault. Weekly vault inspections, especially after significant storms, were recommended until a permanent solution is implemented.

The survey noted that the reservoir vents at Reservoirs 4A, 4B, and 8A should open downward to prevent debris entry. It also identified a need for evaluation of the overflow piping at Reservoirs 2, 4A, and 4B, to ensure compliance with regulations.

The next DOH sanitary survey is scheduled for 2027.

The City has taken the following actions to address some of the deficiencies identified in the sanitary survey.

- A backflow assembly was installed at Well 5A.
- The reservoir overflow screen at Reservoirs 8A and 8B was repaired on September 13, 2022.
- The City implemented an inspection and maintenance program to conduct weekly inspections at Well 5A and immediately after a significant storm even.
- The direct connections of reservoir overflows (Reservoirs 4A and B to drains, sanitary sewer, and/or storm sewer) have been addressed.

The following deficiencies identified in the sanitary survey will be addressed with ongoing or planned Capital Improvement Projects identified in **Chapter 8** and are captured in **Section 6.10.2** as recommended improvements:

- Reservoir vents will be retrofitted or replaced as part of the ongoing Reservoirs 4A, 4B, 8A, and 8B Seismic Valves Retrofit capital project.
- The request for the pump to waste line at Well 5 to terminate above grade will be addressed with a capital improvement project.
- The direct connections of reservoir overflows (Reservoirs 2) to drains, sanitary sewer, and/or storm sewer, will be addressed with a capital improvement project.

6.8 Customer Complaint Response Program

One member of the Water Distribution staff is a Customer Service Representative. This individual is responsible for meter turn-on and turn-off, delinquency notices, meter rereads, new service reads, final service reads, leak adjustments, high consumption investigations, account documentation, and other duties, as assigned. The employee maintains a modified work schedule, which provides more flexibility in dealing with emergency service requests by customers.

Beginning in 2006, the Water Utility, along with the rest of PW transitioned to an asset management software system called CarteGraph. Some of the benefits include:

- Ability to assign and track citizen complaints and requests
- Produce work orders
- Monitor work and maintenance projects
- Track costs for labor, equipment, and material
- Enhanced inventory control
- Integration with GIS
- Benchmark analysis
- Generate reports
- Track infrastructure conditions – GASB 34

The City has a customer service program accessible by the public and City staff via the City's website. Customers fill out the online Citizen Report form and describe the services they are seeking. The submitted form downloads into the CarteGraph system for review and action by staff. In addition, customers can stay connected with the City on mobile devices with a SeeClickFix application. The SeeClickFix app allows customers to report graffiti, abandoned vehicles or potholes, water issues, etc.

6.8.1 Customer Request Response Program

As described above, the CarteGraph system can assign and track customer requests (or complaints) and produce work orders. The City maintains a list of requests and identifies the work done to respond to any requests from the public. The City categorizes the citizen reported issues into the following five categories:

- Water Appearance: contains all requests related to the color of the water (brown, discoloration, cloudy, etc.)
- Odor: contains all requests related to water smell (chemical, sulfur, chlorine smell, etc.)
- Pressure: contains all requests related to change in water pressure (pressure drop, high water pressure, fluctuation in pressure, etc.)
- Taste: contains all requests related to water taste (poor, bitter, strong chlorine taste, etc.)
- Water Quality: contains all requests related to a combination of odor, taste, and discoloration issues.

Customer requests are entered into the CarteGraph or SeeClickFix and a work order is generated. Typically, a Distribution staff member or team will investigate the issue and respond directly to the customer.

A table summarizing the number and type of requests or complaints is provided in **Chapter 3**.

6.9 Recordkeeping and Reporting

All recordkeeping and reporting practices follow DOH regulations as specified in WAC 246-290-480. The Water Manager maintains hard copies of the water quality analysis laboratory reports. These reports are kept at the M&O Building in files organized by year and analysis type.

Analytical laboratories submit reports directly to DOH. As specified by the regulations, chemical analysis reports are kept indefinitely, and bacteriological reports are maintained for a minimum of five years. Additionally, Construction Completion Reports are submitted to DOH, as required. Construction Completion Reports for distribution main projects are maintained on file at the City and are available upon request by DOH, in accordance with WAC 246-290-125.

Water production and purchase source meters are read daily (during the work week). Paper copies are scanned at the end of the month and digital copies in pdf format are maintained on the City computer server by month and year. Annual summary spreadsheets are also maintained on the computer server. This data is added to the monthly DOH reports. Records are maintained for a minimum of 10 years.

Chlorine residual samples are collected in the distribution system and analyzed on a weekly basis. Summary spreadsheets are maintained on the City computer server by year. Records are maintained for a minimum of three years.

Monthly reports containing water production and treatment data are submitted to DOH by the 10th day of the following month, using forms provided by DOH. Signed paper copies are scanned to produce a digital copy and are maintained on the City computer server, organized by year. Digital copies are maintained for a minimum of 10 years.

Most records that Water Utility collected in the past are based on hard copy paper forms. This includes forms that track maintenance and inspection records used for pumps, valves, meters, reservoirs, hydrants, operating equipment, etc. A portion of the integration process with CarteGraph involved the collection and collation of historical data into a form that can be downloaded into the software system. The City's goal is a near-paperless documentation system that can be accessed by staff in the office, field, or home on a 7-day, 24-hour basis. Existing electronic records include those described below.

6.9.1 Cross Connection Control Program

Cross Connection Control records are managed with Tokay software and Laserfiche. Test reports conducted are stored in Laserfiche and are kept for 5 years. Tokay is used for creating reports, identifying and updating when tests are required, and general data entry and management of cross connection devices per parcel.

6.9.2 Water Meter Consumption

Water meter consumption records are maintained by the Finance Department using the Springbrook Utility Billing System. These records include customer account data for classes of customers, billing, service, comments, and questions. The system also includes a tracking feature for water sold each month as well as annual total water sales. The tracking feature is useful because data on water consumption by customer type and season supports the City's WUE Program, per **Chapter 4**. The Finance Department also provides staff with monthly financial reports regarding Water Utility operations.

The City also uses AMI throughout the system as a tool for the WUE Program. Using AMI data, the City may be able to identify customer leaks and, as a result, provide cost savings in the Leak Detection, Repair, and Service Meter Replacements programs. Advanced metering also aids the City's efforts to reduce non-payment of bills and water theft.

6.9.3 Supervisory Control and Data Acquisition (SCADA)

The SCADA system monitors, records, and controls water system operations at various facilities. The electronic records are maintained by the IT Department and a back-up copy is made each evening to ensure that records are retrievable should hardware or software failure occur.

Please note that the SCADA system is discussed more thoroughly in **Section 6.2** of this chapter.

6.9.4 Water Meter Reading

Effective January 1, 2019, the City transitioned to monthly consumption billing. The Utility Billing staff imports the water meter reads monthly into the City Utility Billing System. With the implementation of the AMI system, the City obtained a Cloud-Based Data Analytics Solution with meter data management capabilities called Sensus Analytics. Within Sensus Analytics, is a billing access application, which enables Utility Billing staff to generate and export a billing request file defined by a billing cycle and billing window. Subsequently, the file that contains meter numbers, account numbers, and current water meter reads are imported into the City Utility Billing System. The Utility Billing staff reviews abnormally high or low consumption levels compared to previous readings from the previous year, same period.

Water service meters are read monthly to document customers' water usage for billing purposes. The AMI system automatically stores and transmits the water use data for utility billing, without the need for personnel to collect the data on site.

6.10 Summary of O&M Deficiencies and Recommended Improvements

6.10.1 Water Facilities Evaluation Study

The City completed an extensive Water Facilities Evaluation Study in 2014. The study conducted a physical inspection and evaluation of 40 out of the City's 97 water supply facilities. Inspections included pump stations, treatment facilities, reservoirs, wells, transmission mains, and PRVs. Inspections considered general conditions, corrosion and rust, structural deficiencies, ability to meet current code, and operational constraints. In addition to the inspections, the remaining useful life of the facilities were developed in a desktop analysis for pump, motor, pipe, valve, general electrical equipment, and major electrical equipment.

Where notable deficiencies were identified in the inspections or assets exceeded their usable life, improvements were recommended. Many of the recommended improvements have been completed or are currently scheduled to be completed and identified in the Capital Improvement Plan. Remaining improvements less than or equal to \$10,000 are considered capital maintenance projects, which the City staff or a small works contractor will address as part of the normal M&O budget and are not identified in the Capital Improvement Plan.

Based on the observed facilities, general maintenance improvements are recommended for each facility to create a schedule of improvements based on the facility's remaining useful life. Regular facility inspections are also recommended, as summarized **Table 6-4**. Additionally, maintenance plans were developed for each inspected water system facility. These plans included the improvement type, estimated project cost, and frequency the improvement is required.

Table 6-4 | Recommended Inspections

Asset Type	Recommended Inspection	Frequency (years)
Pump	Perform pump test	5
Motor	Check motor amp draw	5
Reservoir	Inspect coating thickness	5
Reservoir	Inspect reservoir interior	5
PRV Station	Inspect for corrosion and signs of flooding	1
Structure	Inspect for cracks in grout (where applicable)	1
Piping	Inspect for general coating conditions	3

6.10.2 Recommended Improvements

The City operates and maintains an efficient, environmentally sound, and safe water system. Recommended improvements include the outstanding projects identified from the 2014 Facility Evaluation Study, outstanding items to be corrected from the 2022 Sanitary Survey, and general continued repairs and maintenance activities that are conducted by M&O staff or contracted out. **Table 6-5** provides a summary of the identified O&M projects and their costs.

Table 6-5 | O&M Improvement Projects

O&M Deficiency	Planned Year	Notes
The pump to waste line at Well 5 to terminate above grade will be addressed with a capital improvement project. (Identified in 2022 Sanitary Survey)	2026-2028	Included with the Well 5/Well 5A Upgrades Project
Raising the casing at Well 5A to terminate above grade or the provision of a sump pump or alarms to activate when water accumulates in the vault. (Identified in 2022 Sanitary Survey)	2026-2028	Included with the Well 5/Well 5A Upgrades Project
Reservoir vents will be retrofitted or replaced as part of the ongoing Reservoirs 4A, 4B, 8A, and 8B Seismic Valves Retrofit capital project. (Identified in 2022 Sanitary Survey)	2024-2025	Included in CP2219 – Reservoirs 4 and 8 Seismic Rehabilitation
The direct connections of reservoir overflows at Reservoirs 2 to drains, sanitary sewer, and/or storm sewer, will be addressed with a capital improvement project. (Identified in 2022 Sanitary Survey)	2024-2025	Included in Reservoir 2 Valves Project
Conduct inspections of facilities at frequency recommended in the Facilities Evaluation Study.	--	Refer to Table 6-4 . To be completed via annual M&O operating budget.
Continue distribution system corrosion inspection.	TBD	To be completed via annual M&O operating budget as funds are available.
Develop a UDF Program for the Lakeland Service Areas.	TBD	To be completed via annual M&O operating budget as funds are available.
Replace source water supply meters with flow transmitters for improved electronic data transmission and record keeping.	TBD	To be completed via annual M&O operating budget as funds are available.
Continue PRV Vault Repairs	2024-2026	To be completed via annual M&O operating budget as funds are available.
Continue Pump and Equipment Repairs and Maintenance	2024-2026	To be completed via annual M&O operating budget as funds are available.
Continue Annual HVAC Maintenance and Repairs	2024-2026	To be completed via annual M&O operating budget as funds are available.
Continue Fencing Repairs at Water Facilities	2024-2026	To be completed via annual M&O operating budget as funds are available.
Continue Generator Maintenance and Repair	2024-2026	To be completed via annual M&O operating budget as funds are available.
Continue Large Meter Repair and Testing	2024-2026	To be completed via annual M&O operating budget as funds are available.
Continue Chlorine Feed and Analyzer Maintenance	2024-2026	To be completed via annual M&O operating budget as funds are available.

O&M Deficiency	Planned Year	Notes
Continue Vegetation Control and Maintenance at Water Facilities	2024-2026	To be completed via annual M&O operating budget as funds are available.

Distribution Facilities Design and Construction Standards

This chapter outlines the Engineering Design and Construction Standards (EDCS) of the City of Auburn (City), concerning its water system. It encompasses policies and procedures governing project review and approval. To ensure the highest level of water system reliability, integration of the EDCS into the broader city infrastructure is essential. The City recognizes the interdependence of its water system with other municipal services. As such, there is an ongoing collaborative effort between the Water Division and other relevant City departments, such as Community Development and Finance, as well as non-City stakeholders, such as the Valley Regional Fire Authority (VRFA).

The integration of the EDCS in this Water System Plan empowers the City to employ an alternative review process for distribution main projects, through the submittal exception process, which permits the City to approve project reports and construction documents without written approval from the Department of Health (DOH). This submittal exception is granted provided the conditions specified in WAC 246-290-125(2) are met.

The submittal exception does not apply for source of supply, reservoir, pump station, and water treatment projects. For those projects, the City will seek approval from DOH through the submittal process outlined in WAC 246-290-110 and 246-290-120.

The following topics are addressed in this chapter:

- 7.1 Project Review Procedures
- 7.2 Policies and Requirements for Outside Parties
- 7.3 Design and Construction Standards
- 7.4 Construction Certification

7.1 Project Review Procedures

For all construction activities related to the City's water system, coordination must be done directly through the City's Water Department. The City's Water Department reviews plans, including calculations, reports, and AutoCAD files, to verify conformity with development requirements, City standards, City policies, as well as other federal, state, and local requirements. The plan sets are required to feature an overall utility plan illustrating public water facilities and private connections within the water service boundary, regardless of whether the project is inside or outside the City limits. City staff also review projects proposed by developers or other water purveyors to determine impacts to the City's water system facilities.

Development review processes are detailed in the Engineering Design Standards (EDS), available on the City's website. Compliance with Washington State Department of Transportation (WSDOT) "Standard Specifications for Road, Bridge, and Municipal Construction," and relevant City, State, and Federal regulations is also evaluated during the review process.

All water-related improvements projects, whether for capital improvement or development, undergo a thorough review process by the Water Division, including evaluation by the VRFA and City's Fire Authority for fire protection standards. Additionally, all plans involving main extensions, modifications, and fire service installations must be stamped by a Professional Engineer licensed in Washington State.

7.2 Policies and Requirements for Outside Parties

The City manages the water utility in accordance with established water- system policies that govern various facets of utility operations. City policies are established by the City to provide a vision or mission of the water utility and to provide a framework for the design, operation, and ongoing wellbeing of the City's water utility.

Policies are developed specifically for the City's multi-source municipal water system and seek to provide consistent treatment to all utility customers and to provide documentation to current water-system customers as well as those considering service from the City. What is included in these policies is limited to those things related to the water system and its design, maintenance, and operation. There are other policies and criteria that pertain to the water utility the City has in place regarding land use, development, and financial components that could still have an impact on the needs of the water system. These policies and criteria may include factors such as zoning regulations, building codes, infrastructure requirements, and financing options. These additional factors will be considered when planning for the water system, to meet the needs of the community in a sustainable and effective matter.

Policies set forth for development are described in the Water System Policies provided as **Appendix A** of this Plan.

7.3 Design and Construction Standards

Within the Retail Water Service Area (RWAS), the City has established specific standards governing the design and construction of water mains, detailed in the City's EDCS. The EDCS collectively contains the following:

- City of Auburn Engineering Design Standards (EDS).
- City of Auburn Engineering Construction Standards (ECS):
 - City of Auburn Engineering Construction Standards – Standard Details (STD DTL)
 - City of Auburn Engineering Construction Standards – General Special Provisions (GSP)
 - City of Auburn Engineering Construction Standards – Technical Special Provisions (TSP)

These standards undergo periodic updates, with the most recent revision in 2024. The City's 2024 design standards and construction specifications related to the water system are outlined in **Appendix P**. Additionally, this plan incorporates relevant sections of the City's current construction standards, including materials, methods, and standard details applicable to the construction of water system appurtenances.

For detailed information, the latest versions of the collective EDCS are accessible for view on the City's Public Works web page.

Table 7-1 lists sections of the EDCS sections for the specifications, drawing standards, and special conditions of water main installations, extensions, and replacements. Standards for supply sources, reservoirs, pump stations, and water treatment facilities are not presented due to the complex nature of these facilities. For

those projects, the City will seek approval from DOH through the submittal process outlined in WAC 246-290-110 and 246-290-120.

Table 7-1 | Water Main Design and Construction Standards

Specifications for:	
Pipe material and pipe class. ANSI/NSF Standard 61 certified materials required for all pipes.	EDS Section 7.01.02
Disinfection procedures (include de-chlorination or chlorinated water disposal specifications).	TSP – 7.09.3(24)
Pipe bedding and installed depth of bury.	EDS Section 9.05
Bacteriological testing.	TSP – 7.09.3(24)N
Pressure and leakage testing.	TSP – 7.09.3(23)
Separation from sewer mains, non-potable conveyance systems, and other buried utilities.	EDS Section 6.02
Valve spacing.	EDS Section 7.03
Construction Drawings Standards	
Plan and profile views drawn to a particular scale	EDS Sections 3.03, 3.04 & 3.04.07
Easement locations and dimensions	EDS Sections 2.02, 3.04 & 3.04.07.B, 6.01, 7.01.04, 7.01.05, 7.02.01, 7.03 and STD DTL W-06.3, W-22.2, W-23.3,
Appurtenant Design Standard Drawings	
Pipeline trench cross-section, including pipe bedding, backfill, compaction, and road restoration standard details	STD DTL T-01
Hydrants (for fire, flushing)	STD DTL W-07, W-08
Valves	STD DTL W-17, W-18, W-19
Service Meters	STD DTL W-15, W-16, W-16a
Service lines and service connection to main	STD DTL W-9, W-13, W-14
Air relief, vacuum relief, and combination air-vacuum relief valve and valve vault	STD DTL W-02
Pressure reducing valve stations	Submittal review (project specific)
Thrust blocking	STD DTL W-01
Backflow prevention assemblies	STD DTL W-21, W-22, W-23, W-24, W-25
Blow-offs	STD DTL W-03, W-04
Special Conditions	
Pipeline corrosion mitigation measures	TSP 7.09.03(25)
Potable/non-potable pipeline crossing construction details	EDS Section 6.02
Stream-crossing construction details	N/A
Individual service booster pumps	N/A
Temporary water service (i.e., employed during water main replacement or emergency repair)	N/A

7.4 Construction Certification

Construction work aimed at improving City roads and utilities, whether initiated by private developers or the City itself, must adhere to approved contract documents. City approval is mandatory for any modifications to approved plans before implementation, especially for work within the public right-of-way (ROW) or designated easements. Compliance with general WSDOT/APWA Standard Specifications, approved plans, and the City's EDCS is strictly enforced.

Prior to the start of construction, a pre-construction meeting must be held by the City and the developer, contractor, and/or designated representative. Pre-construction meetings establish the first touch point between the City and developer/contractor to discuss the schedule, certain unique aspects of the work, any special restrictions, and general coordination and communication protocols. Consistent presence of the approved set of plans with redline markups identified and requisite permits at the job site during construction is a shared responsibility of the City, the developer, and the construction contractor. The City exercises its authority to enforce standards through appointed project engineers, assistants, and inspectors, ensuring collective adherence to specified standards. Inspections, test measurements, and actions outlined in the City's Development Guidelines and Public Works Standards are pivotal. Post-construction, the submission of as-built drawings is mandated.

Non-compliance with approved project documents can lead to stop-work orders and potential removal of completed elements, subject to penalties established by ordinance. The project's conclusive status is granted only when the City issues a formal letter of acceptance to the responsible party.

Upon completion of construction activities related to the water system, including disinfection, flushing, and pressure testing for water mains, a construction completion report must be submitted. This document becomes part of the project records, and the release of water meters for any lot or building linked to a project is contingent upon final acceptance.

Capital Improvements Program

This chapter's objective is to develop a cohesive Capital Improvement Program (CIP) for the City of Auburn (City) by summarizing and prioritizing all capital projects identified in the previous chapters. The CIP provides a comprehensive accounting of capital projects needed to continue consistent, efficient water supply to the City's Retail Water Service Area (RWSA) through the 20-year planning horizon. The recommended projects were developed in coordination with City staff.

Projects identified as part of the City's asset management program that are anticipated to cost greater than \$50,000 were included as capital projects. The capital projects discussed in **Section 8.2** include water supply and storage improvements, improvements to the distribution system, and upgrades or replacement of aging facilities and distribution piping as discussed in **Chapter 3**.

Projects were allocated to the 10-year (2025 to 2034) and 20-year (2035-2044) planning horizons. Planned projects coincide with the City's current Capital Facilities Plan (CFP) and have been placed into specific years for planned completion. These timeframes are intended to be a framework for future funding decisions that directs when future actions and decisions are intended to occur. However, these timeframes are estimates, and depending on factors involved in the processing of applications and project work, and availability of funding, the timing may change from the included timeframes. The framework does not represent actual commitments from the City, which may depend on funding and staffing resources available.

8.1 Prioritization

8.1.1 Project Identification

Capital projects are organized into two categories to help provide a better understanding of the primary project driver as follows:

- Capacity Projects (CAP): These projects are needed to expand infrastructure capacity to meet increased demands associated with current deficiencies or projected growth.
- Non-Capacity (Non-CAP): These projects are needed to address aged and/or obsolete equipment to maintain and/or improve the reliability of the infrastructures system. These projects are needed to improve existing infrastructure for reasons other than capacity.

The capital projects are also identified and grouped into categories based on the infrastructure they are focused on. Each project is assigned an identification number (Project ID) with the following ID prefixes:

- Supply (S): These projects are associated with the City's water supply sources and treatment facilities.

- Storage (R): These projects are associated with the City’s storage reservoirs or allow modifications in the system impacting reservoir storage transfer throughout the RWSA.
- Pump Stations (PS): These projects are associated with the City’s pump stations or booster pump stations (BPS).
- Distribution (D): These projects are associated with the City’s transmission and distribution piping systems.
- General Improvements (G): General improvement projects do not fit into the other categories and may be broader, impacting multiple components of the City’s water system.

8.1.2 Prioritization Factors

The capital projects for the facilities improvements were prioritized based on system deficiencies, safety concerns, maintenance or capacity requirements, and regulatory requirements.

The capital projects for the capacity driven distribution system improvements were prioritized based on the fire flow availability; projects resolving the largest deficits were prioritized higher, and as such are planned to be completed sooner than projects resolving smaller deficits. The capital projects for the condition driven distribution improvements were prioritized based on the existing pipe age, size, and material. More details are discussed in **Chapter 3**.

The priority order of these improvements is reflected in the schedule of improvements, which is presented in **Section 8.3** and **Appendix W**.

8.1.3 Estimated Costs

“Active projects” are projects that are currently underway for completion. The project costs presented include total project costs for the current and future years and are presented in 2024 dollars.

For projects already included in the City’s 2023 CFP, it was assumed that the project cost in 2024 dollars remains the same, unless the costs were identified as needing to be reassessed.

For planned capital projects identified in the 2015 WSP that have not been completed and are not included in the City’s 2023 CFP, the project costs were escalated from 2014 dollars as presented in the 2015 WSP to 2024 dollars using the Engineering News Record (ENR) Construction Cost Index (CCI).

For all other projects that were newly identified, modified, or reassessed, planning-level project cost estimates were developed for the improvements using average costs from RSMeans, HeavyBid Construction Cost Data, recent City of Auburn project bid tabs, City input, industry experience, and local contractor and supplier costs. These project costs are planning-level estimates and are categorized as Class 5 estimates, as defined by the Association for the Advancement of Cost Engineering (AACE) International:

Class 5 estimates are generally prepared based on very limited information, and subsequently have wide accuracy ranges. As such, some companies and organizations have elected to determine that due to the inherent inaccuracies, such estimates cannot be classified in a conventional and systemic manner.

Class 5 estimates are prepared for any number of strategic business planning purposes, such as but not limited to market studies, assessment of initial viability, evaluation of alternate schemes, project

screening, project location studies, evaluation of resource needs and budgeting, long-range capital planning, etc.

Typical accuracy ranges for Class 5 estimates are -50 % to -20% on the low side and +30% to +100% on the high side, depending on the construction complexity of the project, appropriate reference information and other risks (after inclusion of an appropriate contingency determination). Ranges could exceed those shown if there are unusual risks.

All project descriptions and cost estimates in this WSP represent planning-level accuracy and opinions of costs (-50 percent to +100 percent).

During the pre-design phase of each project, the project definition, scope, and specific information (e.g., pipe length and diameter, roadway restoration requirements, permitting requirements) should be verified. The final cost of individual projects will vary depending on actual labor and material costs, site conditions, market conditions, regulatory requirements, project schedule and other factors. Because of these factors, project feasibility and risks must be carefully reviewed prior to making specific financial decisions or establishing project budgets to support proper project evaluation and adequate funding.

Total estimated project costs were developed through a progression of steps and multiple methodologies. The steps included development of component unit costs, construction costs and, finally, total project costs. The component unit cost includes the sum of materials, labor and equipment of a project's basic features. The construction cost is the sum of component costs and construction markups, which includes a 30 percent allowance for contingency and 10.2 percent for sales tax. The total project costs presented is the sum of construction costs with the following additional allowances:

- 15 percent for City management, survey, legal, and project administration.
- 15 percent engineering design.
- 15 percent construction management and inspection.

The following costs are not included, unless specifically noted:

- Land or right-of-way acquisition.
- Maintenance expenses.
- Operation expenses.

All cost estimates were developed as total project costs in March 2024 dollars. In **Table 8-10**, costs have been inflated and escalated using an annual increase rate from 2024 dollars to their planned implementation year. For projects that will be designed or constructed in 2024, an annual increase of eight percent was used. For projects that will be designed or constructed after 2024, an annual increase of five percent was used. 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 Auburn area used the ENR CCI in Seattle of 15,477 (March 2024).

8.1.3.1 Pipeline Component Unit Costs

The pipelines unit costs were developed using recent City construction bid tabs assuming the use of ductile iron pipe and a typical cover depth of four feet. The estimated unit cost is provided by pipe diameter per linear foot of pipe in **Table 8-1**, which includes the cost for the pipe, trench, roadway restoration, appurtenances, installation, and direct construction markups. As the diameter of pipe and the trench width increase, the costs also increase.

Table 8-1 | Water Pipeline Construction Costs per Linear Foot

Pipe Diameter (inch)	Unit Construction Cost (\$/linear foot)
8	\$490
10	\$510
12	\$520
14	\$570
16	\$630
18	\$730
20	\$780
24	\$880

8.1.3.2 Reservoir Component Unit Costs

Reservoir (storage tank) unit costs were determined based on the tank volume in gallons. Conceptual costs for tanks vary based on the material of storage: prestressed concrete and welded steel being the most common options. Unit costs for the different reservoir options are presented in **Table 8-2** in terms of cost per gallon of storage. The unit costs do not include site piping, site improvements, land acquisition, repair, or recoating. Storage reservoir costs are sensitive to site-specific geotechnical and seismic considerations. A tank siting study is necessary whenever a new tank project is initiated to obtain the information required to inform the design.

Table 8-2 | Reservoir Tank Construction Costs per Gallon

Tank Material	Unit Construction Cost (\$/gallon)
Prestressed Concrete	\$1.50
Welded Steel	\$1.25

8.2 Capital Improvement Program Summary and Schedule

8.2.1 Completed Projects

The following projects have been completed since 2015 WSP was completed:

- S-01: Onsite Improvements Projects, completed in 2016.
- S-02: Emergency Power Improvements Project, completed in 2016.
- S-17: West Hill Springs Flow Control Improvements, completed in 2017.
- S-19: Fulmer Field Improvements Project, completed in 2018.
- R-01: Lakeland Hills Reservoir 5 Improvements, completed in 2016.
- D-03: SCADA Upgrades, completed in 2015.
- D-10: Pipeline Asset Management Study, completed in 2020.
- D-13: Lea Hill PRV Station Improvements, completed in 2018.
- D-14: Valley AC Main Replacement, completed in 2015.
- PS-03: Green River Pump Station Emergency Power, completed in 2020.
- PS-07: Academy Pump Station No.1 Improvements, completed in 2023.
- G-06: Muckleshoot Indian Tribe (MIT) Casino Master Meters, completed in 2016.
- G-09: Water Meter & Billing System Improvements, completed in 2018

The following projects have been eliminated since 2015 WSP was prepared:

- G-05 - Utilities Field Operations Center: This project was replaced with a more comprehensive upgrade to the City's Operations and Maintenance Facilities as reported in the 2021 Limited Comprehensive Plan Update.
- D-12 - Academy Transmission Replacement: This project was eliminated, after further investigation found no issues with the existing pipeline.
- D-15: Braunwood Transmission: This project was split from Reservoir Seismic Rehabilitation (R-06) identified in the 2015 WSP. This project was originally planned to incorporate the Braunwood Satellite System, however after further evaluation, there is not a business case to support this project. Instead, it is replaced in this WSP with a mechanical upgrades project for the Braunwood Pump Station to maintain operation. The potential for incorporation of the Braunwood Satellite System may be more viable in the future pending potential development in the southern portion of the City's RWSA.
- D-16 - Game Farm Park Transmission: This project was originally planned to allow for the decommissioning and removal of the Game Farm Park Pump Station, however after further evaluation, there is not a business case to support this project. Instead, it is replaced in this WSP with a mechanical upgrades project to maintain operation of the Game Farm Park Pump Station. Elimination of the Game Farm Park Pump Station may be more viable in the future pending potential development in the southern portion of the City's RWSA.
- S-12 - West Hill Springs Water Quality Improvements: The City had planned to replace the aging West Hill Springs chlorination building and equipment with a new liquid chlorination system. However, since this project is not required to meet regulatory requirements and after further review of the City's Financial Program, this project was eliminated to prioritize projects required to resolve deficiencies. This project will be completed later, likely beyond the planning horizon for this WSP.
- S-14 - Algona Well 1 Redevelopment: This project was eliminated until the Algona Well 1 Study is completed. A new capital project may be developed in the 10 to 20-year planning horizon pending the outcome of the study.

8.2.2 Active Projects

The following projects are currently underway for completion by the City and are referred to as "Active Projects" that have remaining costs to be spent in the near term:

- CP2021 - Well 4 Facility Improvements: This project was split from the Well 4 Pump Improvements project (S-22) identified in the 2015 WSP. This project includes upgrades to much of the mechanical systems at the facility.
- CP2043 - Well 4 Electrical Improvements: This project was split from the Well 4 Pump Improvements project (S-22) identified in the 2015 WSP to accommodate beneficial electrical improvements outside the original scope of the project. The well facility is over 40 years old and much of the electrical equipment is original. Upgrades to the electrical system will improve the overall efficiency of the facility.

- CP2219 - Reservoir 4 and 8 Seismic Rehabilitation: This project was split from Reservoir Seismic Rehabilitation (R-06) identified in the 2015 WSP. The City plans to install seismic control valves on outlet piping of the Lea Hill Reservoirs (4A & 4B) and Academy Reservoirs (8A & 8B). A seismic control valve isolates the reservoir to prevent catastrophic flows from the reservoir during a seismic pipe failure. This project will also address outstanding deficiencies identified in the 2022 Sanitary Survey, including vent modifications, overflow connection modifications and overflow screen repairs.
- CP2134 - Comprehensive Water System Plan Update: This project was split from identified in the 2015 WSP (G-08), which originally included updates for both 2024 and 2034. This project will be carried forward in the CIP with further WSP updates being required in 2034 and 2044.
- CP1603 - Coal Creek Springs Transmission Main Replacement: This project was identified in the 2015 WSP as project (D-11) will be completed in 2024. The project will replace the existing 24-inch diameter steel transmission main crossing the White River with a new transmission main suspended from a utility and pedestrian bridge to cross the White River.
- CP2204 - Coal Creek Springs Rehabilitation (Phase 1): The Coal Creek Springs Rehabilitation project aims to investigate the cause of low yield and identify potential upgrades to improve water production. The updates will be completed in Phase 2 of the project.
- CP2413 - Reservoir 2 Valves: This project was split from Reservoir Seismic Rehabilitation (R-06) identified in the 2015 WSP. This project will replace the existing 20-inch supply valve with a seismic control valve and replace the 12-inch drain valve at Reservoir 2. Both valves will be installed in a vault. This project was identified as a maintenance issue due to limited access to the valves. The addition of a seismic control valve will improve the resiliency of the distribution system. This project will address the outstanding deficiency identified in the 2022 Sanitary Survey by modifying the overflow connection.
- CP1914 - Cascade Water Alliance Water Purchase: This project was identified in the 2015 WSP as project (S-04) and finances System Development Charges for the right to purchase water from Tacoma Public Utilities (TPU) through the Second Supply Pipeline to meet future projected demand, based on agreements with Cascade Water Alliance. Council approved the agreements for permanent and reserve wholesale supply in September 2013, and a new agreement was executed in 2014. Budget reflects purchase of permanent supply; payments will continue through 2029.
- S-08 - Water Resources Protection Program (Wellhead Protection): This program provides annual funding for implementing strategies identified in the Wellhead Protection Plan. Although some tasks will be performed as part of the water operations budget, other tasks will require consultants with expertise in review and investigation of contaminant sites and other environmental databases, development of spill response plans, and leaking underground storage tanks. This program will continue through the 20-year planning horizon.
- R-03 - Reservoir Repair and Replacements: This is an annual program that provides budget for general reservoir maintenance and minor repairs. This program will continue through the 20-year planning horizon.
- R-05 - Reservoir Painting: This is a program that operates on a 10-year cycle to complete reservoir coatings. This program will continue through the 20-year planning horizon with the next anticipated painting project planned in 2025.

The following projects include distribution improvements identified in the 2015 WSP to be completed as part of either the Annual Distribution System Improvements Program (D-02), Water Repair and Replacement Program (D-09) or are in partnership with other City utilities and are funded by budget available in the Street Utility Improvements annual program (D-06). All three programs have been updated and will continue through the 20-year planning horizon. In total the following active projects will replace approximately 9,000 linear feet of water main in the City's system. The locations of all active distribution system improvement projects are identified in **Figure 3-12 in Chapter 3**.

- CP1619 - 104th Park Development (104th to 102nd Water Main Loop)
- CP2301 - 104th Avenue SE PRV Replacement
- CP2123 - C St SW Preservation
- CP2125 - D St SE and 23rd Street SE Storm Improvements
- CP2410 - 112th Pl SE Water Main Replacement
- CP1622 - Auburn Way South - Hemlock St SE to Poplar St SE
- CP2022 - Garden Avenue Realignment
- CP2210 - M Street NE Widening
- CP2116 - R Street SE Widening
- CP2308 - R St SE and 21st St SE Roundabout
- CP2315 - R St SE Preservation - 33rd St SE to 37th St SE
- CP2319 - Lea Hill Road/104th Ave SE Roundabout
- CP2404 - 12th St SE and Auburn Way South Water R&R
- CP2412 - 2025 Local Street Preservation
- 2026 Local Street Preservation

The following active projects were not identified in the 2015 WSP:

- CP2405 - Fulmer Treatment Facility VFD Replacements: The variable frequency drive (VFD) for pumps 1 and 2 at Fulmer Corrosion Control Treatment Facility (CCTF) were installed in 2002. They are at the end of their useful life and require replacement as repair parts are no longer available.
- CP2329 - Coal Creek Springs Flowmeter Replacement: The project will replace existing source meters on the Coal Creek Springs collectors to improve the accuracy and frequency of production readings.
- Algona Well 1 Study – Phase 1: The project will conduct a preliminary assessment of options to utilize the existing water right.
- Valley Service Area Reservoir No. 3 Siting Analysis: The project will conduct a siting analysis to identify and evaluate possible locations for the new reservoir.
- Braunwood Pump Station Assessment: The project will identify process mechanical upgrades necessary to continued operation. The project will also evaluate roofing replacement material options and costs.
- Coal Creek Springs Rehabilitation – Phase 1: The project will investigate the cause of reduced production from Coal Creek Springs and recommend improvements to increase production capacity.

8.2.3 Capital Improvement Projects

The following projects identified in the 2015 WSP have not been completed since the WSP was prepared, but have been revisited and are discussed in detail in the following sections for completion during this planning period. The timing of most projects has been adjusted based on the City's financial analysis and project prioritization updates.

- S-03 - Well 7 Back-Up Power: Delayed to 2032 since Well 7 has been offline due to high levels of Manganese. The timing of this project will be aligned with the completion of the Well 7 Treatment Phase 1 project (S-15) that will allow the Well to resume operation.
- S-06 - Well 5/5A Upgrades: Delayed from 2022 to 2026.
- S-07 - Well Inspection and Redevelopment Program: Delayed from 2015-2033 to 2026.
- S-09 - Coal Creek Springs Rehabilitation: Delayed from 2018 to 2027 based on awaiting results of ongoing investigations to identify the cause and possible solutions to improve production from Coal Creek Springs. The timing of this project may be adjusted pending results of the on-going investigation.
- S-11 - Wells 3A/3B Treatment: Delayed from 2035 to 2036.
- S-13 - Algona Well 1 Study: Delayed from 2015 to 2039.
- S-15 - Well 7 Treatment Phase 1: Delayed from 2022 to 2030 based on City financial analysis and updated project prioritization.
- S-16 - Well 7 Treatment Phase 2: Moved forward from 2035 to 2033.
- S-18 - Howard Road CCTF Expansion: Delayed from 2025 to 2032. The timing of this project must be aligned with the completion of the Coal Creek Springs Rehabilitation project, as its purpose is to provide increased treatment capacity to accommodate increased flows from Coal Creek Springs.
- S-20 - Well 2 Replacement: Moved forward from 2035 to 2030.
- S-21 - Coal Creek Springs Chlorination Building Replacement: Moved forward from 2035 to 2030.
- R-04 - Valley Service Area Reservoir No. 3: Delayed from 2025 to 2041.
- R-07 - Reservoir Capital Improvements: Delayed from 2025 to 2027 to avoid timing conflicts with other current projects at Reservoirs 4A, 4B, and 8A.
- R-07 - Braunwood Reservoir Improvements: Separated from "Reservoir Capital Improvements" project and delayed from 2025 to 2039.
- PS-04 - Intertie Booster Pump Station Improvements: Delayed from 2021 to 2024.
- PS-09 - Game Farm Park Pump Station Mechanical Upgrades: Replaces original project 'Game Farm Park Pump Station/Distribution System Improvements. Delayed from 2025 to 2034.
- PS-10 - Lea Hill Pump Station Replacement: Delayed from 2025 to 2027 to avoid conflicts with concurrent work in area being completed as part of a separate project.

- G-08 - Comprehensive Water System Plan Update: This project was split into two separate completion years for future updates (2034 and 2044).

Based on the information provided by the City, information included in the 2023 CFP, asset management program input, and results of the system capacity analysis provided in **Chapter 3**, the following new projects were identified that are included in the CIP and are discussed in further detail below:

- Rehabilitate & Clean Wells 2 and 6 (3-year Cycle).
- On-Site Chlorine Generation Systems (OSEC) at Wells 1 and 4.
- Academy PRV Project.
- Braunwood Pump Station Mechanical Upgrades.
- Water Trench Patches Program.
- West Hill Springs Transmission Main Replacement.
- Lea Hill 648 Zoning Adjustment.

8.2.3.1 Water Supply

The City's water supply strategy details both project sizing and timing. A summary of the 0 to 10-year and 10 to 20-year capital projects recommended for securing adequate supply to meet the system's future demands are presented in **Table 8-3**. Project IDs have been revised to reflect the updated prioritization and planned timing of projects presented in this WSP. Previous project IDs from the 2015 WSP as presented above will be discontinued for clarity purposes. Active projects identified above are not discussed in detail as they are already well defined and in progress.

8.2.3.1.1 Cascade Water Alliance Water Purchase (S-01)

Financing to purchase water from Tacoma Public Utilities (Tacoma) to meet water demands is based on an agreement with Cascade Water Alliance (Cascade), which had purchased water supply from Tacoma. The Council approved the agreement for permanent wholesale supply in September 2013. The agreement provides an additional 3.32 mgd of supply during the peak day and 1.5 mgd of average day supply. The City's permanent and reserve agreement requires System Development Charges (SDC) payments of \$21,073,743 between 2017 and 2029. A total of \$934,810 of payments will continue from 2023 through 2029. The SDC costs will decrease if less than the full reserve amount is purchased. The project ID was previously S-04 in the 2015 WSP.

8.2.3.1.2 Water Resources Protection Program (Wellhead Protection) (S-02)

Annual funding for implementing strategies identified in the Wellhead Protection Plan. Although some tasks will be performed as part of the water operations budget, other tasks will require consultants with expertise in review and investigation of contaminant sites and other environmental databases, development of spill response plans, and leaking underground storage tanks. The project ID was previously S-08 in the 2015 WSP.

8.2.3.1.3 Rehabilitate & Clean Wells 2 and 6 (3-year Cycle) (S-3)

Rehabilitation work completed in 2013-2014 indicated it would be beneficial to clean and rehabilitate both wells on a regular basis to improve production capacity and pumping efficiencies. Cleaning was completed in 2020 and again in late 2023/early 2024. This program was originally established as a 5-year cycle, however based on more recent evidence, more frequent cleaning is required. Cleaning and rehabilitation for Wells 2 and 6 will be performed over a 3-year cycle. This program was not identified in the 2015 WSP.

8.2.3.1.4 Well Inspection and Redevelopment Program (S-04)

The City allocates annual funding for investigations and redevelopment of supply wells and springs necessary to support production at maximum capacity for efficient utilization. This program is to be used for production wells and spring collectors, and is not intended to finance the replacement of pumps, motors, buildings, etc. The project ID was previously S-07 in the 2015 WSP.

8.2.3.1.5 On-Site Chlorine Generation Systems (OSEC) at Wells 1 and 4 (S-05)

The existing liquid chlorine (sodium hypochlorite) used at Wells 1 and 4 degrades during low winter demand periods when the volume used is much lower and product turnover is decreased. This results in more chemical consumption to achieve the same chlorine dose which is not cost effective. The hypochlorite systems will be replaced with on-site chlorine generation systems sized to meet peak summer demands while providing flexibility during winter months. This project was not identified in the 2015 WSP.

8.2.3.1.6 Fulmer CCTF Replace On-Site Chlorine Generation System (OSEC) (S-06)

The existing on-site chlorine generating equipment was installed in 2002. The generation cell was replaced in 2012. Sourcing parts for equipment repairs has become increasingly difficult due to the equipment age. An analysis performed in 2018 comparing chlorine alternatives indicated that on-site generation has the lowest overall cost. This project will replace the entire generation system. The chlorination system will be sized to accommodate future production from Well 7.

8.2.3.1.7 Well 5/5A Upgrades (S-07)

Well 5 needs significant improvements including a new building, a backup generator, chlorination, and a hydrologic investigation to evaluate observed decreased production. Due to the small size of the existing site, the acquisition of an adjacent parcel may be required. Additionally, the project will address the recommended Capital Improvements identified in the 2014 Facility Evaluation Study (CIP Project G-01), including a new pump at Well 5 and new pump and motor at Well 5A. Additional upgrades may be identified in the hydrologic investigation; therefore, the cost of this CIP item should be revisited upon completion of the study. This project will also include improvements to address outstanding deficiencies identified in the 2022 Sanitary Survey, including modifications to the pump waste line for Well 5 and addressing water accumulation in the vault at Well 5A. The project ID was previously S-06 in the 2015 WSP.

8.2.3.1.8 Coal Creek Springs Rehabilitation – Phase 2 (S-08)

Complete rehabilitation of the Coal Creek Springs collectors to improve production capacity resulting in greater utilization of the water right. Improvements are to be defined by the outcomes of the 2023/2024 hydrogeologic study currently being completed as Phase 1 (S-04). Additional upgrades may be identified in the hydrologic investigation; therefore, the cost of this CIP item should be revisited upon completion of the study.

8.2.3.1.9 Coal Creek Springs Chlorination Building Replacement (S-09)

Coal Creek Springs chlorination building was identified as requiring replacement in the 2013 Facility Evaluation Study. Additionally, the project will upgrade the source treatment from chlorine gas to a liquid sodium hypochlorite disinfection system. Sizing of the new equipment will be dependent upon capacity improvements completed as part of the Coal Creek Springs Rehabilitation Project. A new building will be constructed to house the equipment. The project ID was previously S-21 in the 2015 WSP.

8.2.3.1.10 Well 7 Treatment Phase 1 (S-10)

Well 7 is not operational due to high manganese levels. Manganese treatment is required to allow operation of this facility to be restored and to utilize the full water right for this well. Due to space limitations at the Well 7 site, the treatment facilities will be added at the Fulmer Field CCT Facility. The treatment facility will be installed in two phases. The first phase will provide 2.5 mgd of capacity. Additionally, phase 1 of the project will address the recommended improvements to the Fulmer Field CCT Facility identified in the 2013 Facility Evaluation Study, including a new pump and motor. The project ID was previously S-15 in the 2015 WSP.

8.2.3.1.11 Well 2 Replacement (S-11)

The Fulmer Well Field Improvement project found that Well 2 can continue to serve the City but would need to be replaced to resolve ongoing operational challenges. This project includes installation of a new large diameter well. It is assumed that the well will remain on its existing site, or other City-owned property. The project ID was previously S-20 in the 2015 WSP.

8.2.3.1.12 Howard Road CCTF Expansion (S-12)

The inflow to the Howard Road CCTF will increase with the completion of the Well 1 Improvements project in 2016 and planning production improvements for Coal Creek Springs Collector Improvements. The existing facility will be expanded to its full capacity to provide additional treatment capacity and redundant pump capacity to match increased flows. Additionally, the project will address the recommended improvements to Howard Road CCTF identified in the 2013 Facility Evaluation Study, including a new pump and motor. The expansion will include an additional aeration tower and a pump to match existing. The project ID was previously S-18 in the 2015 WSP.

8.2.3.1.13 Well 7 Back-up Power (S-13)

Well 7 is currently out of service, but the City has plans to bring the facility back online once manganese treatment is provided as part of the Well 7 Treatment Phase 1 Project. Without back-up power to its pumps, Well 7 is not considered a reliable source of supply for the Valley Service Area. The City has limited land available at the Well 7 site, therefore, backup power will be installed at the Fulmer Field CCT Facility. The project also includes installing underground electrical transmission capability between Well 7 and the Fulmer Field CCT Facility. The project ID was previously S-03 in the 2015 WSP.

8.2.3.1.14 Well 7 Treatment Phase 2 (S-14)

Well 7 Treatment Phase 2 will complete the manganese treatment facilities at the Fulmer Field CCT Facility to allow year-round use of Well 7. Phase 2 will add 2.5 mgd of treatment for a total capacity of 5.0 mgd. The project ID was previously S-16 in the 2015 WSP.

8.2.3.1.15 Wells 3A/3B Treatment (S-15)

Wells 3A and 3B are not operated due to high manganese levels. Manganese treatment is required to allow these wells to be used, which would add 4.03 mgd of instantaneous flow capacity to the City's supply capabilities. The project includes manganese treatment, a new well and treatment building, well pumps, and onsite backup-power. Additionally, a new sodium hypochlorite system for chlorination will be installed. The project ID was previously S-11 in the 2015 WSP.

Table 8-3 | Prioritized Water Supply Improvement Projects

Project Name	Project ID	Project Timing	Added Qi Capacity (mgd)	Estimated Cost 2024 USD	Brief Project Description
0 to 10-Year Planning Horizon					
Cascade Water Alliance Water Purchase	S-01	2024-2029	3.32	\$5,608,860	The agreement provides an additional 3.32 mgd of supply during the peak day and 1.5 mgd of average day supply.
Water Resources Protection Program (Wellhead Protection)	S-02	2024-2044 (Annual)		\$1,287,700	Annual funding for Wellhead Protection activities.
Rehabilitate & Clean Wells 2 and 6 (3-year Cycle)	S-03	2025-2044		\$1,750,000	3-year cycle program to clean and rehab Wells 2 and 6.
Well Inspection and Redevelopment Program	S-04	2026-2027		\$420,000	Annual funding allocation for investigations and redevelopment of wells and springs to maximize production capacity.
On-Site Chlorine Generation Systems (OSEC) at Wells 1 and 4	S-05	2026-2027		\$275,000	Replace liquid hypochlorite systems with on-site generation systems.
Fulmer CCTF Replace On-Site Chlorine Generation System (OSEC)	S-06	2026-2027		\$500,000	Replace aged on-site chlorine generation equipment.
Well 5/5A Upgrades	S-07	2026-2028		\$2,715,000	New building, back-up generator, chlorination, and a hydrologic investigation to evaluate the reasons for decreased production.
Coal Creek Springs Rehabilitation – Phase 2	S-08	2027-2030	4.32	\$5,337,000	Rehabilitation of the Coal Creek Springs collectors to improve production.
Coal Creek Springs Chlorination Building Replacement	S-09	2030-2031		\$2,081,000	Replace chlorination system and building at Coal Creek Springs Facility with hypochlorite disinfection system.
Well 7 Treatment Phase 1	S-10	2030-2032	2.5	\$10,097,000	Requires manganese treatment facilities
Well 2 Replacement	S-11	2030-2031	3.46	\$1,960,000	Replace Well 2 to resolve ongoing operational challenges.
Howard Road CCTF Expansion	S-12	2032-2033		\$1,450,000	Expand the facility to its full capacity (including an additional aeration tower and pumps).
Well 7 Back-Up Power	S-13	2032-2033		\$2,075,000	Provide back-up power for this source.
Well 7 Treatment Phase 2	S-14	2033-2035	2.5	\$8,054,000	Requires completion of manganese treatment facilities.
10 to 20-Year Planning Horizon					
Wells 3A/3B Treatment	S-15	2036-2038	4.03	\$13,945,000	Provide manganese treatment for well operation
Algona Well 1 Study – Phase 2	S-16	2039		\$250,000	Evaluate possible uses of water right.
Subtotal				\$57,805,560	

8.2.3.1.16 Algona Well 1 Study – Phase 2 (S-16)

Algona Well 1 has been abandoned and all related facilities removed. This project will study possible options to utilize the existing water right. One option may be to redevelop the well on-site at its previous location. Another alternative may be to pursue an alternative well location or how to use the water right at another existing facility. The project does not include the development of design, permitting or construction of well infrastructure. The project ID was previously S-13 in the 2015 WSP.

8.2.3.2 Storage

Table 8-4 provides a summary of the planned reservoir projects. Project IDs have been revised to reflect the updated prioritization and planned timing of projects presented in this WSP. Previous project IDs from the 2015 WSP as presented above will be discontinued for clarity purposes. Active projects identified above are not discussed in detail as they are already well defined and in progress.

8.2.3.2.1 Reservoir Repair & Replacements (R-01)

The City has allocated an annual capital expenditure for general reservoir maintenance and minor improvements. Projects are identified by the City on an as-needed basis. The project ID was previously R-03 in the 2015 WSP.

8.2.3.2.2 Reservoir Painting (10-year Cycle) (R-02)

The City plans to paint the welded steel reservoirs to extend their useful life. This program finances the painting of two reservoirs every 10 years. The project ID was previously R-05 in the 2015 WSP.

8.2.3.2.3 Academy PRV Project (R-03)

A new PRV facility will be located to rezone a portion of the Valley 242 pressure zone to the Academy 350 pressure zone to resolve fire flow deficiencies in the area. This PRV facility will also allow storage transfer from the Academy Service Area where this is surplus storage to the Valley Service Area to resolve 2034 storage deficit projections, allowing for more system flexibility. The PRV facility location is assumed to be in a cul-de-sac where U St SE meets 28th St SE but will be confirmed during design. The PRV vault is assumed to house a 2-inch PRV for low flows (normal operation) and a 6-inch PRV for fire flows. This project was not identified in the 2015 WSP.

8.2.3.2.4 Reservoir Capital Improvements (R-04)

The 2013 Facility Evaluation Study identified improvements to reservoir facilities based on the condition and remaining useful life of the assets within the facilities. Improvements were identified at Reservoir 1, Reservoir 4A & 4B, and Reservoir 8A & 8B. The project ID was previously R-07 in the 2015 WSP.

8.2.3.2.5 Braunwood Reservoir Improvements (R-05)

The 2013 Facility Evaluation Study identified improvements to reservoir facilities based on the condition and remaining useful life of the assets within the facilities. Improvements were identified at the Braunwood Reservoir and were previously included in Reservoir Capital Improvements project (R-07) in the 2015 WSP.

8.2.3.2.6 Valley Service Area Reservoir No. 3 (R-06)

To meet future storage requirements in the Valley Service Area, it is recommended that a new, 2-MG storage reservoir. A siting study should be conducted to identify the preferred reservoir location and other details; it is assumed that the reservoir will be in the northeast portion of the Valley 242 pressure zone.

Property acquisition is expected to be required and an allowance of \$1M is included in the project budget. The project ID was previously R-04 in the 2015 WSP. It was assumed that the new reservoir will be a prestressed concrete tank, however this should be confirmed during the siting study.

Table 8-4 | Storage Improvements Projects

Project Name	Project ID	Project Timing	Added Storage (MG)	Estimated Cost 2024 USD	Brief Project Description
0 to 10-Year Planning Horizon					
Reservoir Repair & Replacements	R-01	2024-2044 (Annual)		\$1,392,000	Annual program for reservoir maintenance and minor improvements.
Reservoir Painting (10-year Cycle)	R-02	2025-2044		\$3,500,000	Required for maintenance and reservoir longevity in both Academy and Lea Hill service areas.
Academy PRV Project	R-03	2027		\$470,000	PRV for storage transfer and rezoning to meet fire flow demands.
Reservoir Capital Improvements	R-04	2027		\$470,000	Improvements to Reservoir 1, Reservoir 4A&4B, Reservoir 8A&8B based on the condition and remaining useful life.
10 to 20-Year Planning Horizon					
Braunwood Reservoir Improvements	R-05	2039-2040		\$250,000	Improvements based on condition and remaining useful life.
Valley Service Area Reservoir No. 3	R-06	2041-2044	2.0	\$11,745,000	Required to meet future storage requirements in the Valley service area.
Subtotal				\$17,827,000	

8.2.3.3 Pump Stations

Table 8-5 provides a summary of the planned pump station projects. Project IDs have been revised to reflect the updated prioritization and planned timing of projects presented in this WSP. Previous project IDs from the 2015 WSP as presented above will be discontinued for clarity purposes. Active projects identified above are not discussed in detail as they are already well defined and in progress.

8.2.3.3.1 Intertie Pump Station/Lea Hill BPS Improvements (PS-01)

The Lea Hill BPS serves the closed 648 Pressure Zone and does not have sufficient capacity to meet fire flow requirements under current or future demand projections. To meet fire flow requirements, an additional 2,500 gpm of firm capacity is required. The Lea Hill BPS and that Intertie Pump Station share a building. To increase capacity of the Lea Hill PS, the project will provide additional piping and modify the existing Intertie Pump Station/Lea Hill BPS building to utilize the existing Intertie Pump Station pumps to serve the Lea Hill 648 pressure zone. The project will also add pressure reducing valves and control valves at Lea Hill reservoirs, and system valves to provide efficient operation of the 132nd Ave Tacoma Intertie. On-site back-up power improvements for the Lea Hill BPS are also included to improve facility reliability.

In the 2015 WSP, this project also included distribution system improvements to rezone a portion of the Lea Hill Service Area; this work has been shifted to a separate project titled the Lea Hill 648 Zoning Adjustment project. This project ID was previously PS-04 in the 2015 WSP.

8.2.3.3.2 Lea Hill Pump Station Replacement (PS-02)

The Lea Hill Pump Station will be reconstructed to provide redundant pumped supply to the Lea Hill area. If the Green River Pump Station is out of service for maintenance, a redundant pump station would avoid the need to purchase more expensive regional surface water through the 132nd Intertie. The pump station needs to be relocated from its current location on the shoulder of Lea Hill Road at the base of a steep hill for safety and reliability considerations. Two separate active projects (Garden Avenue Realignment and Lea Hill Roundabout) will construct approximately 900 feet and 835 feet of 12-inch diameter transmission main respectively, that is required for the future pump station. The project ID was previously PS-10 in the 2015 WSP.

8.2.3.3.3 Braunwood Pump Station Mechanical Upgrades (PS-03)

The Braunwood Pump Station is an aging facility that serves the Braunwood Satellite System. The project will include minor mechanical or electrical improvements to rehabilitate the facility for continued use. This project ID was previously PS-09 in the 2015 WSP. This project was not identified in the 2015 WSP.

8.2.3.3.4 Game Farm Park Pump Station Mechanical Upgrades Project (PS-04)

The Game Farm Wilderness Park Pump Station is an aging facility that serves the Game Farm Wilderness and recreational area. The 2013 Facility Evaluation Study identified improvements to allow continued use of the station including pump replacement and building repairs. Additional minor mechanical or electrical improvements may be warranted to rehabilitate the facility for continued use. This project ID was previously PS-09 in the 2015 WSP.

Table 8-5 | Pump Station Improvement Projects

Project Name	Project ID	Project Timing	Added Firm/Reliable Capacity (gpm)	Estimated Cost 2024 USD	Brief Project Description
0 to 10-Year Planning Horizon					
Intertie Pump Station/Lea Hill BPS Improvements	PS-01	2024-2026	2,500 gpm	\$2,325,000	Expand the fire flow capacity of the Lea Hill BPS by connecting to the Intertie PS pumps.
Lea Hill Pump Station Replacement	PS-02	2027-2029		\$6,365,000	Decommission and replace the pump station at the end of its usable life.
10 to 20-Year Planning Horizon					
Braunwood Pump Station Mechanical Upgrades	PS-03	2034-2035		\$250,000	Rehabilitate Pump Station to allow continued use.
Game Farm Park Pump Station Mechanical Upgrades	PS-04	2034-2035		\$250,000	Rehabilitate Pump Station to allow continued use.
Subtotal				\$9,190,000	

8.2.3.4 Distribution System

The City's water distribution system will require many improvements to address fire flow deficiencies identified by the system analysis presented in **Chapter 3**. Additionally, the City has undersized, and aging piping within the water system that needs to be replaced to reduce the risk of breaks and leaks. The identified distribution system improvements programs are described below and summarized in **Table 8-7**.

Project IDs have been revised to reflect the updated prioritization and planned timing of projects presented in this WSP. Previous project IDs from the 2015 WSP as presented above will be discontinued for clarity purposes. Active projects identified above are not discussed in detail as they are already well defined and in progress.

8.2.3.4.1 Annual Distribution System Improvements Program (D-01)

The Annual Distribution System Improvements Program is focused on capacity related improvements to the City's water distribution system as identified in **Figure 3-12** and **Table 3-33** of **Chapter 3**. These improvements address deficiencies during fire flow demand scenarios. A comprehensive list of the projects and their individual estimated costs are provided in **Appendix W**. The total of all project costs is distributed across the 20-year planning horizon and will be prioritized to address the areas with the greatest deficiency first. This project ID was previously D-02 in the 2015 WSP.

8.2.3.4.2 Street Utility Improvements (D-02)

The City Street Utility program provides an annual budget to perform water main improvements in coordination with the Street Preservation programs and general arterial street improvements. By replacing water infrastructure concurrent with other utility or street improvement projects, the City can reduce overall project costs. Identified projects are anticipated to occur annually throughout the planning period. This project ID was previously D-06 in the 2015 WSP.

8.2.3.4.3 Water Repair & Replacements (D-03)

Previous WSPs identified pipelines for the City's Water Repair & Replacement program focus on replacement of old cast iron pipes, pipes under 6-inches that serve fire hydrants, dead-end mains in non-residential areas, and decommissioned duplicate pipes. The budget for this project has been re-evaluated and is revised to focus on the replacement of undersized cast iron pipe. The budget was developed focusing specifically on 4-inch diameter cast iron pipe, however the City may also allocate this budget to replace other undersized cast iron pipe within the system. **Table 8-6** summarizes the basis of the program budget using the same unit cost assumptions and allowances established in **Section 8.1.3**. The City's pipeline water repair and replacement program will be accomplished through the combination of the Street Utility Improvements (D-02) and this program. Ideally, Water Repair and Replacement and Street Utility projects will be constructed on alternating years to maintain consistent levels of capital expenditures. This project ID was previously D-09 in the 2015 WSP.

Table 8-6 | Water Repair & Replacements Cost Estimate

Length (LF)	Existing Size (inch)	New Size (inch)	Unit Cost	Component Cost	Construction Cost	Project Cost
11,740	4	8	\$490/LF	\$5,752,500	\$8,241,000	\$11,950,000

8.2.3.4.4 Water Trench Patches Program (D-04)

This program provides annual funding for roadway restoration of trench patches from water main leak repairs and water service installation that are beyond the scope of work done by City maintenance staff. This project was not identified in the 2015 WSP.

8.2.3.4.5 West Hill Springs Transmission Main Replacement (D-05)

The 2020 pipeline assessment indicated the existing cast iron transmission main is in poor condition. The main has experienced two breaks in the past. The project will replace approximately 1,250 LF of 10-inch

diameter cast iron pipe with 12-inch diameter ductile iron pipe. The project includes preliminary geotechnical investigations prior to design and construction. This project was not identified in the 2015 WSP.

8.2.3.4.6 Lea Hill 648 Zoning Adjustment (D-06)

The system capacity analysis identified deficiencies in the upper portion of the Lea Hill 563 pressure zone where the highest service elevations of the zone are located. This project includes system piping and valving modifications to rezone a portion of the Lea Hill 563 pressure zone to the Lea Hill 648 pressure zone. GIS and site verification, as well as minimal system modeling are required to verify necessary modifications.

Table 8-7 | Distribution System Improvements Projects

Project Name	Project ID	Project Timing	Estimated Cost 2024 USD	Brief Project Description
0 to 20-Year Planning Horizon				
Annual Distribution System Improvements Program	D-01	2025-2044 (Annual)	\$59,699,000	Pipe improvement projects required to address system capacity deficits.
Street Utility Improvements	D-02	2025-2044 (Annual)	\$24,618,000	Water main improvements concurrent with street improvements.
Water Repair & Replacements	D-03	2025-2044 (Annual)	\$11,950,000	Pipe improvements to replace aging and undersized pipes.
Water Trench Patches Program	D-04	2024-2044 (Annual)	\$3,360,000	Annual program for restoration following water and service leaks.
West Hill Springs Transmission Main Replacement	D-05	2024, 2026-2027	\$1,401,000	Transmission piping replacement.
Lea Hill 648 Zoning Adjustment	D-06	2027	\$104,000	Pressure zone modifications to address fire flow capacity deficit.
Subtotal			\$101,132,000	

8.2.3.5 General Utility Projects

The general water system projects and their estimated costs are provided in

Table 8-8. Project IDs have been revised to reflect the updated prioritization and planned timing of projects presented in this WSP. Previous project IDs from the 2015 WSP as presented above will be discontinued for clarity purposes.

8.2.3.5.1 Water System Plan Updates (G-01, G-02)

DOH requires Water System Plans to be updated every ten years. The City has allocated budget to complete Water System Plan Updates in 2034 and 2044. The project ID for both updates was previously G-08 in the 2015 WSP.

Table 8-8 | General Water System Projects

Project Name	Project ID	Project Timing	Estimated Cost 2024 USD	Brief Project Description
0 to 10-Year Planning Horizon				
Water System Plan Update - 2034	G-01	2033-2034	\$750,000	Mandated by Washington Department of Health.
10 to 20-Year Planning Horizon				
Water System Plan Update - 2044	G-02	2043-2044	\$750,000	Mandated by Washington Department of Health.
Subtotal			\$1,500,000	

8.3 CIP Summary and Schedule

Table 8-9 summarizes the total CIP cost by project categories for the 20-year planning horizon. All costs shown are in 2024 dollars. Distribution system improvements comprise more than 50 percent of the allocated costs for the CIP.

Table 8-9 | Total CIP Cost by Project Category from 2024 through 2044

Category	Total CIP Cost Summary 2024 – 2044 (2024 USD)
Supply	\$60,416,013
Storage	\$21,579,621
Pump Stations	\$9,230,000
Distribution	\$121,858,681
General	\$1,750,000
TOTAL	\$214,834,315

The results of prioritizing the improvements were used to establish an implementation schedule that can be used by the City for preparing its 20-year CIP and 6-year CFP. The implementation schedule for the active projects and planned CIP projects is summarized in **Table 8-10**. More details are included in **Appendix W**. The City uses this information to develop rates and SDC charges.

The City will schedule the water main projects in the Annual Distribution Improvements Program and Water Repair and Replacements during the annual budget process. This provides the City with the flexibility to coordinate these projects with roadway or other projects within the same area.

Table 8-10 | Capital Improvements Program Costs and Phasing

CIP ID	Name	CAP/ Non-CAP	Total Estimated Cost 2024 USD	2024	10-Year										20-Year		
					2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035-38	2039-42	2043-44
Active Projects																	
CP1619	104th Park Development (104th to 102nd Water Main Loop)	Non-CAP	\$350,000	\$350,000													
CP2301	104th Avenue SE PRV Replacement	Non-CAP	\$390,475	\$390,475													
CP2123	C St SW Preservation	Non-CAP	\$1,802,075	\$901,038	\$901,038												
CP1603	Coal Creek Springs Transmission Main Replacement	Non-CAP	\$4,450,422	\$4,450,422													
CP2125	D St SE and 23rd Street SE Storm Improvements	Non-CAP	\$2,285,677	\$2,285,677													
CP2021	Well 4 Facility Improvements	Non-CAP	\$884,822	\$884,822													
CP2403	Well 4 Electrical Improvements	Non-CAP	\$1,050,000	\$200,000	\$850,000												
CP2410	112th Pl SE Water Main Replacement	Non-CAP	\$2,100,000	\$255,000	\$1,845,000												
CP1622	Auburn Way South - Hemlock St SE to Poplar St SE	Non-CAP	\$2,398,000		\$2,398,000												
CP2022	Garden Avenue Realignment	Non-CAP	\$699,797	\$699,797													
CP2210	M Street NE Widening	Non-CAP	\$357,000	\$37,000		\$320,000											
CP2116	R Street SE Widening	Non-CAP	\$1,762,488		\$100,000	\$1,662,488											
CP2308	R St SE and 21st St SE Roundabout	Non-CAP	\$544,897	\$61,897	\$483,000												
CP2315	R St SE Preservation - 33rd St SE to 37th St SE	Non-CAP	\$301,850	\$301,850													
CP2319	Lea Hill Road/104th Ave SE Roundabout	Non-CAP	\$850,000	\$100,000		\$150,000	\$600,000										
CP2405	Fulmer Treatment Facility VFD Replacements	Non-CAP	\$175,000	\$175,000													
CP2219	Reservoirs 4 and 8 Seismic Rehabilitation	Non-CAP	\$1,433,871	\$1,433,871													
CP2404	12th St SE and Auburn Way South Water R&R	Non-CAP	\$636,000	\$318,000	\$318,000												
CP2412	2025 Local Street Preservation	Non-CAP	\$725,000	\$65,000	\$660,000												
	2026 Local Street Preservation	Non-CAP	\$1,073,000	\$50,000	\$150,000	\$873,000											
CP2329	Coal Creek Springs Flowmeter Replacement	Non-CAP	\$375,017	\$375,017													
CP2134	Comprehensive Water System Plan Update - 2024	Non-CAP	\$250,000	\$250,000													
CP2209	Coal Creek Springs Rehabilitation - Phase 1	Non-CAP	\$75,614	\$75,614													
CP2413	Reservoir 2 Valves	Non-CAP	\$2,268,750	\$68,750	\$2,200,000												
	Algona Well 1 Study – Phase 1	Non-CAP	\$50,000	\$50,000													
	Valley Service Area Reservoir No. 3 Siting Analysis	Non-CAP	\$50,000	\$50,000													
	Braunwood Pump Station Assessment	Non-CAP	\$40,000	\$40,000													
Supply																	
S-01	Cascade Water Alliance Water Purchase	CAP	\$5,608,860	\$934,810	\$934,810	\$934,810	\$934,810	\$934,810	\$934,810								
S-02	Water Resources Protection Program (Wellhead Protection)	Non-CAP	\$1,287,700	\$87,700	\$60,000	\$60,000	\$60,000	\$60,000	\$60,000	\$60,000	\$60,000	\$60,000	\$60,000	\$60,000	\$240,000	\$240,000	\$120,000
S-03	Rehabilitate & Clean Wells 2 and 6 (3-year Cycle)	Non-CAP	\$1,750,000		\$250,000			\$250,000			\$250,000			\$250,000	\$250,000	\$250,000	\$250,000
S-04	Well Inspection and Redevelopment Program	Non-CAP	\$420,000			\$210,000	\$210,000										
S-05	On-Site Chlorine Generation Systems (OSEC) at Wells 1 and 4	Non-CAP	\$275,000			\$100,000	\$175,000										

CIP ID		Name	CAP/ Non-CAP	Total Estimated Cost 2024 USD	2024	10-Year										20-Year		
						2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035-38	2039-42	2043-44
S-06		Fulmer CCTF Replace On-Site Chlorine Generation System (OSEC)	Non-CAP	\$500,000			\$150,000	\$350,000										
S-07		Well 5/5A Upgrades	CAP	\$2,715,000			\$950,000	\$265,000	\$1,500,000									
S-08		Coal Creek Springs Rehabilitation – Phase 2	CAP	\$5,337,000				\$500,000	\$1,000,000	\$2,000,000	\$1,837,000							
S-09		Coal Creek Springs Chlorination Building Replacement	Non-CAP	\$2,081,000							\$520,250	\$1,560,750						
S-10		Well 7 Treatment Phase 1	CAP	\$10,097,000							\$1,500,000	\$2,597,000	\$6,000,000					
S-11		Well 2 Replacement	CAP	\$1,960,000							\$400,000	\$1,560,000						
S-12		Howard Road CCTF Expansion	CAP	\$1,450,000									\$450,000	\$1,000,000				
S-13		Well 7 Back-Up Power	Non-CAP	\$2,075,000									\$414,961	\$1,660,039				
S-14		Well 7 Treatment Phase 2	CAP	\$8,054,000										\$1,654,000	\$3,800,000	\$2,600,000		
S-15		Wells 3A/3B Treatment	CAP	\$13,945,000												\$13,945,000		
S-16		Algona Well 1 Study – Phase 2	Non-CAP	\$250,000													\$250,000	
Storage																		
R-01		Reservoir Repair & Replacements	Non-CAP	\$1,392,000	\$192,000	\$60,000	\$60,000	\$60,000	\$60,000	\$60,000	\$60,000	\$60,000	\$60,000	\$60,000	\$60,000	\$240,000	\$240,000	\$120,000
R-02		Reservoir Painting (10-year Cycle)	Non-CAP	\$3,500,000		\$250,000	\$1,500,000									\$1,750,000		
R-03		Academy PRV Project	CAP	\$470,000				\$470,000										
R-04		Reservoir Capital Improvements	Non-CAP	\$470,000				\$470,000										
R-05		Braunwood Reservoir Improvements	Non-CAP	\$250,000													\$250,000	
R-06		Valley Service Area Reservoir No. 3	CAP	\$11,745,000													\$1,500,000	\$10,245,000
Pump Station																		
PS-01		Intertie Pump Station/Lea Hill BPS Improvements	Non-CAP	\$2,325,000	\$75,000	\$250,000	\$2,000,000											
PS-02		Lea Hill Pump Station Replacement	Non-CAP	\$6,365,000				\$765,000	\$3,000,000	\$2,600,000								
PS-03		Braunwood Pump Station Mechanical Upgrades	Non-CAP	\$250,000											\$70,000	\$180,000		
PS-04		Game Farm Park Pump Station Mechanical Upgrades	Non-CAP	\$250,000											\$70,000	\$180,000		
Distribution																		
D-01		Annual Distribution System Improvements Program	CAP	\$59,699,000		\$400,000	\$2,500,000	\$2,500,000	\$2,500,000	\$2,500,000	\$2,500,000	\$2,500,000	\$2,500,000	\$2,500,000	\$3,572,636	\$14,290,546	\$14,290,546	\$7,145,273
D-02		Street Utility Improvements	Non-CAP	\$24,618,000		\$601,000	\$617,000	\$1,300,000	\$1,300,000	\$1,300,000	\$1,300,000	\$1,300,000	\$1,300,000	\$1,300,000	\$1,300,000	\$5,200,000	\$5,200,000	\$2,600,000
D-03		Water Repair & Replacements	Non-CAP	\$11,950,000		\$150,000	\$450,000	\$600,000	\$600,000	\$600,000	\$600,000	\$600,000	\$600,000	\$600,000	\$650,000	\$2,600,000	\$2,600,000	\$1,300,000
D-04		Water Trench Patches Program	Non-CAP	\$3,360,000	\$160,000	\$160,000	\$160,000	\$160,000	\$160,000	\$160,000	\$160,000	\$160,000	\$160,000	\$160,000	\$160,000	\$640,000	\$640,000	\$320,000
D-05		West Hill Springs Transmission Main Replacement	Non-CAP	\$1,401,000	\$50,000		\$200,000	\$1,151,000										
D-06		Lea Hill 648 Zoning Adjustment	CAP	\$104,000				\$104,000										
General																		
G-01		Comprehensive Water System Plan Update - 2034	Non-CAP	\$750,000										\$375,000	\$375,000			
G-01		Comprehensive Water System Plan Update - 2044	Non-CAP	\$750,000														\$750,000
Total Project Cost (March 2024 USD)				\$214,834,315	\$15,368,740	\$13,020,848	\$12,897,298	\$10,674,810	\$11,364,810	\$10,214,810	\$8,937,250	\$10,647,750	\$11,544,961	\$9,369,039	\$10,367,636	\$42,115,546	\$25,460,546	\$22,850,273
Cost in Future USD with Inflation/Escalation					\$15,505,949	\$13,438,366	\$15,356,813	\$13,346,021	\$14,919,117	\$14,079,931	\$12,934,911	\$16,181,050	\$18,421,739	\$15,697,211	\$18,238,810	\$84,303,230	\$61,753,697	\$64,192,441

Financial Program

9.1 Introduction

This chapter was prepared by FCS GROUP to provide a financial program that allows the City of Auburn (City) water utility to remain financially viable during the planning period. This financial viability analysis considers the historical financial condition, current and identified future financial and policy obligations, operation and maintenance (O&M) needs, and the financial impacts of the capital projects identified in this Water System Plan (WSP). Furthermore, this chapter provides a review of the water utility's current rate structure with respect to rate adequacy and customer affordability.

9.2 Past Financial Performance

This section includes a historical summary of financial performance as reported by the City, including fund resources and uses arising from cash transactions.

9.2.1 Comparative Financial Statements

The City legally owns and operates a water utility. **Table 9-1** shows a summary of water fund resources and uses arising from cash transactions for the previous 6 years (2017 through 2022). 2023 financial statements were not available at the time the chapter was developed. **Table 9-2** shows a summary of assets and liabilities, with the difference between the two reported as "net position." Increases and decreases in net position are useful indicators of the financial position of the City's utility. Noteworthy findings and trends for the historical performance and condition of the City's water utility are then discussed.

9.2.1.1 Findings and Trends

- The City's water charges for services increased from \$14.8M in 2017 to \$16.5M in 2022. The average annual increase was approximately 2.2 percent per year, with a total increase of 11.4 percent from 2017 to 2022. Charges for services increase each year, except for 2019 and 2020 where revenues fell by 1.5 percent and 1.4 percent respectively. Operating Expenditures increased by \$1.7M across the six years with an average annual increase of 2.8 percent. Similar to observations made in revenues, expenditures dropped in 2020 but to a greater extent, decreasing by 2.0 percent. Despite total operating expenses slightly outpacing growth in operating revenues, operating income has been positive in all years observed. 2019 and 2020 had slightly less operating income than other years, observed at \$2.7M, with the remainder of the years averaging \$3.1M.
- The O&M coverage ratio (total operating revenues divided by total operating expenses) was 126.3 percent in 2017. With expenses slightly outpacing revenues this metric decreased and ended 2022 at 122.8 percent. A ratio of 100.0 percent or greater shows that operating revenue will successfully cover operating expenses, and the utility has remained above this ratio for all years observed.

Table 9-1 | Summary of Historical Fund Resources and Uses Arising From Cash Transactions

	2017	2018	2019	2020	2021	2022
OPERATING REVENUES						
Charges for Service	\$ 14,781,310	\$ 15,293,485	\$ 15,057,517	\$ 14,846,679	\$ 15,879,799	\$ 16,459,868
Other Operating Revenue	-	600	835	835	-	-
Total Operating Revenues	\$ 14,781,310	\$ 15,294,085	\$ 15,058,352	\$ 14,847,514	\$ 15,879,799	\$ 16,459,868
OPERATING EXPENSES						
Operations and Maintenance	\$ 3,753,573	\$ 3,692,419	\$ 3,789,093	\$ 3,727,553	\$ 3,912,937	\$ 3,840,391
Administration	4,672,569	4,702,259	4,727,971	4,615,503	5,221,782	6,028,393
Depreciation and Amortization	3,269,581	3,407,933	3,848,016	3,774,956	3,826,387	3,533,926
Other Operating Expenses	8,964	-	-	-	-	-
Total Operating Expenses	\$ 11,704,687	\$ 11,802,611	\$ 12,365,080	\$ 12,118,012	\$ 12,961,106	\$ 13,402,710
Operating Income (Loss)	\$ 3,076,623	\$ 3,491,474	\$ 2,693,272	\$ 2,729,502	\$ 2,918,693	\$ 3,057,158
NONOPERATING REVENUES (EXPENSES)						
Interest Revenue	\$ 104,564	\$ 178,271	\$ 261,654	\$ 49,808	\$ 22,790	\$ 278,430
Other Non-Operating Revenue	269,264	324,228	589,809	148,433	26,542	86,333
Gain (Loss) on Sale of Capital Assets	-	-	-	-	-	-
Interest Expense	(703,321)	(697,363)	(658,808)	(910,452)	(663,857)	(601,400)
Other Non-Operating Expense	-	-	-	(225,230)	-	(90,443)
Total Non-Operating Revenues (Expenses)	\$ (329,493)	\$ (194,864)	\$ 192,655	\$ (937,441)	\$ (614,525)	\$ (327,080)
Income (Loss) Before Contributions and Transfers	\$ 2,747,130	\$ 3,296,610	\$ 2,885,927	\$ 1,792,061	\$ 2,304,168	\$ 2,730,078
Capital Contributions	\$ 1,176,756	\$ 1,271,234	\$ 3,246,853	\$ 2,170,407	\$ 5,382,110	\$ 1,772,439
Transfers In	2,500,000	2,686,332	39,258	6,536,029	-	-
Transfers Out	(2,693,946)	(2,800,400)	(147,002)	(6,643,340)	(119,472)	(96,339)
Change in Net Position	\$ 3,729,940	\$ 4,453,776	\$ 6,025,036	\$ 3,855,157	\$ 7,566,806	\$ 4,406,178
Net Position, January 1	75,751,705	79,481,645	83,935,421	89,960,457	93,815,614	101,382,420
Net Position, December 31	\$ 79,481,645	\$ 83,935,421	\$ 89,960,457	\$ 93,815,614	\$ 101,382,420	\$ 105,788,598
Financial Ratios						
O&M Coverage Ratio	126.3%	129.6%	121.8%	122.5%	122.5%	122.8%
Net Operating Income as a % of Operating Revenue	20.8%	22.8%	17.9%	18.4%	18.4%	18.6%
Debt Service Coverage Ratio	3.83	4.16	3.93	3.63	3.17	2.85

Table 9-2 | Summary of Historical Comparative Statements of Net Position

	2017	2018	2019	2020	2021	2022
CURRENT ASSETS						
Cash and Cash Equivalents	\$ 5,765,412	\$ 7,294,288	\$ 9,568,609	\$ 11,417,193	\$ 14,719,905	\$ 13,826,776
Investments	-	-	-	-	-	-
Restricted Cash:						
Bond Payments	1,690,316	1,687,994	1,672,123	2,334,270	2,246,000	2,183,144
Customer Deposits	43,892	31,541	40,062	64,792	91,672	104,070
Other (Reserve for Bonds and Rate Stabilization)	1,630,313	1,630,314	1,627,520	11,586,722	5,987,879	2,448,053
Customer Accounts	1,363,945	1,837,533	1,912,797	2,090,429	2,007,050	2,203,858
Other Receivables	-	-	-	-	-	-
Due From Other Governmental Units	17,968	14,338	-	-	10,000	-
Inventories	135,450	183,252	189,071	233,015	242,192	313,273
Total Current Assets	\$ 10,647,296	\$ 12,679,260	\$ 15,010,182	\$ 27,726,421	\$ 25,304,698	\$ 21,079,174
NONCURRENT ASSETS						
Net Pension Asset	\$ -	\$ -	\$ -	\$ -	\$ 2,266,854	\$ 920,143
Capital Assets Not Being Depreciated:						
Land	897,971	897,971	897,971	1,283,524	1,283,524	1,283,524
Intangible - Water Rights	5,449,186	5,701,772	5,954,358	6,889,163	7,823,968	8,758,773
Construction In Progress	8,374,328	620,533	3,488,784	4,443,772	6,918,228	6,283,865
Capital Assets:						
Buildings and Equipment	2,509,599	2,509,599	2,509,599	2,509,599	2,509,599	2,509,599
Improvements Other Than Buildings	131,463,582	142,480,531	145,175,810	151,038,789	159,207,726	167,888,532
Less Accumulated Depreciation	(54,538,817)	(57,946,751)	(61,794,767)	(65,569,723)	(69,396,109)	(72,930,035)
Total Noncurrent Assets Net of Accumulated Depreciation	\$ 94,155,849	\$ 94,263,655	\$ 96,231,755	\$ 100,595,124	\$ 110,613,790	\$ 114,714,401
TOTAL ASSETS	\$ 104,803,145	\$ 106,942,915	\$ 111,241,937	\$ 128,321,545	\$ 135,918,488	\$ 135,793,575
DEFERRED OUTFLOWS OF RESOURCES						
Deferred Outflow from Bond Refunding	\$ -	\$ -	\$ -	\$ 78,146	\$ 78,146	\$ 78,146
Deferred Outflow related to Pensions	312,206	274,590	296,941	334,033	309,166	866,866
Total Deferred Outflows of Resources	312,206	274,590	296,941	412,179	387,312	945,012
CURRENT LIABILITIES						
Current Payables	\$ 1,354,856	\$ 831,153	\$ 971,724	\$ 1,015,566	\$ 1,627,369	\$ 700,718
Claims Payable	-	-	-	-	-	-
Loans Payable - Current	634,328	652,107	467,646	478,000	250,914	224,800
Employee Leave Benefits - Current	125,285	122,115	128,188	122,116	172,872	172,114
Leases Payable - Current	-	-	-	-	-	-
Revenue Bonds Payable - Current	871,737	902,092	935,347	1,215,345	1,268,753	1,327,964
Payable From Restricted Assets:						
Accrued Interest	828,486	794,779	754,158	1,126,592	1,065,376	998,923
Deposits	43,892	31,541	40,062	64,792	91,672	104,070
Other Liabilities Payable	600	-	-	-	-	-
Total Current Liabilities	\$ 3,859,184	\$ 3,333,787	\$ 3,297,125	\$ 4,022,411	\$ 4,476,956	\$ 3,528,589
NONCURRENT LIABILITIES						
Employee Leave Benefits	\$ 37,836	\$ 44,177	\$ 34,069	\$ 44,176	\$ 74,823	\$ 66,026
Loans Payable	3,689,390	3,123,514	2,697,219	2,359,332	2,108,418	1,883,620
Leases Payable	-	-	-	-	-	-
Revenue Bonds Payable	14,899,559	13,952,693	12,972,571	26,189,156	24,596,375	22,944,382
Net Pension Liability	2,775,633	2,245,967	1,937,559	1,917,936	1,216,710	1,478,887
Total Non Current Liabilities	\$ 21,402,418	\$ 19,366,351	\$ 17,641,418	\$ 30,510,600	\$ 27,996,326	\$ 26,372,915
TOTAL LIABILITIES	\$ 25,261,602	\$ 22,700,138	\$ 20,938,543	\$ 34,533,011	\$ 32,473,282	\$ 29,901,504
DEFERRED INFLOWS OF RESOURCES						
Deferred Inflow Related to Leases	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Deferred Inflow Related to Pensions	372,104	581,946	639,878	385,099	2,450,098	1,048,485
Total Deferred Inflows of Resources	\$ 372,104	\$ 581,946	\$ 639,878	\$ 385,099	\$ 2,450,098	\$ 1,048,485
NET POSITION						
Net Investment in Capital Assets	\$ 75,751,151	\$ 77,321,243	\$ 80,831,095	\$ 72,687,561	\$ 86,632,404	\$ 87,779,897
Restricted For:						
Debt Service	801,827	835,535	873,362	10,460,130	658,575	3,265,869
Rate Stabilization	-	-	-	-	-	-
Pension Asset	-	-	-	-	-	920,143
Unrestricted	2,928,667	5,778,643	8,256,000	10,667,923	14,091,441	13,822,689
TOTAL NET POSITION	\$ 79,481,645	\$ 83,935,421	\$ 89,960,457	\$ 93,815,614	\$ 101,382,420	\$ 105,788,598
Current Ratio	2.8	3.8	4.6	6.9	5.7	6.0
Debt to Net Position Ratio	0.26	0.23	0.20	0.33	0.29	0.26
Debt to Noncurrent Capital Assets Ratio	0.22	0.21	0.19	0.31	0.26	0.24

- Net operating income as a percentage of operating revenue was 20.8 percent in 2017, decreasing to a low of 17.9 percent in 2019, before ending 2022 at 18.6 percent. Similar to the O&M coverage ratio, these trends show how successfully operating revenue actually covered operating expenses, with higher positive numbers being the best and negative numbers showing a need for improvement. In addition, these trends demonstrate the ability of the utility to invest in capital, whether through direct cash transfers or the issuance and servicing of debt.
- The debt service coverage ratio measures the amount of cash flow available to meet principal and interest payments. Typically, revenue bond debt service coverage requires a minimum factor of 1.25 during the life of the loans. This ratio is calculated by dividing cash or net operating income (operating revenues less operating expenses) by annual revenue bond debt service. The debt service coverage ratio for all outstanding revenue bond debt ended 2017 at 3.83, decreasing to 2.85 by 2022, as the City took on more debt liabilities. The fact that this ratio has sustained levels higher than the minimum target of 1.25 indicates a stable capacity for new debt and will likely result in favorable terms when entering the bond market.

9.2.1.2 Findings and Trends

- The current ratio is calculated by dividing unrestricted current assets by current liabilities and measures an entity's ability to pay short-term obligations. This ratio ranges from a low of 2.8 in 2017 to a high of 6.9 in 2020, ending at 6.0 in 2022. Anything above 2.0 for this liquidity ratio is good.
- The Debt to Net Position Ratio compares total debt to total net position, which is the difference between total assets and liabilities. This ratio ranged from a high of 0.33 or 33 percent in 2020 to a low of 0.20 or 20 percent in 2019. For utilities, a ratio of 40 to 60 percent helps to moderate rate impacts by spreading costs over a longer period of time. Based on these results, the City may consider utilizing debt service for future capital investments, especially if it benefits system expansion.
- The Debt to Noncurrent Capital Asset Ratio compares total debt to noncurrent capital assets, which are also known as property, plant and equipment. This ratio begins at 0.22 or 22 percent debt to 78 percent noncurrent assets in 2017. Noncurrent capital assets increase by \$20.6 million throughout the six-year history while debt increased by \$6.2 million, and the ratio increases to 24 percent by 2022. Similar to the debt to net position ratio, these results indicate the utility has ample borrowing capacity and may consider utilizing debt service for future capital investments, especially if it benefits system expansion. A ratio of 40 percent debt to 60 percent equity or below is a general industry target.

9.3 Financial Plan

The water utility is responsible for generating sufficient revenue to meet all of its costs. The primary source of funding is derived from ongoing monthly service charges, with additional revenue coming from late penalties and interest earnings. The City controls the level of user charges and, with City Council approval, can adjust user charges as needed to meet financial objectives.

The financial plan can only confirm financial feasibility if it considers the total system costs of providing water services, both operating and capital. To meet these objectives, the following elements have been completed.

1. **Capital Funding Plan.** Identifies the total capital improvement plan (CIP) obligations of the planning period. The plan defines a strategy for funding the CIP, including an analysis of available resources from rate revenues, existing reserves, connection charge revenues, debt financing, and any special resources that may be readily available (e.g., grants, developer contributions, etc.). The capital funding plan impacts the financial plan through the use of debt financing (resulting in annual debt service) and the assumed rate revenue made available for capital funding.
2. **Financial Forecast.** Identifies future annual non-capital costs associated with the operation, maintenance, and administration of the water system. Included in the financial plan is a reserve analysis that forecasts cash flow and fund balance activity, along with testing for satisfaction of actual or recommended minimum fund balance policies. The financial plan ultimately evaluates the sufficiency of utility revenues in meeting all obligations, including cash uses such as operating expenses, debt service, capital outlays, and reserve contributions, as well as any coverage requirements associated with long-term debt. The plan also identifies the future adjustments required to fully fund all utility obligations in the planning period.

9.3.1 Capital Funding Plan

To properly evaluate future capital funding needs, capital costs were escalated by 3.00 percent annually to the year of planned spending. The CIP developed for this WSP identifies \$143.3M in escalated project costs over the 11-year planning horizon from 2024-2034. The 20-year period, through 2043, includes \$262.6M in total escalated project costs.

A summary of the 11-year and 20-year CIPs are shown in **Table 9-3**. As shown, each year has varied capital cost obligations depending on construction schedules and infrastructure planning needs.

Table 9-3 | 11-Year and 20-Year CIPs

Year	Unescalated \$	Escalated \$
2024	\$ 15,368,740	\$ 15,368,740
2025	13,020,848	13,411,473
2026	12,897,298	13,682,743
2027	10,674,810	11,664,653
2028	11,364,810	12,791,194
2029	10,214,810	11,841,764
2030	8,937,250	10,671,544
2031	10,647,750	13,095,389
2032	11,544,961	14,624,811
2033	9,369,039	12,224,471
2034	10,367,636	13,933,236
11-Year Total	\$ 124,407,951	\$ 143,310,019
2035 - 2043	77,003,728	119,267,070
20-Year Total	\$ 201,411,679	\$ 262,577,089

Table 9-4 provides more detail for the 11-year CIP.

Table 9-4 | 11-Year CIP (Escalated \$)

Project	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Active Projects (In Design or Construction)											
104th Park Development (104th to 102nd Water Main Loop)	\$ 350,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
104th Avenue SE PRV Replacement	390,475										
C St SW Preservation	901,038	928,069									
Coal Creek Springs Transmission Main Replacement	4,450,422										
D St SE and 23rd Street SE Storm Improvements	2,285,677										
Well 4 Facility Improvements	884,822										
Well 4 Electrical Improvements	200,000	875,500									
112th Pl SE Water Main Replacement	255,000	1,900,350									
Auburn Way South - Hemlock St SE to Poplar St SE		2,469,940									
Garden Avenue Realignment	699,797										
M Street NE Widening	37,000		339,488								
R Street SE Widening		103,000	1,763,734								
R St SE and 21st St SE Roundabout	61,897	497,490									
R St SE Preservation - 33rd St SE to 37th St SE	301,850										
Lea Hill Road/104th Ave SE Roundabout	100,000		159,135	655,636							
Fulmer Treatment Facility VFD Replacements	175,000										
Reservoirs 4 and 8 Seismic Rehabilitation	1,433,871										
12th St SE and Auburn Way South Water R&R	318,000	327,540									
2025 Local Street Preservation	65,000	679,800									
2026 Local Street Preservation	50,000	154,500	926,166								
Coal Creek Springs Flowmeter Replacement	375,017										
Comprehensive Water System Plan Update - 2024	250,000										
Reservoir 2 Valves	68,750	2,266,000									
Supply											
Cascade Water Alliance Water Purchase	934,810	962,854	991,740	1,021,492	1,052,137	1,083,701					
Water Resources Protection Program	87,700	61,800	63,654	65,564	67,531	69,556	71,643	73,792	76,006	78,286	80,635
Rehabilitate & Clean Wells 2 and 6 (3-year Cycle)		257,500			281,377			307,468			335,979
Well Inspection and Redevelopment Program			222,789	229,473							
Coal Creek Springs Rehabilitation	75,614			546,364	1,125,509	2,318,548	2,193,474				
Coal Creek Springs Chlorination Building Replacement							621,206	1,919,526			
Howard Road CCTF Expansion									570,047	1,304,773	
On-Site Chlorine Generation Systems (OSEC) at Wells 1 and 4			106,090	191,227							
Fulmer CCTF Replace On-Site Chlorine Generation System (OSEC)			159,135	382,454							
Well 5/5A Upgrades			1,007,855	289,573	1,688,263						
Well 7 Treatment Phase 1							1,791,078	3,193,982	7,600,620		
Well 7 Back-Up Power									525,660	2,165,974	
Well 7 Treatment Phase 2										2,158,095	5,106,882
Well 2 Replacement							477,621	1,918,603			
Algona Well 1 Study	50,000										
Storage											
Reservoir Repair and Replacements	192,000	61,800	63,654	65,564	67,531	69,556	71,643	73,792	76,006	78,286	80,635
Reservoir Painting (10-year Cycle)		257,500	1,591,350								
Academy PRV Project				513,582							
Reservoir Capital Improvements				513,582							
Valley Service Area Reservoir No. 3	50,000										
Pump Stations											
Intertie Booster Pump Station Improvements	75,000	257,500	2,121,800								
Lea Hill Pump Station Replacement				835,936	3,376,526	3,014,112					
Braunwood Pump Station Mechanical Upgrades	40,000										94,074
Game Farm Park Pump Station Mechanical Upgrades											94,074
Distribution System											
Annual Distribution System Improvements Program		412,000	2,652,250	2,731,818	2,813,772	2,898,185	2,985,131	3,074,685	3,166,925	3,261,933	4,801,325
Street Utility Improvements		619,030	654,575	1,420,545	1,463,161	1,507,056	1,552,268	1,598,836	1,646,801	1,696,205	1,747,091
Water Repair & Replacements		154,500	477,405	655,636	675,305	695,564	716,431	737,924	760,062	782,864	873,546
Water Trench Patches Program	160,000	164,800	169,744	174,836	180,081	185,484	191,048	196,780	202,683	208,764	215,027
West Hill Springs Transmission Main Replacement	50,000		212,180	1,257,729							
Lea Hill 648 Zoning Adjustment				113,644							
General											
Comprehensive Water System Plan Update - 2034										489,290	503,969
	\$15,368,740	\$13,411,473	\$13,682,743	\$11,664,653	\$12,791,194	\$11,841,764	\$10,671,544	\$13,095,389	\$14,624,811	\$12,224,471	\$13,933,236

9.4 Available Funding Assistance and Financing Resources

9.4.1 City Resources

Resources appropriate for funding capital needs include accumulated cash in the capital fund, rate revenues designated for capital spending purposes, developer contributions, and capital-related charges such as system development charges. The first two resources will be discussed in the **Fiscal Policies** section of the **Financial Forecast**. Capital-related charges are discussed below.

9.4.1.1 System Development Charges

A connection charge such as the City's system development charge (SDC) refers to a one-time charge imposed on new customers as a condition of connecting to the water system. The purpose of the SDC is two-fold: 1) to promote equity between new and existing customers; and 2) to provide a source of revenue to fund capital projects necessary for meeting growth. This revenue can only be used to fund utility capital projects or to pay debt service incurred to finance those projects. In the absence of a connection charge, growth-related capital costs would be borne in large part by existing customers. In 2024, the City charged all new customers an SDC of \$9,553 per meter capacity equivalent (MCE). MCEs are defined by the American Water Works Association and represent the maximum safe operating flow capacity in gallons per minute, relative to the base meter size.

9.4.1.2 Local Facilities Charges

While a connection charge is the manner in which new customers pay their share of system investment costs, local facilities charge funding is used to pay the costs of local facilities that connect each property to the system's infrastructure. Local facilities funding is often overlooked in rate forecasting because it is funded upfront by either connecting customers and developers, or through an assessment to properties, but never from rates.

A number of mechanisms can be considered toward funding local facilities. One of the following scenarios typically occurs: (a) the utility charges a connection fee based on the cost of the local facilities (under the same authority as the facilities assessment fee); (b) a developer funds an extension of the system to its development and turns those facilities over to the utility (contributed capital); or (c) a local assessment is set up called a Utility Local Improvement District (ULID/LID) or a Local Utility District (LUD), which collects tax revenue from benefited properties.

A local facilities charge (LFC) is a variation of the connection charge. It is a city-imposed charge to recover the cost related to service extension to local properties. Often called a front-footage charge and imposed on the basis of footage of the main "fronting" a particular property, it is usually implemented as a reimbursement mechanism to a city for the cost of a local facility that directly serves a property. It is a form of a connection charge and thus can accumulate up to 10 years of interest. It typically applies in instances when no developer-installed facilities are needed through developer extension due to the prior existence of available mains already serving the developing property.

The developer extension is a requirement that a developer install on-site and sometimes off-site improvements as a condition of extending service. These are in addition to the connection charge required and must be built to City standards. Part of the agreement between the City and the developer planning to extend service might include a latecomer agreement (also called payback agreements), resulting in a latecomer charge to new connections for the developer extension.

Latecomer charges are a variation of developer extensions, whereby new customers connecting to a developer-installed improvement make a payment to the City based on their share of the developer's cost. The City passes this charge on to the developer who installed the facilities. As part of the developer extension process, this defines the allocation of costs and records latecomer obligations on the title of affected properties. No interest is allowed, and the reimbursement agreement cannot exceed 20 years in duration.

ULID/LID is another mechanism for funding infrastructure that assesses benefited properties based on the special benefit received by the construction of specific facilities. Most often used for local facilities, some

ULIDs also recover related general facilities costs. Substantial legal and procedural requirements can make this a relatively expensive process, and there are mechanisms by which a ULID can be rejected.

9.4.2 Outside Resources

This section outlines various grant, loan, and bond opportunities available to the City through federal and state agencies to fund the CIP identified in the WSP.

9.4.2.1 Grants and Low-Cost Loans

Historically, federal and state grant programs were available to local utilities for capital funding assistance. However, these assistance programs have been mostly eliminated, substantially reduced in scope and amount, or replaced by loan programs. Remaining grant programs are generally lightly funded and heavily subscribed. Nonetheless, the benefit of low-interest loans makes the effort of applying worthwhile.

The State of Washington’s Department of Commerce maintains a document currently entitled “*Funding Programs for Drinking Water and Wastewater Projects; Updated 3-5-2024*”, which contains details on government programs, eligibility requirements, and contact information, should the City wish to inquire about program offerings and eligibility requirements.

9.4.2.2 Bond Financing

General Obligation Bonds – General obligation (G.O.) bonds are bonds secured by the full faith and credit of the issuing agency, committing all available tax and revenue resources to debt repayment. With this high level of commitment, G.O. bonds have relatively low interest rates and few financial restrictions. However, the authority to issue G.O. bonds is restricted in terms of the amount and use of the funds, as defined by the Washington constitution and statute. Specifically, the amount of debt that can be issued is linked to assessed valuation.

Revised Code of Washington (RCW) 39.36.020 states:

(2)(a)(ii) Counties, cities, and towns are limited to an indebtedness amount not exceeding one and one half percent of the value of the taxable property in such counties, cities, or towns without the assent of three-fifths of the voters therein voting at an election held for that purpose.

(b) In cases requiring such assent counties, cities, towns, and public hospital districts are limited to a total indebtedness of two and one-half percent of the value of the taxable property therein.

While bonding capacity can limit the availability of G.O. bonds for utility purposes, these can sometimes play a valuable role in project financing. A utility rate savings may be realized through two avenues: the lower interest rate and related bond costs, and the extension of repayment obligation to all tax-paying properties (not just developed properties) through the authorization of an ad valorem property tax levy.

Revenue Bonds – Revenue bonds are commonly used to fund utility capital improvements. The debt is secured by the revenues of the issuing utility. With this limited commitment, revenue bonds typically bear higher interest rates than G.O. bonds and require security conditions related to the maintenance of dedicated reserves (a bond reserve) and financial performance (added bond debt service coverage). The City agrees to satisfy these requirements by resolution as a condition of bond sale.

Revenue bonds can be issued in Washington without a public vote. There is no bonding limit, except perhaps the practical limit of the utility's ability to generate sufficient revenue to repay the debt and provide coverage. In some cases, poor credit might make issuing revenue bonds problematic.

9.4.3 Capital Financing Strategy

An ideal capital financing strategy would include the use of grants and low-cost loans when debt issuance is required. However, these resources are very limited and competitive in nature and do not provide a reliable source of funding for planning purposes. It is recommended that the City pursue these funding avenues but assume revenue bond financing to meet the needs which can't be met by available cash resources. The capital financing strategy developed to fund the CIP identified in this WSP assumes the following funding resources:

- Accumulated cash reserves,
- Transfers of excess cash (over minimum balance targets) from the Operating Fund,
- System development charge revenue,
- Interest earned on Capital Fund balances,
- Grant proceeds, and
- Revenue bond financing.

The cash resources described above are anticipated to fund 58.1 percent of the 11-year CIP and 56.4 percent of the 20-year CIP. The remaining funding is assumed to be from new debt obligations of \$69.1M in the next 11-year planning period and an additional \$45.3M between 2034-2043. **Table 9-5** presents the 11-year and 20-year capital financing strategy.

Table 9-5 | 11-Year and 20-Year Capital Financing Strategy

Year	Capital Expenditures Escalated	System Development Charge Revenue	Grant Funding	Revenue Bond Proceeds	Cash / Reserve Funding	Total Financial Resources
2024	\$ 15,368,740	\$ 325,000	\$ 2,717,531		\$ 12,326,209	\$ 15,368,740
2025	13,411,473	452,813		12,958,660	-	13,411,473
2026	13,682,743	468,497		3,541,340	9,672,907	13,682,743
2027	11,664,653	484,723		11,179,930	-	11,664,653
2028	12,791,194	501,511		6,320,070	5,969,613	12,791,194
2029	11,841,764	518,881		10,400,000	922,883	11,841,764
2030	10,671,544	536,853		-	10,134,691	10,671,544
2031	13,095,389	555,446		12,539,943	-	13,095,389
2032	14,624,811	574,684		2,260,057	11,790,070	14,624,811
2033	12,224,471	594,589		9,900,000	1,729,882	12,224,471
2034	13,933,236	615,182			13,318,054	13,933,236
Subtotal	\$ 143,310,019	\$ 5,628,179	\$ 2,717,531	\$ 69,100,000	\$ 65,864,309	\$ 143,310,019
2035 - 2043	119,267,070	6,589,599		45,300,000	67,377,472	119,267,070
Total	\$ 262,577,089	\$ 12,217,778	\$ 2,717,531	\$ 114,400,000	\$ 133,241,780	\$ 262,577,089

9.5 Financial Forecast

The financial forecast, or revenue requirement analysis, forecasts the amount of annual revenue that needs to be generated by user rates. The analysis incorporates operating revenues, O&M expenses, debt service payments, rate-funded capital needs, and any other identified revenues or expenses related to operations. The objective of the financial forecast is to evaluate the sufficiency of the current level of rates. In addition

to annual operating costs, the revenue needs also include debt covenant requirements and specific fiscal policies and financial goals of the City.

For this analysis, two revenue sufficiency tests have been developed to reflect the financial goals and constraints of the City: cash needs must be met; and debt coverage requirements must be realized. In order to operate successfully with respect to these goals, both tests of revenue sufficiency must be met.

Cash Test – The cash flow test identifies all known cash requirements for the City in each year of the planning period. Typically, these include O&M expenses, debt service payments, rate-funded system reinvestment funding or directly funded capital outlays, and any additions to specified reserve balances. The total annual cash needs of the City are then compared to projected cash revenues using the current rate structure. Any projected revenue shortfalls are identified, and the rate increases necessary to make up the shortfalls are established.

Coverage Test – The coverage test is based on a commitment made by the City when issuing revenue bonds and some other forms of long-term debt. For the purposes of this analysis, revenue bond debt is assumed for any needed debt issuance. As a security condition of issuance, the City would be required per covenant to agree that the revenue bond debt would have a higher priority for payment (a senior lien) compared to most other expenditures; the only outlays with a higher lien are O&M expenses. Debt service coverage is expressed as a multiplier of the annual revenue bond debt service payment. For example, a 1.00 coverage factor would imply that no additional cushion is required. A 1.25 coverage factor means revenue must be sufficient to pay O&M expenses, annual revenue bond debt service payments, and an additional 25.0 percent of annual revenue bond debt service payments. The excess cash flow derived from the added coverage, if any, can be used for any purpose, including funding capital projects. Targeting a higher coverage factor can help the City achieve a better credit rating and provide lower interest rates for future debt issues.

9.5.1 Current Financial Structure

The City maintains a fund structure and implements financial policies that target management of a financially viable and fiscally responsible water system.

9.5.1.1 Fiscal Policies

A summary of the key financial policies employed by the City, as well as those recommended and incorporated in the financial program, are discussed below.

Operating Reserve – Operating reserves are designed to provide a liquidity cushion to ensure that adequate cash working capital will be maintained to deal with significant cash balance fluctuations, such as seasonal fluctuations in billings and receipts, unanticipated cash expenses, or lower than expected revenue collections. Like other types of reserves, operating reserves also serve another purpose: they help smooth rate increases over time. Target funding levels for an operating reserve are generally expressed as a certain number of days of O&M expenses, with the minimum requirement varying with the expected revenue volatility. Industry practice for utility operating reserves ranges from 30 days (8.0 percent) to 120 days (33.0 percent) of O&M expenses, with the lower end more appropriate for utilities with stable revenue streams and the higher end more appropriate for utilities with significant seasonal or consumption-based fluctuations. The City's current goal is to maintain a minimum balance in the Operating Fund equal to 90 days of O&M expenses for working capital.

Capital Reserve – A capital contingency reserve is an amount of cash set aside in case of an emergency should a piece of equipment or a portion of the utility’s infrastructure fail unexpectedly. The reserve also could be used for other unanticipated capital needs, including capital project cost overruns. Industry practices range from maintaining a balance equal to 1.0 to 2.0 percent of fixed assets, an amount equal to a 5-year rolling average of CIP costs, or an amount determined sufficient to fund equipment failure (other than catastrophic failure). The final target level should balance industry practices with the risk level of the City.

This financial plan targets a minimum balance in the water utility capital fund equal to 1.0 percent of fixed assets.

System Reinvestment – System reinvestment funding promotes system integrity through ongoing repair and replacement of system infrastructure. Ideally, a detailed asset management plan would guide the level of rate funded system reinvestment, however, in absence of this level of effort, annual depreciation expense is commonly used as a measure of the decline in asset value associated with routine use of the system. Particularly for utilities that do not already have an explicit system reinvestment policy in place, implementing a funding level based on full depreciation expense could significantly impact rates. An alternative benchmark is annual depreciation expense net of debt principal payments on outstanding debt. This approach recognizes that customers are still paying for certain assets through the debt component of their rate and intends to avoid simultaneously charging customers for an asset and its future replacement. The specific benchmark used to set system reinvestment funding targets is a matter of policy that must balance various objectives, including managing rate impacts, keeping long-term costs down, and promoting “generational equity” (i.e., not excessively burdening current customers with paying for facilities that will serve a larger group of customers in the future).

The City is currently phasing in system reinvestment funding, aiming to reach 100 percent of annual depreciation levels by 2030. With this phase-in strategy in place, the City is forecast to fund an average of \$4.1 million in capital costs annually through dedicated rate revenues within the 11-year forecast period.

Debt Management – It is prudent to consider policies related to debt management as part of a broader utility financial policy structure. Debt management policies should be evaluated and formalized, including the level of acceptable outstanding debt, debt repayment, bond coverage, and total debt coverage targets. The City has three outstanding water revenue bonds, a Public Works Trust fund loan, and two other low interest loans. This forecast meets or exceeds the required revenue bond debt service coverage of 1.25.

9.5.1.2 Financial Forecast

The financial forecast is primarily based upon the City’s budget through 2024 and takes into consideration other key factors and assumptions needed to develop a complete portrait of the City’s annual water utility financial obligations. The following is a list of the key revenue and expense factors and assumptions used to develop the financial forecast.

- **Growth** – Rate revenue is escalated utilizing a 0.45 percent growth rate developed based on actual historical trends at the City.
- **Revenue** – The City has two general revenue sources: 1) water service charges (rate revenue); and 2) miscellaneous (non-rate) revenue. In the event of a forecasted annual shortfall, rate revenue can be increased to meet the annual revenue requirement. For the purpose of this financial forecast, rate revenues are forecasted to increase with customer growth. Non-rate revenues are

held constant throughout the forecast period, with the exception of interest earnings which are calculated based on projected balances and assumed investment rates.

- **System Development Charge Revenue** – the existing system development charges are applied to the projected new connections to forecast revenue. Connection charges are forecast to generate an average of \$512,000 annually from 2024-2034. This equates to an average of 46 new MCEs per year. Connection charge revenue is directed towards annual capital needs.
- **Expenses** – O&M expense projections are based on the City’s budget through 2024 with general cost inflation increases of 3.0 percent, labor cost inflation of 5.0 percent for 2025 and 2026, decreasing to 3.0 percent thereafter and benefit cost inflation increases of 12.50 percent for 2025 and 2026, decreasing to 5.5 percent per year thereafter. Budget figures were used for taxes in 2024. Future taxes are calculated based on forecasted revenues and prevailing tax rates.
 - **Facilities GO Bond** - In order to construct a new facility for Maintenance and Operations for the City, the water utility will fund part of a General Obligation Bond totaling approximately \$39.1 million. Beginning in 2025, the water utility’s proportionate share of the bond is forecasted at \$333,000 annually for the remainder of the twenty-year forecast.
- **Existing Debt** – The water utility has six (6) outstanding debt issues: three (3) revenue bonds, one (1) Public Works Trust Fund (PWTF) loan and two (2) Drinking Water State Revolving Fund (DWSRF) loans. Total annual existing debt service obligations begin 2024 at \$2.7 million, decreasing to \$1.1 million by 2034 as four (4) of the six (6) loans are fully repaid.
- **Future Debt** – The capital financial strategy developed for this WSP forecasts the need for \$69.1M in new debt proceeds in five (5) separate instances throughout the eleven-year forecast. The analysis performed assumes all new debt is through revenue bond financing. Annual new debt service obligations are forecasted to begin in 2025 at \$1.5 million increasing to \$6.1 million by 2034.
- **Transfers to Capital** - Operating fund balance above the minimum requirement is assumed to be available to fund capital projects and projected to be transferred to the Capital Fund each year, if needed. In total, the utility is forecast to fund \$17.9 million in capital projects from excess operating fund cash within the 11-year forecast period.

Although the financial plan is completed through 2043, the rate strategy focuses on the shorter-term planning period of 2024 through 2034. It is recommended that the City revisit the proposed rates every 3 to 4 years to ensure that the rate projections developed remain adequate. Any significant changes should be incorporated into the financial plan and future rates should be adjusted as needed.

Table 9-6, following, summarizes the annual revenue requirements based on the forecast of revenues, expenditures, fund balances, and fiscal policies.

Table 9-6 | 11-Year Financial Forecast

Revenue Requirement	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Revenues											
Rate Revenues Under Existing Rates	\$ 18,398,987	\$ 18,480,409	\$ 18,562,210	\$ 18,644,392	\$ 18,726,956	\$ 18,809,906	\$ 18,893,241	\$ 18,976,964	\$ 19,061,078	\$ 19,145,583	\$ 19,230,482
Non-Rate Revenues	711,618	995,023	921,087	742,167	760,542	763,594	775,863	779,012	795,263	798,519	810,558
Total Revenues	\$ 19,110,605	\$ 19,475,432	\$ 19,483,297	\$ 19,386,559	\$ 19,487,499	\$ 19,573,500	\$ 19,669,104	\$ 19,755,976	\$ 19,856,341	\$ 19,944,102	\$ 20,041,040
Expenses											
Cash Operating Expenses	\$ 14,490,240	\$ 15,195,624	\$ 15,775,495	\$ 16,147,464	\$ 16,560,290	\$ 16,986,418	\$ 17,429,740	\$ 17,888,499	\$ 18,366,342	\$ 18,860,547	\$ 19,374,767
Existing Debt Service	2,674,248	2,671,361	2,665,106	2,615,447	2,611,734	2,601,528	2,598,336	1,759,410	1,759,292	1,090,490	1,089,760
New Debt Service	-	1,455,336	1,455,336	2,998,874	2,998,874	3,916,177	3,916,177	5,221,569	5,221,569	6,094,771	6,094,771
Rate Funded System Reinvestment	1,738,857	1,037,921	2,016,114	1,877,607	3,393,539	4,213,598	5,626,454	5,888,362	6,180,858	6,425,348	6,704,012
Total Expenses	\$ 18,903,345	\$ 20,360,242	\$ 21,912,050	\$ 23,639,392	\$ 25,564,438	\$ 27,717,721	\$ 29,570,707	\$ 30,757,840	\$ 31,528,062	\$ 32,471,155	\$ 33,263,310
Total Surplus (Deficiency)	\$ 207,259	\$ (884,810)	\$ (2,428,754)	\$ (4,252,833)	\$ (6,076,939)	\$ (8,144,221)	\$ (9,901,603)	\$ (11,001,863)	\$ (11,671,720)	\$ (12,527,053)	\$ (13,222,271)
Annual Rate Adjustment	0.00%	7.50%	9.50%	9.50%	9.50%	9.50%	9.50%	3.00%	3.00%	3.00%	3.00%
Cumulative Annual Rate Adjustment	0.00%	7.50%	17.71%	28.90%	41.14%	54.55%	69.23%	74.31%	79.54%	84.92%	90.47%
Rate Revenues After Rate Increase	\$ 18,398,987	\$ 19,866,440	\$ 21,850,041	\$ 24,031,724	\$ 26,431,269	\$ 29,070,437	\$ 31,973,157	\$ 33,078,288	\$ 34,221,651	\$ 35,404,570	\$ 36,628,414
Additional Taxes from Rate Increase	-	229,097	543,446	890,472	1,273,446	1,695,963	2,161,979	2,330,808	2,505,891	2,687,448	2,875,704
Net Cash Flow After Rate Increase	\$ 207,259	\$ 272,124	\$ 315,632	\$ 244,027	\$ 353,928	\$ 420,347	\$ 1,016,334	\$ 768,653	\$ 982,962	\$ 1,044,486	\$ 1,299,958
Coverage After Rate Increases	3.00	2.10	2.40	1.91	2.24	2.19	2.52	2.41	2.50	2.43	2.51

The financial forecast indicates that at existing rate levels the utility will become deficient in 2025 as growth in expenses outpaces growth in revenues and the utility takes on additional debt obligations to fund capital infrastructure investment. The City has adopted a 7.50 percent increase for 2025, to resolve the remaining projected deficiency, rates will need to increase by 9.50 percent annually from 2026 through 2030, before decreasing to 3.00 percent annually through 2034.

9.5.1.3 City Funds and Reserves

Table 9-7 shows a summary of the projected Operating Fund and Capital Fund ending balances through 2034 based on the rate forecasts presented above. The Operating Fund is maintained above 90 days of O&M expenses. The Capital Fund balance meets or exceeds the minimum target of 1 percent of fixed assets in most years of the study timeframe with the exception of 2026, 2028 and 2030 where balances fall below target. Fund balances are rebuilt and meet or exceed target balances by the end of the eleven-year timeframe.

Table 9-7 | Ending Cash Balance Summary

Ending Fund Balances	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Operating Fund	\$ 8,988,743	\$ 9,260,867	\$ 3,943,874	\$ 4,036,866	\$ 4,140,073	\$ 4,246,604	\$ 4,357,435	\$ 4,472,125	\$ 4,591,586	\$ 4,715,137	\$ 4,843,692
Capital Fund	2,019,201	6,659,039	1,226,711	9,587,690	1,038,144	4,653,056	1,096,853	9,910,203	3,003,538	8,649,973	3,293,834
Total	\$ 11,007,944	\$ 15,919,905	\$ 5,170,585	\$ 13,624,556	\$ 5,178,217	\$ 8,899,660	\$ 5,454,288	\$ 14,382,328	\$ 7,595,123	\$ 13,365,110	\$ 8,137,526

9.6 Current and Projected Rates

9.6.1 Current Rates

The existing water rates are composed of a fixed monthly charge that varies by meter size and a variable consumption charge per hundred cubic feet (CCF) for all water usage. While fixed charges are consistent across customer classes for all meter sizes except one inch, usage charges are different for each customer class. Consumption for the single family class is divided into three escalating pricing tiers that are applied year-round. This type of inclining tier structure is designed to discourage discretionary usage of water and encourage conservation. All other customers are charged a uniform rate for all consumption used. **Table 9-8** shows the existing City of Auburn water system rate schedule.

Table 9-8 | Existing Schedule of Rates

Description	2024 Existing
Monthly Fixed Charges (All Classes)	
3/4"	\$ 21.08
1" - Single Family	21.08
1" - All Other Classes	23.66
1 1/2"	25.76
2"	29.69
3"	57.11
4"	71.66
6"	91.57
8"	118.30
10"	167.97
Volume Charges per CCF	
Single Family	
0-7 CCF	\$ 4.18
7-15 CCF	5.11
Greater Than 15 CCF	5.81
Multi-Family	
Commercial	\$ 5.00
Manufacturing / Industrial	5.27
Schools	5.15
Municipal	5.61
Irrigation	5.19
	6.94

9.6.2 Projected Rates

The financial forecast discussed above indicates the need for annual rate adjustments to satisfy all forecasted financial obligations. The City has adopted a 7.50 percent increase for 2025, with annual 9.50 percent increases forecasted from 2026 through 2030, and 3.00 percent increases from 2031 to 2034. **Table 9-9** shows the projected rates with increases applied uniformly to the water fixed and volume components for all classes. A more detailed rate study that will analyze the projected increases beyond the current adopted rates will be conducted in 2025.

Table 9-9 | Proposed Schedule of Rates

Description	Existing					Proposed						
	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	
Monthly Fixed Charges (All Classes)												
3/4"	\$ 21.08	\$ 22.66	\$ 24.81	\$ 27.17	\$ 29.75	\$ 32.58	\$ 35.68	\$ 36.75	\$ 37.85	\$ 38.99	\$ 40.16	
1" - Single Family	21.08	22.66	24.81	27.17	29.75	32.58	35.68	36.75	37.85	38.99	40.16	
1" - All Other Classes	23.66	25.43	27.85	30.50	33.40	36.57	40.04	41.24	42.48	43.75	45.06	
1 1/2"	25.76	27.69	30.32	33.20	36.35	39.80	43.58	44.89	46.24	47.63	49.06	
2"	29.69	31.92	34.95	38.27	41.91	45.89	50.25	51.76	53.31	54.91	56.56	
3"	57.11	61.39	67.22	73.61	80.60	88.26	96.64	99.54	102.53	105.61	108.78	
4"	71.66	77.03	84.35	92.36	101.13	110.74	121.26	124.90	128.65	132.51	136.49	
6"	91.57	98.44	107.79	118.03	129.24	141.52	154.96	159.61	164.40	169.33	174.41	
8"	118.30	127.17	139.25	152.48	166.97	182.83	200.20	206.21	212.40	218.77	225.33	
10"	167.97	180.57	197.72	216.50	237.07	259.59	284.25	292.78	301.56	310.61	319.93	
Volume Charges per CCF												
Single Family												
0-7 CCF	\$ 4.18	\$ 4.49	\$ 4.92	\$ 5.39	\$ 5.90	\$ 6.46	\$ 7.07	\$ 7.28	\$ 7.50	\$ 7.73	\$ 7.96	
7-15 CCF	5.11	5.49	6.01	6.58	7.21	7.89	8.64	8.90	9.17	9.45	9.73	
Greater Than 15 CCF	5.81	6.25	6.84	7.49	8.20	8.98	9.83	10.12	10.42	10.73	11.05	
Multi-Family	\$ 5.00	\$ 5.38	\$ 5.89	\$ 6.45	\$ 7.06	\$ 7.73	\$ 8.46	\$ 8.71	\$ 8.97	\$ 9.24	\$ 9.52	
Commercial	5.27	5.67	6.21	6.80	7.45	8.16	8.94	9.21	9.49	9.77	10.06	
Manufacturing / Industrial	5.15	5.54	6.07	6.65	7.28	7.97	8.73	8.99	9.26	9.54	9.83	
Schools	5.61	6.03	6.60	7.23	7.92	8.67	9.49	9.77	10.06	10.36	10.67	
Municipal	5.19	5.58	6.11	6.69	7.33	8.03	8.79	9.05	9.32	9.60	9.89	
Irrigation	6.94	7.46	8.17	8.95	9.80	10.73	11.75	12.10	12.46	12.83	13.21	

9.6.3 Conservation Based Rates

In 2003 the Washington State Legislature passed the Municipal Water Supply Efficiency Requirements Act. The Water Use Efficiency rules went into effect on January 22, 2007 and typically apply to Water System Plans that each jurisdiction is required to develop every six to ten years. The Revised Code of Washington (RCW) outlines the rules of this act, under RCW 70.119.180. In section 4(B), the RCW states that jurisdictions must perform an "evaluation of the feasibility of adopting and implementing water delivery rate structures that encourage water conservation." The City of Auburn currently charges their single family residential customers based on an inclining block rate structure to incentivize water use conservation, therefore no additional evaluation was performed.

9.7 Affordability

The Washington State Department of Health and the Department of Commerce Public Works Board use an affordability index to prioritize low-cost loan awards depending on whether rates exceed 2.5 percent of the median household income for the service area. The average median household income for the City was \$87,406 between 2018 and 2022, expressed in 2022 dollars, according to the U.S. Census Bureau. The 2022 value is escalated based on the actual rate of inflation in 2023 of 4.31 percent and the 3.00 percent inflation rate used in the financial forecast to project the median household income in future years. **Table 9-10**

presents the City's monthly water bill, projected to 2034 and tested against the 2.5 percent monthly affordability threshold.

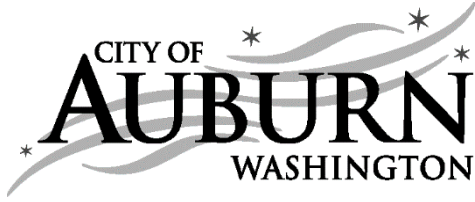
Table 9-10 | Community Affordability Test

Year	Inflation	Median HH Income	2.5% Monthly Threshold	Projected Monthly Bill	% of Median HH Income
2022		\$ 87,406			
2023	4.31%	91,173			
2024	3.00%	93,908	\$ 195.64	\$ 50.34	0.64%
2025	3.00%	96,726	201.51	54.09	0.67%
2026	3.00%	99,627	207.56	59.25	0.71%
2027	3.00%	102,616	213.78	64.90	0.76%
2028	3.00%	105,695	220.20	71.05	0.81%
2029	3.00%	108,866	226.80	77.80	0.86%
2030	3.00%	112,132	233.61	85.17	0.91%
2031	3.00%	115,495	240.62	87.71	0.91%
2032	3.00%	118,960	247.83	90.35	0.91%
2033	3.00%	122,529	255.27	93.10	0.91%
2034	3.00%	126,205	262.93	95.88	0.91%

Applying the 2.5 percent monthly affordability test, the City's rates are forecasted to remain within the indicated affordability range through 2034.

9.8 Conclusion

The results of this analysis indicate that at existing rate levels the utility will be deficient beginning in 2025. To keep pace with expenses and prepare for new debt obligations needed to fund system infrastructure needs, the City has adopted a 7.50 percent rate increase in 2025. Forecasting into the future a 9.5 percent annual rate increase will be required from 2026 through 2030, followed by 3.00 percent increases through 2034. It is recommended that the City regularly review and update the key underlying assumptions that compose the multi-year financial plan to ensure that adequate revenues are collected to meet the City's total financial obligations.



Please click the below link to view the
Amended 2024 Comprehensive Water Plan
Appendices (A-W)

[Appendices \(A-W\)](#)