



City of Longview

1525 Broadway
Longview, WA 98632
www.ci.longview.wa.us

Agenda

Public Works SubCommittee

Wednesday, December 17,
2025

3:00 PM

Training Room
2nd Floor, City Hall

1. **HYBRID MEETING DETAILS**

25-001116 To Join the Webinar: <https://us02web.zoom.us/j/85191031903>
Webinar ID: 851 9103 1903
Or Telephone: (253) 215 8782 or (253) 205 0468

2. **CALL TO ORDER**

3. **ROLL CALL**

4. **APPROVAL OF MINUTES**

25-001117 MINUTES FROM NOVEMBER 19, 2025

5. **NEW BUSINESS**

25-001118 WATER SYSTEM PLAN

25-001119 MT SOLO MAIN WATER MAIN REPAIR

6. **UNFINISHED BUSINESS**

7. **CURRENT PROJECT UPDATES**

8. **PUBLIC COMMENT**

9. **ADJOURNMENT**



Minutes

Public Works SubCommittee

Wednesday, November 19,
2025

3:00 PM

Training Room,
2nd Floor, City Hall

1. **HYBRID MEETING DETAILS**

25-001012 To Join the Webinar: <https://us02web.zoom.us/j/85191031903>
Webinar ID: 851 9103 1903
Or Telephone: (253) 215 8782 or (253) 205 0468

2. **CALL TO ORDER**

The meeting was called to order at 3:06 pm.

3. **ROLL CALL**

Present: Councilmember Ruth Kendall; Councilmember LaFave; Mayor Spencer Boudreau; Public Works Director/Assistant City Manager Chris Collins

Excused: Councilmember Keith Young; Councilmember Erik Halvorson;

Staff: Lisa Wolff, Finance Director; Steve Haubner, Stormwater Manager; Justin Brown, Park & Rec Director; Sam Barham, City Engineer; Morgan Palmer, Engineer; Nancy Vandehey, Admin

4. **APPROVAL OF MINUTES**

25-001013 **MINUTES FROM OCTOBER 15, 2025**

The minutes were approved as presented. This passed unanimously.

5. **NEW BUSINESS**

25-00930 **SPEEDING AND TRAFFIC SAFETY**

Morgan Palmer shared an overview of his topics under Speeding and Traffic Safety. Bike lane issues discussed were parking in bike lanes and ebikes. E-Bikes discussions will be directed to Complete Streets. Morgan pulled up UrbanSDK software to show the new software that we can gather for speed data in the City.

Morgan shared that currently our code does not call out parking in a bike lane as a violation. There are a few areas where it's a greater issue than others. The consensus was that this should go to Complete Streets and then brought to Council.

25-001014 **WATER USE EFFICIENCY PROGRAM**

Chris Collins hoped to bring the completed Water System Plan, but we do not have a water use efficiency program updated policy. The consensus would be to continue with the plan to bring this policy to Council on December 11th and holding a public hearing for input.

6. UNFINISHED BUSINESS

Justin Brown and Chris Collins provided information on the Sennebogen quote that was received and will be presented at Council tomorrow.

Steve Haubner spoke on Resolution 2584 that had an older version attached and approved at Council on November 13th. This was discovered after the meeting. Steve explained the changes between the two versions and why it will be coming back to Council for approval on November 20th.

7. CURRENT PROJECT UPDATES

Sam Barham provided an update on the Mt Solo project. We had the largest boring machine on the west coast here doing this job.

8. PUBLIC COMMENT**9. ADJOURNMENT**

The meeting was adjourned at 3:49 pm.

City of Longview 2025 Water System Plan Update

December 2025

Chris Collins, Public Works Director/ Asst. City Manager

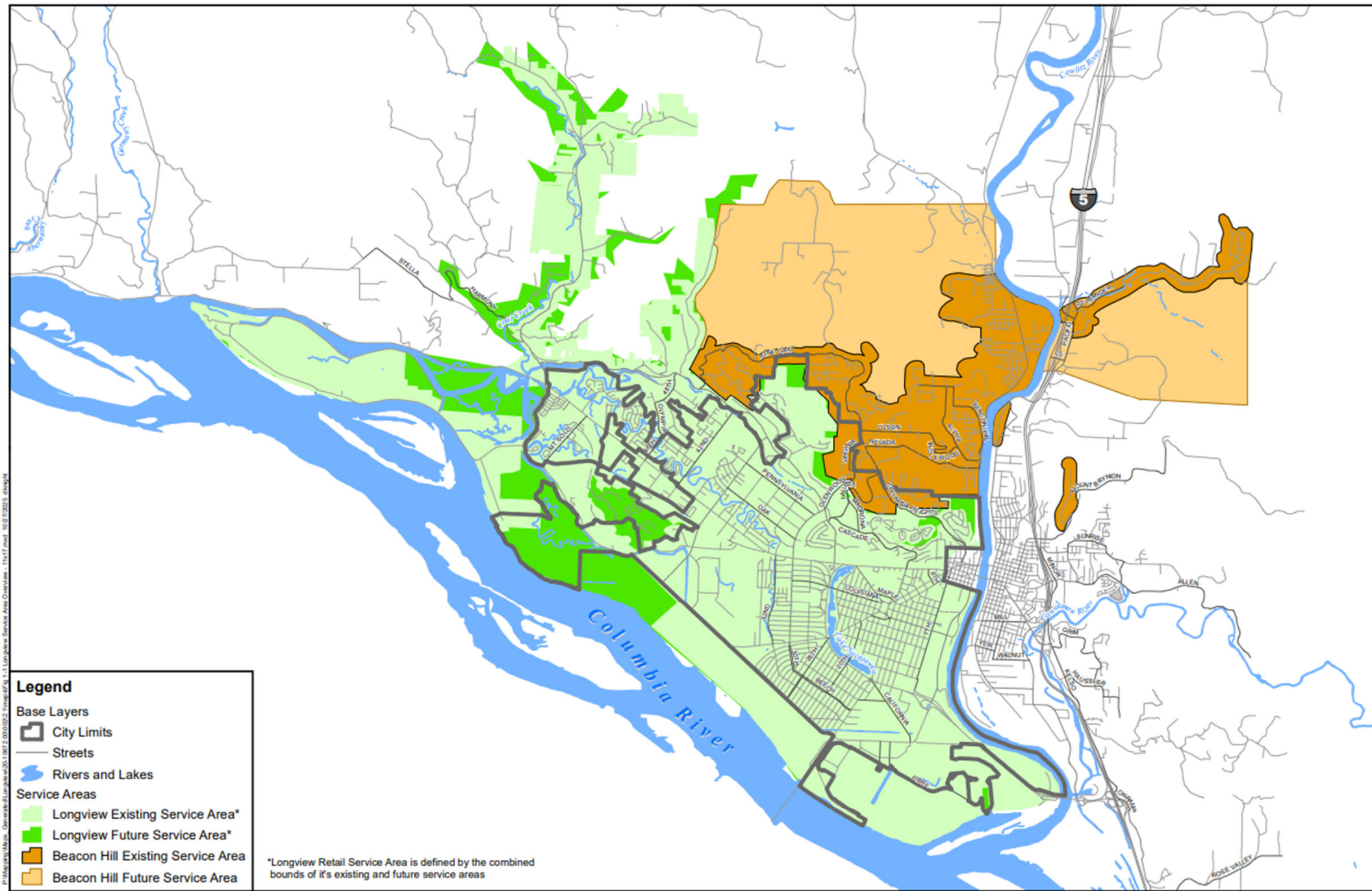
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Purpose of the Water System Plan

- Provides 20-year roadmap
- Required by Washington Administrative Code (WAC) 246-290-100
- Supports regulatory compliance and financial planning
- Updates the 2012 plan

Overview of Longview's Water System

- 32.3 sq miles served
- Groundwater source via Mint Farm Regional Water Treatment Plant
- 213 miles of mains; 8 reservoirs; 6 booster stations



Legend

Base Layers

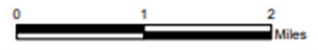
- City Limits
- Streets
- Rivers and Lakes

Service Areas

- Longview Existing Service Area*
- Longview Future Service Area*
- Beacon Hill Existing Service Area
- Beacon Hill Future Service Area

*Longview Retail Service Area is defined by the combined bounds of its existing and future service areas

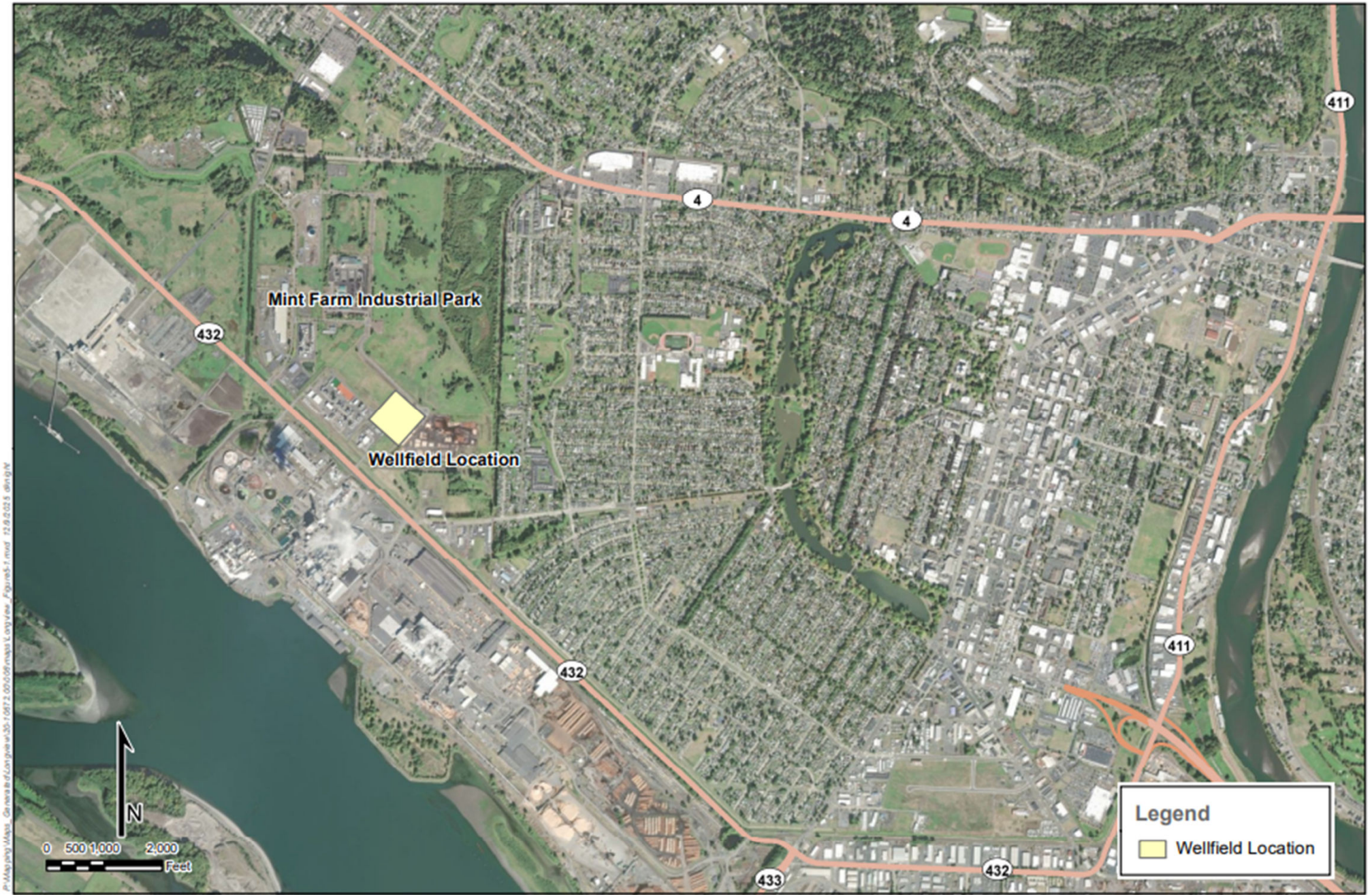
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Mint Farm Water Treatment Plant

- 17.4 MGD current capacity
- 25.3 MGD ultimate capacity
- Media filtration and hypochlorite disinfection

Million Gallons per Day (MGD)



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Wellfield Location Overview
 Comprehensive Water System Plan Update
 Longview, Washington
 December 2025

Figure

5-1

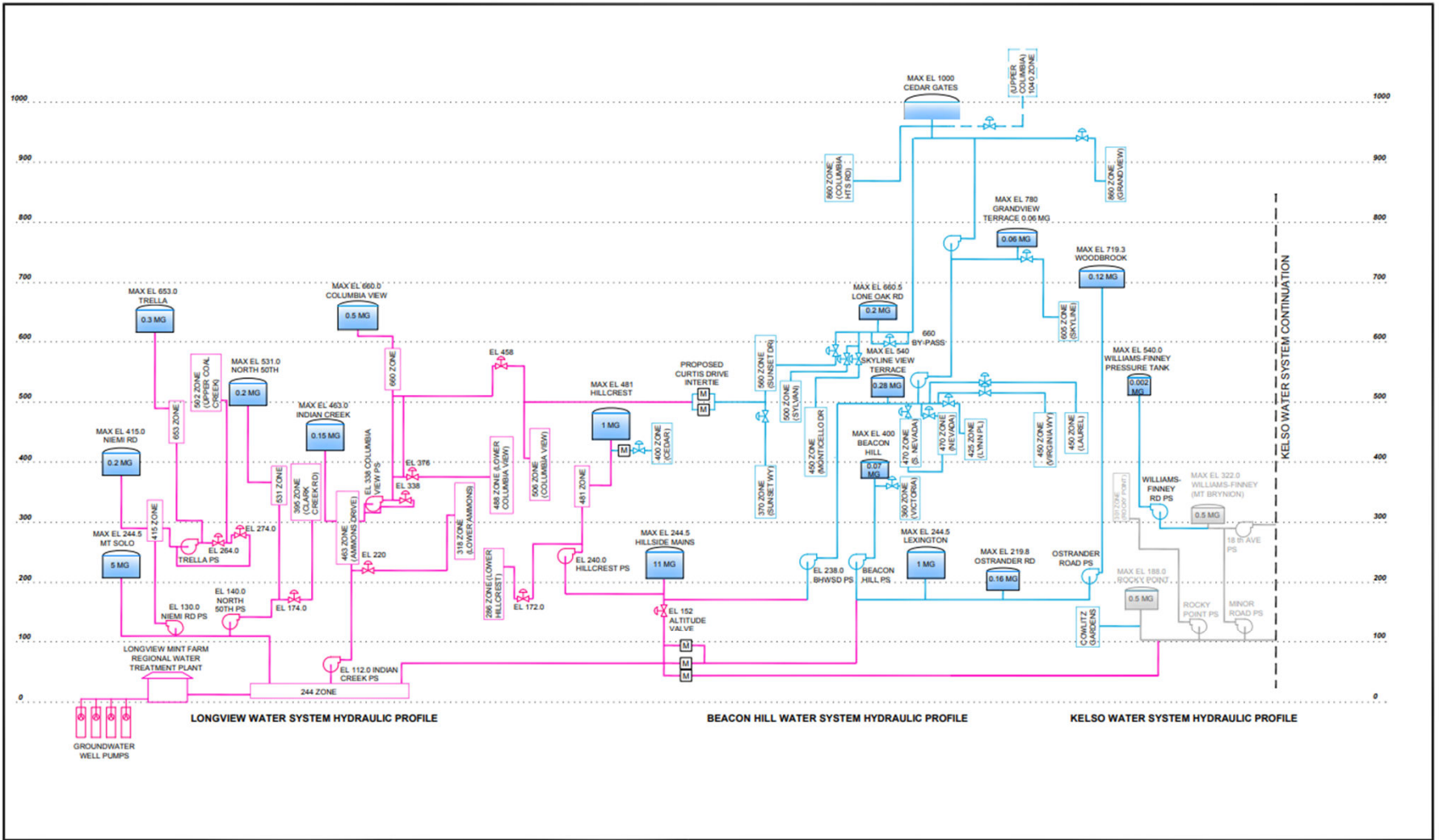
Planning Data & Demand Trends

- Updated demand projections
- 1.72–1.89 billion gallons annually
- Population growth is slower than medium forecast

System Analysis Highlights

- Hydraulic modeling results
- Pressure zone constraints
- Storage and pumping limitations

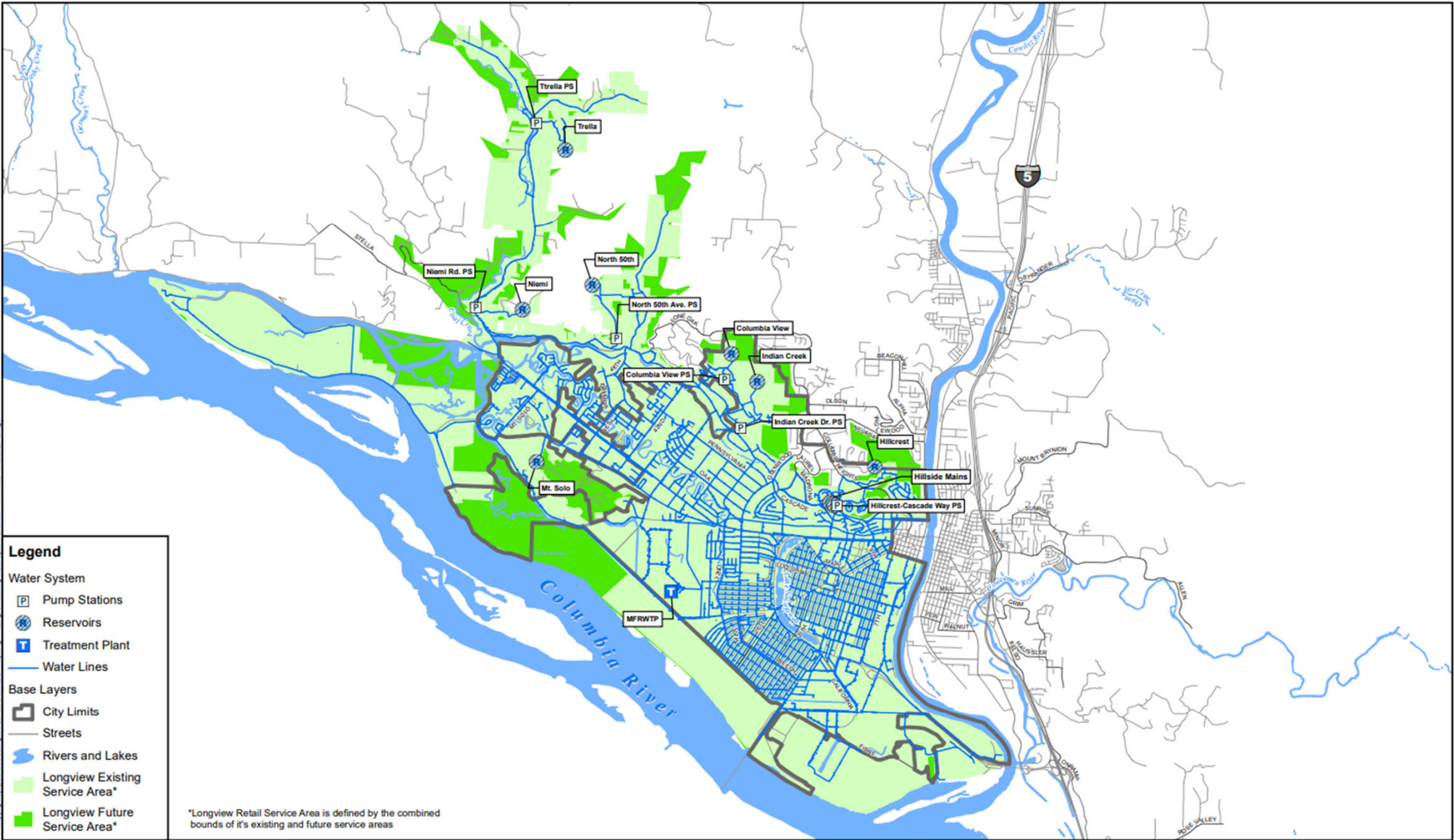
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 Xref Filename: 1



Water System Hydraulic Profile
 Longview WSP
 December 2025

Figure
1-3

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Legend

Water System

- Pump Stations
- Reservoirs
- Treatment Plant
- Water Lines

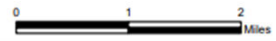
Base Layers

- City Limits
- Streets
- Rivers and Lakes
- Longview Existing Service Area*
- Longview Future Service Area*

*Longview Retail Service Area is defined by the combined bounds of it's existing and future service areas



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Longview Existing Water System Overview
 Comprehensive System Plan Update
 City of Longview, Washington
 December 2025

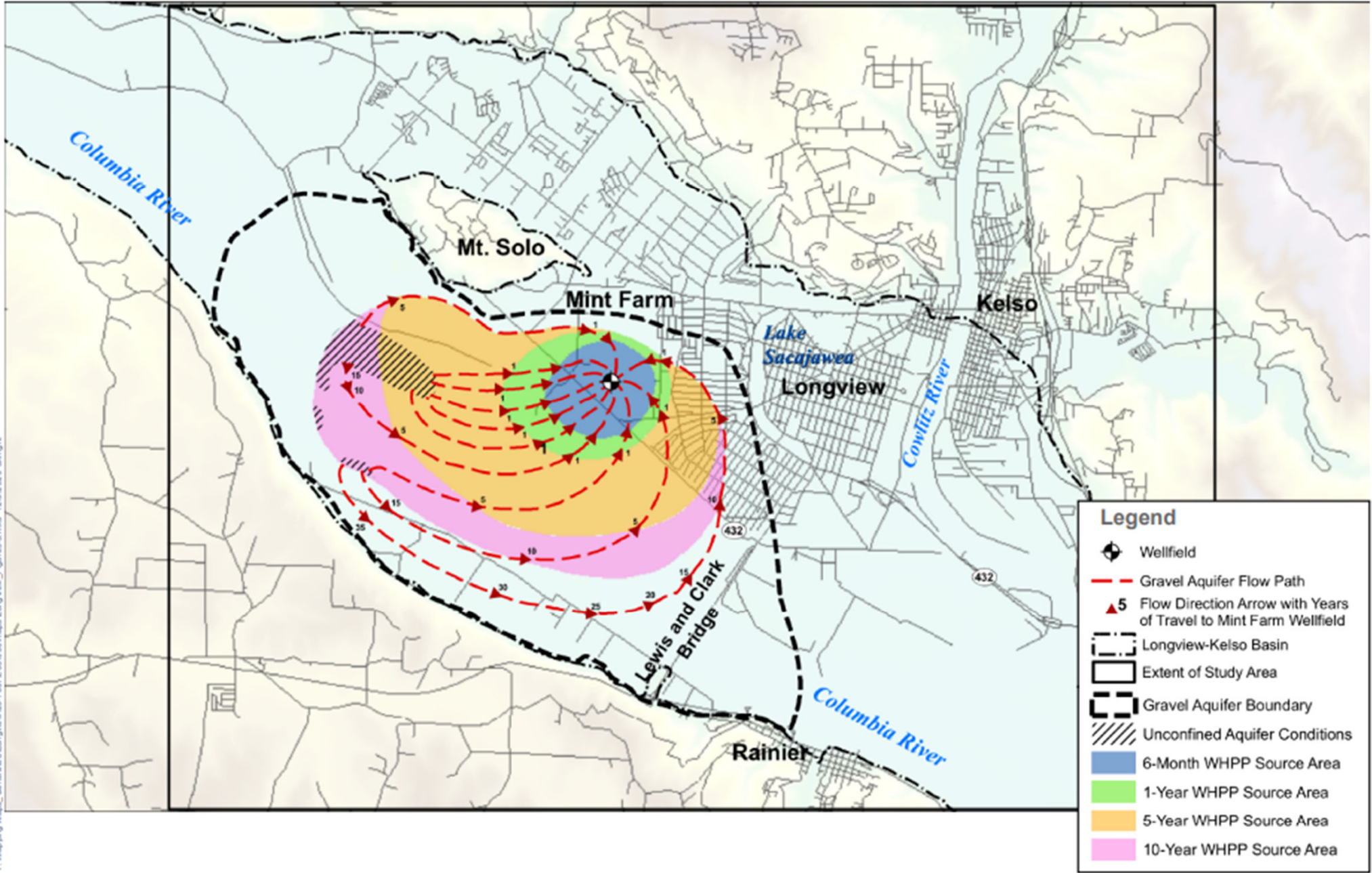
Figure 1-4

Water Use Efficiency (WUE)

- Required by Law
- Full metering
- Leakage between 6–10%

Source Protection

- Wellhead Protection Areas
- Contaminant source inventory
- Groundwater protection strategies



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Source Delineation Area Mint Farm Wellfield

Figure

Comprehensive Water System Plan Update
 Longview, Washington
 December 2025

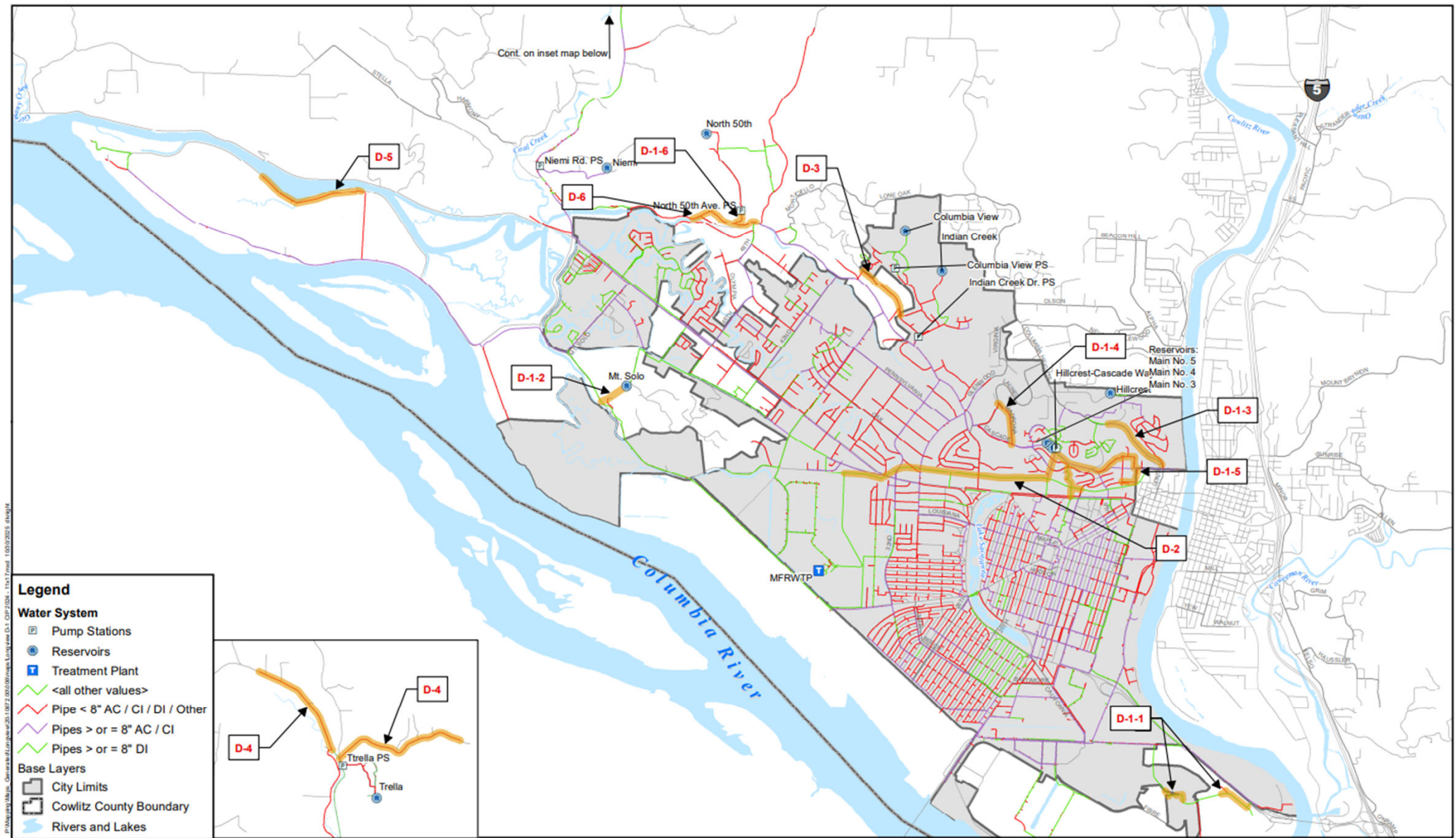
5-3

Operations & Maintenance

- Emergency response
- Cross-connection control
- Reliability-focused maintenance

Capital Improvement Program

- Pipeline Improvements
- Storage and pumping improvements
- SCADA and resiliency enhancements
- Phasing large projects/ bonding strategically



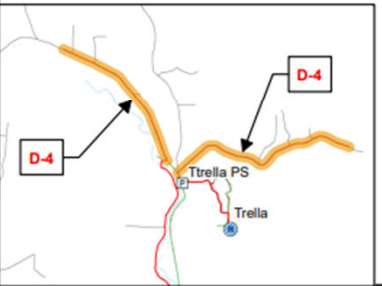
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Water System

- Pump Stations
- Reservoirs
- Treatment Plant
- <all other values>
- Pipe < 8" AC / CI / DI / Other
- Pipes > or = 8" AC / CI
- Pipes > or = 8" DI

Base Layers

- City Limits
- Cowlitz County Boundary
- Rivers and Lakes



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Longview Existing Water System
 CIP Projects
 City of Longview, Washington
 December 2025

Figure
8-1

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Financial Analysis

- Revenue requirement forecast
- Rate alignment for capital projects
- Affordability assessment

Table 9-6
2025 – 2034 Water Rate Forecast

Water Rates Inside City Limits ¹	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Annual Rate Increase		4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
Minimum Monthly Meter Charge:										
All Classes Except Irrigation:										
5/8 Inch Meter	\$ 19.81	\$ 20.60	\$ 21.43	\$ 22.28	\$ 23.17	\$ 24.10	\$ 25.07	\$ 26.07	\$ 27.11	\$ 28.20
1 Inch Meter	\$ 49.94	\$ 51.94	\$ 54.02	\$ 56.18	\$ 58.42	\$ 60.76	\$ 63.19	\$ 65.72	\$ 68.35	\$ 71.08
1-1/2 Inch Meter	\$ 73.45	\$ 76.39	\$ 79.44	\$ 82.62	\$ 85.93	\$ 89.36	\$ 92.94	\$ 96.66	\$ 100.52	\$ 104.54
2 Inch Meter	\$ 113.62	\$ 118.16	\$ 122.89	\$ 127.81	\$ 132.92	\$ 138.24	\$ 143.77	\$ 149.52	\$ 155.50	\$ 161.72
3 Inch Meter	\$ 220.77	\$ 229.60	\$ 238.78	\$ 248.34	\$ 258.27	\$ 268.60	\$ 279.34	\$ 290.52	\$ 302.14	\$ 314.22
4 Inch Meter	\$ 341.36	\$ 355.01	\$ 369.21	\$ 383.98	\$ 399.34	\$ 415.32	\$ 431.93	\$ 449.21	\$ 467.17	\$ 485.86
6 Inch Meter	\$ 676.28	\$ 703.33	\$ 731.46	\$ 760.72	\$ 791.15	\$ 822.80	\$ 855.71	\$ 889.94	\$ 925.54	\$ 962.56
8 Inch Meter	\$ 1,078.14	\$ 1,121.27	\$ 1,166.12	\$ 1,212.76	\$ 1,261.27	\$ 1,311.72	\$ 1,364.19	\$ 1,418.76	\$ 1,475.51	\$ 1,534.53
10 Inch Meter	\$ 1,547.03	\$ 1,608.91	\$ 1,673.27	\$ 1,740.20	\$ 1,809.81	\$ 1,882.20	\$ 1,957.49	\$ 2,035.79	\$ 2,117.22	\$ 2,201.91
12 Inch Meter	\$ 2,216.82	\$ 2,305.49	\$ 2,397.71	\$ 2,493.62	\$ 2,593.37	\$ 2,697.10	\$ 2,804.98	\$ 2,917.18	\$ 3,033.87	\$ 3,155.23
Irrigation:										
5/8 Inch Meter	\$ 15.67	\$ 16.30	\$ 16.95	\$ 17.63	\$ 18.33	\$ 19.06	\$ 19.83	\$ 20.62	\$ 21.45	\$ 22.30
1 Inch Meter	\$ 29.56	\$ 30.74	\$ 31.97	\$ 33.25	\$ 34.58	\$ 35.96	\$ 37.40	\$ 38.90	\$ 40.45	\$ 42.07
1-1/2 Inch Meter	\$ 52.65	\$ 54.76	\$ 56.95	\$ 59.22	\$ 61.59	\$ 64.06	\$ 66.62	\$ 69.28	\$ 72.06	\$ 74.94
2 Inch Meter	\$ 80.40	\$ 83.62	\$ 86.96	\$ 90.44	\$ 94.06	\$ 97.82	\$ 101.73	\$ 105.80	\$ 110.03	\$ 114.43
3 Inch Meter	\$ 154.38	\$ 160.56	\$ 166.98	\$ 173.66	\$ 180.60	\$ 187.83	\$ 195.34	\$ 203.15	\$ 211.28	\$ 219.73
4 Inch Meter	\$ 237.58	\$ 247.08	\$ 256.97	\$ 267.25	\$ 277.93	\$ 289.05	\$ 300.61	\$ 312.64	\$ 325.14	\$ 338.15
6 Inch Meter	\$ 468.76	\$ 487.51	\$ 507.01	\$ 527.29	\$ 548.38	\$ 570.32	\$ 593.13	\$ 616.86	\$ 641.53	\$ 667.19
8 Inch Meter	\$ 746.17	\$ 776.02	\$ 807.06	\$ 839.34	\$ 872.91	\$ 907.83	\$ 944.14	\$ 981.91	\$ 1,021.19	\$ 1,062.03
10 Inch Meter	\$ 1,071.07	\$ 1,113.91	\$ 1,158.47	\$ 1,204.81	\$ 1,253.00	\$ 1,303.12	\$ 1,355.25	\$ 1,409.46	\$ 1,465.83	\$ 1,524.47
12 Inch Meter	\$ 1,532.08	\$ 1,593.36	\$ 1,657.10	\$ 1,723.38	\$ 1,792.32	\$ 1,864.01	\$ 1,938.57	\$ 2,016.11	\$ 2,096.76	\$ 2,180.63
Consumptive Charges per 100 Cubic Feet:										
Single-Family & Duplex:										
0 – 800 Cubic Feet	\$ 4.19	\$ 4.36	\$ 4.53	\$ 4.71	\$ 4.90	\$ 5.10	\$ 5.30	\$ 5.51	\$ 5.73	\$ 5.96
801 – 1,600 Cubic Feet	\$ 4.88	\$ 5.08	\$ 5.28	\$ 5.49	\$ 5.71	\$ 5.94	\$ 6.17	\$ 6.42	\$ 6.68	\$ 6.95
Over 1,600 Cubic Feet	\$ 6.37	\$ 6.62	\$ 6.89	\$ 7.17	\$ 7.45	\$ 7.75	\$ 8.06	\$ 8.38	\$ 8.72	\$ 9.07
Trailer Courts & Apartments (Triplex and Above)	\$ 4.82	\$ 5.01	\$ 5.21	\$ 5.42	\$ 5.64	\$ 5.86	\$ 6.10	\$ 6.34	\$ 6.60	\$ 6.86
Commercial, Churches, Schools, Hospitals, Hotels/Motels	\$ 5.15	\$ 5.36	\$ 5.57	\$ 5.79	\$ 6.02	\$ 6.27	\$ 6.52	\$ 6.78	\$ 7.05	\$ 7.33
Irrigation	\$ 7.62	\$ 7.92	\$ 8.24	\$ 8.57	\$ 8.91	\$ 9.27	\$ 9.64	\$ 10.03	\$ 10.43	\$ 10.85
Note:										
1) Customers outside City limits pay a 65% surcharge over the published inside-City rates.										

Key Takeaways

- Ensures regulatory compliance
- Addresses aging infrastructure
- Improves system resiliency

Next Steps

1. Submit to the Department of Health
2. Complete Appendix information
3. Address comments
4. Department of Health approval
5. Return for final adoption
6. Implement near-term CIP
7. Public communication

City of Longview
Water System Plan Update

December 2025

DRAFT



bhc
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ACKNOWLEDGEMENTS

The Water System Plan Update was developed under the direct supervision of Chris Kelsey, PE of BHC Consultants, LLC.



Chris W. Kelsey, PE
Project Manager

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Appendix E Adjacent Utility Consistency Review

Chapter 1 Water System Description

1.1 Introduction

The City of Longview (City) has prepared this 2025 Water System Plan (WSP) to update and replace the 2012 Longview Comprehensive Water System Plan (2012 Plan). The completion of a draft plan for regulatory review was initially anticipated in 2021; however, staffing departures and shortages, as well as billing system software and data issues, delayed its completion. The purpose of this WSP is to assist the City in developing a long-term planning strategy for its water utility. The WSP evaluates the existing system and its ability to meet anticipated requirements for water source, quality, transmission, storage, and distribution over a 20-year planning horizon. The WSP recommends water system improvements to meet the changing demands of regulatory impacts, population growth, development, and repair/replacement needs. The WSP also estimates the costs of the recommended improvements and determines their impact on water utility rates for the City. This comprehensive WSP has been prepared in accordance with the requirements of Washington Administrative Code (WAC) 246-290-100 – Water System Plan and considers the requirements set forth by the State’s Municipal Water Law, mandating a Water Use Efficiency (WUE) program.

1.2 Ownership History

The City of Longview is located in Cowlitz County in southwestern Washington. The City’s water utility service area covers approximately 32.3 square miles with 25.7 square miles being within the City limits. Water service is supplied from groundwater wells located at the Mint Farm Regional Water Treatment Plant (MFRWTP). The City (Water System ID #48100R) is the sole owner and operator for the Longview distribution system, and owns and operates the MFRWTP in partnership with Beacon Hill Water and Sewer District (BHWSO). Per the Participants Agreement, the MFRWTP is operated under the direction of the Water Operating Board (Board). The Board consists of two members from the City and one member from the BHWSO.

The City began supplying water to customers in the early 1920s. The City originally obtained its water supply from groundwater. A more reliable source was sought because of the age of the wells, high iron levels in the raw water, and rapid population growth. This led to construction in 1945 of the Regional Water Treatment Plant (RWTP) on Fishers Lane that served the City for many years. The RWTP treated water supplied from the Cowlitz River. In 1978, the City and Cowlitz County Public Utility District #1 (PUD) agreed on the joint remodel and subsequent operation of the RWTP. Prior to entering into the ownership agreement, PUD purchased water from the City and Kelso. In January 2011 ownership of the PUD’s water system was transferred to BHWSO. Due to increased costs and operational concerns associated with effectively treating the deteriorated water quality of the Cowlitz River subsequent to the eruption of Mount St. Helens, in combination with the aging components and equipment at the RWTP, the MFRWTP was developed as an alternative water source to replace the Cowlitz River. The MFRWTP started operating in January 2013 with four new groundwater wells and the ability to drill two additional wells to supply future demands.

1.3 Related System Plans

System plans related to this Comprehensive WSP include:

- City of Longview Comprehensive Plan (2019).
- Beacon Hill Water and Sewer District Water System Plan (2018).

- Cowlitz County Comprehensive Plan (2017).
- Longview Comprehensive Water Plan (2012).
- City of Longview Mint Farm Water Supply Preliminary Design Report (2010), Source Approval Documents (2012), and Dissolved Oxygen Injection Project Report (2016).

1.4 Service Area Description

Figure 1-1 illustrates a number of important planning features, including regional water service areas and City limits. The pressure zones served by the City, through facilities described within this chapter, are summarized as follows with their approximate hydraulic grade lines listed in parenthesis:

- Main Area (244)
- Indian Creek (318, 463)
- North 50th (395,531)
- Niemi (415)
- Hillcrest (286, 481)
- Columbia View (488, 506, 660)
- Trella (502, 653)

The existing and future service area boundaries for both the City and its regional supply partner BHWSO are shown on Figure 1-1. The combined bounds of Longview’s existing and future service areas define the City’s existing retail service area. No expansion of this area is planned at this time.

1.4.1 Topography

The service area topography varies from steep slopes to gently rolling terrain, sloping south and west to the generally flat areas along the Cowlitz and Columbia rivers. The Columbia River borders the service area to the south. The area near the confluence of the Cowlitz, Coweeman, and Columbia rivers is flat. Hilly uplands surround the urban area to the north and west.

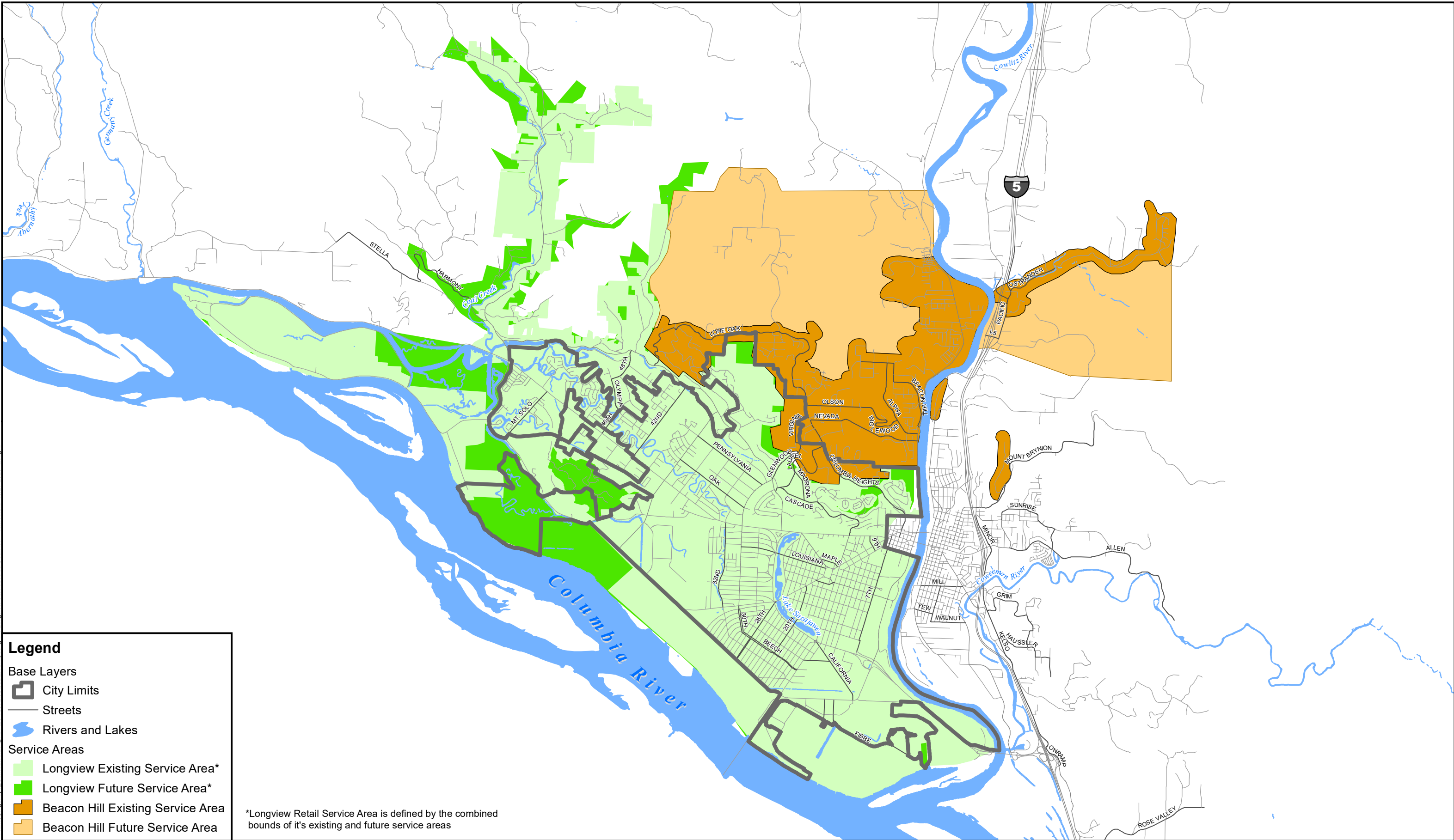
1.4.2 Land Use

The approximate existing land uses for the City are shown on Figure 1-2. Land use information was obtained from both the City and County’s Geographic Information System (GIS). The land use classifications in the unincorporated county areas are not the same as those used within the City limits. To better compare the land uses both within and outside of the City limits some assumptions were made to establish a corresponding City designation for the county parcels. The approximate areas of major land use categories for the existing and future service area are summarized in Table 1-1. Land use is expected to remain the same over the 10- and 20-year planning periods.

Table 1-1
Land Use in Service Area ^{1,2}

Service Area	Residential	Commercial	Industrial	Public/ Quasi Public	Total
Longview City Limits	5,122	1,117	1,872	1,357	9,468
Unincorporated Cowlitz County	1,296	52	2,502	238	4,088
Total Retail Service Area	6,418	1,167	4,375	1,596	13,556
Notes:					
1) Units in acres. Civic Center land use counted in with Public/Quasi Public land use.					
2) Total is based on the latest land use GIS data maintained by the City.					

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Legend

Base Layers

- City Limits
- Streets
- Rivers and Lakes

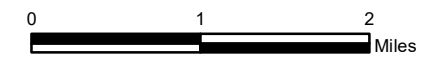
Service Areas

- Longview Existing Service Area*
- Longview Future Service Area*
- Beacon Hill Existing Service Area
- Beacon Hill Future Service Area

*Longview Retail Service Area is defined by the combined bounds of its existing and future service areas



GIS Base data: City of Longview.
 Data sources supplied may not reflect current or actual conditions. This map is a geographic representation based on information available. It does not represent survey data. No warranty is made concerning the accuracy, currency, or completeness of data depicted on this map.
 BHC Consultants LLC, assumes no responsibility for the validity of any information presented herein, nor any responsibility for the use or misuse of the data.

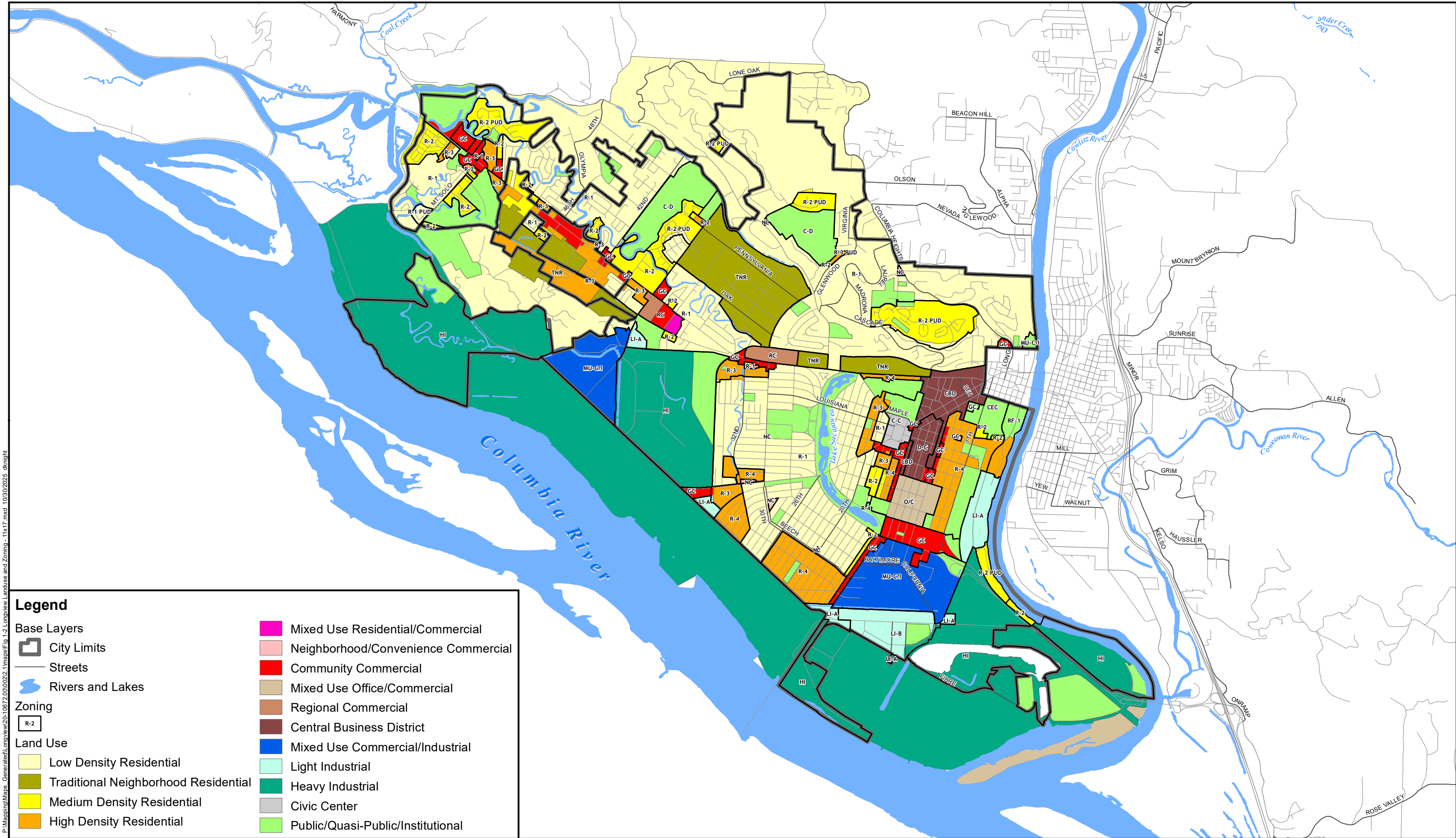


Longview Service Area Overview
 Comprehensive System Plan Update
 City of Longview, Washington
 December 2025

Figure

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P:\Mapping\Maps_Generated\Longview\20-10672\00\002\2-1\maps\Fig.1-2 Longview Land Use and Zoning - 11x17.mxd 10/30/2025 dknight

Legend

Base Layers

- City Limits
- Streets
- Rivers and Lakes

Zoning

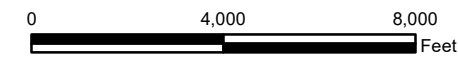
- R-2

Land Use

- Low Density Residential
- Traditional Neighborhood Residential
- Medium Density Residential
- High Density Residential
- Mixed Use Residential/Commercial
- Neighborhood/Convenience Commercial
- Community Commercial
- Mixed Use Office/Commercial
- Regional Commercial
- Central Business District
- Mixed Use Commercial/Industrial
- Light Industrial
- Heavy Industrial
- Civic Center
- Public/Quasi-Public/Institutional



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Longview Land Use and Zoning
 Comprehensive System Plan Update
 City of Longview, Washington
 December 2025

Figure

1-2

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1.5 Service Area and Water Wheeling Agreements

This Section summarizes service area and water wheeling agreements for the City. Copies of the agreements are kept on file electronically with the City.

- Water Services Area Agreement – March 1977: The City, Kelso, and PUD entered into an agreement to provide water to the urban area, to plan orderly system improvements to meet growth, and to provide a basis for decision-making on how to serve new customers without costly duplication of facilities. The following emergency agreements are in place in the event that normal water service is interrupted by an unforeseen event:
 - Water Utilities' Mutual Assistance Plan – 1971: This is a plan among the cities of Kelso, Longview, Castle Rock, and Woodland; and Cowlitz PUD, Carrolls Water Association, and Cloverdale Water Users' Association. The plan includes the exchange of assistance, emergency aid, equipment charges, labor charges, and equipment damage or loss between the water utilities.
 - Weyerhaeuser Company and Longview Emergency Aid Agreement – 1 July 1988: An agreement between Weyerhaeuser and the City for Weyerhaeuser to supply non-potable water to Longview during an emergency.
- RWTP Participants Agreement – 18 December 1978: The City and PUD agreed on the joint construction and subsequent operation of the Longview RWTP on Fishers Lane (amended February 2002). PUD's interest in the RWTP was assigned to BHWSO 1 January 2011. The revised participants' agreement is included in the appendices. With the decommissioning of the RWTP, the terms of ownership between Longview and BHWSO in this agreement remain intact with the construction and ongoing operation of the MFRWTP.
- Water Wheeling Agreements: The three purveyors established long-term wheeling agreements that allow the utilities to use each other's facilities to move water from the treatment facilities to the service area point of delivery; without duplication of facilities. Water wheeling agreements include:
 - Reciprocal Agreement, Kelso and PUD – 17 May 1978: Provides for wheeling service by Kelso for the PUD to deliver water to Haussler Road, Cowlitz Gardens, and William-Finney, and provides for wheeling service by PUD for Kelso to deliver water to Aldercrest No. 3. (The Haussler Road area was turned over to Kelso in July 1997).
 - Agreement between the City and PUD – 9 May 1980: Wheeling service by the City for PUD to deliver water between the Longview Treatment Plant and the Hillside Reservoir and to Lexington.
 - Amendment to the City and PUD Wheeling Agreement – 1 July 1992: Provides for wheeling service to PUD's Maplewood Drive service area in North Longview.
- The City has recently completed updated agreements with BHWSO and Kelso for the continued long-term provision of MFRWTP water to these adjacent public water systems through interties. These agreements are on file with the City.

1.6 Service Area Policies

The City's Comprehensive Plan, adopted October 2019, contains general overarching policies pertaining to annexation, joint planning, public facilities, and utility issues applicable for water system planning that serve as the guide for the development of the City's detailed service policies. The Longview Municipal Code (LMC), Title 15, Article II describes the City's detailed water service policies and is available online through the City's website. The table of contents for the LMC Title 15, Article II and a brief description of each Section is shown below:

- 15.40 Administration: This Section establishes the City's water department, structure, and authority.
- 15.44 Service Connections: Identifies the application process, installation, and connection procedures for service connections adjacent and not adjacent to City water mains, as well as associated fees and customer maintenance responsibilities.
- 15.48 Water Meters: Establishes meter size based on customer class, meter protection, and responsibility in the event of damage by hot water as well as preventive measures.
- 15.52 Shutoffs – Turn-ons: Address changes, interruption and discontinuance of service, as well as meter removal due to non-payment.
- 15.56 Billing Procedures: Identifies billing procedures and policies as well as City and customer obligations and responsibilities.
- 15.60 Prohibited Acts: Describes unlawful acts such as unauthorized connections to mains and hydrants, damage to waterworks property, and fire hydrant obstruction.
- 15.64 Miscellaneous Provisions: Establishes policies such as City exemption for water damage, construction of driveways interfering with service connections, change of occupancy, right to regulate sprinkling and irrigation activities, ownership of mains, fluoridation, and fire protection service.
- 15.68 Cross-Connection Control: Defines cross connection, back flow prevention requirements, and the City's cross connection control program. Ordinance 3208, adopted 28 June 2012, updates this Section to comply with State law. A copy of the ordinance is available online through the City's website.
- 15.72 Extensions – Additions: Establishes procedures and guidelines to insure orderly growth of the water system. Addresses service extensions both within and outside the City's limits.
- 15.74 Water Shortage Response Plan: Establish procedures, guidelines, and authority in the event of water shortage emergencies.

1.7 Inventory of Existing Facilities

This Section presents an inventory of the existing facilities (as of June 2020) for the City.

1.7.1 Interties

Five existing interties are located between the City and BHWSO to deliver water under the water wheeling agreement. One additional two-way intertie connects the City, BHWSO, and Kelso. One emergency connection can be established between the City and Weyerhaeuser to provide water to the City in an emergency situation. The interties and emergency connection are described in Table 1-2.

Table 1-2
Intertie and Water Service Agreements

Carrier ¹	Receiver	Agreement Date	Connection Location	Description of Service
Longview	Kelso and BHWSD	March 1977	101 Fishers Lane	<ul style="list-style-type: none"> ▪ Two-way intertie between the three service providers. Kelso to Longview connection would only work if Longview’s system experiences very low pressure. ▪ 6-inch service through a 6-inch meter [approx. capacity of 1,000 gallons per minute (gpm)].
Longview	BHWSD: Hillside Reservoir	May 1980	Hillside Reservoir off Cedar Street, just above lower intersection with Cascade Way	<ul style="list-style-type: none"> ▪ Continuous use as a point of delivery for either wholesale purchase or wheeling of water. ▪ 12-inch main metered through two 4-inch turbine meters: #1 Meter (1,350 max gpm), #2 Meter (1,250 max gpm). Pump station is capable of approx. 1,000 gpm.
Longview	BHWSD: Lexington	May 1980	Immediately west of 101 Fishers Lane	<ul style="list-style-type: none"> ▪ Continuous use as a point of delivery for either wholesale purchase or wheeling of water. ▪ 8-inch service through a 6-inch meter (approximate capacity of 2,000 gpm). ▪ 8-inch service through an 8-inch meter (approx. capacity of 3,500 gpm).
Longview	BHWSD: Maplewood	July 1992	Intersection of Maplewood Drive and Cedar Lane in Longview	<ul style="list-style-type: none"> ▪ Continuous use as a point of delivery for either wholesale purchase or wheeling of water. ▪ 4-inch main through a 4-inch meter (approx. capacity of 500 gpm).
Weyerhaeuser	Longview	July 1988	Industrial Way at Weyerhaeuser #5 Treatment Plant	<ul style="list-style-type: none"> ▪ Emergency supply of non-potable water in case Longview experiences a significant supply disruption. Pipe spool is removed to eliminate physical connection. Can be re-installed to restore non-potable water supply in emergency situation.
Longview	BHWSD	December 2012	Curtis Drive near Sunset Drive	<ul style="list-style-type: none"> ▪ Continuous use as a point of delivery for either wholesale purchase or wheeling of water. ▪ 4-inch main through a 4-inch meter (approx. capacity of 500 gpm).
<p>Note: 1) Carrier is defined as supplier of water.</p>				

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1.7.2 Facilities

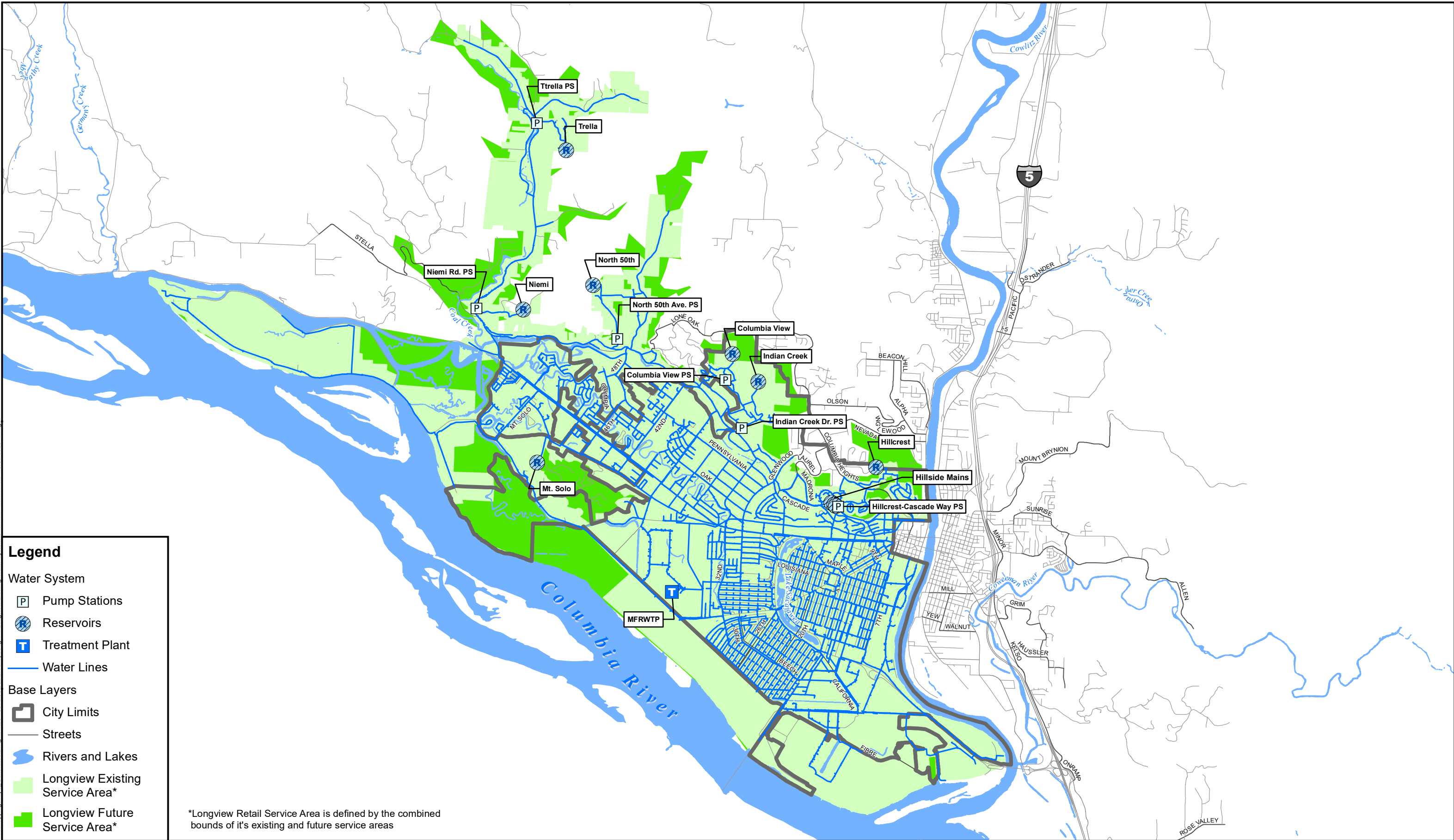
A description of the City's facilities is provided as below. A schematic of the City's water system is presented on Figure 1-3. A map of the existing water system is presented on Figure 1-4.

- Mint Farm Regional Water Treatment Plant: The MFRWTP supplies water to both the City and BHWS. The facility treats groundwater from a deep aquifer and has current design capacity of 17.4 with a build out capacity of 25.3 million gallons per day (MGD). Existing operational and distribution system constraints currently limit the production capacity of the MFRWTP to less than design levels. The treatment process consists of granular media filtration and disinfection using liquid sodium hypochlorite. The facility and its operational constraints are further described in Chapter 3.
- Longview RWTP: The City's former source was the Cowlitz River at the Longview RWTP on Fishers Lane. The City and BHWS decided to switch water sources and construct a new treatment facility for many reasons including aging systems and source water quality issues. This facility will be decommissioned at a later date.
- Booster Pump Stations: The City operates six booster pump stations, all of which pump to reservoirs. In addition, four groundwater wells at the MFRWTP pump through the treatment plant to the distribution system to fill reservoirs. Characteristics of the pump stations are summarized in Table 1-3. All pump stations are controlled by reservoir level sensing, which initiates pump operation.
- Storage: The City has eight water storage facility sites. Characteristics of the water storage facilities are summarized in Table 1-4. Capacities of the facilities range from 150,000 gallons to 12.0 million gallons. All facilities are covered. The City strives to maintain reservoir levels within 1 to 2 feet of overflow during periods of peak demand.
- Pipe: An inventory of the piping material of the water mains is presented in Table 1-5. Longview has approximately 213 miles of pipeline. The majority of the system is cast iron (133 miles) and ductile iron (70 miles) with smaller lengths of asbestos cement (AC), steel, polyvinyl chloride (PVC), and high-density polyethylene (HDPE) pipe.
- Pressure Reducing Stations: The City's pressure reducing stations are summarized in Table 1-6.

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Legend

Water System

- Pump Stations
- Reservoirs
- Treatment Plant
- Water Lines

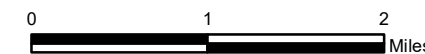
Base Layers

- City Limits
- Streets
- Rivers and Lakes
- Longview Existing Service Area*
- Longview Future Service Area*

*Longview Retail Service Area is defined by the combined bounds of it's existing and future service areas



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Longview Existing Water System Overview
Comprehensive System Plan Update
City of Longview, Washington
December 2025

Figure

1-4

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**Table 1-3
Booster Pump Stations ^{1,2}**

Pump Station Name and Location	Pumps From	Pumps To	Horsepower (HP) and Estimated Capacity ³
<u>Hillcrest:</u> Located at main reservoir site (Hillside Reservoir).	Main (Hillside) Reservoir System (Pressure Zone El. 244.5 feet)	Hillcrest Reservoir and distribution area (Pressure Zone El. 481 feet)	<u>Two Pumps:</u> No. 1: 30 HP, 250 gpm No. 2: 30 HP, 250 gpm
<u>Indian Creek:</u> Sunset Way and Indian Hills Drive.	Main (Hillside) Reservoir System (Pressure Zone El. 244.5 feet)	Indian Creek Reservoir and distribution area (Pressure Zone El. 463 feet)	<u>Two Pumps:</u> No. 1: 60 HP, 350 gpm No. 2: 30 HP, 270 gpm
<u>North 50th ³:</u> Located on North 50 th Avenue.	Main (Hillside) Reservoir System (Pressure Zone El. 244.5 feet)	No. 50th Reservoir and distribution area (Pressure Zone El. 531 feet)	<u>Two Pumps:</u> No. 1: 30 HP, 160 gpm No. 2: 30 HP, 160 gpm
<u>Niemi:</u> Located on Niemi Road.	Main (Hillside) Reservoir System (Pressure Zone El. 244.5 feet)	Niemi Reservoir and Lower Coal Creek distribution area (Pressure Zone El. 415 feet)	<u>Two Pumps:</u> No. 1: 25 HP, 400 gpm No. 2: 25 HP, 340 gpm
<u>Trella:</u> Coal Creek and Ragland Road.	Coal Creek System (Niemi Reservoir - Pressure Zone El. 415 feet)	Trella Reservoir and Upper Coal Creek Road distribution area (Pressure Zone El. 653 feet)	<u>Two Pumps:</u> No. 1: 30 HP, 190 gpm No. 2: 30 HP, 190 gpm
<u>Columbia View:</u> Ammons Drive within Columbia View Addition.	Indian Creek System (Pressure Zone El. 463 feet)	Columbia View Reservoir and distribution area (Pressure Zone El. 660 feet)	<u>Two Pumps:</u> No. 1: 15 HP, 100 gpm No. 2: 15 HP, 100 gpm
<p>Notes:</p> <ol style="list-style-type: none"> 1) Does not include pumps at the treatment plant that supply the Hillside and Mt. Solo reservoirs. 2) All pump stations are controlled by reservoir level sensing. 3) North 50th pump station uses a roto-phase to create 3-phase power. Only one pump can be run at a time. 			

**Table 1-4
Water Storage Facilities**

Storage Location	Tank Capacity (MG)	Type of Construction	Maximum Water Surface Elevation (feet)	Floor of Tank Elevation (feet)	Year Constructed	Date of Last Inspection
<u>Hillside Mains¹</u>						
No. 3	1.5	Concrete	244.5	224.5	1948	1/6/2009
No. 4	5.0	Concrete	244.5	224.5	1950	1/14/209
No. 5	5.0	Concrete	244.5	223.75	1962	1/21/2009
Total	12.0					
Mt. Solo ²	5.0	Concrete	244.5	230	Unknown	12/10/2008
Hillcrest	1.0	Concrete	492	480	Unknown	12/15/2008
Indian Creek	0.15	Concrete	463	451	Unknown	12/3/2008
Columbia View	0.50	Welded Steel	660	640	1983	12/5/2008
Niemi	0.20	Concrete	415	401	1984	12/3/2008
Trella	0.30	Bolted Steel	653	631	1990	12/4/2008
North 50 th	0.20	Bolted Steel	531	505	1989	12/4/2008

Notes:

- 1) Effective (useable) storage is less than stated capacity due to Longview and BHWSO pump suction elevations inhibiting the ability to draw the Hillside Main reservoirs down below a minimum elevation.
- 2) Effective storage is approximately 4.0 MG due to high reservoir elevation which inhibits ability to fill Mt. Solo to full capacity. Reservoir was constructed at wrong elevation and cannot be filled above elevation 244.5 feet which is approximately 4.5 feet below the top of overflow.
- 3) MG=million gallons

**Table 1-5
Inventory of Water Mains**

Diameter (inches)	Cast Iron	Ductile Iron	AC	Steel	PVC/HDPE	CONC	Unknown/NA	Total (feet)	Total (miles)
4	63,742	11,293	3,773	1,532	1,410	0	1	81,751	15
6	343,187	96,554	8,932	3,198	2,638	92	1,744	456,345	86
8	207,044	141,563	5,654	1,364	0	0	132	355,758	67
10	3,595	7,052	0	0	0	0	0	10,647	2
12	77,315	66,512	1,066	0	990	0	459	146,341	28
14	4,531	5,523	0	0	0	0	0	10,054	2
16	1,076	12,839	5,093	0	0	0	0	19,007	4
20	1,303	21,726	0	5,067	0	5,268	0	33,364	6
24	2,949	290	0	0	0	0	0	3,238	1
30	0	6,784	0	0	0	0	0	6,784	1
36	0	292	0	0	0	0	0	292	0
Total Feet	704,741	370,426	24,517	11,161	5,039	5,360	2,336	1,123,580	
Total Miles	133	70	5	2	1	1	0		213

Notes:

- 1) Data are approximate in some cases; lengths shown are in feet unless otherwise noted.
- 2) Galvanized Steel.
- 3) Steel Dipped and Wrapped; and Steel Coal Tar Dipped.
- 4) Source: City of Longview GIS Department.

**Table 1-6
Pressure Reducing Stations**

Name	Location	Service Zones ¹		Pressure Setting (psi)	
		From ²	To ³	High	Low
City View	City View Boulevard and Judith Place	Hillcrest (Pressure Zone El. 481 feet)	Pressure Zone El. 286 feet	135	65
Lower Ammons	Ammons 2900 Block	Ammons Drive (Pressure Zone El. 463 feet)	Pressure Zone El. 318 feet	100	43
Lower Columbia View	Curtis Lane	Columbia (Pressure Zone El. 660 feet)	Pressure Zone El. 488 feet	130	50
North Ammons	East End of Curtis Lane	Columbia (Pressure Zone El. 660 feet)	North Ammons El. 506 feet. Closed zone provide pressure and fire flow for North Ammons Drive.	90	30
Upper Ammons ⁴	Columbia View Pump Station	Columbia (Pressure Zone El. 660 feet)	Pressure Zone El. 463 feet ⁵	130	45
Clark Creek Road	Clark Creek Lane	N. 50 th Avenue (Pressure Zone El. 531 feet)	Clark Creek Road (Pressure Zone El. 395 feet)	154	89
Carlon Loop	Carlon Loop and Upper Coal Creek	Upper Coal Creek and Ragland Road (Pressure Zone El. 502 feet)	Lower Coal Creek (Pressure Zone El. 415 feet) ⁶	110	55
Upper Coal Creek	Tanglewood Drive and Coal Creek Road	Tanglewood Drive (Pressure Zone El. 653 feet)	Upper Coal Creek and Ragland Road (Pressure Zone El. 502 feet)	175	110

Notes:

- 1) The pressure zones correspond to the zones shown on Figure 1-1 and Figure 1-3.
- 2) Maximum overflow elevation of the reservoir from which the Pressure Relief Valve (PRV) is served.
- 3) Pressure of the PRV on the reduced-pressure side, in feet. (The effective elevation of the PRV.)
- 4) Backfeeds from the Columbia View Reservoir when the Indian Creek Reservoir is running low.
- 5) Provides additional fire flow for Zone 463.
- 6) Provides supplemental pressure and fire flow for Zone 415.

Chapter 2 Basic Planning Data

2.1 Introduction

Water demand projections are necessary to plan for capital improvements and evaluate water resource needs. This Chapter summarizes current water demands for the City of Longview (City) water system and presents the methodology and results of water demand projections. The basic planning information provided in this Chapter forms the foundation of the Water System Plan (WSP) and will be utilized in subsequent chapters to assess the current state and anticipated future needs of the water system relative to existing and proposed regulations and requirements. This Chapter is organized into five areas: existing water demands, existing and forecast populations, existing per capita water demand, future water demand, and fire flow demand.

2.2 Analysis Timeline, Years 2020 Through 2024

The majority of work to develop planning and demand projections within this Chapter, as well as perform the system analysis in Chapter 4, was performed in 2019 and 2020. Staffing turnover and shortages, as well as information gaps and inaccuracies that needed multiple years to resolve, resulted in delays to complete the ancillary components of this WSP. When these issues were resolved, updating the projections and analysis were considered; however, the benefit of those efforts was not deemed significant or consequential to the Capital Improvement Program (CIP) as described in the subsections below.

2.2.1 City Billing Department Water Service Consumption Records

The City has utilized a contracted meter reading service for more than three decades to perform scheduled water meter readings. Due to ongoing staffing limitations within the Water Utility Division, this contracted approach continued through 2019 and beyond. Over time, billing personnel began noticing irregularities in consumption data trends within the billing system. Because meter reading schedules are rotationally programmed on an annual basis, staff were able to compare consumption patterns and identify inconsistencies that appeared across multiple billing cycles.

As customer inquiries regarding billing accuracy increased, City utility staff conducted independent spot checks to validate the contractor's readings. These checks revealed prevalent discrepancies between actual and reported consumption data. It was determined that the contracted meter readers were frequently estimating consumption values rather than recording actual reads to expedite their work, resulting in inaccurate and highly inconsistent usage records once actual readings were obtained. These findings led to the termination of the contracted vendor and the transition to in-house meter reading operations beginning in 2024.

Although billing adjustments were made to correct inaccurate charges, it is believed that consumption data collected during this period introduces more potential for error than insight in long-term analysis. As a result, alternative water source data are being used to evaluate demand trends for the years 2020 through 2024 and to adjust future projections accordingly.

2.2.2 Mint Farm Regional Water Treatment Plant Production Records

Although production data can include elements that are not representative of growth trends (prevalent system leaks, process water that does not enter the water distribution system for consumption, high or low periods of system flushing, etc.), these anomalies tend to be diminished over a longer timeframe where the

percentage of abnormalities are reduced. As the confidence level in the accuracy of annual Mint Farm Regional Water Treatment Plant (MFRWTP) metered production data is high and can be captured in consistent recorded annual periods, it serves as a useful data point to trend growth between years 2020 and 2024, Table 2-1 summarizes MFRWTP annual production totals available for years 2019 through 2024.

**Table 2-1
 Annual MFRWTP Production Volume (MG)**

Year	Annual Total Volume Produced ¹
2019	1,722
2020	1,734
2021	1,895
2022	1,825
2023	1,759
2024	1,777

Note:

- 1) From City WUE Reports, 2019-2024. This value includes Authorized Consumption, DSL, and Production and Purchased Water for the City and BHWSD.

The following observations are made from the data above:

- On average, MFRWTP production was 4.4 percent higher between 2020 and 2024 annually in comparison to 2019. However, years 2021 and 2022 included higher than normal Distribution System Losses (DSL) reported by both the City and BHWDS in comparison to surrounding years that might account for some of the more rapid increase in those reported production numbers. There were also exceptionally high demand months during the summer in these years which have not been experienced before or since.
- Years 2023 and 2024 have generally reverted back to similar production levels that occurred in 2019 and 2020.
- Development activity within the City has been observed to be fairly stagnant between 2020 and 2024, suggesting that the high years of production in 2021 and 2022 might account for some unique circumstances.

2.2.3 City Population

Analysis performed in 2019 (Section 2.4) evaluated current and future population growth patterns based on data and methodologies from the Office of Financial Management (OFM). At the chosen “MEDIUM” growth methodology of 0.5 percent annual increase, it forecasted a 2020 population of 38,291. The actual population in that year now established by the 2020 census was 37,818. OFM now provides an updated 2025 population estimate of 38,310, in essence equivalent to this document’s original projection made for 2020. The actual growth rate in recent years has been approximately half of what the MEDIUM methodology forecasted.

2.2.4 2020 Through 2024 Methodology Adjustments

Water production and population data suggest that water demand projections originally made for years 2020, 2030 and 2040 can be translated forward by 5 years for purposes of system analysis and capital project planning. These adjusted 10- and 20-year planning horizons still project a 0.5 percent annual growth rate that has not been borne out in recent years, so the analysis might continue to be slightly conservative. This adjusted methodology is supported by City staff based on the nominal levels of recent development activity, the lack of large scale commercial changes within the City's service area that might have impact on water flow patterns, and the ultimate system deficiencies identified in Chapter 3 largely being independent of small demand deviations.

2.3 Existing Water Demands

Establishing the existing water demand for the City is the basis for forecasting future demand. Mint Farm Regional Water Treatment Plant (MFRWTP) production and purchase data for 2015 to 2019 was obtained from the City and Beacon Hill Water and Sewer District (BHWSO) and is summarized in Table 2-2. The table also includes consumption totals specifically for the City, based on billing department records for established customer categories, and reported DSL. Usage records for other authorized uses, such as for the public works flushing program and fire department hydrant testing, were provided for 2019, but were unavailable for previous years. It is also believed that appreciable unaccounted for system demand has been inherent to consumption records until 2019, primarily through large service meter reading inaccuracies (the master meter to Weyerhaeuser Mill, which has now been calibrated and corrected, is suspected of under-registering consumption volumes by as much 65 million gallons (MG) per year). The City continues to evaluate opportunities to better track water use as part of its Water Use Efficiency (WUE) program, further discussed in Chapter 4.

Table 2-2
Annual MFRWTP Production and Consumption Values for 2015 - 2019 (MG)

Component	2015	2016	2017	2018	2019
Total Produced and Purchased ¹ :	1,974	1,881	1,845	1,821	1,722
▪ Authorized Consumption ¹	1,810	1,701	1,635	1,666	1,620
▪ Water Billed to the City's Customers ²	1,260	1,227	1,249	1,257	1,261
▪ Other Authorized Uses ³	-	-	-	-	79
▪ Distribution System Losses (DSL) ¹	164	180	210	155	102
▪ Distribution System Losses (DSL)	8%	10%	11%	9%	6%
Water Sold to BHWS ⁴ :	274	275	276	283	274
▪ Percent of Finished Water Total Production to BHWS	14%	15%	15%	16%	16%

Notes:

- 1) From City WUE Reports, 2015-2019. This value includes Authorized Consumption, DSL, and Production and Purchased for the City and BHWS.
- 2) From the City's billing department records for all City water customer categories (2015-2018). 2019 values were obtained from 2019 City Production Summary Worksheet. This value is part of the Authorized consumption value but does not include BHWS or other authorized uses values.
- 3) Includes Fire Dept, System O&M, and PW (Public Works) usage reported by the City and now being tracked annually.
- 4) From BHWS WUE Reports, 2015-2018. 2019 values were obtained from 2019 City Production Summary Worksheet.

Table 2-3 lists the Average Day Demand (ADD) and Maximum Day Demand (MDD) for the combined service to both the City and BHWS, based on MFRWTP production records from the Washington State Department of Health (DOH) Chlorination Report Forms. ADD was calculated by converting the provided annual production into an average daily system demand; MDD was established through review of recorded monthly maximum and minimum production values at the MFRWTP. From 2015 to 2019, finished water ADD decreased from 5.40 to 4.72 million gallons per day (MGD) and finished water MDD ranged from 8.96 to 10.19 MGD. As would be expected with increased irrigational use, MDD occurred during the summer months. The maximum MDD:ADD ratio was 2.07 for the system, and the average MDD:ADD ratio was 1.90. The MFRWTP is operated at a high efficiency level; on an annual basis only about 2 MG of backwash water currently is not recycled and is discharged to the sewer system.

**Table 2-3
MFRWTP – ADD and MDD 2015-2019**

Year	2015	2016	2017	2018	2019
Average Day Demand (ADD, MGD)	5.40	5.14	5.04	4.99	4.72
Maximum Day Demand ¹ (MDD, MGD)	9.74	9.52	8.96	10.19	9.77
Month/Day when MDD Occurred	June 29 and July 31	Aug 18	July 6	July 17	July 6
Treated MDD:ADD Ratio	1.80	1.85	1.78	2.04	2.07
Note: 1) ADD and MDD derived from monthly and annual MFRWTP (City and BHWSO) production records from the DOH Chlorination Report Forms.					

Table 2-4 shows the estimated demands by service area for the City. Demands by area are estimates only because the City’s upper distribution zones are not currently metered separately, and the City’s billing system is not set up to easily gather this information. The demands shown in Table 2-4 were obtained from distribution area pump station records. A full year’s worth of data was available for 2019, and for 2020 data was available from January through August. Data for 2019, considered to represent the best available data, was used as the basis year for analysis. Table 2-4 also illustrates that 90 percent of the demand comes from the Main (Zone 244) service area.

**Table 2-4
City of Longview – Water Demand by Distribution Area**

Pump Station for Upper Zones	Pressure Zones Served	Demand (MG per year)	
		2019	2020
Niemi (Lower Coal Creek)	415	24	18
Trella (Upper Coal Creek)	653, 502	20	28
North 50th	531, 395	14	8
Indian Creek (Ammons)	463, 318	13	8
Columbia View	660, 488, 506	7	7
Hillcrest	286, 481	55	48
Main Zone Only Demand	244	1233	--
Total Pumped by Stations to Upper Service Zones		132	117
Percentage Pumped to Upper Pressure Zones		9.7%	--

Annual demands by customer connection category for the City are summarized in Table 2-5. These categories include single-family, city, multi-family, commercial, school and irrigation. The main pressure area serves the full range of customers, while the upper pressure zones primarily serve single-family residences. Average demands per connection are also listed in Table 2-5. This data was obtained from the City’s billing records. Single-family customers generally have one unit per connection.

Equivalent Residential Units (ERUs) are used to express water usage by type of service connection. One ERU is defined as one average day of water consumption by a single-family residence, measured in gallons per day (gpd). Information by customer class for the year range from 2015 through 2019 is also shown in Table 2-5. The average demand per single-family residential unit for Longview is 144 gpd, not including distribution system losses. Including the distribution system losses, the demand is 157 gpd. As with overall production levels, the ERU demand within the City has declined in recent years. The ERU for each customer class is calculated by dividing the annual demand for each customer class by the average demand per single-family residence to obtain the number of ERUs for each customer class based on usage in that class. The ERUs for each customer class are listed in Table 2-5.

Approximately 66 percent of the annual water demand is from residential customers (52 percent single-family and 15 percent multi-family). Commercial demand accounts for approximately 27 percent of the total annual demand. The southern side of the service area is heavily industrialized. Most of the existing industries obtain process water from their own sources but receive potable water from the City. All industrial connections are metered and include a backflow device as required by the City’s cross connection control program. In Table 2-5 industrial demands, along with medical and church demands, are included in the commercial customer class.

**Table 2-5
 Residential Equivalence by Customer Class for 2015 – 2019**

Customer Class	Annual Demand Per Customer Class (MG)	Number of Connections	ADD/Account (gpd/account)	Equivalent Residential Units
Single-Family	631	11,994	144	11,994
City	17	62	756	324
Multi-Family	182	380	1,317	3,466
Commercial ¹	351	980	981	6,660
School	26	23	3,114	503
Irrigation	36	125	792	686
Totals	1,243	13,564	7,104	23,633
Average Demand Per Single-Family Residence = 144 gpd				
Note:				
1) Only data from 2019 was used for the Commercial customer class, since accurate data for a large industrial user was not properly metered in the previous years. The Commercial customer class includes Medical, Church, and Industrial users.				

Consumer demands can vary seasonally. This seasonality is captured in Figure 2-1 which shows monthly demand by customer class. Demands shown are based on five-years of billing data from 2015-2019. The seasonal variation pattern follows a normal and expected trend of higher demand in the summer months for most customer classes.

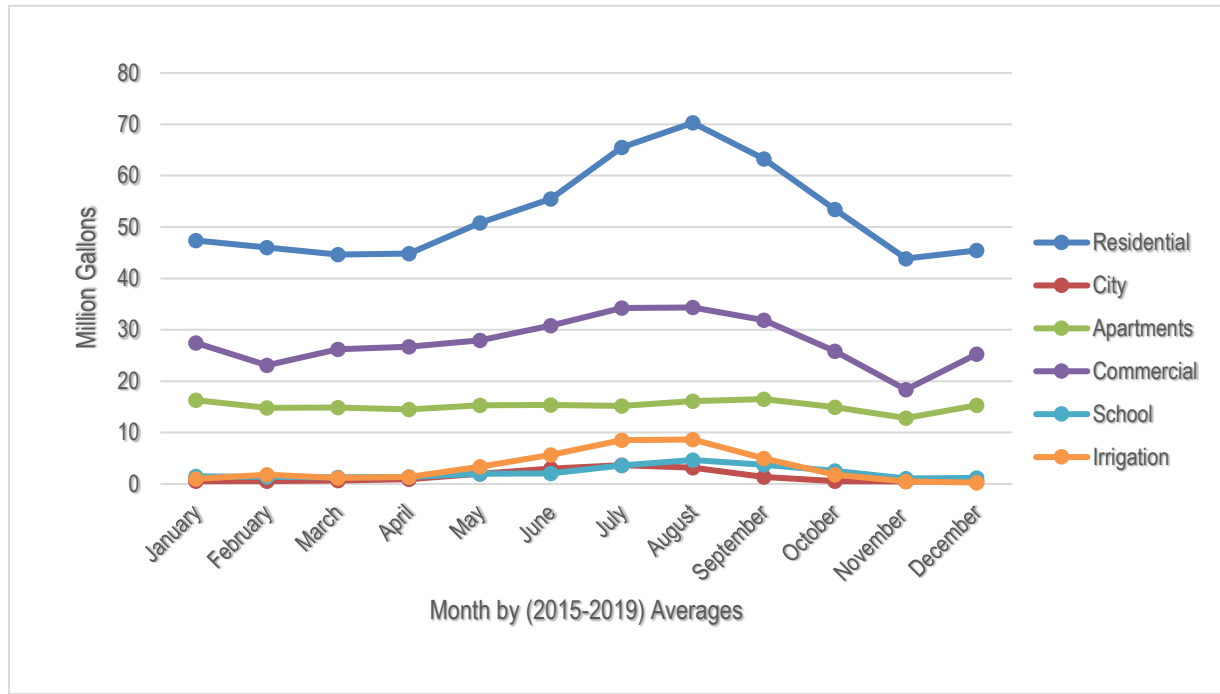


Figure 2-1 Monthly Demand by Customer Class (2015-2019 Average)

To enhance the accuracy of system analysis, it is beneficial to identify the largest water users within the system. The recorded demands for these customers can be individually extracted from their customer class totals when distributing demands within the system model, and be placed individually at their locations. Table 2-6 tabulates the demand for the City’s largest water users from 2019, extracted from billing account information.

**Table 2-6
City of Longview Top Consumers**

Top Consumers	Total Consumption (MG)	ERUs
Nippon Dynawave Packaging	64.8	1,235
Westrock	36.8	702
PeaceHealth St. John Medical Center	31.7	604
Longview School District	26.3	501
Port of Longview	11.7	223
Lower Columbia College	9.9	188
Longview Country Club	8.5	162
Cowlitz County Jail	8.0	152
Fairways Apartments	6.7	127
Regional Wastewater Authority	5.9	113

2.4 Existing and Forecast Population

Development of future water demand projections, assessment of the water system’s ability to fulfill those demands, and development and planning of future water system improvements all depend on accurate growth estimates. Growth forecasting was performed using the mathematical equation for exponential growth shown in Equation 2-1 below:

Equation 2-1 $P = P_o * \exp(r * t)$

Where P = Population at time (t) in years
 P_o = Initial population
 r = Annual Growth Rate
 t = Years elapsed from basis year

Population growth rates are currently being analyzed using the most recent Census data (2010) and forecasts for Cowlitz County from the OFM, which were last completed in 2017. Per OFM’s *Growth Management Act county projections* website, their method is to “[prepare] a reasonable range of possible population growth for Washington counties participating in GMA.”

Table 2-7 shows the high, medium, and low growth rates projected for Cowlitz County. Once the county planning targets have been selected, each jurisdiction within the county is tasked with selecting a reasonable rate of growth within the range established by OFM. In some previous planning efforts, the City had used an estimated annual growth rate of approximately 1 percent per year. However, this was not borne out by actual growth from 2010 to 2017, which instead equated to an average of 0.3 percent per year. Therefore, for forecasting purposes, a medium growth rate of 0.5 percent per year is used in this WSP, as is concurrently prescribed by the City of Longview’s Comprehensive Plan updated in October 2019. This medium rate aligns more closely with observed growth trends. For projection purposes, the unincorporated service area is assumed to grow at the same rate as the City.

Table 2-7
Projected Growth Rates for Cowlitz County

Cowlitz County	Projected Annual Growth Rate	
	2017-2030	2017-2040
High	1.23%	1.03%
Medium	0.61%	0.46%
Low	0.23%	0.17%

Note:
 1) Source: Office of Financial Management.

Office of Financial Management (OFM) uses the 2010 Census population as the baseline population from which it derives annual population estimates. 2017 was used as the baseline year for compatibility with the City’s Comprehensive Plan. Future projections were then calculated using the medium growth rate of 0.5 percent per year and the population growth formula discussed above. Washington State Department of Health (DOH) requires water system plans to use 10- and 20-year planning periods from the present to be

approved for the 10-year maximum allowable period. Table 2-8 presents the source baseline year, estimated existing and future population forecast for the City. For this 2020 WSP update, forecasts and analysis will be made for years 2030 and 2040 in accordance with planning periods.

Table 2-8
Population Forecast for the City of Longview

Level of Forecast	2017	2020 OFM/ 2025 Census	2030 (escalated to 2035)	2040 (escalated to 2045)
Medium	37,510	38,291/38,310	40,249	42,307
Note: 1) Source: Office of Financial Management: April 1, 2019 Population of Cities, Towns and Counties.				

2.5 Existing Per Capita Water Demand

Per capita water demand for the City is listed in Table 2-9. In order to establish the per capita demand for the City’s water service area, the population of the service area was estimated using the average number of people per household based on 2010 Census data and OFM projections. The estimated water service area population is based on average of 2.4 persons per ERU multiplied by the total single and multi-family ERUs. Per capita demands are presented for informational purposes only.

Table 2-9
City of Longview Per Capita Water Demands

2020 Population ¹	2020 Demand		2020 Per Capita Demand (gpcd) ² (Considered acceptable for 2025 use)
	(Annual MG)	(gpd)	
38,291	1,243	3,456,947	90.3
Notes: 1) Water Service Area Population. Estimated based on 2010 per household census data and OFM growth projections. 2) gpcd = gallons per capita per day.			

2.6 Future Water Demands

Evaluation of future water source, storage, transmission, and distribution system needs requires an estimate of anticipated future water demands. Future water demand projections for the City are best estimated from population projections and recent demand trends. Review of 5 years of MFRWTP records allowed determination of an ADD:MDD ratio for the system. The ratio for the MFRWTP and the established ADD value for the City were used to establish MDD values for the City. ADD and MDD values were escalated using Equation 2-1 and the actual growth rate appearing in Table 2-7. The 2017 values are used for projections because they represent the most current water demands of the system. Future water demands for BHWSD were gathered from their water system plan update (2018).

2.6.1 Average Daily Demand (ADD) and Maximum Daily Demand (MDD)

Future water demand forecasts, including ADD and MDD for the City, are summarized in Table 2-10. The demands are based on water sold to each utility, a percentage of distribution system losses, and major industrial facilities planned for the future. The City of Kelso is currently evaluating the long-term investment associated with their source supplies available in the future. An alternative is not making an investment to improve its facilities, but rather abandoning their facilities and purchasing supply from the City. The average and maximum future demands have been incorporated into Table 2-10 for consideration of this alternative. The ADD and MDD for only the City, BHWS, and the total for the MFRWTP are presented graphically on Figure 2-2 without conservation effects. The demands portrayed are proposed to be projected forward by 5 years, as illustrated in Table 2-10. Conservation effects are discussed in Chapter 4 of this WSP.

**Table 2-10
Future Water Demands (MGD)**

Area	2020 (Now 2025 Base Year)		2030 (Escalated to 2035)		2040 (Escalated to 2045)	
	ADD	MDD	ADD	MDD	ADD	MDD
City of Longview ¹	3.43	6.54	3.60	6.87	3.79	7.23
BHWS ²	0.78	1.43	0.82	1.49	0.87	1.54
Total	4.21	7.97	4.42	8.36	4.66	8.77
City of Kelso ³	2.37	3.61	2.53	3.89	2.70	4.20
Total including City of Kelso	6.58	11.58	6.95	12.25	7.36	12.97

Notes:

- 1) Values for City of Longview 2020 were obtained from Table 2-1 Water Billed to City of Longview and the average value from 2015-2019 was used for 2021.
- 2) ADD and MDD values between 2017 through 2027 were used from Table 2-7 Future Projected Water Demands Based on Population (MG) of the BHWS Water System Plan (2018) to interpolate the 2020 ADD and MDD value. The annual growth rate is 0.42 percent.
- 3) ADD and MDD values are taken from Table 4-18 of the City of Kelso 2025 WSP. The values for year 2045 were interpolated forward.

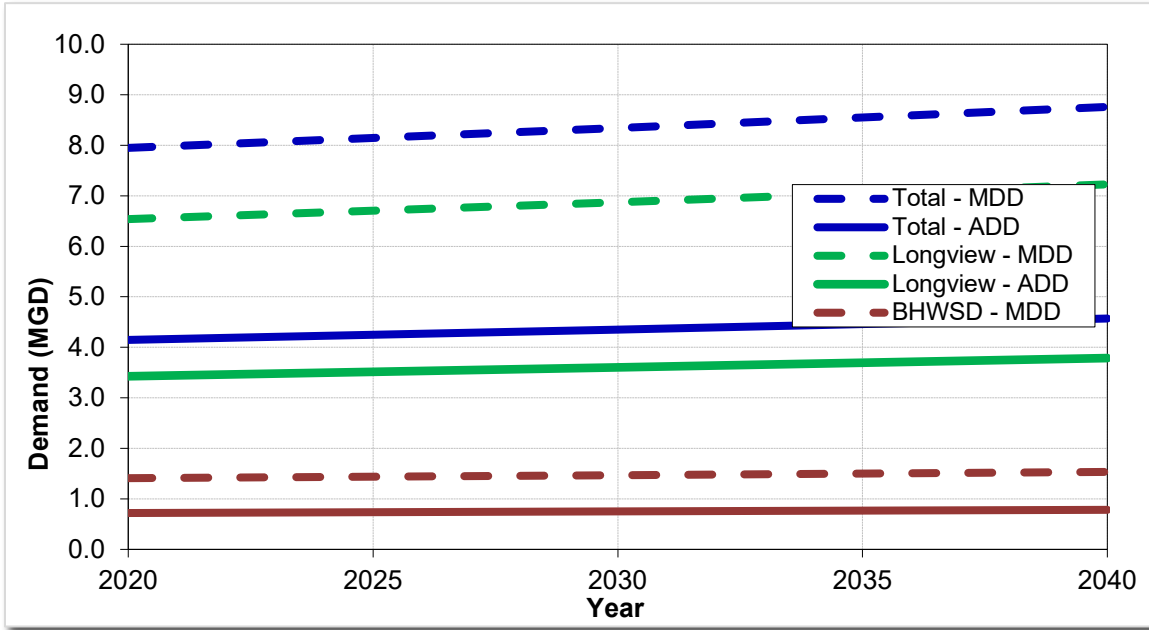


Figure 2-2 City of Longview Projected Water Demands

Table 2-11 summarizes the projected ERUs for the City, which are used to analyze present and future system requirements based on the projected demand per ERU based on 2015 to 2019 ERU water demand calculations. Equivalent Residential Units (ERU) are projected by customer classes for the 10- and 20-year planning periods. The growth rate for individual customer classes has historically paced the area residential growth. Therefore, the growth rate by customer class was assumed to be the same as the general residential forecasted growth rate.

**Table 2-11
Projected ERUs and Demand Per ERU**

Annual Growth Rate for the City of Longview (%)		0.50%	
Customer Class	2020 (Now 2025 Base Year)	2030 (Escalated to 2035)	2040 (Escalated to 2045)
Single-Family	11,994	12,609	13,255
City	324	341	358
Multi-Family	3,466	3,644	3,831
Commercial	6,660	7,001	7,360
School	503	529	556
Irrigation	686	721	758
Totals	23,633	24,845	26,119
Demand per ERU (gpd/ERU)¹			
ADD²	144.0		
MDD	274.8		
Notes:			
1) Demand per ERU will remain the same throughout the 10- and 20-year planning period because ERUs and water demands are forecast using the same method.			
2) Refer to Table 2-5 to reference ADD.			

Table 2-12 provides ERU projections by zone. The values shown in the tables are used to perform the source, treatment capacity, pump station capacity, and storage analyses discussed in Chapter 3. Calculations to obtain ERUs (in gpd) are explained in Section 2.2 and ERUs are displayed in Table 2-5. The actual number of ERUs by zone was calculated by taking the corresponding percentage of water demand for each zone.

Potential development areas known to the City that might represent focal points of future growth may be considered in future water model scenarios used to evaluate system capacity. The City’s 2019 Future Land Use Map, developed for the most recent Comprehensive Plan update, allocates greater quantities of medium- and high-density residential land uses in two particular areas: the downtown core and the Ocean Beach Highway/West City of Longview corridor, which has designated a City gateway. Both areas demonstrate the potential for infill and redevelopment to accommodate a growing population and may be considered for a greater allocation of growth relative to the rest of the City in future scenarios. However, the growth rate is assumed to be uniform for each customer class for the purposes of this WSP because the City is currently experiencing relatively uniform growth rates throughout its service areas.

Table 2-12
ERU Projection by Zone

Estimated % Growth Rate by Zone ¹			0.50%		
Pump Station and Zones Served	Metered Demand 2019 (MG)	Percentage of Water Demand	ERU by Zone		
			2020 (Now 2025 Base Year)	2030 (Escalated to 2035)	2040 (Escalated to 2045)
Niemi (415)	23	1.72%	407	428	450
Trella (502, 653)	20	1.44%	340	358	376
North 50 th (395, 531)	14	1.04%	245	258	271
Indian Creek (318, 463)	13	0.92%	218	229	241
Columbia View (488, 506, 660)	7	0.53%	126	132	139
Hillcrest (286, 481)	55	4.04%	954	1,003	1,054
Main Zone (244)	1,233	90.31%	21,344	22,438	23,589
Totals	1,365		23,633	24,845	26,119
Notes:					
1) Growth rates assumed uniform among zones.					
2) BHWSO demand projections not included.					

2.6.2 Peak Hour Demand (PHD)

Peak Hour Demand (PHD) is the maximum rate of water use, excluding fire flow, that can be expected to occur within a defined service area over a continuous 60-minute time period. The following Equation 5-1 from the DOH Water System Design Manual was used to calculate PHD for the years shown. Future PHD

was forecast using the peak hour demand Equation 2-2, the value obtained for 2017, and the annual percent growth rate.

Equation 2-2
$$PHD = \frac{MDD}{1440} * (C * N + F) + 18$$

- Where:
- PHD = Peak Hourly Demand (gpm)
 - C = Coefficient associated with ranges of ERUs (C=1.6)
 - N = Number of service connections in ERUs
 - F = Factor associated with ranges of ERUs (F=225)
 - MDD = Maximum Day Demand (gpd/ERU)

Further discussion of this formula appears in Chapter 3. Projected MDDs are located in Table 2-10, and PHD projections through 2040 are provided in Table 2-13. PHD for 2020 is based on the Equation 5-1 shown above and takes the peaking factor, the average demand per single-family residence in gallons per day as well as the number of accounts in terms of ERUs. The PHD is then divided by the MDD to create a PHD:MDD ratio that is used to project to 2030 and 2040. The PHD value and PHD:MDD values for BHWSD are obtained from the BHWSD WSP (2018).

Table 2-13
Peak Hourly Demand Projections (MGD)

Component	2020 (Now 2025 Base Year)	PHD:MDD Ratio	2030 (Escalated to 2035)	PHD:MDD Ratio	2040 (Escalated to 2045)	PHD:MDD Ratio
City of Longview ¹	10.48	1.60	11.01	1.60	11.58	1.60
BHWSD ²	2.9	2.00	3.1	2.04	3.3	2.08
Total	13.4	-	14.1	-	14.8	-

Notes:

- 1) Values based on the PHD:MDD ratio multiplied by City of Longview MDD values listed in Table 2-10.
- 2) Estimated from Beacon Hill Water and Sewer District WSP (2018). The WSP provided data for years 2017, 2027, and 2038 that have been interpolated to match the analysis years of this document, including a straight line growth projection continuing to year 2045.

2.7 Fire Flow Demand

Fire flow demand refers to the rate of water flow necessary to control major fires within the service areas. The water transmission and distribution system should be designed to maintain a minimum pressure of 20 pounds per square inch (psi) at the point of fire flow delivery as well as throughout the rest of the system under maximum day conditions as required by WAC 246-290-230(6).

2.7.1 Fire Flow Standards

Several standards are available for establishing fire flow:

- International Fire Code (IFC)

- Cowlitz County Ordinance 16.05.080
- Washington Survey and Rating Bureau Standard.

The City has established its own Fire Marshal jurisdiction, and an interlocal agreement between the City and Cowlitz 2 Fire and Rescue (Mutual Aid Agreement 19 January 1995) enhanced emergency response. The agreement is available on file with the City.

2.7.2 Fire Flow Requirements

Actual fire flow requirements for specified projects depend on several circumstances:

- Size of the structure(s).
- Location of the structure/project.
- Type of construction material (wood versus concrete/brick, etc.).
- Number of stories.
- Building fire protection systems (sprinklers, automatic fire doors, etc.).
- Proximity of adjacent structures.
- Type of occupancy/building use (storage of flammable chemicals, etc.).

Fire flow demand requirements and standards for land use classification and structural type are summarized in Table 2-14. The standards require fire flows to be delivered at a minimum of 20 psi during MDD. The design fire flows shown in Table 2-14 will be used in the hydraulic analysis of the distribution systems computer model. Results of the computer modeling will identify areas that require improvement in order to meet fire flow demands.

In general, the City's policy is to follow the IFC or Cowlitz County Ordinance 16.05.080, depending on the jurisdictional location of the pressure zone. In cases where a City-operated zone falls into both the city and county, the City fire flow standards will apply. Fire flows for the main zone (244) will comply with the Washington State Rating Bureau (WSRB).

**Table 2-14
Fire Flow Demand Requirements**

Class	City of Longview Pressure Zones Inside City Limits	City of Longview Pressure Zones Outside City Limits
Residential/Single-Family	244, 481, 286, 318, 463, 506, 660, 488	481, 318, 488, 531, 395, 415, 502, 653
Residential/Multi-Family	244, 481, 286, 318, 463, 488	481, 318, 488
Commercial	244	244, 415, 502
Schools	244	244
Industrial	244	244
Class	Jurisdiction	Fire Flow (gpm)/Duration (hrs)
Residential/Single Family (Less than 3,500 sf)	County	500 gpm for 0.5 hr ¹
Residential/Single Family (Less than 3,600 sf)	City	1,000 gpm for 1 hr ²
Residential/Multi-Family	City/County	1,500 gpm for 2 hrs ²
Commercial	County	1,500 gpm for 2 hrs
Commercial	City	5,000 gpm for 4 hrs ²
Schools	City	5,000 gpm for 4 hrs ²
Industrial	City	5,000 gpm for 4 hrs ²
Notes:		
<ol style="list-style-type: none"> 1) County Ordinance. Refer to full ordinance and 2015 IFC, Table B105.1 for larger dwellings and other building classes. 2) IFC estimated minimum required fire flow based on typical construction type and size for each building class and including sprinkler system deductions. Actual fire flow requirements are determined based on the 2015 IFC, Table B105.1. 3) sf = square feet. 		

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Chapter 3 System Analysis

3.1 Introduction

A water utility's ability to meet current and anticipated demands is the principal consideration in water system planning. In addition to demand considerations, water quality, facilities planning, and regulatory requirements all influence how a water system must be analyzed. To address these influences, the following components are examined in this chapter:

- General Facility Standards.
- Water Quality Regulations and Standards.
- Analysis of Water Quality and Treatment.
- System Analysis.
- Summary of System Deficiencies.

Water quality and facility analyses evaluate existing facilities according to pre-identified design standards. The results of these analyses provide a summary of water system deficiencies and basis for recommended improvements.

3.2 General Facility Standards

Performance and design criteria typically address sizing and reliability requirements for source, storage, distribution, fire flow, and water quality. The DOH relies on various publications, agencies, and the utility itself to establish appropriate design criteria. WAC 246-290-200 - Design Standards, details the various criteria recognized by the DOH. The following are brief descriptions of the two most widely recognized performance and design standards: Water Systems Design Manual and the Recommended Standards for Water Works. Developer design requirements, including materials, sizing, and construction standards, are presented in Chapter 7: Distribution Facilities Design and Construction Standards. Table 3-1 summarizes the minimum allowable design standards.

- Water System Design Manual, DOH (4th Edition, June 2020): These standards serve as a guideline for preparing plans and specifications for Group A public water systems in accordance with WAC 246-290 and build and expand on the current standards published in DOH's Sizing Guidelines for Public Water Supplies. Where these documents specify standards different from the Ten States Standards, provisions of the DOH Standards will govern. The design manual also includes procedures for establishing system capacity based upon ERUs.
- Recommended Standards for Water Works, A Committee Report of the Great Lakes – Upper Mississippi River Board of State Public Health and Environmental Manager (2018): Commonly known as the "Ten States Standards" this document formalizes the design standards recommended by a water supply committee representing 10 Midwestern and Upper Great Lake states and the Province of Ontario. First published in 1953, the Water Supply Committee report has been revised and reissued numerous times, most recently in 2018. The report presents recommendations for both design and construction standards; however, the construction standards are somewhat general in nature, with minor emphasis on materials specifications.

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Table 3-1
DOH - General Facility Requirements

Table 3-4 PFAS Monitoring Requirements ¹	Table 3-4 PFAS Monitoring Requirements ¹	Table 3-4 PFAS Monitoring Requirements ¹
Average Daily Demand (ADD) and Maximum Daily Demand (MDD)	ADD determined by historical water use data generated by accurate production and consumption meters. MDD is estimated by using at least two-years-worth of historical data. System leakage and total authorized consumption, based on an evaluation of the difference between total production and total consumption metered records, must be quantified per WAC 246-290-820.	
<ul style="list-style-type: none"> ▪ PHD is the peak hourly demand for the whole system in gpm. ▪ ERU_{MDD} is maximum day demand per ERU in gpd. ▪ C is the Coefficient associated with the no. of ERUs. ▪ N is the Number of ERUs. ▪ F is the Factor associated with the no. of ERUs. 	$PHD = \frac{ERU_{MDD}}{1440} [(C)(N) + F] + 18$ <ul style="list-style-type: none"> ▪ If ERUs > 500, C = 1.6, F = 225. ▪ If ERUs >250 and < 500; C = 1.8, F = 125. ▪ If ERUs >100 and < 250; C = 2.0 and F = 75. ▪ If ERUs > 50 and < 100; C = 2.5, F = 25. ▪ If ERUs > 15 and < 50; C = 3.0, F = 0. 	
Water Quality and Treatment	As established in WAC 246-290, last updated October 2025.	Recent modifications associated with establishment of monitoring requirements for per- and polyfluoroalkyl substances (PFAS).
Storage Requirements	<p>The sum of:</p> <p><u>Operational Storage (OS, gallons):</u> OS depends on the sensitivity of the water level sensors and the geometrical configuration of the reservoir. Conservatively, <i>Minimum OS</i> = 2.5 * <i>pump supply capacity</i> when the pump is off.</p> <p><u>Equalizing Storage (ES, gallons):</u> $ES = (PHD - Q_s) * 150$, where Q_s = sum of all non-emergency sources of supply in gpm. Maintaining 30 psi is required.</p> <p><u>Standby Storage (SB, gallons):</u> $SB = (N)(SB_i)(T_d),$ where N = number of ERUs based on the ERU_{MDD} value, SB_i =unit SB volume in gallons per day per ERU, and T_d = number of selected days for meeting standard of reliability; or 200 gallons/ERU, whichever is greater. Maintaining 20 psi is recommended.</p> <p><u>Fire Suppression Storage (FSS, gallons):</u> FSS is calculated based on the required fire flow for each zone provided by the local fire authorities and given as $FSS = (FF)(t_m)$, where FF = the required fire flow rate in gpm and t_m is the duration of the fire flow rate in minutes. Maintaining 20 psi is required.</p> <p><u>Dead Storage (DS, gallons):</u> DS corresponds to the volume of water not included in the capacity analysis, since it is not available to all customers at minimum required pressures.</p>	Standby storage to be based on a minimum 200 gallons/ERU. Nesting of fire and standby storage (the smaller of the two to be allocated within the volume of the larger calculated component, rather than additive values) is integrated into system analysis.

Table 3-4 PFAS Monitoring Requirements ¹	Table 3-4 PFAS Monitoring Requirements ¹	Table 3-4 PFAS Monitoring Requirements ¹
Source of Supply	Per WAC 246-290-222, water system source, treatment, transmission, and storage facilities must be designed so that together they meet MDD. DOH recommends source(s) be able to meet MDD, and emergency sources cannot be included in the total source capacity calculations.	Treatment plant unit processes will meet MDD. Unit Process capacity is based on reliable capacity. Reliable capacity is the capacity of a treatment plant with the largest unit out of service.
Minimum System Pressure	The system must be designed to provide PHD to customers at pressures greater than or equal to 30 psi throughout the distribution system after depletion of equalizing storage. When equalizing and fire flow storage is depleted, the system must provide at least 20 psi of pressure at all points while under MDD plus fire flow conditions.	
Minimum Pipe Sizes	The minimum size for a transmission line should be determined by hydraulic analysis. The smallest distribution system line shall not be less than 6 inches in diameter. Distribution mains must deliver PHD with 30 psi residual pressure, and fire flow at MDD with 20 psi system wide. It is recommended that pipe must be sized so the maximum velocity of 8 feet per second (fps) is not exceeded under PHD conditions.	Minimum pipe diameter as established in the City's Design and Construction Standards. The City's standards meet or exceed DOH requirements for 6" minimum pipeline requirement.
Backup Power Requirements	Per Section 7.5.3 of the Water System Design Manual, an onsite back-up power facility that starts through an automatic transfer switch is recommended. A manual transfer can be used if it can provide power at a reasonable time.	
Booster Pump Requirements	Per WAC 246-290-230 and Section 8.1 of the Water System Design Manual, open system booster pumps must meet MDD for the system at a minimum pressure of 30 psi. Open systems are defined as systems pumping to reservoirs where water levels are allowed to fluctuate based on changing demands. The recommended reliability standard is MDD with the largest pump out of service. Closed system booster pumps must meet PHD with a minimum pressure of 30 psi.	Booster pump capacity will be analyzed with the largest booster pump out of service, as known as reliable capacity (as defined above).
Water System Physical Capacity	Determine the water system physical capacity of each system component in terms of ERUs, as required by WAC 246-290-222.	City will adopt DOH criteria for determining ERUs as established in the Recommended Standards for Waterworks Manual.

3.3 Water Quality Regulations and Standards

This Section discusses the following:

- Regulatory Framework.
- Applicable Drinking Water Regulations.
- Existing Drinking Water Quality Standards.
- Water Quality Monitoring Requirements.
- Potential Future Drinking Water Regulations.

3.3.1 Regulatory Framework

In the state of Washington, the United States Environmental Protection Agency (EPA) and the DOH establish drinking water standards in accordance with EPA requirements. In general, water quality standards can be separated into primary and secondary standards. Primary standards are established for the protection of public health, while secondary standards cover aesthetic considerations. Current drinking water regulations attempt to manage two distinct kinds of risk: microbial and chemical.

The City has historically used surface water as its source of supply and thus, has been subject to increasingly stringent surface water regulations. With completion of the new MFRWTP and groundwater source several years ago, the old Fisher Lane surface water treatment plant will no longer be used or maintained as a backup source of drinking water supply. The regulations governing groundwater are very different from those concerning surface water. In surface water treatment, turbidity is used as a surrogate for pathogens and is closely tracked throughout treatment. Because groundwater is much safer with respect to microbial contamination, there is no emphasis on tracking turbidity and sampling requirements are generally reduced.

In general, water quality standards can be separated into source water/water treatment and distribution system requirements. The regulatory requirements applicable to each category will be discussed below.

3.3.2 Applicable Regulations

The Safe Drinking Water Act (SDWA) is the foundation for all state and local government water quality standards. Present regulatory approaches and health effect assessment methodologies largely focus on individual contaminants. Therefore, the utilities must maintain a broad perspective to manage overall risks and formulate plans to address known and emerging contaminants. The State Drinking Water Regulations are revised regularly to incorporate new EPA rules. Compliance with the ever-changing rules related to water quality and treatment is very challenging.

The basic regulatory requirements for drinking water quality in the State of Washington are published in the Drinking Water Regulations (WAC 246-290) and administered and enforced by DOH. The City of Longview Group A Public Water System is regulated under WAC 246-290. In most cases, the regulations adopted by DOH are the minimum requirements established by the EPA. However, DOH has the option to adopt and enforce standards that are more stringent than the federal regulation. These regulations provide oversight for the design, construction, and operation of public water systems in Washington. Existing regulations cover bacteriological contaminants, inorganic compounds (IOCs), physical characteristics, lead and copper, disinfection by-products (DBPs), volatile organic chemicals (VOCs), synthetic organic chemicals (SOCs), and radionuclides.

3.3.3 Water Quality Standards

Historically, the City’s source has been the Cowlitz River, thus the Surface Water Regulations applied. Beginning in late 2012, the City commissioned its new groundwater source and treatment facility, the MFRWTP. The previous surface water treatment plant was decommissioned sometime after the transition to the new groundwater source. Therefore, this Section will focus on the regulations and standards that are applicable to groundwater.

This Section discusses applicable drinking water regulations associated with groundwater sources of water supply, distribution system water quality standards, and the compliance impacts that are pertinent to the City. The regulations discussed include the following:

- Groundwater Rule.
- Arsenic Rule.
- Radionuclides.
- Inorganic and Organic Compound Monitoring.
- Per- and polyfluoroalkyl substances (PFAS).
- Stage 1 Disinfectant/Disinfection By-Product Rule (D/DBPR-1).
- Stage 2 D/DBPR (D/DBPR-2).
- Total Coliform Rule.
- Lead and Copper Rule.
- Consumer Confidence Reports.

Groundwater Rule

Rule Summary

Pathogenic viruses and bacteria can occur in public water systems that use groundwater if the source water becomes contaminated.

The rule addresses these risks through a risk-targeting approach that relies on four major components:

1. Periodic sanitary surveys of groundwater systems require the evaluation of eight critical elements and the identification of significant deficiencies (e.g., a well located near a leaking septic system).
2. Source water monitoring to test for the presence of *E. coli*, enterococci, or coliphage, as follows:
 - a. Triggered monitoring for systems that do not already provide treatment that achieves at least 4-log inactivation or removal of viruses and have a positive total coliform in their routine distribution system sampling.
 - b. Assessment monitoring at the option of the State to require systems, at any time, to conduct source water assessment monitoring to help identify high risk systems.
3. Corrective actions required as follows for any system with a significant deficiency or source water fecal contamination:
 - a. Correct all significant deficiencies.

- b. Eliminate the source of contamination.
 - c. Provide an alternate source of water.
 - d. Provide treatment which reliably achieves 4-log inactivation or removal of viruses.
4. Compliance monitoring to ensure the installed treatment technology reliably achieves 4 log inactivation or removal of viruses.

Compliance Impacts

Free chlorine is used at the MFRWTP to oxidize iron and manganese and facilitate their removal in greensand filters. Because a free chlorine residual is maintained throughout the treatment process, a disinfection credit is claimed. The City maintains chlorination reports to continually demonstrate that 4-log virus inactivation is achieved. Microbial monitoring under the Groundwater Rule is not required.

Arsenic Rule

Rule Summary

Arsenic is most often present as a naturally occurring element in rocks, soil, water, air, plants, and animals. Volcanic activity, the erosion of rocks and minerals, and forest fires are natural sources that can release arsenic into the environment. Arsenic is also used by industry in the United States for wood preservative purposes as well as in paints, drugs, dyes, soaps, metals, and semi-conductors. Agricultural applications, mining, and smelting also contribute to arsenic releases. Studies link inorganic arsenic ingestion to a number of health effects. These health effects include:

- Cancerous Effects: skin, bladder, lung, kidney, nasal passages, and liver and prostate cancer.
- Non-cancerous effects: cardiovascular, pulmonary, immunological, neurological and endocrine (e.g., diabetes) effects.

Compliance Impacts

On 22 January 2001, the EPA adopted a standard for arsenic in drinking water at 10 parts per billion (ppb), replacing the old standard of 50 ppb. The rule became effective on 22 February 2002. The rule was adopted by the DOH in 2006.

Arsenic is sampled as part of the IOC group of chemicals. The MFRWTP has been designed to meet the City's goal of less than 5 ppb for arsenic. Through background levels initially monitored and implemented MFRWTP treatment techniques, the City has received a waiver for source water testing of IOCs to occur at a reduced 9-year interval.

Radionuclides

Rule Summary

Radionuclides are radioactive forms of elements that can occur naturally in the environment or be generated by human activity. Prolonged exposure can increase the risk of cancer. DOH has adopted the maximum contaminant level (MCL) standards for radionuclides under WAC 246-290-310 (7) presented in Table 3-2.

**Table 3-2
 Radionuclide Standards**

Radionuclide	MCL (5 pCi/L)
Combined Radium – 226 and 228	5 picocuries per liter (pCi/l)
Gross Alpha (excludes radon and uranium)	15 pCi/l
Beta Particles and Photo Emitters	4 millirems/year (mrem/yr)
Uranium	0.030 milligrams per liter (mg/l)

Compliance Impacts

The City must sample and analyze a Mint Farm wellfield treated source water sample prior to the distribution system every 6 years for Gross Alpha and Radium 228. DOH must be notified within 48 hours of a violation of the primary MCL.

Inorganic and Organic Compound Monitoring Requirements

Rule Summary

WAC 246-290-300 establishes the inorganic and organic monitoring regulations. The contaminant groups included are IOCs, VOCs, and SOCs, as well as the individual contaminants asbestos, nitrate, and nitrite.

Compliance Impacts

Table 3-3 presents typical monitoring requirements for organic and inorganic compounds for systems serving a population greater than 3,300, along with the City’s current monitoring status. Repeat monitoring is based on initial results and vulnerability. If a contaminant is not detected (or is detected at very low levels), the frequency of monitoring is reduced. However, if a contaminant is found above the “trigger,” the purveyors may be required to temporarily perform quarterly sampling.

The vulnerability assessment must demonstrate that the water system is not vulnerable to a particular contaminant, either by showing the contaminant was never used in the source area, or that susceptibility to the contaminant does not exist (due to source water production programs, prior test results, wellhead protection programs, etc.).

Results of the analyses must be reported to the DOH within 10 days after the end of the required monitoring period, unless the results exceed the MCL. In that case, the results must be reported to the DOH within 24 hours, or by the next business day after the results are reported to the utility.

**Table 3-3
Inorganic and Organic Compound Monitoring Requirements for
Groundwater Systems**

Contaminant	Sampling Frequency ¹	Trigger that Increases Sampling	Requirements for Waivers/ Current Compliance
Asbestos	1 sample every 9 years, not required for source approval.	> MCL	Based on vulnerability assessment. Longview has received a waiver from monitoring.
Nitrate	Annual.	≥ 50% MCL	No waivers allowed.
Nitrite	1 sample every 3 years.	≥ 50% MCL	No waivers allowed.
Inorganic Compounds (IOCs)	1 sample every 3 years.	> MCL	Includes arsenic standard of 10 ppb. Longview has received a waiver and performs complete IOC testing every 9 years.
Volatile Organic Compounds (VOCs) ²	Quarterly sampling required for first 3 years of operation, then 1 sample every 3 years.	Detection	If first sample is non-detect additional samples in first 3 years may be waived. Longview has received a waiver and performs VOC testing every 6 years.
Synthetic Organic Compounds (SOCs) ² : <ul style="list-style-type: none"> ▪ Dioxin ▪ Endothal ▪ EDB ▪ Diquat ▪ Glyphosphate 	Quarterly sampling required for first 3 years of operation, then 1 sample every 3 years.	Detection	If first sample is non-detect additional samples in first 3 years may be waived. Longview has received complete waivers for these compounds.
Synthetic Organic Compounds (SOCs): <ul style="list-style-type: none"> ▪ Herbicides ▪ Pesticides ▪ Insecticides 	Quarterly sampling required for first 3 years of operation, then 1 sample every 3 years.	Detection	If first sample is non-detect additional samples in first 3 years may be waived. Longview has received waivers for all these compounds and performs herbicide/pesticide testing every 9 years.
Notes: <ol style="list-style-type: none"> 1) Sampling location is source water after treatment for all analytes. 2) Well casing must be > 200 feet. Sampling frequency assumes low rating in the Susceptibility Assessment. 			

Per- and Polyfluoroalkyl Substances (PFAS)

Rule Summary

Washington State has recently adopted US Environmental Protection Agency (EPA) MCLs established for six PFAS organic compounds – PFOA, PFOS, PFHxS, HFPO-DA, PFNA, and PFBS. These standards replace State Action Levels (SALs) the initially established until federal regulation was completed. However, federal review of these compounds is ongoing, and EPA announced in May 2025 that the MCLs of all compounds beyond PFOA and PFOS would be rescinded and the compliance deadline for the remaining MCLs extended.

PFAs are a large group of chemicals that have been used since the 1950s in the manufacturing of consumer products such as food packaging, outdoor clothing, ski and snowboard waxes and carpets. Their role is to aid in the creation of stain and water resistant or non-stick surfaces. PFAs have also been used in some forms of firefighting foam. They do not easily break down within the environment, and have been detected in air, soil, water and food. Perfluorooctanoic acid (PFOA) and perfluorooctyl sulfonate (PFOS) are the most known PFAS chemicals, and their use by manufacturers has been significantly curtailed over the last 15 years.

If ingested over periods of time, the accumulation of PFAs are suspected through human and animal studies to have the following potential health effects:

- Lower infant birth weight.
- Increased cholesterol levels.
- Immune suppression.
- Liver and thyroid problems.
- Increased risk of some types of cancer.

Compliance Impacts

Table 3-4 established impending monitoring requirements for PFAS during interim SAL guidelines, but the City water department is continuing to coordinate with DOH on monitoring as federal regulations continue to evolve. Similar to other organic compounds, sampling is to occur after source water treatment has occurred but prior to its entry into the distribution system.

**Table 3-4
PFAS Monitoring Requirements¹**

Contaminant	Sampling Frequency	MCL	Requirements for Waivers/Current Compliance
PFOA	1 sample every 3 years, with increased frequency triggered as monitoring results approach MCL.	4 ng/l ²	First round of sampling to be performed by December 31, 2025. Systems may be eligible for waiver in the future.
PFOS	1 sample every 3 years, with increased frequency triggered as monitoring results approach MCL.	4 ng/l	First round of sampling to be performed by December 31, 2025. Systems may be eligible for waiver in the future.
HFPO-DA	1 sample every 3 years, with increased frequency triggered as monitoring results approach MCL.	10 ng/l	First round of sampling to be performed by December 31, 2025. Systems may be eligible for waiver in the future.
PFHxS	1 sample every 3 years, with increased frequency triggered as monitoring results approach MCL.	10 ng/l	First round of sampling to be performed by December 31, 2025. Systems may be eligible for waiver in the future.
PFNA	1 sample every 3 years, with increased frequency triggered as monitoring results approach MCL.	10 ng/l	First round of sampling to be performed by December 31, 2025. Systems may be eligible for waiver in the future.
PFBS	1 sample every 3 years, with increased frequency triggered as monitoring results approach SAL.	345 ng/l	First round of sampling to be performed by December 31, 2025. Systems may be eligible for waiver in the future.
Notes: 1) City Water Department is continually coordinating with DOH to modify the monitoring requirements of this rapidly evolving regulation. 2) ng/l = nanograms per liter.			

Stages 1 and 2 Disinfectant/Disinfection By-Product Rule (D/DBPR-1,2)

Rule Summary

The two stages of the D/DBPR that have been promulgated to date apply to all community water systems and non-transient, non-community water systems that add a disinfectant during any part of the treatment process. Excessive concentrations of chlorine when used as a disinfectant, as well as the potential by-products that can be created from chlorine and other disinfectants when associated with organics in a water source, can have adverse human health effects and increase the risk of cancer. The two stages of the rule were promulgated in 1998 and 2006, with respective compliance, depending on system size, to occur in the years after rule adoption. All systems must now be in compliance with both stages of the rule.

Under D/DBPR-1, disinfectant MRDLs and disinfection by-product MCLs were introduced, with disinfectant compliance determined at the point of treatment dosing while DBPs were monitored for compliance at distribution system locations that were identified through existing system information and judgement. Locations of greatest water age, thought to be analogous with maximum DBP potential, were used to establish points of monitoring and compliance, which was upheld by having system-wide running annual averages stay below MCLs. Under D/DBPR-2, an Initial Distribution System Evaluation (IDSE) that relied on hydraulic modeling and/or sampling programs was used to identify DBP compliance points more rigorously within the distribution system. Those recommended and adopted locations must all now demonstrate compliance with running annual averages individually.

TOC Removal Requirements

TOC removal requirements for control of DBP precursors apply to all systems using surface water [including Groundwater Under the Influence of Surface Water (GWI)]. These removal requirements do not apply to Longview, due to the City’s groundwater supply status.

Compliance Impacts

Routine monitoring requirements under the D/DBPR-1 and WAC 246-290-300 and 310 are summarized in Table 3-5. If an MCL is exceeded, the City must take follow up action as directed by the DOH. Actions may include re-sampling and/or public notification. With Longview’s transition from surface water to groundwater source, source water and distribution system organics might be expected to decrease, limiting DBP potential. Although Longview has remained compliant with D/DBP-1,2, by-product concentrations have yet to diminish to levels that demonstrate justification for a waiver to reduce monitoring requirements.

**Table 3-5
 Stage 1 and 2 Disinfectants/Disinfection By-Products Rule
 Monitoring Requirements**

Disinfectant/Disinfection By-Products	Stage 1/2 MCL	Stage 1/2 Monitoring Compliance
Disinfectant By-Products (MCL): <ul style="list-style-type: none"> ▪ Total Trihalomethanes (TTHM) ▪ Haloacetic Acids 5 (HAA5) ▪ Bromate² ▪ Chlorite³ 	80 µg/l ¹ 60 µg/l 10 µg/l 1 mg/l	TTHM and HAA5 monitoring locations have been established within the City’s approved Distribution System Monitoring Program with DOH. Quarterly sampling and monitoring occurs to demonstrate that individual running annual averages remain below MCLs. Bromate and chlorite do not apply.
Disinfectants (MRDL): <ul style="list-style-type: none"> ▪ Chlorine ▪ Chloramines ▪ Chlorine Dioxide³ 	4 mg/l 4 mg/l 0.8 mg/l	Chlorine MRDL compliance is demonstrated through monitoring performed within the distribution system where bacteriological (coliform) sampling occurs.
Notes: <ol style="list-style-type: none"> 1) µg/l = microgram per liter. 2) Required only for systems using ozone. 3) Required only for systems using chlorine dioxide. 		

Total Coliform Rule (TCR) and Revised Total Coliform Rule (RTCR)

Rule Summary

The TCR, which became effective in 1990, prescribes monitoring and compliance protocols for assuring the bacteriological quality of water in distribution systems. It applies to all types of systems and establishes an MCL goal of zero for total coliform, fecal coliform, and *E. coli*. Coliform bacteria, though not necessarily disease-causing themselves, can be indicators of organisms that can cause gastroenteric infections, dysentery, hepatitis, typhoid fever, cholera, and other infectious diseases. Coliform bacteria reside in the intestinal tracts of warm-blooded mammals and are excreted in large numbers with feces. Fecal coliforms are a subset of total coliforms and are generally a better indicator of direct fecal contamination. *Escherichia coli* (*E. coli*) is a subset of fecal coliforms and is an even better indicator of fecal contamination. Coliforms can be found in sewage, soils, surface waters, and vegetation.

The Revised Total Coliform Rule (RTCR) replaced the Total Coliform Rule (WAC 246-290-310) on April 1, 2016. It requires systems vulnerable to contamination to find and fix problems and pathways that could allow pathogens to enter the distribution system. The monitoring requirements that remain valid under the TCR and RTCR are detailed in WAC 246-290-300.

Key provisions issued under the RTCR include:

- Began April 1, 2016, for all systems.
- Maintains the coliform monitoring schedule on the system's Water Facilities Inventory form.
- Requires system assessments and corrective actions following "treatment technique triggers" associated with positive samples.
- Changes the Acute Maximum Contaminant Level (MCL) to *E. coli* MCL; removes Non-Acute MCL.
- Requires updating or revising coliform monitoring plans.
- Changes monitoring, reporting, and public notification requirements.
- Requires start-up procedures for seasonal systems.

Compliance Impacts

The City's water department collects 50 monthly samples throughout the distribution system for total coliform testing to maintain active compliance against bacteriological outbreak.

Lead and Copper Rule

Rule Summary

Published in June 1991, the Lead and Copper Rule (LCR) sets treatment technique requirements for lead and copper. The LCR calls for monitoring to establish compliance with action levels of 0.015 mg/l for lead and 1.3 mg/l for copper, with a maximum contaminant level goal (MCLG) of zero for lead. If either action level is exceeded, the water system must assess corrosion control alternatives and implement an "optimal" corrosion control program and/or treat the source water. Systems that remain in noncompliance after implementing 'optimal' corrosion-control strategies are required to locate and replace lead service lines according to a prescribed schedule.

Lead is a highly toxic metal now banned for use in new public water system pipes, flux, and solder. Infants and pregnant women are especially susceptible to lead poisoning. Lead causes central and peripheral nervous system damage, hindering development in small children. The presence of lead in older facilities is a nationwide concern. All new pipes, fittings, solder, or flux used in the installation or repair of public water systems must now be lead-free (WAC 246-290-230). Lead-free is defined in the state regulations as no more than 8 percent lead in pipes and pipe fittings and no more than 0.2 percent lead in solder and flux.

Copper is both a primary and secondary drinking water standard. Copper is associated with stomach distress, Wilson's disease, and staining of porcelain.

In October 2011, short term revisions to the Lead and Copper Rule (LTR-STR) went into effect. The monitoring plan and frequency of monitoring requirements were unchanged with the revisions, but additional framework was added that included:

- Water systems must provide notification of sample results to water users where lead and copper samples are collected.
- Systems must submit written documentation to DOH prior to the addition of a new source or any long-term treatment change. The documentation must include an evaluation of the potential impacts on the corrosivity of the finished water. DOH must review and approve any addition or change before implementation.
- The LCR-STR refines when compliance and monitoring periods begin and end. For systems monitoring annually or less frequently for lead and copper, the monitoring period is limited to the warmest time of the year between June and September. The LCR-STR also further defines the timing of actions following a lead or copper action level exceedance; the timing of monitoring activities related to reduced monitoring schedules; and reporting requirements.
- Systems must provide public education within 60 days after the monitoring period in which they exceed the lead action level. The revisions require all community water systems to provide information in their CCRs on lead in drinking water. Previously, only water systems that detected lead above the action level in more than five percent of the homes sampled had to include a short informational notice about lead in their CCR.
- The new rule adds a requirement for utilities to reconsider previously "tested-out" lines when resuming lead service line replacement programs.

In December 2021, EPA announced the implementation of further revisions to the rule (LCRR) as an interim step to developing and finalizing the Lead and Copper Rule Improvements (LCRI) in 2024. Areas of focus under the revisions and intended new rule include:

- Full inventory, public notification, and complete replacement of lead service lines.
- Establishing trigger levels for lead and copper below the action levels that allow earlier mitigation.
- Required testing at schools and child care facilities.
- Review of and improvement/simplification to tap sampling technique and action/trigger level compliance.

- The LCR-STR refines when compliance and monitoring periods begin and end. For systems monitoring annually or less frequently for lead and copper, the monitoring period is limited to the warmest time of the year between June and September. The LCR-STR also further defines the timing of actions following a lead or copper action level exceedance; the timing of monitoring activities related to reduced monitoring schedules; and reporting requirements.
- Prioritization of historically underserved communities.

Compliance Impacts

The City's water department collects 30 samples from identified services within the distribution system under its DOH monitoring program to maintain active compliance below action levels. Rule revisions to be implemented with sampling, testing, and notification are actively discussed with DOH and implemented accordingly. As required, the City submitted its complete lead service line inventory to DOH in 2024 and continues to plan for the identification and replacement of all lead or unknown material service lines in accordance with the evolving timelines of this rule. Longview does perform treatment (pH adjustment) through chemical addition to its Mint Farm groundwater source.

Consumer Confidence Reports (CCR)

Rule Summary

This rule requires community water systems to prepare and provide annual CCRs to their customers reporting the quality of the water delivered by the systems. CCRs are intended to provide information to the public regarding the quality of the water delivered by Community Water Systems (CWSs) and characterize the risks (if any) from exposure to contaminants in the drinking water. The CCR must be written in plain English and shall present the results of sampling programs conducted by the CWS, as well as any MCL violations, variances, or exemptions granted to the system. The CCR must also provide the name of a utility contact person.

Compliance Impacts

Each system must mail a copy of the CCR to every customer. The City currently prepares annual CCRs, mails a copy of the CCR to every customer, and posts the report online on the City's Water Operations Division website.

Unregulated Contaminant Monitoring Rule (UCMR)

Rule Summary

Under 1996 amendments to the Safe Water Drinking Act (SWDA), EPA established the UCMR to introduce 5-year monitoring cycles for high priority contaminants suspected to be present in drinking water that do not have set health-based standards. All large public water systems, and a representative number of smaller systems, are now required to participate in these monitoring cycles. The resultant database is used to inform EPA on future rulemaking decisions associated with potentially introducing new health-based standards. Longview has participated in data collection for past UCMR cycles and will be required to do so for one year during the 2023 through 2025 collection period under UCMR 5. Lab testing of samples for 29 different PFAS compounds will be included, in addition to lithium.

Compliance Impacts

The City will continue to perform testing for unregulated contaminants in future cycles as required and coordinated with DOH.

3.3.4 Future or Potential Regulations

EPA continuously reviews scientific data and deliberates case history in considering regulation of drinking water for health-based standards. Part of that process is the cyclical review of existing contaminants and the adequacy of their established MCLs, and another part of the process is the consideration of new contaminants that are evaluated off of a maintained Contaminant Candidate List (CCL). Recent candidates that have been reviewed, for which no rulemaking action has been initiated, include fluoride, radon, perchlorate, methyl tertiary butyl ether (MTBE), N-Nitrosodimethylamine (NDMA), and 1,4- dioxane. In some cases, these contaminants remain on the CCL for future review, and can be incorporated into an upcoming UCMR monitoring cycle as deemed appropriate. Chromium, which remains under EPA review for consideration of modifications to the current MCL (a total chromium MCL of 0.1 mg/l is being evaluated to determine if it is appropriate, or if individual regulation of the most common forms, chromium-3 and chromium-6, should be considered). None of these potential regulatory developments are far enough along to assess the potential compliance impact to Longview.

Much of the focus for upcoming regulation at the federal level will be associated with continued LCR and PFAS MCLs, as discussed in previous sections. Additionally, potential revisions to Microbial and Disinfection ByProduct Rules (chlorate and nitrosamines are two identified DBP candidates) are being considered, with evaluation still in preliminary stages.

3.4 Summary of Water Quality and Treatment Related Constraints

The MFRWTP has been in operation since 2013 and maintains compliance with DOH regulatory requirements for treatment. Upon construction, the primary objectives of the treatment facility were to remove iron and manganese to concentration levels below established secondary MCLs, as well as disinfect, fluoridate, and provide corrosion control for LCR compliance through chemical pH adjustment. Source water quality monitoring requirements for the Mint Farm wellfield are now infrequent, but extensive sampling and testing of this source during piloting performed in advance of the facility's construction established relevant background concentrations and remaining treated water objectives, as detailed in Table 3-6.

**Table 3-6
Raw Water Quality and Treated Water Objectives**

Parameter	Average Raw Mint Farm Groundwater Quality	MFRWTP Finished Water Goals
pH	7.2	7.6
Alkalinity (mg/l as CaCO ₃)	110	
Temperature (degree Celsius)	12	
Total Hardness (mg/l as CaCO ₃)	90	0
Iron (mg/l)	0.66	< 0.05
Manganese (mg/l)	0.53	< 0.02
Arsenic (µg/l)	4.9	< 5
Calcium (mg/L as CaCO ₃)	66	
Dissolved Inorganic Carbon (mg/l)	254	
Total Dissolved Solids (mg/l)	160	
Conductivity (µmho/cm)	280	
Total Silica (mg/l)	51.5	
Fluoride (mg/l)	< 0.2	1.0
Chloride (mg/l)	6.0	
Sulfate (mg/l)	0.6	
Phosphate (mg/l)	0.4	

The MFRWTP has maintained compliance with these treatment objectives since startup; however, distribution system water quality and hydraulic system constraints associated with the change in source water quality and location have confounded water department operations during the years of operation since. The issues have included:

- Change in water quality characteristics in transitioning from a surface water to groundwater source that resulted in increased reaction with the interior surfaces of older pipelines, leading to discoloration and suspension of particulate within sections of the distribution system.
- Introduction of dissolved levels of groundwater minerals, not requiring regulatory treatment for customer health protection, that has resulted in nuisances to customer end uses that include hard surface spotting to dishes and increased maintenance of appliances.
- Difficulties to maintaining appropriate ranges of reservoir and distribution system chlorine residual levels associated with the City’s main storage facilities, the 244 Zone Hillside reservoirs. These issues are influenced by the system hydraulic grade line generated within the 244 Zone from finished water pumping at the MFRWTP, which directly supplies most of system demand on its way to filling the reservoirs, limiting the ability of the reservoirs to turn over.
- Limitations to being able to effectively turn over Hillside reservoirs, due to minimum tank levels that need to be maintained in order to effectively supply water to BHWSO through both a pressure fed master meter vault along Westside Highway and a booster pump station located at the Hillside reservoirs.

- Operational issues associated with attempting normal draw/fill cycles with the 244 Zone Mt Solo reservoir, whose comparative proximity to the MFRWTP and equivalent overflow elevation with the more remote Hillside reservoirs has resulted in common activation of the reservoir’s altitude valve due to arriving hydraulic grades in excess of the overflow elevation.
- Inability to operate the MFRWTP at its peak designed production levels. The facility is designed to be able to treat four groundwater wells simultaneously to meet peak and future system demands. However, if more than two wells are brought into operation with the current system configuration, high pressures generated in proximity to the MFRWTP due to constraints in transmission capacity have resulted in watermain and customer service leaks and breaks.

Ensuing evaluations and recommendations to address the distribution system pipe reaction water quality issues are on file with the City. This resulted in the installation of a dissolved oxygen injection system at the MFRWTP that has helped stabilize pipe wall reactions, though operational constraints to achieving target levels of dissolved oxygen(DO) concentration while adequately controlling chlorination practices, distribution system residuals, and customer complaints associated with “milky water” still exist. An additional consideration is that the injection system capacity is limited by the water pressure at the point of injection, such that the intent to operate three and four Mint Farm wells simultaneously, increasing injection point pressure, would further impede the system’s capability to achieve target concentrations of DO.

To alleviate several of these current operational issues, the City has prioritized the construction of a dedicated transmission line between the MFRWP and the Hillside reservoirs in their upcoming capital improvement program (CIP). Preliminary design efforts and pursuit of funding for this essential project are underway. Regarding supplemental actions to be considered in addressing these issues, an April 2021 *Phase 2 Water Quality Improvement Study* performed by Confluence Engineering Group was completed and is available on file with the City. The City continues to carry out the recommendations of this study and has recently installed mixing systems within individual Hillside reservoir cells.

3.5 System Analysis

The objective of this Section is to determine whether the existing system facilities can meet the current and projected demands identified in Chapter 2: Basic Planning Data. The following water system components will be analyzed: source capacity, treatment plant capacity, booster pump station capacity, and storage capacity.

Current and projected average and peak demands for the City (developed in Chapter 2: Basic Planning Data) and BHWSD (from BHWSD WSP 2019) are summarized in Table 3-7 and Table 3-8. These projections were used for system analysis. BHWSD water demands are added when considering source and treatment capacity.

Table 3-7
Summary of Longview Water Demands

Year	ADD (MGD)	MDD (MGD)	PHD (MGD)	ERUs	ADD ERU Demand (gpd/ERU)	MDD ERU Demand (gpd/ERU)
2025	3.43	6.54	10.48	23,633	144.0	274.8
2035	3.60	6.87	11.01	24,845	144.0	274.8
2045	3.79	7.23	11.58	26,119	144.0	274.8

Table 3-8
Summary of BHWS D Water Demands

Year	ADD (MGD)	MDD (MGD)	PHD (MGD)	ERUs	ADD ERU Demand (gpd/ERU)	MDD ERU Demand (gpd/ERU)
2025	0.78	1.43	2.9	4,658	150.9	350.0
2035	0.82	1.49	3.1	5,072	150.9	350.0
2045	0.87	1.54	3.3	5,502	150.9	350.0

3.5.1 Source

The MFRWTP has four groundwater wells that pump water from a deep aquifer to the surface. There is room and aquifer capacity for two additional wells to be constructed when needed. Table 3-9 summarizes maximum instantaneous withdrawal rates and sustainable withdrawal rates for the MFRWTP as shown on their new water right permit.

Table 3-9
Summary of Available Groundwater Rights

Annual Source (acre-ft/yr)	Annual Source (MGD)	Instantaneous Maximum Source (gpm)	Instantaneous Maximum Source (MGD)
13,500	12.05	28,250	40.68

The available source capacity was compared to current and projected demands to determine source adequacy for ADD and MDD. Projected demands and source capacity were converted to ERUs. The results of the analyses are shown in Table 3-10 and Table 3-11. Because the MFRWTP serves both the City and BHWS D, the analysis was performed on their cumulative demands. The MDD, ADD, and ERUs were combined between the City ERUs and BHWS D ERUs, respectively.

Table 3-10
Allowable ERUs for Raw Water Maximum Source Capacity
(ADD Approach)

Year	Projected Raw Water Demand (MGD) ¹	Annual Source Water Right (MGD)	Projected ERUs ¹	Available Source ERUs ²	Remaining Source ERUs
2025	4.21	12.05	28,291	83,632	55,341
2035	4.42	12.05	29,911	83,632	53,721
2045	4.66	12.05	31,621	83,632	52,011

Notes:

- 1) Projected ERUs include both Longview and BHWSO projected figures.
- 2) Available ERUs = Annual Source / ADD ERU demand.

Table 3-11
Allowable ERUs for Raw Water Instantaneous Maximum Source Capacity
(MDD Approach)

Year	Projected Raw Water Demand (MGD)	Instantaneous Maximum Source Water Right (MGD)	Projected ERUs ¹	Available Source ERUs ²	Remaining Source ERUs
2025	7.97	40.68	28,291	148,035	119,744
2035	8.36	40.68	29,911	148,035	118,124
2045	8.77	40.68	31,621	148,035	116,414

Notes:

- 1) ERUs include both the City and BHWSO projected figures.
- 2) Available ERUs = Instantaneous Maximum Source / MDD ERU demand.

3.5.2 Treatment Capacity

Treatment capacity is a function of maximum day capacity expressed as ERUs. Table 3-12 illustrates the estimated allowable ERUs based on treatment capacity. The MFRWTP is designed to allow expansion and addition of two wells and two pressure filters. The staged maximum capacity is shown in Table 3-12. The current excess capacity and future addition of two wells and pressure filters will provide the City with the ability to attract potential industrial customers to support the City’s economic stability.

**Table 3-12
MFRWTP Capacity (MDD Approach)**

Year	Maximum Daily Demand (MGD) ¹	Projected ERUs	MFRWTP Reliable Capacity (MGD) ²	Available Treatment ER ^{3,4}	Remaining Treatment ERUs
2025	7.97	28,291	17.4	63,319	35,028
2035	8.36	29,911	17.4	63,319	33,408
2045	8.77	31,621	17.4	63,319	31,698

Notes:

- 1) MFRWTP includes both the City and BHWS.
- 2) MFRWTP reliable capacity based on Basis of Design. See Chapter 1, Section 1.7.2 Facilities.
- 3) Available ERUs = Treatment Capacity / MDD ERU demand.
- 4) Ultimate plant capacity is 25.3 MGD; future capacity will be added as demand increases. See Chapter 1, Section 1.7.2 Facilities.

3.5.3 Pressure Zone and Storage Analysis

Storage requirements were calculated in each pressure zone for 2025 (average), 2035 (10-year planning period), and 2045 (20-year planning period) demands. Pressure zones were grouped according to the pump station that serves that zone. As such, a lower zone served through a PRV was grouped with the upper pressure zone serving the PRV.

Review of Pump Criteria

Allocation of Source by Zone

It has already been established that the supply source for the City is adequate. The next step in the planning process is water allocation by zone. This allocation is an important consideration when determining the required storage volume for each zone. As defined below, total capacity, reliable capacity, and net reliable capacity must be evaluated to determine storage requirements. A discussion of the determination of required storage volumes follows.

- Total Capacity (TC): total pump station production with all pumps in service.
- Reliable Capacity (RC): total pump station production with the largest pump out of service. RC is used for pump station capacity analysis.
- Net Reliable Capacity (NRC): an adjustment to RC that accounts for withdrawals by a higher zone (e.g., a lower pump zone supplies an upper zone pump station). NRC is used in the storage capacity analysis to determine the amount of ES that a pressure zone requires.

Review of Storage Criteria

The criteria for storage requirements used in this analysis are outlined in the DOH Design Manual (4th Edition) for Group A Public Water Systems. A storage reservoir consists of five component volumes:

- Operational storage (OS).
- Equalizing storage (ES).

- Standby storage (SB).
- Fire suppression storage (FSS).
- Dead storage (DS).

Operational Storage (OS)

Operational Storage (OS) is the volume of water devoted to supplying the water system when the pump facility is at rest. The OS volume, which varies by system, must be sufficient to prevent excessive pump cycling. The OS requirement is additional to the equalizing and standby/fire storage requirements. Currently, the City strives to maintain its reservoirs within 1 foot of the overflow level, except Mt. Solo and Columbia View. OS volume may change when the MFRWTP comes online in order to enhance tank turnover.

Equalizing Storage (ES)

Equalizing Storage (ES) is provided to meet seasonal and/or daily variations in demand that exceed the source pumping capacity. Diurnal peaks, which vary significantly from the average daily flow, typically occur during the morning and early evening. ES volume depends on PHD, source production capacity, and mode of operation (i.e., continuous pumping or call-on-demand).

If actual water records are unavailable, the DOH recommends the following equation to estimate the required ES volume. Therefore, the ES for each pressure zone was calculated as follows:

ES (gallons) = (PHD – Qs)(150 min), where:

PHD = PHD (gpm)

Qs = Source Production Rate (gpm)

Standby Storage (SB)

The main purpose of SB is to provide a measure of reliability for the system in case of unusual operating conditions (e.g., source production interruption or power failure). The volume of SB recommended varies depending upon whether the system is considered a single or multiple source system. However, when excessive water is stored, quality degradation may occur as the water ages. The City is considered to be a single-source system for this analysis. The recommended single-source SB volume is twice the ADD, as shown in the following equation (DOH 2001):

SB (gallons) = (2 days) (ADD)(N), where:

ADD is measured in gpd/ERU

N = Number of ERUs

or:

SB (gallons) = N * 200 gal/ERU

SB is to be provided to all service connections at 20 psi, and in no case can it be less than 200 gallons/ERU. The storage analysis was performed using the 200 gallons/ERU minimum to calculate SB.

Fire Suppression Storage (FSS)

The water delivery system (pumps, pipes, and reservoirs) must deliver the minimum fire suppression flows in accordance with established requirements while maintaining 20 psi throughout the distribution system [WAC 246-290-211(5)]. FSS is the product of the required fire flow (gpm) and duration (hrs). For example, per Cowlitz County Building Code, Article 16.05 for residential multi-family and commercial areas in the county, the required FSS is 1,500 gpm for 120 minutes, or 180,000 gallons. The recommended design fire flow requirements were summarized in Chapter 2: Basic Planning Data.

Dead Storage (DS)

Dead Storage (DS) is the volume of stored water that is not available to all consumers at the minimum design pressure. DS is excluded from the volumes provided to meet OS, ES, SB, and FSS. The total storage capacity of a reservoir minus the DS is the volume of effective storage.

Required Storage Volume

The total required storage volume for each pressure zone is equal to the sum of the OS, ES, and the larger of either SB or FSS. The required storage volume is based on effective storage and does not include DS.

3.5.4 Storage and Pump Station Analysis

For the purposes of this analysis, the MFRWTP’s treated water production was allocated as per historical records of water demand between the City and BHWSD. As shown in Table 2-1, BHWSD currently receives approximately 16 percent of the MFRWTP’s water production on a yearly basis. Available source volume was then allocated to each zone as described in Table 3-13. A summary of demand by pressure zone is presented in

**Table 3-13
 Available Supply Allocated by Zone**

Storage Analysis Zones	Total Capacity (gpm)	Reliable Capacity (gpm)
Main Zone (244) ¹	16,000 ¹	12,000
Niemi (415)	740	340
Trella (502, 653)	380	190
N. 50th Ave. (395, 531)	320	160
Indian Creek (318, 463)	620	270
Columbia View (488, 506, 660)	200	100
Hillcrest (286, 481)	500	250

Note:

1) Main Zone pumping capacity is the pumping capacity of the wells at the Mint Farm.

In Table 3-14 ADDs by pressure zone are calculated based on information provided in Table 2-3. MDD by pressure was calculated by multiplying the MDD:ADD ratio for the City in Table 2-2 by the ADD by pressure zone.

Table 3-14
Summary of Demands by Area

Reservoir Zone	2025			2035			2045		
	ADD (MGD)	MDD (MGD)	PHD (gpm)	ADD (MGD)	MDD (MGD)	PHD (gpm)	ADD (MGD)	MDD (MGD)	PHD (gpm)
Niemi (415)	0.05	0.09	185	0.05	0.10	194.6	0.05	0.10	204.57
Trella (502, 653)	0.08	0.15	165	0.08	0.15	173.2	0.08	0.16	182.08
North 50 th (395, 531)	0.02	0.04	136	0.02	0.04	142.8	0.02	0.05	150.09
Indian Creek (318, 463)	0.02	0.04	127	0.02	0.04	133.9	0.02	0.05	140.78
Columbia View (488, 506, 660)	0.02	0.04	99	0.02	0.04	104.4	0.02	0.04	109.74
Hillcrest (286, 481)	0.13	0.25	352	0.14	0.26	370.2	0.15	0.28	389.13
Main Zone (244) ¹	3.89	7.36	7,952	4.09	7.72	8,376	4.31	8.09	8,808
Total	4.21	7.97	NA	4.42	8.36	NA	4.66	8.77	NA
Note: 1) Total BHWSD demand included in Main Zone demand only.									

Pump Station Analysis

Pump station capacity was assessed to determine each pump station’s ability to meet ADD and MDD over the planning period. For the re-pump zones, cumulative ADD and MDD values were used to determine whether the lower pump station could meet the instantaneous demand from the combined lower and upper zones. Niemi Road is an example of a re-pump zone (refer to Figure 1-3, Hydraulic Profile). The results of this analysis, summarized in Table 3-15, show that all pump stations have sufficient capacity to meet demand through 2045. The Main Zone’s pumping capacity is the capacity of the well pumps at the Mint Farm. The Main Zone’s pumps are able to meet both the City’s demands and BHWSD’s demands through 2045. Though all pump stations have adequate hydraulic capacity through the 20-year planning period, the physical condition of the equipment and structures associated with each are approaching the end of their useful life. Capital budgeting to allow a systematic replacement of these facilities over a reasonable time period is recommended.

**Table 3-15
Pump Station MDD Capacity Analysis for Current Condition**

Current Condition (2025)							
Pumping Zone	ERUs	ADD (gpm)	MDD (gpm)	Pump Station Capacity (gpm)¹	ADD Excess Capacity (gpm)	MDD Excess Capacity (gpm)	MDD Pump Station Capacity in ERUs
Niemi (415) ²	407	34	65	340	306	275	1,784
Trella (502, 653)	340	53	102	190	137	88	997
North 50 th (395, 531)	245	15	29	160	145	131	839
Indian Creek (318, 463) ²	218	15	29	270	255	241	1,416
Columbia View (488, 506, 660)	126	13	25	100	87	75	525
Hillcrest (286, 481)	954	91	174	250	159	76	1,311
Main Zone (244) ³	26,002	2,697	5,106	12,000	9,303	6,894	62,951
2035							
Pumping Zone	ERUs	ADD (gpm)	MDD (gpm)	Pump Station Capacity (gpm) ¹	ADD Excess Capacity (gpm)	MDD Excess Capacity (gpm)	MDD Pump Station Capacity in ERUs
Niemi (415) ²	428	36	69	340	304	271	1,784
Trella (502, 653)	358	56	107	190	134	83	997
North 50 th (395, 531)	258	16	31	160	144	129	839
Indian Creek (318, 463) ²	229	16	31	270	254	239	1,416
Columbia View (488, 506, 660)	132	14	27	100	86	73	525
Hillcrest (286, 481)	1,003	96	183	250	154	67	1,311
Main Zone (244)	27,510	2,838	5,361	12,000	9,162	6,639	62,951

2045							
Pumping Zone	ERUs	ADD (gpm)	MDD (gpm)	Pump Station Capacity (gpm)¹	ADD Excess Capacity (gpm)	MDD Excess Capacity (gpm)	MDD Pump Station Capacity in ERUs
Niemi (415) ²	450	38	72	340	302	268	1,784
Trella (502, 653)	376	59	112	190	131	78	997
North 50 th (395, 531)	271	17	32	160	143	128	839
Indian Creek (318, 463) ²	241	17	32	270	253	238	1,416
Columbia View (488, 506, 660)	139	15	28	100	85	72	525
Hillcrest (286, 481)	1,054	101	193	250	149	57	1,311
Main Zone (244)	29,090	2,991	5,621	12,000	9,009	6,379	62,951

Notes:

- 1) Pump station capacity is based on Reliable Capacity.
- 2) Niemi demands include Trella; Indian Creek demands include Columbia View.
- 3) Main Zone demand and ERUs include total BHWSD demand.

Longview Storage Capacity Analysis

The results of the storage capacity analysis are presented in Table 3-16. The analysis includes the current condition and the projected storage needs for the 10-year (2035) and 20-year (2045) planning periods.

As shown in Table 3-16, the City meets storage requirements with the exception of the Niemi and Indian Creek zones. FSS is the dominant requirement for many of the City's upper pressure zones that require smaller domestic storage needs. The City uses the IFC requirement for residential/multi-family in the Indian Creek Zones (318 and 463), which is 1,500 gpm for 2 hours.. There are other operational considerations for the Indian Creek zone to consider as well.

The Longview Country Club and golf course has a high peak demand during periods when they are irrigating and can rapidly deplete the storage supply in the Indian Creek zone. During periods of irrigation, the City and golf course need to coordinate operations, so the City is able to provide the necessary level of service to this zone. It is estimated that golf course irrigation demands occur over a 4-hour period with an overall demand volume of approximately 84,000 gallons. Based on conversations with City staff and operational observations, the additional golf course demand was added to the required standby storage for analysis purposes. Analysis shows that even with the additional 84,000 gallons added to the standby storage requirement; the fire flow demand is still the greater demand and controlling volume for the standby requirement.

Based on the storage analysis, the Niemi service zone requires an additional 6,000 gallons while Indian Creek requires an additional 52,000 gallons of storage to meet fire flow storage needs. However, in both these cases PRVs from higher zones can also be used to provide supply and storage volume. Niemi can be served through a PRV from the Trella zone and Indian Creek through a PRV from the Columbia View zone. The reservoirs in these higher zones both contain adequate spare volume to meet the deficiencies in Niemi and Indian Creek; hence, no volumetric need for new storage exists during the 20-year planning period. The City believes the reservoirs have remaining life; however, they are suspected to be seismically deficient. Capital budgeting to allow systematic seismic retrofitting of these facilities over a reasonable time period is recommended.

The four main elements of the water system (water rights, treatment, pumping, and storage) have been analyzed for their ability to meet future demands. Due to the system's water main sizing and extensive looping, transmission and distribution system elements are not considered limiting from an overall capacity standpoint. Table 3-17 shows the capacity of each element as ERUs. Currently, treatment is the limiting element of the system but is still exceedingly sufficient to meet demand beyond 2045. The MFRWTP will be able to expand capacity in the future if demand increases past current capacity. The other elements also adequately meet future demands over the planning periods of 10 and 20 years. ERUs for both the City and BHWS are shown in Table 3-17 to provide comparison of demands and demonstrate the City's ability to amply meet its the combined demand.

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Table 3-16
Summary of Available Storage

Current Condition (2025)										
Reservoir Zone	Zone Demand as ERUs	FSS (gal)	SB Storage (gal) ¹	ES (gal)	OS (gal)	Total Required Storage (gal)	Effective Storage (gal)	Existing Storage as ERUs ²	Additional ERUs Required	Additional Required Storage (gal)
Niemi (415)	407	180,000	81,350	-	45,497	225,497	220,000	1,100	-	5,497
Trella (502, 653)	340	180,000	68,015	-	34,123	214,123	310,000	1,550	-	-
North 50th (395, 531)	245	15,000	49,055	-	51,185	100,240	220,000	1,100	-	-
Indian Creek (318, 463)	218	180,000	43,535	-	32,170	212,170	160,000	800	-	52,170
Columbia View (488, 506, 660)	126	180,000	25,133	-	71,580	251,580	520,000	2,600	-	-
Hillcrest (286, 481)	954	180,000	190,755	15,315	80,784	286,853	1,000,000	5,000	-	-
Main Zone (244) ³	25,641	1,200,000	5,128,156	-	2,253,109	7,381,265	11,640,000 ⁴	58,200	-	-
2035										
Reservoir Zone	Zone Demand as ERUs	FSS (gal)	SB Storage (gal) ¹	ES (gal)	OS (gal)	Total Required Storage (gal)	Effective Storage (gal)	Existing Storage as ERUs ²	Additional ERUs Required	Additional Required Storage (gal)
Niemi (415)	428	180,000	85,522	-	45,497	225,497	220,000	1,100	-	5,497
Trella (502, 653)	358	180,000	71,503	-	34,123	214,123	310,000	1,550	-	-
North 50th (395, 531)	258	15,000	51,571	-	51,185	102,756	220,000	1,100	-	-
Indian Creek (318, 463)	229	180,000	45,768	-	32,170	212,170	160,000	800	-	-52,170
Columbia View (488, 506, 660)	132	180,000	26,422	658	71,580	252,238	520,000	2,600	-	-
Hillcrest (286, 481)	1,003	180,000	200,537	18,023	80,784	299,344	1,000,000	5,000	-	-
Main Zone (244) ³	27,126	1,200,000	5,425,214	-	2,253,109	7,678,323	11,640,000 ⁶	58,200	-	-
2045										
Reservoir Zone	Zone Demand as ERUs	FSS (gal)	SB Storage (gal) ¹	ES (gal)	OS (gal)	Total Required Storage (gal)	Effective Storage (gal)	Existing Storage as ERUs ²	Additional ERUs Required	Additional Required Storage (gal)
Niemi (415)	450	180,000	89,908	-	45,497	225,497	220,000	1,100	-	5,497
Trella (502, 653)	376	180,000	75,170	-	34,123	214,123	310,000	1,550	-	-
North 50th (395, 531)	271	15,000	54,215	-	51,185	105,400	220,000	1,100	-	-
Indian Creek (318, 463)	241	180,000	48,115	-	32,170	212,170	160,000	800	-	-52,170
Columbia View (488, 506, 660)	139	180,000	27,777	1,460	71,580	253,041	520,000	2,600	-	-
Hillcrest (286, 481)	1,054	180,000	210,821	20,869	80,784	281,653	1,000,000	5,000	-	-
Main Zone (244) ³	28,745	1,200,000	5,749,095	-	2,253,109	8,002,205	11,640,000 ⁵	58,200	-	-
Notes:										
1) Existing ERU demand for each zone shown in Chapter 2, Table 2-12. The addition of an 84,000 gallon storage provision does not result in the standby requirement exceeding the fire requirement in any of the analysis years.										
2) Existing Storage as ERUs = Effective storage / 200gal/ERU.										
3) Includes Mt. Solo and Hillside Reservoirs, Effective storage for the Mt. Solo reservoir is 4MG.										
4) Dead storage calculated based on existing highest suction piping elevation (230.3).										
5) Reflects the removal of 1.0 MG of storage and adjustments to the pump station suction elevation to increase effective storage.										

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Table 3-17
Determination of Limiting Criteria for System Elements

Criteria	2025			2035			2045		
	Capacity (ERUs)	Longview ERUs	BHWSD ERUs ¹	Capacity (ERUs)	Longview ERUs	BHWSD ERUs	Capacity (ERUs)	Longview ERUs	BHWSD ERUs
Source Capacity ²									
Maximum Water Right Capacity	83,632	23,633	4,658	83,632	24,845	5,072	83,632	26,119	5,502
Instantaneous Water Right Capacity	148,035	23,633	4,658	148,035	24,845	5,072	148,035	26,119	5,502
Treatment Capacity ²	63,319	23,633	4,658	63,319	24,845	5,072	63,319	26,119	5,502
Reliable Pump Capacity ³	69,823	23,633	-	69,823	24,845	-	69,823	26,119	-
Storage Capacity ³	70,350	23,633	-	70,350	24,845	-	70,350	26,119	-
Water System Physical Capacity: 63,319 ERUs									
Notes:									
1) From BHWSD Water System Plan (Draft 2019).									
2) Includes both the City and BHWSD. Capacity is based on current design capacity of MFRWTP and does not include future capacity provisions.									
3) Pumping and storage capacities represent the sum of all system facilities.									

3.6 Telemetry and Controls

The intended water distribution supervisory control and data acquisition (SCADA) system that began to be implemented with MFRWTP construction is still in process. Full control and monitoring of the treatment facility is online, but installation and networking of essential remote facilities (reservoirs and pump stations) is still being implemented. The SCADA system is to be composed of programmable logic controllers (PLCs) with a Wonderware InTouch interface and licensed radio telemetry. The SCADA system servers are housed in the City's Data Center at City Hall, with back up servers at the MFRWTP and remote access capability from the Utilities Operations Center and from the homes of authorized personnel. The SCADA system will eventually serve all eight reservoirs sites and six pump stations and allow the City to monitor and control each facility.

Currently, the distribution system has limited monitoring and control capabilities. Three communication methods are used: leased telephone lines, direct buried cables, and licensed radio. Most of the reservoirs in higher pressure zones are linked to pump stations through buried cables or radio. All reservoirs provide continuous signals. The communication system for most remote sites needs to be replaced because the hardwire system is failing.

3.7 Distribution System Hydraulic Modeling

The City's water distribution system was analyzed using Innovyze InfoWater Pro hydraulic modeling software. This package offers the integration of water system hydraulic analysis and water quality platforms, as well as other maintenance and security modules, with GIS mapping. InfoWater Pro offers graphical capabilities to display node and junction input information (pipe lengths and diameters, elevations, demands, etc.) and results (velocities, fire flows, hydraulic grades, pressure contours, etc.) on top of the mapping layers.

3.7.1 Model Development

The City provided its existing water distribution system computer model that was developed as part of the 2012 WSP update. This model was setup for steady state simulation analysis only. As part of this model development effort, the model was extended so that it could also be used to carry out extended period simulation (EPS) analysis. The sequential steps described below were performed to update the model to a level that accurately depicts current system conditions:

1. **Facilities Update:** The model was updated based on information provided by the City and by comparing it to the latest City GIS data. Examples of facilities added since the last update include:
 - New distribution system water lines/transmission mains.
 - Piping modifications at Hillside Main Reservoir.
 - New or revised pumps/pump curves within existing pump stations.
 - Changed PRV settings.
 - Changed operational control parameters, including valve settings and reservoir set points.
2. **Demand Dispersal:** Existing and future demand projections for the City, as discussed in Chapter 2, were distributed among specific service areas correlating to pressure zones. This data were obtained through recorded yearly source of supply production data for facilities serving those areas. The data was used to create demand files for system nodes for existing demands and for

projected year 2035 and 2045 demands. Apart from large individual services with recordable information, demands were dispersed evenly across the nodes within each area.

3. **Calibration:** Water system model calibration involves recording actual field hydrant flow test data within specific pressure zones. The field-recorded data ideally include measured static and residual pressures at the hydrant before and during flooding, as well as the measured flow rate from the hydrant. Obtaining simultaneous test pressures at other locations within the zone is preferred, with an optimal targeted pressure drop of at least 10 psi at the hydrant. Zone boundary conditions must also be established and recorded during testing periods including:
 - Reservoir levels.
 - Settings and flow rates through all system PRVs within the pressure zone being tested.
 - Pumping rates for well or booster pumps in operation during testing that either contribute water to or take water from the pressure zone being tested.

Recorded field-testing conditions are replicated within the computer model, with the zone demand condition estimated according to the season and time of day when testing was performed. The objective is to iteratively adjust model conditions until the field-measured static and residual pressures at recorded locations match those calculated by the model. This is typically achieved by adjusting individual pipe friction, or “C,” factors. However, other modeling conditions could be at fault, so caution should be taken not to over-adjust C factors in order to match pressures. Other model characteristics that are frequently discovered to be inaccurate during calibration are:

- Node elevations that have been incorrectly entered or are based on conflicting data
- Incorrect PRV settings within the model
- Inaccurate pump curves that cause abnormal pumping flow rates within the model
- Inaccurate field measurement equipment, including uncalibrated or sensitive flow measurement and pressure gauges
- Discovery of a partially or fully-closed distribution system valve.

Typically, if the static pressures between model and field data are markedly different, but the pressure drop is similar, other modeling conditions such as those listed above should be checked and evaluated. Calibration is typically considered successful when pressures match to within 3 psi or 4 psi.

The City measures and collects hydrant flow and pressure data during its ongoing flushing program and uses this data to continuously calibrate the model. Outside of performing calibration scenario checks on the most recent flushing program tests, no additional calibration was performed as part of this plan. Modeled results matched field flow and pressure measurements within tolerable levels of accuracy, but pipe friction factors were not drastically modified due to the limitation of known boundary conditions during flushing. Exact reservoir levels, as well as PRV settings (which commonly undergo slight adjustments by operational staff based on regular facility checks), could not be accurately validated. The calibration review did, however, discover and correct inaccurate node elevations. The City’s distribution system piping C factors are between 100 and 150, except for a few consolidated areas of older pipe where tuberculation has been field verified. A pipe replacement program is ongoing to help address this problem.

4. **Scenario Creation:** The modeling software program allows for the creation and easy manipulation of varying databases representing physical, control, and demand input data. In order to more efficiently analyze the system under specified design criteria used to determine deficiencies, the following datasets and scenarios were created for the City's system:
 - Existing, 2035, and 2045 PHD scenarios with reservoirs set at the base of equalizing volume and pumps in service to represent operation under peak conditions.
 - Existing, 2035, and 2045 MDD scenarios with reservoirs set at the base of fire volume and pumps in service to represent operation under peak day conditions and at the conclusion of a fire flow event.

3.7.2 Hydraulic Evaluation Design Criteria

The design criteria used to evaluate the distribution system is based on maintaining ranges of system pressures and velocities as defined in WAC 246-290-230 and in the DOH Water System Design Manual. The models were run with varying conditions to adhere to these criteria for distribution system design, including:

- Maintain a minimum pressure of 30 psi at all service connections within the distribution system during PHD conditions.
- Maintain a minimum pressure of 20 psi at all service connections in the distribution system during fire flows under system MDD conditions.
- Limit pipe velocities to approximately 8 fps under PHD conditions.
- Limit pressure within the distribution system to 100 psi.
- Reservoir levels were assumed to be at the minimum water elevation as shown in the summary tables for each purveyor in Chapter 1.

The City established the required fire flow rates and durations for different customer classes in accordance with local Fire Marshal requirements (see Chapter 2).

3.7.3 Modeling Results

The system model was run in the static mode under appropriate scenarios to compare pressure, velocity, and available fire flow results against the design criteria. The results and deficiencies discussed below are independent of ongoing programs that may exist for the City for annual replacement of undersized (4 inch and smaller) water lines, as well as for waterlines made of unsuitable materials (AC, unlined cast iron and steel, and others). Many pressure and velocity deficiencies identified, however, were within these undersized and antiquated material pipelines.

The City has completed some of the recommended transmission and distribution system water line construction projects listed in its 2005 Comprehensive Plan Capital Improvement Program, resulting in the strengthening of transmission capabilities to deliver adequate pressures and flows. On the whole, the core of the distribution system within the Main 244 zone is strong, but perimeter service areas within the 244 Zone and boosted pressure zones that currently have long sections of unlooped water lines still remain as deficiencies.

Pressure Deficiencies

Due to the extensive looping of most of the City’s distribution system and a moderate 20-year growth projection with demands evenly dispersed throughout the system, the pressure deficiencies between existing conditions and projected Years 2035 and 2045 are the same.

The Main 244 zone of the City operates largely within a pressure range of 100 to 105 psi in the downtown grid. These high pressures are handled at individual service locations by the building department through the plumbing code. Fluctuating elevations within certain areas of the distribution system create pressure pockets that greatly exceed 100 psi, but the high pressures have been historically reported and observed with no adverse effects.

Pressures greater than 30 psi can be found throughout the distribution system under all conditions with the following exceptions:

- Homes adjacent to reservoirs (Hillside Mains, Hillcrest, Trella, and Neimi). Only a handful of connections are impacted in each location.
- Under certain fire flow conditions, which are discussed under Flow Deficiencies.

Pressures lower than 20 psi can be found throughout the distribution system under all conditions with the following exceptions:

- Homes adjacent to reservoirs (Hillside Mains, Hillcrest, Trella, and Neimi). Only a handful of connections are impacted in each location.
- Under certain fire flow conditions, which are discussed under Flow Deficiencies.

Velocity Deficiencies

Velocity deficiencies are limited to a small number of isolated cases where velocities exceed 10 fps under peak day conditions. These deficiencies will be addressed through an ongoing undersized watermain annual replacement program.

Flow Deficiencies

Replacement of undersized distribution and transmission mains within potentially high growth portions of the service area may be delayed until the growth occurs. This delay will allow cost associated with the required improvements to be shared with the project proponents and thus represents better planning. Implementing improvements before future needs are precisely known may result in undersized utilities.

The analysis of the City’s transmission and distribution system reveals the following deficiencies (2- and 4-inch mains were not considered in the analysis). The City is aware of the fire flow deficiencies in the 4-inch or smaller mains and their replacement is a priority. Other fire flow deficient mains/areas are identified below:

- The farthest extent of the long, unlooped 6-inch waterline traveling north along Coal Creek Road and Ragland Road within the 502 zone, where the required 500 gpm (County requirement outside of City limits) fire flow rate cannot be met at adequate pressures.
- The area within the Sunset 318 zone where there is 6-inch water line that cannot meet the 500 gpm County minimum fire flow requirement and dead ends to Poplar Road.

- The area at the end of Clark Creek Road in the 395 zone, where the required 500 gpm County minimum fire flow rate cannot be met at adequate pressures.
- The Barlow Point and Willow Grove area within the Main 244 zone, where long, unlooped 6- and 8-inch waterlines cannot meet the required 500 gpm County minimum fire flow requirements.
- The Fisher Lane area near Castleman has a 6-in pipe within the Main 244 Zone, one that loops and is just north of the abandoned 16-in diameter pipe along Fisher Lane. This area cannot meet the required 1,000 gpm fire flow.
- Along with the main near Fisher Lane, there is also a main near Castleman just south of the 16-inch along Fisher Lane that is 4-inch and has many branches that dead end that are also 4-inch in diameter. These pipes within this area do not meet the required fire flow of 1,000 gpm.
- The area within Hillcrest 286 Zone, has a looped pipe along Madrona Laurel and Cascade that has pipe between 4 and 6-in in diameter and does not meet the requirements for fire flow of 1,000 gpm.
- The area within the Main 244 zone along Pacific that ties into the connection to North 50th pump station has pipeline that is 6 inches in diameter and does not meet the 1,000 gpm fire flow requirement.

Addressing these deficiencies is prioritized by the pipeline replacement projects included within the Chapter 8 Capital Improvement Plan (CIP).

3.8 Summary of System Deficiencies and Recommendations

Table 3-18 summarizes the deficiencies and recommendations for the City developed throughout this Section. These recommendations will be further explored in Chapter 8: Capital Improvement Program.

Table 3-18
Summary of System Deficiencies and Recommendations

Location	Deficiency	Planning Period	Recommendation
Treatment			
Dissolved oxygen system	Meet DO water quality enhancement objectives while balancing distribution system impacts	6 Years	Implement recommended DO system optimization measures that will allow reduced DO concentrations to meet water quality objectives. Further treatment system capital investment is deferred in lieu of targeting completion of the dedicated transmission main that will enable these water quality objectives.
Distribution/Transmission			
2-, 4-, and 6-inch distribution mains	Required fire flow cannot be met in portions of the distribution system	10 and 20 Years	Continue annual pipe replacement program to address deteriorating and undersized mains. First projects to be performed under the City’s annual replacement program are the ones that address the existing hydraulic deficiencies identified in the distribution system analysis in the chapter.
Dedicated transmission main	Excessive resulting system pressures and water quality challenges	10 and 20 Years	A dedicated 30-inch water transmission main connecting the MFRWTP to The Hillside reservoirs will allow the City to use and treat water from all 4 of the Mint Farm wells, provide optimum levels of dissolved oxygen addition, and promote enhanced distribution system water quality per the 2022 Confluence study.
Storage			
	Niemi and Indian Creek Reservoirs	10 and 20 Years	Storage volume deficiencies can be addressed through supplemental storage volume from higher pressure zones through PRVs. Programmatic seismic retrofitting of reservoirs is recommended, with continued conditions assessments to determine if and when reservoir replacement becomes favorable.
Pumping			
	None Identified by model	6 and 20 Years	Refer to pump analysis in this chapter for recommendations. Programmatic replacement of pump stations reaching their useful life expectancy is recommended.

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Chapter 4 Water Use Efficiency and Reuse

4.1 Introduction

Washington State Legislature House Bill 1338, which came to be known as the Municipal Water Law (MWL), was passed in 2003. The MWL was developed to recognize the increasing demands being placed on our state's water resources, and the associated importance of conserving water for fish, by our growing communities, agriculture, and industry. The objectives of the bill are to:

- Provide more certainty and flexibility for water rights held by water systems.
- More closely tie water system planning and engineering approvals by the Washington State Department of Health (DOH) to water rights administered by the Washington State Department of Ecology (Ecology).
- Improve the ability to plan for future growth.
- Offer greater flexibility to solve public health problems with water right changes and transfers.
- Advance water use efficiency (WUE).
- Assure greater reliability of safe drinking water for communities.

Because MWL allows greater flexibility in the use of municipal water rights to serve the future growth of communities, potentially stressing the state's water resources further, the advancement of water use efficiency is seen as a necessary countermeasure. At the Legislature's direction, DOH developed and adopted an enforceable WUE Program in 2007, with water utility requirements integrated as a new Part 8 of WAC 246-290. The main requirements, with which City of Longview (City) fully complies, include:

- Publicly establishing water savings goals for its customers.
- Evaluating or implementing specific water saving measures to achieve customer-based goals.
- Developing a WUE planning program to support the established goals.
- Installing meters on all customer connections by January 22, 2017.
- Achieving a standard of no more than 10% water loss.
- Report annually on progress towards achieving these goals.

The primary goal of the WUE program discussed in this Chapter is to evaluate and update the City's program elements, including the required customer side efficiency goal set through public process, and to adopt the new program concurrently with the Water System Plan (WSP) update. Evaluated measures will be implemented or continued, based on conserving water resources and eliminating non-essential water use both by customers and within the system during operations. The City's WUE program is consistent with the guidelines established within the January 2017 Third Edition of the DOH *Water Use Efficiency Guidebook*.

The following water use efficiency elements will be discussed in this Section:

- Metering Program.
- WUE Program.

- Distribution System Leakage.
- Source of Supply and Water Shortage Response Plan.
- Water Rights Self-Assessment.
- Reclaimed and Water Reuse Opportunities.

4.2 Metering Program

The Mint Farm Regional Water Treatment Plant (MFRWTP) has meters installed at each of its well sources and a finished water meter to measure all the water leaving the plant.

The City has service meters on all service connections (100 percent metered). As discussed in Chapter 2, the meters were read by a private contractor until recently, when the City brought that function into its utility department responsibilities due to contractor related reading inaccuracies. Meter readings are reported to the City's Finance Department for billing. The City relies on historical water use at each connection to validate the accuracy of the meter readings. In the event that a reading appears to differ from the norm, the finance department notifies the Water Division. The Water Division then promptly investigates and repairs or replaces suspect meters as necessary.

The City has an ongoing meter replacement program that targets the upgrade and installation of 500 new service meters and meter boxes annually. The City has standardized on meters with remote reading capability and furnishes the meters to contractors when 1-inch or smaller in size is used.

The commercial, industrial, and trailer courts/apartment meters are read monthly, while most residential meters are read every two months. The master meters to Beacon Hill Water and Sewer District (BHWS) are also read monthly. Individual meters are tested upon a customer's complaint regarding their water bill. Meters 3 inches and larger are tested annually. One hundred thousand dollars (\$100,000) per year is budgeted for large meter replacements. The City has metering at most of its pump stations and uses motor run times and pump model flow rates to document production levels at the few without meters. As systematic replacement and/or regionalization of pump station facilities is invested in by the City as part of its Capital Improvement Plan (CIP), metering will become standardized with all facilities.

The emergency intertie to City of Kelso is metered, but the emergency connection from Nippo Dynawave is not. There are no plans to install a meter on the Weyerhaeuser connection because it will be used only during an extreme water supply emergency.

4.3 WUE Program

An urban area conservation plan was adopted by the Cities of Longview and Kelso and the Cowlitz County Public Utility District (PUD) in 1999, with elements from the regional effort carried forward and updated within a 2005 Water System Comprehensive Plan jointly completed by the utilities. Since that time, ownership of the PUD's water system has been transferred to BHWS, and utility plan updates have been separately performed by each agency.

The most recent City conservation objectives within the 2012 Comprehensive Water System Plan update were to:

- Reduce average day demand (ADD) per equivalent residential unit (ERU) by 1 percent by 2018 as a demand side goal.

- Implement or maintain the following conservation measures to aid in achieving the demand side goal:
 - Maintain an inverted block rate structure that places a premium on the purchase and use of large amounts of water.
 - Maintain a newly introduced sewer rate schedule that adds a usage fee to the fixed monthly base rate for customers that develop a pattern of exceeding their average water usage from recent records.
 - Present WUE exhibits at annual County and City-based events, such as the Cowlitz County Fair and the Go Fourth Festival at Lake Sacajawea Park.
 - Make WUE speakers available at civic group meetings.
 - Distribute WUE educational information through other venues and publications, including elementary schools, the City's website and newsletter, utility billing (with inclusion of 13-month customer historical usage graph), and the required annual Consumer Confidence Report (CCR).
- Additionally, the City has implemented the following supply side measures to aid in the conservation of its watershed resources:
 - Ongoing water meter calibration, repair and replacement program, as discussed in Section 4.2, to ensure accurate readings and better detect leaks that can occur on the private side of a service.
 - Repair leaks detected within public water infrastructure and replace pipelines with a history of multiple leaks.
 - Use data recorded through the City's Supervisory Control and Data Acquisition (SCADA) system to identify unusual system flow patterns associated with potential leaks or other operational use inefficiencies needing investigation.
 - Continue building and populating a utility asset management system that documents existing infrastructure information (age, materials, make/manufacturer, etc.) and adds condition assessments that aid in prioritizing replacement.

The demand side reduction goal was established following a successful period of conservation implementation between 2005 and 2010 where a 4.2 percent decrease in gallons per day (gpd)/ERU was achieved. The less aggressive goal of a further reduction of 1% is reflective of communities that have established and multi-faceted conservation programs that start to approach optimized achievements, though the 186.5 gpd/ERU maintained in 2010 is a higher value than what some other similar communities have achieved. Using the demand information established in Chapter 2 (144 gpd/ERU is the calculated average demand extracting system losses, the average increases to 157 gpd/ERU with their inclusion), Table 4-1 illustrates the considerable additional success the City's ongoing conservation measures have had over the last decade, exceeding the goal set with the last WSP. Table 4-2 shows a summary of the water demands on a per capita and per ERU basis. Both tables solely represent the City's water use information from Chapter 2, extracting the water produced at the MFRWTP that is distributed to BHWS.

The reduction in water use might be most attributable to the City's ongoing programs that have enhanced the accuracy of tracking both water use through meter replacement and maintenance, as well as identification and correction of sources of water loss. Water and sewer rate structure are certainly influential

as well, with the hope that informational outreach programs provide regular and consistent reinforcement to customers of the importance of conservation. On a per capita basis, it is estimated that ADD is down from 101.5 in 2010 to 89.5 gpd.

**Table 4-1
 ADD and MDD Reduction 2010-2019**

2010		2015-2019 Average		Percent Change	
ADD (gpd/ERU)	MDD (gpd/ERU)	ADD (gpd/ERU)	MDD (gpd/ERU)	ADD (gpd/ERU)	MDD (gpd/ERU)
185.5	346.9	144.0	273.6	(28.8%)	(26.8%)

**Table 4-2
 Summary of Per Capita Water Demands and ERUs**

2015-19 Average Water Service Area Population	ADD (MGD)	ERUs	Per Capita Demand (gpcd)	Per ERU Demand (gpd/ERU)
38,291	3.41	23,633	89.1	144.0

While a continued trend of reduced water use would be beneficial in the coming years, realistic goal setting is important. The average demands illustrated in Table 4-2 are emblematic of a community that is likely approaching a plateau regarding conservation, where further demand reductions become more challenging to achieve and the publicly accepted conservation measures are now well established. The average annual City demands between 2015 and 2019 are indicative of this potential conservation program maturation; there is no apparent consistent trend in lowered demands between the former and later years. Maintaining trends in reduced water use will be further challenged by the impacts of climate change and the increased acceptance of citizens towards the Mint Farm source of supply.

For these reasons, a focus on the critical summer peak demand season that most stresses a watershed’s resources is reflected in the following demand side goal has been established with this WSP update (as publicly reviewed and adopted by the City in 2025):

New Water Use Efficiency Goal: Maintain ADD demands at or below current level of 144 gpd/ERU while reducing maximum day demand (MDD) by 3% on a similar gpd/ERU basis by year 2031.

Materials associated with this required public forum are included in Appendix A. Table 4-3 includes the conservation measures that will be maintained by the City to aid in achieving this goal, with the justification of cost-effectiveness for each included. More information on these measures and associated costs is also included in Appendix A, with estimated volumetric water savings.

Table 4-3
2023 Adopted WUE Conservation Measures (Minimum of 9 Required)

Measure	Cost-Effectiveness
Maintain inverted block water rate structure.	No cost to City to maintain, felt to be impactful in curtailing water usage.
Maintain usage fee as an addition to sewer base rate.	No cost to City to maintain, felt to be impactful in curtailing water usage and a fair recognition of cost for larger than average flows that must be conveyed by the sewer collection system.
Maintain educational exhibit and have conservation representative at County Fair. Information highlighting curtailment of summertime irrigational needs included.	Exhibit and educational materials, labor for City staff attendee are nominal in cost and within existing budgetary items and defined responsibilities.
Maintain educational exhibit and conservation representative at Go Fourth Festival. Information highlighting curtailment of summertime irrigational needs included.	Exhibit and educational materials, labor for City staff attendee are nominal in cost and within existing budgetary items and defined responsibilities.
Annually participate and present on scheduled meetings for active civic groups (Chamber of Commerce, the Senior Center, Lions, Rotary, Kiwanis, Elks). Information highlighting curtailment of summertime irrigational needs included.	Presentation and educational materials, labor for City staff attendee are nominal in cost and within existing budgetary items and defined responsibilities.
Present WUE materials at local elementary schools. Information highlighting curtailment of summertime irrigational needs included.	Preparation of educational materials are nominal in cost and within existing budgetary items and defined staff responsibilities.
Include WUE information in the City’s newsletter, including focus on irrigational curtailment during summer issues.	Preparation of educational materials are nominal in cost and within existing budgetary items and defined staff responsibilities.
Include WUE information on the City website.	Preparation of educational materials are nominal in cost and within existing budgetary items and defined staff responsibilities.
Include 13-month usage graph on utility bills.	Invoicing format and data for graph creation is automatically generated through software, no additional expenditure required.

In addition to these demand side measures, the City will continue to practice its supply side meter and pipeline repair and replacement programs. These baseline operations functions not only promote conservation, but their continuance is required to meet state regulations, avoid contamination, and attain acceptable levels of service to City customers.

The effectiveness of the overall program will be evaluated by comparing the ADD and MDD on an annual basis. Table 4-4 uses the projections made in Chapter 2 to show the impact on future average daily and maximum daily demands if the measures implemented by the City are successful in curtailing peak summer usage and reducing MDD by 3 percent on a per ERU basis.

**Table 4-4
Future Water Demands (MGD) With and Without Conservation Goals Achieved**

Scenario	2020		2030		2040	
	ADD	MDD	ADD	MDD	ADD	MDD
Without Additional Conservation Efforts	3.43	6.54	3.60	6.87	3.79	7.23
With Additional Conservation Efforts	3.43	6.54	3.60	6.66	3.79	7.01
Projected Conservation Program Water Savings	N/A	N/A	0.00	0.21	0.00	0.22

4.4 Distribution System Leakage (DSL)

Distribution System Leakage (DSL) is defined as the total amount of water produced and purchased, minus authorized system consumption generally registered through meters. A 3-year running annual average DSL of greater than 10 percent requires a water utility to initiate a corrective action plan to reduce lost water. Table 4-5 shows City DSL for the most recent years for which Annual Performance Reports have been filed with DOH.

**Table 4-5
Distribution System Losses (DSL) for 2018-2024**

Reporting Period (January 1 – December 31)	Distribution System Leakage Volume (gallons)	Distribution System Leakage Percentage
2018	154,528,787	8.5%
2019	101,505,645	5.9%
2020	159,906,559	9.2%
2021	117,749	6.2%
2022	73,668	4.0%
2023	88,849	5.1%
2024	122,711	6.9%

Note:

- 1) 2021 through 2024 Performance Reports filed is assumed to have a mistaken value input for calculated DSL annual volume, while the percentage calculation is assumed correct. It is likely that the stated values in gallons is intended to be thousands of gallons, based on annual production totals.

As reported in the 2024 WUE Annual Performance Report, the current 3-year average DSL is 5.3 percent. The City Water Division continues to focus on better accounting of unauthorized water. Efforts to better account for water include:

- Metering of hydrant usage by the Fire Department or by the City for system flushing and maintenance.
- Improved flushing program including better estimates of water used, more efficient unidirectional flushing (closing more valves), and better de-chlorination practices.

- More timely and accurate service meter readings by operations staff since 2025, as recent past year calculated consumption totals in Performance Reports might have a component of inaccurate data.

4.5 Source of Supply and Reliability

The City's source of supply is the Mint Farm Wellfield, consisting of four individual wells that are alternately operated for municipal production. Generally, only one or two of the wells need to operate at a time to fulfill system demand and operating more than two wells simultaneously currently causes some operational issues with high resulting distribution system pressures. The source water quality is tested according to the DOH required monitoring program, and aquifer levels are also continuously measured.

4.5.1 Water Shortage Response Plan

Chapter 15.74 of the LMC is the City's Water Shortage Response Plan that will be implemented in the event of a potable water shortage or other situation that disrupts or diminishes the water supply. The four-stage plan provides for increasingly more stringent measures depending on the severity of the shortage. Enforcement of the measures includes a Notice of Warning and then a Notice of Violation that includes a water use surcharge. The surcharge for the first violation is \$100 and increases to \$500 for the fourth and subsequent violations. City staff are also authorized to install water flow restrictors or discontinue water service if other efforts to enforce the code are unsuccessful.

Water users will be notified of the status of the water shortage and what measures are in place via the City's weekly newsletter (City Info), the local newspaper (The Daily News), and local Radio stations. The City issues 'Fact Sheets' and standard press releases and will utilize the same procedure for water shortage notices.

The decision of when to implement the various stages of the plan will be made by the City's Public Works Director based on input by the Water Division manager and circumstances contributing to the water shortage. The Water Shortage Response Plan is a component of the City's water utility Emergency Response Plan, updated on a 5-year cycle and maintained on file at City offices.

4.5.2 Interties

The City has an intertie with the City of Kelso, and an emergency connection to Nippo Dynawave that can be connected quickly. Both measures could potentially be utilized in an emergency event. However, the Nippo Dynawave intertie can only provide non-potable water. These connections are described in more detail in Chapter 1. As the infrastructure associated with Kelso's source of supply (Ranney Well collector beneath the eastern bank of the Cowlitz River) ages, they are considering the option of upgrading their intertie network with the City to introduce the Mint Farm Wellfield as a primary water source to their system.

4.6 Water Rights

In order to develop the new Mint Farm Wellfield, the City applied for a groundwater permit to meet the projected 50-year demand (i.e., 2059). On 22 November 2010, a permit was issued by Ecology for 13,500 acre-feet per year (acre-ft/yr) and 28,250 gpm for municipal use within the area served by the City and BHWS. Prior to obtaining the groundwater permit, the City held three municipal water rights for up to 57 cubic feet per second (cfs) and 14,629 acre-feet per year (ft/yr), as well as a recreational water certificate (1,724 acre-ft/yr) for the flushing of Lake Sacajawea. Refer to the Water Rights Self-Assessment form included in Table 4-6 for more detailed permit/certificate information.

The City was not required to relinquish their existing municipal surface water rights associated with the Cowlitz River which are now designated as secondary water rights. The total municipal water withdrawals for the City and BHWSD may not exceed 14,679 acre-ft/yr; the sum of the currently held surface water rights. From a water rights standpoint, the City will continue to be allowed to withdraw municipal water from the Cowlitz River, if necessary, to supplement the new groundwater source provided the combined withdrawals do not exceed 14,679 acre-ft/yr. The City does not plan to abandon their surface water rights at this time; however, the old regional Water Treatment Plant on Fishers Lane has been completely decommissioned and is no longer capable of production.

The Water Rights Self-Assessment form compares existing, 6-year and 20-year City production needs to Mint Farm source withdrawals permissible by right. The form does not account for the use of any Cowlitz River water rights that might have been retained. In all three scenarios, maximum anticipated instantaneous withdrawals are assumed to be the same – three wells in operation simultaneously at a cumulative capacity of 12,000 gpm entering the system through the MFRWTP. The year 2040 cumulative projection for City and BHWSD MDD without the potential effects of conservation is estimated to be 8.76 MGD (7.23 for The City and 1.53 for BHWSD), which could be produced by the three Mint Farm wells in roughly 12 hours of operation. The annual volume necessary to serve both utilities on an ADD basis in 2040, is approximately 5,120 acre-ft (3.79 MGD for The City and 0.78 MGD for BHWSD). Both these average and peak instantaneous levels of production are comfortably below the City's Mint Farm water rights. The Mint Farm is capable of serving the needs of The City and BHWSD through 2040 and beyond. Furthermore, if performing similar calculations by adding Kelso ADD and MDD projections from Table 2-9 to the total need, the Mint Farm water rights would still be adequate through 2040.

4.7 Water Reclamation and Reuse

4.7.1 Reclaimed Water

The Three Rivers Regional Wastewater Treatment plant (TRRWTP), located southeast of The City, treats sewage from the cities of Longview and Kelso, BHWSD, and Cowlitz County. Ecology and DOH have established two classes of effluent that may be beneficially reused, Class A and Class B, with the former requiring a higher level of treatment. As such, Class A reclaimed water may be applied to a wider variety of uses, while Class B is more restricted to end uses that are less prone to potential public contact. The TRRWTP is permitted to produce Class A effluent but currently treats to a secondary level that achieves Class B. TRRWTP currently uses reclaimed water for onsite wastewater treatment plant (WWTP) irrigation and wash down water.

The Three Rivers Regional Wastewater Authority has evaluated other potential reclaimed water uses, such as irrigation, impoundments, groundwater recharge, and industrial/commercial uses. However, none of the options evaluated are economically feasible at this time due to the expense associated with the installation of the reclaimed water infrastructure and increased operational costs associated with its production and delivery.

Should it become feasible to provide reclaimed water in the future, the following list of potential reclaimed water users would be considered. The following combined users account for a substantial percentage of the City's annual consumption:

- St. John's Medical Center.
- Port of Longview.

- Northwest Hardwoods.
- Mint Valley Golf Course.
- Swanson Bark and Wood Products.

4.7.2 Water Reuse

The City encourages water reuse where possible. Several area industrial users have implemented onsite reuse programs that have dramatically reduced their potable water demands. Many industrial users have onsite alternative sources for process water demands. Two of the City's largest customers, Nippo Dynaware and Longview Fibre Paper and Packaging, only use City water for potable uses (drinking, eye washes, shower, etc.). Millennium Bulk Terminal is another large customer that only uses City water for potable uses.

The MFRWTP includes a backwash recovery system whereby approximately 90 percent of the process backwash water is recycled to the head of the treatment process for reuse. This practice saves the City on the order of 50 million gallons of water a year currently. Other reuse opportunities are evaluated on a case-by-case basis.

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**Table 4-6
Water Right Self-Assessment Forms**

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 or CFS) 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
S2-05233C	Cowlitz River	7		Unspecified													
S2-00823C	Cowlitz River	50		8,904													
S2-29641P	Cowlitz River	50		5,725													
S2-29642P	Cowlitz River	9		1,724													
S2-25806C	Cowlitz River	2		403													
G2-30521	Mint Farm Wellfield	28,250		13,500		12,000	16,250	4,650	8,850	12,000	16,250	4,870	8,630	12,000	16,250	5,120	8,380
Totals		28,250		13,500		12,000	16,250	4,650	8,850	12,000	16,250	4,870	8,630	12,000	16,250	5,120	8,380

Pending Water Right Applications Identify any water right applications that have been submitted to Ecology.						
Application Number	New or Change Application?	Date Submitted	Quantities Requested			
			Primary Qi	Non-Additive Qi	Primary Qa	Non-Additive Qa

Interties: Systems receiving wholesale water complete this Section. Wholesaling systems must include water sold through intertie in the current and forecasted source production columns above.															
Name of Wholesaling System Providing Water	Quantities Allowed In Contract		Expiration Date of Contract	Currently Purchased Current quantity purchased through intertie				10-Year Forecasted Purchase Forecasted quantity purchased through intertie				20-Year Forecasted Purchase Forecasted quantity purchased through intertie			
	Maximum Qi Instantaneous Flow Rate	Maximum Qa Annual Volume		Maximum Qi Instantaneous Flow Rate	Current Excess or (Deficiency) Qi	Maximum Qa Annual Volume	Current Excess or (Deficiency) Qa	Maximum Qi 10-Year Forecast	Future Excess or (Deficiency) Qi	Maximum Qa 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
	1 Longview and BHWS jointly own source and treatment facilities, supplying water through existing interties														
Totals															

Interruptible Water Rights: Identify limitations on any water rights listed above that are interruptible.		
Water Right #	Conditions of Interruption	Time Period of Interruption
1		
2		
3		

Additional Comments:

- City of Longview Water rights also supply full demand to BHWS through to interties at Fishers lane and Curtis Drive.
- Demand projections for current, 10-year and 20-year shown above include BHWS demands.

Chapter 5 Source Water – Wellhead Protection Program

This Chapter discusses the City of Longview’s (City) source of supply and summarizes the aquifer characteristics and the City’s Wellhead Protection Program. The Mint Farm Wellfield and Mint Farm Regional Water Treatment Plant (MFRWTP) started producing drinking water for the City and Beacon Hill Water and Sewer District (BHWSO) in late 2012. Various studies were conducted, and reports generated to determine the feasibility of the site as the sole source of supply from hydrogeologic and water quality aspects. These reports are available in their entirety on the City’s web site at <http://www.mylongview.com/publicworks/WaterProject.html>.

Information pertinent to protecting the groundwater source is contained in Part 2 of the City’s MFRWTP Preliminary Design Report (PDR), dated March 2010. More specifically, Part 2A, Hydrogeologic Characterization, Part 2B, Water Quality and Environmental Risk Assessment, contain hydrogeology information on the aquifer and the results of the Environmental Site Assessment (Phase I and II) and Human Health Risk Assessment. This information is also available on the City’s web site. To protect the groundwater source, and in accordance with Washington Administrative Code (WAC) 246-290-135 (3), this Chapter is the City’s Wellhead Protection program.

5.1 Source Information

5.1.1 Aquifer Characteristics

The wellfield is located in the southwestern part of the City in an area known as the Mint Farm Industrial Park (see Figure 5-1) and is situated on a relatively flat floodplain at an elevation of approximately 10 feet above mean sea level. A network of dikes and drainage ditches in the Longview-Kelso basin lowers the overall shallow groundwater elevations and protects the basin from flooding during high river levels and large storm events. The wellfield site was used for agricultural operations, including mint and grass farming, until about 1975. The wellfield is located near industrial and commercial businesses, a managed wetland, and undeveloped property.

Two distinct groundwater systems are present at the wellfield site: a shallow system, and a deep system with a confining layer of silt and clay about 200 feet thick between the two systems. In the area around the wellfield site, the confining layer ranges in thickness from approximately 100 feet to 200 feet near the wellfield but becomes appreciably thinner to the north and east near residential areas. The wellfield consists of four wells drilled into the deep aquifer, with plans to add two more wells as needed to meet future water demands. Figure 5-2 shows the wellfield and treatment plant configuration. Groundwater modeling indicates the source for the deep aquifer is the Columbia River, with a travel time to the wellfield of between 2 and 35 years. Figure 5-3 illustrates the aquifer source area and anticipated travel times. The hydrogeologic characterization of the Mint Farm area, including the deep groundwater aquifer, is provided in Hydrogeologic Characterization of PDR Part 2A, Hydrogeologic Characterization (Kennedy/Jenks 2010).

The groundwater model utilized a 50-year demand scenario (2059). Based on the groundwater modeling results, the wellfield is capable of meeting and exceeding the 2059 demands. Water right permit G2-30521 has been extended and the new deadline for proof of appropriation is October 1, 2025.

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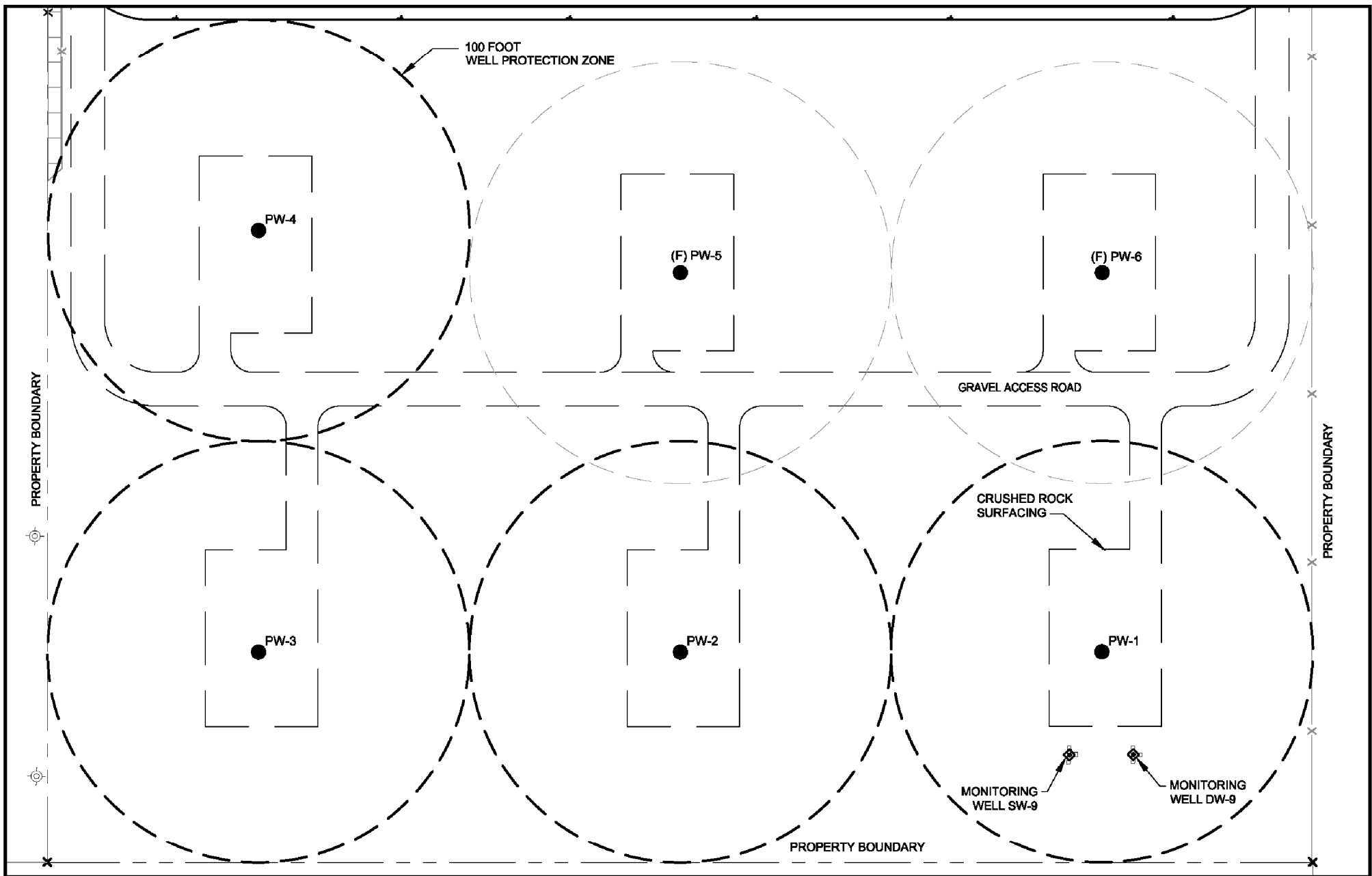
Wellfield Location Overview

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Figure

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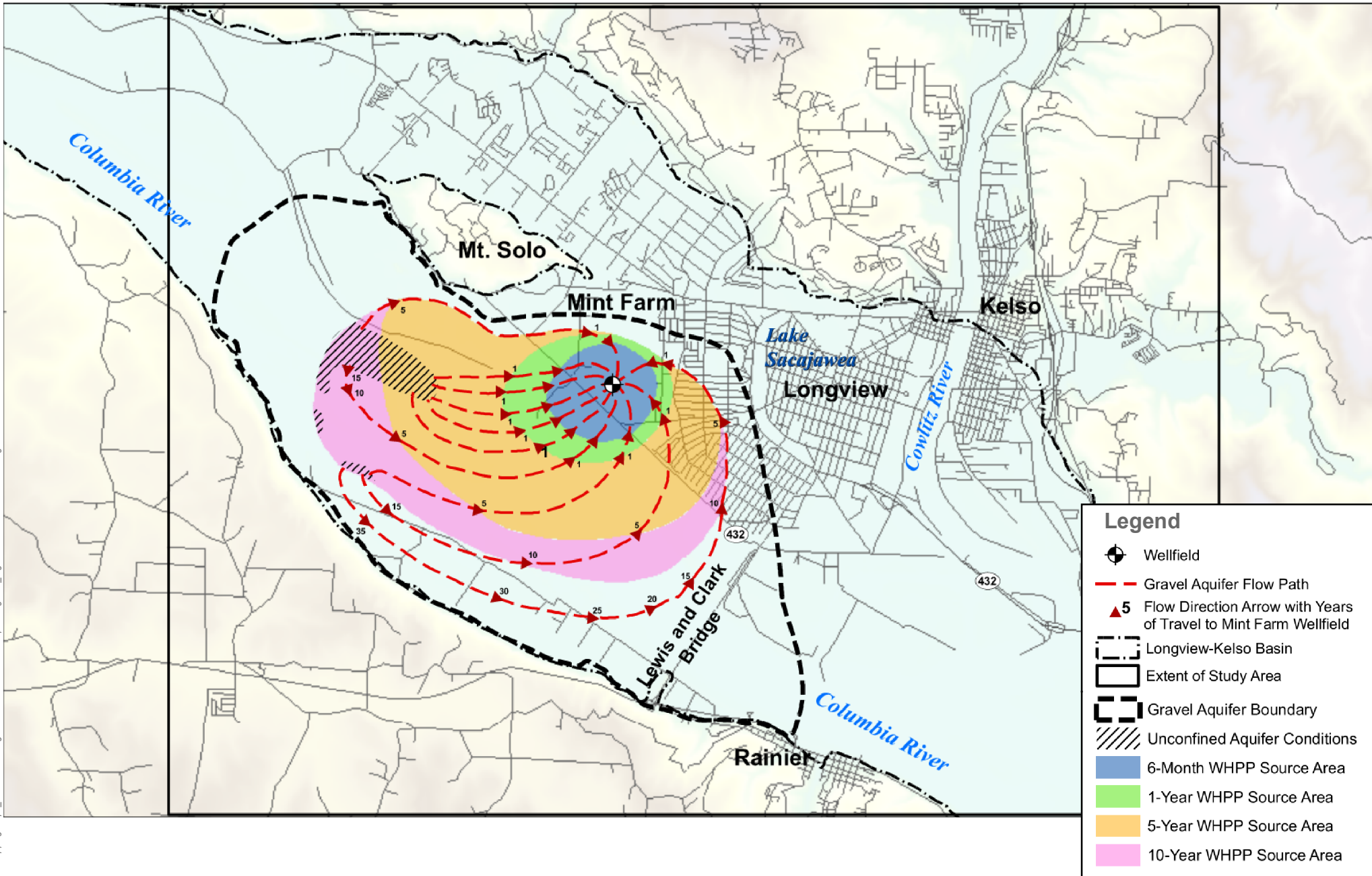
Wellfield Detail

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Figure

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Legend

- Wellfield
- Gravel Aquifer Flow Path
- 5 Flow Direction Arrow with Years of Travel to Mint Farm Wellfield
- Longview-Kelso Basin
- Extent of Study Area
- Gravel Aquifer Boundary
- Unconfined Aquifer Conditions
- 6-Month WHPP Source Area
- 1-Year WHPP Source Area
- 5-Year WHPP Source Area
- 10-Year WHPP Source Area

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Source Delineation Area Mint Farm Wellfield

Figure

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5.1.2 Constructed Wells

Four wells were drilled on the wellfield site (PW-1 through PW-4), with plans to add two additional wells to meet future water demands. The wells are nearly identical and drilled to a depth of between 352 and 378 feet. All the wells have sanitary seals to at least 150 feet below ground surface (bgs). Table 5-1 below summarizes the constructed wells. Copies of the well logs for each well are included in Appendix B.

**Table 5-1
Mint Farm Wellfield – Constructed Wells**

Well Name	Ecology Well Tag#	Depth (feet bgs)	Depth to First Open Interval (feet bgs)	Sustained Yield (gpm)	Length of Pump Test	Drawdown (feet)	Drawdown of Nearest Well (feet)
PW-1	BAM420	375	230 bgs	3,918	36 days	3.3 avg.	.33 avg.
PW-2	BHF855	378	228	3982	12 hours	2.2	0
PW-3	BHF856	352	235	3987	12 hours	1.9	0
PW-4	BHF857	352	237	3950	12 hours	1.7	0

A Groundwater Contamination Susceptibility Assessment Survey Form was completed for each well and a Source Approval package was submitted to the Washington State Department of Health (DOH) in 2012 to consider these four wells as part of a wellfield, rather than regulate them as unique separate wells. Copies of the susceptibility forms are included in Appendix B and the wellfield source has now been approved by DOH.

5.2 Wellhead Protection Area

The Wellhead Protection Area (WHPA) delineation was developed using the three-dimensional numerical groundwater model United States Geological Survey Code MODFLOW2000 and average daily demand (ADD) projected at 12 MGD in 2059. Current water demand forecast suggests a 2059 ADD of about 8 MGD. As a result, the analysis is quite conservative allowing for unexpected industrial or commercial demand, or higher than forecasted growth. The groundwater flow patterns were calculated using MODPATH, a particle tracking program that uses the hydraulic gradient, hydraulic conductivity, and porosity. The model results indicate the times for water from the Columbia River to travel to the Mint Farm Wellfield varies from approximately 2 years to over 35 years along the paths shown on Figure 5-3. The City’s comprehensive Wellhead Protection Plan (WHPP) comprises specific elements that include:

- A susceptibility assessment.
- Delineation of wellhead protection areas.
- Inventory of potential contaminant sources.
- Distribution of findings.
- Contingency Plans.
- Appropriate spill/incident response measures.

Under Ordinance 3127 (included in Appendix B), adopted by the City in 2010, the Mint Farm Wellfield WHPA was established. The area is larger than the estimated 10-year time of travel to have boundaries that are readily recognizable in the field and on maps to facilitate implementation of various protective measures. The WHPA is shown on Figure 5-4.

Potential threats to groundwater quality caused by 12 MGD ADD pumping at the Mint Farm wellfield were evaluated with three model scenarios:

- Forward particle tracking from potential contaminating activities (PCAs).
- Constant ground surface contaminant source at the Mint Farm.
- Constant ground source contaminant source along the Columbia River.

The results indicate that contamination from the above sources does not reach the Mint Farm production wells within a 30-year time frame (Kennedy/Jenks Consultants 2010), with lower average pumping rates anticipated for the foreseeable future. Figure 5-5 provides an additional illustration of the source of supply to the Mint Farm wells. Water from the Columbia River percolates through the deep water-bearing gravel to the Mint Farm and up into the wells. Therefore, the City's Wellhead Protection Plan is focused as follows:

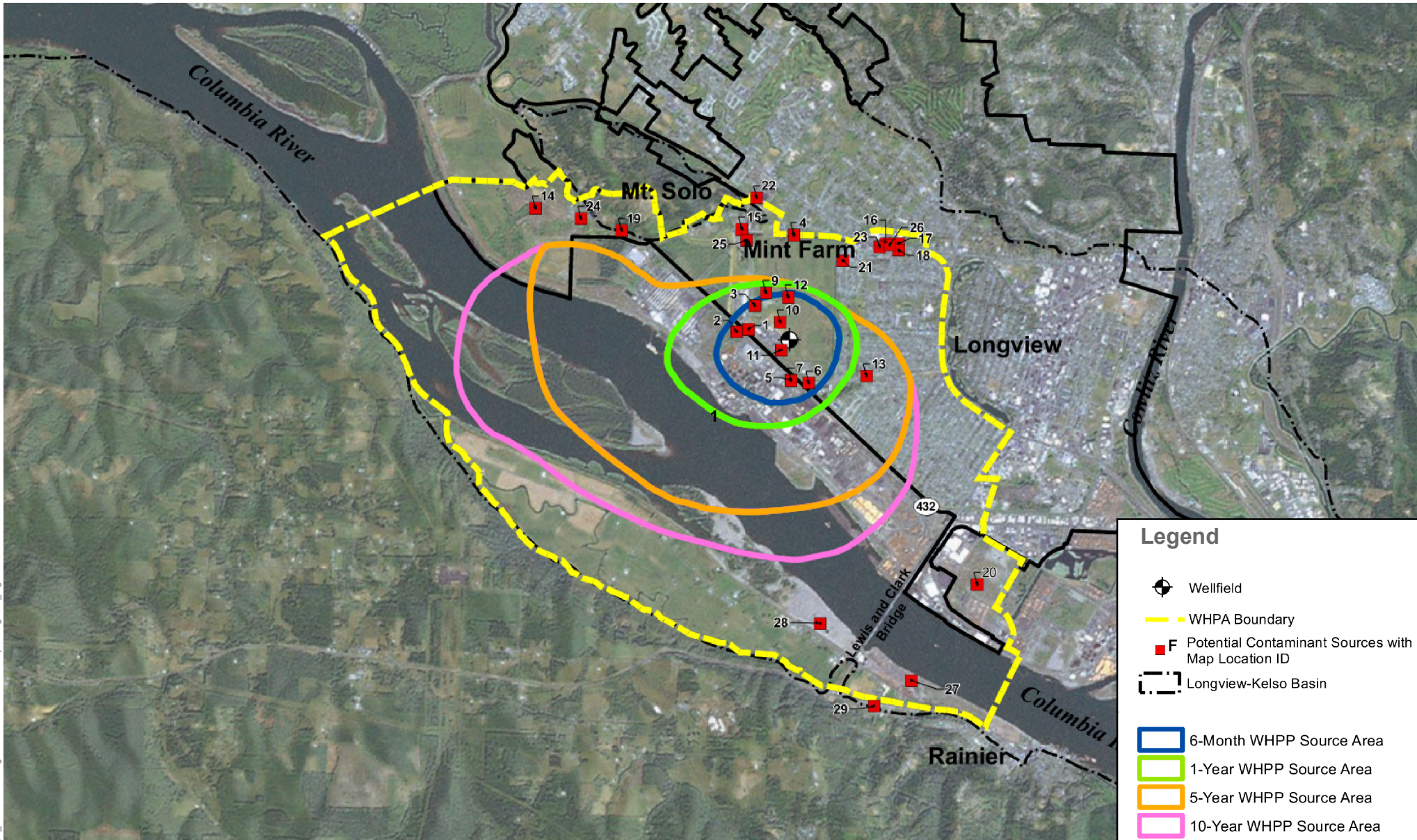
- Most spills of light non-aqueous phase liquid will float on the river surface and not impact the deep aquifer. Major spills consisting of dense non-aqueous phase liquid could sink to the river bottom and present some concern. In both cases, the compound will be flushed downstream rapidly. A method to quickly report spills in the Columbia River to the City will be developed as part of the program.
- Protective measures within the wellhead protection area will focus on preventing or mitigating the risks from construction or drilling methods that could penetrate to the deep aquifer, such as drilled pilings, piers, or other penetrations for new buildings and structures.
- The prevention of spills or surface contamination of any kind within the wellhead protection area is essential, even if the likelihood of penetration to the deep aquifer is remote.

5.2.1 Inventory of Potential Contaminants

An environmental review was completed in 2008 by GSI Water Solutions, Inc. (GSI) that identified and assessed the potential contaminants in the Mint Farm WHPA. A copy of GSI's 2008 report is available in its entirety on the City's website. This report identified 17 risks from industrial or commercial activities, three risks from contaminated shallow groundwater plumes, and risk from inadequate well seals.

Although numerous sites for potential contamination were identified, most were determined to be low risk surface contamination sites. To address the medium risk elements, the City has established a rigorous monitoring program. The shallow groundwater plumes appear to be migrating away from the wellfield towards the Columbia River. The Water Quality and Environmental Risk Assessment Part 2B of the PDR presents a thorough discussion of water quality findings, as well as the data gathering and analyses conducted of the deep and shallow monitoring well network constructed in 2009. The City will continue to monitor the deep sentry wells for early detection purposes. As noted previously, the Longview MODFLOW Model did not identify any complete pathways between potential contamination activities in the Mint Farm or neighboring industrial areas and the deep groundwater aquifer.

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Legend

- Wellfield
- WHPA Boundary
- Potential Contaminant Sources with Map Location ID
- Longview-Kelso Basin
- 6-Month WHPP Source Area
- 1-Year WHPP Source Area
- 5-Year WHPP Source Area
- 10-Year WHPP Source Area
- Longview City Limits

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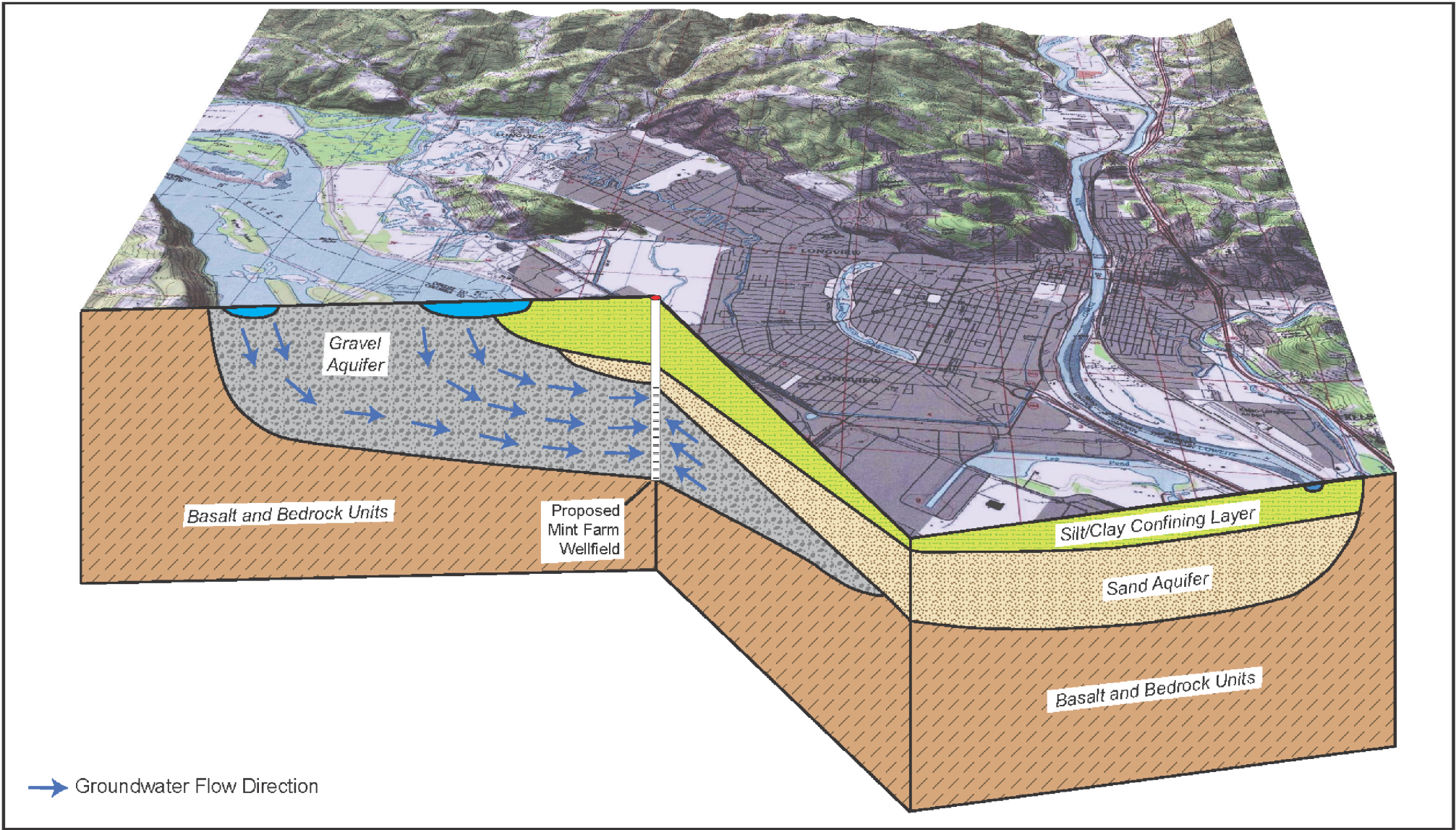
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Wellhead Protection Area (WHPA) Mint Farm Wellfield Figure

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Groundwater Flowpaths to Mint Farm Wellfield

Figure

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Spills, leaks, or discharges of potential contaminants on or near the surface will not directly impact the deeper aquifer. However, these sources of contamination may enter the Columbia River through either the shallow aquifer or the drainage canals. The tremendous flow of the Columbia River, as well as the fact that the recharge area is at the bottom of the river, minimizes the potential threat presented by the shallow aquifer or drainage canals in this area.

A list of the potential sources of contamination within and near the 10-year time of travel is included in Table 5-2. These sites are located on Figure 5-4. The City will notify all owners and operators of these sites of the wellfield and request their assistance in protecting the aquifer. Regulatory agencies and local governments (regulatory and first responders) involved with the areas within the WHPP will also be notified. An example copy of these letters are included in Appendix B.

The following is a list of governmental agencies that will be notified of the WHPA boundary and potential contaminant inventory:

- City of Rainier.
- Columbia County (Oregon).
- Columbia River Fire District.
- Cowlitz County.
- National Oceanic and Atmospheric Administration Fisheries / National Marine Fisheries Service.
- Oregon State Department of Environmental Quality.
- Oregon State Department of Fish & Wildlife.
- Port of Longview.
- Port of St. Helens.
- US Army Corps of Engineers.
- US Coast Guard.
- US Environmental Protection Agency.
- Washington Department of Emergency Management.
- Washington State Department of Ecology.
- Washington State Department of Fish and Wildlife.
- Washington State Department of Health.

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Table 5-2
List of Potential Sources of Contamination

Company/Business	Site Name	Map Location	Latitude	Longitude	Time of Travel Zone
Moeller Land/Cattle Company, Inc.	Flex Foam Facility	1	46.141	-122.987	6-Month
Bonneville Power Administration	Longview Substation	2	46.141	-122.992	6-Month
Puget Sound Energy/Elec	Energy Plant	3	46.14	-122.985	6-Month
Solvay Interox America	Peroxide Facility	4	46.137	-122.983	6-Month
Amigo Properties, LLC		5	46.135	-122.98	6-Month
Bell Timber, Inc.	Utility Pole Production	6	46.135	-122.975	6-Month
Lot15, LLC	Cannabis Production	7	46.14	-122.983	6-Month
Westlake Chemical	Chlorine Production	8	46.13	-122.989	6-Month
Nippon Dynawave Packaging Company, LLC	Paper Production	9	46.132	-122.986	6-Month
Wa Mart Property, LLCc	Washington Way Market	10	46.131	-122.975	6-Month
Patriot Rail Corporation	Rail Spur	11	46.134	-122.972	6-Month
Waite Specialty Machine Works, Inc.		12	46.133	-122.976	6-Month
Millennium Bulk Terminals-Longview	Millennium Bulk Terminals-Longview	13	46.141	-122.998	5-Year
Singh, LLC	Millers Market	14	46.133	-122.966	5-Year
North Pacific Paper Company, LLC	Paper Production	15	46.124	-122.975	5-Year
Weyerhaeuser Nr Company	Saw Mill	16	46.125	-122.97	5-Year
Mt Solo Landfill, Inc.	Closed Land Fill	17	46.151	-123.021	Buffer Area
Keystone Contracting, Inc.	Heavy Construction	18	46.15	-123.016	Buffer Area
Gt Metals and Salvage	Salvage Yard	19	46.15	-122.988	Buffer Area
Epson	Epson Portland Inc	20	46.148	-122.987	Buffer Area
Longview School District 122	Bus Garage	21	46.152	-122.985	Buffer Area
Fred Meyer	Fred Meyer Fuel Stop	22	46.148	-122.963	Buffer Area
Safeway	Safeway Fuel Station	23	46.148	-122.962	Buffer Area
Washington Petroleum Group	Chevron Gas Station	24	46.148	-122.963	Buffer Area
Sheri Smith Trust	Beach Way Gas And Grocery	25	46.147	-122.964	Buffer Area
Port Of Longview	Port Of Longview	26	46.111	-122.951	Buffer Area
International Raw Materials (IRM)	Dry Bulk Cargo	27	46.108	-122.953	Buffer Area
Teevin Brothers	Log Exports	28	46.097	-122.957	Buffer Area
Us Gypsum Company	Us Gypsum Co	29	46.104	-122.972	Buffer Area
Rainier Shell	Shell Gas Station	30	46.096	-122.961	Buffer Area
Singh Balbir/Kaur Amarjit Et Al	Texaco Fuel Station	31	46.155	-122.984	Buffer Area
McCall Trucking	McCall Trucking	32	46.148	-123.008	Buffer Area

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Existing Deep Aquifer Wells

Weyerhaeuser, who has three deep gravel aquifer wells, has been contacted and is considering decommissioning these wells. Millennium Bulk Terminals has been contacted to initiate plans for protection of their nine deep wells. Currently, Millennium Bulk Terminals does not have plans to abandon any of their wells and is restoring all nine wells to operating condition. Puget Sound Energy has two deep wells, constructed in 2001 and 2002 using modern construction methods that pose little risk of contamination to the City's wellfield.

5.2.2 Management Strategies and Implementation

The City's approach to management and implementation of the WHPP, a combination of ordinances and a monitoring well network, are discussed below.

Ordinances

Chapter 17 of the LMC deals with the environment and includes sections on Critical Areas, stormwater management, and general environmental protection. This chapter of the LMC was expanded to include protection of the municipal water source aquifer. The water supply protection ordinance (Ord. No. 3127) was first adopted on 11 February 2010 to prohibit the practice of hydraulic fracturing at all locations within or beneath the corporate city limits. The ordinance also prohibits "any other activity that has the potential to significantly reduce the Mint Farm Aquifer recharge, aquifer flow, or aquifer water quality and threaten the use of the Mint Farm Aquifer as a municipal water supply."

The City Council approved this Wellhead Protection Plan on February 9, 2012. The City will update this Plan and the LMC by ordinance as necessary to provide additional detail on regulations to protect the aquifer. Notification letters will be sent to public agencies when updates to the WHPA occur, with letters to any appropriate identified businesses within the designated area also released.

Outside of Longview Jurisdiction

For areas within the WHPA but outside of Longview's jurisdiction, the City has approached Cowlitz County regarding their adoption of a wellhead protection ordinance that is similar to the City's. The City has also contacted Weyerhaeuser Company and Millennium Bulk Terminals regarding the potential for executing wellhead protection agreements if the County does not adopt a wellhead protection ordinance. Additionally, the City will contact the City of Rainier and Columbia County in Oregon regarding adoption of wellhead protection ordinances similar to the City's, to address that portion of the Wellhead Protection Area that lies within Oregon.

Monitoring Wells

The City is committed to continuing to sample select deep monitoring wells located along Industrial Way including DW-1, DW-2, DW-5, DW-6, DW-7, and DW-9 on a semi-annual basis. For the monitoring wells, the City has developed an extended list of potential contaminants to be evaluated that include both regulated and non-regulated chemicals. These monitoring wells are within the primary flow path from the river to the Mint Farm and analyses of these wells will provide an early warning system to the City if an unanticipated contamination of the deep aquifer occurs. The wellhead protection program utilizes monitoring wells as an early identification of potential adverse changes in groundwater quality within the target aquifer. The City is considering additional monitoring wells and has contacted Weyerhaeuser

Company and Millennium Bulk Terminals regarding the potential to install additional monitoring wells on their property. The location of the existing monitoring wells is shown on Figure 5-6.

The sampling protocols are like those used in the initial quality assurance plan for the monitoring wells. Trained City staff collect the samples and are responsible for record-keeping. Sampling for the monitoring wells includes the regulated drinking water contaminants and the complete EPA 524.2 list of VOCs. In 2012, City staff was trained on sampling protocols and began conducting the bi-annual sampling using in-house staff in 2013. The cost associated with the continued monitoring well sampling has been included in the operating budget.

Through 2023 there have been a few random samples exceeding state reporting levels in the monitoring wells. After retesting, the results were under those levels and the initial results have been deemed inaccurate. Over 25,000 samples have been taken through 2023.

Water quality in the City's Mint Farm deep production wells will be tested as required by DOH. In the event that the water quality samples from the monitoring wells indicate the presence or change in a previously measured analyte, the City will institute additional testing parameters to track the variation and to ensure that water from the wells continues to be safe and meet regulated water quality standards.

P:\Mapping\Maps_Generated\Longview\20-10672.00\006\maps\Figure 5-6 Well_Locs.mxd 12/9/2025 akright



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Groundwater Monitoring Well Sites

Figure

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5.2.3 Contingency Plan

Due to the characteristics of the deep aquifer, it is very unlikely that one or more wells would be impacted by a contamination event requiring immediate suspension of its use. A more likely scenario would be detection of a slight quantity of a drinking water contaminant in a monitoring well and/or production well.

If contamination is detected in a monitoring well or production well, the City will initiate a quality assurance/quality control review of the sampling and handling procedures and collect a confirmation sample as soon as possible. If the presence of a contaminant is confirmed, the City will consult with the DOH, and consideration should be given to sampling other wells in the wellfield, selected monitoring wells, and the treated water. Even if a drinking water maximum contaminant level (the level at which consumers' health may be impacted after a prolonged exposure) is exceeded, the City will likely have time to address the problem without impacting public health.

If a production well, monitoring well or nearby deep aquifer well is impacted by contamination, the City will immediately notify BHWSD and the City of Kelso, water purveyors supplied by the MFRWTP. Similarly, the City will work with Washington State Department of Ecology (Ecology) and the DOH to report the contamination and locate its source.

Depending on the level and extent of contamination, various operational options will be considered including:

- Using other wells in the wellfield.
- Alternating use of individual wells.
- Changing the length of time that each well is in operation.
- Reducing water system demands by implementing the City's Water Shortage Response Plan ordinance (LMC 15.74) as discussed in Section 4.5.1.
- Obtaining water from the City of Kelso through their intertie.
- Equipping the City's Prudential Boulevard Well.
- Obtaining water from another approved source of water.
- Depending on the level of contamination, the City will consider providing treatment of water from one or more production wells. Treating and lowering the contaminant level in one production well may allow the City to blend this water with water containing a higher concentration of contaminant, to produce water containing a reduced average level. Blending is a common treatment technique for chemical contamination of wells.

5.2.4 Spill and Incident Response Planning

As previously stated, a spill or other contamination of the soil or shallow groundwater likely will not directly affect the deep aquifer. However, because of the potential for this contamination to migrate to the Consolidated Diking Improvement District's drainage ditches and/or Columbia River, the City must be notified of any event that may cause contamination of shallow groundwater or the drainage system. Current first response containment procedures should be followed rather than washing or flushing the spill into the ground or drainage system. Likewise, the City should be notified of spills or discharges to the river that are not permitted or that exceed permit levels.

As stated above, the City will notify all first responders and governmental agencies with jurisdiction in the WHPA and requested their assistance in protecting the quality of the deep gravel aquifer. In addition to the notification list of agencies to be notified, the following entities will be requested to report spills to the City's emergency telephone operator:

- City of Rainier Police Department.
- Columbia River Fire.
- Cowlitz 2 Fire & Rescue.
- Cowlitz Clean Sweep.
- Cowlitz County Com Center (Dispatch).
- Cowlitz County Sheriff.
- Longview Fibre Paper & Packaging Inc.
- Longview Fire Department.
- Longview Police Department.
- Millennium Bulk Terminals.
- PNE Corporation.
- Port of Longview.
- Port of St. Helens.
- U.S. Army Corps of Engineers.
- U.S. Coast Guard.
- U.S. Environmental Protection Agency.
- Washington State Department of Ecology.
- Washington State Patrol.
- Weyerhaeuser Company.

The City will also maintain an awareness of new developments or discharges to the Columbia River and also monitor permit renewals and discharges on other nearby upstream tributary rivers.

Chapter 6 Operation and Maintenance Program

6.1 Introduction

This Chapter summarizes elements of the City of Longview’s (City) water utility operation and maintenance (O&M) program, including procedures associated with supply, treatment, storage and distribution facilities. These elements include:

- Organization.
- System Operation and Control.
- Emergency Response.
- Safety Procedures.
- Recordkeeping.
- Cross Connection Control (CCC) Program.

6.2 Organization

6.2.1 Responsibilities

The City’s water utility includes staff that are generally divided by responsibility into water treatment and system control operations (those stationed at the Mint Farm Regional Water Treatment Plant (MFRWTP), water distribution operations, water distribution repair, and water system metering. All staff are designated under the City’s Utilities Operation and Filter Plant Division, with some having partial responsibilities for other utilities as well. All water operations staff maintain maintenance responsibilities associated with the facilities they operate. The City’s Engineering Department provides oversight and supplemental management of these duties, as well as plans and leads the construction of necessary capital improvements. The current organization chart for the Utilities Division is shown on Figure 6-1.

6.2.2 Water Division

The Water Operations Division is responsible for the supply, treatment, distribution and storage of potable water. As such, it is responsible for maintenance of wells, treatment facilities, water mains, water meters, valves, hydrants, pump stations and reservoirs in the City service area. A private contractor was responsible for meter reading.

Table 6-1 summarizes the primary functions of each lead staff position shown on Figure 6-1, the organization chart for the Utilities Division.

Table 6-1
Water System Operation and Maintenance Staff Positions

Position	Essential Job Functions
Utilities Manager	Manages daily operation and maintenance of the treatment plant and the distribution system.
Utility Systems Supervisors	Supervises maintenance of metered services, water mains, pumping stations, and reservoirs.
Filter Plant Lead	Responsible for daily operation and maintenance of the treatment plant.
Treatment Plant Operators	Daily operation and maintenance of the treatment plant and water quality testing in the distribution system.
Operations Crew	Operation and maintenance of pump stations, reservoirs, and valves, and marking facility locations.
Maintenance Crew	Repair and/or replace water mains, valves, and services.
Meter Crew	Repair and/or replace broken meters and meter boxes, large meter testing, change meters to touch-read, and test City-owned backflow assemblies.

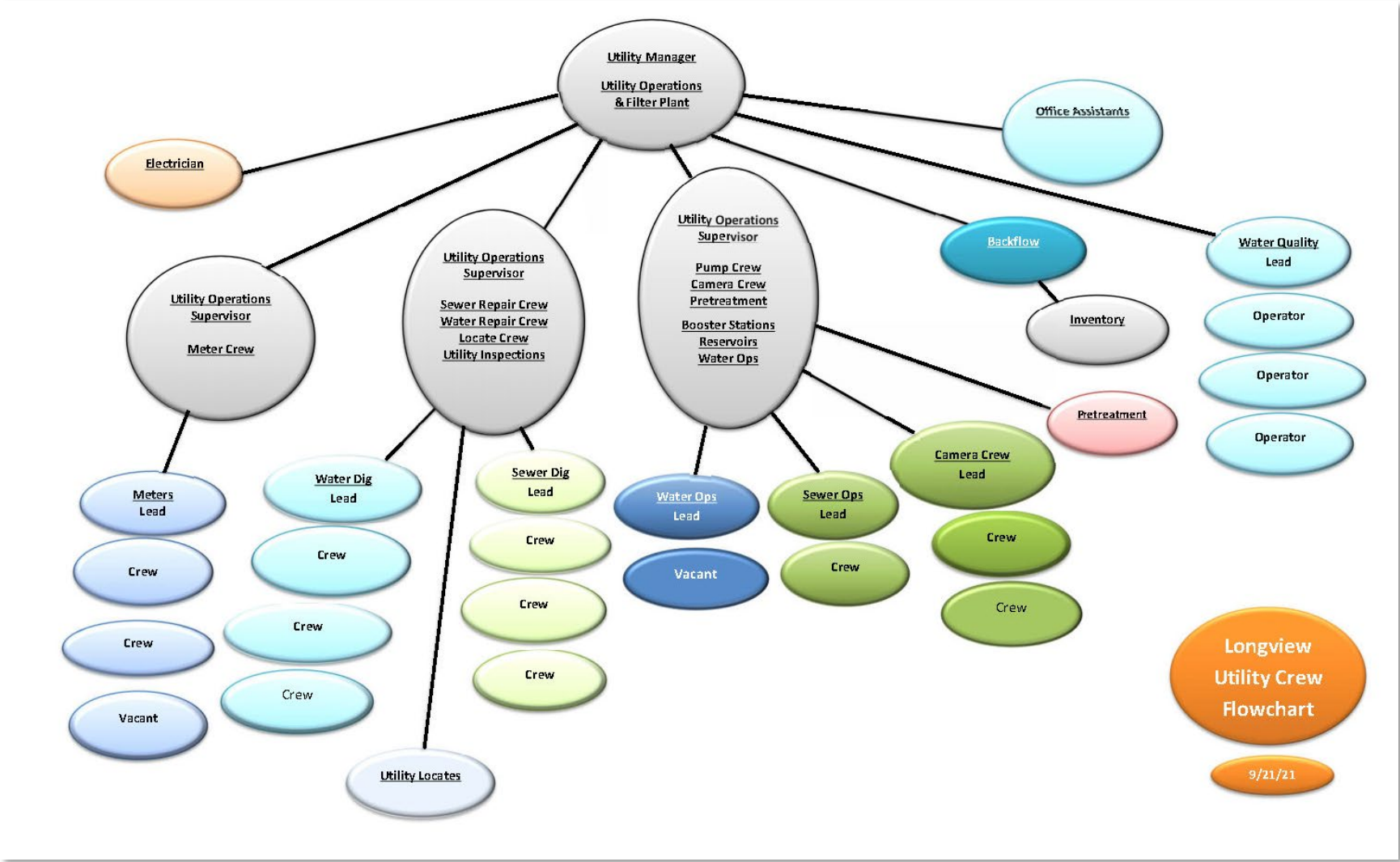


Figure 6-1 Longview Water System Organization Structure

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6.2.3 Operator Certification

The Washington State Department of Health (DOH) waterworks certification program establishes minimum requirements and standards by which operators in charge of public water systems are examined and certified. The assigned classification of the public water system, based on the complexity of the water treatment process and the population served for a distribution system, determines the required grade level for operator certification. Once certified, operators are required to show professional growth in order to maintain their certification. This can be accomplished by advancing in level or number of certificates or by obtaining three Continuing Education Units (CEUs) every 3 years. The City has a budget line item to address continuing education.

The City’s distribution system is classified as a Group 4 distribution system. The MFRWTP is classified as Group 3. The City staff certifications shown in Table 6-2, which include cross connection control specialists (CCS), either meet or exceed Washington Administrative Code (WAC) 246-292-020 certification level requirements for this system. To maintain professional growth and to fulfill continuing education requirements, all certified staff are encouraged to participate in American Water Works Association (AWWA) Section and Subsection affairs and attend appropriate workshops and seminars

Table 6-2
Water System Lead Staff Members

Position	Certification
Utilities Manager	WDM 3, CCS
Filter Plant Lead	WTPO 4, CCS
Utility Systems Supervisor	WDM 3, CCS
Utility Systems Supervisor	WDM 3, CCS
Utility Systems Supervisor	WDM 3, CCS

6.2.4 Mint Farm Regional Water Treatment Plant

The City will operate the MFRWTP in partnership with Beacon Hill Water and Sewer District (BHWS) under the direction of the Board. The Board consists of two members from the City and one member from the BHWS.

6.3 System Operation and Control

6.3.1 System Components

Existing facilities in the City service area are summarized in Chapter 1. Water distribution system components are documented in an O&M manual. There are numerous MFRWTP O&M manuals kept in hardcopy onsite and electronically at the facility. The City tracks and schedules water system maintenance and the cross connection control (CCC) program through electronic software.

6.3.2 Preventive Maintenance Program

Preventive maintenance for the City’s water distribution system is summarized in Table 6-3. The MFRWTP O&M manual details recommended maintenance procedures associated with its facilities.

Recent sanitary surveys conducted by the DOH have found the City’s pumping, distribution, and storage facilities in satisfactory physical condition and that the City had an excellent O&M Program.

Table 6-3
Summary of Preventive Maintenance Operations

System Component	Maintenance	Frequency
Water Distribution and Storage		
Water Mains	Flush older areas. Flush entire system.	Quarterly Annually
Reservoirs	Clean and inspect.	Every 5 Years
Valve	Exercise.	Every 2 Years
Water Meters (¾-inch to 2-inch)	Replace approximately 600 water meters.	Annually
Compound Meters (2 inches or larger)	Test. Repair or replace.	Annually, as Needed
Pumps and Booster Pump Stations including Valves and Motors	Inspect.	Twice Weekly
Reservoir Security	Inspect.	Once a Year
Service Meters	Remove and replace.	As Needed
Longview MFRWTP		
Refer to Longview MFRWTP Electronic O&M Manual to be submitted prior to plant start-up and commissioning.		

6.4 Equipment, Supplies, and Chemical Inventory

6.4.1 Water Distribution System

The Utilities Manager maintains an adequate and appropriate inventory of construction and maintenance/repair supplies. In the event an after-hours emergency event arises requiring supplies not currently on hand, the City maintains a list of suppliers and vendors for after-hours emergencies. The list of supplies on hand includes:

- Water main, ductile iron, 4-, 6-, 8-, 12-, and 20-inch.
- Pipe fittings and couplings: 4-, 6-, 8-, 12-, and 20-inch.
- Repair clamps: Various sizes.
- HDPE service pipe: ¾- through 2-inch.
- Service meters: ¾-, 1-, and 2-inch.
- Miscellaneous fittings and valves.
- Pump seals and spare parts.

- Control valve repair kits.
- Fire hydrants and valves.
- Hydraulic backhoe.
- Hydraulic excavator.
- Dump trucks.
- Pickups.
- Meter test bench.
- Tapping tool.
- Service truck and tools, parts bins and power take-off.
- Vacuum/Jet Trailer with hydraulic valve turner.

6.4.2 Mint Farm Regional Water Treatment Plant

The Filter Plant Lead maintains the spare parts and water treatment process/chemical inventories. The chemicals are bid annually and delivered as needed throughout the year. Some of the chemicals used and representative spare parts are listed below. A more detailed list of spare parts will be included in the O&M manual for the new plant, which will be submitted to DOH prior to plant startup.

- Pump seals.
- Electronic control room spares (switches, etc.).
- Oil and grease.
- Liquid Sodium Hypochlorite (12.5 percent).
- Liquid Fluorosilicic Acid (24.4 percent).
- Liquid Sodium Hydroxide (25 percent).
- Laboratory Supplies.
- Spare equipment as recommended by manufacturers (refer to O&M Manual).

6.5 Emergency Response Program

A water supply emergency response plan (ERP) was developed by HDR, Inc. for the City and the Cowlitz County Public Utility District (PUD) in 2007. The DOH approved the plan on 20 August 2007. The ERP was updated and certified to the US Environmental Protection Agency, per the requirements of the America's Water Infrastructure Act (AWIA) of 2018, in December 2021. Both the updated ERP, as well as the predecessor Risk and Resilience Assessment completed by the City in June 2021, and available on file with the City Engineering Department. Certain information within these documents may be kept guarded for security purposes.

6.5.1 Call-Up List

- Water Distribution System: The emergency call-up list for the Longview Water Division is on file with a contracted answering service, the police and fire departments, and the Cowlitz County Emergency Communications. The Water Supervisor is the first call, followed by the Utilities Manager and the Sewer Supervisor.
- MFRWTP: The emergency call-up list for the MFRWTP is on file at the Communications Center, the police and fire departments. The Filter Plant Lead is the first call, followed by the shift operators.

6.5.2 Risk and Resilience Assessment

The City recently completed a Risk and Resilience Assessment (RRA) in compliance with the AWIA federal regulations. The AWIA requires the use of an all-hazards risk and resilience approach in developing the RRA and ERP. The all-hazards approach addresses the prevention, protection, preparedness, response, and recovery from a full range of threats and hazards, as well as other emergencies. To complete the RRA, the City conducted a Vulnerability Assessment of its facilities using the US Environmental Protection Agency's (EPA) Vulnerability Self-Assessment Tool (VSAT). Specific findings and information from the Vulnerability Assessment are not included here but are available for review by authorized agencies as necessary and approved by the Utilities Manager.

- Distribution System: The piping materials comprising the water mains in the City system are described in Chapter 1. Most of the system (93 percent) consists of cast or ductile iron pipe in good condition. An appreciable amount is old lead-joint pipe. All new water main installations are ductile iron, restrained push-on-joint pipe. The remaining pipe in the system (7 percent), which is located in small distribution areas, consists mainly of small diameter galvanized steel or asbestos-cement pipe. Sections of this older pipe are replaced as resources permit. Although vulnerable to damage from earthquakes, the system is well looped, which minimizes the effect of major main breaks.
- Reservoirs: Reservoirs are located in non-public or remote areas and have not experienced any appreciable amount of human intrusion. All reservoirs are covered and fenced.
- Booster Pumping Stations: Booster pump stations, both buildings and sites, have experienced occasional vandalism, but damage was insufficient to disrupt operation. The enclosures are well constructed and secure.
- MFRWTP: Protection of the Wellhead area is discussed in Chapter 5. Auxiliary power will be available onsite for the well pumps and treatment facilities. The site will be fenced and secure.

6.5.3 Contingency Plan

The City has a Water Shortage Response Plan in place, Longview Municipal Code (LMC), Chapter 15.74, that describes the procedures for declaring an emergency and appropriate actions based on the degree or stage of the declared emergency. The Water Shortage Response Plan is discussed in more detail in Chapter 4 of this 2025 Water System Plan (WSP). A source Contingency Plan is included in the Source Water – Wellhead Protection Program (Chapter 5, Section 5.2.4).

- **Emergency Water Supply:** The City also has an emergency intertie with Kelso, which was used successfully in 1980 to prevent disruption to service caused by the eruption of Mount St. Helens. Additionally, there is an agreement between the City and the Nippon Dynawave (formerly Weyerhaeuser Company) that provides for Nippon Dynawave to supply water to the City during an emergency. Currently, this connection is inactive but could be reactivated should it become necessary. However, this is a non-potable water supply; therefore, additional measures would be necessary to utilize this particular emergency supply.
- **Flood Plan:** The City developed an emergency flood plan after the Mount St. Helens eruption. It includes an early warning and notification system, management and supervisory rosters, general policies and procedures, specific plans for each warning level, and specific procedures for each department. The plan is reviewed annually. The City's Water Department and the treatment plant are protected from the 1 percent chance of the annual 100-year by a system of levees, dikes, and other structures. The flood plan is in place to address the possibility that one of these protecting structures could fail.

6.6 Safety Procedures Program

The City has a Safety and Risk Manager on staff who maintains the "Health and Safety Manual." Monthly safety meetings are held at the utility operation center. The Washington State Department of Labor and Industries (L&I) have conducted past general safety inspections with no significant issues of concern identified.

6.7 Cross Connection Control (CCC) Program

All public water systems must develop a CCC program as regulated by WAC 246-290-490. The CCC is designed to protect public health by preventing the contamination of public drinking water systems through cross connections. Thus, the City developed a CCC program to protect its treatment, storage, and distribution facilities from contamination via cross connections. Program materials are maintained and kept on file through the City's Water Department. The WAC requires the installation of backflow preventers commensurate with the degree of hazard and annual inspections and testing of backflow preventers. The City shall ensure the installation of an approved air gap, RPBA, or RPDA on premises posing a severe and high health cross-connection hazard including, but not limited to, the premises listed on the Table 9 of the WAC. Table 9 is included in the CCC program, along with the City's CCC sample forms for inspections and testing of backflow preventers. The City's CCC program includes public education regarding cross connections using the City's common outreach methods (water bill, CCR, newsletters, and web site).

The City's CCC program is authorized by LMC Article 15.68, which was revised in 2012 to comply with regulatory requirements. The revised CCC program was developed to address the 10 elements identified in WAC 246-290-490. The City currently has four staff members that are certified CCS.

The City participates in DOH's online Annual Summary Report filing process for backflow prevention devices and maintains a master list of backflow service connections. A past DOH sanitary survey recommended that the City conduct assessments on all backflow prevention devices in hazardous locations. The City is actively conducting hazardous assessment surveys and tracking backflow prevention devices in areas of known potential contamination.

The City Manager has the authority to interpret the provisions of LMC Article and decide their applicability to a situation while the Utilities Manager is responsible for enforcement.

Compliance and enforcement covered in LMC Chapter 15, includes the following elements:

- Review and determine any potential cross-connections.
- Monitor and inspect all cross-connection control assemblies relied upon for system protection.
- Test all CCC assemblies owned by the City annually.
- Maintain CCC assembly records, including a record of each device.
- Discontinue service to any premises affected by a cross-connection until it is eliminated or controlled.

Current CCC procedures for the City are listed below:

- Cross-connections are identified by the City's Water Department.
- If the cross-connection cannot be eliminated, a backflow prevention device is required. All backflow prevention assemblies must be inspected and approved by the City Water Department. The assemblies must also be tested when installed.
- All backflow prevention assemblies relied upon for system protection must be tested annually. A sample of a Backflow Preventer Test Report is included in the City's CCC sample forms.
- Installation, inspection, and testing of backflow prevention assemblies are conducted according to the current edition of *The Accepted Procedure and Practice in Cross-Connection Control Manual*, Pacific Northwest Section, AWWA.
- Each CCC assembly has a detailed report (Backflow Preventer Detail Report) associated with its use and installation.

6.8 Recordkeeping

Recordkeeping procedures by the City and the treatment plant are summarized in Table 6-4. Electronic records will be maintained on the City's computer information network and backed up by Supervisory Control and Data Acquisition (SCADA) reports. Additional water quality reporting procedures are included in Chapter 3.

**Table 6-4
Recordkeeping Procedures**

Record	Comment	Minimum Years Retained
Pumping and Plant Flows	<ul style="list-style-type: none"> ▪ Maintained at the MFRWTP. 	6
Bacteriological Results	<ul style="list-style-type: none"> ▪ Maintained at Operations Center. 	6
Cross Connection Control	<ul style="list-style-type: none"> ▪ Maintained at Operations Center. 	6
Disinfection Monitoring Plan	<ul style="list-style-type: none"> ▪ Maintained at Operations Center. 	10
Corrosion Control Monitoring	<ul style="list-style-type: none"> ▪ Maintained at Operations Center. 	12
Customer Complaints	<ul style="list-style-type: none"> ▪ Maintained at Operations Center. 	6
WQMR	<ul style="list-style-type: none"> ▪ Maintained at Operations Center and MFRWTP. 	6
Monitoring Well Water Quality Sampling, Done on a Semi-Annual Basis	<ul style="list-style-type: none"> ▪ Maintained at MFRWTP. 	As Long as System is in Operation
MFRWTP Monthly Report: Includes: Daily hours of operation; amount of water treated, wash water and chemicals used; and water quality.	<ul style="list-style-type: none"> ▪ Submitted monthly to DOH. ▪ Maintained at the MFRWTP and Operations Center. 	6
Monthly Operating Report: Includes: Amount of treated water pumped to customers, amount of water billed, and quantities of chemicals used.	<ul style="list-style-type: none"> ▪ Maintained at the MFRWTP and Operations Center. ▪ Used to calculate unauthorized water use and treatment costs. 	6
Fluoridation and Chlorination Reports	<ul style="list-style-type: none"> ▪ Submitted monthly to DOH. ▪ Maintained at the MFRWTP. 	6
Source Meter Readings	<ul style="list-style-type: none"> ▪ Maintained at the MFRWTP. 	As Long as System is in Operation
Water Facilities Inventory Report	<ul style="list-style-type: none"> ▪ Submitted annually to DOH. ▪ Maintained at the Operations Center. 	6
Production Well Water Leveling Monitoring	<ul style="list-style-type: none"> ▪ Maintained at the MFRWTP. 	As Long as System is in Operation
Sanitary Survey	<ul style="list-style-type: none"> ▪ Maintained at Operations Center. 	10
Consumer Confidence Reports and Public Notices	<ul style="list-style-type: none"> ▪ Maintained at Operations Center. 	6
Corrective Action Records MCL Related (Groundwater Rule)	<ul style="list-style-type: none"> ▪ Maintained at Operations Center and MFRWTP. 	10
Project Reports, Construction Documents and Related Drawings, Inspection Reports and Approvals	<ul style="list-style-type: none"> ▪ Maintained at Operations Center and MFRWTP. 	Life of Facility

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6.8.1 Customer Complaint Process

The City takes all customer concerns and complaints seriously. Each drinking water complaint received by City’s Utilities Division is investigated as outlined in Table 6-5.

**Table 6-5
Complaint Follow-Up Process**

Actions	Water Quality (Taste and Odor, Color, etc.)	Water Quality (Illness)	Water Outage / Low Pressure
Complaint received by the Utility Clerks.	X	X	X
Complaint logged into Maintenance Management System as a Work Request.	X	X	X
Complaint forwarded directly to Utilities Manager, or a Utility Supervisor for follow-up within 1 hour.		X ^(a)	
Operations Crew follow-up with site visit within 4 hours.	X ^(a)		
Operations Crew notified by pager and follow-up with site visit within 1 hour.			X ^(b)
Response to the complaint logged in as work order for permanent record.	X	X	X
Completed work orders reviewed periodically for trends, flushing program modifications, repair/replacement, budgeting, etc.	X	X	X
Notes: 1) Site Investigation may include chlorine residual, coliform sample, and/or distribution system flushing. 2) Site investigation may include pressure tests on site and at neighboring connections to determine the extent and cause of the problem. May involve checking distribution system valves and looking for leaks.			

Complaints received in the field are investigated at the time the complaint is made, and then entered as a work order. All calls received after hours are transferred to the Public Works after hour emergency dispatch center who forwards complaints to the Utilities Manager or one of the field supervisors. The dispatch center has home and mobile phone numbers for the Utilities Manager and each of the field supervisors. Depending on the information received from the dispatch center, the call will be returned to determine the appropriate response which may range from calling a field crew out immediately to conducting a site visit the next working day.

Complaints received by other City staff or officials are directed to the Utilities Division for entry into the system and the completion of a response.

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Chapter 7 Design and Construction Standards

7.1 Introduction

This Chapter of the 2025 Water System Plan (WSP) contains information pertaining to the design and construction standards for the City of Longview (City). It is intended to assist the City and design engineers in preparing detailed construction plans and specifications. The following elements will be discussed: design and construction standards, policies and requirements for outside parties, project review procedures, and construction inspection procedures.

7.2 Design Standards

Design standards identify the performance standards and sizing criteria to be used in designing each water system improvement. Standards for treatment facilities, fire flow demands, storage requirements, pipeline size, and water quality will be discussed. Design guidelines for many different system components can be found in the Washington State Department of Health’s (DOH) *Water System Design Manual (2020)*.

7.2.1 Treatment Facilities

The capacity of the MFRWTP was assessed based on projected average daily demand (ADD) and maximum day demand (MDD) in Chapter 3: System Analysis. The demand projection methodology is presented in Chapter 2. Treatment facilities are typically designed to meet MDD demands for the water system on a reliable capacity basis (i.e., one treatment train out of service).

7.2.2 Pump Station Facilities

The capacity of the City’s pump stations are described in Chapter 3. Pump stations are typically sized to meet MDD for their pressure zone on a reliable capacity basis (i.e., largest pump out of service).

7.2.3 Fire Flow Demands

Design fire flow demands were used in the hydraulic analysis of the distribution systems and to determine fire storage requirements. Fire flow demand is discussed in more detail in Chapter 2.

7.2.4 Storage Requirements

The City is classified as a Group A Public Water System. According to the *Water System Design Manual (2020)*, Group A reservoirs must be designed to provide stability, durability, and protection of water quality while being compatible with existing and future facilities. Five storage components—Operational, Equalizing, Standby, Fire Suppression, and Dead Storage—must be considered in each reservoir design and in the analysis of existing storage facilities. Each component is discussed in detail in Chapter 3. The City has decided to combine or “nest” standby and fire flow storage requirements.

7.2.5 Pipeline Size

Hydraulic evaluation criteria are based on maintaining system pressure and velocity as defined in the DOH Washington Administrative Code (WAC) 246-290-230 and in *Group A Public Water Systems Waterworks Standards*. The following criteria are recommended when new distribution mains are constructed or old mains replaced:

- Maintain a minimum pressure of 30 pound per square inch (psi) at any point in the distribution system during PHD conditions.
- Maintain a minimum pressure of 20 psi at any point in the distribution system during fire flows under MDD conditions.
- Limit pipe velocities to 8 feet per second (fps).
- Limit main pressures in the distribution system to 100 psi. Some areas near the new MFRWTP will experience pressure greater than 100 psi once the plant is brought online. The City will address these concerns in these areas on a case by case basis.
- Use a hydraulic pipe model to verify system conditions and pipe size requirements.

The distribution systems were evaluated for both existing and forecasted future (2030 and 2040) conditions. Existing and forecasted demands are discussed in more detail in Chapter 2.

7.2.6 Water Quality Standards

Water quality must conform to the United States Environmental Protection Agency Safe Drinking Water Act (SDWA) as amended and the DOH criteria as specified in the Drinking Water Regulations (Chapter 246-290 WAC current edition). Part 4 of these regulations identifies water quality requirements that must be met. These regulations define monitoring requirements, maximum contaminant levels (MCLs), maximum residual disinfectant levels (MRDLs), and follow-up action. Water quality requirements are presented in detail in Chapter 3.

7.3 Construction Standards

The City maintains a *Standard Plans and Specifications Manual* referred to as the “City Standards.” These City Standards apply to the design and construction of all new and upgraded facilities. The City has adopted the latest versions of the Washington State Department of Transportation *Standard Specifications for Road, Bridge, and Municipal Construction* and its American Public Works Association (APWA) Supplement. The City Standards provide a supplement to the Standard Specifications. In addition, standard drawings for sewer and water utilities, among others, have been developed and included in the manual. A copy of the Standard Plans and Specifications Manual is available for review on the City’s website at <https://www.mylongview.com/427/Special-Provisions-Standard-Drawings>.

7.4 Policies and Requirements for Outside Parties

Policies and requirements for outside parties are contained within the body of the City’s governing documents. The governing document for the City is Longview Municipal Code (LMC) Title 15, Article II, Water, Section 15.72 – Extensions and Additions and the Standard Plans and Specifications Manual. The City’s service area policies are summarized in Chapter 1, Section 1.6 of this WSP.

7.5 DOH Project Report and Construction Document Submittal Exceptions

7.5.1 Applicable State Regulations

WAC 246-290-125 provides an exception to the requirement that public water systems submit certain project reports and construction documents to DOH for review and approval. DOH allows exceptions through a three-tiered policy defined in the following regulatory subsections.

- WAC 246-290-125(1) provides an exception to all utilities for the submittal and approval of valves, meters, fittings, backflow assemblies and hydrants, and maintenance of painted surfaces not contacting potable water.
- WAC 246-290-125(2) provides an exception to utilities for the submittal of new distribution main provided the utility has an approved water system plan that includes standard specifications for distribution mains. It also requires the utility to maintain on file a construction completion report.
- WAC 246-290-125(3) provides an exception to purveyors for the submittal of major projects such as transmission mains, storage tanks, and booster pump stations provided that:
 - A current department-approved water system plan is on file.
 - A professional engineer licensed in the State of Washington reviews the project. The review engineer and design engineer must not be the same individual.
 - The project is identified in the capital improvement section of the WSP.
 - The project is in accordance with the other applicable portions of WAC 246-290-125(3), Sections e, f, g, and h.

Source-of-supply projects, interties, and water quality treatment-related projects are not eligible for submittal exception procedures. The utility intends to submit major projects to DOH for review and approval.

7.5.2 Projects Identified for Exceptions

The utility maintains sufficient resources, both in house and with the use of private consultants, to meet the project submittal exceptions for all project groups defined in Section 7.5.1.

7.6 Construction Inspection Procedures

A Construction Report for Public Water System Projects, per WAC 246-290-040 is required upon completion of all water system improvement projects. The form must be completed by the purveyor and submitted to DOH upon project completion.

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Chapter 8 Capital Improvement Program

8.1 Introduction

This Chapter summarizes the recommended 20-year capital improvements and their respective costs as identified throughout the previous Chapters. Organized by category, this Chapter describes prioritized improvements included for transmission and distribution system pipelines, booster pump stations, storage facilities, and planning, controls, and general system improvements (system control, data acquisition, emergency response).

In recent years, the City of Longview (City) has invested significantly in supply, treatment and storage facility upgrades through the construction of the Mint Farm Regional Water Treatment Plant (MFRWTP), the covering of open reservoirs, replacement of vulnerable reservoir intake/discharge pipelines, and installation of storage facility mixing systems to enhance water quality. As might be anticipated, the focus of improvements within this document's planning horizon is consequently focused more on pipeline and pumping facility improvements. Recommended projects are developed based on the analyses presented in Chapter 2 and Chapter 3 and input from City engineering and operational staff. A summary table indicating project type, number, description, and benefit is included for each category.

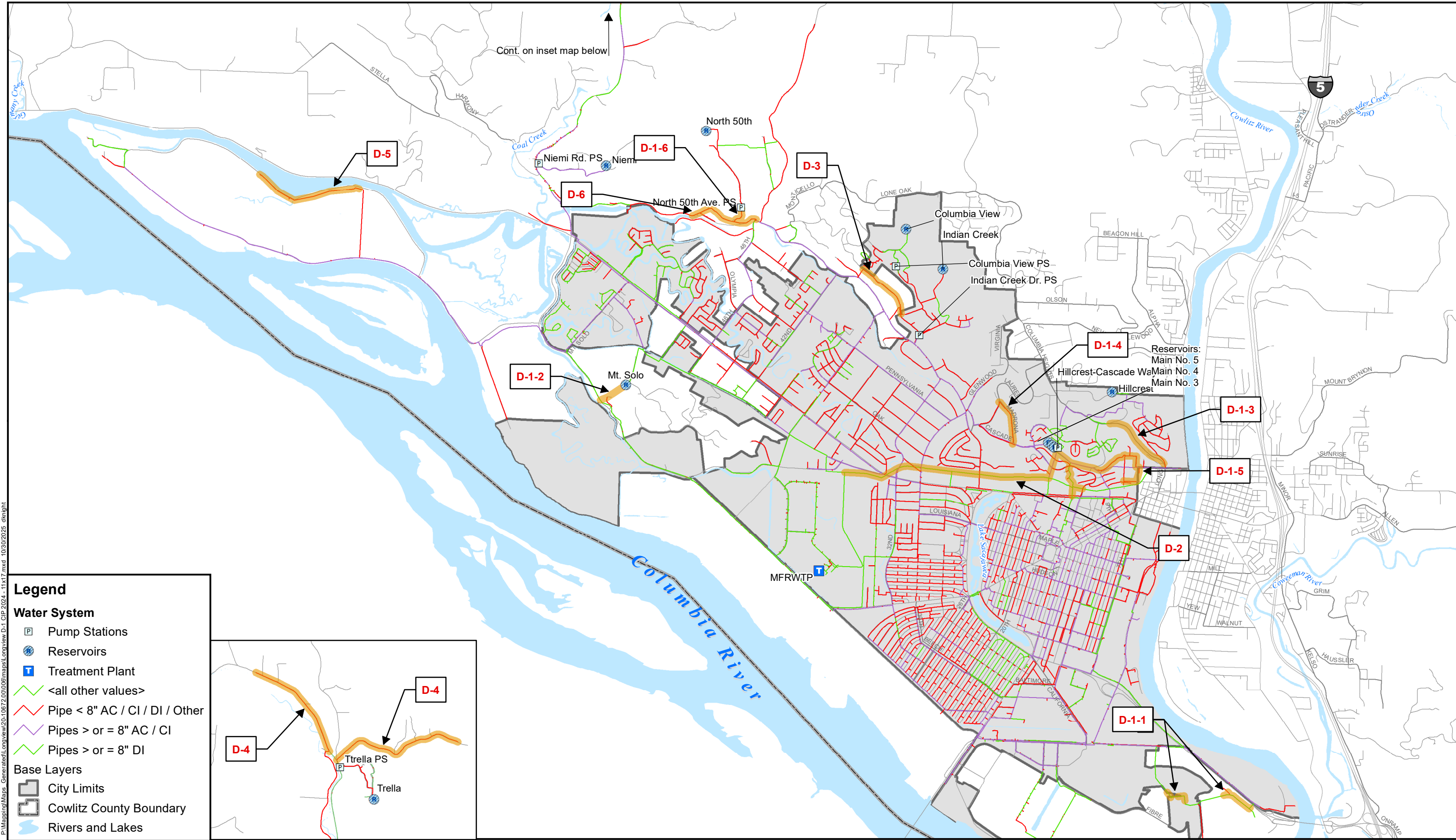
The project recommendations presented in this Chapter are intended to assist the City in identifying and prioritizing necessary water system improvement projects. Projects not included in the adopted 10-year Capital Improvement Plan (CIP) are identified as long-range projects that may be included in subsequent 10-year CIPs. The CIP improvements will be funded primarily through the City's existing reserve and replacement funds or through debt financing, unless more attractive funding opportunities arise.

Opinions of Probable Project Cost (OPPCs) for individual capital projects were initially developed concurrently with the major system analysis efforts performed in 2019 and 2020. For those projects that remain within this updated CIP, OPPCs were escalated to current values by an appropriate industry index (Engineering News Record, or ENR) for the area to reflect trends in material and supply chain costs that have occurred in recent years. Many of the CIP projects that now remain reflect revised system improvement scopes, with associated estimates, that were provided directly by the City. Projects were selected and prioritized using the following criteria:

- Compliance with regulatory/health and public safety requirements.
- Transmission, distribution, and storage improvements.
- Sources of supply to meet projected growth.
- System reliability/repair.
- Project and budget scheduling intended to achieve attainable financing.

The recommended 10-year capital improvements include distribution system upgrades, booster pump station improvements, telemetry and controls, pressure control, and miscellaneous activities. Figure 8-1 shows the location of the recommended improvements.

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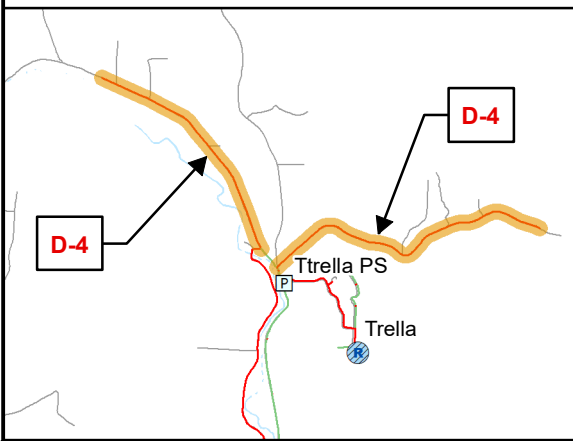
Legend

Water System

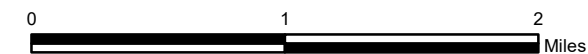
- P Pump Stations
- R Reservoirs
- T Treatment Plant
- <all other values>
- Pipe < 8" AC / CI / DI / Other
- Pipes > or = 8" AC / CI
- Pipes > or = 8" DI

Base Layers

- City Limits
- Cowlitz County Boundary
- Rivers and Lakes



GIS Base data: City of Longview.
Data sources supplied may not reflect current or actual conditions. This map is a geographic representation based on information available. It does not represent survey data. No warranty is made concerning the accuracy, currency, or completeness of data depicted on this map.
BHC Consultants LLC, assumes no responsibility for the validity of any information presented herein, nor any responsibility for the use or misuse of the data.



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8.1.1 Planning Level Cost Estimates

Planning level cost estimates were developed for the projects identified in the 10- and 20-year window. These estimates include sales tax, contractor overhead and profit (OH&P), planning level estimate contingency, and engineering/design and construction management. These costs are presented within conceptual levels of accuracy appropriate for work that has not had design conditions validated through field investigations yet.

The transmission and distribution main planning level cost estimates consist of unit and lump sum prices based upon a recent bid tabulation process for public works projects in western Washington. Cost estimates include furnishing and installation of piping, valves and fittings, gravel, asphalt repair, fire hydrant assemblies, as well as sales tax, construction contingency, engineering and administration. The following assumptions were used to develop the cost estimates:

- All pipe is ductile iron, cement-mortar lined, AWWA Class 52.
- Pipe bedding will consist of 6 inches of crushed rock above and below the pipe.
- Ten percent of the pipeline trench length is backfilled with select imported backfill.
- Along arterials, 80 percent of the pipeline trench length is filled with controlled density backfill to a depth of 4 feet.
- Hydrant assemblies are installed every 400 feet.
- Isolation valves are installed every 600 feet.

Where pipeline is in a roadway, asphalt restoration includes an 8-foot-wide patch of asphalt, 3 inches thick, overlying 6 inches of crushed surfacing. Concrete restoration includes a 10.5-foot-wide patch of concrete 8 inches thick, overlying 6 inches of crushed surfacing.

8.2 Water Supply and Treatment

As discussed in Chapter 1 and Chapter 3 of this 2025 Water System Plan (WSP), the Mint Farm Regional Water Treatment Plant (MFRWTP) is the main source of supply for the City and for Beacon Hill Water and Sewer District (BHWSO). More detailed information regarding the development and design of the facility can be found in the *Basis of Design Report*, (Kennedy/Jenks Consultants, 2010).

The MFRWTP has the capacity to accommodate increased demands from unanticipated new industrial development. The MFRWTP's current constructed capacity is 17.4 million gallons per day (MGD) with an ultimate build out capacity of 25.3 MGD. Refer to Chapter 3, Section 3.5.2, for more detailed information on the MFRWTP's capacity. The capacity and condition of MFRWTP facilities is satisfactory for the planning horizon of the CIP, and no current regulatory compliance issues have been identified. Hence, no capital projects are included within the CIP associated with supply and treatment, though it should be recognized that the City will continue to pay off debt service for the construction of the MFRWTP until complete towards the end of the decade.

Annual operating and equipment servicing costs associated with the production of MFRWTP water will continue to occur, but are planned for and financed outside the realm of capital improvements.

8.3 Transmission and Distribution Mains

The City has a total of one transmission project and 12 distribution projects listed on the CIP list. Though the transmission main project is shown outside of the initial 10-year CIP window, it has been identified as a critical project that the City actively seeking funding for in an attempt to expedite its timeline. The design of this 30-inch transmission main starts near the MFRWTP and travels to the Hillside Main Reservoirs within rights-of-way that are likely to also have distribution mains.

The distribution system improvements (as well as the transmission main project) are presented in Table 8-1. The general objective of the itemized improvements is to begin to establish an annual budget for pipeline projects that allows system-wide replacement at an interval more in line with the life expectancy of the infrastructure. This annual program is identified as project D-1, which will continuously be funded during the 20-year planning horizon. Due to the increased urgency of several identified system pipeline deficiencies, the initial years of this annual program will be dedicated to completing improvements that address these areas under projects D-1-1 through D-1-6.

In addition to deficiencies identified by hydraulic modeling, repair and replacement projects were selected based on maintenance history and relative vulnerability to pipe failure resulting from pipe size, age, and material. Future annual projects are anticipated to address system areas where smaller existing 4-inch diameter watermains remain that restrict available fire flow and pressures to customers. This pipe size is not compliant with standard industry practices and current City standards that have been adopted since their installation and are inadequate for connection of hydrants. All completed projects will expand or improve the water main grid, providing increased flows and pressures more reliably for the long-term.

8.3.1 D-1 – Ongoing Annual Maintenance Program

Undersized asbestos cement (AC), cast iron (CI) main will be replaced and prioritized under this program with an annual budgetary allocation of approximately \$3,000,000. The schedule has improvements starting in 2033, however, more immediate, specific projects have been identified and prioritized earlier in the plan. These projects are detailed in the Sections below and in Table 8-1.

D-1-1 – Port of Longview (Port) IRCE Main Relocation Replacement

This Project will install approximately 2,200 linear foot (LF) of new watermain at three separate locations within the Port's property to facilitate the completion of the Industrial Rail Corridor Expansion (IRCE) project. The new watermain segments will enhance distribution system looping, reduce dead end pipelines, and alleviate IRCE project conflicts through appropriate pipeline relocations. The probable project cost is approximately \$638,300, see Table 8-1.

D-1-2 – Mt. Solo Main Watermain Replacement

This Project will replace approximately 3,150 LF of 12-inch watermain from Mt. Solo Reservoir to Mt. Solo Road and from 20-inch main to Weber Street. This upgrade will improve the security of the distribution system by relocating the main outside of an active slide zone. The probable project cost is approximately \$2,574,000, see Table 8-1.

Table 8-1
CIP Schedule

2025 Capital Improvement Plan Schedule																	
Project Number	Project Name	Project Description	Benefit	Total Cost	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029	FY 2030	FY 2031	FY 2032	FY 2033	FY 2034	FY 2035-2044	Funding Source
Seattle Construction Cost Index (Increases by 3 percent per year)					0	0	0	0	0	0	0					0	
Transmission and Distribution Improvements																	
D-1	Ongoing Annual Main Replacement Program	Undersized, AC, CI pipeline replacement prioritized under this program.	A large portion of City's current watermain are undersized and/or of substandard materials.	\$ 36,000,000										\$3,000,000	\$3,000,000	\$ 30,000,000	
D-1-1	Port of Longview IRCE Main Relocation	Install three sections of new main totaling approx. 2,200 LF within Port property.	Relocate/replace existing watermain to eliminate conflicts with the Port's Industrial Rail Corridor Expansion (IRCE) project.	\$ 638,300		\$ 638,300											
D-1-2	Mt. Solo Main Replacement	Approx 3,150 LF of 12-inch Connection from Mt. Solo Reservoir to Mt. Solo Rd Connection from 20-inch main to Weber St.	Improve security of the distribution system by relocating the main outside of an active slide zone. An additional \$1.216M in project cost is being separately funding through a FEMA grant to meet the overall \$3.79M project cost.	\$ 2,574,000		\$2,574,000											
D-1-3	Columbia Hts waterline replacement	Install approx. 3,600 LF Columbia Hts. Main.	Improve distribution system reliability and address existing required design standard deficiency (fire flow, pressure, velocity).	\$ 1,288,000			\$190,800	\$1,097,200									
D-1-4	Replace Madrona Watermain	Replace 2,100 LF of 6- and 4-inch pipe with 8-inch pipe along eastern loop between Madrona Dr, Laurel Rd, and Cascade Way.	Improve distribution system reliability and address existing required design standard deficiency (fire flow, pressure, velocity).	\$ 752,000					\$ 752,000								
D-1-5	Replace Castleman-main	Approximate 1,000 LF of 8-inch, 2,100 LF of 12-inch, and 7,550 LF of 24-inch pipe to replace Castleman area 6-inch deficient distribution piping.	Improve distribution system reliability and address existing required design standard deficiency (fire flow, pressure, velocity).	\$ 2,430,000						\$ 90,000	\$ 270,000	\$2,070,000					
D-1-6	Replace N 50th Main	Replace approx. 650 LF of 6-inch pipe with 8-inch along N 50th Ave.	Improve distribution system reliability and address existing required design standard deficiency (fire flow, pressure, velocity).	\$ 233,000							\$ 233,000						

2025 Capital Improvement Plan Schedule																	
Project Number	Project Name	Project Description	Benefit	Total Cost	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029	FY 2030	FY 2031	FY 2032	FY 2033	FY 2034	FY 2035-2044	Funding Source
D-2	Dedicated Transmission Main – Hillside Reservoir – 30 inches	12,750 LF New Dedicated Transmission Main from MFWTP to Hillside Reservoir – 30 inches.	This project will improve water quality through better dissolved oxygen transfer and reservoir turnover, allow full Mint Farm wellfield and RWTP production capacity without localized distribution system high pressure issues, and provide better operational flexibility to take down individual Hillside tanks. Funding for estimated project cost of \$36M will be pursued once Mint Farm Regional WTP debt is retired. Preliminary planning work being grant funded.	\$ 36,000,000				\$2,000,000		\$2,000,000		\$2,000,000		\$2,000,000		\$ 28,000,000	
D-3	Replace Sunset Main	Replace 4,400 LF of 4-inch pipe with 8-inch. Pipe starting from Sunset Way and continuing along Poplar Way to dead end.	Improve distribution system reliability and address existing required design standard deficiency (fire flow, pressure, velocity).	\$ 1,580,000								\$ 234,000	\$1,346,000				
D-4	Replace Trella Zone Main	Replace 14,500 LF of 6-inch pipe with 8-inch within the Trella Zone along Coal Creek Rd branches between Coal Creek Rd and Ragland Rd.	Improve distribution system reliability and address existing required design standard deficiency (fire flow, pressure, velocity).	\$ 5,188,000									\$ 192,000	\$ 576,000	\$2,210,000	\$ 2,210,000	
D-5	Replace Willow Grove Main	Replace 5,200 LF of 6-inch dia. Pipe with 8-inch diameter pipe from the southern loop of Willow Grove Rd to, west along the northern loop of Willow Grove Rd, and dead ends along Ocean Beach Hwy.	Improve distribution system reliability and address existing required design standard deficiency (fire flow, pressure, velocity).	\$1,860,000								\$ 276,000	\$1,584,000				
D-6	Replace Pacific Way Main	Replace approx. 3,400 LF of main along Pacific Way.	Improve distribution system reliability and address existing required design standard deficiency (fire flow, pressure, velocity).	\$ 1,314,000									\$ 195,000	\$1,119,000			
<i>Subtotal</i>				\$89,857,300	\$ 0	\$3,212,300	\$ 190,800	\$1,097,200	\$ 752,000	\$ 90,000	\$ 503,000	\$2,580,000	\$3,317,000	\$4,695,000	\$5,210,000	\$ 60,210,000	

2025 Capital Improvement Plan Schedule																		
Project Number	Project Name	Project Description	Benefit	Total Cost	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029	FY 2030	FY 2031	FY 2032	FY 2033	FY 2034	FY 2035-2044	Funding Source	
Pumping Improvements																		
PS-1	Pump Station Replacement Fund	Annual allocation towards goal of replacing one aging pump station facility serving the City's higher elevations in the northern service area every 5 years.	Will allow the retirement of essential aging buildings and equipment that are approaching the end of their useful lives and becoming challenging to operate and maintain (Niemi, Trella, North 50 th , Indian Creek, Columbia View).	\$ 10,080,000								\$ 630,000	\$ 630,000	\$ 630,000	\$ 630,000	\$ 630,000	\$ 630,000	\$ 6,300,000
<i>Subtotal</i>				\$ 10,080,000		\$ 0	\$ 0	\$ 0	\$ 0	\$ 630,000	\$ 630,000	\$ 630,000	\$ 630,000	\$ 630,000	\$ 630,000	\$ 6,300,000		
Storage Improvements																		
ST-1	Seismic Corrections at Various Tanks	Most tanks built before 1980s require seismic retrofitting including a large seismic retrofit and/or seismic improvements to help with bringing the tank up to seismic code.	Costs based on retrofitting of existing tanks with perimeter steel bracing anchor bolted to concrete foundations.	\$ 3,005,800			\$ 158,200	\$ 158,200	\$ 158,200	\$ 158,200	\$ 158,200		\$ 158,200	\$ 158,200	\$ 158,200	\$ 158,200	\$ 1,582,000	
<i>Subtotal</i>				\$ 3,005,800	\$ 0	\$ 0	\$ 158,200	\$ 158,200	\$ 158,200	\$ 158,200	\$ 158,200	\$ 158,200	\$ 158,200	\$ 158,200	\$ 158,200	\$ 158,200	\$ 1,582,000	
Planning, Controls and General System Upgrades																		
PCG-1	SCADA System Upgrades	Annual allocation to allow continued building of the City's SCADA system through critical facility control equipment installation and programming.	Allows enhanced collection and processing of system data and setpoints to facilitate operational decision making and optimization.	\$ 950,000			\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 500,000	
PCG-2	Fisher's Lane Regional WTP Abandonment	Final phase of property abandonment for decommissioned/demolished old regional WTP that used Cowlitz River Water Supply.	Cap and abandon old regional WTP drain line through the Cowlitz River dyke embankment in preparation for property sale.	\$ 93,800		\$ 93,800												
<i>Subtotal</i>				\$ 1,043,800	\$ 0	\$ 93,800	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 500,000	
O&M Improvements																		
O&M-1	Valve Replacement			\$ 877,025		\$ 30,000	\$ 31,500	\$ 33,075	\$ 34,729	\$ 36,465	\$ 38,288	\$ 40,203	\$ 42,213	\$ 44,223	\$ 46,329	\$ 500,000		
O&M-2	Large Meter Replacement			\$ 3,759,453		\$ 140,000	\$ 147,000	\$ 154,350	\$ 162,068	\$ 170,171	\$ 178,679	\$ 187,613	\$ 196,994	\$ 206,375	\$ 216,203	\$ 2,000,000		
<i>Subtotal</i>				\$ 4,636,477	\$ 0	\$ 170,000	\$ 178,500	\$ 187,425	\$ 196,797	\$ 206,636	\$ 216,967	\$ 227,816	\$ 239,207	\$ 250,598	\$ 262,531	\$ 2,500,000		
TOTAL				\$108,623,377	\$ 0	\$3,476,100	\$ 577,500	\$1,492,825	\$1,156,997	\$1,134,836	\$1,558,167	\$3,646,016	\$4,394,407	\$5,783,798	\$6,310,731	\$ 71,092,000		

2025 Capital Improvement Plan Schedule																	
Project Number	Project Name	Project Description	Benefit	Total Cost	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029	FY 2030	FY 2031	FY 2032	FY 2033	FY 2034	FY 2035-2044	Funding Source
Developer Projects																	
DV-01	Public / Private Joint Utility Improvement		Placeholder for water system partnering opportunities.	\$ 1,000,000		\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 500,000	
DV-02	LID		Placeholder for LID partnering opportunities.	\$ 2,000,000		\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 1,000,000	
<i>Subtotal</i>				\$ 3,000,000	\$ 0	\$ 150,000	\$ 150,000	\$ 150,000	\$ 150,000	\$ 150,000	\$ 150,000	\$ 150,000	\$ 150,000	\$ 150,000	\$ 150,000	\$ 1,500,000	

D-1-3 – Columbia Heights Watermain Replacement

This Project will replace approximately 3,600 LF of 8-inch watermain along Columbia Heights Road to improve distribution system reliability and address existing required design standard deficiencies (fire flow, pressure, velocity). The probable project cost is approximately \$1,288,000, see Table 8-1.

D-1-4 – Madrona Watermain Replacement

This Project will replace approximately 2,100 LF of 6-inch and 4-inch watermain with 8-inch pipe along the eastern loop between Madrona Drive, Laurel Road, and Cascade Way. This upgrade will improve distribution system reliability and address existing required design standard deficiencies (fire flow, pressure, velocity). The probable project cost is approximately \$752,000, see Table 8-1.

D-1-5 – Castleman Watermain Replacement

This Project will install approximately 1,000 LF of 8-inch watermain, 2,100 LF of 12-inch watermain, and 7,550 LF of 24-inch watermain to replace 6-inch deficient distribution piping along Castleman Drive. This upgrade will improve distribution system reliability and address existing required design standard deficiencies (fire flow, pressure, velocity). The probable project cost is approximately \$2,574,000, see Table 8-1.

D-1-6 – N 50th Ave Watermain Replacement

This Project will install approximately 650 LF of 8-inch watermain along North 50th Avenue to replace undersized 6-inch main and improve distribution system reliability and address existing required design standard deficiencies (fire flow, pressure, velocity). The probable project cost is approximately \$233,000, see Table 8-1.

D-2 – Dedicated Transmission Main – Hillside Reservoir 30 Inches

This Project will construct a new dedicated transmission main of approximately 12,750 LF of 30-inch pipe between the MFRWTP and Hillside Reservoir. This project will improve water quality through better dissolved oxygen transfer and reservoir turnover, allow for full Mint Farm wellfield and MFRWTP production capacity without localized distribution system high pressure issues, and provide better operational flexibility to take down individual Hillside tanks. The probable project cost provided by the City is approximately \$36,000,000, with preliminary project efforts anticipated through funding that becomes available in 2027 (see Table 8-1). Funding sources outside of water utility reserves will be necessary to complete this critical project.

D-3 – Sunset Way Watermain Replacement

This Project will replace approximately 4,400 LF of 4-inch watermain with 8-inch pipe along Sunset Way and Poplar Way. This upgrade will improve distribution system reliability and address existing required design standard deficiencies (fire flow, pressure, velocity). The probable project cost is approximately \$1,580,000, see Table 8-1.

D-4 – Trella Zone Watermain Replacement

This Project will replace approximately 14,500 LF of 6-inch watermain with 8-inch pipe along Coal Creek Road and Ragland Road within the Trella Zone. This upgrade will improve distribution system reliability and address existing required design standard deficiencies (fire flow, pressure, velocity). The probable project cost is approximately \$5,188,000, see Table 8-1.

8.3.2 D-5 – Willow Grove Watermain Replacement

This Project will replace approximately 5,200 LF of 6-inch watermain with 8-inch pipe along Willow Grove Road to improve distribution system reliability and address existing required design standard deficiencies (fire flow, pressure, velocity). The probable project cost is approximately \$1,860,000, see Table 8-1.

8.3.3 D-6 – Pacific Way Watermain Replacement

This Project will install approximately 3,400 LF of 8-inch watermain along Pacific Terrace and Pacific Way to replace 6-inch main and improve distribution system reliability while addressing existing required design standard deficiencies (fire flow, pressure, velocity). The probable project cost is approximately \$1,314,000, see Table 8-1.

8.4 Booster Pump Stations Improvements

The City's booster pump stations that serve the smaller, elevated pressure zones within the northern portions of its service area are aging and becoming more susceptible to both equipment and facility failure. Programmatic improvements to these facilities must be planned. In 2020, City staff performed a conceptual analysis to address pumping and storage facility deficiencies within these areas via a more regional/consolidated solution that allowed one larger booster pump station and reservoir to be connected to all of the pressure zones for adequate supply and pressure needs. Because of isolated topography and property acquisition challenges, it was determined that this concept was not feasible within the current planning horizon.

Alternatively, the City will begin to develop capital reserves for the replacement of these aging facilities on an individual basis, with the target of one booster pump station replacement every 5 years. Project PS-1 in Table 8-1 estimates annual allocations, based on existing facilities size and capacity, to accomplish this objective.

8.5 Storage Facilities

The City does not have overall additional storage volume needs within the 10-year CIP planning horizon, but has recently completed a few major storage facility projects, including the covering of the Hillside reservoirs and installation of mixing systems to enhance water quality. The physical condition of existing storage tanks is satisfactory and will continue to be regularly inspected and assessed. However, many of the existing tanks are likely seismically deficient, based on recent International Building Code updates. Similar to the planning decision rendered for a consolidated booster pump station, a centrally located larger reservoir to serve the upper elevations of City's northern service area was determined to be infeasible at this time.

Project ST-1 in Table 8-1 develops and annual reserve to begin to implement seismic upgrades to the City's existing tanks in order to bring them into compliance, with the necessary funding based on conceptual estimates for bracing to be added at the City's steel and concrete tanks over the 20-year planning horizon. These assumptions will need to be confirmed through individual facility analysis at the time that the project is started, and funding needs may change significantly.

8.6 Planning, Controls and General System Improvements

There are a number of planning, controls, and general system improvements planned within the 10-year planning window. As discussed in Section 3.6: Telemetry and Controls, the City's Supervisory Control and Data Acquisition (SCADA) system continues to be developed. An annual allocation has been set aside to allow for the continuation of building the SCADA system through critical facility control equipment installation and programming. The City has also planned for the replacement of deteriorating large customer meters to improve system reliability and accounting. This Section also includes projects to address deteriorating valves, emergency power upgrades, improved meter reading capabilities and data processing, as well as long-range planning. These projects are presented in Table 8-1.

8.7 Operations and Maintenance Improvements

An annual City-developed allocation is included as projects O&M-1 and O&M-2 in Table 8-1 for continuing water service meter and valve replacement programs that must be considered from a utility resource planning perspective. These programs, however, are funded through a utility maintenance fund and not through the capital program. Therefore, the annual allocations shown in Table 8-1 for these projects are not included in the rate model developed under Chapter 9 that is used to assess capital funding adequacy.

8.8 Summary of City's Capital Improvements

The complete CIP list for the City is summarized in Table 8-1. These projects include a project description, CIP construction time frame, and benefit. All projects are deemed necessary to address existing deficiencies and are not growth-based. In addition to the infrastructure classifications discussed above, system extensions associated with development are anticipated. Though the burden of these capital projects will be borne by the developer, partnerships can occasionally make sense where the City contributes to project cost in order to effect additional upgrades that go beyond meeting development standards. All other the 20-year projects are assumed to be 100 percent growth driven.

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Chapter 9 Financial Analysis

9.1 Introduction

This Chapter assesses the City’s ability to execute the capital improvement plan recommended in Chapter 8 while maintaining water user rates at reasonable levels. It evaluates the historical financial condition of the City’s water utility and estimates the financial impact of funding the capital improvement plan, given projected capital needs and funding sources.

9.2 Historical Financial Condition

This section summarizes historical financial performance as reported in the financial statements of the City’s combined Water-Sewer Fund. Initially, this task was intended to analyze the historical performance of the water utility separate from the sewer utility, but after conversations with City staff, it was determined that an analysis of the combined Fund would be sufficient as the City does not separately report its financials for each utility. Table 9-1 summarizes the Fund’s 2015–2024 income statements, while Table 9-2 summarizes the Fund’s balance sheets.

Operating expenditures (including depreciation) varied from year to year, but on average increased by about \$570,000 per year. Depreciation has increased by 3.3 percent per year on average while other operating expenses increased at a rate averaging 2.7 percent per year. Table 9-1 shows positive net operating income ranging from a low of about \$1,443,000 in 2016 to a high of about \$4,376,000 in 2024.

The operating ratio (ratio of operating expenses to operating revenues) has ranged from a low of 0.64 to a high of 0.76, indicating that the Fund has consistently spent less than it earns from operations. A lower operating ratio indicates a greater margin between revenues and expenses. The observed range suggests that the City’s Water-Sewer Fund has maintained relatively strong cost control and operational efficiency throughout the period.

The Fund’s net assets have continued to grow as operating revenues have consistently exceeded operating expenditures. Despite the fact that the City increased its water rates by a total of 55 percent from 2015 – 2024, revenue from charges for services only grew by 35 percent during that period. This suggests that the City’s has experienced a net decrease in water sales over the past ten years.

Table 9-2 suggests that the Water-Sewer Fund has maintained a relatively high current ratio (ratio of current assets to current liabilities), ranging from 2.7 in 2018 to 6.5 in 2024. Since 2015, the Fund has maintained an average ratio of 3.6. As a general benchmark, a ratio of 2:1 or higher is considered a healthy level of liquidity relative to liabilities and suggests that the Fund can more than cover its debt and operating expenses.

Days of cash on hand is a measure of financial security, quantifying how long the City’s Water-Sewer Fund would be able to fund daily operating and maintenance costs if no additional revenues were collected. It is calculated by dividing unrestricted cash by the average daily cost of operations (excluding depreciation). While there is no firm minimum standard for this metric, bond rating agencies have expressed a preference for a minimum of 180 days of cash on hand for utilities seeking to optimize their bond ratings. The Water-Sewer Fund has been able to maintain 371 – 560 days of cash on hand since 2015.

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Table 9-1
Statement of Revenues, Expenses, & Changes in Fund Net Position

Historical Income Statements (\$000s)	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Operating Revenues:										
Charges For Services ¹	\$ 20,347	\$ 20,446	\$ 21,268	\$ 21,564	\$ 21,513	\$ 22,086	\$ 23,063	\$ 23,868	\$ 24,908	\$ 27,410
Miscellaneous	\$ 1	\$ 4	\$ 1	\$ 10	\$ 1	\$ 20	\$ 4	\$ 5	\$ 1	\$ 3
Total Operating Revenues	\$ 20,348	\$ 20,450	\$ 21,269	\$ 21,574	\$ 21,514	\$ 22,106	\$ 23,066	\$ 23,873	\$ 24,909	\$ 27,413
Operating Expenses:										
Cash Operating Expenses	\$ 14,688	\$ 15,403	\$ 15,386	\$ 15,328	\$ 16,248	\$ 14,963	\$ 14,815	\$ 16,695	\$ 17,849	\$ 18,718
Depreciation	\$ 3,219	\$ 3,604	\$ 3,676	\$ 3,743	\$ 3,731	\$ 3,867	\$ 4,114	\$ 4,197	\$ 4,291	\$ 4,319
Total Operating Expenses	\$ 17,907	\$ 19,007	\$ 19,062	\$ 19,071	\$ 19,979	\$ 18,829	\$ 18,929	\$ 20,892	\$ 22,139	\$ 23,037
Operating Income (Loss)	\$ 2,441	\$ 1,443	\$ 2,207	\$ 2,503	\$ 1,535	\$ 3,276	\$ 4,137	\$ 2,981	\$ 2,770	\$ 4,376
Non-Operating Revenues (Expenses):										
Interest Revenue	\$ 60	\$ 99	\$ 163	\$ 291	\$ 368	\$ 116	\$ 38	\$ 374	\$ 1,096	\$ 1,094
Interest Expense	\$ (663)	\$ (655)	\$ (611)	\$ (582)	\$ (454)	\$ (526)	\$ (488)	\$ (450)	\$ (410)	\$ (351)
Operating Grant Revenue	-	\$ 4	-	-	-	\$ 87	-	\$ 180	-	-
Disposition of Capital Assets	\$ (1,266)	\$ (227)	\$ (1,186)	\$ (472)	\$ (784)	\$ (34)	\$ (33)	\$ (142)	\$ (290)	\$ (63)
Other	\$ 14	\$ 47	\$ 32	\$ 21	\$ 32	\$ 53	\$ 29	\$ 42	\$ 96	\$ 71
Total Nonoperating Revenues (Expenses)	\$ (1,855)	\$ (732)	\$ (1,602)	\$ (743)	\$ (837)	\$ (304)	\$ (454)	\$ 4	\$ 492	\$ 752
Income (Loss) Before Contributions	\$ 586	\$ 711	\$ 605	\$ 1,760	\$ 698	\$ 2,972	\$ 3,683	\$ 2,985	\$ 3,262	\$ 5,128
Capital Contributions	\$ 275	\$ (115)	\$ 604	\$ 278	\$ 185	\$ 224	\$ 567	\$ 1,797	\$ 149	\$ 471
Transfers In	-	\$ 135	-	-	-	\$ 205	\$ 70	-	\$ 4,303	-
Transfers Out	\$ (507)	-	-	\$ (10)	\$ (242)	\$ (155)	\$ (100)	-	-	\$ (3,057)
Total Capital Contributions	\$ (231)	\$ 20	\$ 604	\$ 268	\$ (58)	\$ 273	\$ 537	\$ 1,797	\$ 4,452	\$ (2,587)
Change In Net Position	\$ 355	\$ 732	\$ 1,209	\$ 2,029	\$ 640	\$ 3,246	\$ 4,220	\$ 4,783	\$ 7,714	\$ 2,541
Net Position, January 1	\$ 60,826	\$ 59,781	\$ 60,513	\$ 61,722	\$ 63,751	\$ 64,390	\$ 67,636	\$ 72,115	\$ 76,898	\$ 84,612
Prior Period Adjustments	\$ (1,400)	-	-	-	-	-	\$ 259	-	-	\$ 1,505
Net Position, December 31	\$ 59,781	\$ 60,513	\$ 61,722	\$ 63,751	\$ 64,390	\$ 67,636	\$ 72,115	\$ 76,898	\$ 84,612	\$ 88,657
¹Annual Change in Charges for Services		+0.5%	+4.0%	+1.4%	-0.2%	+2.7%	+4.4%	+3.5%	+4.4%	+10.0%
Annual Water Rate Increases		+4.5%	+5.5%	+4.7%	+4.5%	+6.0%	0.0%	+3.7%	+10.0%	+6.3%

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Table 9-2
Statement of Net Position

Historical Balance Sheets (\$000s)	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Current Assets:										
Cash & Investments	\$ 11,824	\$ 14,162	\$ 14,632	\$ 15,927	\$ 14,134	\$ 16,658	\$ 18,665	\$ 21,748	\$ 18,690	\$ 20,120
Receivables, Net	\$ 3,117	\$ 3,192	\$ 3,448	\$ 3,398	\$ 3,481	\$ 3,828	\$ 4,052	\$ 3,808	\$ 3,856	\$ 3,720
Due from Other Funds	\$ 195	\$ 143	\$ 37	\$ 2	\$ 88	\$ 266	\$ 251	\$ 192	\$ 4,303	\$ 0
Due from Other Governments	\$ 336	\$ 63	\$ 90	\$ 234	\$ 32	\$ 19	\$ 58	\$ 40	\$ 24	\$ 0
Inventory	\$ 330	\$ 331	\$ 388	\$ 397	\$ 346	\$ 433	\$ 444	\$ 555	\$ 613	\$ 645
<i>Total Current Assets</i>	\$ 15,802	\$ 17,891	\$ 18,595	\$ 19,958	\$ 18,081	\$ 21,204	\$ 23,470	\$ 26,343	\$ 27,486	\$ 24,485
Non-Current Assets:										
Restricted Investments	\$ 4,645	\$ 1,662	\$ 798	\$ 797	\$ 797	\$ 797	\$ 797	\$ 797	\$ 797	\$ 4,657
Noncurrent Receivables	\$ 3,549	\$ 3,306	\$ 3,072	\$ 2,983	\$ 2,699	\$ 2,408	\$ 2,048	\$ 865	\$ 1,577	\$ 1,544
Net Pension Asset	-	-	-	-	-	-	\$ 2,177	\$ 814	\$ 896	\$ 687
Assets Held for Resale	\$ 78	\$ 78	\$ 78	\$ 78	\$ 78	\$ 78	\$ 78	\$ 78	\$ 165	\$ 165
Net Capital Assets	\$ 81,132	\$ 81,105	\$ 80,262	\$ 80,423	\$ 79,743	\$ 78,503	\$ 76,778	\$ 76,176	\$ 80,867	\$ 78,074
<i>Total Noncurrent Assets</i>	\$ 89,404	\$ 86,151	\$ 84,210	\$ 84,281	\$ 83,317	\$ 81,786	\$ 81,878	\$ 79,730	\$ 84,302	\$ 85,127
Total Assets	\$ 105,206	\$ 104,042	\$ 102,805	\$ 104,239	\$ 101,398	\$ 102,990	\$ 105,348	\$ 106,073	\$ 111,788	\$ 109,612
Current Liabilities:										
Accounts Payable	\$ (216)	\$ (460)	\$ (303)	\$ (919)	\$ (203)	\$ (1,503)	\$ (265)	\$ (743)	\$ (1,428)	\$ (179)
Due to Other Funds	\$ (88)	\$ (54)	\$ (84)	\$ (131)	\$ (152)	\$ (84)	\$ (231)	\$ (66)	\$ (161)	\$ (72)
Due to Other Governments	\$ (38)	-	-	\$ (127)	\$ (69)	\$ (17)	-	\$ (2)	-	-
Accrued Wages Payable	\$ (162)	\$ (168)	\$ (177)	\$ (177)	\$ (199)	\$ (192)	\$ (203)	\$ (207)	\$ (237)	\$ (243)
Compensated Absences	\$ (115)	\$ (139)	\$ (138)	\$ (137)	\$ (149)	\$ (156)	\$ (195)	\$ (250)	\$ (280)	\$ (235)
Accrued Bond Interest Payable	-	-	-	-	-	-	-	-	-	\$ (148)
Customer Deposits	\$ (481)	\$ (498)	\$ (490)	\$ (552)	\$ (541)	\$ (513)	\$ (469)	\$ (460)	\$ (481)	\$ (483)
Other Current Liabilities	\$ (192)	\$ (96)	\$ (107)	\$ (121)	\$ (88)	\$ (137)	\$ (243)	\$ (231)	\$ (372)	\$ (227)
Current Portion of Long-Term Obligations	\$ (4,217)	\$ (4,404)	\$ (4,313)	\$ (5,194)	\$ (4,450)	\$ (4,478)	\$ (4,503)	\$ (4,532)	\$ (4,558)	\$ (2,192)
<i>Total Current Liabilities</i>	\$ (5,509)	\$ (5,819)	\$ (5,612)	\$ (7,358)	\$ (5,851)	\$ (7,080)	\$ (6,109)	\$ (6,491)	\$ (7,517)	\$ (3,779)

Table 9-2
Statement of Net Position (Continued)

Historical Balance Sheets (\$000s)	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Non-Current Liabilities:										
Bonds Payable, Net	\$ (6,728)	\$ (6,321)	\$ (6,162)	\$ (5,869)	\$ (5,569)	\$ (5,256)	\$ (4,933)	\$ (4,597)	\$ (4,251)	\$ (17,312)
Due to Other Governments	\$ (31,745)	\$ (29,960)	\$ (27,965)	\$ (26,074)	\$ (24,552)	\$ (22,250)	\$ (19,933)	\$ (17,601)	\$ (15,253)	\$ 0
Compensated Absences	\$ (84)	\$ (76)	\$ (98)	\$ (160)	\$ (181)	\$ (140)	\$ (219)	\$ (193)	\$ (129)	\$ (258)
Pension Obligation (Net)	\$ (1,330)	\$ (1,663)	\$ (1,211)	\$ (779)	\$ (530)	\$ (575)	\$ (108)	\$ (264)	\$ (244)	\$ (287)
<i>Total Noncurrent Liabilities</i>	\$ (39,887)	\$ (38,020)	\$ (35,436)	\$ (32,882)	\$ (30,832)	\$ (28,221)	\$ (25,193)	\$ (22,655)	\$ (19,877)	\$ (17,857)
Total Liabilities	\$ (45,396)	\$ (43,839)	\$ (41,048)	\$ (40,240)	\$ (36,683)	\$ (35,301)	\$ (31,302)	\$ (29,146)	\$ (27,394)	\$ (21,636)
Deferred Outflows	\$ 217	\$ 360	\$ 241	\$ 205	\$ 192	\$ 232	\$ 232	\$ 786	\$ 695	\$ 955
Deferred Inflows	\$ (247)	\$ (50)	\$ (276)	\$ (452)	\$ (517)	\$ (285)	\$ (2,164)	\$ (815)	\$ (477)	\$ (275)
Net Investment in Capital Assets	\$ 44,242	\$ 43,167	\$ 40,815	\$ 42,371	\$ 44,428	\$ 45,864	\$ 46,512	\$ 48,347	\$ 55,399	\$ 57,743
Restricted for Pension Assets	-	-	-	-	-	-	\$ 338	\$ 798	\$ 1,114	\$ 687
Restricted for Debt Service	-	-	-	-	-	-	\$ 2,492	\$ 2,377	\$ 2,239	\$ 2,239
Restricted for Capital Projects	\$ 736	\$ 798	\$ 2,879	\$ 2,780	\$ 2,608	\$ 2,519	\$ 797	\$ 797	\$ 797	\$ 753
Unrestricted	\$ 3,909	\$ 865	\$ 798	\$ 797	\$ 797	\$ 797	-	-	-	-
Total Net Position	\$ 10,894	\$ 15,683	\$ 17,231	\$ 17,803	\$ 16,557	\$ 18,456	\$ 21,976	\$ 24,579	\$ 25,063	\$ 27,235

Overall, the City's Water-Sewer Fund has realized positive net income and annual increases in net asset value in recent years, exhibiting relatively stable financial performance. This outcome appears to be the result of the City's proactive approach to increasing its water rates to preserve the financial health of its water utility.

9.3 Current Financial Structure

The City operates its water utility under a set of financial policies that target management of a financially viable and fiscally responsible enterprise fund. The policy framework used in the financial forecast is discussed in further detail below.

9.3.1 Utility Reserves

The water utility's resources are separable into five primary funds:

- **Water Operating Fund:** This is the utility's pool of unrestricted resources. Inflows include rate revenue and other operating revenues; outflows include operating and maintenance (O&M) expenses and other utility revenue needs not covered by other sources. Industry practice for utility operating reserves typically ranges from 30 days (8 percent) to 120 days (33 percent) of operating expenses, with the lower end more appropriate for utilities with stable revenue streams and the higher end of the range more appropriate for utilities with significant seasonal or consumption-based fluctuations. The financial analysis assumes a year-end minimum balance target of 60 to 90 days of total annual operating expenditures excluding transfers and annual debt service. This equates to \$1.4 million to \$2.1 million in 2025 based on the 2025 operating budget of approximately \$8.6 million (excluding transfers and annual debt service).
- **Water Capital Fund:** This reserve represents the hub of the water utility's capital activity. Inflows include capital recovery fees (CRFs), capital grants and developer donations, and other money set aside for capital purposes; the City spends these funds on capital projects. The financial analysis assumes a minimum balance for this fund equivalent to 1.0 percent of the original cost of fixed assets. This equates to \$454,000 in 2025 and grows over time as capital projects are completed and added to the asset inventory.
- **Filtration Plant Operating Fund:** This fund supports the day-to-day operations of the Filtration Plant, which provides treated water to customers of the City of Longview and Beacon Hill Water & Sewer District (BHWSD). The financial plan assumes BHWSD covers 15.6 percent of Filtration Plant operating expenditures, with the City covering the remainder.
- **Filtration Plant Capital Fund:** This fund is dedicated to capital improvements at the Filtration Plant and is governed by its own Capital Improvement Plan (CIP). The study assumes BHWSD contributes 14.9 percent of the capital costs associated with the Filtration Plant. This fund is forecasted to be self-sufficient in supporting the planned improvements, requiring no additional contributions from the City's Water Operating Fund or Water Capital Fund.
- **Bond Reserve:** This is the restricted bond reserve. The City is not currently required to fund this reserve, as long as it maintains enough of a balance to cover the annual debt service payments.

Table 9-3 summarizes the water utility’s fund balances as of the end of 2024:

Table 9-3
2024 Ending Balances – City of Longview Water Utility

Water Operating Fund	\$ 4,794,144
Water Capital Fund	\$ 3,581,491
Filtration Plant Operating Fund	\$ 587,047
Filtration Plant Capital Fund	\$ 328,690
Bond Reserve	\$ 739,704
Combined Fund Balance as of 12/31/24	\$10,031,076

9.4 Capital Needs and Funding Strategy

The CIP can impact rates directly depending on the City’s capital funding strategy – for example, the City may set rates to generate cash funding for the CIP or issue additional debt to fund projects. Determining these impacts is a two-step process, involving the identification of capital investment needs and the development of a funding strategy.

9.4.1 Capital Investment Needs

Table 9-4 summarizes the total capital cost projections, which reflect adjustments for anticipated inflation at an assumed rate of 4.0 percent per year. Table 9-4 indicates that the City is expected to spend approximately \$46.5 million on water utility capital projects from 2025 – 2034. Note that Table 9-4 excludes costs attributable to the Filtration Plant, which City staff indicated will be covered through resources in the Filtration Plant Capital Fund with no additional impact on the City’s water rates.

Table 9-4
Summary of 2025 – 2034 Capital Forecast

Capital Forecast (\$000s)	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	Total
Capital Improvement Plan per Table 8-1											
City-Funded Projects	\$ 3,476	\$ 578	\$ 3,493	\$ 1,157	\$ 3,135	\$ 1,558	\$ 5,646	\$ 4,394	\$ 7,784	\$ 6,311	\$ 37,532
Developer-Funded Projects	150	150	150	150	150	150	150	150	150	150	1,500
Total	\$ 3,626	\$ 728	\$ 3,643	\$ 1,307	\$ 3,285	\$ 1,708	\$ 5,796	\$ 4,544	\$ 7,934	\$ 6,461	\$ 39,032
Less: O&M Improvements ¹	(170)	(179)	(187)	(197)	(207)	(217)	(228)	(239)	(251)	(263)	(2,138)
Net Capital Cost (2025 Dollars)	\$ 3,456	\$ 549	\$ 3,456	\$ 1,110	\$ 3,078	\$ 1,491	\$ 5,568	\$ 4,305	\$ 7,683	\$ 6,198	\$ 36,894
Plus: Adjustment for Inflation ²	-	22	281	139	523	323	1,478	1,360	2,832	2,624	9,582
Total Projected Capital Expenditures	\$ 3,456	\$ 571	\$ 3,737	\$ 1,249	\$ 3,601	\$ 1,814	\$ 7,046	\$ 5,665	\$ 10,515	\$ 8,822	\$ 46,476
Forecast of Capital Fund Activity											
Beginning Balance	\$ 3,581	\$ 1,548	\$ 9,083	\$ 8,697	\$ 11,072	\$ 12,008	\$ 15,052	\$ 13,235	\$ 13,549	\$ 9,727	\$ 3,581
Plus: Interest Earnings	72	31	181	174	221	240	301	265	271	195	1,951
Plus: Capital Recovery Fees	171	173	173	174	174	175	176	177	177	178	1,748
Plus: FEMA Grant	1,030	-	-	-	-	-	-	-	-	-	1,030
Plus: Developer Funding	150	156	162	169	176	183	190	197	205	213	1,801
Plus: Transfer from Operating Fund	-	7,746	2,835	3,107	3,966	4,260	4,562	5,340	6,040	6,392	44,248
Less: Capital Expenditures	(3,456)	(571)	(3,737)	(1,249)	(3,601)	(1,814)	(7,046)	(5,665)	(10,515)	(8,822)	(46,476)
Ending Balance	\$ 1,548	\$ 9,083	\$ 8,697	\$ 11,072	\$ 12,008	\$ 15,052	\$ 13,235	\$ 13,549	\$ 9,727	\$ 7,883	\$ 7,883
Minimum Balance	\$ 454	\$ 460	\$ 497	\$ 510	\$ 546	\$ 564	\$ 634	\$ 691	\$ 796	\$ 885	
Notes:											
1)	The City plans to fund Projects O&M-1 (Valve Replacement) and O&M-2 (Large Meter Replacement) as part of the Water Fund Operating Budget.										
2)	The CIP estimates are adjusted for inflation at an assumed rate of 4.0 percent per year.										

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9.4.2 Available Financing Options

Potential sources of external capital project financing include:

A. 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 pursued. Nonetheless, the benefit of low-interest loans makes the effort of applying worthwhile.

B. Bond Financing

Two types of municipal bonds are considered for financing the City's capital costs:

- **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 Washington constitution and statute. Specifically, the amount of debt that can be issued is linked to assessed valuation.

RCW 39.36.020 states:

“(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 availability of G.O. bonds for utility purposes, these can sometimes play a valuable role in project financing. G.O. bond financing can be beneficial to utility rates in two ways: (a) the lower interest rate and related bond costs, and (b) the extension of repayment obligations to all taxpaying properties (not just utility customers) 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 utility revenues rather than taxes or other revenue sources. With this limited commitment, revenue bonds typically bear higher interest rates than G.O. bonds and also 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 ordinance 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 pay the debt service and meet applicable coverage requirements.

9.4.3 Capital Funding Strategy

The financial forecast assumes the following conceptual capital funding hierarchy:

1. Any available grants or developer contributions would be used first, as they come from third-party sources and generally contribute toward the cost of specific projects. The City would rationally use this funding to pay for projects before tapping its own resources.
2. Available cash reserves (above the assumed minimum balances) are then applied.
3. Anticipated low-cost loans such as Public Works Trust Fund (PWTF) loans would then be used (if any are available). This analysis does not assume the availability of any low-cost loans.
4. Revenue bonds, as relatively high-cost debt with additional coverage requirements, are the last resort for any costs in excess of other resources. This analysis does not assume any revenue bonds.

Table 9-4 shows the Operating Fund contributing \$44.2 million (a combination of existing cash balances and cash generated through water rates) toward capital funding during the planning period. This funding is expected to be supplemented by a \$1.0 million FEMA grant, capital recovery fees, interest earnings, and developer contributions.

9.5 Financial Forecast

The near-term projections that drive the financial forecast are discussed in further detail below:

9.5.1 Revenues

Given that many of the water utility's operating revenues depend on the number of ratepayers and the amount of water that they use, the rate of customer growth is a key assumption of the financial forecast. Based on the growth that the City experienced in its water customer base from 2019 – 2023, this analysis assumes annual customer growth of 0.43 percent (equivalent to roughly 49 new connections per year).

The projected revenues are based on the projections in the City's 2025 – 2026 Budget. Future revenues are forecasted as follows:

- **Rate Revenue:** Rate revenue projections are based on the 2025 Budget projection of \$11.9 million, adjusted for projected customer growth and CPI inflation plus half a percent. Future-year projections assume 4.0 percent annual rate adjustments.
- **Investment Interest:** Interest earnings are computed on the water utility's projected cash balances, assuming an annual earnings rate of 2.0 percent.

9.5.2 Expenses

Operating expense projections are generally based on the City's 2025 – 2026 Budget. In virtually all cases, operating expense projections reflect annual adjustments for inflation. The inflation rates used in the financial forecast include:

- **General Cost Inflation:** Assumed to be 3.5 percent throughout the study period, this rate applies to most expenses. This assumption is consistent with the ten-year average Historical Consumer Price Index for All Urban Consumers (CPI-U) and appears to be conservatively high compared to the forecast of Seattle CPI released by the Washington Economic and Revenue Forecast Council in June 2025.

- **Labor and Benefit Cost Inflation:** Based on feedback received from other jurisdictions regarding annual cost-of-living adjustments, step increases, and rising healthcare costs, the financial forecast assumes that labor and benefit costs increase at a rate of 3.5 percent and 4.5 percent per year, respectively.
- **Taxes:** Taxes are computed based on the water utility's projected revenues assuming a State excise tax rate of 5.029 percent. The water utility is also charged 5.0 percent on its billings by the General Fund to cover the cost of paying excise taxes on the utility tax revenue that is collected by the General Fund.

The City's water utility currently pays for a share of Filtration Plant debt service, including three PWTF loans and two Drinking Water State Revolving Fund (DWSRF) loans. The analysis assumes BHWSO covers roughly 14.6 percent of this debt service, with the City's water utility making up the remainder. The annual payment on the water utility's obligations averages \$1.3 million through 2032, when the loans are set to reach maturity.

9.5.3 Revenue Sufficiency

With revenues and expenses defined and projected, the next step is to define how much revenue is adequate to meet the water utility's financial needs and satisfy the City's reserve targets. The financial forecast defines revenue sufficiency via a series of tests:

A. Cash Flow Sufficiency Test

This test requires that the water utility generates sufficient funds to meet its cash obligations. The cash flow obligations relating to rates include:

- Operating, maintenance, and administrative expenses.
- Debt service payments.
- Rate-funded capital expenditures.

Offsetting these obligations are various sources of revenue, including:

- Interest earnings on operating and bond reserves.
- Miscellaneous operating and non-operating revenues.
- Use of surplus operating or bond reserves.

To satisfy this test, water rate revenue must be sufficient to cover all cash needs not covered by other sources. Some resources, such as bond proceeds or CRF revenues, are not typically considered available for meeting these needs but are used for capital project funding.

B. Coverage Sufficiency Test

When the City issues revenue bonds, it agrees to certain terms and conditions related to the repayment of those bonds. One of those terms is referred to as bond coverage – simply put, the City agrees to collect enough in revenues to meet all operating expenses and not only pay debt service but actually collect an additional multiple of that debt service. A bond coverage ratio of 1.25 is most common, meaning that the City would collect expenses plus 1.25 times debt service as a minimum legal level of revenues.

Besides being a legal requirement, the realized coverage ratio is an important statistic used to evaluate a utility's financial integrity and ability to meet its debt obligations. Revenue generated to comply with coverage requirements may be used for capital purposes and may reduce the amount of revenue needed to meet cash needs in subsequent years. It can also be used to meet capital requirements (and thus may reduce future borrowing) but generally cannot be held over to reduce coverage needs in subsequent years unless deposited in a rate stabilization reserve established in the utility's bond covenants. Because the City's water utility does not currently have any revenue bonds outstanding and the financial analysis does not anticipate the need for bond issuance to fund the CIP, the water utility's cash flow needs define its annual revenue requirement.

C. Water Rate Revenue Requirement

Table 9-5 shows a summary of the 2025 – 2034 revenue requirement forecast.

Table 9-5 suggests that the rate strategy of 4.0 percent (0.5 percent above the assumed CPI inflation rate of 3.5% per year) will be adequate to support completing the planned capital projects while preserving the water utility's financial integrity. Table 9-5 shows the water utility's reserves remaining above the combined minimum target of 60 of annual operating expenditures plus 1 percent of the cost of system assets for the duration of the planning period. By 2034, the combined balance is projected to exceed the minimum target by approximately \$7.9 million – projects planned to occur beyond 2034 are projected to draw the reserves down further, though the water utility is expected to remain comfortably above the minimum balance even beyond 2034. These additional reserves may provide the water utility with protection against unanticipated needs and/or the flexibility to expand its main replacement program in future years.

Table 9-5
2025 – 2034 Revenue Requirement Forecast

Financial Forecast (\$000s)	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Revenues										
Water Rate Revenue	\$ 11,946	\$ 11,998	\$ 12,049	\$ 12,101	\$ 12,153	\$ 12,205	\$ 12,257	\$ 12,310	\$ 12,363	\$ 12,416
BHWSD Contributions: O&M	\$ 216	\$ 216	\$ 265	\$ 275	\$ 285	\$ 294	\$ 305	\$ 316	\$ 327	\$ 339
BHWSD Contributions: Debt Service	\$ 253	\$ 252	\$ 250	\$ 248	\$ 145	\$ 145	\$ 144	\$ 65	-	-
Other Operating Revenues	\$ 416	\$ 472	\$ 380	\$ 389	\$ 399	\$ 410	\$ 421	\$ 432	\$ 443	\$ 455
Total	\$ 12,831	\$ 12,938	\$ 12,944	\$ 13,013	\$ 12,982	\$ 13,054	\$ 13,127	\$ 13,123	\$ 13,133	\$ 13,210
Expenses										
Operating Expenses: Distribution	\$ 6,868	\$ 7,111	\$ 7,321	\$ 7,539	\$ 7,765	\$ 8,000	\$ 8,242	\$ 8,494	\$ 8,755	\$ 9,026
Operating Expenses: Filtration	\$ 1,607	\$ 1,645	\$ 1,702	\$ 1,762	\$ 1,824	\$ 1,888	\$ 1,954	\$ 2,024	\$ 2,096	\$ 2,170
CIP Projects Funded from Operations	\$ 170	\$ 179	\$ 187	\$ 197	\$ 207	\$ 217	\$ 228	\$ 239	\$ 251	\$ 263
Debt Service	\$ 1,739	\$ 1,727	\$ 1,716	\$ 1,704	\$ 998	\$ 992	\$ 987	\$ 450	-	-
Total	\$ 10,384	\$ 10,662	\$ 10,926	\$ 11,202	\$ 10,794	\$ 11,097	\$ 11,411	\$ 11,207	\$ 11,102	\$ 11,459
Net Operating Cash Flow	\$ 2,447	\$ 2,276	\$ 2,018	\$ 1,811	\$ 2,188	\$ 1,957	\$ 1,716	\$ 1,916	\$ 2,031	\$ 1,751
Annual Rate Adjustment		4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
Post-Adjustment Summary:										
Water Rate Revenue	\$ 11,946	\$ 12,477	\$ 13,032	\$ 13,612	\$ 14,217	\$ 14,849	\$ 15,510	\$ 16,200	\$ 16,920	\$ 17,672
Net Cash Flow	\$ 2,447	\$ 2,707	\$ 2,903	\$ 3,171	\$ 4,046	\$ 4,336	\$ 4,641	\$ 5,415	\$ 6,131	\$ 6,480
Projected Year-End Reserve Balances										
Operating Reserve	\$ 7,242	\$ 2,203	\$ 2,271	\$ 2,335	\$ 2,415	\$ 2,491	\$ 2,571	\$ 2,645	\$ 2,737	\$ 2,825
Capital Reserve	\$ 1,548	\$ 9,083	\$ 8,697	\$ 11,072	\$ 12,008	\$ 15,052	\$ 13,235	\$ 13,549	\$ 9,727	\$ 7,883
Total	\$ 8,790	\$ 11,286	\$ 10,968	\$ 13,407	\$ 14,423	\$ 17,543	\$ 15,806	\$ 16,194	\$ 12,464	\$ 10,708
Minimum Reserve Balances										
Operating Reserve	\$ 1,421	\$ 1,469	\$ 1,514	\$ 1,557	\$ 1,610	\$ 1,661	\$ 1,714	\$ 1,763	\$ 1,825	\$ 1,884
Capital Reserve	\$ 454	\$ 460	\$ 497	\$ 510	\$ 546	\$ 564	\$ 634	\$ 691	\$ 796	\$ 885
Total	\$ 1,875	\$ 1,929	\$ 2,011	\$ 2,067	\$ 2,156	\$ 2,225	\$ 2,348	\$ 2,455	\$ 2,621	\$ 2,769

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9.6 Water Rates

The City’s water rate structure consists of the following elements:

- A fixed minimum monthly meter charge that increases with water meter size. The City imposes a reduced set of meter charges on irrigation meters to recognize that they do not require fire-suppression services and as a result should not be allocated costs associated with oversizing infrastructure to convey fire flow.
- An inclining-block consumptive charge structure for single-family homes, which intends to promote water-use efficiency.
- A uniform consumptive charge structure for users other than single-family homes. Though Section 5.4 of the Water Use Efficiency Guidebook lists only inclining-block and seasonal rates as “conservation rate structures,” a uniform consumptive rate structure is appropriate for these users for the following reasons:
 - As shown in Figure 2-1, apartments exhibit minimal peaking in their usage – especially considering that most multi-family tenants do not see their water bill directly, conservation-oriented rate structures are unlikely to impact their water consumption.
 - Figure 2-1 suggests that commercial users peak more in their water usage than apartments, but notably less than single-family users. A seasonal or inclining-block rate structure could give commercial users a stronger incentive to conserve water, but many businesses are tenants in shopping centers or business parks and either do not see their water bill directly or receive a bill that is divided among multiple tenants.
 - Because irrigation usage occurs almost exclusively during peak-demand periods, a seasonal rate structure would function largely like a uniform volume rate structure. Inclining-block rates can send stronger conservation pricing signals to irrigation users, but a uniform rate that is adequately high can accomplish a similar outcome (while avoiding the complexity of scaling consumption tiers with meter size). Under the City’s existing structure, the irrigation consumptive rate is higher than the highest rate that applies to single-family users under the inclining-block structure.

Table 9-6 shows the water rate forecast assuming uniform “across-the-board” increases to the existing rates.

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Table 9-6
2025 – 2034 Water Rate Forecast

Water Rates Inside City Limits ¹	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Annual Rate Increase		4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
Minimum Monthly Meter Charge:										
All Classes Except Irrigation:										
5/8 Inch Meter	\$ 19.81	\$ 20.60	\$ 21.43	\$ 22.28	\$ 23.17	\$ 24.10	\$ 25.07	\$ 26.07	\$ 27.11	\$ 28.20
1 Inch Meter	\$ 49.94	\$ 51.94	\$ 54.02	\$ 56.18	\$ 58.42	\$ 60.76	\$ 63.19	\$ 65.72	\$ 68.35	\$ 71.08
1-1/2 Inch Meter	\$ 73.45	\$ 76.39	\$ 79.44	\$ 82.62	\$ 85.93	\$ 89.36	\$ 92.94	\$ 96.66	\$ 100.52	\$ 104.54
2 Inch Meter	\$ 113.62	\$ 118.16	\$ 122.89	\$ 127.81	\$ 132.92	\$ 138.24	\$ 143.77	\$ 149.52	\$ 155.50	\$ 161.72
3 Inch Meter	\$ 220.77	\$ 229.60	\$ 238.78	\$ 248.34	\$ 258.27	\$ 268.60	\$ 279.34	\$ 290.52	\$ 302.14	\$ 314.22
4 Inch Meter	\$ 341.36	\$ 355.01	\$ 369.21	\$ 383.98	\$ 399.34	\$ 415.32	\$ 431.93	\$ 449.21	\$ 467.17	\$ 485.86
6 Inch Meter	\$ 676.28	\$ 703.33	\$ 731.46	\$ 760.72	\$ 791.15	\$ 822.80	\$ 855.71	\$ 889.94	\$ 925.54	\$ 962.56
8 Inch Meter	\$ 1,078.14	\$ 1,121.27	\$ 1,166.12	\$ 1,212.76	\$ 1,261.27	\$ 1,311.72	\$ 1,364.19	\$ 1,418.76	\$ 1,475.51	\$ 1,534.53
10 Inch Meter	\$ 1,547.03	\$ 1,608.91	\$ 1,673.27	\$ 1,740.20	\$ 1,809.81	\$ 1,882.20	\$ 1,957.49	\$ 2,035.79	\$ 2,117.22	\$ 2,201.91
12 Inch Meter	\$ 2,216.82	\$ 2,305.49	\$ 2,397.71	\$ 2,493.62	\$ 2,593.37	\$ 2,697.10	\$ 2,804.98	\$ 2,917.18	\$ 3,033.87	\$ 3,155.23
Irrigation:										
5/8 Inch Meter	\$ 15.67	\$ 16.30	\$ 16.95	\$ 17.63	\$ 18.33	\$ 19.06	\$ 19.83	\$ 20.62	\$ 21.45	\$ 22.30
1 Inch Meter	\$ 29.56	\$ 30.74	\$ 31.97	\$ 33.25	\$ 34.58	\$ 35.96	\$ 37.40	\$ 38.90	\$ 40.45	\$ 42.07
1-1/2 Inch Meter	\$ 52.65	\$ 54.76	\$ 56.95	\$ 59.22	\$ 61.59	\$ 64.06	\$ 66.62	\$ 69.28	\$ 72.06	\$ 74.94
2 Inch Meter	\$ 80.40	\$ 83.62	\$ 86.96	\$ 90.44	\$ 94.06	\$ 97.82	\$ 101.73	\$ 105.80	\$ 110.03	\$ 114.43
3 Inch Meter	\$ 154.38	\$ 160.56	\$ 166.98	\$ 173.66	\$ 180.60	\$ 187.83	\$ 195.34	\$ 203.15	\$ 211.28	\$ 219.73
4 Inch Meter	\$ 237.58	\$ 247.08	\$ 256.97	\$ 267.25	\$ 277.93	\$ 289.05	\$ 300.61	\$ 312.64	\$ 325.14	\$ 338.15
6 Inch Meter	\$ 468.76	\$ 487.51	\$ 507.01	\$ 527.29	\$ 548.38	\$ 570.32	\$ 593.13	\$ 616.86	\$ 641.53	\$ 667.19
8 Inch Meter	\$ 746.17	\$ 776.02	\$ 807.06	\$ 839.34	\$ 872.91	\$ 907.83	\$ 944.14	\$ 981.91	\$ 1,021.19	\$ 1,062.03
10 Inch Meter	\$ 1,071.07	\$ 1,113.91	\$ 1,158.47	\$ 1,204.81	\$ 1,253.00	\$ 1,303.12	\$ 1,355.25	\$ 1,409.46	\$ 1,465.83	\$ 1,524.47
12 Inch Meter	\$ 1,532.08	\$ 1,593.36	\$ 1,657.10	\$ 1,723.38	\$ 1,792.32	\$ 1,864.01	\$ 1,938.57	\$ 2,016.11	\$ 2,096.76	\$ 2,180.63
Consumptive Charges per 100 Cubic Feet:										
Single-Family & Duplex:										
0 – 800 Cubic Feet	\$ 4.19	\$ 4.36	\$ 4.53	\$ 4.71	\$ 4.90	\$ 5.10	\$ 5.30	\$ 5.51	\$ 5.73	\$ 5.96
801 – 1,600 Cubic Feet	\$ 4.88	\$ 5.08	\$ 5.28	\$ 5.49	\$ 5.71	\$ 5.94	\$ 6.17	\$ 6.42	\$ 6.68	\$ 6.95
Over 1,600 Cubic Feet	\$ 6.37	\$ 6.62	\$ 6.89	\$ 7.17	\$ 7.45	\$ 7.75	\$ 8.06	\$ 8.38	\$ 8.72	\$ 9.07
Trailer Courts & Apartments (Triplex and Above)	\$ 4.82	\$ 5.01	\$ 5.21	\$ 5.42	\$ 5.64	\$ 5.86	\$ 6.10	\$ 6.34	\$ 6.60	\$ 6.86
Commercial, Churches, Schools, Hospitals, Hotels/Motels	\$ 5.15	\$ 5.36	\$ 5.57	\$ 5.79	\$ 6.02	\$ 6.27	\$ 6.52	\$ 6.78	\$ 7.05	\$ 7.33
Irrigation	\$ 7.62	\$ 7.92	\$ 8.24	\$ 8.57	\$ 8.91	\$ 9.27	\$ 9.64	\$ 10.03	\$ 10.43	\$ 10.85
Note:	1) Customers outside City limits pay a 65% surcharge over the published inside-City rates.									

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9.6.1 Water Rate Affordability

As noted in Section 9.1, a key objective of this financial chapter is to evaluate the City’s ability to execute the planned capital improvement projects while maintaining affordable water rates. While the term “affordable” is relatively subjective in its definition, agencies that offer low-cost loans to utilities often use an “affordability index” based on median household income to define a threshold beyond which utility rates impose financial hardship on ratepayers. The benchmark most often used in this evaluation is 4.5 percent of the median household income in the relevant demographic area for the combined water/sewer bill. The 2019–2023 American Community Survey 5-year estimates indicate a median income of \$60,844 (in 2023 dollars) for households in the City of Longview – adjusting for inflation in the Seattle CPI that occurred from June 2023 to June 2025 (6.6 percent), the equivalent 2025 median income level would be \$64,870. Based on the existing water rates shown in Table 9-7, an average residential customer using 7 ccf per month would pay a monthly water bill of \$49.14; under the City’s existing sewer rates, this customer would pay a monthly sewer bill of \$84.78 – applying the City’s utility tax of 18 percent to these charges, the total combined water and sewer bill is \$158.03. This represents about 2.9 percent of the median monthly income of a household in the City – based on the affordability index discussed above, the City’s water and sewer rates would be considered “affordable.”

However, there has been a growing consensus in the industry that median household income is of limited value in assessing the impacts of utility rates on customers with income levels far below the area median. As discussions about rate affordability continue to evolve, two alternative metrics have been gaining traction as providing a more meaningful basis for evaluating affordability:

- **Hours at Minimum Wage (HM):** This metric quantifies the amount of time that someone earning minimum wage would need to work in order to pay their combined water/sewer bill, assuming they use a “lifeline” volume of 50 gallons per capita per day (gpcd). Based on the City’s average household size of 2.7 persons, this volume equates to roughly 5 ccf per month per household. The literature discussing HM recommends 8.0 hours as a threshold for defining an “affordable” water/sewer bill.
- **Affordability Ratio at the 20th Income Percentile (AR₂₀):** This metric expresses the combined bill (at 50 gpcd) as a percentage of the net disposable income (NDI) of a home in the 20th income percentile after accounting for the cost of food, housing, power, healthcare, and taxes. 2022 – 2023 data from the American Community Survey and the Bureau of Labor Statistics’ Consumer Expenditure Survey suggests that a household at the 20th income percentile in Longview has approximately \$496 in disposable monthly income. The literature discussing AR₂₀ recommends 10.0 percent of net disposable income as a threshold for an “affordable” water/sewer bill.

Table 9-7 shows the affordability evaluation of the City’s current and projected monthly residential combined water and sewer bills:

**Table 9-7
Affordability Evaluation**

Year	Monthly Water/Sewer Bill @ 7 ccf	% of MHI (Target: ≤ 4.5%)	Monthly Water/Sewer Bill @ 5 ccf	HM (Target: ≤ 8.0)	AR ₂₀ (Target: ≤ 10%)
2025	\$158.03	2.9%	\$132.77	8.0 Hours	26.8%
2026	\$169.24	3.0%	\$142.19	8.3 Hours	28.7%
2027	\$175.96	3.0%	\$147.84	8.3 Hours	29.8%
2028	\$182.98	3.1%	\$153.75	8.4 Hours	31.0%
2029	\$190.28	3.1%	\$159.88	8.4 Hours	32.3%
2030	\$197.89	3.1%	\$166.27	8.5 Hours	33.6%
2031	\$205.80	3.1%	\$172.92	8.5 Hours	34.9%
2032	\$214.01	3.1%	\$179.82	8.5 Hours	36.3%
2033	\$222.54	3.1%	\$186.99	8.6 Hours	37.7%
2034	\$231.48	3.1%	\$194.50	8.6 Hours	39.3%

Table 9-7 suggests that the combined water and sewer bill is reasonably affordable for customers at the median income level, but may be a burden for customers at lower income levels. Specifically,

- The combined bill at 7 ccf is expected to increase from 2.9 percent to 3.1 percent of median household income over the ten-year period, remaining below the threshold of 4.5 percent defined as “affordable”
- The HM value for the combined bill at 5 ccf is expected to increase from 8.0 hours to 8.6 hours over the planning period, exceeding the threshold of 8.0 hours. This finding is based on the published Washington State minimum wage of \$16.66 per hour (2025) and \$17.13 per hour (2026), adjusted for expected future inflation (3.5 percent per year).
- The AR₂₀ value for the combined bill at 5 ccf under current rates significantly exceeds the recommended threshold of 10.0 percent, suggesting that the City’s utility rates may noticeably burden a household at the 20th income percentile. This finding is based on an estimated annual income level of \$26,504, net of \$20,558 in annual essential expenditures – both are assumed to increase with inflation, leaving the NDI constant over the planning period.

The City offers a utility rate relief program for low-income seniors and disabled customers that provides a 50 percent discount on the sewer base charge and the residential garbage/recycling rate as well as waiving the stormwater rate. With the sewer rate discount, the HM values shown in Table 9-7 would decrease by 1.4 – 1.5 hours (and would fall between 6.6 and 7.1 hours for the planning period) and the AR₂₀ values would decrease by an average of 5 to 6 percent (falling between 22.1 and 32.4 percent for the planning period). Even with the discount, customers at lower income levels may still struggle to pay their utility bills. If the City wishes to provide additional relief, it could potentially consider:

- Expanding the discount to apply to sewer consumption charges and water charges.
- Expanding the discount to reduce or waive utility taxes.

- Expanding the pool of qualifying customers to include all low-income customers (versus just offering it to low-income senior/disabled customers).


9.7 Conclusion

Key findings of the financial analysis include:

- Despite declining water sales, the City's Water-Sewer Fund has had relatively strong financial performance over the past ten years due to a history of consistent rate increases averaging roughly 5 percent per year.
- Table 9-4 indicates that the City is expected to spend approximately \$46.5 million on water utility capital projects from 2025 – 2034, with the Operating Fund projected to contribute \$44.2 million of capital funding over the planning period. This contribution is expected to be supplemented by a \$1.0 million FEMA grant, capital recovery fees, interest earnings, and developer contributions.
- Table 9-5 suggests that a rate strategy of 4.0 percent (0.5 percent above the assumed CPI inflation rate of 3.5% per year) will be adequate to support completing the planned capital projects while preserving the water utility's financial integrity.
- Table 9-7 suggests that the combined water and sewer bill is reasonably affordable for customers at the median income level, but it may impose a significant financial burden for customers at lower income levels. The City's current utility rate relief program for low-income senior/disabled customers alleviates this burden to an extent, but it has room to be expanded if the City wishes to provide a greater amount of assistance to a greater number of customers.

It is important to remember that the analysis performed in this chapter relies on a variety of assumptions regarding growth, cost escalation, and operational conditions (among others). It would be prudent for the City to regularly monitor the water utility's financial position, revisiting the key underlying assumptions to ensure that its revenue remains sufficient to meet its financial obligations.

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Mt. Solo Reservoir Fill Line

Public Works Subcommittee

December 17th, 2025





❖ **Location:** Between Mt. Solo reservoir and Roy Morse Park

• **Scope of Work:** Horizontal directional drill 26” HDPE water line underneath the slide zone

❖ **Length of Improvement:** 750LF of HDD and 150LF of open trench

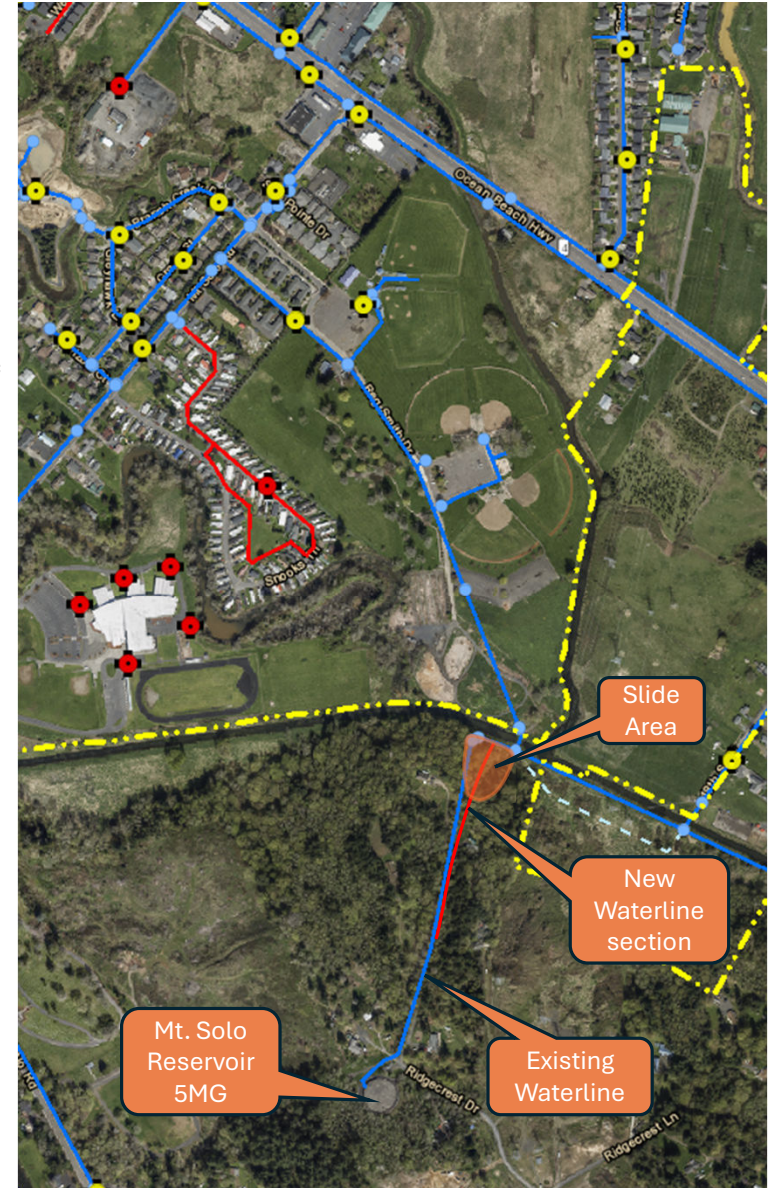
❖ **Budget:** \$3.7M (\$1.1M FEMA secured, \$2.6M Water Construction).

❖ **Schedule:**

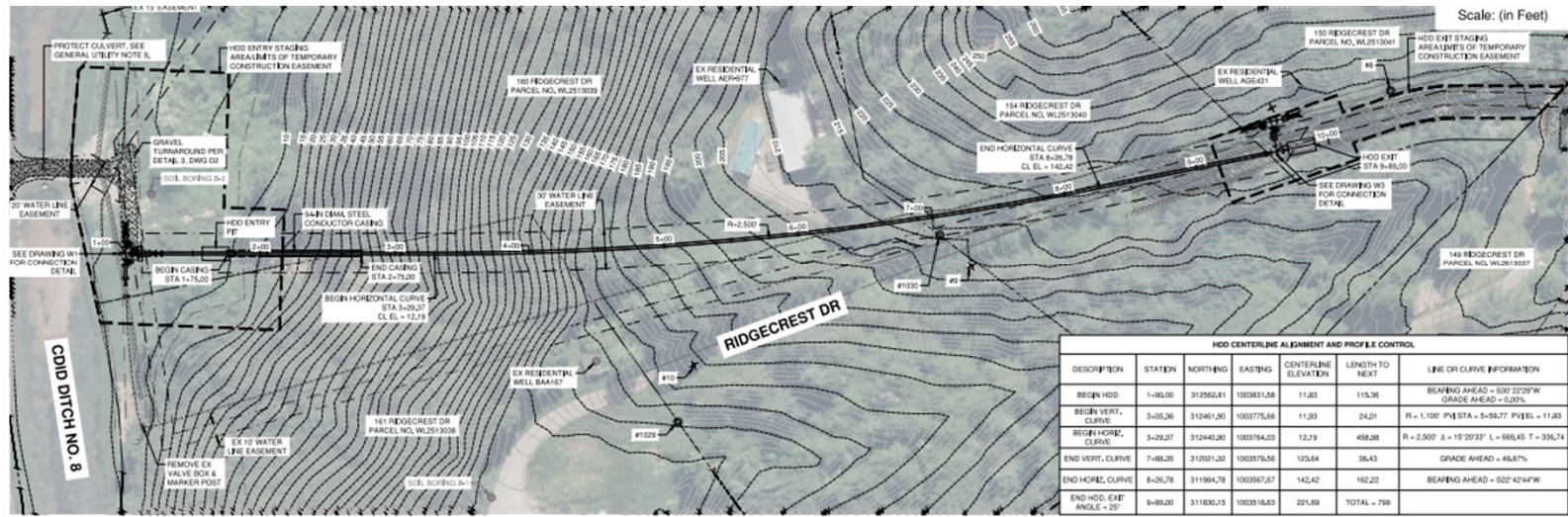
- Completed Design: June 2025
- Bid Opening: July 2025
- Construction Start: September 2025
- Construction Comp.: December 2025

❖ **Benefits:**

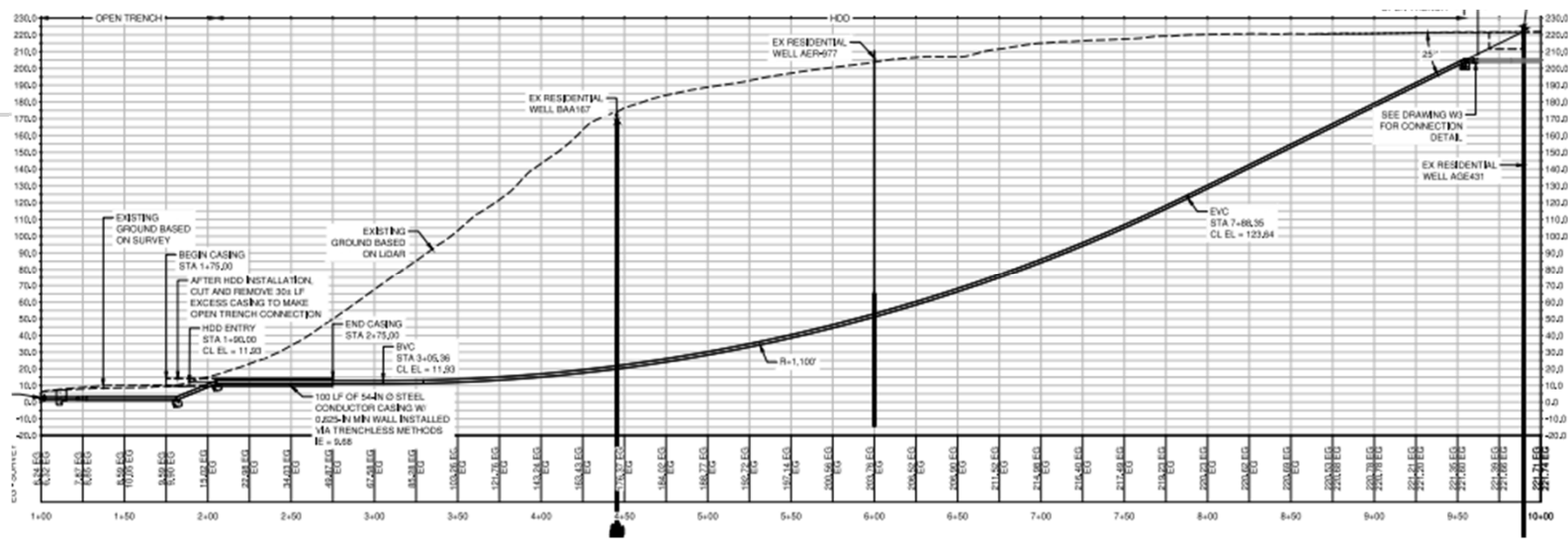
- Protect existing water assets from future catastrophic damage, of future landslides.
- Ensure a reliable fill and distribution to the Mt. Solo Reservoir for decades.



Mt. Solo Reservoir Fill Line



Construction Plans





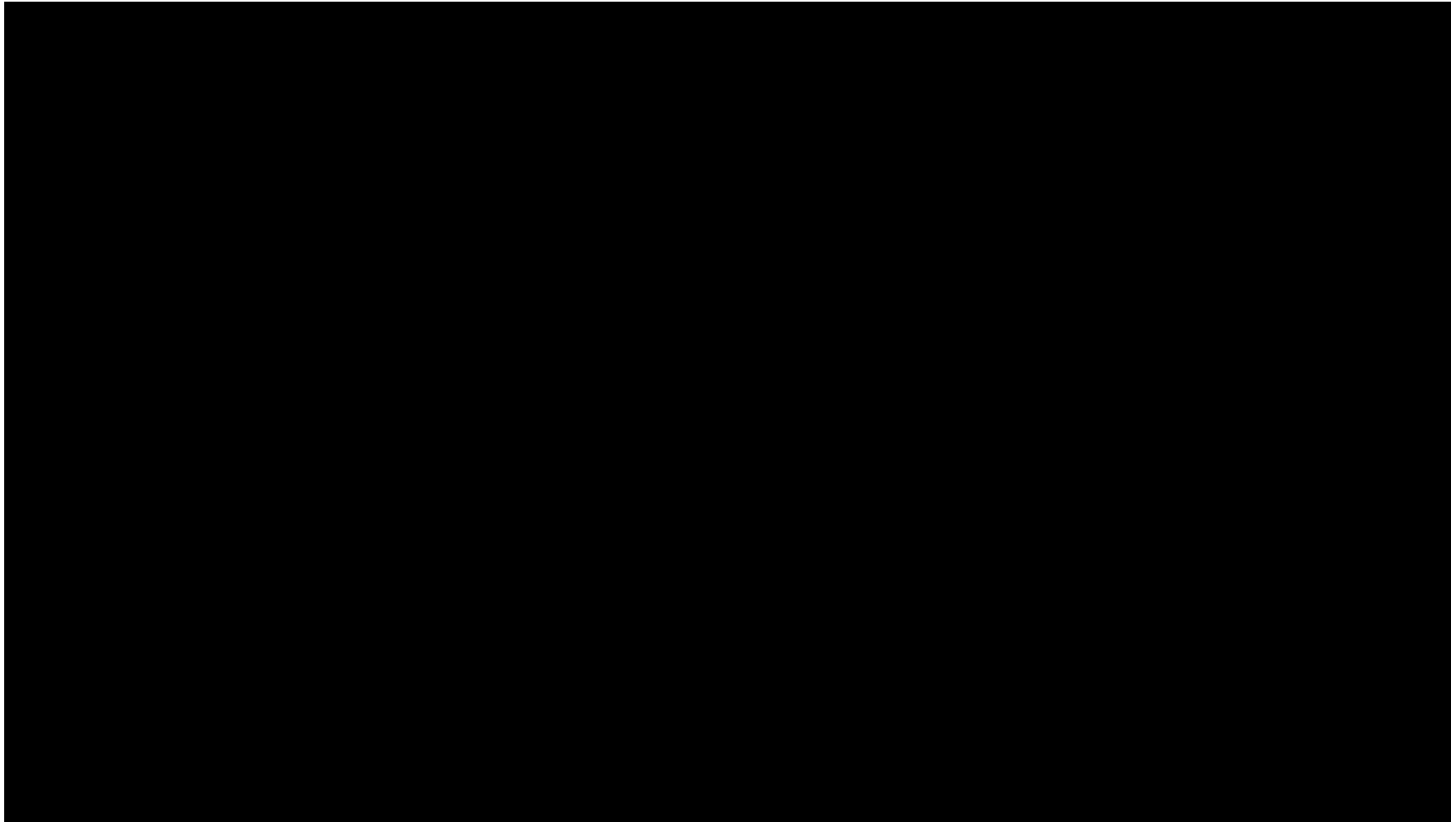
Mt. Solo Reservoir Fill Line

Drilling and welding Operations

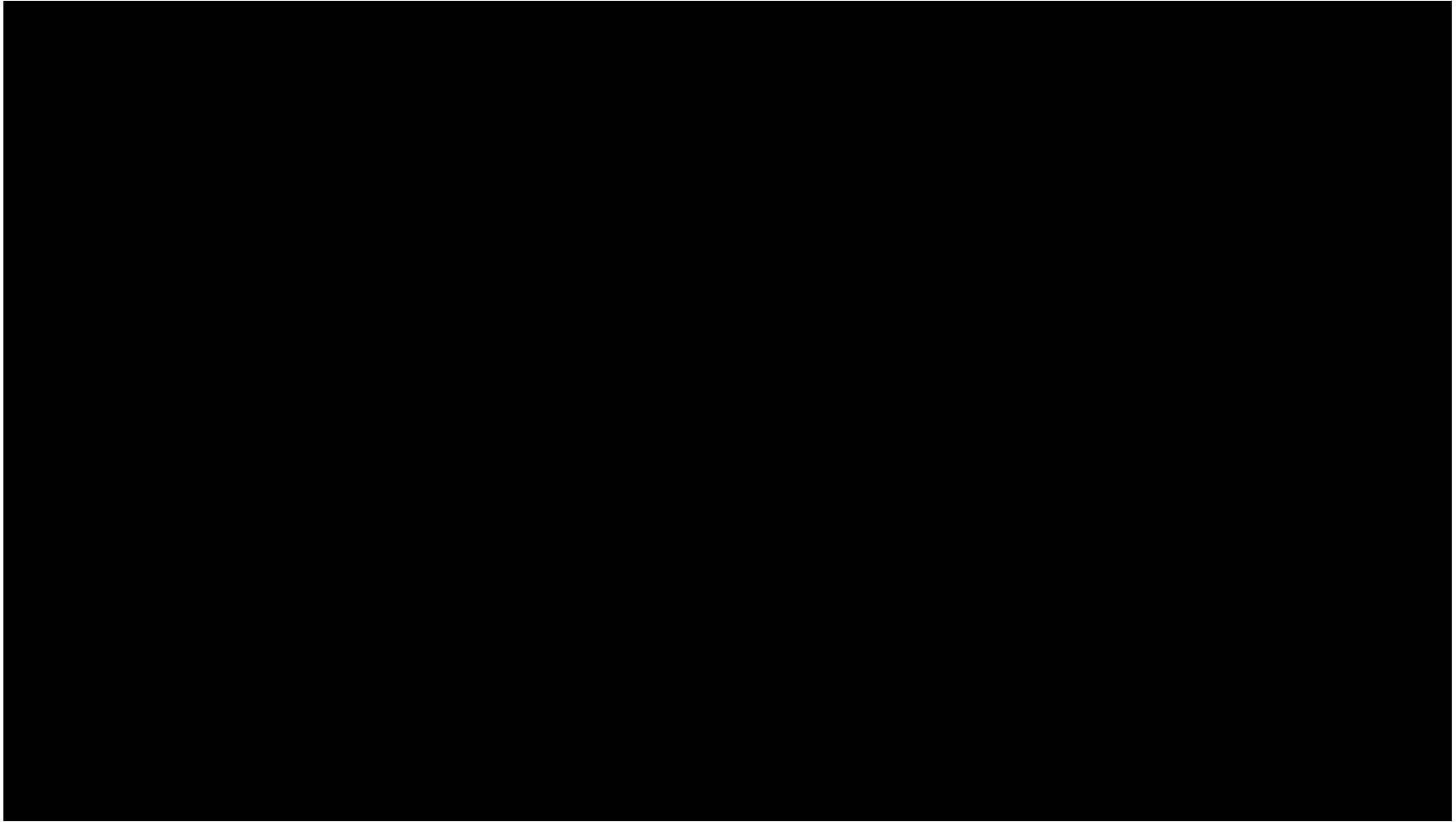
Mt. Solo Reservoir Fill Line

Pipe Pullback





Mt. Solo Reservoir Fill Line Pipe Pullback



Mt. Solo Reservoir Fill Line Pipe Pullback

Mt. Solo Reservoir Fill Line Pipe Pullback

