



DRAFT Water System Plan

City of Centralia

Centralia, Washington
September 29, 2021

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Certification

This DRAFT Water System Plan for the City of Centralia was prepared by HDR Engineering, Inc., under the direction of the following Registered Professional Engineers:



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Appendix J: Consumer Confidence Report
Appendix K: D/DBP Compliance Monitoring Plan
Appendix L: Maintenance Reporting Procedures
Appendix M: Cross Connection Control Program
Appendix N: Water Rights Self-Assessment

1. Introduction

This section provides general information about the City of Centralia (City) water system. Material is presented describing the history and development of the water system, and the current ownership and management of the system. The existing service area is described, including the relationship of the City water system and service area to the surrounding municipalities and water systems. Water system policies are summarized, and other related planning documents are also described in this section.

1.1 Service Area and Adjacent Purveyors

The City currently provides water service to customers within its Retail Service Area, shown in Figure 1-1A. This area is comprised of the majority of the land within City Limits plus portions of the City's Urban Growth Area (UGA) where service is currently provided or is anticipated to be provided in the near future. In addition, there are areas outside of the UGA where the City provides service to customers; thus, these areas (such as Seminary Hill Road to the east of the City, and Blanchard Road to the southwest of the City) are also considered to be within the City's Retail Service Area.

Although the City currently provides service to the majority of parcels within its Retail Service Area, there are some parcels that do not presently receive water service. As such, it is important to note that the City's "Existing Service Area" (i.e., only that area to which service is currently provided) is defined as the part of the Retail Service Area in which water distribution infrastructure currently exists. This is depicted on Figure 5-1 as the areas to which current water distribution piping extends.

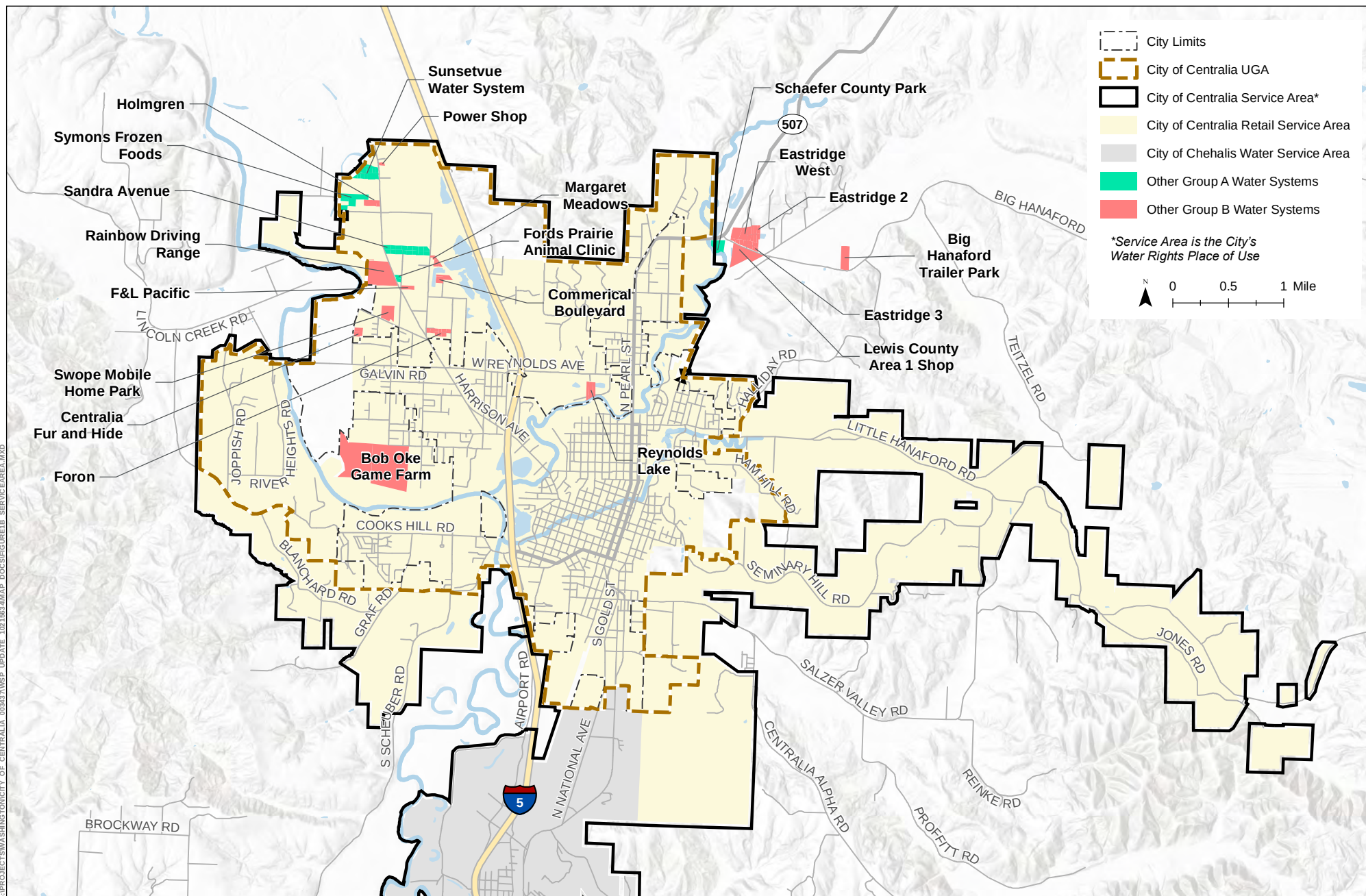
Contrasted with the City's Retail Service Area, the City's broader Water Service Area includes areas where water service is expanding, and the service areas of future wholesale water customers as shown in Figure 1-1B. Expanding retail service is planned for additional portions of the UGA, to which service may be extended in the future. The level of growth anticipated within the Water Service Area is discussed in Section 2. As is the case with Growth Management Act (GMA) planning, the City's UGA, and therefore its water service area, is subject to change to reflect future development patterns and related planning efforts.

The City is currently planning to construct a large regional groundwater supply to meet the long-term future water needs of the City and other public water systems in the region. This project is discussed in Section 07. The largest Group A water purveyor adjacent to the City's water system service area is the City of Chehalis, with whom the City of Centralia maintains an intertie that is currently used only for emergencies but which will be used for wholesale water deliveries in the future and for delivery of a portion of the new groundwater supply to serve growth demands in Chehalis. The City of Chehalis water service area is shown in Figure 1-1B as a Future Wholesale Service Area.

There are several small Group A and Group B water systems located within the City's Retail Service Area. The City has consolidated several small systems into its service area since the

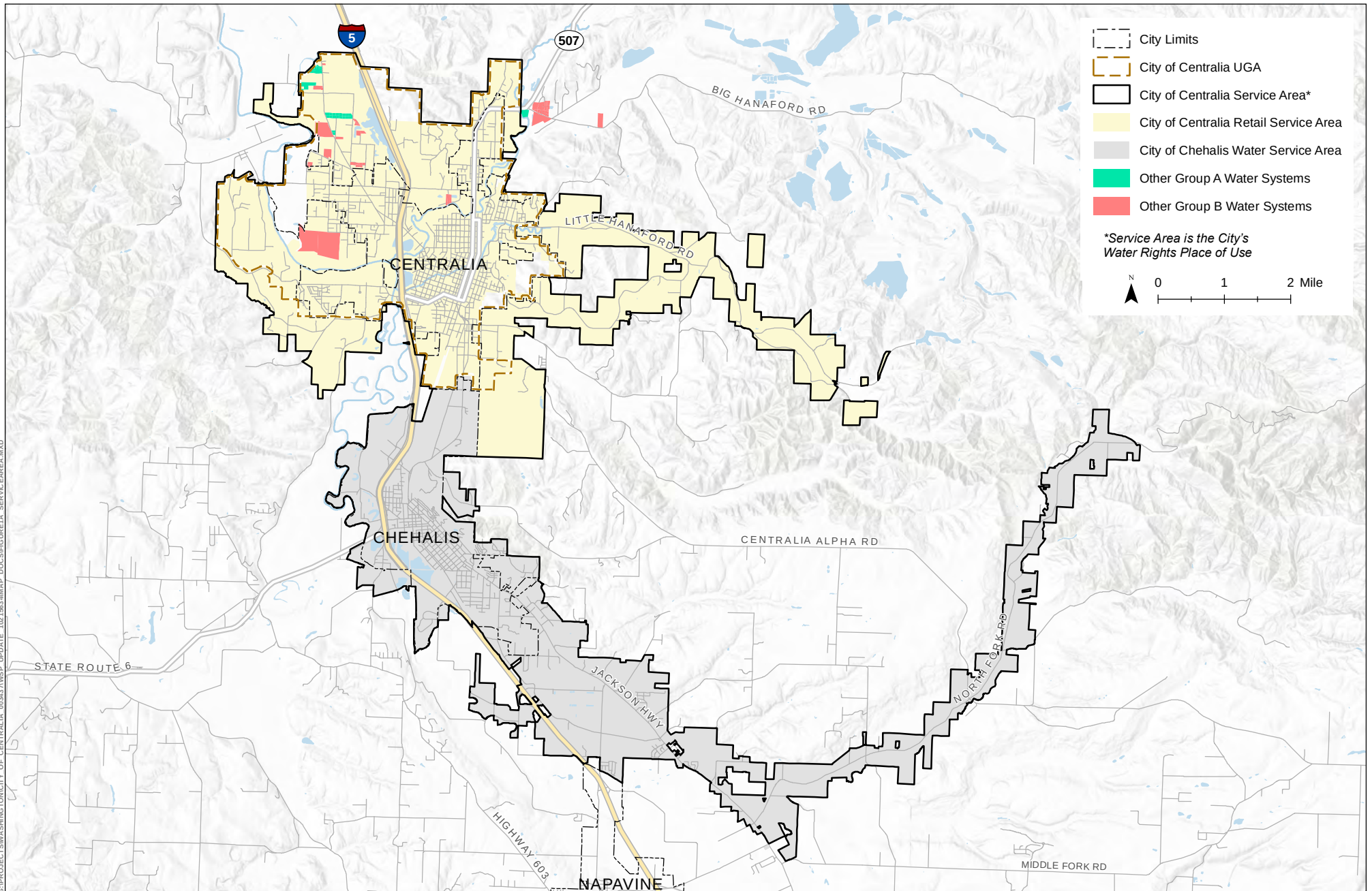
prior Water System Plan was published. Service areas for small systems within the Centralia Retail Service Area are also identified on Figure 1-1A.

G:\PROJECTS\WASHINGTON\CITY OF CENTRALIA_003437\WSP_UPDATE_10210634\MAP_DOCUMENTS\FIGURE1B_SERVICEAREA.MXD



WATER SERVICE AREA FIGURE 1-1A

City of Centralia Water System Plan
April 2021



1.2 Purpose and Objectives of Water System Plan

The purpose of a Water System Plan (WSP) is to provide a uniform process for water purveyors to:

- Identify present and future needs,
- Set forth the means for addressing those needs, and
- Demonstrate that the system has the operational, technical, managerial, and financial capability to achieve and maintain compliance with all relevant local, State, and federal plans and regulations.

Pursuant to the Municipal Water Law of 2003, the WSP also identifies service areas within which the City's water rights can be used. The City is required to develop a WSP according to DOH regulations under Chapter 246-290-100 (Group A Public Water Supplies) of the Washington Administrative Code (WAC).

1.3 Ownership and Management

This WSP is developed for the public water system owned and operated by the City of Centralia, Washington. The City water system is considered a Group A community water system by DOH and has a Public Water System Identification Number of 12200D. A summary of the system is provided in the utility's Water Facilities Inventory (WFI), included as Appendix A to this WSP.

1.4 Natural Setting

1.4.1 Hydrology and Hydrogeology

Naturally, all aspects of the City's water supply are intricately connected to local and regional hydrology. The major rivers in the area, the Chehalis and the Skookumchuck, will always constrain local patterns of development.

The City enjoys a fortuitous location with respect to the regional hydrogeology. The watercourses of the Skookumchuck River and the Chehalis River confluence, west of the Skookumchuck, are aligned along a wide glacial outwash deposit as much as 130 feet thick. This deposit of sand and gravel is a very productive aquifer (referred to as the Centralia Outwash Gravel Aquifer). There are several dozen wells in and around the City which yield water from this aquifer in excess of 500 gallons per minute (gpm) each.

1.4.2 Geography and Topography

Centralia generally lies within a glaciofluvial plain east of the confluence of the Skookumchuck and Chehalis Rivers. The lowlands extend to the west and south along the Chehalis River, and to the north along the Skookumchuck. The foothills of the Cascade Mountains begin at the eastern edge of the City. These hills form an eastern boundary to the lowlands which extend to

the north and south of the City. Other highlands lie to the north-northwest, bordered by Coffee Creek and Interstate 5 (I-5) to the east and west, respectively. The City of Chehalis lies to the south.

The most intense development has occurred in low-lying areas where gravity's challenge to water delivery has not been severe. The higher areas have been slow to develop due, in part, to lack of water supply. Demands for developable land will increase as the area's population grows, forcing the development of local highlands and requiring the extension of City services there.

1.5 History of Water System

The City has endeavored to supply potable water to its citizenry since 1913, when it acquired a privately owned water system. Originally, the City produced water from the Skookumchuck River. This source of supply was abandoned in 1914 for the Newaukum River source. In the late 1930s, the City began augmenting its surface water supply with groundwater wells. Since then, the City has continued to respond to increasing demands for water by developing new groundwater supplies. In 1990-91, massive landslides in the Newaukum Watershed, combined with surface water quality regulations imposed by the federal Surface Water Treatment Rule (SWTR), led to the discontinued use of the Newaukum surface water source. The Newaukum intake has not been used for potable water production since September 1993.

Currently, the City relies upon its groundwater resources, and is acquiring Skookumchuck River water rights for use as mitigation for the development of additional groundwater rights and sources to meet long-term future needs of the City and neighboring communities.

1.6 Overview of Existing System

In the early 2000's, the City made significant changes to its water supply sources. Water treatment facilities were constructed at the Tennis Court Wells, allowing these supplies to become a primary source. The City also developed the Ford's Prairie Wells in close proximity to the Eshom Well. With treatment facilities constructed to serve all three of these wells, the City now has two significant wellfield supplies that meet the majority of its water supply need. The K Street and Washington Street Wells, two of the City's older wells, serve as seasonal and emergency backup supplies.

All wells pump directly into the City's Central Pressure Zone, where approximately ninety-five percent of the City's demand is exerted. Water extracted from the wells is pumped into the Davis Hill and Seminary Hill reservoirs. Other system facilities include:

- Tennis Court Treatment Facility (air stripping, chlorination, fluoridation)
- Fords Prairie Treatment Facility (air stripping, chlorination, fluoridation)
- Five reservoirs with total storage capacity of 8.0 million gallons
- Six pump stations serving small, pumped zones
- Radio telemetry system enabling remote control and monitoring of most of the system

- One emergency intertie with the City of Chehalis
- Seven pressure zones

Section 5 includes a full inventory of water system facilities, with detailed descriptions of the wells, storage reservoirs, distribution system, and other components that make up the system. The intertie agreement with Chehalis is provided as Appendix B.

1.7 Water Utility Policies

The City's water utility policies have been established to ensure orderly operations through a variety of circumstances. Policies have been developed to cover all aspects of production and delivery of water to the customer. Many of these policies serve as standard operating procedures through various scenarios. New policy is developed on an as-needed basis and must be approved by the City Council.

The City's water utility policies are contained in Title 15 (Water and Sewers) of the Centralia Municipal Code (CMC). Pertinent sections, which are provided in Appendix C of the WSP, include:

- 15.04 – Rules and Regulations
- 15.05 – Water Conservation Program
- 15.08 – Water Supply

The City has a duty to serve all new connections located within its Retail Service Area, so long as the following four threshold factors are met, as described in WAC 246-290-106:

- 1) The City has sufficient capacity to provide water in a safe and reliable manner.
- 2) The service request is consistent with the City's adopted plans and development regulations.
- 3) The City has sufficient water rights to provide service.
- 4) The City can provide service in a timely and reasonable manner.

In keeping with this requirement, typically new developments occurring within City Limits apply for water service from the City, following the process described in CMC 15.04.030 (Application for Service). This section of the CMC also addresses potential service to development located outside of City Limits. Additional sections of CMC 15.04 address duty to serve related policies, such as CMC 15.04.040 (Availability of Service).

1.8 Related Plans

The City's previous WSP was prepared in 2013. This WSP serves as an update to that document, and was developed in accordance with Chapter 246-290-100 WAC, the DOH "Water System Planning Handbook", and the DOH Water System Design Manual (dated June 2020).

This WSP has also been prepared in accordance with the City of Centralia Comprehensive Plan (dated August 28, 2018), and the Lewis County Comprehensive Plan (originally approved June 1, 1999, and most recently amended June 2017).

1.9 Review Comments and Responses

The Draft WSP was provided to the City's Community Development Department, Lewis County, City of Chehalis, and DOH for review. Comments on the Draft WSP are provided in Appendix D, along with Consistency Statement Checklists, consistent with Municipal Water Law planning requirements.

In accordance with the State Environmental Policy Act (SEPA), a SEPA checklist has also been completed for the WSP and is provided in Appendix E.

2. System Planning Considerations

General planning data for the City of Centralia (City) are presented in this section. A discussion of the Growth Management Act and its influence upon urban planning is provided, followed by a summary of existing and projected future land uses within the City and its Urban Growth Area (UGA), as well as a forecast of service area population.

2.1 Relation to the Growth Management Act

The Washington State Legislature passed the Growth Management Act (GMA) in 1990 to require coordinated planning for growth in the faster growing counties in the State. The GMA emphasizes management of “urban growth,” including the type of growth, its intensity, its location, and how it affects utilities and services. The GMA requires all urban counties and their cities to develop and adopt 20-year comprehensive plans, along with regulations to implement those plans. These requirements include Lewis County and the City of Centralia. The County and City comprehensive plans must address specific issues including (but not limited to) land use, transportation, housing, capital facilities and services, natural environment, and economic development. The Legislature has amended the act from time to time.

Highlights of the GMA, as it pertains to water system plans, are described below:

- **Urban growth.** Encourage development in urban areas where adequate public facilities and services exist or can be provided in an efficient manner.
- **Reduce sprawl.** Reduce the inappropriate conversion of undeveloped land into sprawling, low-density development.
- **Economic development.** Encourage economic development throughout the State that is consistent with adopted comprehensive plans, promote economic opportunity for all citizens of this State, especially for unemployed and for disadvantaged persons, and encourage growth in areas experiencing insufficient economic growth, all within the capacities of the State’s natural resources, public services, and public facilities.
- **Permits.** Applications for both State and local government permits shall be processed in a timely and fair manner to ensure predictability.
- **Environment.** Protect the environment and enhance the State’s high quality of life, including air and water quality, and the availability of water.
- **Citizen participation and coordination.** Encourage the involvement of citizens in the planning process and ensure coordination between communities and jurisdictions to reconcile conflicts.
- **Public facilities and services.** Ensure that those public facilities and services necessary to support development shall be adequate to serve the development at the time the development is available for occupancy and use without decreasing current service levels below locally established minimum standards.
- **Capital facilities.** GMA cities and counties must demonstrate that they can afford the infrastructure needed to support expected growth. If the services cannot be provided, the land uses must be revised or the levels of services (LOS) reduced.
- **Comprehensiveness.** Comprehensive plans must integrate planning for land use, housing, transportation, capital facilities, and utilities. All areas of cities and counties and all plan elements must be addressed from an area-wide perspective.

- **Consistency.** Comprehensive plans must avoid internal contradictions and must not interfere with the successful implementation of the plans of neighboring jurisdictions. Plan policies must be consistent with the direction established by the GMA and adopted county-wide planning policies.

The GMA requires that counties and cities establish Urban Growth Areas (UGAs) to help guide urban growth into the most appropriate areas, encourage orderly development of utilities and transportation networks, and to reduce urban sprawl. The City of Centralia's existing UGA is shown in Figure 2-1. This is the area which contains the forecasted 20-year growth in population and employment.

2.2 Urban Growth Areas and Land Use

A comprehensive discussion of the existing UGA and associated land use is included in the Land Use element of the Centralia Comprehensive Plan 2018-2040 (2018 Comp Plan).

The City of Centralia Water Service Area currently comprises approximately 14,960 acres, or 23.4 square miles. The present land use is approximately 48 percent residential, 3 percent commercial, and 7 percent industrial, with the remainder of the land available for public facilities and natural resources. Figure 2-1 presents zoning within City Limits and the UGA, as well as land use for areas outside of the UGA but within the City's Water Service Area.

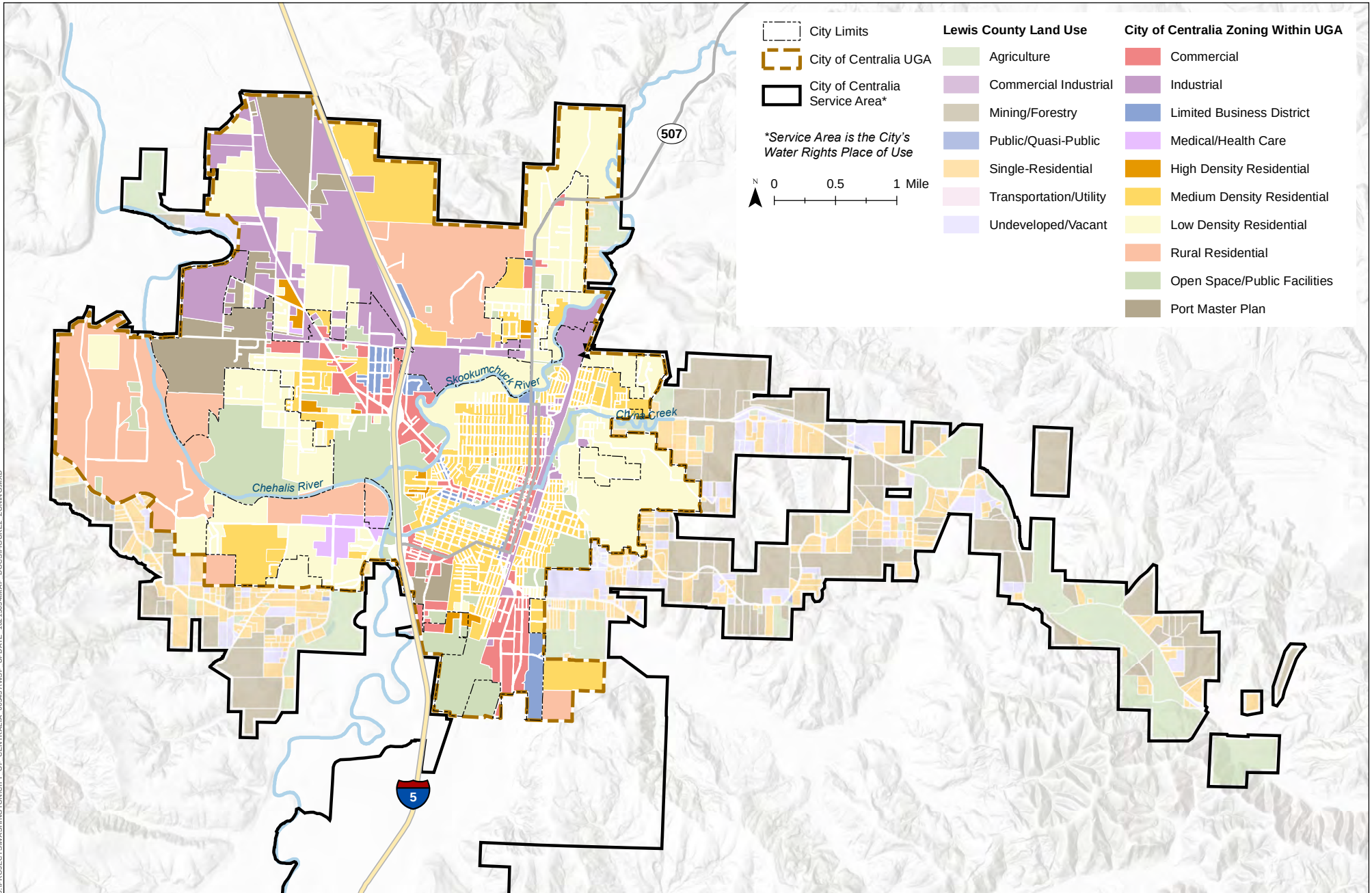
The UGAs that Lewis County has approved are indicated on Figure 2-1. These include areas in the north-central part of the City (Davis Hill and along Reynolds Avenue) and to the west of the City (i.e., Cooks Hill and the area around the Department of Fish and Wildlife Game Farm). The City envisions growth will occur in these areas within the 20-year planning period. It is noted that the Widgeon Hill area to the southeast of the City has been recently made part of the City of Chehalis' UGA. However, it is shown as being within the City's Service Area, as there is still potential for the City to provide water service to this area.

Table 2-1 provides a breakdown of the future land distribution within the Water Service Area classified by the 2018 Comp Plan, taking into account existing and anticipated development.

Table 2-1. Future Land Use Distribution

Land Use Description	Acreage	Percent
Within UGA		
Rural Residential	2,406.19	14.31%
Very Low Density Residential	976.89	5.81%
Low Density Residential	1,553.10	9.24%
Medium Density Residential	1,363.62	8.11%
Med High Density Residential	153.36	0.91%
High Density Residential	76.71	0.46%
Limited Business District	146.57	0.87%
Gateway Commercial District	66.46	0.40%
Central Business District Commercial	147.26	0.88%
Highway Commercial	92.89	0.55%
General Commercial	251.11	1.49%
Medical/Health Care	86.82	0.52%
Port Master Plan	584.28	3.47%
Light Industrial	485.98	2.89%
Heavy Industrial	671.05	3.99%
Public Facilities, Parks, and Open Space	1,103.69	6.56%
Outside UGA		
Agriculture	2,072.43	12.32%
Commercial Industrial	2.22	0.01%
Commercial Retail	0.00	0.00%
Mining/Forestry	2,497.31	14.85%
Multi-Residential	11.74	0.07%
Public/Quasi-Public	172.97	1.03%
Single-Residential	1,261.76	7.50%
Transportation/Utility	4.07	0.02%
Undeveloped/Vacant	628.28	3.74%
Total	16,816.78	100%

Note: Acreage of zones does not include water bodies, right of way, etc. Therefore, the total acreage of zoning distribution does not add to the total area within the Water Service Area described in Section 2.2.



2.3 Water Service Area and Current Connections

The City provides water to the majority of the population residing within its corporate limits, as well as some people who reside outside of the City Limits, as described in more detail in Section 1.1. The City serves approximately 7,192 active customer connections (as of July 2021), including residential, commercial, and other users. The City water utility is managed by the City as a part of Centralia Public Works.

The City's Water Service Area is shown on Figure 1-1. Over the next 20 years, the City plans to expand its infrastructure to serve additional customers within the UGA, as discussed in Section 1. In accordance with the principles set forth by the GMA, an urban level of service will be provided to areas within the UGA, while provision of water will generally not be made outside of the UGA, except in specific cases as authorized by the City Council.

2.3.1 Wholesale Service Area

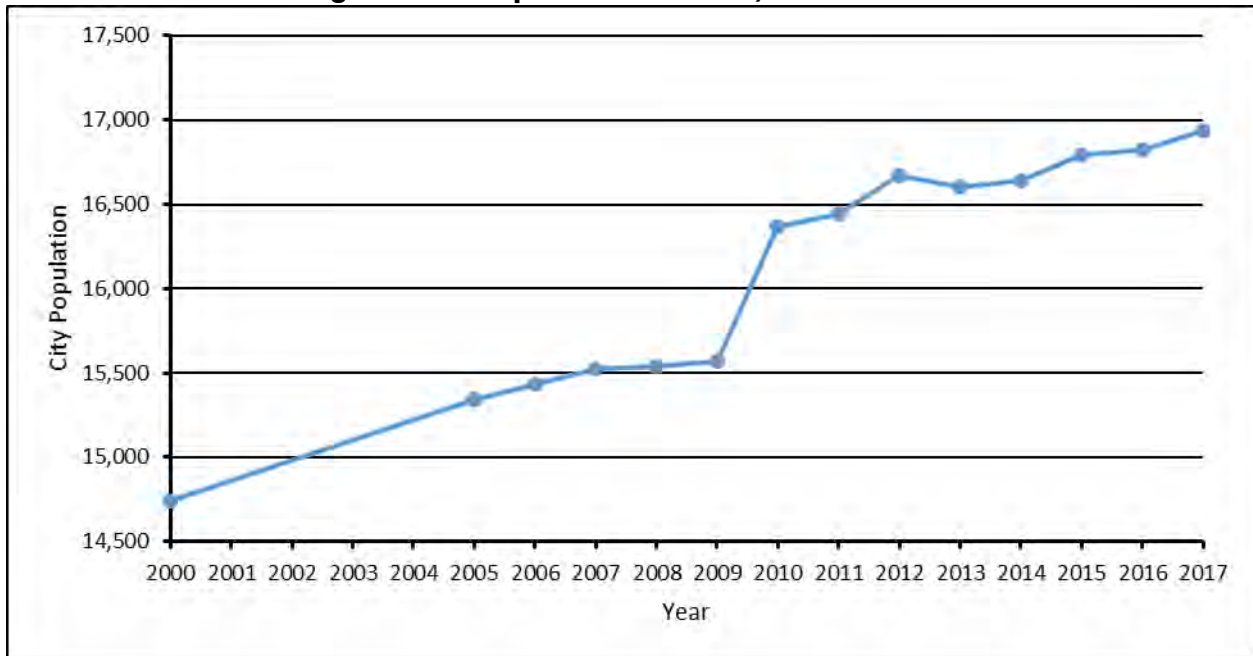
The City plans to serve wholesale water to the City of Chehalis within the 10-year planning horizon using the regional groundwater supply described in Section 1.1. Therefore, the City of Chehalis' water system is indicated as part of the City's future wholesale service area, within the greater City of Centralia Service Area (Figure 1-1). The City is also considering future wholesale agreements with the communities of Boistfort and Galvin. No formal discussions about wholesale agreements have occurred between these water systems and therefore are not considered future wholesale areas. However, to capture the possibility of providing wholesale service to these customers in the future, they are included in Figure 1-1 as eligible wholesale customers.

2.4 Population

2.4.1 Historical Population

The State Office of Financial Management (OFM) estimates the population for each county within the State, based on U.S. Census Bureau data. County and city governments in each county then allocate the projected planning population to the cities and unincorporated areas in their county.

Figure 2-2 depicts the historical trend in population growth for the City of Centralia, based upon OFM information. The data for years 2000 and 2010 are based on US Census data, while the data for other years are based on OFM estimates provided in the 2018 Centralia Comprehensive Plan. The OFM estimates show the City's population has grown from 14,742 in 2000 to approximately 16,940 in 2017. (The abrupt increase from 2009 to 2010 may be due to the estimation procedure used for the years leading up to the 2010 US Census. Census data are typically considered more accurate than estimates in the intervening years.) Population is only shown through 2017 because subsequent year populations are forecast estimates in the current comprehensive plan.

Figure 2-2. Population Growth, 2000 – 2017

Data Source: 2018 Comp Plan, Chapter 3

As discussed in Section 2.3, the City water system serves some connections located outside of City Limits as well. The accounting of the actual population served by the City water system is arrived at through analysis of service connections.

Table 2-2 provides a summary of historical service connections and population served. This information is based on City billing records combined with averages for the number of people per household in both single-family and multi-family dwelling units.

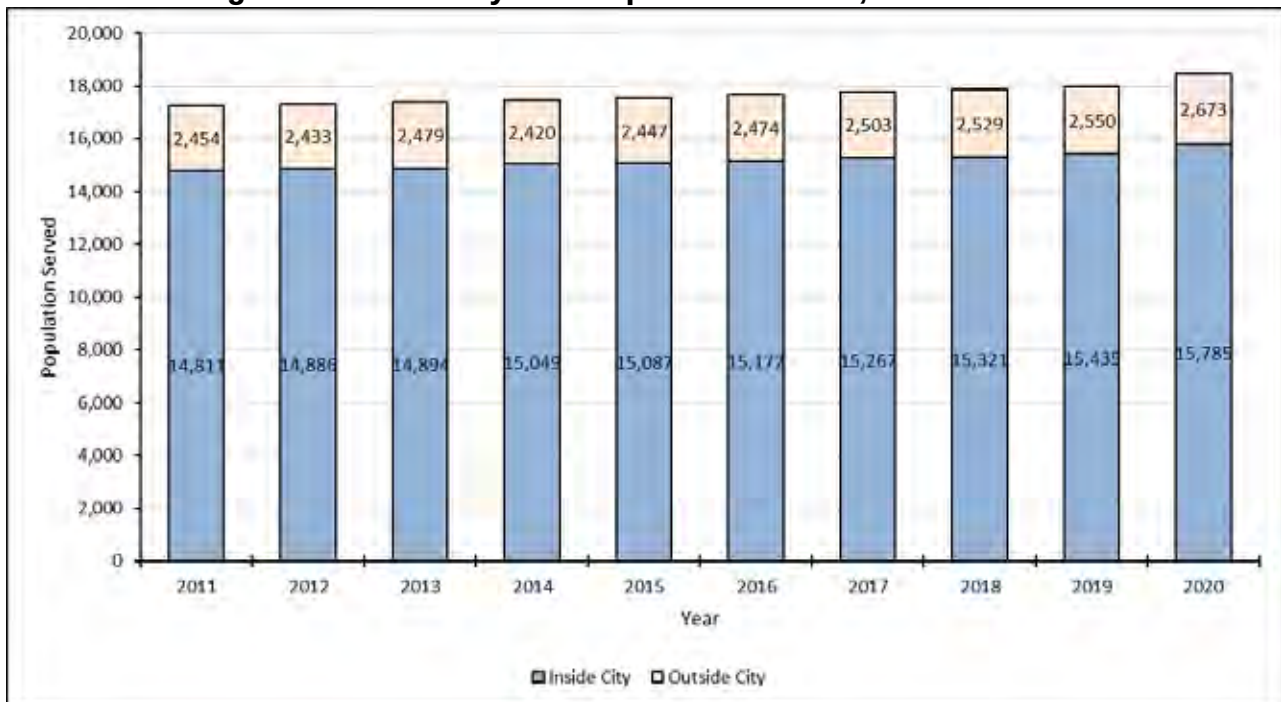
Table 2-2. Water System Connections and Population Served

Inside City								
	Connections ⁽¹⁾					Residential Population Served ⁽²⁾		
	Single-Family Residential	Multi-Family Residential	Commercial	Other	Total	Single-Family Residential	Multi-Family Residential	Total
2011	4,592	308	672	106	5,678	11,296	3,514	14,811
2012	4,590	315	682	107	5,694	11,291	3,594	14,886
2013	4,612	311	684	105	5,712	11,346	3,549	14,894
2014	4,638	319	683	105	5,745	11,409	3,640	15,049
2015	4,658	318	692	101	5,769	11,459	3,628	15,087
2016	4,688	319	698	98	5,803	11,532	3,640	15,172
2017	4,731	318	703	100	5,852	11,638	3,628	15,267
2018	4,821	303	740	103	5,967	11,860	3,461	15,321
2019	4,863	304	760	104	6,032	11,963	3,471	15,435
2020	4,835	341	723	100	5,999	11,894	3,891	15,785
Outside City								
	Connections ⁽¹⁾					Residential Population Served ⁽²⁾		
	Single-Family Residential	Multi-Family Residential	Commercial	Other	Total	Single-Family Residential	Multi-Family Residential	Total
2011	877	26	46	15	964	2,157	297	2,454
2012	873	25	43	14	955	2,148	285	2,433
2013	878	28	42	13	961	2,160	319	2,479
2014	863	26	43	13	945	2,123	297	2,420
2015	865	28	45	14	952	2,128	319	2,447
2016	876	28	44	15	963	2,155	319	2,474
2017	897	26	46	17	986	2,207	297	2,503
2018	909	26	48	14	997	2,236	293	2,529
2019	917	26	49	15	1,006	2,256	294	2,550
2020	943	31	54	14	1,042	2,320	354	2,673
Total								
	Connections ⁽¹⁾					Residential Population Served ⁽²⁾		
	Single-Family Residential	Multi-Family Residential	Commercial	Other	Total	Single-Family Residential	Multi-Family Residential	Total
2011	5,469	334	718	121	6,642	13,454	3,811	17,265
2012	5,463	340	725	121	6,649	13,439	3,879	17,318
2013	5,490	339	726	118	6,673	13,505	3,868	17,373
2014	5,501	345	726	118	6,690	13,532	3,936	17,469
2015	5,523	346	737	115	6,721	13,587	3,948	17,534
2016	5,564	347	742	113	6,766	13,687	3,959	17,647
2017	5,628	344	749	117	6,838	13,845	3,925	17,770
2018	5,730	329	788	117	6,964	14,096	3,754	17,850
2019	5,780	330	809	119	7,038	14,219	3,765	17,984
2020	5,778	372	777	114	7,041	14,214	4,245	18,458

¹ Source of Data: City billing records.

² Single-Family Residential Population = Single-Family Residential Connections X 2.46 people/connection
 Multi-Family Residential Population = Multi-Family Residential Connections X 7 multi-family housing units/connection
 X 1.63 people/multi-family housing unit. These numbers were provided by the City of Centralia Public Works Department.

The total number of system connections has increased from 6,642 in 2011 to 7,041 in 2020. This translates to an increase in population served of 17,265 to 18,548 during the same time period. The in-City percentage of population served was 86 percent in 2020. This proportion of in-City population served has been historically consistent (Figure 2-3).

Figure 2-3. Water System Population Served, 2011 – 2020

Data Source: Water Utility Billing Records. Population estimates are based upon number of billed services, translated to housing units and population (see Table 2-2).

2.4.2 Population Forecast

The 2018 Comp Plan and 2018 City of Centralia Population Growth Memorandum (2018 Population Forecast), prepared by SCJ Alliance, were used as the basis for population and water demand forecasting in this WSP.

20-year Population Forecast

The 2018 Comp Plan provides a 20-year population forecast, based on OFM's forecast. The City anticipates a population in the city limits of 26,280 by 2040. This projection represents a compound annual growth rate of 1.76 percent between 2020 and 2040. (Source: 2018 Comp Plan Appendix B and 2018 Population Forecast, Table 10.)

50-year Population Forecast

SCJ Alliance produced the City of Centralia Population Growth Memorandum, which extends the 20-year population forecast out to a 50-year medium-to-high-range forecast. The City anticipates a population of 38,172 by 2070. This projection results in an average compound annual growth rate of 1.33 percent between 2040 and 2070. (Source: 2018 Population Forecast, Table 10.)

In the case of long-range utility planning, it is sensible to utilize a conservative (i.e., high) growth assumption that is grounded in land use-based planning. Therefore, the future needs analysis of this WSP is predicated on these growth assumptions. During subsequent WSP updates, growth projections will be revisited to take into account changes in comprehensive planning that will occur over time. Also, forecasting population over such a distant horizon will inevitably miss population fluctuations caused by unpredictable economic and social events.

2.4.3 Population Forecast for Wholesale Service Area

Future wholesale customers are responsible for conducting their own population and demand forecasts, which are presented in their respective WSPs. The City of Chehalis most recently updated its WSP in 2011. Eligible wholesale customers will be similarly responsible for conducting their own planning and informing the City of their water needs to potentially be served through wholesale service.

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3. Water Demand Forecast

This section provides a summary of historical water production and consumption for the City of Centralia (City), as well as detailed forecasts of future water demand.

3.1 Water Production History

Water production is defined for the City as the total volume of water withdrawn from its groundwater supplies. Volume is reported in million gallons (MG). The City's annual production history for 2012-2020 is presented in Table 3-1, based upon well meter records. Table 3-2 shows monthly production from 2012 to 2020. Data from 2020 indicates the total system production was approximately 735 MG. Figure 3-1 provides a monthly comparison for the years 2014 to 2020.

Table 3-1. Annual Well Production (MG), 2012-2020

	K St. ⁽¹⁾	Washington ⁽²⁾	Tennis Court	Port District ⁽³⁾	Total
2012	0	0	470	306	776
2013	0	0	329	449	778
2014	0	0	411	402	813
2015	0.34	0	490	366	856
2016	0	0	275	476	751
2017	0	0	237	518	755
2018	0	0	180	647	827
2019	0	0	153	600	753
2020	0	0	184	551	735

Notes:

(1) The K St. wells are utilized to meet seasonal demands when necessary and were only used in 2015.

(2) The Washington Wells are emergency sources.

(3) Eshom Well production is included in the Port District wellfield.

Table 3-2. Monthly Well Production (MG), 2012-2020

	2012	2013	2014	2015 ⁽¹⁾	2016	2017	2018	2019	2020
January	57.7	57.6	56.6	65.1	52.8	56.9	52.9	52.9	52.8
February	54.8	53.3	54.3	59.4	47.4	47.5	48.3	49.1	48.9
March	59.3	58.1	58.5	71.6	51.1	51.7	53.9	54.6	52.1
April	58.9	57.6	59.1	70.6	53.3	52.7	76.3	54.9	43.2
May	63.8	66.1	62.5	65.0	63.4	57.1	104.9	67.1	57.1
June	62.3	68.9	73.8	89.6	79.2	66.9	60.0	79.1	62.4
July	78.9	93.3	92.9	104.9	80.8	88.9	100.1	83.2	85.4
August	92.4	88.2	93.1	94.7	90.1	93.2	95.1	87.5	90.7
September	79.3	64.9	71.6	67.1	65.2	73.3	66.5	63.4	74.5
October	58.9	58.9	67.0	58.0	59.2	58.3	58.7	56.6	60.7
November	53.2	52.8	62.8	53.2	53.2	53.3	56.6	52.9	52.1
December	56.9	59.2	61.4	57.2	55.4	54.9	53.9	52.0	55.8
Total	776.6	778.8	813.5	856.6	751.0	754.8	827.2	753.3	736.0⁽²⁾

Notes:

(1) Data for May and December of 2015 is estimated, due to data collection interruptions.

(2) Total does not match 2020 production total in Table 3-2 due to rounding.

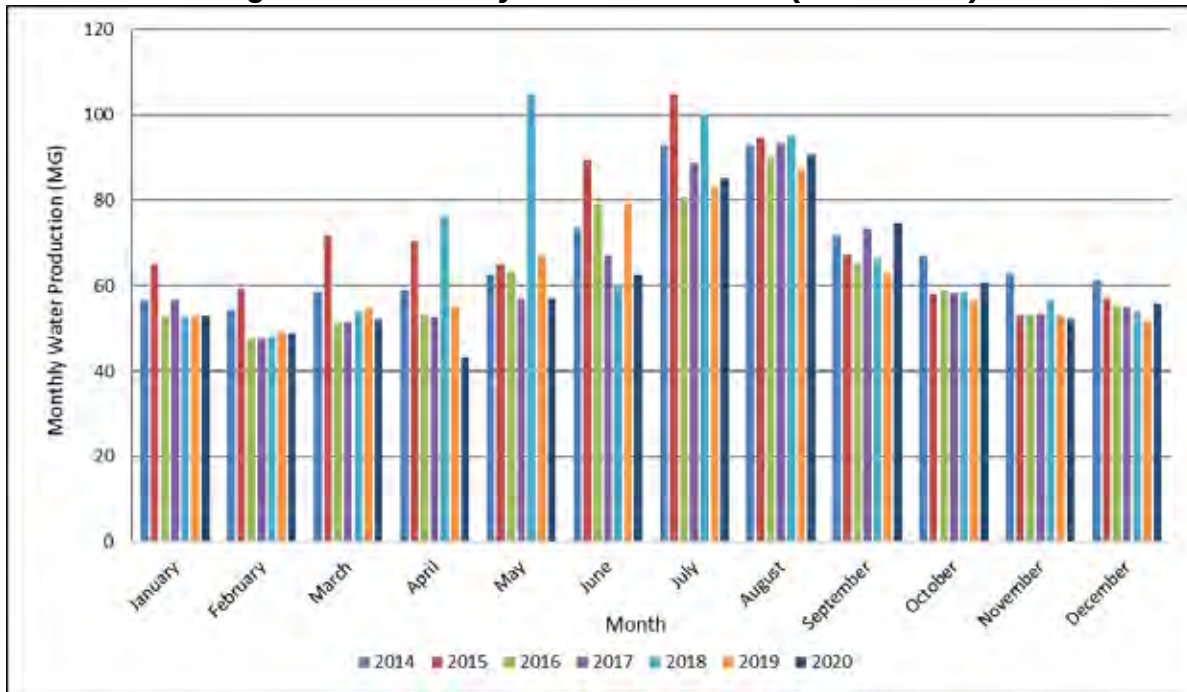
Figure 3-1. Monthly Water Production (2014-2020)

Table 3-3 summarizes average day and maximum day production from 2011 to 2020. Average day production is the total volume produced in a calendar year, divided by the number of days in that year. Maximum day production is defined as the highest amount of water produced on a single day in the calendar year, typically occurring in the summer. Table 3-3 includes the peaking factor, which is determined by dividing the maximum day production by the average daily production.

Average day production has averaged approximately 2.14 million gallons per day (mgd), while maximum day demand has averaged approximately 3.93 mgd. The average peaking factor during this same time period is 1.84. This factor was used to develop maximum day demand forecasts, as described in a later section.

Table 3-3. Average and Maximum Day Production, 2011-2020

	Average Day Production (MGD)	Maximum Day Production (MGD)	Peaking Factor
2011	2.13	3.33	1.56
2012	2.13	3.74	1.76
2013	2.13	3.24	1.52
2014	2.23	3.85	1.73
2015	2.35	4.10	1.75
2016	2.06	4.88	2.37
2017	2.07	3.97	1.92
2018	2.27	4.50	1.99
2019	2.06	3.75	1.82
2020	2.01	3.95	1.96
Average	2.14	3.93	1.84

3.2 Customer Categories, Connections, and Consumption

The City maintains billing record summaries for water sold in each customer category. The five customer billing categories are: single family residential, multi-family residential, commercial, industrial, and other (which includes hydrant flushing and other unspecified City uses).

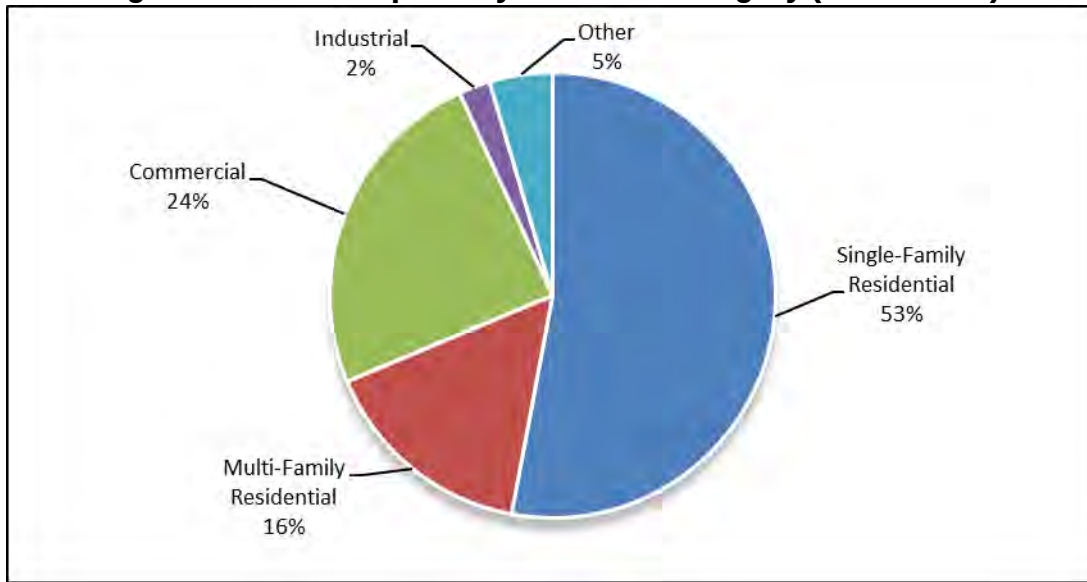
The number of connections from 2011 to 2020 is provided in Table 2-2 of Section 2. In December of 2020, the City served 7,041 connections. The majority of these (82%) were single family residential. Connections are defined by their location either inside the City Limits or outside the City Limits. The total annual consumption from 2011 to 2020 by each customer class is shown in Table 3-4. The percentage of consumption by customer class is shown in Figure 3-2.

Table 3-4. Water Consumption (MG except where noted), 2011-2020 ⁽¹⁾

Inside City							
	Single-Family	Multi-Family	Commercial	Industrial	Other	Total Consumption	Average Daily Consumption (mgd)⁽²⁾
2011	252	84	111	11	14	472	1.29
2012	253	80	114	11	16	474	1.30
2013	249	81	114	9	13	466	1.28
2014	250	83	125	15	19	492	1.35
2015	263	82	126	15	26	512	1.40
2016	255	81	120	15	24	495	1.36
2017	256	83	126	15	23	504	1.38
2018	259	83	129	16	30	518	1.42
2019	257	83	128	14	34	517	1.42
2020	266	93	121	14	33	528	1.45
Outside City							
	Single-Family	Multi-Family	Commercial	Industrial	Other	Total Consumption	Average Daily Consumption (mgd)⁽²⁾
2011	60	7	23	-	5	95	0.26
2012	60	9	24	-	4	97	0.27
2013	55	9	24	-	4	93	0.25
2014	59	12	22	-	6	99	0.27
2015	60	12	22	-	7	102	0.28
2016	59	11	22	-	7	100	0.27
2017	59	11	23	-	4	98	0.27
2018	61	14	25	-	4	104	0.29
2019	58	14	24	-	4	100	0.27
2020	61	13	25	-	6	105	0.29
Total							
	Single-Family	Multi-Family	Commercial	Industrial	Other	Total Consumption	Average Daily Consumption (mgd)⁽²⁾
2011	313	90	134	11	19	567	1.55
2012	313	89	138	11	20	572	1.57
2013	304	91	138	9	17	559	1.53
2014	309	95	148	15	25	591	1.62
2015	323	95	148	15	33	614	1.68
2016	315	92	143	15	31	595	1.63
2017	316	94	150	15	27	602	1.65
2018	320	97	155	16	34	623	1.71
2019	315	97	153	14	38	617	1.69
2020	327	106	146	14	39	633	1.73
Average	315	95	145	14	28	597	1.64

Notes:

⁽¹⁾ From water utility records, Billed Consumption Report. Usage converted from units of hundred cubic feet (CCF) to million gallons (MG).⁽²⁾ Total consumption in million gallons divided by days per year.

Figure 3-2. Consumption by Customer Category (2011-2020)

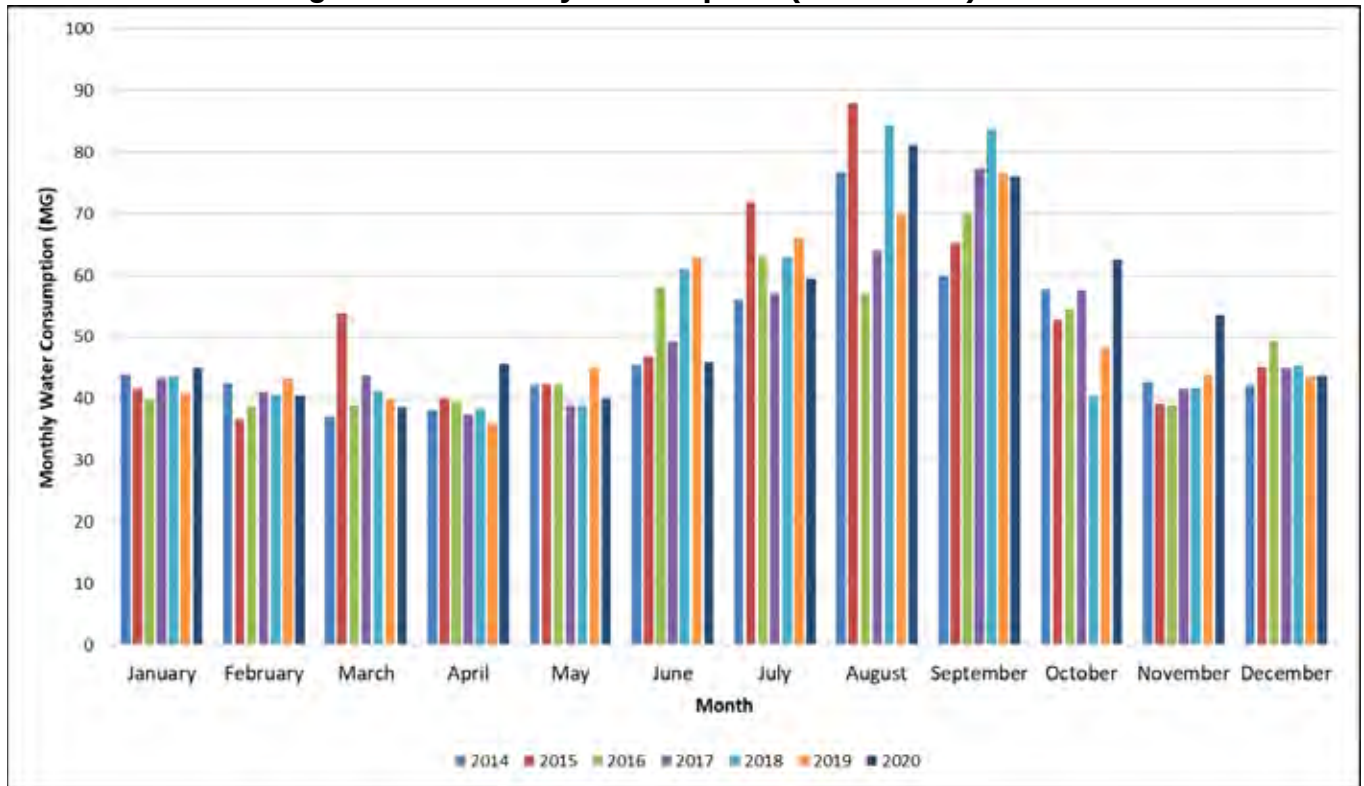
Monthly billed water consumption for 2011-2020 is provided in Table 3-5. The monthly and annual distribution of reported and actual water use may differ somewhat from this representation since billing numbers are based on meter read dates, which lag behind actual use. Monthly distribution of water consumption is shown in Figure 3-3.

Table 3-5. Monthly Water Consumption (MG), 2011-2020 ⁽¹⁾

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
January	40	39	39	44	42	40	43	44	41	45
February	40	39	43	43	37	39	41	41	43	41
March	41	36	34	37	54	39	44	41	40	39
April	39	44	37	38	40	40	37	38	36	46
May	38	41	44	42	42	42	39	39	45	40
June	43	47	45	45	47	58	49	61	63	46
July	51	45	49	56	72	63	57	63	66	59
August	57	60	73	77	88	57	64	84	70	81
September	67	74	62	60	65	70	77	84	77	76
October	62	55	43	58	53	54	58	40	48	63
November	35	40	51	43	39	39	42	42	44	54
December	46	45	38	42	45	49	45	45	44	44
Total	559	565	561	585	623	590	596	623	617	633

Notes:

(1) From water utility billing records.

Figure 3-3. Monthly Consumption (2014-2020)

The largest customers in the City are in the commercial category. Together, they comprise between 7% and 11% of the total consumption in the system as measured between 2018 and 2020. Table 3-6 summarizes the 15 largest customers.

Larger users may be served in the future, with the potential for industrial expansion at locations such as the Port of Centralia and the Industrial Park at TransAlta. Such industrial growth is envisioned in the Lewis County Comprehensive Plan, and is therefore considered in the City's long-range demand forecast, as an "Additional Allowance," presented in Section 3.5.

Table 3-6. Summary of Largest Water Customers⁽¹⁾

Top Customers in All Three Years				
Name	2018 Consumption (MG)	2019 Consumption (MG)	2020 Consumption (MG)	2018-2020 Average ⁽²⁾ (MG)
Sierra Pacific Industries	8.6	7.8	8.1	8.2
Parks Department	10.0	7.5	6.9	8.1
NW Hardwoods	8.8	6.9	7.3	7.7
Providence Hospital	7.4	7.2	7.0	7.2
Ives & Harrison Family HSG LLC	4.0	5.1	4.4	4.5
Harrison RV Park	3.5	3.6	4.3	3.8
Millard Refrigerated Services (Sprinkler)	3.6	3.3	3.1	3.3
KPS Motels LLC	2.4	3.1	3.9	3.1
Millard Refrigerated Services (2")	2.7	3.0	2.9	2.9
Care Center Centralia Inc	3.2	3.1	2.9	3.1
Safeway, Inc.	2.9	2.7	2.7	2.8
Top Customers Not in All Three Years				
Name	2018 Consumption (MG)	2019 Consumption (MG)	2020 Consumption (MG)	2018-2020 Average ⁽²⁾ (MG)
Centralia Holdings LLC	--	3.5	5.6	4.5
Inland Environmental Resources	--	3.2	2.9	3.1
SW Washington Fair	3.4	2.6	--	3.0
Sharon Care	4.3	--	--	4.3
TOTAL	64.8	62.5	62.1	63.1

Notes:

(1) Information from City billing records.

3.3 Water Balance and Distribution System Leakage

A water balance is an accounting of all water that is produced. The City's 2020 water balance is shown in Table 3-7. The table is a slightly modified version of the format recommended for use by the American Water Works Association.

Table 3-7. 2020 Water Balance

	Level 1	Level 2	Level 3	Volume (mg)	% of Produced Water
Water Produced	Revenue Water	Billed Authorized Consumption	1. Billed Water Exported	0.0 ¹	0%
			2. Billed Metered Consumption	633 ²	86%
			3. Billed Unmetered Consumption	0.0 ¹	0%
	Non-Revenue Water	Unbilled Authorized Consumption	4. Unbilled Metered Consumption	0.0 ³	0%
			5. Unbilled Unmetered Consumption	66 ⁴	9%
		Apparent Losses	6. Unauthorized Consumption	0.0 ³	0%
			7. Customer Metering Inaccuracies	0.0 ³	0%
		Real Losses	8. Known Leakage	0.0 ³	0%
			9. Assumed Leakage	36 ⁵	5%
Total				735	100%

Notes:

- (1) This category does not apply to Centralia.
- (2) Data Source: City records, Billed Consumption Report.
- (3) City staff do not track this number; therefore zero was used in the water balance.
- (4) City estimates unbilled authorized consumption is 9% of production.
- (5) Water Production minus all other categories.

The water balance allocates the water produced to different categories at three different levels.

Level 1 allocates the water to either Revenue Water or Non-Revenue Water. As implied by the names, Revenue Water generates income while Non-Revenue Water does not. This is helpful in understanding what percent of water production generates income for the City. Additionally, non-revenue water needs to be factored into the demand forecast. The City's 2020 water production is divided into 86% Revenue Water and 14% Non-Revenue Water.

Level 2 splits Non-Revenue Water into the following three sub-categories, which are useful in identifying potential additional revenue sources and identifying the magnitude of leaks or other losses that could be addressed:

- **Unbilled Authorized Consumption:** Includes uses such as water system flushing, firefighting, and unbilled contractor use. Typically, it is standard practice not to charge for uses falling into this sub-category. However, it is always a prudent idea to review these uses to ensure that a legitimate revenue opportunity is not missed. The City estimates that 9% of production has been unbilled authorized consumption. This is based on records kept in 2020. The City plans to refine their accounting of unbilled authorized consumption so as to improve documentation in the future.
- **Apparent Losses:** Includes unauthorized uses and customer meter inaccuracies, both of which are lost revenue opportunities.

- **Real Losses:** Includes various types of system leaks. A certain level of leakage is unavoidable; however, leakage beyond that level should be repaired to avoid unduly burdening both the natural resource and the physical infrastructure. Any amount that cannot be assigned to another category is considered a real loss under the American Water Works Association's protocol, as well as per the formula for calculating distribution system leakage under Washington State's Water Use Efficiency Rule.

Level 3 further splits water into additional sub-categories to support further estimation and water management.

A longer history of other water balance elements, namely distribution system leakage and non-revenue water is provided in Table 3-8.

Table 3-8. Distribution System Leakage and Non-Revenue Water (mg)

Year	Water Produced ⁽¹⁾	Authorized Consumption ⁽²⁾	Billed Consumption	Non-Revenue Water		Distribution System Leakage ⁽⁴⁾	
				Qty	Percent of Billed Consumption ⁽³⁾	Qty	Percent of Production & Purchases
2011	778	668	567	211	37%	110	14.1%
2012	777	663	572	205	36%	114	14.7%
2013	779	660	559	220	39%	119	15.2%
2014	813	679	591	222	38%	134	16.5%
2015	856	692	614	242	39%	164	19.2%
2016	751	651	595	156	26%	100	13.3%
2017	755	671	602	153	25%	84	11.1%
2018	827	697	623	204	33%	130	15.7%
2019	753	685	617	136	22%	68	9.1%
2020	735	699	633	102	16%	36	4.9%
2011-2020 Average	782	676	597	185	31%	106	13.4%
2018-2020 Average	772	694	624	147	24%	78	9.9%

Notes:

(1) Data Source: Table 3-1.

(2) Data Source: Water utility records, Billed Consumption Report.

(3) Used for developing the demand forecast. Note this is intentionally different than non-revenue as a percent of production.

(4) Distribution system leakage is defined in the Water Use Efficiency Rule as water production minus authorized consumption.

The City's distribution system leakage has been an average of 13.4% of production from 2011-2020. The three-year average from 2018 to 2020 was 9.9%. This is below the 10% threshold mandated by the Water Use Efficiency Rule; therefore, the City is not required to develop a Water Loss Action Plan.

3.4 Water Use Factors and Equivalent Residential Units

ERUs are a method of representing all types of water use as an equivalent number of single-family households. The ERU value represents the average amount of water consumption by a single-family household and is calculated by dividing the system-wide total single-family water consumption by the

number of single-family connections. Table 3-9 summarizes the single-family water consumption from 2011-2020, the number of connections, and the calculated ERU value. The three-year average for 2018-2020 is 153 gpd per ERU.

This analysis also yielded information regarding the number of ERUs for the other water use categories defined in Section 3.2. For each category, the total consumption was divided by the ERU value to arrive at the equivalent number of ERUs.

Table 3-9. Equivalent Residential Unit (ERU) Analysis

	Single-Family Residential Consumption (MG) ⁽¹⁾	Single-Family Residential Connections or ERUs ⁽²⁾	ERU Water Demand Factor (GPD) ⁽³⁾	Multi-Family ERUs ⁽⁴⁾	Commercial ERUs ⁽⁵⁾	Industrial ERUs ⁽⁶⁾	“Other” ERUs ⁽⁷⁾	Non-revenue ERUs ⁽⁸⁾	Total ERUs ⁽⁹⁾
2011	313	5,469	157	1,580	2,341	191	336	3,692	13,610
2012	313	5,463	157	1,555	2,417	198	352	3,589	13,573
2013	304	5,490	152	1,641	2,495	169	309	3,968	14,072
2014	309	5,501	154	1,690	2,627	259	440	3,962	14,479
2015	323	5,523	160	1,617	2,526	262	564	4,143	14,635
2016	315	5,564	155	1,630	2,522	265	542	2,760	13,284
2017	316	5,628	154	1,679	2,673	274	485	2,723	13,461
2018	320	5,730	153	1,736	2,765	290	611	3,648	14,780
2019	315	5,780	149	1,772	2,799	258	701	2,494	13,803
2020	327	5,778	155	1,872	2,571	255	686	1,806	12,968
Average ('18-'20)	321	5,763	153	1,793	2,712	268	666	2,649	13,850

Notes:

(1) From Table 3-4.

(2) From Table 2-2.

(3) Single-family residential consumption divided by number of single-family residential connections.

(4) Multi-family residential consumption (from Table 3-4) divided by the ERU value.

(5) Commercial consumption (from Table 3-4) divided by the ERU value.

(6) Industrial consumption (from Table 3-4) divided by the ERU value.

(7) Other consumption (from Table 3-4) divided by ERU value.

(8) Non-revenue consumption (from Table 3-8) divided by the ERU water demand factor.

(9) Sum of all calculated ERUs.

Another water use factor is calculated for industrial and commercial use. Appendix D in the 2018 City of Centralia Comprehensive Plan reports that the current developed commercial and industrial land areas are 351 acres and 668 acres respectively. From Table 3-4, the commercial and industrial consumption is divided by the current developed area to yield a water use factor of 1,171 gpd/acre for commercial consumption and 63 gpd/acre for industrial consumption. These values are used in the water demand forecast presented in the following section.

3.5 Water Demand Forecast

As the City's population grows and commercial/industrial development occurs, demands on the water system will increase accordingly. To anticipate the level of water supply requirements and to adequately

plan for system improvements required to meet future needs, the City has developed a water demand forecast. The forecast takes into account the planning considerations presented in Section 2, while also factoring in the effects of future conservation efforts and accounting for potential large industrial development.

While the time horizon for the WSP is 20 years in length (i.e., to year 2041), the demand forecast has been developed considering a 50-year horizon (i.e., to year 2071). This was done to investigate the effects of continued growth upon the water system and to help guide long-term water supply strategies. The following sections describe how the water demand forecast was prepared.

3.5.1 50-Year Water Demand Forecast

A multi-step process was taken in developing the water demand forecast, as described below:

- **Step 1 Single-Family Demands.** The projection for single-family demands began with the 2020 number of single family ERUs as a base, with the number of ERUs projected out to Year 50 (2071) using an annual growth rate of 1.76% from years 2021-2041 and an annual growth rate of 1.33% for years 2042-2071. These growth rates are based on demographic forecasts in the Comprehensive Plan and the SCJ Alliance Population Projections for the City. The number of ERUs is then multiplied by the ERU value of 153 gpd. For the purpose of long-range planning, the City is employing this as a conservative (i.e., “high”) estimate of potential water demands that may need to be met in the long term. The City should monitor demand growth from decade to decade as actual demands might grow quicker or slower than forecasted.
- **Step 2 Multifamily Demands.** The projection for multi-family demands began with the 2020 actual consumption, which was then increased by the same annual growth rates identified in step 1.
- **Step 3 Commercial Demands.** The projection for the commercial demands began with the 2020 actual consumption for the commercial billing category minus the Largest Users. For Year 20 (2041), the expected number of commercial acres developed in Year 20 (per the Comprehensive Plan) is multiplied by the commercial water use factor, 1,171 gpd/acre. For Year 10 (2031), the demand is interpolated between the Base Year and Year 20, using a compound growth rate. For Year 50 (2071), the Year 20 demand is increased by annual growth rates consistent with what is described in step 1.
- **Step 4 Industrial Demands.** The projection for industrial demands began with the 2020 actual consumption. For Year 20 (2041), the expected number of industrial acres developed in Year 20 (per the Comprehensive Plan) is multiplied by the industrial water use factor, 63 gpd/acre. For Year 10 (2031), the demand is interpolated between the Base Year and Year 20, using a compound growth rate. For Year 50 (2071), Year 20 (2041) demand is increased by annual growth rates consistent with what is described in step 1.
- **Step 5 Largest Users Demands.** The demand projection for the “Large Users” category used the 2020 actual consumption, which was held constant through Year 50 (2071) as no substantial growth is anticipated by these customers.
- **Step 6 Other Uses.** The demand projection for Other Uses began with the 2020 actual consumption, which was then increased by annual growth rates as described in step 1.

- **Step 7 Regional Wholesale Demands.** The City is in discussions with the neighboring City of Chehalis for a wholesale water agreement. Centralia recognizes that there may be other neighboring communities who may purchase water wholesale in the future as well. This regional supply will be associated with additional water rights the City acquired from TransAlta (see Section 7.1.4 - Water Rights Self-Assessment for more information). The regional wholesale demands could be up to 3 mgd maximum day demand beginning in the mid-2020s (no specific date set as of the writing of this plan). Therefore, 3 mgd was applied as MDD at the 10-year planning horizon and ADD was calculated by dividing MDD by the peaking factor ($3 \text{ mgd} \div 1.84 = 1.6 \text{ mgd}$ approximately). For the 20-year planning horizon, the forecast assumes both ADD and MDD are 3 mgd. This reflects a planning assumption that 3 mgd will not be used on a daily basis by the 10-year horizon, but that it could be by the 20-year horizon.
- **Step 8 Industrial Additional Allowance Demands.** The demand projection for the Industrial Allowance begins with zero demand in the Base year then adds 0.5 mgd every five years. This allowance accounts for demands related to potential industrial expansion that would bring more intensive water uses than that of the current industrial sector in Centralia. with the supply to meet these potential additional demands also comes from the water rights the City acquired from TransAlta.
- **Step 9 Subtotal Average Day Demand (ADD).** The subtotal for the Average Day Demand is a summation of all the categories above.
- **Step 10 Non-Revenue Water.** The demand projection for Non-Revenue Water multiplies the subtotal ADD, excluding the regional wholesale and industrial additional allowance, by the non-revenue factor. Initially, the non-revenue factor is defined as 24% of billed consumption (a conservative, consistent estimate based on recent trends; see Table 3-8), but then decreases to 20% of billed consumption, consistent with the prior water system plan. This factor remains constant from 2033 to 2071. This decrease in non-revenue water is based on the City's previous goal to reduce distribution system leakage over that time. As described in Section 4.6, that goal was to reduce leakage (as a percentage of overall production, as compared to "percent of consumption", which is how the non-revenue factor is portrayed for calculation purposes) from its present level of 17% to 10% of production by 2033.
- **Step 11 Total Average Day Demand (ADD).** The subtotal ADD and non-revenue water added together.
- **Step 12 Maximum Day Demand (MDD).** A peaking factor of 1.84 (2011-2020 average) is applied to the ADD for all categories except the Industrial Additional Allowance and Regional Wholesale, assuming that high water use industries do not exhibit seasonal or diurnal peaking like other uses. Regional Wholesale MDD is described in step 7.
- **Step 13 Conservation.** As discussed in Section 4.4, the City has established two water use efficiency goals. One of them calls for a more aggressive reduction in distribution system leakage (DSL) than is envisioned in the baseline demand forecast, by maintaining DSL at less than ten percent of production by 2019 (as opposed to reaching that level by 2033).

As presented in Table 3-10, the Year 10 (2031) water demand (with additional conservation effects considered) is projected to be 5.29 mgd on an average day basis and 8.89 mgd on a maximum day basis.

This level of demand increases to 8.41mgd and 11.27 mgd by Year 20 (2041), on average and maximum day bases, respectively. The Year 50 (2071) demand forecast reaches 13.00 mgd and 17.21 mgd on average and maximum day bases.

The results of the forecast *without* the effects of additional conservation are slightly higher. These more conservative demand projections are used throughout the WSP in such efforts as the water system analysis and development of system improvements.

Table 3-10. Water Demand Forecast

Water Use Category	Base (2021)			10-Year (2031)			20-Year (2041)			50-Year (2071)		
	No. of ERUs	Demand (MGD)		No. of ERUs	Demand (MGD)		No. of ERUs	Demand (MGD)		No. of ERUs	Demand (MGD)	
		ADD	MDD ⁽²⁾		ADD	MDD ⁽²⁾		ADD	MDD ⁽²⁾		ADD	MDD ⁽²⁾
Single-Family Residential ⁽¹⁾	5,981	0.91	1.68	7,122	1.09	2.00	8,479	1.29	2.38	12,711	1.94	3.57
Multi-Family Residential ⁽¹⁾	1,938	0.30	0.54	2,308	0.35	0.65	2,748	0.42	0.77	4,119	0.63	1.16
Commercial ⁽³⁾	1,585	0.24	0.45	2,718	0.41	0.76	4,664	0.71	1.31	6,991	1.07	1.96
Industrial ⁽⁴⁾	270	0.04	0.08	395	0.06	0.11	579	0.09	0.16	869	0.13	0.24
Other Uses ⁽⁵⁾	710	0.11	0.20	846	0.13	0.24	1,007	0.15	0.28	1,509	0.23	0.42
Largest Users ⁽⁶⁾	1,114	0.17	0.31	1,114	0.17	0.31	1,114	0.17	0.31	1,114	0.17	0.31
Regional Wholesale ⁽⁷⁾	0	0.00	0.00	10,682	1.63	3.00	19,654	3.00	3.00	19,654	3.00	3.00
Additional Allowance ⁽⁸⁾	0	0.00	0.00	6,551	1.00	1.00	13,103	2.00	2.00	32,757	5.00	5.00
Subtotal	11,598	1.77	3.26	31,736	4.84	8.07	51,347	7.84	10.22	79,723	12.17	15.67
Non-Revenue Water ⁽⁹⁾	2,784	0.42	0.78	3,034	0.46	0.85	3,718	0.57	1.04	5,462	0.83	1.53
Total Demand	14,382	2.20	4.04	34,770	5.31	8.93	55,065	8.41	11.27	85,186	13.00	17.21
Additional Conservation ⁽¹⁰⁾	0.00	0.00	0.00	(134)	(0.02)	(0.04)	0.00	0.00	0.00	0.00	0.00	0.00
Total Demand with Conservation	14,382	2.20	4.04	34,636	5.29	8.89	55,065	8.41	11.27	85,186	13.00	17.21

ERU = Equivalent Residential Unit; ADD = Average Day Demand; MDD = Maximum Day Demand; MGD = Million Gallons per Day

(1) For years 2021-2041, the projected annual growth rate is 1.76% per year as documented in the 2018 Centralia Comprehensive Plan. For years 2042-2071, the projected annual growth rate is 1.33% per year as documented in the 2018 SCJ Alliance City of Centralia Population Growth Memorandum. ADD is based on a water use factor of 153 gallons per day/ERU.

(2) Based on a peaking factor of 1.84.

(3) Year 2041 projection reflects additional commercial development accommodated by existing and available commercial parcels in the UGA expansion areas. Commercial water use factor is 1,171 gpd/acre. Year 2021 and 2031 projection is based upon interpolation between 2019 and 2041. Projections beyond year 2041 are based upon growth rates as defined in footnote 1.

(4) Year 2041 projection reflects additional industrial development accommodated by existing and available industrial parcels in the UGA expansion areas. Industrial water use factor is 63 gpd/acre. Year 2021 and 2031 projection is based upon interpolation between 2019 and 2041. Projections beyond year 2041 are based upon growth rates as defined in footnote 1.

(5) Other Uses projection is based on growth rates defined in footnote 1.

(6) Largest Users is a subset of the commercial demand and is assumed to be constant through the entire planning period.

(7) Reflects water demands reserved for future regional wholesale demands described in step 7 of section 3.5.1.

(8) Reflects allowances for unforeseen large industrial demands. Between 2021 and 2071, an allowance of 0.5 MGD is added every 5 years. A peaking factor is not applied to this category.

(9) Assumed as 24% of Subtotal consumption in 2021, then decreasing to 20% of consumption by 2033 (reflecting reductions in distribution system leakage consistent with what was planned for in the previous WSP), and then remains at this level into the future.

(10) Additional conservation efforts are assumed to reduce non-revenue water more quickly than is assumed in the baseline demand forecast (see note 8). The planned, and more aggressive, reduction in distribution system leakage (DSL), assumes that beginning in 2021, DSL is no more than 10% of production and remains at this level into the future. The reductions in overall demand associated with this are depicted here.

3.5.2 Water Demand Forecast Apportioned to Pressure Zones

The 20-year water demand forecast presented in Table 3-10 has been divided amongst existing and envisioned future pressure zones, for the purpose of system analysis (as presented later in the WSP). As described above, the demand forecast without the adjustment for additional conservation effects is used. The key assumptions used to develop the pressure zone-based forecast for the 10-year and 20-year time horizons are summarized in Table 3-11. The 50 year forecast is not apportioned to pressure zones because the hydraulic modeling only goes through the 20 year time horizon. Water demand by pressure zone is summarized in Table 3-12.

Existing demand – The majority (i.e., 95 percent) of the existing demand is within the Central Zone. The remainder of the existing demand is allocated according to percentages shown in Table 3-11. All industrial and wholesale demands are allocated to the central zone.

New demand – New non-industrial demands were allocated to pressure zones based on the forecasted allocation percentages in the prior water system plan, which in turn were based on projected growth patterns throughout the City, which have remained the same since development of the prior plan. These allocations are presented in Table 3-11. All new industrial demands, including the additional allowance, were allocated to the central pressure zone.

Table 3-11. Pressure Zone Non-Industrial Demand Allocations

Pressure Zone	2021	2031	2041
Central Zone	95.1%	89.7%	81.0%
Cooks Hill	1.8%	4.1%	7.7%
Davis Hill	0.4%	1.6%	3.5%
Ham Hill	0.6%	0.5%	0.5%
Seminary Hill	1.1%	1.0%	0.9%
Winterwood Estates	0.5%	0.5%	0.4%
Zenkner Valley	0.5%	0.5%	0.4%
Widgeon Hill	0.0%	2.2%	5.7%

Table 3-12. Water Demand Forecast by Pressure Zone (in mgd)

Pressure Zones	Base (2021)		10-Year (2031)		20-Year (2041)	
	ADD	MDD	ADD	MDD	ADD	MDD
Central Zone	2.090	3.845	5.038	8.430	7.776	10.109
Cooks Hill	0.039	0.071	0.107	0.196	0.256	0.472
Davis Hill	0.009	0.016	0.041	0.076	0.115	0.212
Ham Hill	0.013	0.024	0.014	0.026	0.015	0.028
Seminary Hill	0.024	0.044	0.026	0.048	0.028	0.052
Winterwood Estates	0.011	0.020	0.012	0.022	0.013	0.024
Zenkner Valley	0.011	0.020	0.012	0.022	0.013	0.024
Widgeon Hill ⁽¹⁾	0.000	0.000	0.057	0.105	0.188	0.345
TOTAL	2.195	4.039	5.307	8.925	8.405	11.266

- (1) The Widgeon Hill area to the southeast of the City has been recently made part of the City of Chehalis' UGA. However, it is shown as being within the City's Service Area, as there is still potential for the City to provide water service to this area.

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4. Water Conservation

Water conservation consists of any beneficial reduction in water losses, waste, or use. Efficient water use benefits the environment, public health, and economy by helping to improve water quality, maintain aquatic ecosystems, and protect water resources. Through activities such as public education and leak detection, the City of Centralia (City) has realized water savings via conservation in recent years. However, the City is committed to strengthening and expanding its conservation efforts.

This section of the Water System Plan (WSP) presents a water conservation program for the City. The emphasis upon water conservation was bolstered by passage of 2E2SH1338 (Municipal Water Law – Efficiency Requirements Act, Chapter 5 Laws of 2003). This section provides information to comply with DOH guidance regarding Municipal Water Law requirements. Included is a statement of conservation objectives, evaluations of water conservation measures, and identification of selected water conservation activities.

4.1 Water Use Efficiency Requirements and Compliance Summary

The conservation planning requirements that must be addressed in water system plans are contained in the following sources:

- State of Washington Water Use Efficiency Rule (January 2007)
- Department of Health Water Use Efficiency Guidebook (January 2017)
- Department of Health Water System Planning Handbook (August 2020)

The State of Washington recently revised water conservation planning requirements as a result of the 2003 Municipal Water Law. An outgrowth of that law is the Water Use Efficiency Rule (Rule), which was finalized in January 2007. The Rule has several requirements and corresponding compliance dates. Some of the requirements are associated with water system plans, while other requirements are independent of the ten year water system planning cycle.

There are seven main categories of requirements: 1) meters, 2) data collection, 3) distribution system leakage, 4) goals, 5) efficiency program, 6) demand forecast, and 7) performance reports. Table 4-1 lists the requirements of the Rule and shows that the City is in compliance with current requirements, and is well prepared to comply with upcoming requirements

Table 4-1. Compliance with Water Use Efficiency Rule Requirements

Category	Requirement	Centralia Compliance Status
Meters	1. Meter all sources.	Yes, all sources are metered.
	2. Meter all service connections.	Yes, all service connections are metered.
Data Collection	1. Provide an annual consumption by customer class.	Yes, provided in Section 3.2
	2. Provide “seasonal variations” consumption by customer class.	Yes, provided in Section 3.2
	3. Evaluate reclaimed water opportunities.	Yes, provided in Section 4.3
	4. Consider water use efficiency rate structure.	Yes, Centralia’s rate structure is conservation based.
	5. Provide monthly and an annual production for each source.	Yes, provided in Section 3.1
Distribution System Leakage	1. Calculate annual volume and percent using formula defined in the Rule.	Yes, distribution system leakage is calculated and reported to DOH on an annual basis. See Section 4.6 for the City’s Water Loss Control Action Plan.
	2. Report annually: annual leakage volume, annual leakage percent, and for systems not fully metered, meter installation progress and leak minimization activities.	
	3. Develop water loss control action plan (if leakage is over 10% for 3 year average).	
Goals	1. Establish measurable (in terms of water production or usage) conservation goals and re-establish every 6 years. Provide schedule for achieving goals.	Yes, measurable goals were originally established via a public process in October 2005. These goals were re-established in early 2012, during the course of the prior WSP update. The goals were then revised and adopted in August 2019, during the course of this WSP update.
	2. Use a public process to establish goals.	
	3. Report annually on progress.	Yes, report submitted annually to DOH
Efficiency Program	1. Describe existing conservation plan.	Yes. This information is contained in section 4.3
	2. Estimate water saved over last 6 years due to conservation program.	
	3. Describe conservation goals.	
	4. Implement or evaluate 1-12 measures, depending on size. (Six measures for Centralia).	
	5. Describe conservation programs for next 6 years including schedule, budget, and funding mechanism.	
	6. Describe how customers will be educated on efficiency practices.	
	7. Estimate projected water savings from selected measures.	Yes. The City evaluated seven measures, as reported in this water system plan update.
	8. Describe how efficiency program will be evaluated for effectiveness.	
	9. Estimate leakage from transmission lines (if not included in distribution system leakage).	N/A. All leakage is included in the distribution system leakage number.

Category	Requirement	Centralia Compliance Status
Demand Forecast	Provide demand forecast reflecting no additional conservation.	Yes, provided in Section 3
	Provide demand forecast reflecting savings from efficiency program.	
	Provide demand forecast reflecting all “cost effective” evaluated measures.	N/A. Since Centralia is implementing the required minimum number of measures, this forecast is not required.
Performance Reports	Develop an annual report including: goals and progress towards meeting them, total annual production, annual leakage volume and percent and, for systems not fully metered, status of meter installation and actions taken to minimize leakage.	Yes, Centralia has submitted an annual performance reports beginning in 2009.
	Submit annually by July 1 to DOH and customers and make available to the public.	

4.2 Current Conservation Program

The City established programs that strive to decrease the amount of unaccounted-for water and make efficient use of water. The City's commitment to conservation is reflected in the following objectives:

- Promote public awareness about the need for the wise use of water through an effective water conservation public education and technical assistance program.
- Decrease the City's level of unaccounted-for water use through implementation of proven supply-side demand management strategies such as leak detection and repair and replacement of inferior water mains.
- Achieve long-term reductions in average demands for water through effective implementation of feasible demand-side water conservation strategies.

The City's recent conservation program has consisted of eight components. A summary of each over the last six years is shown in Table 4-2. The details of each measure are discussed below.

Table 4-2. Current Conservation Program

Components	Currently Implemented by Centralia
1. Leak Detection and Repair	X
2. Service Meters	X
3. Source Meters	X
4. Conservation Kits	X
5. Public Outreach	X
6. Escalating Rate Structure	X
7. Landscape Management	X
8. Reclaimed Water	X

1. Leak Detection and Repair

There have been very significant improvements in the efficiency of water delivery in the City water system in the past 30 years. Currently, distribution system leakage is estimated at approximately 10 percent of total production. This is significantly less than the 40 percent level that existed in 1991.

To prevent major distribution system leakage the City is proactive in repairing and replacing failed water lines. Between 2011 and 2020, the City repaired 834 service leaks, replaced 270 service lines, repaired 316 main breaks, and replaced thousands of feet of old water main. The City continues proactive leak detection to assist in finding leaks that are not apparent at the ground surface.

2. Service Meters

All services within the City water system are metered. In 2003, the City began a meter replacement program to upgrade their meters to a mobile automated-read network. The program is complete. With the new system in place, the City has been identifying service leaks and making repairs based on the increased level of data provided by the meters.

3. Source Meters

The City has meters on all its sources.

4. Conservation Kits

The City distributes faucet aerators, hose nozzles, low flow showerheads, and toilet leak detection tablets to its customers to encourage water conservation. These kits are made available through the customer service center for all customer classes.

5. Public Outreach

An important component of the Water Conservation Program will be a means of alerting the water system customers to the need for water conservation. Typical approaches to public education about water conservation include:

- Public displays of water conservation educational materials at libraries, fairs, and other public places.
- Educational presentations in schools, before civic groups, etc.;
- Presentation of information on the City's website; and,
- Direct mail of water conservation promotional materials. The latter has been accomplished frequently through mailings of educational pamphlets and other materials in monthly water service billings.

The City regularly provides its water system customers with conservation-related educational materials enclosed in monthly billings. There were a few education programs conducted in the elementary school that included water conservation books and a discussion by City staff.

6. Escalating Rate Structure

The City uses an escalating rate structure. The 2021 consumption charge for single family residents begins at a rate of \$3.21 per 100 cubic feet (CCF) for 1-6 CCF, increases to \$4.30 per CCF for 6-15 CCF, and is at a maximum of \$5.33 per CCF for over 15CCF.

7. Landscape Management

The City offers incentives to irrigation customers to have an irrigation meter installed at no cost if the customer incorporates conservation measures such as timers and water saving techniques to reduce irrigation water use. The City also promotes the use of rain gardens to capture storm water and reduce irrigation.

8. Reclaimed Water

The City's Wastewater Treatment Plant (WWTP) currently produces Class D reclaimed water. This water is used at the WWTP for in-plant purposes such as cleaning, spray water, and some landscape irrigation, and has reduced the amount of potable water used by the WWTP. At a maximum, the WWTP can produce 875 gallons per minute (i.e. approximately 1.25 mgd) of Class D reclaimed water. There are no plans to expand reclaimed water usage within the City, as it is cost-prohibitive at this time. However, a list of potential future reclaimed water uses is provided in Appendix F.

4.3 2019-2028 Conservation Program

The time period for the City's conservation program aligns closely with the 10-year planning period for the Water System Update. In the sections below, the conservation goals for the next 10 years are defined as well as the next phase of the City's conservation program.

4.4 Goals

The activities outlined in Section 4.5 constitute the City's key water conservation actions and implementation strategies. However, another key element in a conservation plan is to identify a specific water conservation target, thereby providing a goal by which the City can evaluate the effectiveness of its conservation strategies.

The Water Use Efficiency goals previously adopted by the City in 2012 are listed below, along with discussion of the City's progress in meeting those goals.

2011-2017 WUE Goals

- 1) ***Reduce distribution system leakage to less than ten percent of total production by 2031, as calculated on a rolling three-year average.*** As described in more detail in Section 4.6, the City has made significant strides in resolving leaks over recent years, reducing the amount of leakage to 11 percent of production in 2017. This has been further reduced to 9.9 percent by 2020. Through the efforts described in Section 4.6 (i.e., full implementation of automated meter reading, periodic leak detection, and annual pipeline renewal and replacement activities), the City will proactively work to continue lowering the level of leakage. Because the City is already close to meeting the goal of maintaining leakage to less than ten percent of production, this goal has been modified, as noted below.

- 2) ***Maintain an average day demand Equivalent Residential Unit (ERU) water use factor of less than 200 gpd.*** The City's per-ERU water use declined from an average of 212 gpd in 1997-2003, to an average of 172 gpd in 2006-2010. As described in Section 3.4, per-ERU water use has continued to decline, reaching an average of 155 gpd for the period of 2011-2017. This has further decreased to 153 gpd as of 2020. This is in part a result of conservation measure implementation during the past two decades. The current ERU water use factor is equal to or lower than that of other western Washington utilities and it is unlikely to be reduced further without significant investment in costly conservation measures. To reflect the City's gains in reducing per-ERU water use, this goal has been modified, as noted below.

Based on the discussion above regarding the City's progress towards meeting its previously defined water use efficiency goals, revised goals have been established for the 2019-2028 time horizon. Those goals are:

2019-2028 WUE Goals

- 1) ***Reduce distribution system leakage to less than ten percent of total production by 2019, as calculated on a rolling three-year average.*** As noted above, distribution system leakage has been reduced to 11 percent of production, as of 2017. A large leak that went undetected for a long time caused this value to rise to 15 percent in 2018. However, the City is confident that through its continued water conservation efforts, it can achieve a three-year rolling average of less than ten percent, effective in 2019. Therefore, that is the goal the City has set regarding this metric. (NOTE: Since this goal was first adopted in 2019, this objective has been achieved.)
- 2) ***Maintain an average day demand Equivalent Residential Unit (ERU) water use factor of less than 175 gpd.*** As noted above, per-ERU water use has declined to approximately 150 gpd in recent years. The City anticipates maintaining usage at this level, but to account for abnormally hot, dry years or other factors outside the City's control, a goal of 175 gpd has been established, which reflects a reduction from the previously established goal.

The system-wide demand forecast presented in Section 3.5.1 (see Table 3-10) includes adjustments for reduced non-revenue water, reflecting the first goal stated above. It should be noted that accurate data reporting of system production and usage by customer classes is critical to measure conservation effectiveness. Even with such data, annual fluctuations in weather, meter inaccuracies, and other system changes occasionally make verification of reductions difficult. Therefore, these goals should be considered as approximate targets.

4.5 Measures

The City's conservation program for 2019-2028 consists of the eight measures shown in Table 4-3. According to the Municipal Water Law, the City is required to implement or evaluate six measures. The City is currently in compliance with the conservation requirements and the details of each measure are discussed further below.

Table 4-3. 2019-2028 Conservation Program

Measure	Relationship to Current Program
1. Faucet Aerators	Continuation
2. Low Flow Showerheads	Continuation
3. Toilet Leak Detection Tablets	Continuation
4. Conservation Pamphlets	Continuation
5. School Conservation Programs	Continuation
6. Escalating Rate Structure	Continuation
7. Irrigation Conservation Program	Continuation
8. Rain Gardens	Continuation

These measures have been selected due to a combination of factors including applicability to the City's service area, customer acceptance, cost effectiveness, and/or savings potential. The City will continue to use source meters, service meters, and system leak detection and repair, although those activities are not counted as official conservation "measures" under the new conservation Rule.

1. Faucet Aerators

The City will continue to distribute faucet aerators to its customers through the service center.

2. Low Flow Showerheads

The City will continue to distribute low flow showerheads to its customers through the service center.

3. Toilet Leak Detection Tablets

The City will continue to distribute toilet leak detection tablets to its customers through the service center.

4. Conservation Pamphlets

The City will continue to distribute conservation literature to its customers through conservation kits, monthly billing mailers, the annual Customer Confidence Report, and on the City website.

5. School Conservation Program

The City will continue to conduct public education programs in its schools where presentations will be provided by City Staff on conservation techniques and other information is distributed to students.

6. Escalating Rate Structure

The City plans to continue using its current rate structure, including escalating rates for water consumption block as described in Section 4.2.

7. Irrigation Conservation Program

The City plans to continue its incentive to irrigators of providing free installation of irrigation meters if the customer employs water saving techniques and devices to reduce irrigation.

8. Rain Gardens

The City will continue its program that promotes the use of rain gardens along with guidance on their construction and use.

The City will be using the eight measures listed above to meet the conservation goals defined in Section 4.4. The current conservation goals are scheduled to be re-evaluated as part of the next water system update.

4.6 Water Loss Control Action Plan

As described in Section 3.3, the City's distribution system leakage averaged 9.9 percent of production from 2018 to 2020. This is below the 10 percent threshold that triggers the need to develop a Water Loss Control Action Plan (WLCAP). Therefore, the City did not develop a WLCAP for this planning cycle. However, the City will continue to implement projects and monitor progress related to reducing distribution system leakage.

The City is currently replacing automated meter reading transmitters that have had battery failures. This will result in a more accurate accounting of water usage and will aid in efficiently identifying leaks presently occurring at old meter sites. As a result of replacing these units, the City expects revenue from billed consumption to increase.

The City is active in identifying and repairing leaks. As a result of past activity, the City has repaired leaking infrastructure that reduced distribution system leakage from 40 percent in 1991 to 4.9 percent in 2020. The City will continue to conduct leak detection periodically per Project WD-3 in the capital improvement program outlined in Table 13-1. Additionally, the City budgets annually for pipeline renewal and replacement in Project WD-1, also included in Table 13-1.

5. Existing System Description

This section provides a description of the City of Centralia's (City) existing water system components. An inventory of supply source, treatment, storage, and distribution system facilities is presented in detail. Figure 5-1 depicts the general location of all major facilities and Figure 5-2 provides a hydraulic schematic of the system.

5.1 Sources of Supply

The City's water system currently relies entirely on groundwater for potable water supply. Use of the Newaukum River intake has been discontinued since September 1993, due to its status as an unfiltered surface water source which can not meet the requirements of the Surface Water Treatment Rule (SWTR).

The primary sources of supply for the City are the Tennis Court and Fords Prairie Wellfields (including Eshom Well). Seasonal peaking supply is provided by the K Street Well and the Washington Well exists as an emergency backup supply. The remaining City wells are considered inactive due to a variety of water quality concerns. Table 5-1 provides summary information regarding these sources.

Table 5-1. Source Water Pumping Facilities

Well Name/Location	Pump Characteristics			Date Drilled	Date Pump Installed	Comments
	HP	Capacity (gpm)	Head (ft)			
Fords Prairie Wells						
-Well No. 1	40	960	321	2002	2002	Primary Source
-Well No. 2	30	1,270	321	2002	2002	Primary Source
Eshom Well	125	1,200	275	1991	1991	Primary Source
Tennis Court Wells						
-Well No. 1	125	605	296	1996	1998	Primary Source
-Well No. 2	50	1,300	279	1996	1998	Primary Source
K St Well	75	750	300	1935	1985	Seasonal Source
Washington Well	150	1,000	Unknown	1935	1975	Emergency Source ⁽¹⁾
N. Tower Well	40	400	245	1935	1992	Emergency Source ⁽¹⁾
Downing Well	200	700	375	1977	1977	Emergency Source ⁽¹⁾
Riverside Well	75	700	284	1971	1971	Emergency Source ⁽¹⁾
Borst Park Wells						
-Well No. 1	100	812	305	1993	1993	Emergency Source ⁽¹⁾
-Well No. 2	100	1,200	305	1993	1993	Emergency Source ⁽¹⁾

(1) Use of the term emergency source reflects only the current status of wells and does not imply any intention by the City to relinquish or abandon water rights associated with the wells or the ability to use such water rights differently in the future.

Details regarding the City's two primary sources of supply are provided in the sections below.

5.1.1 Tennis Court Wellfield

The Tennis Court wells were drilled in 1996 in response to water quality concerns at the previously drilled Borst Park wells and the older wells in the system. Although capable of

substantial yield, the Tennis Court wells have required corrosion control treatment to comply with the Lead and Copper Rule. Air stripping facilities were constructed, and since 2000, the Tennis Court site has provided a significant amount of the City's supplies.

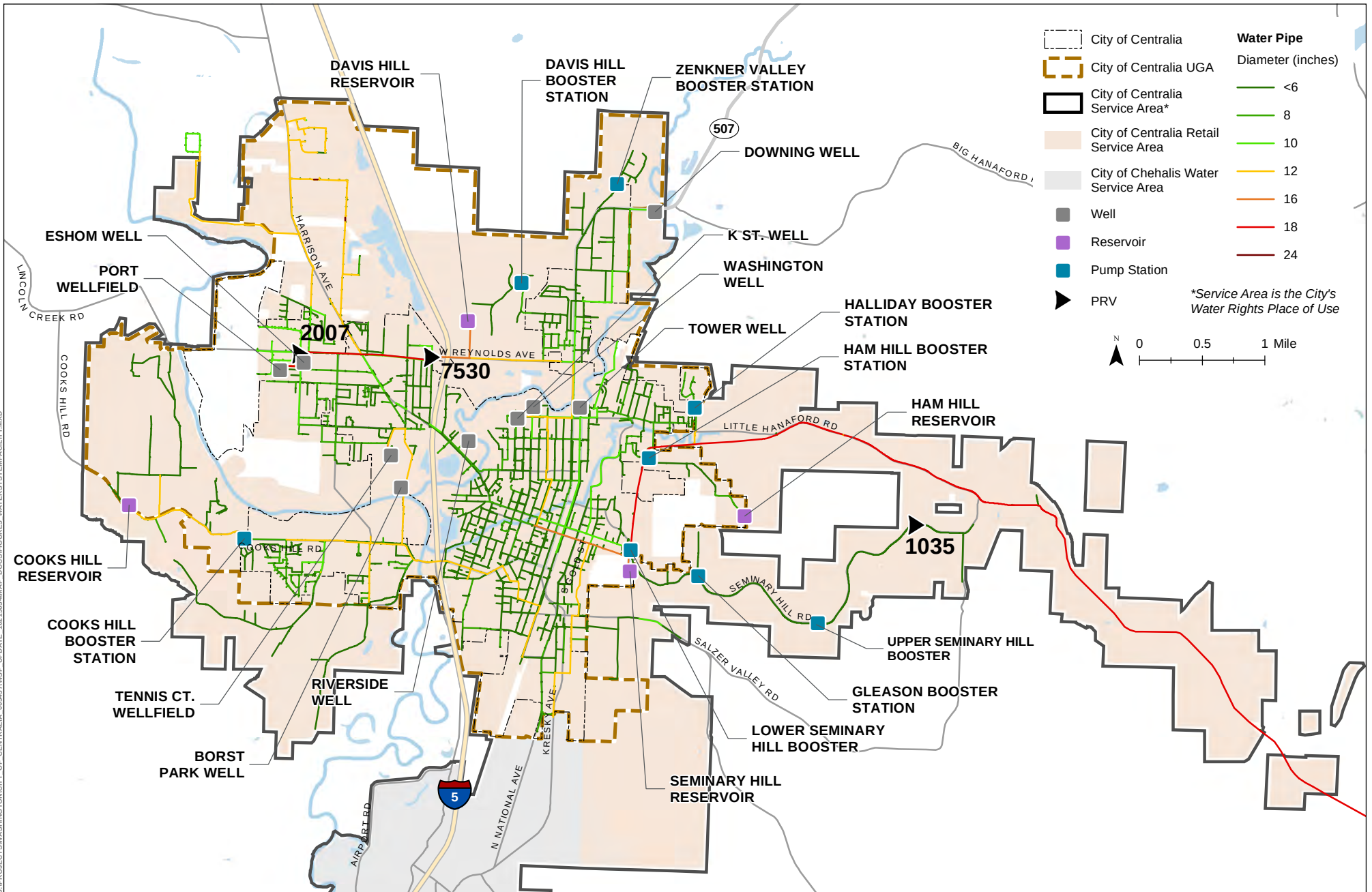
5.1.2 Fords Prairie Wellfield

The Fords Prairie Wellfield, also referred to as the Port District Wellfield, includes Eshom Well (drilled in 1991), as well as two newer wells drilled in 2002, and that are located to the west of Eshom Well. All three wells are part of a project referred to as the Fords Prairie Aquifer Restoration Project, the goal of which is to remove perchloroethylene (PCE, also known as tetrachloroethylene) from a portion of the Centralia Outwash Gravel Aquifer (COGA), and to then utilize the treated water for potable purposes. The project was initiated after water quality tests in the Eshom Well in 1988 indicated that there was PCE contamination in the well. Subsequent tests of other nearby wells revealed contamination throughout the area of Centralia known as Fords Prairie. The likely source of contamination was identified in 1990, when PCE was detected in shallow wells in and around Village Park, a mobile home and recreational vehicle park located approximately 3,000 feet east-southeast of the Eshom Well. The contamination source may have originated from a dry cleaning business that was reported to have operated at that site.

Although the City bears no responsibility for the contamination, it has entered into a voluntary agreement with the Department of Ecology to perform the cleanup. As a part of that agreement, the City has developed the two newer wells which, in conjunction with the Eshom Well, serve to capture the contaminant plume. An air-stripping treatment facility was constructed to remove PCE from the extracted water, which is then conveyed to the City's distribution system. The Fords Prairie facility began producing water in 2003, and is anticipated to provide the majority of the City's near-future supply, in conjunction with the Tennis Court Wells.

5.2 Water Treatment

The City's reliance on groundwater limits the water treatment requirements to disinfection and corrosion control. Hypochlorite disinfection is employed at the Tennis Court and Fords Prairie Treatment Facilities. As described in the previous section, air stripping is also used at these facilities. At the Tennis Court site, the objective is corrosion control, to maintain compliance with the Lead and Copper Rule. At the Fords Prairie site, the objective is removal of PCE contamination. Fluoridation is also conducted at the Tennis Court and Fords Prairie facilities. The City installed a hypochlorite tank and injection system at the K Street well. The tank is filled with fresh hypochlorite if the facility will be used. The Washington well is an emergency source only and has no associated treatment equipment.



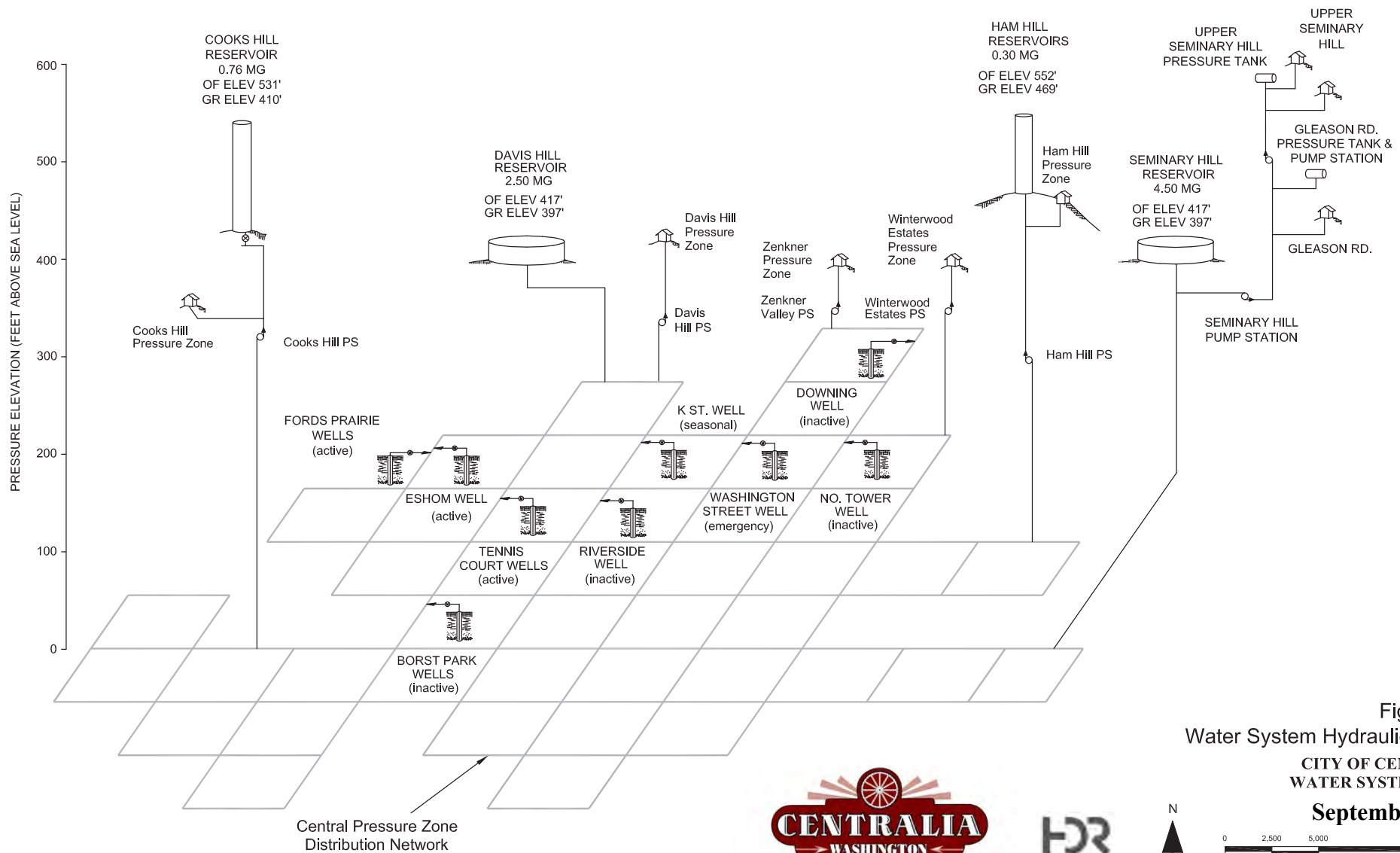


Figure 5-2
Water System Hydraulic Profile
CITY OF CENTRALIA
WATER SYSTEM PLAN
September 2021



5.3 Storage

A summary of the City's existing water storage facilities is provided in Table 5-2. In total, the City's storage volume is approximately 8 million gallons (MG).

Table 5-2. Existing Water Storage Facilities

Name	Date of Construction	Capacity (MG)	Const. Material	Elevations		Dimensions	
				Over-flow	Floor	Ht.	Dia.
Seminary Hill	1993	4.500	Concrete	417'	397'	20'	203'
Davis Hill	1982	2.500	Welded Steel	417'	397'	20'	150'
Ham Hill– Tank 1 ¹	1982	0.071	Welded Steel	552'	469'	83'	12'
Ham Hill– Tank 2	2005	0.230	Welded Steel	552'	469'	83'	22'
Cooks Hill	2005	0.760	Welded Steel	531'	410'	121'	33'

Notes:

¹ Not currently in use.

MG = Million Gallons

5.4 Distribution System

5.4.1 Pressure Zones

The City's water system is divided into seven pressure zones, as summarized in Table 5-3.

Table 5-3. Pressure Zones

Pressure Zone	Source	Maximum HGL (ft)
Central	Seminary Hill and Davis Hill Reservoirs	417
Ham Hill	Ham Hill BPS and Reservoirs	552
Zenkner Valley	Zenkner Valley BPS	Variable
Davis Hill	Davis Hill BPS	Variable
Cooks Hill	Cooks Hill BPS and Reservoir	531
Seminary Hill	Seminary Hill and Gleason BPS	Variable
Winterwood Estates	Halliday Ridge BPS	Variable

Notes:

HGL = Hydraulic Grade Line

5.4.2 Booster Pump Stations

Table 5-4 describes the City's seven booster pumping stations and their facilities.

Table 5-4. Booster Pumping Stations and Zone Pressure Tanks

Pump Station Name/Location	Number of Pumps	Pump Characteristics		
		Hp	Q (gpm)	Head (ft.)
Cooks Hill				
- Lead Pump	1	5	145	156
- Lag Pump	1	10	145	156
- Fire Pump	None			
Davis Hill				
- Lead Pump	1	5	50	100
- Lag Pump	1	5	50	160
- Fire Pump	1	25		
Ham Hill				
- Lead Pump	1	5	90	164
- Lag Pump	1	5	90	164
- Fire Pump	None			
Gleason				
- Lead Pump	1	7.5	75	160
- Lag Pump	1	7.5	Combined	160
- Fire Pump	None			
Seminary Hill				
- Lead Pump	1	30	250	140
- Lag Pump	1	30	250	140
- Fire Pump	Combined			
Winterwood Estates (Halliday Ridge BPS)				
- Lead Pump	1	7.5	150	115
- Lag Pump	1	7.5	150	115
- Fire Pump	1	30		
Zenkner Valley				
- Lead Pump	1	7.5	50	200
- Lag Pump	1	7.5	50	200
- Fire Pump	1	25		

Pressure Tank Name/Location	Tank Set-Pressures (psi)	
	Pump-On	Pump-Off
Gleason Rd	40	60
Upper Seminary Hill Rd.	50	70
Note: Pressures are adjustable using the telemetry system.		

5.4.3 Distribution Lines

Table 5-5 provides a summary of the distribution system piping present in the water system. This includes approximately seven miles of the 18-inch transmission piping extending to the City from the old Newaukum River supply. This piping is currently maintained for water that is fed from the system (i.e., not from the Newaukum River) to customers along the line.

Table 5-5. Water Distribution Pipe Inventory

Pipe diameter (inch)	Length by material (feet)									Total (feet)	Total (miles)
	Asbestos cement	Cast iron	Copper	Ductile iron	Galvanized iron	HDPE	PVC	Steel	Unknown		
Unknown	8	160		804	351		1,482		5,237	8,042	1.52
1/2					410					410	0.08
3/4			657		3,205	140	187		391	4,581	0.87
1			1,282		11,872	81	2,884		531	16,650	3.15
1-1/4					1,154					1,154	0.22
1-1/2			59		8,230		2,296		49	10,634	2.01
2		21		6	37,591		36,891		1,077	75,585	14.32
2-1/2					183					183	0.03
3					109		893			1,002	0.19
4	17,583	24,537		3,660	849		2,380	112	185	49,307	9.34
5		23								23	0.00
6	52,281	75,589		25,293	244		90,678		585	244,670	46.34
8	9,147	31,972		67,309			5,749		213	114,390	21.66
10	20,038	18,232		21,520					16	59,806	11.33
12		3,868		85,991						89,859	17.02
16	262	3,475		2,810		2,188				8,735	1.65
18	61,635			7,204						68,839	13.04
24								293		293	0.06
Total (feet)	160,955	157,876	1,998	214,596	64,198	2,409	143,441	406	8,284	754,163	
Total (miles)	30.48	29.90	0.38	40.64	12.16	0.46	27.17	0.08	1.57	142.83	

Data Source: City of Centralia GIS database

5.4.4 Pressure Reducing Valves

The transmission main along Galvin Road, conveying water from the Fords Prairie Treatment Facility to the eastern side of the City, is a high pressure line. Two distribution lines that come off of the Galvin Road transmission main (i.e., at Sandra Avenue and Lum Road) require pressure reductions to provide suitable service to customers. Therefore, two pressure reducing valves (PRVs) have been installed at these locations. Both PRVs are set with an operating pressure of 100 pounds per square inch (psi).

5.5 Telemetry

The City of Centralia Water Utility uses SCADA for control of the water system. The City uses radio telemetry and the Wonderware system for SCADA communications. The WIN911 software is used for alarm notification.

5.6 Auxiliary Power

The City maintains a 750 kW onsite generator at the Fords Prairie wellfield. In addition, the City owns a 100 kW trailer-mounted portable generator, for use at Davis Hill, Zenkner Valley, and Halliday Ridge Booster Pump Stations. The City also has auxiliary power switches at the Tennis Court well and Lower Seminary Hill booster station.

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6. Design Standards and Construction Specifications

This section presents the City of Centralia's (City) Design Standards and Construction Specifications. The Design Standards have been developed to ensure that a consistent minimum level of service is maintained throughout the system and to facilitate planning, design, and construction of water system projects. Developed separately, but for use in conjunction with the Design Standards, the Construction Specifications present a detailed description of the design and materials specifications to be observed during any water system improvement project.

The purpose of the inclusion of Construction Specifications is such that by having them approved with this Water System Plan (WSP) and kept on file at the Department of Health (DOH), construction documents do not need to be submitted for each project concerning distribution main construction. This is done in accordance with WAC 246-290-125 (project report and construction document submittal exceptions).

6.1 Design Standards

6.1.1 Supply

Supply facilities must be designed to meet the maximum day demand (MDD). Supply capacity will be sufficient to replenish storage within three days of fire or emergency drawdown during MDD conditions. The supply will be provided at a hydraulic grade line (HGL) that meets replenishment needs of storage facilities.

6.1.2 Storage

The Department of Health (DOH) requires public water systems to provide sufficient storage to meet any seasonal or diurnal variations in demand, fire flows, and emergency demands such as during power outages and equipment failures. These standards utilize these guidelines as criteria for determination of reasonable treated water storage required in each pressure zone, as well as for the City's system as a whole.

For a given reservoir design, each of the five storage components listed below must be considered:

- Operational Storage;
- Equalizing Storage;
- Standby (Emergency) Storage;
- Fire Suppression Storage; and
- Dead Storage, if any.

Only effective storage may be used in determining actual available, or design storage volume. Effective storage is equal to the total volume minus the dead storage built into the reservoir. The required storage volume has been interpreted as the sum of Equalizing Storage, Standby

(Emergency) Storage, and Fire Suppression Storage at an elevation sufficient to provide 20 psi (static) to the highest customer in any pressure zone. In addition, equalizing storage is evaluated with the requirement that 30 psi (static) is provided to the highest customer within the analyzed pressure zone. Operational storage is any surplus storage that is available after subtracting the other required storage components.

Operational Storage

Operational storage is the volume of the reservoir devoted to supplying the water system while, under normal operating conditions, the sources of supply are in “off” status. Operational storage is additive to the other components of storage and provides an additional factor of safety. The volume of operational storage should be sufficient to prevent excessive pump cycling.

Equalizing Storage

Equalizing storage capacity is utilized to meet the daily (diurnal) variations in demand. Peak use periods typically occur during the morning and evening hours, especially during the breakfast and dinner hours. Water is typically withdrawn from storage during these peak demand periods and replenished during low demand periods during late evening and early morning hours.

For systems like Centralia that supply water to storage based upon the reservoir water levels (on-call-demand), the DOH guidelines specify that the following equation be used to estimate equalizing storage:

$$\begin{aligned} \text{Equalizing Storage (gal)} &= (\text{PHD} - Q_s)(150 \text{ min}), \text{ where} \\ \text{PHD} &= \text{Peak Hourly Demand (gpm)} \\ Q_s &= \text{Source production rate (gpm)} \end{aligned}$$

In Centralia’s situation, Q_s is greater than the PHD in most cases, resulting in a negative value for Equalizing Storage. In this case, a value of 0 has been used as an assumed minimum.

Standby Emergency Storage

The purpose of standby storage is to provide a measure of reliability should sources fail or when unusual conditions impose higher demands than anticipated. The volume of emergency storage required is dependent upon the reliability of the source of supply and the ability to provide an alternative supply. If the system or zone has multiple sources of supply, the volume of water produced by the supply sources, after assuming the largest source is out of service, can reduce the standby storage requirement.

For the City, the largest source in any pressure zone is taken out of production before the storage volume is calculated. Booster pumps in a pressure zone are considered a source in this analysis. For pump stations, the capacity of the largest single pump is removed from service during this calculation, not the full pump station capacity.

The recommended standby storage should not be less than 200 gallons per equivalent residential units (ERU). For systems with multiple sources the standby storage is based on the following equation:

Standby Storage (gal) = $(2 \cdot \text{ADD})(N) - t_m (Q_s - Q_L)$ where

- ADD = Average Day Demand/ERU (gpd/ERU)
- N = Number of ERUs
- Q_s = Sum of all installed and available sources of supply in gpm
- Q_L = the largest capacity source available to the system in gpm
- t_m = Time that remaining sources are pumped on the day that the largest source is not available, in minutes (day is assumed as a full 24 hours)

The larger of the amount calculated in the equation above, or 200 gallons per ERU, is used for Standby Emergency Storage in this analysis.

Fire Suppression Storage

Water systems are required to construct and maintain facilities capable of delivering fire flows in accordance with the determination of the fire flow requirements made by the local fire protection authority while maintaining 20 psi pressure throughout the distribution system. Based on information provided by City Fire Department staff, the current minimum fireflow requirements for the City were developed. They range from 1,000 gpm for 2 hours for residential occupancies to 5,000 for 5 hours for commercial/industrial occupancies. Appendix G provides documentation of communication from the Fire Marshal. These flow requirements were used in hydraulic modeling and the development of capital improvements for the City's infrastructure.

The minimum fire suppression storage for systems is the product of the required flow rate multiplied by the flow duration and is based on the following equation:

Fire suppression storage (gal) = FF (t_m) where

FF = required fire flow rate

t_m = Duration of FF rate (in minutes)

Dead Storage

Dead storage is the volume of stored water not available to all customers at the minimum design pressure, as set forth in WAC 246-290-230(5) and (6). As such, dead storage is excluded from the volumes provided to meet the effective storage. For the purpose of design, the City considers dead storage to be that volume which is at an elevation lower than the elevation necessary to provide 20 psi (static) at the meter of the highest customer in the highest pressure zone served by a given reservoir. However, as stated above in the discussion regarding fire suppression storage, the City also acknowledges that its system must be able to deliver fire flows while providing at least 20 psi to all customers under dynamic conditions (maximum day demands plus fire flows), as compared to static conditions.

The analyses conducted in Sections 8 and 9 of this WSP consider all of the conditions noted above. In addition, while the City requires that the minimum amount of recommended standby storage (as calculated per the above equation) be provided above the dead storage elevation (i.e., above 20 psi), the City does consider the portion of dead storage that can physically be withdrawn and conveyed into the system as available to meet extended standby (emergency) needs, even though pressures may drop below 20 psi to some customers. This provides an additional level of reliability in the event of severe emergencies.

6.1.3 Distribution System

General

The function of the distribution system is to convey water to customers at adequate service pressures and to provide fire flows. During the peak-hour demand, the capacity of the distribution system must meet demands with a residual pressure of no less than 30 psi. During fire-fighting events, the minimum residual pressure permitted at the fire location is 20 psi, while maintaining positive system pressures throughout the rest of the distribution system (under maximum day demand conditions).

Usually, the inability to meet the above demand conditions results from inadequate distribution capacity; that is, pipes are not large enough or pipeline gridding is poor. The capacity of the distribution system is greatly reduced when head loss is greater than about 10 feet per 1,000 feet of pipe length.

Sometimes increasing pipe diameters or pipeline grid spacing is not sufficient to significantly increase flows. In these cases, it is better to consider adjusting the hydraulic elevation of either the supply or storage facilities. When analyzing the distribution system, the capability to replenish equalizing storage volume must be considered. The equalizing volume must be replenished at a rate sufficient to refill the storage reservoirs during the late evening/early morning replenishment hours.

Pressure Zones

Pressure zones are determined by evaluating ground elevation as it relates to available hydraulic gradient. The static pressure at the lowest elevation will generally not be greater than 100 psi, while at the highest elevation of the zone, it must be sufficient to ensure that at peak demand conditions the pressure is not less than 30 psi. Pressure reducing valves (PRVs) are used to intertie pressure zones in order to utilize stored water at higher elevations and to lower pressures to acceptable service levels. PRV stations will be sized to provide the maximum instantaneous demand or the required fire flow, whichever is greater.

To the extent possible, the City will keep the number of pressure zones to a minimum. Wherever pressure zones are made, the system becomes fragmented, and the water conveyance capacity can be affected because distribution mains cannot be interconnected at pressure zone boundaries.

Pump Stations

A minimum of two pumps are required at each pump station to provide flexibility and system redundancy. Each pump must be able to meet maximum day demand design conditions in the pressure zone served.

6.2 Construction Specifications

The City maintains a complete set of water system construction specifications and standard detail drawings as Chapter 2 (Water) of the City's Design and Development Guidelines. A copy of the current guidelines is located in Appendix H. Discussed therein are the specific construction requirements for the City of Centralia, as related to water system components and

improvements. These documents will govern the installation of new water infrastructure. The design and development guide for water is also accessible on the City's website at this link: <http://www.cityofcentralia.com/Files/Chapter%20%20Water.pdf>.

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7. Source Capacity Analysis

This chapter addresses existing water rights and their ability to support current and projected future levels of water demand. A comparison is also made between source pumping capacity and demands, for the water system as a whole as well as for each pressurized zone.

7.1 Water Rights Evaluation

7.1.1 Existing Water Rights

Since the City's last Water System Plan update, the City hired water rights attorney Thomas M. Pors to evaluate its water rights portfolio and update the City's water right self-assessment. Mr. Pors' assessment is reflected in this section, including Table 7-1, and in the self-assessment forms included as Table 7-2.

The water rights associated with each of the City's sources of water supply are described in Table 7-1 and discussed below. As demonstrated in Table 7-2, the City's rights are adequate to meet current water demands and projected demands through 2041. The need for additional water rights and/or additional sources of supply is discussed in Section 7.2.

Primary and Supplemental Water Rights

The City's water rights are noted as either primary (additive) or supplemental (non-additive) water rights, and where appropriate these interpretations are explained in footnotes to Table 7-1 and/or in the text below. Generally, primary water rights are additive to pre-existing rights and can be used to the full extent of the authorized quantities, regardless of the use being made under other water rights. The use of supplemental water rights is conditional based on the language in the water right decision documents and is often dependent on the use being made under prior rights. In most cases, supplemental water rights can be used as an alternative source for previously-issued water rights, and do not increase the total authorized annual quantity of water allowed to be withdrawn and used by the City.

The City's initial water source and water right was from the North Fork Newaukum River, and all subsequent water rights are sourced from groundwater in the Centralia area. The initial Newaukum River water right is a primary water right and is discussed in more detail below. Though the Newaukum River source is not presently used, the associated water right is still valid and is being exercised through groundwater wells that were issued as supplemental to the older Newaukum River water right. Not all of the City's groundwater rights are supplemental to the Newaukum River water right, however.

Table 7-1. City of Centralia Water Rights

Permit Certificate or Claim #	Name of Rightholder or Claimant	Priority Date	Source Name/ Number	Primary or supplemental	Individual Water Right Capacity		Existing System Capacity Per Source, based on Water Right Limits	
				Cumulative Qa of <u>Groundwater</u> in AFY ¹	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa) Primary/Supp	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa) (Primary/Supp)
1. S2-CV1P31 (SW Change Vol. 1, p 31)	City of Centralia	1912	North Fork Newaukum R.		4.8 MGD	5,376 AFY	4.8 MGD = 7.4 cfs = 3,333 gpm ¹	5,376 AFY
2. 562-D	City of Centralia	1937	N. Tower #2 and Tennis Ct #1& 2	Primary	700 gpm	186 AFY	See G2-24010C for combined capacity Tennis Court WF	
				186 AFY¹				
3. 563-D	City of Centralia	1937	K Street #4 and Fords Prairie Wellfield	Primary	900 gpm	238 AFY	See G2-28215C for combined capacity of K Street Well #4	
				424 AFY¹				
4. 564-D	City of Centralia	1937	Washington #5 and Fords Prairie Wellfield	Primary	1,400 gpm	372 AFY	Washington #5 1,400 gpm	Washington #5 2,258 AFY (372)
				796 AFY¹			See G2-28214C for combined capacity of Fords Prairie WF	
5. G2-*04714	City of	10/10/1	Eshom #9	Primary	1,200	1,920 AFY	See G2-28212C for combined capacity of	

(Cert 4491-A)	Centralia	957	and BP #1, BP #2	2,716 AFY¹	gpm		Eshom Well #9	
6. G2-00168C	City of Centralia	9/28/1960	Riverside #11	Supplemental (Aggregate Cap)	1,000 gpm	1,600 AFY	Riverside #11 total 1,000 gpm	Riverside #11 total 1,600 AFY
				2,716 AFY¹				
7. G2-24010C	City of Centralia	11/10/1975	Downing #10 and Tennis Ct #1& 2	Primary/Supp	1,300 gpm	1,568/432 AFY	Tennis Court WF total 2,000 gpm	Tennis Court WF total 2,000 AFY (1,754/246)
				4,284 AFY¹				
8. G2-28212C	City of Centralia	7/9/1991	Eshom #9 and BP #1 and #2 (Inactive)	Partially Supplemental	200 gpm	320 AFY	Eshom #9 total 1,470 gpm	Eshom #9 total 2,246 AFY (2,246)
				4,604 AFY^{1,2}				
9. G2-28214C	City of Centralia	7/9/1991	Washington #5 and Fords Prairie WF	Partially Supplemental	1,400 gpm (Suppl. Qi)	1,886 AFY	See 564-D for combined capacity of Washington Well #5 Fords Prairie WF total 2,800 gpm	See 564-D for combined capacity of Washington Well #5 Fords Prairie WF total 2,258 AFY (1,886)
				6,490 AFY^{1,2}				
10. G2-28215C	City of Centralia	7/9/1991	K Street #4 and Fords Prairie WF	Partially Supplemental	900 gpm (Suppl. Qi)	1,214 AFY	K Street #4 total 1,800 gpm	K Street #4 total 1,452 AFY (1,452)
				7,704 AFY^{1,2}				
11. CG2-00731 (LEWI-15-01)	City of Centralia	10/23/1970	Eshom Road Well	Primary	70 gpm	6 AFY	See G2-28212C for combined capacity of Eshom Well #9	
				7,710 AFY¹				

Total				7,710AFY^{1,3}	6,770 gpm (9.75 MGD)	9,666 AFY +5,452 AFY supplemental	6770 gpm (9.75 MGD)	7,710AFY
Claims								
S2-302347CL ³	City of Centralia							
Pending Applications								
G2-28782	City of Centralia	3-18-1993	North Tower Well	N/A	700 gpm	1,129 AFY	Pending	Pending
G2-22908	City of Centralia	3-15-2000	Related to Eshom Well cleanup	N/A	4,000 gpm	6,440 AFY	Pending	Pending
S2-30405	City of Centralia	4-13-2007	Skookumchuck River	N/A	26 cfs	unknown	Pending	Pending
G2-30763	City of Centralia	1-31-2020	Groundwater Borst Park	NA	8,333 gpm	8,961 AFY	Pending	Pending

Notes:

¹ The cumulative annual quantities shown in this column are for groundwater rights only, and do include the North Fork Newaukum River (NFNR) water right, the exercise of which would limit some of these groundwater rights to supplemental (non-additive) status.

² The “supplemental to existing rights” limitation in these groundwater rights refers to a specific condition in the state Reports of Examination (ROEs) relating to the NFNR water right. There is no intention expressed in the documentation for these water rights to make the annual quantity supplemental to the City’s other groundwater rights. To the extent the NFNR water rights are not exercised, this water right is an alternative to that source, and is interpreted as additional annual groundwater quantity in Column 5. As of the publication of this plan, these rights allow Centralia to access 3,420 AFY of the 5,376 AFY (64%) of the NFNR right.

³ This claim is for the same source as the NFNR vested right (see Note 1), but was not necessary when filed because the water right was certificated under the Water Code as a change certification.

North Fork Newaukum River

From 1914 until late 1991, the City's major source of supply was a diversion from the North Fork of the Newaukum River. A Notice of Appropriation of Water was filed with Lewis County on September 20, 1912, for a quantity of 10 cfs (6.5 mgd). A Certificate of Change in Point of Diversion (POD) was issued to the City on May 19, 1923, by the State Supervisor of Hydraulics (Vol. 1, Page 31). This certificate authorized the POD to be changed from the SE 1/4 of SW 1/4, Section 20, Township 14 N., Range 1 E. W.M. to a point in the SW 1/4 of the SE 1/4 of Sec. 20, T. 14 N., R.1 E. W.M. The City's claim to a vested right under the Notice of Appropriation, as amended by the Certificate of Change, was confirmed by Lewis County Superior Court Decree No. 22433, dated October 4, 1954. The priority date for this pre-code vested right is likely 1912 or earlier. The quantity confirmed was 4.8 mgd, the capacity of the source transmission main at that time. This water right was certified without an annual limitation and qualifies as a "pumps and pipes" water right in good standing per RCW 90.03.330(3). Calculated as a continuous withdrawal, 4.8 mgd is equivalent to 3,333 gpm, and totals 5,376 AF/year. The quantities of 4.8 mgd and 5,376 AF/yr are therefore shown in Table 7-1 as the primary water rights related to this source.

The Newaukum River source has been out of use since 1991 due to catastrophic failure of the reservoir, but the water right is still valid and is used as the primary water right that supports ground water rights issued as supplemental (non-additive) to this water right. (See text below regarding G2-28212, G2-28214, and G2-28215).

Pre-Code Ground Water Declarations

The City established three vested rights to groundwater prior to the adoption of the Ground Water Code in 1945, which were confirmed in certificates issued in 1948.

Certificate No. 562-D, with a 1937 priority date, allows a 700 gpm instantaneous withdrawal rate and an annual withdrawal of 186 AF/yr from the North Tower Well. In 1996, the City applied for a change of point of withdrawal to the new Tennis Court well field, which was approved by Ecology on May 14, 1998.

Certificate No. 563-D, with a 1937 priority date, allows a 900 gpm instantaneous withdrawal and an annual withdrawal of 238 AF/yr from the City's K Street Well #4. In 2002, the City applied for a change to Certificate 563-D to add the Fords Prairie Well Field (also known as the Port Wells) as an additional place of withdrawal, which was approved with no additional conditions affecting total instantaneous or annual quantity.

Certificate No. 564-D, with a 1937 priority date, authorizes 1,400 gpm and 372 AF/yr from the City's Washington Well #5. In 2002, the City applied for a change to Certificate 564-D to add the Fords Prairie Well Field (also known as the Port Wells) as an additional place of withdrawal, which was approved with no additional conditions affecting total instantaneous or annual quantity.

Eshom Well

Certificate 4491-A, with a priority date of September 10, 1957, authorizes 1,200 gpm and 1,920 AF/yr from the Eshom Well, with no supplemental conditions or limitations. In 1992, the City

applied for a change to Certificate 4491-A to add two new well sites as alternative sources due to contamination detected in the Eshom Well. Ecology approved the change application, adding the Borst Park wells under Certificate 4491-A, and issued a superseding certificate (G2-04714C), which confirmed the quantity of this water right as 1,200 gpm and 1,920 AF/yr, with no supplemental limitation.

Riverside Well

Certificate G2-00168C, with a priority date of September 28, 1960, authorizes 1,000 gpm and 1,600 AF/yr from the Riverside Well. The report of examination dated November 18, 1960 mistakenly calculated the City's pre-existing total annual quantity of water rights at only 1,600 AF/yr, and approved the water right for 640 AF/yr of primary plus 1,600 AF/yr of supplemental annual quantity. The annual quantity was later reduced in the certificate to 1,600 AF/yr. The ROE and Permit for this water right include an "aggregate cap limitation" that states, "The total annual withdrawal under this application shall be limited to 2,240 acre-feet less any quantity withdrawn under existing rights." While this language does not affect the scope of the City's existing water rights, in light of the City's self-assessment that it already possessed more than 2,240 AF/yr of primary water rights, Certificate G2-000168 is interpreted as wholly supplemental as to annual quantity.

The Riverside Well is not currently in use due to a determination by WSDOH that it is "under the influence of surface water" and requires treatment. That means that this water right cannot currently be accessed by the City. While this is not a primary water right, it is a candidate for a change application to add another ground water source as necessary.

Downing and Tennis Court Wells

Certificate G2-24010C, with a priority date of November 10, 1975, authorizes 1,300 gpm and 2,000 AF/yr from the Downing Well. In 1996, the City applied for a change in the point of withdrawal from the Downing Well to the new Tennis Court Wells in Borst Park. Ecology approved the change in 1998. The superseding certificate for this water notes that of the 2,000 AF/yr of annual quantity, 1,568 AF/yr is a primary right and 432 AF/yr is a supplemental right, which is how the City interprets this water right.

1991 Ground Water Applications

In 1991, after landslides impacted the Newaukum River source, the City filed three applications to permit additional ground water sources as an alternative supply. These water rights were approved as alternative sources to the Newaukum River, but were not limited as supplemental to the City's other groundwater rights.

Application G2-28212 requested an additional 200 gpm (320 ac-ft/year) from the Eshom Well and the two Borst Park Wells. The application was approved, permit granted, and certificate G2-28212C was issued. The 320 AF/yr is supplemental to the Newaukum River water right, but not to other groundwater rights.

Application G2-28214 requested 1,400 gpm continuously from the Washington Well. The application was approved, permit granted, and certificate G2-28214C was issued for 1,400 gpm and 1,886 AF/yr. The annual quantity of G2-28214C is supplemental to the Newaukum River

water right, but not to other City ground water rights. The instantaneous quantity of 1,400 gpm issued under G2-28214C, however, is supplemental to the 1,400 gpm issued under Certificate 564-D, because the intent of this right was to increase the total authorized annual quantity from this well, not the rate of instantaneous withdrawal. In 2001, the City applied to the Lewis County Water Conservancy Board to add the Fords Prairie Wellfield to this water right and to Certificate 564-D, which was subsequently approved by the Board and Ecology.

Application G2-28215 requested 900 gpm continuously from the K Street Well. The application was approved, permit granted, and certificate G2-28215C was for 900 gpm and 1214 AF/yr. The annual quantity of G2-28215C is supplemental to the Newaukum River water right, but not to other City ground water rights. The instantaneous quantity of 900 gpm issued under G2-28215C, however, is supplemental to the 900 gpm issued under Certificate 563-D, because the intent of this right was to increase the total authorized annual quantity from this well, not the rate of instantaneous withdrawal. In 2001, the City applied for a change to Certificate G2-28215 to add the Fords Prairie Wellfield as an additional place of withdrawal, which was approved with no additional conditions affecting total instantaneous or annual quantity.

Eshom Road Well – Mobile Home Park Consolidation and Appeal

In 2015, the City acquired water right certificate G2-00731C from a mobile home park as part of a consolidation of the mobile home park's water system into the City's municipal system. The City applied to the Lewis County Water Conservancy Board to change the purpose and place of use of this water right to the City's municipal service area and to change the point of withdrawal to the Eshom Road Well. The Board approved the application in the full amount of the original certificate's quantity, 70 gpm and 7 AF/yr. Ecology modified the Board's order, reducing the annual quantity to 5.3 AF/yr. The City appealed Ecology's modification order to the Pollution Control Hearings Board (PCHB). Following discovery and negotiations, the City and Ecology agreed to settle the appeal at a higher annual quantity of 6.0 AF/yr, representing the highest annual quantity of metered historical use of water by the mobile home park.

The City's appeal of Ecology's order and the settlement agreement focused on the validity of inchoate municipal purpose water rights following a consolidation-type of transfer to a larger municipal water system. Ecology, WSDOH, and the Washington Water Utility Council are meeting and negotiating an update to Ecology's policies and procedures regarding inchoate water right consolidations as a result of the City's appeal.

7.1.2 Pending Water Right Applications

There are four pending applications for new water rights by the City. They include G2-28782 which was filed in March 1993 for an additional 700 gpm from the North Tower Well, and G2-29908 which was filed in March 2000 for 4,000 gpm for two wells to be used in conjunction with the cleanup effort for the Eshom well, also with the intent to later use this source for municipal supply.

In addition, the City filed an application in April 2007 for 26 cubic feet per second (cfs) for a new surface water right from the Skookumchuck River in follow-up to the discussion presented in Section 7.1.3. No action has been taken on this application by Ecology at this time.

Tables 7-1 and 7-2 summarize the pending applications.

7.1.3 Skookumchuck River

The City initiated negotiations in 1967 with the private utility PacifiCorp relating to PacifiCorp's development on the Skookumchuck River (Surface Water Permit No. 14966 and Reservoir Permit No. R-359). A draft agreement was developed in May 1967, but was never signed by the two parties. The draft agreement set forth an option for the City to acquire up to 2 mgd from the reservoir for its own use or for an industry of its choice.

The City also initiated negotiation with PacifiCorp many years ago to ratify a Memorandum of Understanding (MOU) by which the City would have access to up to 8.8 mgd of water from the development in exchange for some share of the expense to operate and maintain the reservoir.

TransAlta is the successor to PacifiCorp and is the current holder of the Skookumchuck River water rights. TransAlta is in the process of transferring its water right into a water bank managed by the State's Trust Water Program, with the intention of mitigation credits being sold to interested users. This is expected to be approved and operating in 2021. The City recognizes the value of purchasing these mitigation credits as a means of developing new groundwater sources to meet forecasted demands, notably wholesale and potential new large user demands. The City would look to expand its pumping capacity within the existing aquifer after acquisition of mitigation credits.

On January 31, 2020, the City filed an application with Ecology for 8 mgd of groundwater near the confluence of the Skookumchuck and Chehalis Rivers for future use. This is approximately 5,556 gpm instantaneous, or 8,961 acre-feet per year annually. The City, with their consultant Pacific Groundwater Group, is assisting Ecology in processing the application and anticipates approval in late 2021 or early 2022. Ecology will determine how much groundwater the City can develop and how much mitigation credit is needed from the TransAlta water bank.

The City has discussed providing wholesale water to the City of Chehalis through what is currently an emergency intertie. Chehalis would purchase the wholesale water to supplement their local supply, particularly during peak demand times in the summer. Centralia and Chehalis working to establish an agreement for up to 3 mgd of wholesale water on an average and max day basis. Deliveries could start as early as 2022 depending on the timing of establishing a wholesale contract.

7.1.4 Comparison of Water Rights with Future Water Demand

Appendix N is the City's water rights self-assessment in Department of Health's format and includes a comparison of existing water rights to current usage from all sources and to the future demand forecast. This table includes the North Fork Newaukum River surface water right as an existing water right, even though this source is not currently being utilized, because this water right is tied to several of the City's groundwater rights.

The average day demand (ADD) without conservation for the ten- year forecast period (2031) is 5.31 mgd which equates to 5,945 AF/yr, with a maximum day requirement (MDD) of 9.77 mgd. The 20-year (2041) forecast is for an ADD of 8.41 mgd which equates to 9,415 AF/yr, with a MDD of 15.47 mgd (would require continuous pumping at 10,740 gpm). The 50-year (2071) forecast is for an ADD of 13.00 mgd, which equates to 14,565 AF/yr, with a MDD of 23.93 mgd, which is equivalent to 16,615 gpm.

Within the 20-year planning horizon, the City's water rights are sufficient to meet forecasted demands. In the 50-year planning horizon, the City has sufficient water rights to meet ADD, but would require additional instantaneous capacity to meet MDD. This additional capacity will be provided by the Skookumchuck River water right, described in section 7.1.3.

7.2 Source Capacity Evaluation

The source capacity analyses presented below examine the ability of the City's existing sources of supply to meet current and projected future water demands. The analyses are conducted by comparing the City's water demand forecast, as presented in Section 3, with current source (i.e., groundwater well and/or booster pump station) capacities. Capacity is analyzed for the following four criteria:

- Ability to provide MDD with sources operating for 24 hours per day (DOH requirement)
- Ability to provide MDD with sources operating for 20 hours per day (DOH recommendation)
- Ability to provide ADD with sources operating 20 hours per day with the largest source offline (DOH recommendation)
- For open pressure zones, ability to provide fire storage replenishment during MDD with sources operating 24 hours per day (DOH recommendation)

Closed pressure zones require the two following analyses:

- Ability to provide peak hour demand (DOH requirement)
- Ability to provide peak hour demand with the largest pump offline (DOH recommendation)
- Ability to meet fire flow requirements in closed zones is analyzed in the distribution system analysis (Chapter 9).

Deficiencies noted in these analyses form the basis for supply-related improvements included in the capital improvement program presented in Chapter 13.

7.2.1 Total System Capacity

According to DOH planning requirements, sources of supply must be sufficient to meet needs on a maximum day demand (MDD) basis. This must hold true for the system as a whole, as well as for each "open" pressure zone that has storage.

The source capacity analysis for the City's entire system is summarized in Table 7-2. Two wells were not included: the Washington Well, which is considered available only for emergency situations, and the Riverside Well, which is currently inactive.

Three demand forecasts are considered in this analysis: a baseline forecast focusing on the current retail service area, a forecast adding the regional wholesale demands to the baseline, and a forecast adding the industrial allowance to the baseline and regional demands.

As shown in Table 7-2, existing source capacities are capable of meeting maximum day demands in the baseline forecast currently and through the ten-year planning horizon. Sources become inadequate in the 20-year planning horizon by several hundred gallons per day. In the forecasts incorporating regional wholesale demands and industrial allowance, sources become inadequate by the 10-year planning horizon.

Based on this approach, the analysis indicates that development of additional sources should take place within the next 10 years. The timing of additional source development could be linked to activation of regional wholesale deliveries and expected activation of new large industrial customers. As previously noted, the City has begun such efforts related to the Skookumchuck River water rights. The City plans to make use of these newly acquired water rights to expand overall groundwater production. These plans are further described in the capital improvement program (Chapter 13).

Figures 7-1 and 7-2 graphically display the relationship between the three demand scenarios, current available source, and total water rights for average day and max day demands, respectively.

Table 7-2. Source Capacity for the Full System

	Year				
	2021	2031	2041	2071	Max ⁽⁵⁾
Available Source: 24-hour Pumping (gpd)					
Fords Prairie & Eshom Wells (2,200 gpm)	3,168,000	3,168,000	3,168,000	3,168,000	3,168,000
Tennis Court Well No. 1 (600 gpm)	864,000	864,000	864,000	864,000	864,000
Tennis Court Well No. 2 (1,200 gpm)	1,728,000	1,728,000	1,728,000	1,728,000	1,728,000
Washington Well (1,000 gpm) ⁽¹⁾	0	0	0	0	0
K Street Well (750 gpm) ⁽²⁾	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000
Riverside Well (inactive) ⁽³⁾	0	0	0	0	0
Total Available Source (gpd)	6,840,000	6,840,000	6,840,000	6,840,000	6,840,000
Total Available Source, Largest Offline (gpd)	5,112,000	5,112,000	5,112,000	5,112,000	5,112,000
Available Source: 20-hour Pumping (gpd)					
Fords Prairie & Eshom Wells (2,200 gpm)	2,640,000	2,640,000	2,640,000	2,640,000	2,640,000
Tennis Court Well No. 1 (605 gpm)	720,000	720,000	720,000	720,000	720,000
Tennis Court Well No. 2 (1,200 gpm)	1,440,000	1,440,000	1,440,000	1,440,000	1,440,000
Washington Well (1,000 gpm) ⁽¹⁾	0	0	0	0	0
K Street Well (750 gpm) ⁽²⁾	900,000	900,000	900,000	900,000	900,000
Riverside Well (inactive) ⁽³⁾	0	0	0	0	0
Total Available Source (gpd)	5,700,000	5,700,000	5,700,000	5,700,000	5,700,000
Total Available Source, Largest Offline (gpd)	4,176,000	4,176,000	4,176,000	4,176,000	4,176,000
Baseline Demands					
Projected ERUs and Demand ⁽⁴⁾					
Equivalent Residential Units (ERU's)	14,382	17,537	22,309	32,775	20,295
Average Day Demand (gpd)	2,195,214	2,676,837	3,405,169	5,002,732	3,097,826
Maximum Day Demand (gpd)	4,039,195	4,925,380	6,265,510	9,205,026	5,700,000
Fire Flow Requirement (gpd)	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000
Capacity Analysis Surplus/(Deficiency)					
MDD - 24 hr capacity	2,800,805	1,914,620	574,490	(2,365,026)	1,140,000
MDD - 20 hr capacity	1,660,805	774,620	(565,510)	(3,505,026)	0
ADD with Largest Source Offline - 20 hr capacity	1,080,786	599,163	(129,169)	(1,726,732)	178,174
Fire Storage Replenishment During MDD - 24 hr capacity	2,300,805	1,414,620	74,490	(2,865,026)	640,000
Baseline + Regional Wholesale					
Projected ERUs and Demand ⁽⁴⁾					
Equivalent Residential Units (ERU's)	14,382	28,219	41,963	52,429	20,295
Average Day Demand (gpd)	2,195,214	4,307,272	6,405,169	8,002,732	3,097,826
Maximum Day Demand (gpd)	4,039,195	7,925,380	11,785,510	14,725,026	5,700,000
Capacity Analysis Surplus/(Deficiency)					
MDD - 24 hr capacity	2,800,805	(1,085,380)	(4,945,510)	(7,885,026)	1,140,000
MDD - 20 hr capacity	1,660,805	(2,225,380)	(6,085,510)	(9,025,026)	0
ADD with Largest Source Offline - 20 hr capacity	1,080,786	(1,031,272)	(3,129,169)	(4,726,732)	178,174
Fire Storage Replenishment During MDD - 24 hr capacity	2,300,805	(1,585,380)	(5,445,510)	(8,385,026)	640,000
Baseline + Regional Wholesale + Industrial Allowance					
Projected ERUs and Demand ⁽⁴⁾					
Equivalent Residential Units (ERU's)	14,382	34,770	55,065	85,186	20,295
Average Day Demand (gpd)	2,195,214	5,307,272	8,405,169	13,002,732	3,097,826
Maximum Day Demand (gpd)	4,039,195	9,765,380	15,465,510	23,925,026	5,700,000
Capacity Analysis Surplus/(Deficiency)					
MDD - 24 hr capacity	2,800,805	(2,925,380)	(8,625,510)	(17,085,026)	1,140,000
MDD - 20 hr capacity	1,660,805	(4,065,380)	(9,765,510)	(18,225,026)	0
ADD with Largest Source Offline - 20 hr capacity	1,080,786	(2,031,272)	(5,129,169)	(9,726,732)	178,174
Fire Storage Replenishment During MDD - 24 hr capacity	2,300,805	(3,425,380)	(9,125,510)	(17,585,026)	640,000
Notes:					
1. Washington Well is an emergency source and is not available for maximum day demand.					
2. K Street Well is a seasonal source and is available during periods of peak demand.					
3. Riverside Well is inactive and the source is unavailable.					
4. Projected ERUs and demand forecasts taken from Demand Forecast Summary table.					
5. Maximum ERUs to be served with current sources based on limiting factor of capacity analysis.					

Figure 7-1. Annual Source Capacity Analysis

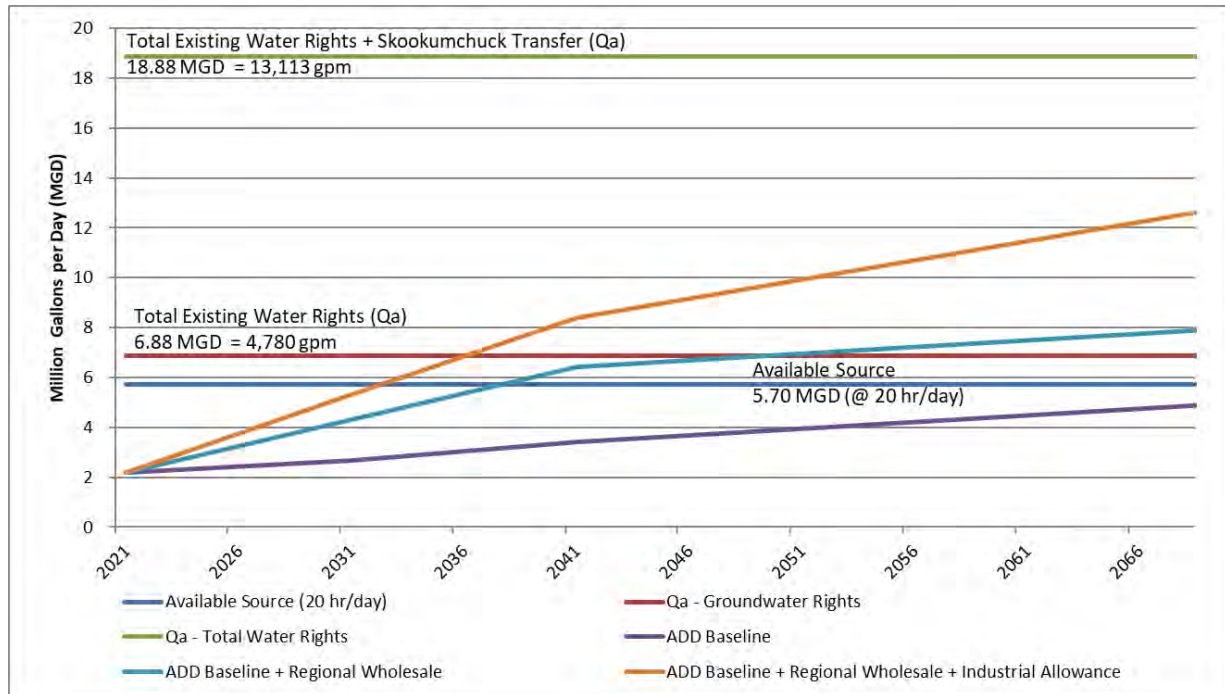
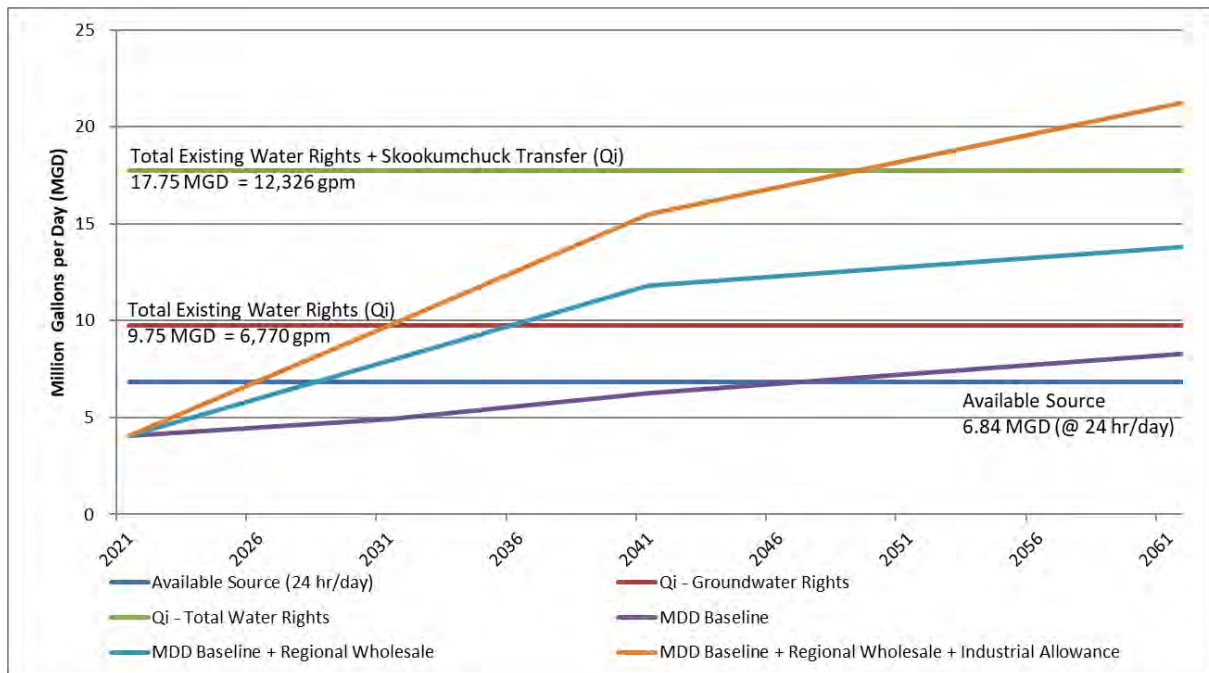


Figure 7-2. Instantaneous Source Capacity Analysis



7.2.2 Cooks Hill Pressure Zone

Table 7-3 presents the source capacity analysis for the Cooks Hill Pressure Zone. The existing pump station is deficient in its ability to meet projected 2041 water demands, due to the significant amount of growth planned for in the Cooks Hill area. The supply deficiency of approximately 124,000 gpd (MDD at 20-hour source capacity) in 2041 could be addressed by increasing the capacity of the pump station. The capital improvement program (see Chapter 13) includes a project meeting this need.

Table 7-3. Evaluation of Source Adequacy for Cooks Hill

	Year			
	2021	2031	2041	Max ⁽²⁾
Projected ERUs and Demand⁽¹⁾				
MDD Equivalent Residential Units (ERU's)	254	699	1,680	1,140
Average Day	38,773	106,648	256,409	174,000
Maximum Day	71,342	196,232	471,793	320,160
Fire Storage Requirement (1,000 gpm for 2 hours)	120,000	120,000	120,000	120,000
Available Source: 24 hour pumping (gpd)				
Cooks Hill Pump 1 (145 gpm)	208,800	208,800	208,800	208,800
Cooks Hill Pump 2 (145 gpm)	208,800	208,800	208,800	208,800
Total Available Source (gpd)	417,600	417,600	417,600	417,600
Total Available Source, Largest Offline (gpd)	208,800	208,800	208,800	208,800
Available Source: 20 hour pumping (gpd)				
Cooks Hill Pump 1 (145 gpm)	174,000	174,000	174,000	174,000
Cooks Hill Pump 2 (145 gpm)	174,000	174,000	174,000	174,000
Total Available Source (gpd)	348,000	348,000	348,000	348,000
Total Available Source, Largest Offline (gpd)	174,000	174,000	174,000	174,000
Capacity Analysis Surplus/(Deficiency)				
MDD - 24 hr capacity	346,258	221,368	(54,193)	97,440
MDD - 20 hr capacity	276,658	151,768	(123,793)	27,840
ADD with Largest Source Offline - 20 hr capacity	135,227	67,352	(82,409)	0
Fire Storage Replenishment During MDD - 24 hr capaci	306,258	181,368	(94,193)	57,440
Notes:				
1. Projected ERUs and demand forecasts taken from Zone Demand Forecast.				
2. Maximum ERUs to be served with current sources based on limiting factor of capacity analysis.				

7.2.3 Ham Hill Pressure Zone

Table 7-4 presents the source capacity analysis for the Ham Hill Pressure Zone. As indicated in the table, the Ham Hill Booster Pump Station is capable of meeting water demands in this pressure zone beyond the 20-year time frame.

Table 7-4. Evaluation of Source Adequacy for Ham Hill

	Year			
	2021	2031	2041	Max ⁽²⁾
Projected ERUs and Demand ⁽¹⁾				
MDD Equivalent Residential Units (ERU's)	85	94	101	708
Average Day	12,924	14,335	15,396	108,000
Maximum Day	23,781	26,377	28,328	198,720
Fire Storage Requirement (1,000 gpm for 2 hours)	120,000	120,000	120,000	120,000
<i>Available Source: 24 hour pumping (gpd)</i>				
Ham Hill BPS Pump 1 (90 gpm)	129,600	129,600	129,600	129,600
Ham Hill BPS Pump 2 (90 gpm)	129,600	129,600	129,600	129,600
Total Available Source (gpd)	259,200	259,200	259,200	259,200
Total Available Source, Largest Offline (gpd)	129,600	129,600	129,600	129,600
<i>Available Source: 20 hour pumping (gpd)</i>				
Ham Hill BPS Pump 1 (90 gpm)	108,000	108,000	108,000	108,000
Ham Hill BPS Pump 2 (90 gpm)	108,000	108,000	108,000	108,000
Total Available Source (gpd)	216,000	216,000	216,000	216,000
Total Available Source, Largest Offline (gpd)	108,000	108,000	108,000	108,000
Capacity Analysis Surplus/(Deficiency)				
MDD - 24 hr capacity	235,419	232,823	230,872	60,480
MDD - 20 hr capacity	192,219	189,623	187,672	17,280
ADD with Largest Source Offline - 20 hr capacity	95,076	93,665	92,604	0
Fire Storage Replenishment During MDD - 24 hr capacity	195,419	192,823	190,872	20,480
Notes:				
1. Projected ERUs and demand forecasts taken from Zone Demand Forecast.				
2. Maximum ERUs to be served with current sources based on limiting factor of capacity analysis.				

7.2.4 Davis Hill Pressure Zone

Being a “closed” pressure zone, the sources for the Davis Hill Pressure Zone must be sufficient to meet peak hour demands (PHD).

As indicated in Table 7-5, the Davis Hill Booster Pump Station is deficient in its ability to meet projected 2031 peak hour water demands due to the significant amount of growth potential in the Davis Hill area. The supply deficiencies could be addressed by an upgrade of the pump station. The capital improvement program (see Chapter 13) includes a project meeting this need. The planned project would not only address the supply deficiency, but would also allow for reconfiguring of the pump station to accommodate a potential future Upper Davis Hill Reservoir if needed, to which it would then pump.

Table 7-5. Evaluation of Source Adequacy for Davis Hill

	Year			
	2021	2031	2041	Max ⁽³⁾
Projected ERUs and Demand⁽¹⁾				
MDD Equivalent Residential Units (ERU's)	56	271	756	307
Average Day (gpd)	8,616	41,378	115,375	46,791
Maximum Day (gpd)	15,854	76,136	212,290	86,096
Fire Flow Requirement (1,000 gpm for 2 hours)	120,000	120,000	120,000	120,000
Peak Hour (gpm) ⁽²⁾	50	138	298	150
Available Source: 24 hour pumping (gpd)				
Davis Hill Pump 1 (50 gpm)	72,000	72,000	72,000	72,000
Davis Hill Pump 2 (50 gpm)	72,000	72,000	72,000	72,000
Davis Hill Pump 3 (50 gpm)	72,000	72,000	72,000	72,000
Total Available Source (gpd)	216,000	216,000	216,000	216,000
Total Available Source, Largest Offline (gpd)	144,000	144,000	144,000	144,000
Total Available Source, Largest Offline (gpm)	100	100	100	100
Available Source: 20 hour pumping (gpd)				
Davis Hill Pump 1 (50 gpm)	60,000	60,000	60,000	60,000
Davis Hill Pump 2 (50 gpm)	60,000	60,000	60,000	60,000
Davis Hill Pump 3 (50 gpm)	60,000	60,000	60,000	60,000
Total Available Source (gpd)	180,000	180,000	180,000	180,000
Total Available Source, Largest Offline (gpd)	120,000	120,000	120,000	120,000
Capacity Analysis Surplus/(Deficiency)				
PHD with all Pumps Online (gpm)	100	12	(148)	0
PHD with Largest Pump Offline (gpm)	50	(38)	(198)	(50)
Notes:				
1. Projected ERUs and demand forecasts taken from Zone Demand Forecast.				
2. PHD : (Maximum Day Demand per ERU / 1440) * [(C) * (N) + F]				
(C & F values obtained from Table 5-1 in DOH Oct. 2019 WSDM)				
3. Maximum ERUs to be served with current sources based on limiting factor of capacity analysis.				

7.2.5 Zenkner Valley Pressure Zone

Table 7-6 presents the source capacity analysis for the Zenkner Valley Pressure Zone, a “closed” pressure zone. As indicated in the table, the Zenkner Valley Booster Pump Station is deficient in its ability to meet projected peak hour water demands with the largest source offline in this pressure zone throughout the planning period. The supply deficiency of approximately 50 gpm could be addressed by an upgrade of the pump station. The capital improvement program (see Chapter 13) includes a project to upgrade this pump station. Similar to the situation at Upper Davis Hill, this project would allow for reconfiguring of the pump station to accommodate a potential future Zenkner Valley Reservoir.

Table 7-6. Evaluation of Source Adequacy for Zenkner Valley

	Year			
	2021	2031	2041	Max ⁽³⁾
Projected ERUs and Demand⁽¹⁾				
MDD Equivalent Residential Units (ERU's)	71	78	84	158
Average Day (gpd)	10,770	11,946	12,830	24,143
Maximum Day (gpd)	19,817	21,981	23,607	44,423
Fire Flow Requirement (1,000 gpm for 2 hours)	120,000	120,000	120,000	120,000
Peak Hour (gpm) ⁽²⁾	57	61	64	100
Available Source: 24 hour pumping (gpd)				
Zenkner Pump 1 (50 gpm)	72,000	72,000	72,000	72,000
Zenkner Pump 2 (50 gpm)	72,000	72,000	72,000	72,000
Total Available Source (gpd)	144,000	144,000	144,000	144,000
Total Available Source, Largest Offline (gpd)	72,000	72,000	72,000	72,000
Total Available Source, Largest Offline (gpm)	50	50	50	50
Available Source: 20 hour pumping (gpd)				
Zenkner Pump 1 (50 gpm)	60,000	60,000	60,000	60,000
Zenkner Pump 2 (50 gpm)	60,000	60,000	60,000	60,000
Total Available Source (gpd)	120,000	120,000	120,000	120,000
Total Available Source, Largest Offline (gpd)	60,000	60,000	60,000	60,000
Capacity Analysis Surplus/(Deficiency)				
PHD with all Pumps Online (gpm)	43	39	36	0
PHD with Largest Source Offline (gpm)	(7)	(11)	(14)	(50)
Notes:				
1. Projected ERUs and demand forecasts taken from Zone Demand Forecast.				
2. PHD : (Maximum Day Demand per ERU / 1440) * [(C) * (N) + F]				
(C & F values obtained from Table 5-1 in DOH Oct. 2019 WSDM)				
3. Maximum ERUs to be served with current sources based on limiting factor of capacity analysis.				

7.2.6 Winterwood Estates Pressure Zone

Table 7-7 presents the source capacity analysis for the Winterwood Estates Pressure Zone, a “closed” pressure zone (meaning the analysis evaluates peak hour pumping capacity). As indicated in the table, the Winterwood Estates Booster Pump Station is capable of meeting water demands in this pressure zone beyond the 20-year time frame.

Table 7-7. Evaluation of Source Adequacy for Winterwood Estates

	Year			
	2021	2031	2041	Max ⁽³⁾
Projected ERUs and Demand ⁽¹⁾				
MDD Equivalent Residential Units (ERU's)	71	78	84	734
Average Day (gpd)	10,770	11,946	12,830	112,009
Maximum Day (gpd)	19,817	21,981	23,607	206,096
Fire Flow Requirement (1,000 gpm for 2 hours)	120,000	120,000	120,000	120,000
Peak Hour (gpm) ⁽²⁾	57	61	64	300
<i>Available Source: 24 hour pumping (gpd)</i>				
Winterwood Pump 1 (150 gpm)	216,000	216,000	216,000	216,000
Winterwood Pump 2 (150 gpm)	216,000	216,000	216,000	216,000
Total Available Source (gpd)	432,000	432,000	432,000	432,000
Total Available Source, Largest Offline (gpd)	216,000	216,000	216,000	216,000
Total Available Source, Largest Offline (gpm)	150	150	150	150
<i>Available Source: 20 hour pumping (gpd)</i>				
Winterwood Pump 1 (150 gpm)	180,000	180,000	180,000	180,000
Winterwood Pump 2 (150 gpm)	180,000	180,000	180,000	180,000
Total Available Source (gpd)	360,000	360,000	360,000	360,000
Total Available Source, Largest Offline (gpd)	180,000	180,000	180,000	180,000
Capacity Analysis Surplus/(Deficiency)				
PHD with all Pumps Online (gpm)	243	239	236	0
PHD with Largest Source Offline (gpm)	93	89	86	(150)
Notes:				
1. Projected ERUs and demand forecasts taken from Zone Demand Forecast.				
2. PHD : (Maximum Day Demand per ERU / 1440) * [(C) * (N) + F] + 18				
(C & F values obtained from Table 5-1 in DOH Oct. 2019 WSDM)				
3. Maximum ERUs to be served with current sources based on limiting factor of capacity analysis.				

7.2.7 Seminary Hill Pressure Zone

Table 7-8 presents the source analysis for the Seminary Hill Pressure Zone, a “closed” pressure zone. As indicated in the table, the Seminary Hill Booster Pump Station is capable of meeting water demands in this pressure zone beyond the 20-year time frame.

Table 7-8. Evaluation of Source Adequacy for Seminary Hill

	Year			
	2021	2031	2041	Max ⁽³⁾
Projected ERUs and Demand ⁽¹⁾				
MDD Equivalent Residential Units (ERU's)	155	172	185	1,404
Average Day (gpd)	23,694	26,281	28,225	214,296
Maximum Day (gpd)	43,598	48,357	51,934	394,305
Fire Flow Requirement (1,000 gpm for 2 hours)	120,000	120,000	120,000	120,000
Peak Hour (gpm) ⁽²⁾	93	100	105	500
Available Source: 24 hour pumping (gpd) ⁽²⁾				
Seminary Pump 1 (250 gpm)	360,000	360,000	360,000	360,000
Seminary Pump 2 (250 gpm)	360,000	360,000	360,000	360,000
Total Available Source (gpd)	720,000	720,000	720,000	720,000
Total Available Source, Largest Offline (gpd)	360,000	360,000	360,000	360,000
Total Available Source, Largest Offline (gpm)	250	250	250	250
Available Source: 20 hour pumping (gpd) ⁽²⁾				
Seminary Pump 1 (250 gpm)	300,000	300,000	300,000	300,000
Seminary Pump 2 (250 gpm)	300,000	300,000	300,000	300,000
Total Available Source (gpd)	600,000	600,000	600,000	600,000
Total Available Source, Largest Offline (gpd)	300,000	300,000	300,000	300,000
Capacity Analysis Surplus/Deficiency				
PHD with all Pumps Online (gpm)	407	400	395	0
PHD with Largest Source Offline (gpm)	157	150	145	(250)
Notes:				
1. Projected ERUs and demand forecasts taken from Zone Demand Forecast.				
2. PHD : (Maximum Day Demand per ERU / 1440) * [(C) * (N) + F] + 18				
(C & F values obtained from Table 5-1 in DOH Oct. 2019 WSDM)				
3. Maximum ERUs to be served with current sources based on limiting factor of capacity analysis.				

7.2.8 Future Widgeon Hill Pressure Zone

Widgeon Hill is an undeveloped area located to the south of the City. Widgeon Hill was recently moved into the City of Chehalis' UGA, but Centralia continues to consider the source demands of a potential Widgeon Hill pressure zone since the area remains in Centralia's retail service area. Provision of water service to this area will require a new pump station and reservoir. Table 7-9 presents the source capacity analysis for the Widgeon Hill Pressure Zone. A 320 gpm pump station (two pumps at 160 gpm) would be required to meet this zone's forecasted demands in 2041.

Table 7-9. Evaluation of Source Adequacy for Future Widgeon Hill Pressure Zone

	Year			
	2021	2031	2041	Max ⁽²⁾
Projected ERUs and Demand ⁽¹⁾				
MDD Equivalent Residential Units (ERU's)	0	372	1,230	1,258
Average Day	0	56,824	187,698	192,000
Maximum Day	0	104,556	345,365	353,280
Fire Storage Requirement (1,000 gpm for 2 hours)	0	120,000	120,000	120,000
Available Source: 24 hour pumping (gpd)				
Widgeon Hill Pump 1 (160 gpm)	0	230,400	230,400	230,400
Widgeon Hill Pump 2 (160 gpm)	0	230,400	230,400	230,400
Total Available Source (gpd)	0	460,800	460,800	460,800
Total Available Source, Largest Offline (gpd)	0	230,400	230,400	230,400
Available Source: 20 hour pumping (gpd)				
Widgeon Hill Pump 1 (160 gpm)	0	192,000	192,000	192,000
Widgeon Hill Pump 2 (160 gpm)	0	192,000	192,000	192,000
Total Available Source (gpd)	0	384,000	384,000	384,000
Total Available Source, Largest Offline (gpd)	0	192,000	192,000	192,000
Capacity Analysis Surplus/(Deficiency)				
MDD - 24 hr capacity	0	356,244	115,435	107,520
MDD - 20 hr capacity	0	279,444	38,635	30,720
ADD with Largest Source Offline - 20 hr capacity	0	135,176	4,302	0
Fire Storage Replenishment During MDD - 24 hr capacity	0	316,244	75,435	67,520
Notes:				
1. Projected ERUs and demand forecasts taken from Zone Demand Forecast.				
2. Maximum ERUs to be served with current sources based on limiting factor of capacity analysis.				

7.3 Interties

The City of Centralia has an emergency intertie with the City of Chehalis. As noted in section 7.1.3, this intertie is likely to be converted into a wholesale supply intertie to the City of Chehalis within the next few years. Centralia maintains no other interties with adjacent utilities.

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8. Storage Capacity Analysis

This section presents a capacity analysis of the City of Centralia's (City) water storage facilities. Adequacy of the existing facilities is first examined, followed by recommendations for future storage improvements.

8.1 Evaluation of Existing Storage Facilities

The design standards for storage facilities presented in Section 6 were used to analyze the adequacy of the City's existing reservoirs for each pressure zone where storage is currently provided. The ERU and demand forecasts utilized for these analyses are the same as those used for the source capacity analyses presented in Section 7.

It is important to note what potential regional wholesale demands are not factored into these storage capacity analyses, as it is assumed that storage will be provided by the utilities receiving wholesale supply (i.e., Centralia will not be responsible for providing fire suppression or standby storage to wholesale customers).

8.1.1 Central Zone

The Davis Hill and Seminary Hill reservoirs presently provide 7.0 million gallons (MG) of storage to the Central Zone. As depicted in Table 8-1, this is more than sufficient to meet the storage needs of this zone within the ten-year time horizon. If the industrial allowance is not considered, existing storage capacities remain sufficient to provide needed volumes beyond 2041.

However, considering the additional demands represented by the industrial allowance, there is a storage deficiency of approximately 1.7 MG in this zone by 2041. Some projects listed in the City's capital improvement program address a portion of this potential deficiency by connecting the Central Zone to some of the higher pressure zones via pressure reducing valves. This will make the storage in these upper zones available to the Central Zone, allowing the noted deficiency to be partially corrected. Table 8-2 presents the revised Central Zone storage analysis, with the incorporation of Cooks Hill, Zenkner Hill, and Widgeon Hill reservoir storage volumes.

It is also noted that the deficiency associated with the industrial allowance identified in Tables 8-1 and 8-2 is due solely to the additional standby storage demands imposed by potential future large industrial use. The assumptions used in defining these standby needs are the same as those used for calculating standby storage requirements for the rest of the City's system. Standby requirements exerted on the City's system may be less than assumed here if a particular industry has lower standby needs or can meet its own requirements through self-provided (i.e., on-site) storage. Such reductions in potential City system standby needs should be examined prior to development of additional storage facilities to meet future industrial needs.

Table 8-1. Evaluation of Storage Adequacy for Central Zone (Considering Davis Hill and Seminary Hill Reservoirs Only)

	Year			
	2021	2031	2041	Max - 20 year horizon ⁽¹¹⁾
Projected ERUs and Demand⁽¹⁾				
Retail Service Area - Baseline Demand				
Equivalent Residential Units (ERU's)	14,043	16,744	20,528	23,474
Average Day Demand (gpd)	2,143,517	2,555,854	3,133,364	3,583,054
Maximum Day Demand (gpd)	3,944,072	4,702,771	5,765,390	6,592,820
ADD - Industrial Allowance (gpd)	0	1,000,000	2,000,000	2,000,000
MDD - Industrial Allowance (gpm)	0	694	1,389	3,472
PHD (gpm)	4,444	5,982	7,857	10,859
Available Source (gpd)⁽²⁾				
Existing				
Fords Prairie and Eshom (2,220 gpm)	2,664,000	2,664,000	2,664,000	2,664,000
Tennis Court Well No. 1 (600 gpm)	720,000	720,000	720,000	720,000
Tennis Court Well No. 2 (1,200 gpm)	1,440,000	1,440,000	1,440,000	1,440,000
K Street Well (750 gpm) - Seasonal	900,000	900,000	900,000	900,000
Washington Well (1,000 gpm) - Emergency	0	0	0	0
Total Available Source (gpd)	5,724,000	5,724,000	5,724,000	5,724,000
Multi-Source Credit (gpd) ⁽³⁾	4,200,000	4,200,000	4,200,000	4,200,000
Required Storage Calculations				
Operational Storage (gal) ⁽⁴⁾	1,272,539	1,272,539	1,272,539	1,272,539
Equalizing Storage (gal) ⁽⁵⁾	70,378	300,994	582,264	1,032,669
Fire Flow Storage (gal) ⁽⁶⁾	1,500,000	1,500,000	1,500,000	1,500,000
Standby Storage - No Industrial Allowance (gal) ⁽⁷⁾	2,808,600	3,348,875	4,105,573	4,694,792
Standby Storage - Includes Industrial Allowance (gal) ⁽⁷⁾	2,808,600	4,659,151	6,726,126	7,315,344
Required Storage				
Greater than 30 psi at highest meter (gal) ⁽⁸⁾	1,342,917	1,573,534	1,854,803	2,305,208
Greater than 20 psi at highest meter - No Industrial Allowance (gal) ⁽⁹⁾	4,151,517	4,922,408	5,960,376	7,000,000
Greater than 20 psi at highest meter - With Industrial Allowance (gal) ⁽⁹⁾	4,151,517	6,232,685	8,580,929	9,620,553
Existing Storage Greater Than 30 psi (gal)⁽¹⁰⁾				
Davis Hill	4,500,000	4,500,000	4,500,000	4,500,000
Seminary Hill	2,500,000	2,500,000	2,500,000	2,500,000
Total Existing Storage at 30 psi (gal)	7,000,000	7,000,000	7,000,000	7,000,000
Storage Surplus/(Deficiency) at 30 psi (gal)	5,657,083	5,426,466	5,145,197	4,694,792
Existing Storage Greater Than 20 psi (gal)⁽¹⁰⁾				
Davis Hill	4,500,000	4,500,000	4,500,000	4,500,000
Seminary Hill	2,500,000	2,500,000	2,500,000	2,500,000
Total Existing Storage at 20 psi (gal)	7,000,000	7,000,000	7,000,000	7,000,000
Storage Surplus/(Deficiency) at 20 psi - No Industrial Allowance (gal)	2,848,483	2,077,592	1,039,624	0
Storage Surplus/(Deficiency) at 20 psi - With Industrial Allowance (gal)	2,848,483	767,315	(1,580,929)	(2,620,553)
Notes:				
(1) Projected demands taken from Chapter 3. ERUs calculated as Average Day Demand / ERU water use factor (153 gpd/ERU).				
(2) Available source assumes source pumps are on for 20 hours in a day, at the maximum production rate.				
(3) Multi-source credit assumes largest source is out of service.				
(4) Required operational storage is based on observed tanks levels fluctuations of 3.4 feet.				
(5) Required Equalizing Storage is equal to [(PHD - Total Available Source) x 150 minutes] .				
PHD : (Maximum Day Demand per ERU / 1440) * [(C) * (N) + F] + 18				
(C & F values obtained from Table 5-1 in DOH Dec 2009 WSDM)				
(6) Required Fire Flow Storage = 5,000 gpm x 5 hours.				
(7) Required Standby Storage is the greater of (2* ADD less multi-source credit) or (200 gallons per ERU).				
(8) Total required storage greater than 30 psi is equal to the total of operational and equalizing storage.				
(9) Total required storage greater than 20 psi is equal to the total of operational, equalizing, and the greater of either standby or fire flow storage.				
(10) The storage volume available in existing reservoirs at 30 and 20 psi is based on the elevation of the highest customer (~320 ft).				
(11) Maximum ERUs served by Available Storage located solely in the Central Zone.				

**Table 8-2. Evaluation of Storage Adequacy for Central Zone
(Considering PRV-Connections to Upper Pressure Zones)**

	Year			
	2021	2031	2041	Max - 20 year horizon ⁽¹¹⁾
Projected ERUs and Demand ⁽¹⁾				
Retail Service Area - Baseline Demand				
Equivalent Residential Units (ERU's)	14,297	17,443	22,208	26,571
Average Day Demand (gpd)	2,182,290	2,662,502	3,389,773	4,055,813
Maximum Day Demand (gpd)	4,015,414	4,899,003	6,237,182	7,462,696
ADD - Industrial Allowance (gpd)	0	1,000,000	2,000,000	2,000,000
MDD - Industrial Allowance (gpm)	0	694	1,389	3,472
PHD (gpm)	4,523	6,200	8,381	11,826
Available Source (gpd) ⁽²⁾				
Existing				
Fords Prairie and Eshom (2,220 gpm)	2,664,000	2,664,000	2,664,000	2,664,000
Tennis Court Well No. 1 (600 gpm)	720,000	720,000	720,000	720,000
Tennis Court Well No. 2 (1,200 gpm)	1,440,000	1,440,000	1,440,000	1,440,000
K Street Well (750 gpm) - Seasonal	900,000	900,000	900,000	900,000
Washington Well (1,000 gpm) - Emergency	0	0	0	0
Total Available Source (gpd)	5,724,000	5,724,000	5,724,000	5,724,000
Multi-Source Credit (gpd) ⁽³⁾	4,200,000	4,200,000	4,200,000	4,200,000
Required Storage Calculations				
Operational Storage (gal) ⁽⁴⁾	1,390,413	1,390,413	1,390,413	1,390,413
Equalizing Storage (gal) ⁽⁵⁾	82,268	333,700	660,896	1,177,649
Fire Flow Storage (gal) ⁽⁶⁾	1,500,000	1,500,000	1,500,000	1,500,000
Standby Storage - No Industrial Allowance (gal) ⁽⁷⁾	2,859,403	3,488,613	4,441,540	5,314,236
Standby Storage - Includes Industrial Allowance (gal) ⁽⁷⁾	2,859,403	4,798,890	7,062,092	7,934,789
Required Storage				
Greater than 30 psi at highest meter (gal) ⁽⁸⁾	1,472,681	1,724,113	2,051,310	2,568,062
Greater than 20 psi at highest meter - No Industrial Allowance (gal) ⁽⁹⁾	4,332,085	5,212,726	6,492,849	7,882,298
Greater than 20 psi at highest meter - With Industrial Allowance (gal) ⁽⁹⁾	4,332,085	6,523,003	9,113,402	10,502,851
Existing Storage Greater Than 30 psi (gal) ⁽¹⁰⁾				
Davis Hill	4,500,000	4,500,000	4,500,000	4,500,000
Seminary Hill	2,500,000	2,500,000	2,500,000	2,500,000
Zenkner Reservoir	0	0	148,077	148,077
Cooks Hill Reservoir	0	262,352	262,352	262,352
Widgeon Hill Reservoir	0	107,692	107,692	107,692
Total Existing Storage at 30 psi (gal)	7,000,000	7,370,044	7,518,121	7,518,121
Storage Surplus/(Deficiency) at 30 psi (gal)	5,527,319	5,645,931	5,466,812	4,950,059
Existing Storage Greater Than 20 psi (gal) ⁽¹⁰⁾				
Davis Hill	4,500,000	4,500,000	4,500,000	4,500,000
Seminary Hill	2,500,000	2,500,000	2,500,000	2,500,000
Zenkner Reservoir	0	0	175,000	175,000
Cooks Hill Reservoir	0	407,298	407,298	407,298
Widgeon Hill Reservoir	0	300,000	300,000	300,000
Total Existing Storage at 20 psi (gal)	7,000,000	7,707,298	7,882,298	7,882,298
Storage Surplus/(Deficiency) at 20 psi - No Industrial Allowance (gal)	2,667,915	2,494,572	1,389,449	0
Storage Surplus/(Deficiency) at 20 psi - With Industrial Allowance (gal)	2,667,915	1,184,295	(1,231,104)	(2,620,553)
Notes:				
(1) Projected demands taken from Chapter 3. ERUs calculated as Average Day Demand / ERU water use factor (153 gpd/ERU).				
(2) Available source assumes source pumps are on for 20 hours in a day, at the maximum production rate.				
(3) Multi-source credit assumes largest source is out of service.				
(4) Required operational storage is based on observed tanks levels fluctuations of 3.4 feet.				
(5) Required Equalizing Storage is equal to [(PHD - Total Available Source) x 150 minutes] .				
PHD : (Maximum Day Demand per ERU / 1440) * [(C) * (N) + F] + 18				
(C & F values obtained from Table 5-1 in DOH Dec 2009 WSDM)				
(6) Required Fire Flow Storage = 5,000 gpm x 5 hours.				
(7) Required Standby Storage is the greater of (2*ADD less multi-source credit) or (200 gallons per ERU).				
(8) Total required storage greater than 30 psi is equal to the total of operational and equalizing storage.				
(9) Total required storage greater than 20 psi is equal to the total of operational, equalizing, and the greater of either standby or fire flow				
(10)				
The storage volume available in existing reservoirs at 30 and 20 psi is based on the elevation of the highest customer (~320 ft).				
(11) Maximum ERUs served by Available Storage located solely in the Central Zone.				

8.1.2 Cooks Hill

The Cooks Hill Reservoir provides 760,000 gallons of storage to the Cooks Hill Pressure Zone. As depicted in Table 8-3, this is more than sufficient to meet the storage needs of this zone within the ten-year time horizon. The slight deficiency that is depicted for the 20 psi requirement at the 20-year time horizon (2041) is based on increased standby storage needs. However, based on DOH regulations, storage volumes at elevations providing less than 20 psi to the highest service can be considered available to meet standby storage needs. There is sufficient volume (i.e., more than 350,000 gallons) of this type of storage (which is used to elevate fire flow and equalizing storage) to meet this stated 20 psi related “deficiency”. Adequate fire flow storage is available above 20 psi beyond the planning horizon. Therefore, there are no overall storage deficiencies in this zone.

Table 8-3. Evaluation of Storage Adequacy for Cooks Hill

	Year			
	2021	2031	2041	Max ⁽¹¹⁾
Projected ERUs and Demand ⁽¹⁾				
Retail Service Area				
Equivalent Residential Units (ERU's)	254	699	1,680	1,474
Average Day Demand (gpd)	38,773	106,648	256,409	225,049
Maximum Day Demand (gpd)	71,342	196,232	471,793	414,090
PHD (gpm)	132	280	586	522
Available Source (gpd) ⁽²⁾				
Existing				
Cooks Hill Pump 1 (145 gpm)	174,000	174,000	174,000	174,000
Cooks Hill Pump 2 (145 gpm)	174,000	174,000	174,000	174,000
Total Available Source (gpd)	348,000	348,000	348,000	348,000
Multi-Source Credit (gpd) ⁽³⁾	174,000	174,000	174,000	174,000
Required Storage Calculations				
Operational Storage (mg) ⁽⁴⁾	70,374	70,374	70,374	70,374
Equalizing Storage (mg) ⁽⁵⁾	0	5,738	51,665	42,048
Fire Flow Storage (mg) ⁽⁶⁾	120,000	120,000	120,000	120,000
Standby Storage (mg) ⁽⁷⁾	50,803	139,738	338,818	294,877
Required Storage				
Greater than 30 psi at highest meter (mg) ⁽⁸⁾	70,374	76,112	122,039	112,422
Greater than 20 psi at highest meter (mg) ⁽⁹⁾	190,374	215,850	460,857	407,298
Existing Storage Greater Than 30 psi (mg)⁽¹⁰⁾				
Cooks Hill	262,352	262,352	262,352	262,352
Total Existing Storage at 30 psi (mg)	262,352	262,352	262,352	262,352
Storage Surplus/(Deficiency) at 30 psi (mg)	191,978	186,240	140,314	149,931
Existing Storage Greater Than 20 psi (mg)⁽¹⁰⁾				
Cooks Hill	407,298	407,298	407,298	407,298
Total Existing Storage at 20 psi (mg)	407,298	407,298	407,298	407,298
Storage Surplus/(Deficiency) at 20 psi (mg) - Standby Storage	216,924	191,448	(53,558)	0
Storage Surplus/(Deficiency) at 20 psi (mg) - Fire Flow Storage	216,924	211,186	165,260	174,877
Notes:				
(1) Projected demands taken from Chapter 3. ERUs calculated as Average Day Demand / ERU water use factor (152 gpd/ERU).				
(2) Available source assumes source pumps are on for 20 hours in a day, at the maximum production rate.				
(3) Multi-source credit assumes largest source is out of service.				
(4) Required operational storage is based on observed tanks levels fluctuations of 11 feet.				
(5) Required Equalizing Storage is equal to [(PHD - Total Available Source) x 150 minutes] . PHD : (Maximum Day Demand per ERU / 1440) * [(C) * (N) + F] + 18 (C & F values obtained from Table 5-1 in DOH Dec 2009 WSDM)				
(6) Required Fire Flow Storage = 1,000 gpm x 2 hours.				
(7) Required Standby Storage is the greater of (2*ADD less multi-source credit) or (200 gallons per ERU).				
(8) Total required storage greater than 30 psi is equal to the total of operational and equalizing storage.				
(9) Total required storage greater than 20 psi is equal to the total of operational, equalizing and the greater of either standby or fire flow storage.				
(10) The storage volume available in existing reservoirs at 30 and 20 psi is based on the elevation of the highest customer (~420 ft).				
(11) Maximum ERUs served by Available Storage located solely in the Cooks Hill Zone.				

8.1.3 Ham Hill

Together, the two Ham Hill Reservoirs provide 760,000 gallons of storage to the Ham Hill Pressure Zone. As depicted in Table 8-4, this is more than sufficient to meet the storage needs of this zone within the 20-year time horizon. It should be noted that approximately half of the Ham Hill Reservoir storage is considered dead storage, as it serves to elevate the effective storage to appropriate elevations in the standpipes.

Table 5-2 notes that Ham Hill Tank 1 is currently not in use. Therefore, the analysis includes additional line items depicting surplus or deficiency considering Ham Hill Tank 1 offline. In this scenario, the Ham Hill zone has insufficient storage at 20 psi.

There is one service next to the reservoir at an elevation of approximately 480 feet. This service is excluded from the elevation-based calculations below so as not to trigger a 20 psi related deficiency in the reservoir.

Table 8-4. Evaluation of Storage Adequacy for Ham Hill

	Year			
	2021	2031	2041	Max ⁽¹¹⁾
Projected ERUs and Demand ⁽¹⁾				
Retail Service Area				
Equivalent Residential Units (ERU's)	85	94	101	555
Average Day Demand (gpd)	12,924	14,335	15,396	84,689
Maximum Day Demand (gpd)	23,781	26,377	28,328	155,828
PHD (gpm)	64	69	72	249
Available Source (gpd) ⁽²⁾				
Existing				
Ham Hill Pump 1 (100 gpm)	144,000	144,000	144,000	144,000
Ham Hill Pump 2 (100 gpm)	144,000	144,000	144,000	144,000
Total Available Source (gpd)	288,000	288,000	288,000	288,000
Multi-Source Credit (gpd) ⁽³⁾	144,000	144,000	144,000	144,000
Required Storage Calculations				
Operational Storage (gal) ⁽⁴⁾	38,351	38,351	38,351	38,351
Operational Storage - Ham Hill 1 Offline (gal) ⁽⁴⁾	34,121	34,121	34,121	34,121
Equalizing Storage (gal) ⁽⁵⁾	0	0	0	7,358
Fire Flow Storage (gal) ⁽⁶⁾	120,000	120,000	120,000	120,000
Standby Storage (gal) ⁽⁷⁾	16,934	18,783	20,172	110,966
Required Storage				
Greater than 30 psi at highest meter (gal) ⁽⁸⁾	38,351	38,351	38,351	45,709
Greater than 20 psi at highest meter (gal) ⁽⁹⁾	158,351	158,351	158,351	165,709
Existing Storage Greater Than 30 psi (gal)⁽¹⁰⁾				
Ham Hill 1	19,203	19,203	19,203	19,203
Ham Hill 2	63,095	63,095	63,095	63,095
Total Existing Storage at 30 psi (gal)	82,298	82,298	82,298	82,298
Storage Surplus/(Deficiency) at 30 psi (gal)	43,948	43,948	43,948	36,589
Storage Surplus/(Deficiency) at 30 psi (gal) - Ham Hill 1 Offline	20,515	20,515	20,515	13,157
Existing Storage Greater Than 20 psi (mg)⁽¹⁰⁾				
Ham Hill 1	38,665	38,665	38,665	38,665
Ham Hill 2	127,044	127,044	127,044	127,044
Total Existing Storage at 20 psi (mg)	165,709	165,709	165,709	165,709
Storage Surplus/(Deficiency) at 20 psi (mg)	7,358	7,358	7,358	0
Storage Surplus/(Deficiency) at 20 psi (gal) - Ham Hill 1 Offline	(27,077)	(27,077)	(27,077)	(34,436)
Existing Available Storage (mg)⁽¹⁰⁾				
Ham Hill 1	70,000	70,000	70,000	70,000
Ham Hill 2	230,000	230,000	230,000	230,000
Total Existing Storage at 20 psi (mg)	300,000	300,000	300,000	300,000
Storage Surplus/(Deficiency) at 0 psi (mg)	141,649	141,649	141,649	134,291
Storage Surplus/(Deficiency) at 0 psi (gal) - Ham Hill 1 Offline	67,420	67,420	67,420	60,061
Notes:				
(1) Projected demands taken from Chapter 3. ERUs calculated as Average Day Demand / ERU water use factor (153 gpd/ERU).				
(2) Available source assumes source pumps are on for 24 hours in a day, at the maximum production rate.				
(3) Multi-source credit assumes largest source is out of service.				
(4) Required operational storage is based on observed tanks levels fluctuations of 12 feet.				
(5) Required Equalizing Storage is equal to [(PHD - Total Available Source) x 150 minutes] .				
PHD : (Maximum Day Demand per ERU / 1440) * [(C) * (N) + F] + 18				
(C & F values obtained from Table 5-1 in DOH Dec 2009 WSDM)				
(6) Required Fire Flow Storage = 1,000 gpm x 2 hours.				
(7) Required Standby Storage is the greater of (2*ADD less multi-source credit) or (200 gallons per ERU).				
(8) Total required storage greater than 30 psi is equal to the total of operational and equalizing storage.				
(9) Total required storage greater than 20 psi is equal to the total of operational, equalizing, and the greater of either standby or fire flow storage.				
(10) The storage volume available in existing reservoirs at 30, 20, and 0 psi is based on the elevation of the highest customer (~460 ft).				
(11) Maximum ERUs served by Available Storage located solely in the Ham Hill Zone.				

8.2 Evaluation of Future Storage Facilities

As indicated in Section 8.1, the City's existing storage facilities provide sufficient volume to meet the needs associated with current and projected 20-year levels of water demand, with the possible exceptions noted relating to potential future large industrial growth.

However, it is also acknowledged that the City maintains some small “closed” pressure zones, for which there is no gravity storage currently provided. At the current levels of demand, these zones and their associated pump stations operate sufficiently to meet needs. But if significant development is proposed for these zones in the future, the City may elect to incorporate gravity storage in these areas, which include Upper Davis Hill, Zenkner Hill, and Upper Seminary Hill. Such reservoirs would serve primarily to meet growth needs, but would also bolster fire suppression reliability. Fire flow deficiencies that currently exist in some of the City's boosted zones are currently planned to be resolved through pipeline replacements and pump station upgrades. However, potential future reservoirs could also meet these needs. The sizing of such facilities to meet these needs is provided in the subsections that follow. At the end of this section, the preliminary sizing of a potential future reservoir to serve the Widgeon Hill area, a portion of the City's UGA that is presently undeveloped, is also provided.

It is important to note that these future reservoirs will likely be fully funded through developer contributions, as it will be significant development pressure that triggers their implementation.

8.2.1 Upper Davis Hill Reservoir

The Davis Hill Pressure Zone is unable to achieve required fire flows, as discussed in Section 9.6. While this is primarily a function of undersized distribution pipes, fire suppression reliability would also be enhanced with the addition of gravity water storage, thus eliminating the reliance upon fire pumps. Such storage would also serve additional growth in this area, which will likely be the primary trigger for implementation of storage in this zone.

The analysis assumes the reservoir would come online between the 10- and 20-year planning horizons. A storage reservoir with a volume of 250,000 gallons is sufficient to meet these needs, as shown in Table 8-5. This does not account for any dead storage, which may be required dependent upon final siting of the reservoir.

Table 8-5. Evaluation of Storage Adequacy for Upper Davis Hill

	Year			
	2021	2031	2041	Max ⁽¹¹⁾
Projected ERUs and Demand ⁽¹⁾				
Retail Service Area				
Equivalent Residential Units (ERU's)	56	271	756	935
Average Day Demand (gpd)	8,616	41,378	115,375	142,687
Maximum Day Demand (gpd)	15,854	76,136	212,290	262,545
PHD (gpm)	50	138	298	354
Available Source (gpd) ⁽²⁾				
Davis Hill Pump 1 (50 gpm)	72,000	72,000	72,000	72,000
Davis Hill Pump 2 (50 gpm)	72,000	72,000	72,000	72,000
Davis Hill Pump 3 (50 gpm)	72,000	72,000	72,000	72,000
Total Available Source (gpd)	216,000	216,000	216,000	216,000
Multi-Source Credit (gpd) ⁽³⁾	144,000	144,000	144,000	144,000
Required Storage Calculations				
Operational Storage (gal) ⁽⁴⁾	0	0	25,000	25,000
Equalizing Storage (gal) ⁽⁵⁾	0	0	29,664	38,040
Fire Flow Storage (gal) ⁽⁶⁾	0	0	120,000	120,000
Standby Storage (gal) ⁽⁷⁾	0	0	151,173	186,960
Required Storage				
Greater than 30 psi at highest meter (gal) ⁽⁸⁾	0	0	54,664	63,040
Greater than 20 psi at highest meter (gal) ⁽⁹⁾	0	0	205,837	250,000
Existing Storage Greater Than 30 psi (gal)⁽¹⁰⁾				
Upper Davis Reservoir	0	0	96,154	96,154
Total Existing Storage at 30 psi (gal)	0	0	96,154	96,154
Storage Surplus/(Deficiency) at 30 psi (gal)	0	0	41,490	33,114
Existing Storage Greater Than 20 psi (mg)⁽¹⁰⁾				
Upper Davis Reservoir	0	0	250,000	250,000
Total Existing Storage at 20 psi (mg)	0	0	250,000	250,000
Storage Surplus/(Deficiency) at 20 psi (mg)	0	0	44,163	0
Existing Available Storage (mg)⁽¹⁰⁾				
Upper Davis Reservoir	0	0	250,000	250,000
Total Existing Storage at 20 psi (mg)	0	0	250,000	250,000
Storage Surplus/(Deficiency) at 0 psi (mg)	0	0	44,163	0

Notes:

(1) Projected demands taken from Chapter 3. ERUs calculated as Average Day Demand / ERU water use factor (153 gpd/ERU).

(2) Available source assumes source pumps are on for 24 hours in a day, at the maximum production rate.

(3) Multi-source credit assumes largest source is out of service.

(4) Operational storage is estimated at 10% of reservoir volume.

(5) Required Equalizing Storage is equal to [(PHD - Total Available Source) x 150 minutes] .

PHD : (Maximum Day Demand per ERU / 1440) * [(C) * (N) + F] + 18

(C & F values obtained from Table 5-1 in DOH Dec 2009 WSDM)

(6) Required Fire Flow Storage = 1,000 gpm x 2 hours.

(7) Required Standby Storage is the greater of (2*ADD less multi-source credit) or (200 gallons per ERU).

(8) Total required storage greater than 30 psi is equal to the total of operational and equalizing storage.

(9) Total required storage greater than 20 psi is equal to the total of operational, equalizing, and the greater of either standby or fire flow storage.

(10) The storage volume available in existing reservoirs at 30, 20, and 0 psi is based on the elevation of the highest customer (~400 ft).

(11) Maximum ERUs served by Available Storage located solely in the Upper Davis Hill Zone.

8.2.2 Zenkner Hill Reservoir

Similar to Upper Davis Hill, portions of the Zenkner Valley Pressure Zone are unable to achieve required fire flows. While this is primarily a function of undersized distribution pipes, fire suppression reliability would also be enhanced with the addition of gravity water storage, thus eliminating the reliance upon fire pumps. Such storage would also serve additional growth in this area, which will likely be the primary trigger for implementation of storage in this zone.

A storage reservoir with a volume of 175,000 gallons is sufficient to meet these needs, as shown in Table 8-6. This does not account for any dead storage, which may be required dependent upon final siting of the reservoir.

Table 8-6. Evaluation of Storage Adequacy for Zenkner Hill

	Year			
	2021	2031	2041	Max ⁽¹¹⁾
Projected ERUs and Demand ⁽¹⁾				
Retail Service Area				
Equivalent Residential Units (ERU's)	71	78	84	661
Average Day Demand (gpd)	10,770	11,946	12,830	100,942
Maximum Day Demand (gpd)	19,817	21,981	23,607	185,733
PHD (gpm)	57	61	64	268
Available Source (gpd) ⁽²⁾				
Zenkner Pump 1 (50 gpm)	72,000	72,000	72,000	72,000
Zenkner Pump 2 (50 gpm)	72,000	72,000	72,000	72,000
Total Available Source (gpd)	144,000	144,000	144,000	144,000
Multi-Source Credit (gpd) ⁽³⁾	72,000	72,000	72,000	72,000
Required Storage Calculations				
Operational Storage (gal) ⁽⁴⁾	0	0	17,500	17,500
Equalizing Storage (gal) ⁽⁵⁾	0	0	0	25,238
Fire Flow Storage (gal) ⁽⁶⁾	0	0	120,000	120,000
Standby Storage (gal) ⁽⁷⁾	0	0	16,810	132,262
Required Storage				
Greater than 30 psi at highest meter (gal) ⁽⁸⁾	0	0	17,500	42,738
Greater than 20 psi at highest meter (gal) ⁽⁹⁾	0	0	137,500	175,000
Existing Storage Greater Than 30 psi (gal)⁽¹⁰⁾				
Zenkner Reservoir	0	0	148,077	148,077
Total Existing Storage at 30 psi (gal)	0	0	148,077	148,077
Storage Surplus/(Deficiency) at 30 psi (gal)	0	0	130,577	105,339
Existing Storage Greater Than 20 psi (mg)⁽¹⁰⁾				
Zenkner Reservoir	0	0	175,000	175,000
Total Existing Storage at 20 psi (mg)	0	0	175,000	175,000
Storage Surplus/(Deficiency) at 20 psi (mg)	0	0	37,500	0
Existing Available Storage (mg)⁽¹⁰⁾				
Zenkner Reservoir	0	0	175,000	175,000
Total Existing Storage at 20 psi (mg)	0	0	175,000	175,000
Storage Surplus/(Deficiency) at 0 psi (mg)	0	0	37,500	0
Notes:				
(1) Projected demands taken from Chapter 3. ERUs calculated as Average Day Demand / ERU water use factor (153 gpd/ERU).				
(2) Available source assumes source pumps are on for 24 hours in a day, at the maximum production rate.				
(3) Multi-source credit assumes largest source is out of service.				
(4) Operational storage is estimated at 10% of reservoir volume.				
(5) Required Equalizing Storage is equal to [(PHD - Total Available Source) x 150 minutes] .				
PHD : (Maximum Day Demand per ERU / 1440) * [(C) * (N) + F] + 18				
(C & F values obtained from Table 5-1 in DOH Dec 2009 WSDM)				
(6) Required Fire Flow Storage = 1,000 gpm x 2 hours.				
(7) Required Standby Storage is the greater of (2*ADD less multi-source credit) or (200 gallons per ERU).				
(8) Total required storage greater than 30 psi is equal to the total of operational and equalizing storage.				
(9) Total required storage greater than 20 psi is equal to the total of operational, equalizing, and the greater of either standby or fire flow storage.				
(10) The storage volume available in existing reservoirs at 30, 20, and 0 psi is based on the elevation of the highest customer (~400 ft).				
(11) Maximum ERUs served by Available Storage located solely in the Zenkner Hill Zone.				

8.2.3 Upper Seminary Hill Reservoir

Similar to Upper Davis Hill and Zenkner Valley, portions of the Seminary Hill Pressure Zone are unable to achieve required fire flows. While this is primarily a function of undersized distribution pipes, fire suppression reliability would also be enhanced with the addition of gravity water storage, thus eliminating the reliance upon pumping to fight fires. Such storage would also serve additional growth in this area, which will likely be the primary trigger for implementation of storage in this zone.

A storage reservoir with a volume of 300,000 gallons is sufficient to meet these needs, as shown in Table 8-7. This does not account for any dead storage, which may be required dependent upon final siting of the reservoir.

Table 8-7. Evaluation of Storage Adequacy for Upper Seminary Hill

	Year			
	2021	2031	2041	Max ⁽¹¹⁾
Projected ERUs and Demand⁽¹⁾				
Retail Service Area				
Equivalent Residential Units (ERU's)	155	172	185	658
Average Day Demand (gpd)	23,694	26,281	28,225	100,390
Maximum Day Demand (gpd)	43,598	48,357	51,934	184,717
PHD (gpm)	93	100	105	289
Available Source (gpd)⁽²⁾				
Seminary Pump 1 (250 gpm)	360,000	360,000	360,000	360,000
Seminary Pump 2 (250 gpm)	360,000	360,000	360,000	360,000
Total Available Source (gpd)	720,000	720,000	720,000	720,000
Multi-Source Credit (gpd) ⁽³⁾	360,000	360,000	360,000	360,000
Required Storage Calculations				
Operational Storage (gal) ⁽⁴⁾	0	30,000	30,000	30,000
Equalizing Storage (gal) ⁽⁵⁾	0	0	0	0
Fire Flow Storage (gal) ⁽⁶⁾	0	120,000	120,000	120,000
Standby Storage (gal) ⁽⁷⁾	0	34,436	36,983	131,538
Required Storage				
Greater than 30 psi at highest meter (gal) ⁽⁸⁾	0	30,000	30,000	30,000
Greater than 20 psi at highest meter (gal) ⁽⁹⁾	0	150,000	150,000	161,538
Existing Storage Greater Than 30 psi (gal)⁽¹⁰⁾				
Upper Seminary Hill Reservoir	0	92,308	92,308	92,308
Total Existing Storage at 30 psi (gal)	0	92,308	92,308	92,308
Storage Surplus/(Deficiency) at 30 psi (gal)	0	62,308	62,308	62,308
Existing Storage Greater Than 20 psi (mg)⁽¹⁰⁾				
Upper Seminary Hill Reservoir	0	161,538	161,538	161,538
Total Existing Storage at 20 psi (mg)	0	161,538	161,538	161,538
Storage Surplus/(Deficiency) at 20 psi (mg)	0	11,538	11,538	0
Existing Available Storage (mg)⁽¹⁰⁾				
Upper Seminary Hill Reservoir	0	300,000	300,000	300,000
Total Existing Storage at 20 psi (mg)	0	300,000	300,000	300,000
Storage Surplus/(Deficiency) at 0 psi (mg)	0	150,000	150,000	138,462

Notes:

- (1) Projected demands taken from Chapter 3. ERUs calculated as Average Day Demand / ERU water use factor (153 gpd/ERU).
- (2) Available source assumes source pumps are on for 24 hours in a day, at the maximum production rate.
- (3) Multi-source credit assumes largest source is out of service.
- (4) Operational storage is estimated at 10% of reservoir volume.
- (5) Required Equalizing Storage is equal to [(PHD - Total Available Source) x 150 minutes] .
PHD : (Maximum Day Demand per ERU / 1440) * [(C) * (N) + F] + 18
(C & F values obtained from Table 5-1 in DOH Dec 2009 WSDM)
- (6) Required Fire Flow Storage = 1,000 gpm x 2 hours.
- (7) Required Standby Storage is the greater of (2*ADD less multi-source credit) or (200 gallons per ERU).
- (8) Total required storage greater than 30 psi is equal to the total of operational and equalizing storage.
- (9) Total required storage greater than 20 psi is equal to the total of operational, equalizing, and the greater of either standby or fire flow storage.
- (10) The storage volume available in existing reservoirs at 30, 20, and 0 psi is based on the elevation of the highest customer (~500 ft).
- (11) Maximum ERUs served by Available Storage located solely in the Upper Seminary Hill zone.

8.2.4 Widgeon Hill Reservoir

There is potential for growth within the Widgeon Hill area within the 20-year time frame. Though Widgeon Hill is part of the City of Chehalis' UGA, Centralia continues to consider the need for storage in the area since it remains within the Centralia retail service area. Future water system infrastructure needed to provide service to this area would include a storage reservoir. A reservoir with a volume of 300,000 gallons is sufficient to meet the projected 20-year growth needs, as shown in Table 8-8. This does not account for any dead storage, which may be required dependent upon final siting of the reservoir.

Table 8-8. Evaluation of Storage Adequacy for Widgeon Hill

	Year			
	2021	2031	2041	Max ⁽¹¹⁾
Projected ERUs and Demand ⁽¹⁾				
Retail Service Area				
Equivalent Residential Units (ERU's)	0	372	1,230	1,251
Average Day Demand (gpd)	0	56,824	187,698	190,927
Maximum Day Demand (gpd)	0	104,556	345,365	351,305
PHD (gpm)	0	173	446	452
Available Source (gpd) ⁽²⁾				
Widgeon Hill Pump 1 (160 gpm)	230,400	230,400	230,400	230,400
Widgeon Hill Pump 2 (160 gpm)	230,400	230,400	230,400	230,400
Total Available Source (gpd)	460,800	460,800	460,800	460,800
Multi-Source Credit (gpd) ⁽³⁾	230,400	230,400	230,400	230,400
Required Storage Calculations				
Operational Storage (gal) ⁽⁴⁾	0	30,000	30,000	30,000
Equalizing Storage (gal) ⁽⁵⁾	0	0	18,843	19,833
Fire Flow Storage (gal) ⁽⁶⁾	0	120,000	120,000	120,000
Standby Storage (gal) ⁽⁷⁾	0	74,455	245,937	250,167
Required Storage				
Greater than 30 psi at highest meter (gal) ⁽⁸⁾	0	30,000	48,843	49,833
Greater than 20 psi at highest meter (gal) ⁽⁹⁾	0	150,000	294,780	300,000
Existing Storage Greater Than 30 psi (gal)⁽¹⁰⁾				
Widgeon Hill Reservoir	0	107,692	107,692	107,692
Total Existing Storage at 30 psi (gal)	0	107,692	107,692	107,692
Storage Surplus/(Deficiency) at 30 psi (gal)	0	77,692	58,849	57,859
Existing Storage Greater Than 20 psi (mg)⁽¹⁰⁾				
Widgeon Hill Reservoir	0	300,000	300,000	300,000
Total Existing Storage at 20 psi (mg)	0	300,000	300,000	300,000
Storage Surplus/(Deficiency) at 20 psi (mg)	0	150,000	5,220	0
Existing Available Storage (mg)⁽¹⁰⁾				
Widgeon Hill Reservoir	0	300,000	300,000	300,000
Total Existing Storage at 20 psi (mg)	0	300,000	300,000	300,000
Storage Surplus/(Deficiency) at 0 psi (mg)	0	150,000	5,220	0
Notes:				
(1) Projected demands taken from Chapter 3. ERUs calculated as Average Day Demand / ERU water use factor (153 gpd/ERU).				
(2) Available source assumes source pumps are on for 24 hours in a day, at the maximum production rate.				
(3) Multi-source credit assumes largest source is out of service.				
(4) Operational storage is estimated at 10% of reservoir volume.				
(5) Required Equalizing Storage is equal to [(PHD - Total Available Source) x 150 minutes] .				
PHD : (Maximum Day Demand per ERU / 1440) * [(C) * (N) + F] + 18				
(C & F values obtained from Table 5-1 in DOH Dec 2009 WSDM)				
(6) Required Fire Flow Storage = 1,000 gpm x 2 hours.				
(7) Required Standby Storage is the greater of (2*ADD less multi-source credit) or (200 gallons per ERU).				
(8) Total required storage greater than 30 psi is equal to the total of operational and equalizing storage.				
(9) Total required storage greater than 20 psi is equal to the total of operational, equalizing, and the greater of either standby or fire flow storage.				
(10) The storage volume available in existing reservoirs at 30, 20, and 0 psi is based on the elevation of the highest customer (~570 ft).				
(11) Maximum ERUs served by Available Storage located solely in the Widgeon Hill Zone.				

9. Distribution System Analysis

This section presents analysis of the City of Centralia's (City) distribution system. Hydraulic modeling was performed to evaluate the adequacy of existing facilities for conveying current and future flows, and to aid in determining improvements that would ensure future viability of the distribution system.

9.1 Methodology

As required by DOH, the City's water distribution system was analyzed and deficiencies were identified for the following two conditions: peak hour demands (PHD), and maximum day demands (MDD) plus fire flow. All modeling calculations were performed within the WaterGEMS software produced by Bentley.

Pressure is the primary hydraulic parameter analyzed via computer modeling to identify system deficiencies. The target minimum system operating pressure is 30 pounds per square inch (psi) during peak hour demand conditions. During fire flow conditions, a residual pressure of 20 psi must be maintained throughout the analyzed pressure zone. Available fire flow is also limited by keeping pipe velocities below a maximum velocity of 10 feet per second.

The general methodology of this hydraulic modeling analysis was to examine the current distribution system during various demand and fire flow conditions. According to the above pressure criteria, deficiencies were noted and distribution system improvements proposed. Further analysis was performed to verify that additional improvements associated with growth of the City meet the minimum distribution system criteria. All distribution system improvements, relating either to remedy of current deficiencies or accommodation of future growth are presented in Section 13.

9.2 Demand Allocation

Section 3 presents information on City water demands for the existing system and provides an estimate of projected water demands for the 10-year and 20-year planning horizons. For the hydraulic model, the demand forecast was used to determine the total demand for customers within the City's service area.

As part of the demand forecast, the forecasted demand for each pressure zone was determined as described in Section 3. The forecasted demands by pressure zone were allocated in the model by equally distributing the pressure zone demands to the model junctions within the pressure zone. These allocated demands include both revenue and non-revenue demands.

As such, demands were allocated across every node in the model with the exclusion of some nodes that are located on a transmission line or near a storage reservoir, pump station, or PRV station. A thorough review of the system was conducted, checking to see if demands were assigned to nodes in a reasonable manner.

Demands were allocated in the model for average day, maximum day, and peak hour demand conditions.

9.3 Calibration

A critical step in the development of a hydraulic model, prior to using it as a tool to analyze system performance, is calibration. Calibration consists of measuring pressure and flows in the field and comparing them with the same pressures and flows simulated in the model. For the previous 2013 Water System Plan, a steady-state calibration was completing using a total of 12 hydrant tests.

As part of the 2021 Water System Plan, an additional four hydrant tests were completed in the Central Zone, two of which focused on new piping installed in the northwest corner of the system. The test locations were selected to provide adequate coverage for each pressure zone and to maximize the friction losses across the system by placing the test locations as far from sources of water for each pressure zone as possible.

For the hydrant test, a pressure gage was placed on the “residual” hydrant and pressure was measured under normal operating (where no hydrant was flowing) or “static” conditions. Once the pressure was recorded, a second hydrant was opened and the flow at this hydrant was measured using a pitot gage. While the second hydrant was open, the pressure was observed and recorded (once the gage readings stabilized) at the residual hydrant.

To conduct calibration, the system operations or boundary conditions are recorded during the time the hydrant tests are conducted. Boundary conditions of concern typically include system demands, reservoir levels, well operation, and pump station flows.

For the City, the levels in the reservoirs were recorded for each hydrant test occurring in the system. Pump station and well operations were also recorded. Demands were allocated as described above, with total demand adjusted to match the calculated average demand for the day of the field testing.

Adjustments of model friction factors were made within the system to achieve steady state calibration. Friction factors were adjusted based on pipe material and age as summarized in Table 9-1. Table 9-2 contains the field data collected for the hydrant tests and the results of the model simulations both before and after making the friction factor adjustments in Table 9-1. One of the four tests (Test #4) was not used for steady state calibration because the field measurements indicated a pressure drop not reasonably predicted by the model. Even when adjusting all pipes in the model to have a friction factor of $C = 160$, the model was predicting a much greater drop than what was measured in the field. This may be caused by a valve not fully closing in the field that was planned for the test. For the other tests, possible errors may occur due to measurement differences in pressure, flow, and elevation data assumed in the mode. However, after making the friction factor adjustments, the model results much better aligned to the field measurements as seen in Table 9-2.

Comparing the model results with the field measurements for static pressures indicates the overall accuracy of the model node elevations, tank elevations, and PRV settings under normal demand conditions. As shown in Table 9-2, the simulated model pressures, with the exception of one, indicate a reasonable match between modeled and observed conditions.

Table 9-1. Adjusted pipe friction factor assumptions

Material	Installation Decade	Hazen-Williams Friction Factor, C
Asbestos Cement	All	145
Cast Iron	Unknown, Prior to 1950	90
Cast Iron	1950	110
Cast Iron	1960	115
Cast Iron	1970	130
Cast Iron	1980	140
Ductile Iron	Unknown	135
Ductile Iron	Prior to 1950	120
Ductile Iron	1950	130
Ductile Iron	1960 through 2000	140
Ductile Iron	2010 through 2020	150
Galvanized Iron	Prior to 1970	100
Galvanized Iron	1970 and later	120
PVC	All	150

Table 9-2. Calibration Results

Hydrant Test No.	Pressure Zone	Fire flow (gpm)	FIELD Static Pressure (psi)	MODEL Static Pressure (psi)	Static Pressure Difference (psi) ^a	FIELD Residual Pressure (psi)	MODEL Residual Pressure (psi)	Field Pressure Drop (psi) ^b	Model Pressure Drop (psi) ^c	Difference in Field and Model Pressure Drops (psi) ^d
Based on original model friction factors										
1	Central	1,405	105	101.4	-3.6	78	52.0	27	49.4	22.4
2	Central	1,405	105	101.5	-3.5	75	55.9	30	45.6	15.6
3	Central	920	95	97.7	2.7	30	2.5	65	95.2	30.2
4	Central	1,405	100	99.2	-0.8	80	19.5	20	79.7	59.7
Based on revised model friction factors										
1	Central	1,405	105	105.8	0.8	78	67.4	27	38.4	11.4
2	Central	1,405	105	105.7	0.7	75	69	30	36.7	6.7
3	Central	920	95	98.2	3.2	30	30.6	65	67.6	2.6
4	Central	1,405	100	100.3	0.3	80	50.1	20	50.2	30.2

Footnotes:

^a Calculated: Model Static Pressure (psi) minus Field Static Pressure (psi)^b Calculated: Field Residual Pressure (psi) minus Field Static Pressure (psi)^c Calculated: Model Residual Pressure (psi) minus Model Static Pressure (psi)^d Calculated: Model Pressure Drop (psi) minus Field Pressure Drop (psi)

9.4 Modeling Scenarios

In accordance with WAC 246-290-230, a minimum pressure of 30 psi must be maintained at all customer connections under peak hour demand (PHD) conditions with equalizing storage depleted in the reservoirs. A minimum of 20 psi must be maintained for fire flows under MDD conditions with equalizing and fire flow storage depleted. If these criteria could not be met, improvements were identified and through an iterative trial-and-error process, implemented until pressure criteria could be satisfied with a minimum of total pipe and facility additions.

A number of steady state hydraulic analyses were completed for each pressure zone for existing (2021), ten-year (2031), and twenty-year (2041) demand conditions. These considered peak hour demand and fire flow demand (MDD plus fire flow) conditions. Table 9-3 describes the modeling scenarios conducted, and the sequence within which they were performed. The results of the peak hour and fire flow analyses are described in greater detail below.

Table 9-3. Modeling Scenarios

Description	Demand	Purpose
Maximum pressure	Static (zero) demand with full tanks	Evaluate system for maximum possible pressures
Existing Year Peak Hour	2021 Peak Hour Demand	Evaluate system
Existing Year Fire Flow	2021 Maximum Day Demand plus fire flow	Evaluate system
Plan Year 10 Peak Hour	Plan Year 10 Peak Hour Demand	Evaluate system performance and develop CIP for peak hour conditions
Plan Year 10 Fire Flow	Plan Year 10 Maximum Day Demand plus fire flow	Evaluate system performance and develop CIP for Plan Year 10 fire flow conditions
Plan Year 20 Peak Hour	Plan Year 20 Peak Hour Demand	Evaluate system and develop CIP for Plan Year 20 peak hour conditions
Plan Year 20 Fire Flow	Plan Year 20 Maximum Day Demand plus fire flow	Evaluate system performance and develop CIP for Plan Year 20 fire flow conditions

9.5 Maximum Pressure Analysis Results

The DOH Water System Design Manual recommends that working pressures in the distribution system should be limited to 80 psi. A model run was completed with static (zero) distribution system demands with storage facilities at their full level which represents a scenario of the highest possible pressures in the distribution system.

The analysis found that most of the Central pressure zone is around 100 psi with a few areas having pressures as high as 115 psi. In the same scenario, the lowest pressures in the Central zone are several service connections near the intersection of E Main St and S Baker Street (about 900 feet north of the Seminary Hill Tank) with pressures around 20 psi.

In cases where a customer is concerned about high pressure and potentially adverse effects on in-premise plumbing, it is the customer's responsibility to install and maintain their own individual pressuring reducing valve on their side of the meter. Typically, City customers implement this approach only when pressures are frequently in excess of 100 psi.

A map of maximum distribution system pressures is given in Figure 9-2.

9.6 Peak Hour Analysis Results

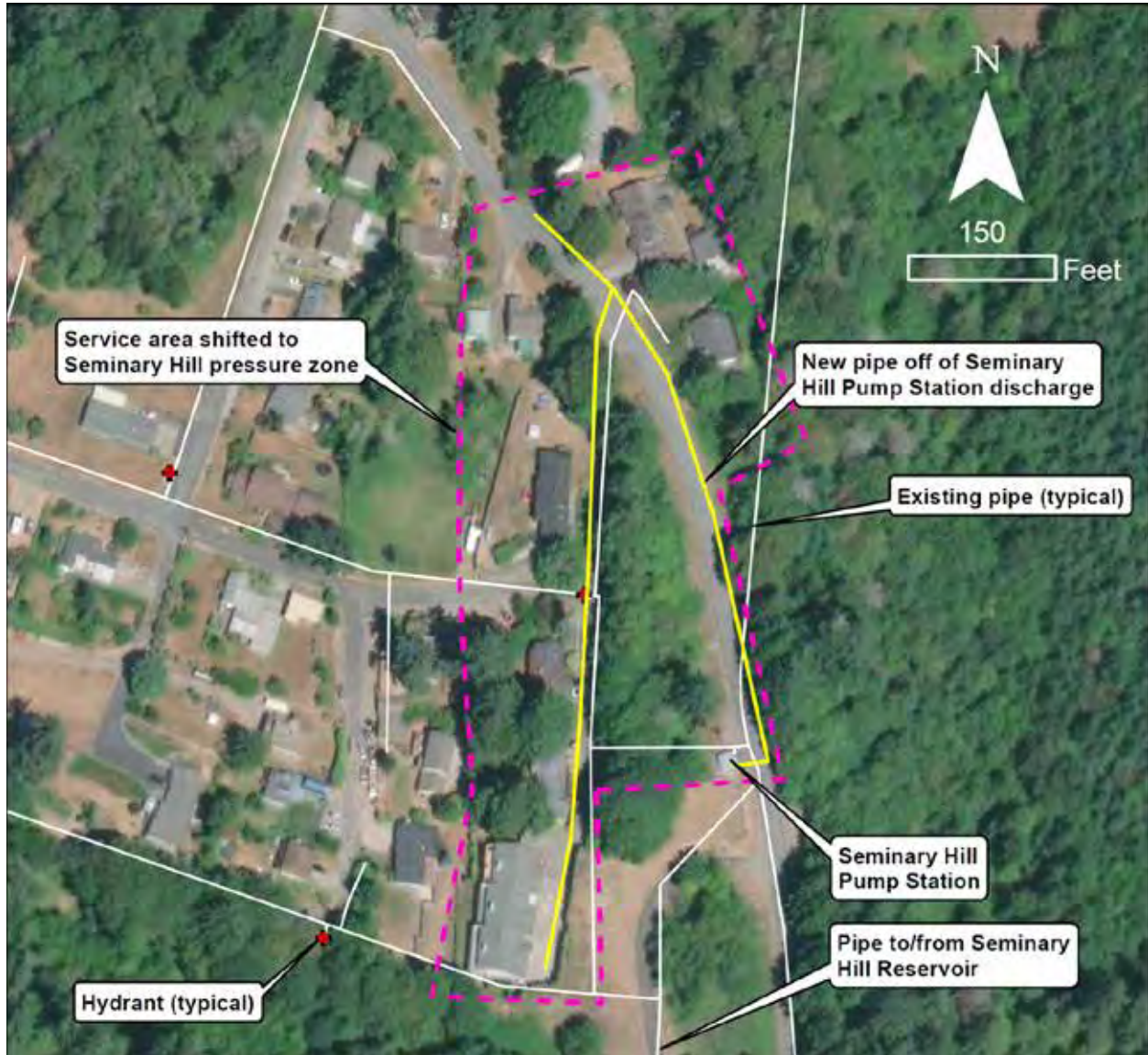
Figure 9-3 presents the PHD pressure results for 2021 while Figure 9-4 presents the PHD pressure results 2041 with 20-year capital improvement plan (CIP) piping, with both having operational and equalizing storage depleted. There are two areas of the distribution system with low pressures (less than 30 psi).

There is an area of low pressure in the vicinity of the Seminary Hill Reservoir (near the intersection of E Main St and S Baker St) due to the local topography. This includes a multifamily unit that connects at a lower elevation and uses a small booster pump station to provide pressure. A double-check backflow assembly is installed on the complex's fire system, and it is inspected annually. Additionally, an in-line check valve is installed on the City's side of the booster pump.

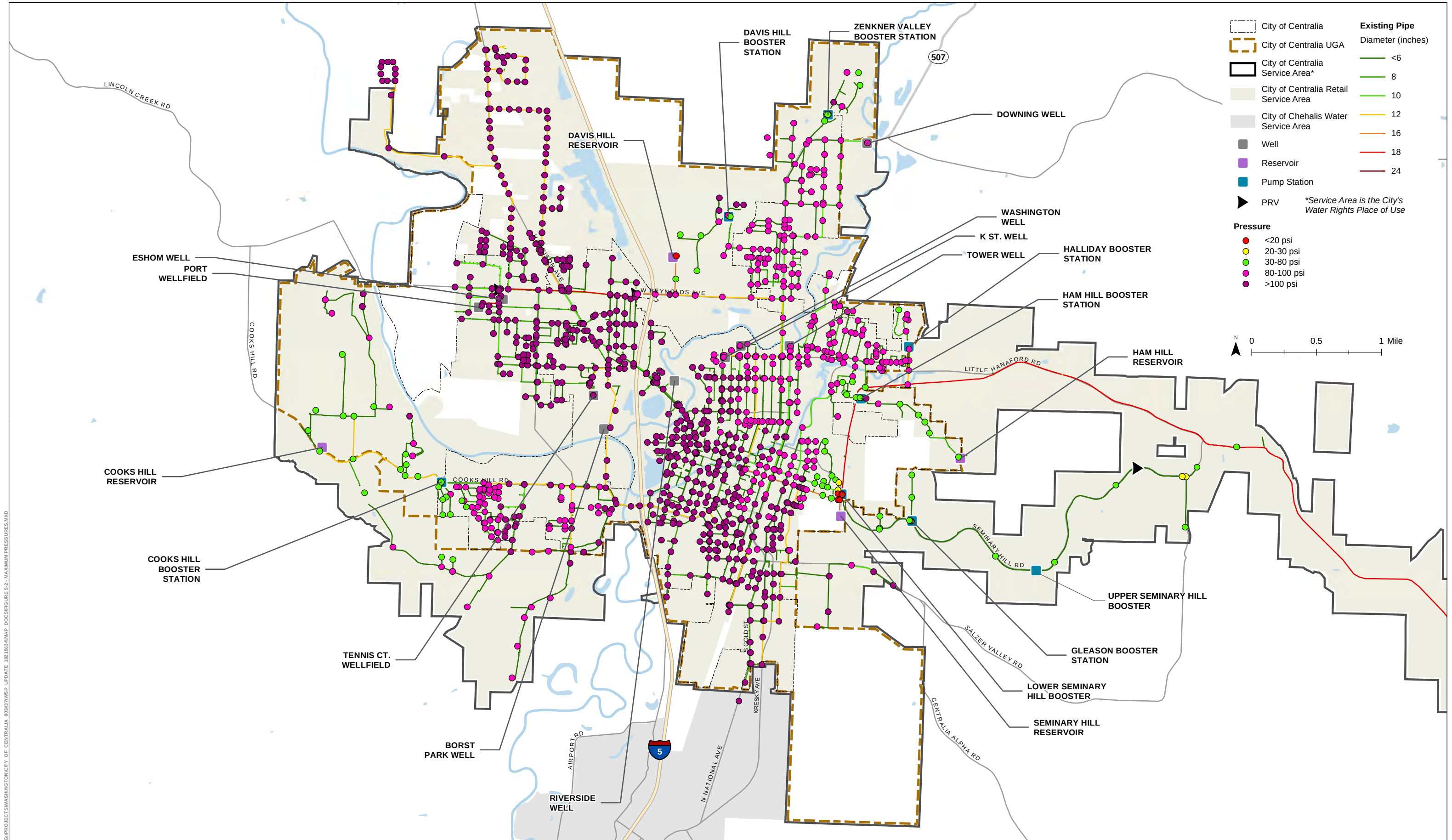
Another area of low pressure is on Blanchard Rd at the end of the piping connected to the Central zone. Figure 9-3 shows that this area currently has a pressure of 24 psi. Figure 9-4 shows that with 2041 PHD, the pressure drops to 15 psi.

There are other services that are affected with delivery pressures between 20 and 30 psi. Historically, there have not been complaints from any of the affected customers and no new development is planned at these locations. However, as discussed in Section 9.6, these areas not only have low pressures during PHD, but also limit available fire flow if including these areas as part of the 20 psi minimum pressure constraint.

To resolve the low pressures around S Baker St, the low pressure area could be connected to the Seminary Hill pressure zone. This could be done by adding approximately 1,300 feet of piping from the Seminary Hill pump station north along Seminary Hill Rd and the south along Baker St. Service connections with low pressures would then shift to the newly installed pipe. This is shown on Figure 9-1. While the piping in the Central Zone would continue to have pressures below 30 psi, they can then be considered transmission pipe (instead of distribution pipe) which has a minimum required pressure of 5 psi.

Figure 9-1. Baker Street Modifications

The area of low pressure on Blanchard Rd can be resolved by installing approximately 900 feet of water line on Blanchard Rd closing the gap between the Central and Cooks Hill Zones. The low pressure area would then become part of the Cooks Hill Zone. An isolation valve would then be added to separate the Cooks Hill and Central Zones.



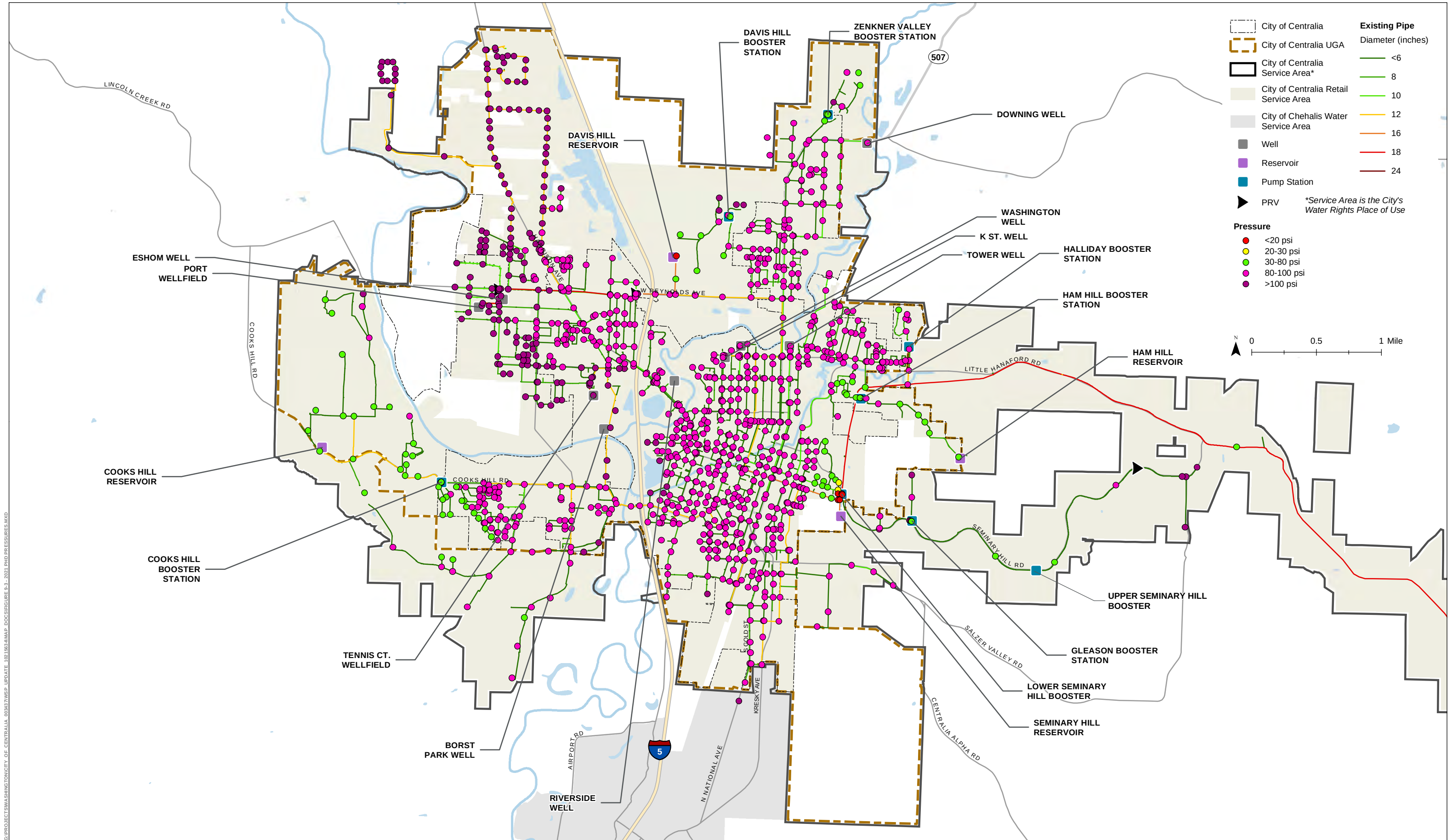
G:\PROJECTS\WASHINGTON\CITY OF CENTRALIA_003431\WSP_UPDATE_101153\MAP_DOCUMENTS\FIGURE 9-2_MAXIMUM PRESSURES.MXD



MAXIMUM SYSTEM PRESSURES

FIGURE 9-2

City of Centralia Water System Plan
April 2021



G:\PROJECTS\WASHINGTON\CITY OF CENTRALIA_003431\WSP_UPDATE_101163\MAP_DOCUMENTS\FIGURE 9-3_2021 PHD PRESSURES.MXD

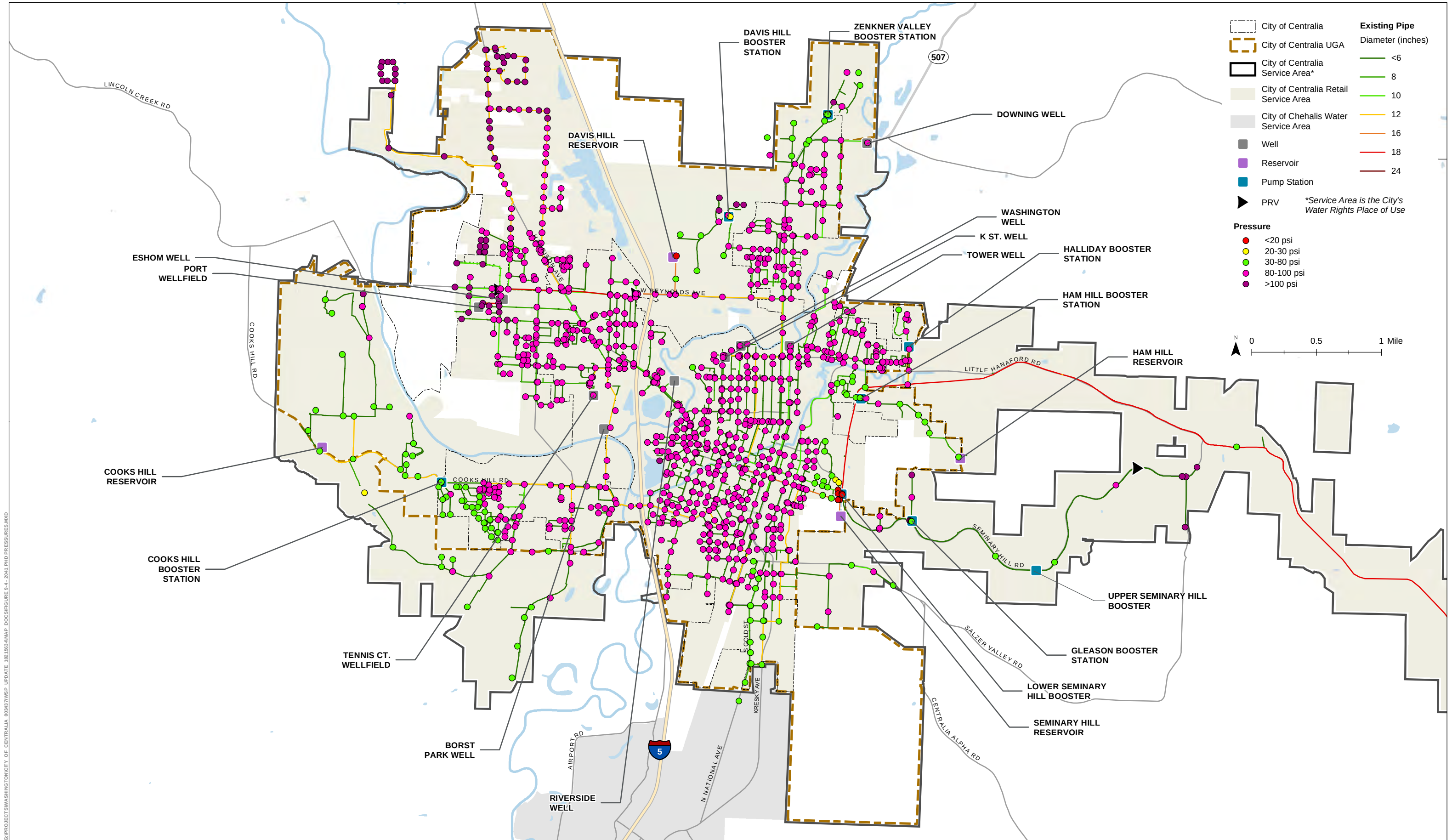


2021 PEAK HOUR PRESSURE MAP

FIGURE 9-3

City of Centralia Water System Plan

April 2021



G:\PROJECTS\WASHINGTON\CITY OF CENTRALIA_003431\WSP_UPDATE_101163\MAP_DOCUMENTS\FIGURE 9-4_2041 PHD PRESSURES.MXD



2041 PEAK HOUR PRESSURE MAP WITH 20-YEAR CIP

FIGURE 9-4

City of Centralia Water System Plan
April 2021

9.6 Fire Flow Analysis Results

The available fire flow for 2021 (assuming the existing system and current levels of demand) is provided in Figure 9-5. The amount of fire flow deficiency compared to fire flow goals for 2021 is provided in Figure 9-6. Figure 9-7 provides the available fire flow for 2041 while Figure 9-8 provides the fire flow deficiency for 2041 (assuming future demand levels and 20-year capital projects have been implemented).

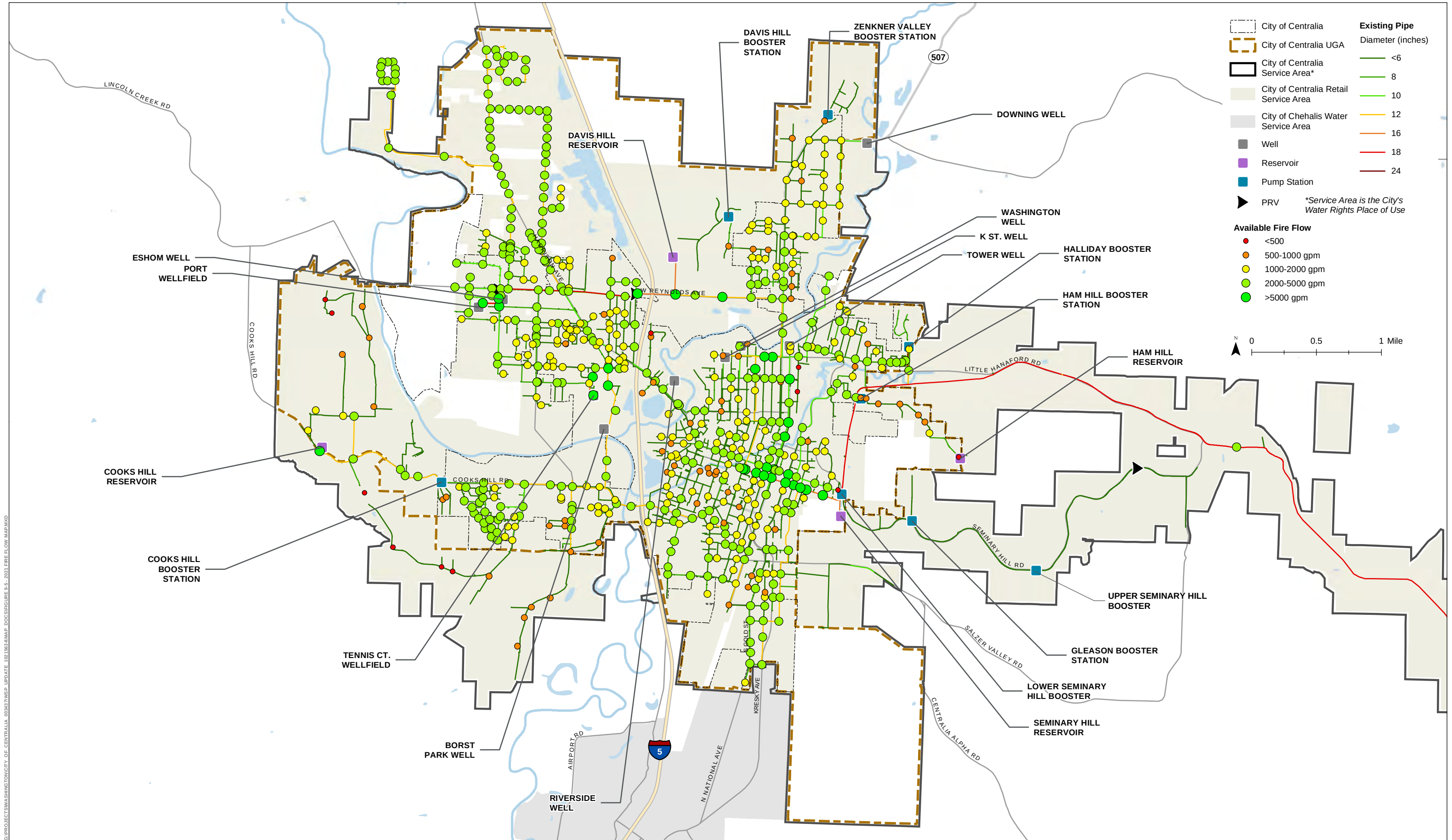
Numerous deficiencies have been identified in the model, mostly a result of inadequately sized piping throughout portions of the system and inadequately sized booster pump stations for the elevated pressure zones. Improvements have been listed that improve or eliminate these deficiencies in the future. These improvements are described in more detail in Section 13 (Capital Improvement Program). A portion of the deficiencies listed do not have an assigned improvement, because the Annual Small Waterline Replacement program will address the deficiency.

Throughout the Central pressure zone, available fire flow is limited due to the 20 psi pressure constraint being reached at the lower pressure area near Baker Street discussed in Section 9.6. The improvement discussed in Section 9.6 helps to resolve this.

There are three areas that have larger 5,000 gpm fire flow goals. This includes the Port of Centralia Park II located at the northwest end of the system that currently has an available fire flow of approximately 3,500 gpm. Similarly, the current available fire flow for the Industrial Drive area is approximately 3,000 gpm. The Galvin Road industrial area has an available fire flow of approximately 2,500 gpm. Projects have been identified in the CIP to address these deficiencies and increase available fire flow in these areas above 5,000 gpm.

Other areas of deficiencies shown on Figure 9-6 have projects identified in Section 13 to address those deficiencies.

Figure 9-8 does show some areas that continue to have deficiencies. However, these areas are either located in low pressure areas (such as near a reservoir), a single hydrant located on a dead-end main that is limited by the velocity constraint, or have hydrants in the vicinity that do not have a deficiency.



G:\PROJECTS\WASHINGTON\CITY OF CENTRALIA_003431\WSP_UPDATE_101153\6.MXD DOCS\FIGURE 9-5-2021 FIRE FLOW MAP.MXD

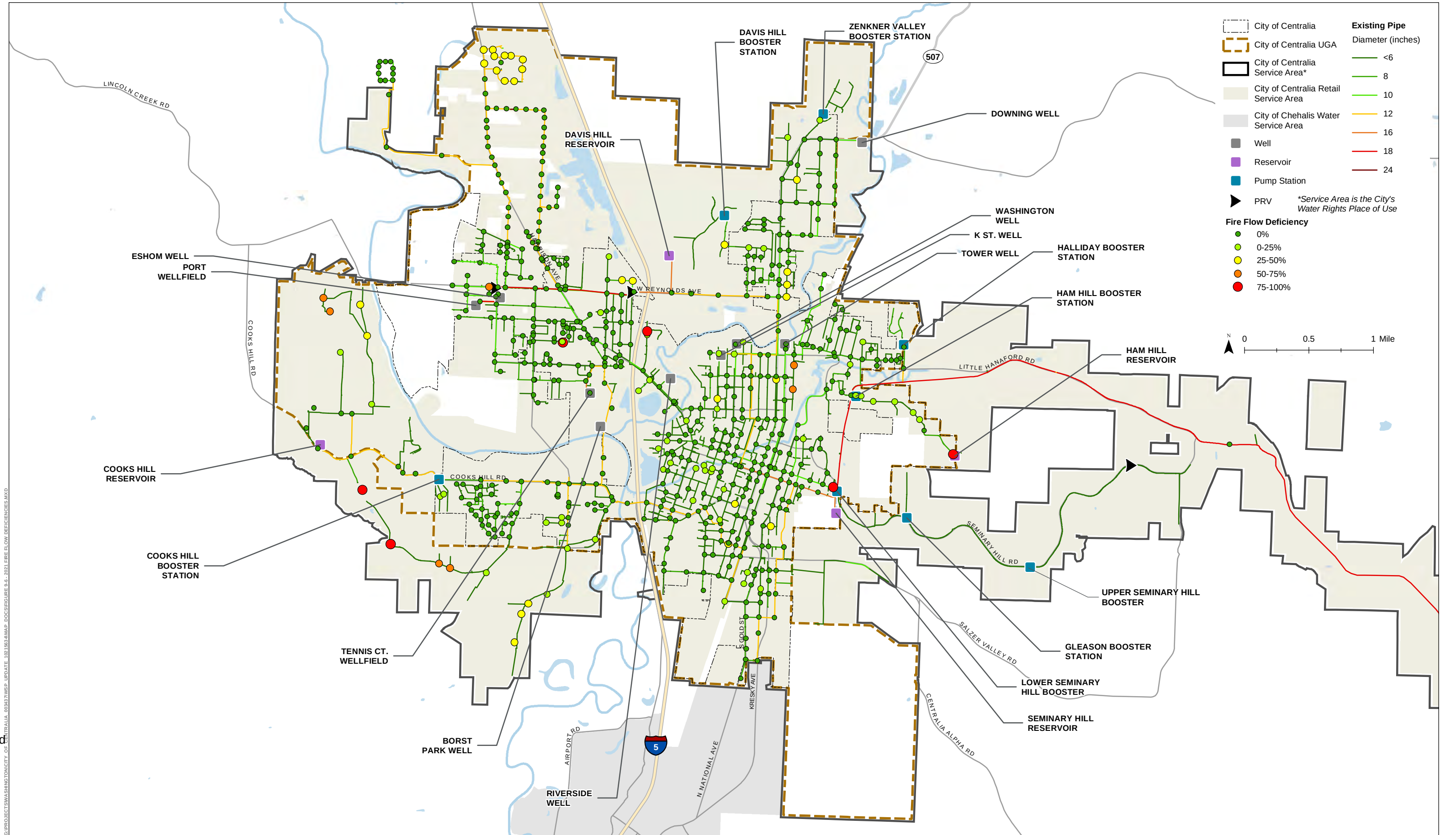


2021 AVAILABLE FIRE FLOW MAP

FIGURE 9-5

City of Centralia Water System Plan

April 2021



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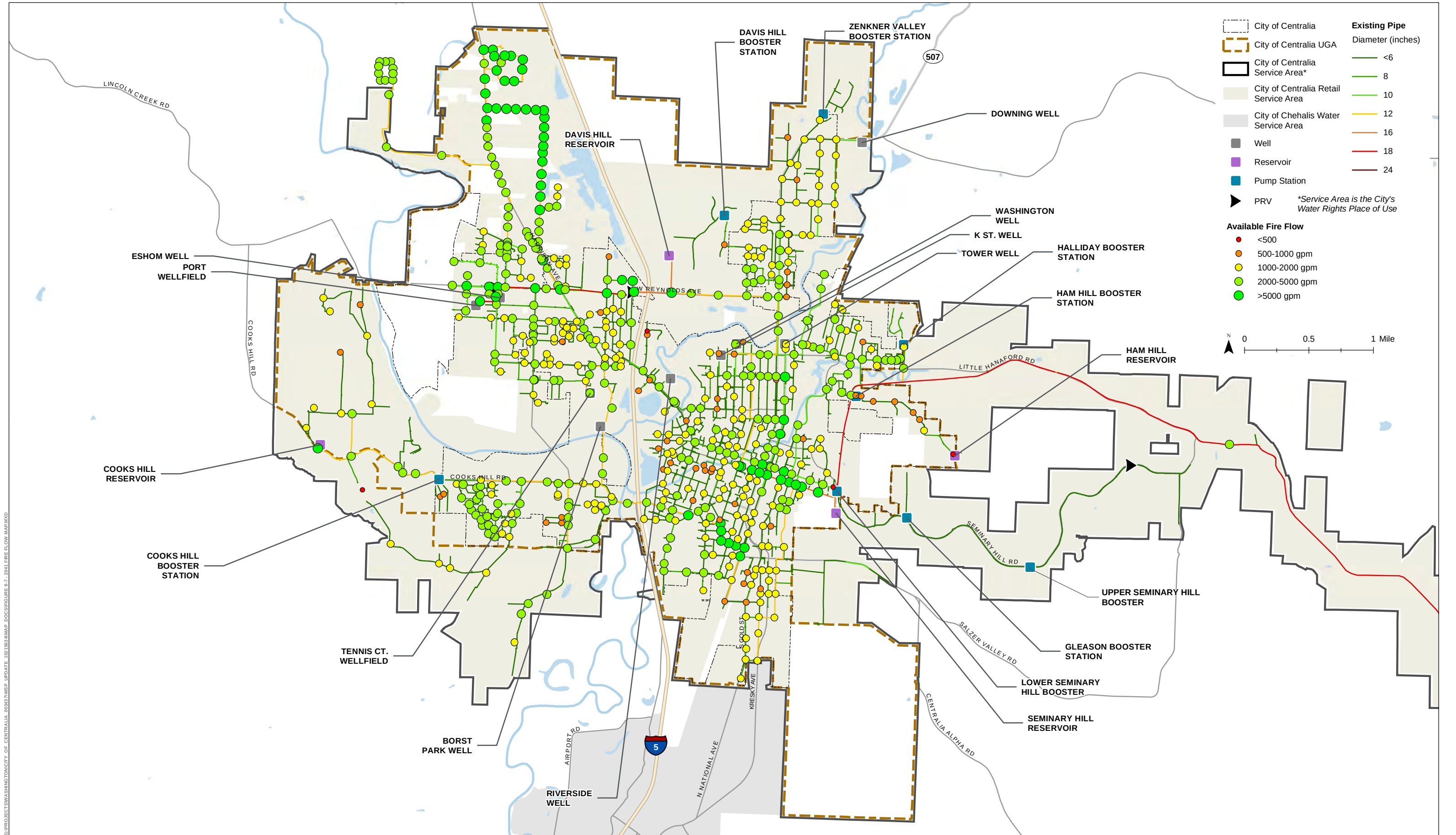


2021 FIRE FLOW DEFICIENCIES

FIGURE 9-6

City of Centralia Water System Plan

April 2021



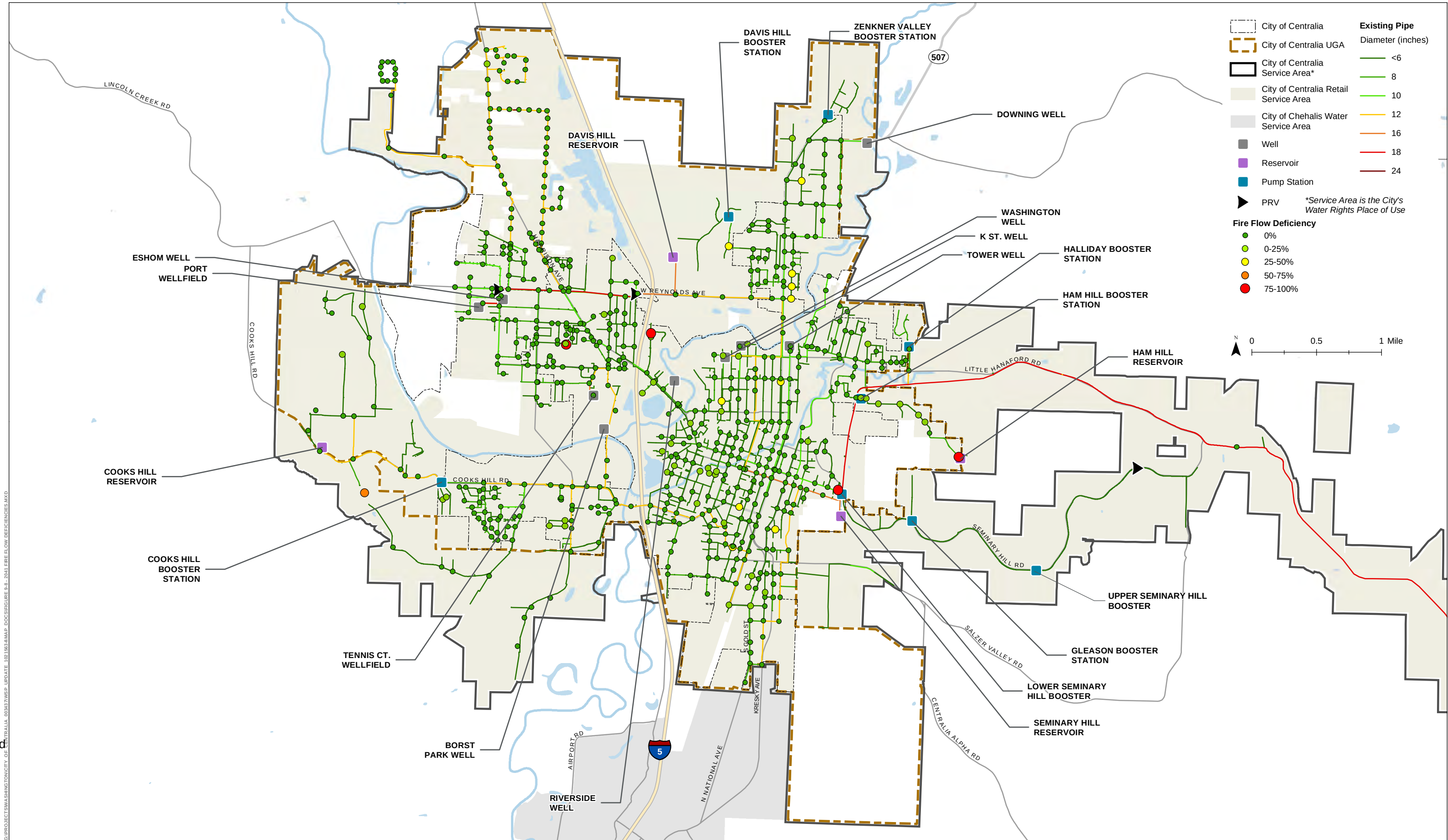
G:\PROJECTS\WASHINGTON\CITY OF CENTRALIA_003431\WSP_UPDATE_1011503\MAP_DOCUMENTS\FIGURE 9-7_2041 FIRE FLOW MAP.MXD



2041 AVAILABLE FIRE FLOW MAP WITH 20-YEAR CIP

FIGURE 9-7

City of Centralia Water System Plan
April 2021



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10. Regulatory Compliance Program

This chapter provides a review of current Washington Administrative Code (WAC) 246-290 and federal drinking water regulations pursuant to the Safe Drinking Water Act (SDWA), and an assessment of the City's compliance for the period between 2013 and 2020 (referred to as "compliance period" for the remainder of this chapter). This chapter describes system components in regard to applicable regulations, monitoring practices, and compliance status. It also identifies possible future regulations and assesses the implications for the City.

10.1 Safe Drinking Water Act and Washington Administrative Code

The federal regulatory framework directing water quality is the Safe Drinking Water Act (SDWA) and its 1986 and 1996 Amendments. The SDWA and Amendments, administered by the U.S. Environmental Protection Agency (EPA), provide the framework for the operation and monitoring of public water supply systems. Washington State has incorporated these regulations into State law and has assumed primacy for administration.

Washington State law incorporates the SDWA and its amendments as Chapter 246-290 of the Washington Administrative Code (WAC 246-290). The Washington State Department of Health (DOH) administers and enforces these WAC codes. As a Group A public water system, the City is required to meet drinking water quality regulations and conform to monitoring and reporting requirements as described by WAC 246-290.

10.2 System Overview

The City of Centralia's potable water system consists of two primary sources of supply, the Tennis Court Wellfield (two wells) and the Port District Wellfield (three wells); a seasonal peak demand source, the K Street Well; and an emergency source, the Washington Well. The City's sources of supply and operational status are summarized in Table 10-1.

Table 10-1. Water Sources and Operational Status

Source	Status	Type
Tennis Court Wellfield	Primary Source	2 wells
Port District Wellfield	Primary Source	3 wells
K Street	Seasonal	1 well
Washington	Emergency	1 well
Borst Park	Off-line	1 well
Downing	Off-line	1 well
Riverside	Off-line	1 well

Beginning in 1999 the City began to transition its source of supply. In October of that year the City brought the Tennis Court Wellfield on-line and removed the Borst Park source from service. In February 2001, the Riverside well was removed from service. Finally, in June 2003 the City

brought the Port District Wellfields on-line. Per DOH monitoring requirements, only the Tennis Court, Port District and K Street sources are identified for monitoring.

Both primary sources are treated by air stripping, to raise pH for corrosion control at the Tennis Court site, and to remove contaminants at the Port District site. Water is disinfected with chlorine in the form of sodium hypochlorite and fluoridated before entering the distribution system. As a 100% groundwater system that does not purchase water from another purveyor, the City is responsible for complying with the regulations pertaining to groundwater sources shown in Table 10-2.

Table 10-2. Applicable Safe Drinking Water Act Regulations

Rule	Description
National Primary Drinking Water Requirements (1976)	Physical and chemical
Radionuclides Rule (1976)	Gross alpha and beta emitters, radium-226, and radium-228
Phase I (VOCs) and Phase II and Phase V (IOCs and SOCs) – 1989, 1993, and 1994 respectively	Volatile organic chemicals (VOCs), inorganic chemicals (IOCs), and synthetic organic chemicals (SOCs)
Lead and Copper Rule (1992) and Lead and Copper Rule Minor Revisions (2000)	Lead and copper and treatment for corrosion control
Consumer Confidence Rule (1998)	Water quality compliance reporting to customers
Public Notification Rule (2000)	Notification of public after water quality violation
Stage 1 Disinfectants/Disinfection By-Products Rule (2002)	Disinfectant residual, total trihalomethanes (TTHMs), and haloacetic acids (HAA5)
Radionuclides Rule (2003)	Radionuclides
Arsenic Rule (2006)	Arsenic
Stage 2 D/DBP Rule (2006)	TTHMs, HAA5
Groundwater Rule (2007)	Fecal indicators in groundwater
Revised Total Coliform Rule (2013)	Coliform Bacteria
Unregulated Monitoring Rule 4 (UCMR4) (2018)	Monitoring for contaminants included on assessment and screening lists

10.3 Summary of Effective Source Water Quality Regulations

The City conducts water quality monitoring in compliance with EPA and DOH requirements. The City annually reviews its Water Quality Monitoring Report (WQMR), as issued by DOH, and communicates any issues, or asks for clarification, with the State.

The approaches to monitoring for various parameters are outlined below, along with a summary of monitoring violations during the prior compliance period. Details regarding the City's water quality results are contained within DOH's Sentry database system, accessible online at DOH's website.

10.3.1 Source and Treatment Regulations

National Primary Drinking Water Standards

National Primary Drinking Water Standards are currently set for 87 contaminants. Maximum contaminant levels (MCLs) and maximum contaminant level goals (MCLGs) have been established for 77 contaminants, while the remaining ten have treatment technique requirements. A constituent's MCL is generally based on its public health goal (PHG), which is the level of a contaminant in drinking water below which there is no known or expected health risk. Regulated constituents include microbial contaminants, inorganic chemicals (IOCs), volatile organic chemicals (VOCs), synthetic organic chemicals (SOCs), radionuclides, and disinfection by-products (DBPs).

The EPA regulates most of the chemical contaminants through the rules known as Phase I, II, IIb, and V. The EPA issued the four rules regulating 69 contaminants over a five-year period as it gathered, updated, and analyzed information on each contaminant's presence in drinking water supplies and its health effects. Since the Phase V Rule, MCLs for additional contaminants have been established through new regulations, such as the Arsenic Rule, and must be adopted by DOH.

The EPA has also established secondary standards for 15 contaminants to address the aesthetic quality of drinking water. These secondary standards have also been adopted within the WAC. Because the federal standards primarily address taste and odor, rather than health issues, they are often used only as a guideline. For new community water systems, the DOH requires treatment for secondary MCL (SMCL) exceedances under WAC 246-290-320 (3)(d). For existing public water systems, the WAC stipulates that the required follow-up action be determined by DOH based on the degree of consumer acceptance of the water quality and their willingness to bear the cost of meeting the secondary standard.

Current primary and secondary MCLs for inorganic and organic constituents, respectively, are documented in the following subsections.

Phase I, II and V Regulations

Phase I, II, and V of the federal Primary Drinking Water Regulations set maximum contaminant levels (MCLs) for 15 inorganic compounds (IOCs), 33 synthetic organic compounds (SOCs), and 21 volatile organic compounds (VOCs). WAC 246-290-300 and 246-290-390 defer to the federal rules and require testing based on a "vulnerability of occurrence" assessment. WAC 246-290-300 stipulates that regulated IOCs, VOCs and SOCs are to be monitored on 12 to 36-month sampling cycles depending on the contaminant. The primary drinking water regulations apply to all the sources that are not classified as emergency sources.

As part of the Phase II Rule, systems with a significant amount of asbestos-cement (AC) pipe must conduct periodic asbestos monitoring in the distribution system. In Washington State, DOH has historically required systems that contain more than 10% AC pipe in their distribution system to comply with the monitoring requirement. These systems must collect one sample in the distribution system at a location served by AC pipe and under conditions where asbestos contamination is most likely to occur. Approximately 21% of the City's pipes are AC pipe, therefore the City conducts asbestos monitoring.

City's Status

The City has a waiver to monitor for IOCs every nine years at all sources. The most recent samples were collected in summer 2019, and the next sampling round is due in 2028.

The City is on a standard nine year asbestos monitoring schedule. The most recent sample was collected in summer 2013, and the next sample is due in summer 2022.

The City must monitor for VOCs every three years at the Port District wellfield and K Street well, and every 6 years at the Tennis Court wellfield. Regarding SOCs, herbicide monitoring must occur once every nine years. Pesticides and soil fumigants must be monitored every three years at all sources. Nitrates are required to be sampled at each source every year.

No exceedances were observed for any Phase I, II, or V contaminants during the prior compliance period.

Arsenic Rule

The original arsenic MCL of 0.050 mg/L was established as part of the 1975 National Interim Primary Drinking Water Regulations. After years of additional health effects research and cost/benefit analysis, the EPA published the final Arsenic Rule in January 2001 with an effective date of January 2006. The Arsenic Rule revised the arsenic MCL downward to 0.010 mg/L and identified several best available treatment technologies for compliance. As with other primary MCLs, compliance with the new arsenic MCL is based on the running annual average of results collected for each entry point to the distribution system. The rule makes arsenic monitoring requirements consistent with monitoring for other IOCs regulated under the Phase II/V standardized monitoring framework. However, if arsenic is detected above the MCL in any individual sample, the system must increase the frequency of monitoring at that sampling point to quarterly.

City's Status

During the prior compliance period, there have been no MCL exceedances.

Radionuclides

The Radionuclides Rule became effective in 1978 and is part of the Primary Drinking Water Regulations. Current radionuclide MCLs include limits for radium-226, radium-228, adjusted gross alpha emitters, gross beta and photon emitters, and uranium. Monitoring for radionuclides must be conducted either annually for four years or once every four years depending on system contaminant levels. Combined radium, gross alpha, and uranium sampling is required once every three, six, or nine years, depending on a system's average contaminant levels. Table 10-3 summarizes the current radionuclide MCLs.

Under this rule, monitoring for radionuclides must be conducted at each entry point to the distribution system. Systems were required to conduct an initial round of monitoring between 2003 and 2007, unless earlier radionuclide data was accepted for use in grandfathering by DOH. Thereafter, the required monitoring frequency is determined by DOH and depends on system contaminant levels observed during initial monitoring. The rule allows for eliminating the analysis of radium-226 and uranium for a particular source if gross alpha results are ≤ 5 pCi/L.

and 15 pCi/L, respectively. Similarly, monitoring for beta and photon emitters may be waived by DOH if the system is deemed not vulnerable to these contaminants.

Table 10-3. Radionuclide Rule MCLs

Contaminant	MCLs
Radium – 226, Radium – 228	5 pCi/L (Combined)
Gross Alpha Particles	15 pCi/L
Gross Beta and Photon Emitters	4 mrem/yr ¹
Uranium	30 µg/L

City's Status

The City is on a standard six-year monitoring schedule for radionuclides at all sources. During the prior compliance period, there have been no radionuclide exceedances.

Unregulated Contaminant Monitoring Rule

The EPA issued the first Unregulated Contaminant Monitoring Rule (UCMR) in 1999, with requirements that were effective from 2001 through 2006. The UCMR required public water systems to perform monitoring and reporting of specified contaminants to investigate their occurrence. The UCMR accomplished the following:

- Established three lists of contaminants, categorized by available analytical methods.
- Required that large Public Water Systems (PWSs) and some small PWSs monitor for List 1 contaminants.
- Required that selected large and small PWSs monitor List 2 contaminants.
- Required systems to submit data to the EPA and the State.
- Required systems to include detected contaminants in the Consumer Confidence Report.

The EPA did not require List 3 monitoring under the UCMR since analytical methods were not established before 2005.

Unregulated Contaminant Monitoring Rule 2

In August 2005, the EPA proposed a second Unregulated Contaminant Monitoring Rule (UCMR2) that includes two lists of contaminants; some systems are required to monitor for these contaminants. The rule became final in February 2007. According to the final rule, all PWSs serving more than 10,000 people are required to conduct assessment monitoring for 10 contaminants on the Assessment Monitoring List (i.e., List 1) at distribution system entry-points twice during a 12-month period between January 2008 and December 2010. Systems serving more than 100,000 people are required to conduct screening monitoring for 15 contaminants on the Screening Survey List (i.e., List 2). All analyses are to be conducted by laboratories that are EPA approved for the contaminants in consideration.

Unregulated Contaminant Monitoring Rule 4

USEPA issued the UCMR4 in 2016, with requirements that were effective from 2018 through 2020. The UCMR4 required systems to conduct monitoring for specified contaminants to investigate their occurrence. All systems serving more than 10,000 persons are required to monitor for 10 List 1 cyanotoxins during a four-consecutive-month period from March 1, 2018, to November 31, 2020. All systems serving more than 10,000 persons will also be required to monitor for 20 List 1 additional contaminants during a 12-month period between January 1, 2018, and December 31, 2020. The 20 List 1 additional contaminants consist of metals, pesticides, HAA, alcohols, semivolatile chemicals, and indicators.

City's Status

The City is required to monitor only for those contaminants found on the UCMR 2's List 1, Assessment Monitoring, consisting of 10 chemical contaminants for which standard analytical methods are available. The City is in compliance with this requirement.

Groundwater Rule

The Groundwater Rule (GWR) was promulgated on November 8, 2006 and became effective in December 2009. It applies to all public water systems that use groundwater, unless the groundwater sources are under the influence of surface water or groundwater and surface water are blended prior to treatment (neither of which applies to Centralia). The GWR contains the following primary elements:

- Sanitary surveys
- Source water monitoring
- Corrective action treatment requirements
- Public notification requirements.

Systems were required to comply with all requirements except for the sanitary surveys requirement by December 1, 2009. States were required to conduct the first cycle of sanitary surveys by December 31, 2012.

Further details on each primary element are below.

Sanitary Surveys

The GWR requirement for sanitary surveys builds on existing requirements related to the SWTR and related rules. However, the GWR adds requirements for frequency, scope of surveys, survey documentation, and corrective actions. DOH must conduct sanitary surveys every three years, or five years if the system meets specified performance criteria. The sanitary survey must include eight elements:

- Source
- Treatment
- Distribution system
- Finished water storage

- Pumps, pump facilities, and controls
- Monitoring, reporting, and data verification
- System management and operation
- Operator compliance with State requirements.

If DOH identifies a significant deficiency during the course of the sanitary survey, the State must notify the system within 30 days and may specify the appropriate corrective action. The system has 120 days to take the corrective action or develop a State-approved plan for achieving compliance.

Source Water Monitoring

Systems which do not provide (and demonstrate via monitoring) 4-log treatment of viruses at groundwater sources may be required to conduct source water monitoring for fecal indicators. The GWR specifies two types of source monitoring: assessment monitoring and triggered monitoring. DOH may require systems to conduct assessment source water monitoring for fecal indicators on a case-by-case basis at each source. Groundwater systems will be required to conduct triggered source water monitoring within 24 hours of a positive distribution system total coliform sample to determine whether the coliform presence is due to fecal contamination of the source. Triggered monitoring requires systems to collect a source water sample from each groundwater source in use when the positive sample occurred (or at sources requested by DOH).

DOH will determine whether groundwater systems must conduct assessment source water monitoring and will specify the appropriate fecal indicator. The GWR indicates that States could require systems to monitor for *E. coli*, enterococci, or coliphage.

Corrective Action Treatment Requirements

If it is determined that a system has a significant deficiency, either through the results of a sanitary survey or source water monitoring, the system will be required to implement corrective actions. The GWR specifies that corrective actions are:

- Correct significant deficiencies
- Provide an alternative source of water
- Eliminate the source of contamination
- Provide treatment that reliably achieves at least 4-log treatment of viruses.

Public Notification Requirements

The GWR also establishes requirements for notifying the public according to the type of violation incurred by the groundwater system. This is addressed in more detail in Section 10.4.3.

City's Status

The City is in compliance with the GWR.

Both primary sources are treated by air stripping, to raise pH for corrosion control at the Tennis Court site, and to remove contaminants at the Port District site. Water is disinfected with

chlorine in the form of sodium hypochlorite and fluoridated before entering the distribution system.

Source Water Protection Programs

The Safe Drinking Water Act (Section 1428) established a Wellhead Protection Program (WHPP) to protect groundwaters that contribute to public water systems. DOH has expanded those Federal source protection regulations to include all Group A community and non-community water systems, including groundwater, GUI, and filtered and non-filtered surface water sources. Accordingly, DOH has developed regulations that require all Group A water systems that maintain and operate their own sources to implement a WHPP (WAC 246-290-135(3)), or a Watershed Control Program (WCP) (WAC 246-290-135(4)), or any combination thereof, as deemed appropriate by the State. More detail is provided in Chapter 11.

Secondary National Drinking Water Regulations

In addition to the parameters listed above, the City voluntarily monitors its sources for levels of several compounds to that can impact the aesthetic quality of water. The SDWA secondary maximum contaminant levels (SMCLs) provide a guide to utilities that choose to monitor these parameters. These SMCLs are not enforceable in terms of providing safe drinking water; rather, the SMCLs address aesthetic characteristics. The City is not required to monitor the parameters listed in Table 10-4, but includes these parameters in their monitoring program as a proactive step to ensure customer satisfaction.

Table 10-4. Secondary Drinking Water Parameters

Parameter	Requirement	
	Unit	SMCL
Chloride	mg/L	250
Fluoride	mg/L	4
Iron	mg/L	0.3
Manganese	mg/L	0.05
Silver	mg/L	0.1
Sulfate	mg/L	250
Zinc	mg/L	5
Color	color units	15
Conductivity	umhos/cm ⁴	700
Hardness	mg/L	NA
Sodium	mg/L	NA

10.3.2 Distribution System Regulations

Coliform Rule

Coliform bacteria describe a broad category of organisms routinely monitored in potable water supplies. Though not all coliform bacteria are pathogenic in nature, they are relatively easy to identify in laboratory analysis. If coliform bacteria are detected, then pathogenic organisms may also be present. Bacterial contamination in a water supply can cause a number of waterborne diseases, therefore these tests are strictly monitored and regulated by DOH.

The EPA published the Revised Total Coliform Rule (RTCR) in February 2013 with minor corrections in February 2014. The RTCR is the revision to the 1989 Total Coliform Rule (TCR) and is intended to improve public health protection. Provisions of the RTCR include:

- Setting a maximum contaminant level goal (MCLG) and maximum contaminant level (MCL) for E. coli for protection against potential fecal contamination.
- Setting a total coliform treatment technique (TT) requirement.
- Requirements for monitoring total coliforms and E. coli according to a sample siting plan and schedule specific to the PWS.
- Provisions allowing PWSs to transition to the RTCR using their existing TCR monitoring frequency, including PWSs on reduced monitoring under the existing TCR.
- Requirements for seasonal systems to monitor and certify the completion of state-approved start-up procedures.
- Requirements for assessments and corrective action when monitoring results show that PWSs may be vulnerable to contamination.
- Public notification (PN) requirements for violations.
- Specific language for CWSs to include their Consumer Confidence Reports (CCRs) when they must conduct an assessment or if they incur an E. coli MCL violation.

City's Status

The City performs coliform monitoring as outlined in its Coliform Monitoring Plan. A map and list of sampling locations is provided as Appendix I. The City currently collects 30 samples per month with the exception of June, July, and August, when only 20 samples per month are collected from sites throughout the distribution system. As additional sample sites are required, they are selected based on population served, system hydraulics, average and maximum residence times and adequate representation of each pressure zone.

The City is in compliance with the Total Coliform Rule and WAC 246-290-300. The City has consistently met regulatory sampling requirements and samples have not exceeded the regulatory limit of more than one positive sample per month.

Stage 1 Disinfectants/ Disinfection By-Products Rule

Stage 1 of the Disinfectants/Disinfection By-Products (D/DBP) Rule was promulgated in December 1998 and revised in January 2001. The D/DBP Rule became effective in January 2002 and replaced the former Trihalomethane Rule. The D/DBP Rule sets MCLs for disinfection byproducts including total trihalomethanes (TTHMs), the sum of five haloacetic acids (HAA5), chlorite and bromate and maximum residual disinfectant levels (MRDLs) for disinfectants including chlorine, chloramine, and chlorine dioxide. It also includes monitoring, reporting and public notification requirements for these compounds and sets several MCLGs for specific DBP species. Table 10-5 summarizes the Stage 1 D/DBP Rule parameters and monitoring requirements for water systems that use both groundwater and surface water sources, and provide chlorine disinfection.

Table 10-5. Stage I D/DBP Monitoring Requirements

Chemicals	MCL or MRDL	Number of Samples	Sample Locations
TTHM	MCL 80 µg/L	4 per quarter per disinfected source.	1 at max. residence time; 3 at average residence time in distribution system.
HAA5	MCL 60 µg/L	Same as TTHM requirement.	At same location as TTHM requirement
Chlorine	MRDL 4.0 mg/L	Same as number of total coliform samples collected monthly	Same location as total coliform samples.

Stage 2 Disinfection By-Products Rule

The Stage 2 DBPR was promulgated by the EPA on January 4, 2006 and was adopted by DOH in WAC 246-290. The key provisions of the Stage 2 DBPR consist of:

- An Initial Distribution System Evaluation (IDSE) to identify distribution system locations with high DBP concentrations. Further information is provided below.
- Site-specific locational running annual averages (LRAAs) instead of system-wide RAAs to calculate compliance data. LRAAs will strengthen public health protection by eliminating the potential for groups of customers to receive elevated levels of DBPs on a consistent basis.

The MCLs for TTHM and HAA5 remain unchanged from the Stage 1 DBPR at 0.080 and 0.060 mg/L, respectively, although they will now be calculated as LRAAs.

The IDSE is the first step in Stage 2 DBPR compliance. Its intent is to identify sampling locations for Stage 2 DBPR compliance monitoring that represent distribution system sites with high TTHM and HAA5 levels. For systems serving more than 500 people, three options were available for the IDSE:

- 40/30 Waiver, which allows systems with no samples exceeding TTHM and HAA concentrations of 40 and 30 µg/L, respectively, during 8 consecutive quarters to apply to waive the IDSE requirements.
- Standard Monitoring Program (SMP), which involves a 1-year distribution system monitoring effort to determine locations that routinely show high THM4 and HAA5 concentrations.
- System-Specific Study (SSS), based on historical data and a system model.

City's Status

The City applied for a 40/30 Certificate based on their Stage 1 TTHMs and HAAs compliance monitoring results. The City was granted the certification and was not required to submit an IDSE report. **The City completed its Stage 2 D/DBP Compliance Monitoring Plan on [DATE].** The City's D/DBP Compliance Monitoring Plan is shown in Appendix K.

The City chlorinates at the outlet of the Port District and Tennis Court Wellfields. The City currently collects annual samples at the Port District Wellfield and at 1622 Gold St representing the maximum residence time in the distribution system and test for HAAs and TTHMs. No exceedances were observed during the prior compliance period

Lead and Copper Rule

Lead and copper are heavy metals that may be found in household plumbing materials and water service lines. Lead can cause a variety of adverse health impacts, including delaying physical and mental development in infants and children. Copper can cause aesthetic issues in addition to short-term and long-term negative health impacts. The Lead and Copper Rule (LCR) establishes monitoring requirements, action levels, and compliance requirements to control the levels of these metals at customers' taps.

Under the LCR, water systems are required to perform monitoring of standing water samples at customer taps to determine if more than 10% of homes that meet certain criteria exceed the lead and copper action levels of 0.015 mg/L and 1.3 mg/L, respectively. If these action levels cannot be met, systems must implement public education and a corrosion control treatment strategy for meeting these levels.

In 2004, the EPA initiated a review of LCR implementation across the nation. This effort was focused on determining whether national lead levels are increasing. As a result of this effort, the EPA identified several targeted changes to the existing regulation that would meet short-term goals for improving implementation of the LCR. These revisions, which were finalized in October 2007 and became effective in December 2007, are intended to enhance LCR implementation in the areas of monitoring, treatment, customer awareness, and lead service line replacement. Additionally, these revisions focus on improving compliance with public education requirements to ensure that consumers receive meaningful and timely information that assists in limiting exposure to lead in drinking water. Table 10-6 provides a summary of the LCR revisions.

Table 10-6. Lead and Copper Rule Revisions

Activity	Rule Revision
Monitoring	- Clarify language in the rule regarding the number of samples required and the number of sites from which samples should be collected. - Modify definitions for monitoring and compliance periods to make it clear that all samples must be taken in the same calendar year. - Clarify the reduced monitoring criteria that would prevent small and medium water systems above the lead action level or large systems deemed to no longer meet Optimum Corrosion Control Treatment from remaining on a reduced monitoring schedule.
Treatment or Source Water Changes	- Require water systems to provide advanced notification to the primacy agency of intended changes in treatment or source water that could impact long-term water quality. - The primacy agency must approve the planned changes using a process that will allow the states and water systems to take as much time as needed for systems and states to consult about potential problems.
Customer Awareness and Public Education	- Require utilities to provide a notification of tap water monitoring results for lead to owners and/or occupants of homes and buildings that are part of the utility's sampling program. - Changes to the content, delivery, and time frame of public education regarding lead action level exceedances. Systems must partner with additional organizations to disseminate the message to at-risk populations. - Requires educational statements about lead in drinking water to be included in all Consumer Confidence Reports.
Lead Service Line Replacement	Require utilities to reconsider previously "tested-out" lead service lines when resuming lead service line replacement programs.

The EPA promulgated further revisions to the LCR, in December 2020. The goals of the final rule are:

- Provide greater and more effective protection of public health
- Better identify high levels of lead
- Improve reliability of lead tap sampling results
- Strengthen corrosion control treatment (CCT) requirements
- Expand consumer awareness
- Improve risk communication
- Accelerate lead service line replacement (LSLR)

The final rule mostly focuses on lead. The rule incorporates a trigger level for lead of 10 micrograms per liter (90th percentile). A sample at this concentration triggers additional planning, monitoring, and treatment requirements.

A key focus of the rule are lead service lines (LSLs). The rule requires water systems to inventory their LSLs and establish and LSL removal plan (or demonstrate the absence of LSLs) within three years of rule publication. The inventory must be updated annually. The results of lead monitoring determine the rate at which the utility must replace LSLs:

- If P90 > 15 ug/L, the system must replace 3% of LSLs per year based on a 2-year rolling average for at least 4 consecutive 6-month monitoring period
- If P90 > 10 ug/L to 15 ug/L, LSL replacement goals will be developed in consultation with the regulatory agency for two consecutive 1-year monitoring periods

The rule contains guidance on how these plans should be developed. These regulations also affect priorities for sample collection.

More information about the LCR can be found on the EPA website: [EPA - Lead and Copper Rule](#)

City's Status

The City performs at-the-tap monitoring for lead and copper at 30 locations with a frequency of one sample every three years. The City has consistently maintained compliance with lead and copper action levels and the broader monitoring and notification requirements of the LCR. The City last sampled for lead and copper in June 2020. The next sampling event is due by June 2023.

With the promulgation of the 2020 LCR revisions, the City will develop a plan to achieve compliance with the new regulations.

10.3.3 Other Regulations

Consumer Confidence Reports (CCR) and Public Notification Rule

Under the CCR Rule promulgated in 1998, community water systems are required to provide an annual Consumer Confidence Report (CCR) on the quality of their drinking water and levels of detected contaminants, if any. The annual report must be supplied to all customers and must include:

- Information on the source of drinking water;
- A brief definition of terms;
- If regulated contaminants are detected, the maximum contaminant level goal (MCLG), the maximum contaminant level (MCL), and the level detected;
- If an MCL is violated, information on health effects; and
- If EPA requires it, information on levels of unregulated contaminants.

While the CCR addresses annual “state-of-the-water” reports, the Public Notification Rule (PNR) directs utilities in notifying customers of acute violations when they occur.

The PNR was revised in May 2000 and outlines public notification requirements for violations of MCLs, treatment techniques, testing procedures, monitoring requirements, and violations of a variance or exemption. If violations have the potential for “serious adverse effect,” consumers and the State must be notified within 24 hours of the violation. The notice must explain the violation, potential health effects, corrective actions, and whether consumers need to use an alternate water source. Notice must be made by appropriate media or posted door-to-door. Less serious violations must be reported to consumers within 30 days, in an annual report, or by mail or direct delivery service within one year depending on the severity of the violation. The 2000 revisions also provide the rule Administrator the option of requiring public notification of unregulated contaminants.

City's Status

The City is in compliance with the CCR Rule. Annual CCRs have been published as required. No acute violations have occurred since the promulgation of these rules and therefore the PNR has not been implemented. A copy of Centralia's 2020 CCR is in Appendix J.

10.4 Anticipated Monitoring Requirements

Anticipated future regulatory requirements are summarized in Table 10-7. This table includes ongoing programs to introduce new regulatory requirements, under the Unregulated Contaminant Monitoring Rule and the Contaminant Candidate List, as well as specific rules and regulations currently under consideration. A brief description of anticipated requirements under each rule is provided herein.

Table 10-7. Anticipated Future Regulations

Proposed Rule	Affected Contaminants	Proposed Publication Date ^a
Unregulated Contaminant Monitoring Rule 5 (UCMR5)	Various parameters	December 2021
Per- and Poly-Fluoroalkyl Substances (PFAS)	Monitoring requirements for PFOA and PFOS; potential future requirements for other PFAS	TBD
^a Effective and compliance dates were obtained from the Federal Register and EPA's Drinking Water Website and represent the best information available as of the date of this report.		

Unregulated Contaminant Monitoring Rule 5

The EPA proposed a fifth Unregulated Contaminant Monitoring Rule 5 (UCMR5) in summer 2020, and expects to publish the final rule in December 2021. UCMR5 will specify assessment monitoring for a list of 30 contaminants, 29 of which are under the Per- and Poly-Fluoroalkyl Substances (PFAS) category. This monitoring will be required during a 12-month period between 2023 and 2025.

Per- and Poly-Fluoroalkyl Substances

PFAS are a group of man-made chemicals manufactured and used in a variety of industries since the 1940s. The EPA initially established a provisional lifetime health advisory level (HAL) for perfluorooctanesulfonic acid (PFOS) and perfluorooctanoic acid (PFOA) in 2009. Six PFAS were included in the third Unregulated Contaminant Monitoring Rule (UCMR 3). The two most frequently detected PFAS during UCMR 3 were PFOS and PFOA. As a result, the EPA replaced the provisional HAL with a formal HAL for these two compounds, individually or combined, of 70 nanograms per liter (ng/L) in 2016. The EPA has not yet incorporated PFAS monitoring into Safe Drinking Water Act requirements.

Washington State initiated rulemaking related to PFAS in December 2017. The State Board of Health determined that a state action level (SAL) is the best way to set a standard for PFAS. A

SAL is the concentration of a contaminant or group of contaminants without a maximum contaminant level (MCL) established to protect public health. If exceeded, a SAL triggers required monitoring, follow-up actions, and public notification. There is currently a draft rule that establishes SALs for five PFAS compounds:

- PFOA – 10 nanograms/liter (ng/L)
- PFOS – 15 ng/L
- PFHxS – 70 ng/L
- PFNA – 14 ng/L
- PFBS – 860 ng/L

The draft rule will require community water systems monitor for these chemicals once every three years. The draft rule also establishes monitoring, reporting, public notice and follow-up action requirements. DOH maintains fact sheets on their webpage describing these requirements. The City will stay apprised as these requirements are formalized.

The EPA developed a PFAS Action Plan in February 2019 with seven goals:

1. Conduct the Maximum Contaminant Level (MCL) process for PFOS and PFOA, and evaluate information to determine if a broader class of PFAS should be regulated.
2. Strengthen enforcement authorities and clarify cleanup strategies by designating PFOS and PFOA as hazardous substances and develop interim groundwater cleanup recommendations.
3. Determine if PFAS should be added to the Toxics Release Inventory and if rules to prohibit the use of certain PFAS should be developed.
4. Include additional PFAS in UCMR 5 that were not previously part of UCMR 3.
5. Increase research related to PFAS, including improved detection and measurement methods.
6. Utilize EPA enforcement tools, when necessary, to address PFAS exposure in the environment and assist states in enforcement activities.
7. Develop a risk communication toolbox for federal, state, tribal, and local partners to use with the public.

In February 2020, EPA announced that it is proposing to regulate PFOS and PFOA under the Safe Drinking Water Act (SDWA). EPA is seeking information related to other PFAS and comments on potential monitoring requirements and regulatory approaches for PFAS. If a positive regulatory determination is finalized, EPA would begin the process for establishing a National Primary Drinking Water Regulation for PFOS and PFOA. As previously noted, some of these contaminants will be required under UCMR5 monitoring. Other regulations related to these substances may come in the future at an undetermined date. The City will monitor how these regulations evolve.

10.5 Laboratory Certification

The City utilizes an independent, DOH-certified laboratory for water quality testing. The contact information for this laboratory is listed below.

Lewis County Enviro Lab - Chehalis
360 NW North St.
Chehalis, WA 98532
(360) 740-1222

10.6 Summary of Regulatory Status by Source and Component

Review of water quality data for the most recent monitoring period, 2013 - 2020, indicates that the City has been in compliance with all effective federal and State drinking water regulations. Table 10-8 summarizes applicable regulations and the City's compliance status.

10.7 Summary of Monitoring Requirements and Plans

Currently, the City is required to conduct source water monitoring at the Tennis Court and Port District wellfields and the K Street Well. Table 10-9 provides a summary of water quality monitoring requirements for the City. The table includes the parameters to be monitored, sampling location and frequency. Table 10-9 is intended to be a guide; detailed requirements are available in WAC 246-290.

Table 10-8. Summary of Applicable Regulations and Compliance Status

Regulation	Requirements	Status	Compliance Status
Phase I, Phase II, Phase V Regulations	• Written Plan • Monitoring • Waivers granted for herbicides, insecticides, inorganics, and VOCs	• Monitoring conducted per DOH directed monitoring Plan and waivers • Meets MCLs	Yes
Arsenic Rule	• Monitoring	• Monitors • Meets MCL	Yes
Radionuclides	• Monitoring	• Monitors • Meets MCLs	Yes
Unregulated Contaminant Monitoring Rule	• Monitor for listed contaminants under UCMR1 and UCMR2	• Monitors • Meets MCL	Yes
Source Water Protection Program	• Wellhead Protection Plan	• Approved plan	Yes
Groundwater Rule	• Sanitary Surveys, source water monitoring	TBD	Yes
Total Coliform Rule	• Written Plan • Monitoring	• Monitors throughout distribution system • Meets monitoring requirements • Approved plan	Yes
Lead and Copper Rule	• Monitoring • Treatment Optimization	• Monitors • Optimized for corrosion control	Yes
Stage I D/DBP Rule	• Written Plan • Monitoring	• Monitors D/DBPs throughout distribution system • Meets MCLs	Yes
Stage 2 D/DBO Rule	• Written Plan • Monitoring	• Monitor D/DBOs through distribution system • Meets MCLs	Yes
CCR and Public Notification Rules	• Annual Reports • Reporting as needed	• Consumer Confidence Reports published annually	Yes

Table 10-9. Summary of Existing Monitoring Requirements

Parameter	Regulatory Requirement	Location	Schedule/Status
Inorganic Chemicals			
Asbestos	Primary Drinking Water Regulations	Distribution system	One sample every nine years
Regulated Inorganics	Primary Drinking Water Regulations	All sources	One sample every three years
Nitrate	Primary Drinking Water Regulations	All sources	One sample annually
Lead Copper	Lead and Copper Rule	Customer taps	One set of 30 samples every three years
Radionuclides			
Gross Alpha Emitters Gross Beta Emitters Radium 226 and 228 Uranium	Radionuclides	All sources	Once every four years
Organic Chemicals			
VOCs	Phase I	K Street Tennis Court Port District	One sample every three years
SOCs (herbicides, general pesticides and insecticides)	Phase II & V	Point of entry into distribution system ¹	None. Waivers granted
Dioxin, endoathall, Diquat, Glyphosate, EDB & other soil fumigants	Phase II & V	Point of entry into distribution system ¹	None. Waivers granted
Bacteriological			
Total Coliform	Total Coliform Rule	Throughout distribution system	30 samples per month
Chlorine Residual	SWTR	Throughout distribution system	Same as Total Coliform sites
Disinfection By-Products			
Total Trihalomethanes (TTHM) Haloacetic Acids (HAA5)	Stage I D/DBP Rule	4 per disinfected source: 3 at average hydraulic residence time, 1 at maximum residence time	One sample per treatment plant per year

11. Source Protection Program

This section provides a summary of the City of Centralia's (City) existing Wellhead Protection Plan (WHPP), as well as updates to some sections of the WHPP.

11.1 Summary of Existing Wellhead Protection Plan

The existing WHPP was prepared under the State of Washington Wellhead Protection Program approved by EPA in 1994. The program is administered by the Department of Health (DOH), which approved the City's plan in 1999. The WHPP has two main components: wellhead protection area delineation, and pollution prevention planning. Both of the components are summarized briefly below. The existing WHPP is incorporated by reference into this Water System Plan (WSP).

As part of the wellhead protection area delineation effort, the plan includes a description of the geology and hydrogeology of the area and compilation of well characteristics. The plan also includes 6-month, 1-, 5-, and 10-year estimations of time-of-travel zones for the City's water supply wells, based upon a numerical model. The time-of-travel zones extend generally to the east of the wellfields due to the westerly direction of the regional groundwater flow.

The pollution prevention planning component of the WHPP contains an inventory of potential contaminant sources, a spill response assessment, contingency planning, and a pollution prevention plan. The list of known and potential contaminant sources was originally compiled in 1999, based on information obtained from a "windshield survey" and State and Federal databases. General categories of potential contaminants were then ranked according to relative risk. The sites posing the highest risk to ground water quality are: (1) known contaminated sites, (2) commercial and industrial facilities within the protection areas, (3) transportation and storage of hazardous materials, and (4) stormwater facilities.

The spill response assessment provides a discussion of the organization, lines of communication, and strategies that the City employs to address spill situations. The contingency planning section describes options available to the City in the event that some well supplies become contaminated or are otherwise unavailable. One of the options discussed in the contingency plan is the expansion of pumping capacity and provision of treatment at the Eshom Well. This has taken place since the initial development of the WHPP, with the addition of the two Fords Prairie Wells and the Fords Prairie Treatment Facility.

The WHPP also presents ground water management strategies, including budgetary costs for implementation. Recommended management strategies include both regulatory and non-regulatory approaches. Examples of key strategies that the City continues to implement include:

- Implement a ground water quality monitoring program within the Wellhead Protection Management Area.

- Pursue the clean-up of known contaminated sites (e.g., the Fords Prairie Aquifer Restoration Project).
- Update the potential contaminant source inventory every two years.
- Communicate with local agencies about the nature of their wellhead protection needs, and explore improved coordination among programs which might affect land use, environmental protection, and spill response.
- Communicate regularly with property owners within the Wellhead Protection Management Area regarding their responsibility for pollution prevention, and seek their participation in all information activities.

11.1.1 Wellhead Protection Plan Update

Since the development of the 1999 WHPP, there have been changes within the City water system that impact the WHPP. The most significant changes occurred between 2000 and 2004, and were documented within the WHPP update discussion included in the 2005 WSP. No other significant changes have occurred within the system since 2004. However, key system characteristics that were described in the 2005 WSP and which are still pertinent as of this version of the WSP because they represent material updated since the original 1999 WHPP, are summarized below.

Since the prior WSP update, the City contracted with Pacific Groundwater Group to re-delineate the groundwater time-of-travel zones in the Fords Prairie area, reviewed and updated the potential contaminant sources, and established a nitrates monitoring program for the Centralia Outwash Gravel Aquifer (COGA).

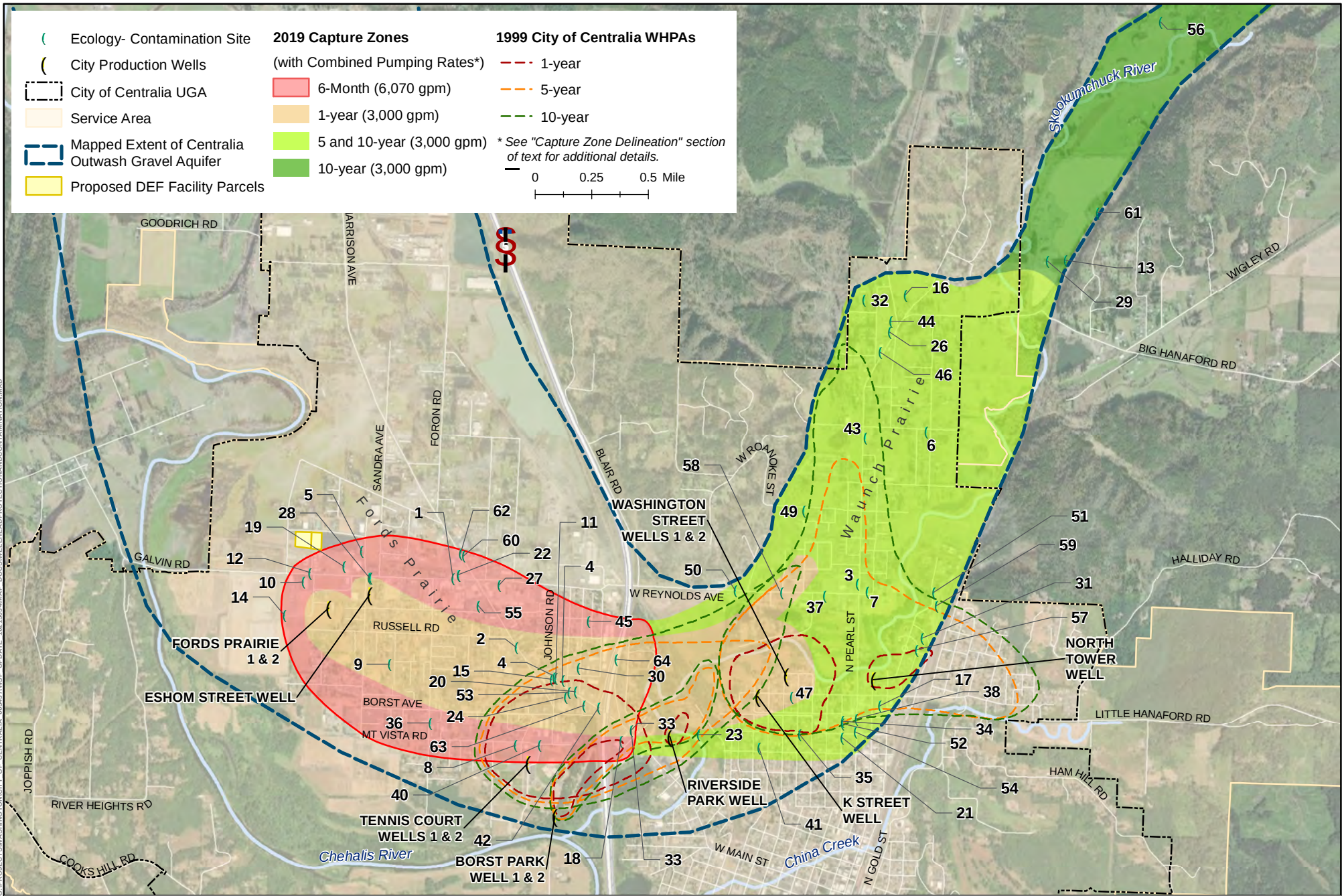
11.2 Well Pumping Characteristics and Wellhead Protection Management Area

The original Wellhead Protection Management Area, or buffer zone, was created based upon the delineated time-of-travel zones for all wells used by the City at the time the WHPP was developed (i.e., in 1999). This included pumping by the North Tower, Washington, and K Street Wells (located in the eastern portion of the City). The buffer zone was then modified in the WHPP (i.e., expanded to the west) to reflect anticipated future conditions (i.e., assuming pumping of Eshom and Tennis Court Wells, and reduced pumping of the easterly wells mentioned above). However, the upgradient (i.e., northeasterly) portion of the buffer zone remained unchanged, although the City anticipated significantly reduced pumping of the easterly wells. Even though this portion of the buffer zone is far beyond the 10-year time-of-travel zone for the westerly wells that are currently utilized, it was retained so as to reflect a conservative approach in terms of managing the City's wellhead area.

The majority of the City's supply is currently obtained from the two Tennis Court Wells and the three wells in the Fords Prairie area. Information about the City's source water pumping facilities is contained in Table 5-1.

As part of a recent SEPA review process for a diesel emission fluid (DEF) manufacturing facility, it was noted that the proposed facility is located within the one-year Wellhead Protection Area (WHPA) delineated by the Washington State Department of Health (DOH) for Fords Prairie Wells 1 and 2. Additionally, a perchloroethylene (PCE) plume is known to exist downgradient of the Trailer Village Laundromat within the Eshom Well's WHPA. The Eshom Well has had a few detections of PCE in the past. The addition of the Fords Prairie Wellfield to the supply profile influences the groundwater mechanics of the Eshom Well, rendering the prior delineated WHPA inaccurate.

For these reasons, the City requested that PGG update the capture zones using recent groundwater elevation data and methods that take groundwater flow and aquifer properties into account to assess whether the proposed DEF facility is within the capture zone. Additionally, the City requested that the 1999 Eshom well WHPA be re-delineated due to concerns about its accuracy. The updated capture zones, or Wellhead Protection Management Area, is shown on Figure 11-1.



**WELLHEAD PROTECTION AREA AND
POTENTIAL CONTAMINATION SITES
FIGURE 11-1**

11.3 Inventory of Potential Contaminant Sources

Section B1 of the original 1999 WHPP contains an inventory of potential contaminant sources. Within this discussion are summary results of a “windshield survey” of the Wellhead Protection Management Area, and information obtained from State and Federal contaminant site databases. This information becomes outdated as activities change within the City. Therefore, updates are required every two years.

The information presented below represents an update to the database search, current as of 2021.

Database Search

For the 1999 WHPP, several data sets were reviewed to obtain information on known and potential sources of contamination. These included Department of Ecology (Ecology) databases (those available in July 1998) for:

- Confirmed and Suspected Contaminated Sites
- Leaking Underground Storage Tanks
- Underground Storage Tanks
- Hazardous Waste Generators (RCRA generators)

Since that time, Ecology has changed the way it maintains these databases. All information of this nature is now compiled into a single database (i.e., the Facility Site Identification Database), accessible via the Internet. This database was searched in April 2021 and data were downloaded and mapped alongside the updated WHPAs to determine the list of potential contaminant sources. This includes sites such as underground storage tanks, leaking underground storage tanks, hazardous waste generators, hazardous waste management activities, and State clean-up sites.

The database search identified 83 sites located within the management area. Figure 11-1 provides the locations of these sites, and Table 11-1 provides details regarding each site.

Table 11-1. Inventory of Potential Contaminant Sources

FID	DOE Facility ID	Site name	Type of Point Source	Ecology Program	Within 1-Yr Travel Zone	Within 5-Yr Travel Zone	Within 10-Yr Travel Zone
1	1155	Northwest Hardwoods Inc Fill	Air Qual Local Authority Reg	Air Quality	Y		
			Emergency/Haz Chem Rpt TIER2	HAZARDOUS WASTE	Y		
			State Cleanup Site	TOXICS	Y		
			Underground Storage Tank	TOXICS	Y		
			Landfill	SOLIDWASTE	Y		
			Industrial SW GP	WATER QUALITY	Y		
2	1169	TRAILER VILLAGE	Voluntary Cleanup Sites	TOXICS	Y		
			State Cleanup Site	TOXICS	Y		
3	1178	TRI COUNTY TRUCK & DIESEL	Underground Storage Tank	TOXICS		Y	
4	1179	Pacific Pride Tiger Town	Underground Storage Tank	Toxics	Y		
5	4445	CCP Composites US LLC Centralia Northpark	Industrial SW GP	WATER QUALITY	Y		
6	4857	S & S Mobile Salvage	Revised Site Visit Program	HAZARDOUS WASTE		Y	
7	5133	Dan Hull Dist Inc	Industrial Sw Gp	Water Quality		Y	
			Emergency/Haz Chem Rpt TIER2	Hazardous Waste		Y	
8	5828	Centralia Sports Fields	Construction Sw Gp	Water Quality	Y		
9	9077	Lewis County Alberta Dr	Underground Injection Control	WATER QUALITY	Y		
10	11554	The Chronicle Print Shop	Revised Site Visit Program	HAZARDOUS WASTE	Y		
11	15431	Rite Aid 5284	Hazardous Waste Generator	HAZARDOUS WASTE	Y		

FID	DOE Facility ID	Site name	Type of Point Source	Ecology Program	Within 1-Yr Travel Zone	Within 5-Yr Travel Zone	Within 10-Yr Travel Zone
12	15476	FERRELLGAS DBA BLUE RHINO NW CENTRALIA	Emergency/Haz Chem Rpt TIER2	HAZARDOUS WASTE	Y		
13	18316	LEWIS COUNTY PW BIG HANAFORD PIT	Sand and Gravel GP	WATER QUALITY			Y
14	34876	UNFI Incorporated Centralia	Industrial SW GP	WATER QUALITY	Y		
			Hazardous Waste Generator	HAZARDOUS WASTE	Y		
15	58132	TIME OIL CO JACKPOT FOOD MART CENTRALIA	Emergency/Haz Chem Rpt TIER2	HAZARDOUS WASTE	Y		
16	NA	Northwest Hardwoods Landfill	State Cleanup Site	TOXICS		Y	
17	94602	City of Centralia Light Department	State Cleanup Site	TOXICS		Y	
			LUST Facility	TOXICS		Y	
			Underground Storage Tank	TOXICS		Y	
18	150947	Jiffy Lube Store 2050	Emergency/Haz Chem Rpt Tier2	Hazardous Waste	Y		
19	NA	Rogers Machinery	Underground Storage Tank	TOXICS	N		
20	3904592	Safeway Fuel 1495	Underground Storage Tank	Toxics	Y		
21	4949613	DR ZIGS RADIATOR SHOP	Underground Storage Tank	TOXICS		Y	
22	6114444	AT&T WIRELESS CENTRALIA	Emergency/Haz Chem Rpt TIER2	HAZARDOUS WASTE	Y		
23	6337826	At&T Centralia	Emergency/Haz Chem Rpt Tier2	Hazardous Waste		Y	
24	6436724	Borst Park Bp	Underground Storage Tank	Toxics	Y		
25	7435285	I5 Foodmart	Underground Storage Tank	Toxics	Y		
26	7504507	Grassers Auto Wrecking	State Cleanup Site	Toxics		Y	
27	7629299	CENTRALIA STREET SHOP	Underground Storage Tank	TOXICS	Y		
28	7999433	Centralia Port Northpark Dr	Enforcement Final	Hazardous Waste	Y		

FID	DOE Facility ID	Site name	Type of Point Source	Ecology Program	Within 1-Yr Travel Zone	Within 5-Yr Travel Zone	Within 10-Yr Travel Zone
29	9497073	STERLING BREEN CRUSHING	Enforcement Final	WATER QUALITY			Y
			Sand and Gravel GP	WATER QUALITY			Y
30	10759868	American Pacific Industries	Hazardous Waste Generator	HAZARDOUS WASTE	Y		
31	11411147	Qwest Communications Co Centralia	Emergency/Haz Chem Rpt Tier2	Hazardous Waste		Y	
32	14253896	KIWANIS VOCATIONAL HOMES FOR YOUTH	Underground Storage Tank	TOXICS		Y	
33	16317171	Arco 6184	Underground Storage Tank	Toxics	Y		
34	24541718	CASCADE HAULING & CONSTRUCTION	Underground Storage Tank	TOXICS		Y	
35	25117314	Symons Frozen Foods Inc F St	Emergency/Haz Chem Rpt Tier2	Hazardous Waste		Y	
36	33637331	Providence Centralia Hospital Centralia	Non Enforcement Final	Ecology Action Site	Y		
37	43722518	Napavine Drug Lab 2	Hazardous Waste Generator	HAZARDOUS WASTE		Y	
38	49314784	Kellys Body Shop	Revised Site Visit Program	Hazardous Waste		Y	
39	51251146	DULIN CONSTRUCTION INC	Underground Storage Tank	TOXICS	Y		
40	51864166	CENTRALIA PARKS & RECREATION	Underground Storage Tank	TOXICS	Y		
41	52768442	Precision Laboratory Plastics LLC	Hazardous Waste Generator	HAZARDOUS WASTE		Y	
42	54295862	Chevron 93124	LUST Facility	Toxics	Y		
			Underground Storage Tank	Toxics	Y		
			Voluntary Cleanup Sites	Toxics	Y		
			Hazardous Waste Generator	Hazardous Waste	Y		
43	56646196	Reliance Food Center Inc	Underground Storage Tank	Toxics		Y	
			LUST Facility	Toxics		Y	

FID	DOE Facility ID	Site name	Type of Point Source	Ecology Program	Within 1-Yr Travel Zone	Within 5-Yr Travel Zone	Within 10-Yr Travel Zone
			Emergency/Haz Chem Rpt TIER2	HAZARDOUS WASTE		Y	
44	58139141	MINKS COUNTRY MARKET	Underground Storage Tank	TOXICS		Y	
45	62917955	RELIABLE ENTERPRISES	Underground Storage Tank	TOXICS	Y		
46	63264888	Elan Painting Inc	Hazardous Waste Generator	Hazardous Waste		Y	
			Underground Storage Tank	TOXICS		Y	
			Industrial SW GP	WATER QUALITY		Y	
47	73886322	TOLEDO TELEPHONE CO INC	Underground Storage Tank	TOXICS	Y		
48	77567317	SUPERIOR MUFFLER PARKWAY ENTERP	Underground Storage Tank	TOXICS	Y		
49	77889162	DARRELL PRICE	Underground Storage Tank	TOXICS		Y	
			Revised Site Visit Program	HAZARDOUS WASTE		Y	
50	77975549	Qwest Corporation W00832	Hazardous Waste Generator	Hazardous Waste		Y	
			Haz Waste Management Activity	Hazardous Waste		Y	
			Underground Storage Tank	TOXICS		Y	
51	83676636	Gold Beach Investment Properties Inc	Hazardous Waste Generator	HAZARDOUS WASTE		Y	
52	84673392	LEWIS COUNTY DISTRIBUTORS INC	Underground Storage Tank	TOXICS		Y	
53	87285554	Texaco 638021033	Lust Facility	Toxics	Y		
			Voluntary Cleanup Sites	Toxics	Y		
54	91259769	Toads Auto Machine	Hazardous Waste Generator	HAZARDOUS WASTE		Y	
55	NA	Lincoln Creek Lumber	Underground Storage Tank	TOXICS	Y		
56	93874971	JC OCONNOR CONSTRUCTION INC	Underground Storage Tank	TOXICS			Y

FID	DOE Facility ID	Site name	Type of Point Source	Ecology Program	Within 1-Yr Travel Zone	Within 5-Yr Travel Zone	Within 10-Yr Travel Zone
57	94628852	Crescent Ave Drug Lab	Hazardous Waste Generator	HAZARDOUS WASTE	Y		
58	96441174	CONRAD MOVING & STORAGE	Underground Storage Tank	TOXICS	Y		
59	96829392	Willamette Valley Company	Emergency/Haz Chem Rpt Tier2	Hazardous Waste		Y	
			Industrial SW GP	Water Quality		Y	
60	3084551	Parkway Mobile Home Park	Underground Storage Tank	Toxics	Y		
61	97749373	Lian Kenneth Residence	Hazardous Waste Generator	HAZARDOUS WASTE			Y
62	98895788	Lewis Cnty Fire Dist 12 Centralia	Underground Storage Tank	TOXICS	Y		
			Hazardous Waste Generator	HAZARDOUS WASTE	Y		
63	99386131	Unocal SS 4722	LUST Facility	Toxics	Y		
			Underground Storage Tank	Toxics	Y		
			Voluntary Cleanup Sites	Toxics	Y		
			Emergency/Haz Chem Rpt TIER2	HAZARDOUS WASTE	Y		
64	99996974	WA DOT I-5 Blakeslee To Grand Mound Widening	401CZM Project Site	Ecology Action Site	Y		
			Non Enforcement Final	Ecology Action Site	Y		

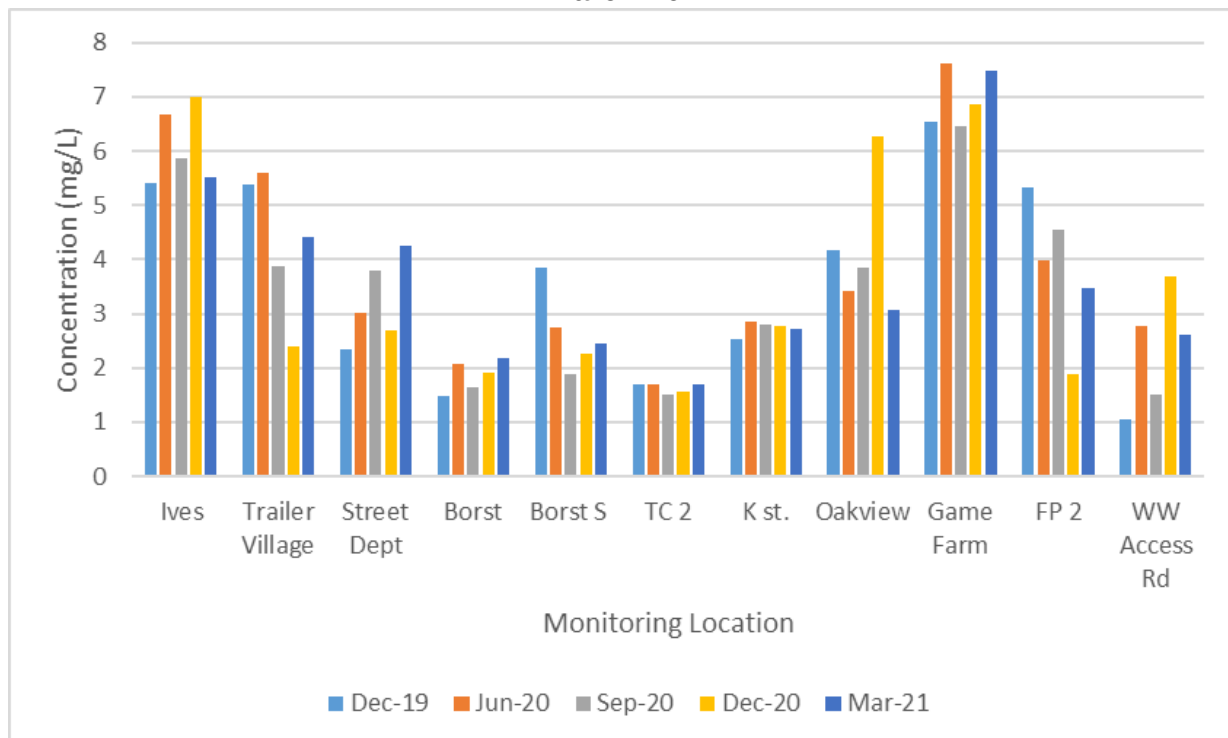
11.4 Nitrate Monitoring Program

The City has concerns about the potential for nitrate contamination in the COGA. The recharge area for the COGA is designated a Critical Aquifer Recharge Area (CARA), and encompasses much of the City to the north and west of the Skookumchuck River and Chehalis River confluence. Septic systems within the City limits and in unincorporated areas of the Urban Growth Area (UGA) overlie the CARA and may cause nitrate contamination within the shallow aquifer. Most septic systems overlying the CARA are in the Fords Prairie and Waunch Prairie areas. Most of the City's active production wells are in the Fords Prairie area, so nitrogen loading in this part of the City is of greatest concern. Other point sources of nitrate contamination, such as livestock facilities, stormwater infiltration features, and wastewater facilities, can contribute nitrates to the COGA as well.

To address this concern the City worked with PGG to characterize the presence of nitrates in the COGA and develop a nitrogen monitoring program. The City installed six monitoring wells in July 2019 and will use several other existing wells to monitor for nitrates. The first nitrate monitoring program sample was taken in December 2019, with quarterly monitoring beginning in June 2020.

The City is creating a baseline dataset so seasonal concentration variability may be observed. Monitoring data as of March 2021 are presented in Figure 11-2. The data show nitrate concentrations at monitoring sites relative to each other. There is no clearly observed seasonal nitrate trend. The City will continue to collect and review this data to look for trends in nitrate concentrations in the COGA.

Figure 11-2: Nitrate concentrations at monitoring program sites, December 2019 – March 2021



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12. Operations and Maintenance Program

12.1 Organizational Structure

The City of Centralia (City) uses a Council/Manager form of government. Elected positions include those for the Mayor and each of the six Council members. The City Manager and directors of each administrative department are filled by appointment. Of these departments, the Public Works Department has responsibility for the management and operation of the City's water system.

The Public Works Department is located at 1100 North Tower Avenue and is headed by the Public Works Director. Responsibilities of this position include overall management of all operations including implementation of City policy and contractual commitments of the City.

A Water Operations Manager, under the direction of the Public Works Director, organizes and administers the day-to-day operations and maintenance of the water system. Figure 12-1 provides a diagram of the organizational structure of the Public Works Department staff involved in water system operations.

12.2 Personnel Certification

Pursuant to Chapter 246-292 WAC, the City is required to have certified operators. Certified personnel are required for positions that are in direct charge of a public water system or major segments of the system and are responsible for monitoring or improving water quality.

Some level of certification is required for most City water system operator positions. All certified personnel must renew their certificates annually. They must demonstrate their continued professional growth in the field by accumulating three related college credits or continuing education units (CEUs) every three years. The City will continue training and assistance for all staff in obtaining their certification and in meeting the three-year CEU requirements. This will assist both the operators and the City in maintaining an efficient level of water system operations. A listing of Water System Operations Personnel and their level of certification as of March 2021 is included in Table 12-1.

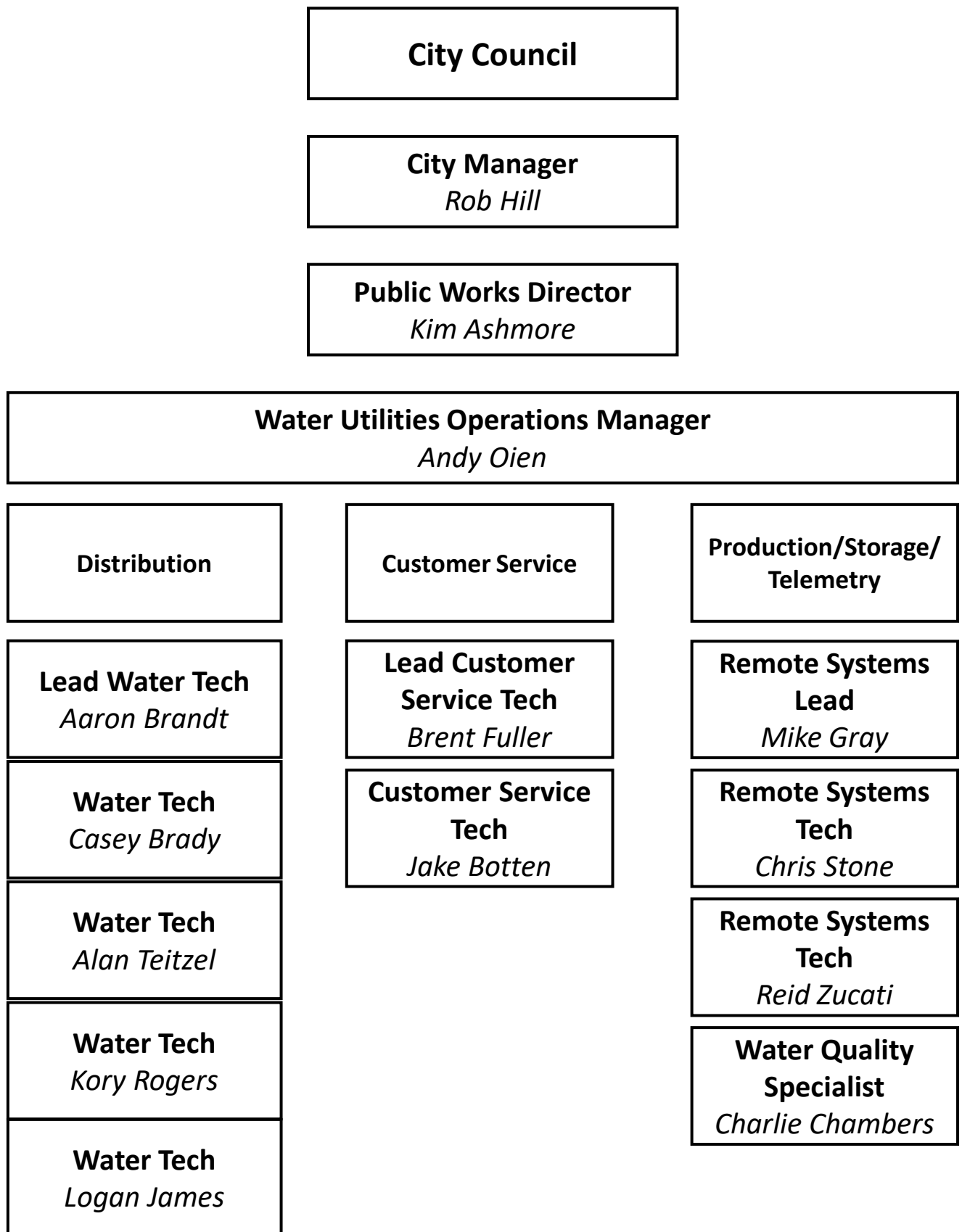


Figure 12-1. City of Centralia Organizational Chart

Table 12-1. Personnel Certification

Staff Person	Title	Certification
Andy Oien	Water Operations Manager	WDS; WTPO-3; CCS; WDM-3
Aaron Brandt	Lead Water Technician	WDS; WTPO-2; WDM-2
Logan James	Water Technician	CCS; WDS
Kory Rogers	Water Technician	WDM-2; CCS; WDS
Casey Brady	Water Technician	WDS; CCS; WDM-2
Alan Teitzel	Water Technician	WDS; CCS; WTPO-2; WDM-2
Brent Fuller	Lead Water Customer Service Technician	WDS; CCS
Jake Botten	Customer Service Technician	WDM-1
Mike Gray	Remote Systems Lead Technician	WDS; WDM-2; WTPO-2
Chris Stone	Remote Systems Technician	CCS; WDM-2; WTPO-2
Reid Zucati	Remote Systems Technician	WTPO-1; WDS
Charlie Chambers	Water Quality Technician	CCS; WDS; WDM-2

Notes

WDS: Water Distribution Specialist
 WDM: Water Distribution Manager
 CCS: Cross Connection Specialist
 WTPO: Water Treatment Plant Operator
 WTPOIT: Water Treatment Plant Operator-In-Training
 BAT: Backflow Assembly Tester

12.3 Daily Operations

12.3.1 General

Centralia has a well-organized system of day-to-day monitoring and inspection to ensure that the water system is kept in good operating condition. Daily operations and maintenance are carried out by Water Utility staff under the direction of the Water Operations Manager. Troubleshooting, adjustments, and repairs are also a part of the daily operations program. Routine operations procedures for various system components are described below.

12.3.2 Sources

Each well, while in operation, is visited daily by a service technician, who observes conditions, checks pump status, and observes water level in the well.

12.3.3 Storage

Daily reservoir checks are carried out to monitor water levels, chlorine residuals, pH, and provide security. Operators check fences, gates, and locks for evidence of intrusion. Reservoirs are drained, cleaned, and inspected once per year.

12.3.4 Booster Facilities

Each booster pump station is inspected weekly. This includes a check of the pumps, flow meters, pressure gauges, and controls as well as overall physical condition of the station.

12.3.5 Service Meters

Water service meters are inspected in response to customer requests or when other evidence suggests a meter has become inoperative.

12.3.6 Dead-end Lines

Dead-end lines have blow-offs operated weekly to maintain chlorine residual.

12.4 Emergency Response Plan

State Department of Health (DOH) requirements for a Water System Plan (WSP) specify that an Emergency Response Plan (ERP) be included in the Operations Program. The purpose of an ERP is to guide personnel through system malfunctions, natural disasters, and other events affecting routine system operation.

The major elements in this ERP include a description of system vulnerability, contingency plan, and emergency response procedures. Since potential emergency situations are varied, a response plan that is flexible enough to adapt to most conditions is important. Proper staffing, training, and communication, as well as a suitable inventory of maintenance and repair parts, are also basic to the ERP.

12.4.1 Vulnerability Overview

In January 2004, the City of Centralia performed a Vulnerability Assessment in accordance with the Environmental Protection Agency (EPA) Bio-Terrorism Preparedness and Response Act of 2002. All Utility facilities were assessed and rated with regard to acts of bio-terrorism. Results were sent to the EPA and integrated into this Emergency Response Plan. As a result of the Vulnerability Assessment, the City added active alarm systems to the Fords Prairie Wellfield, the Seminary Hill and Davis Hill Reservoirs, and the North End Shop.

12.4.2 America's Water Infrastructure Act (AWIA)

AWIA requires that all community water systems serving populations greater than 3,300 persons conduct a Risk and Resilience Assessment (RRA) of the risks to, and resilience of, their system, and update their Emergency Response Plan accordingly. The RRA is required to include the following elements:

- Risk to the system from malevolent acts and natural hazards
- Resilience of the infrastructure, including supervisory control and data acquisition (SCADA)/cyber resilience
- Monitoring practices of the system
- Financial infrastructure of the system
- Use, storage, or handling of various chemicals by the system
- Operation and maintenance of the system

The RRA provides a review of the vulnerability of the City's critical assets, which incorporates risks caused by both natural hazards and human-caused threats. This RRA summary report documents the process and results of the RRA, providing the City with an understanding of which assets in the system are most critical, along with potential mitigation measures that can be considered to address the identified risk in the water system. The City certified its RRA to the administrator of the U.S. Environmental Protection Agency (EPA) by the deadline (June 30, 2021).

The RRA must be reviewed at least every 5 years to determine if revisions are required because of changes to the water system. Upon review, the water system must recertify the RRA if there are no revisions or certify a revision to the RRA. The City is also required to update its Emergency Response Plan (ERP) within 6 months of each RRA certification so that the revised ERP includes information from the latest RRA. The ERP update must also be certified to the EPA. As of publication of this plan, the City is updating its ERP, which must be certified by December 31, 2021.

12.4.3 Contingency Plan

The contingency plan presented herein is intended to serve as a guide to City personnel for developing response procedures. It provides an emergency roster, gives guidelines for determining priority service customers, describes DOH notification procedures, suggests methods for organizing repair parts and materials, sets water service priorities, establishes basic personnel responsibilities, and presents a general field response procedure.

Emergency Roster

An up-to-date Emergency Call Up Roster is provided in Table 12-2. It has been prepared containing personnel and suppliers' names and phone numbers. A copy of this list is displayed at the Utility Office, City Hall, and Fire and Police Departments. In the event of an emergency, additional personnel should be assigned as deemed necessary by supervision.

Table 12-2. City of Centralia Emergency Contacts

Contact	Phone Number
Fire/Police/Medical	911
DOH Regional Engineer	(360) 236-3018
DOH Emergency Contact (after hours)	1-877-481-4901
Department of Ecology Spill Response	800-258-5990
County Environmental Services	360-740-1217
County Environmental Health	360-740-2718
Electric Utility	360-330-7512
Pump Service	888-644-6686
Electrician	360-736-9907
Media Contact (KELA)	360-736-3321
Media Contact (KITI)	360-736-1355

Call Before You Dig	811
Engineering Consultant (HDR)	(360) 570-4400

Priority Service List

The City plans to develop a Priority Service List, to protect individuals and/or organizations who are dependent upon an uninterrupted supply of water and/or strict water quality requirements. Public information and education concerning this service is important to encourage those in need of special water service to contact the City for inclusion on the list. Possible candidates for this service might include individuals on home-care kidney dialysis equipment or other medical facilities and organizations requiring uninterrupted water for specialized commercial or industrial processes.

DOH Notification

The Public Works Director, or their designee, will immediately notify the DOH District Engineer in the event that water shutdown is threatened or required for more than 24 hours, water quality is determined to be unacceptable, or whenever a public health risk associated with the water system is detected.

Material Supplies

The City maintains a computerized inventory of repair and replacement parts that permits an immediate determination of readiness to respond to an emergency. The inventory is updated monthly as purchase invoices and crew reports are received. The quantity and type of materials in storage are checked periodically against the computer printout to ensure accuracy.

Priorities

When used for drinking, water quality should meet all applicable State and federal drinking water quality standards. Furthermore, priorities of water usage are rated in the following order.

- Fire Fighting (Life Threatening)
- Drinking
- Fire Fighting (Property Threatening)
- Sanitary
- Industrial
- Commercial

This usage priority rating is a general guideline only. Decisions by City officials regarding water allocation during emergencies may vary from this on the basis of prevailing conditions.

Responsibilities

The following are responsibilities for administrative and technical personnel in the event of an emergency.

- Mayor and City Manager
 - o Keep public informed.
- Public Works Director

- o Keep Mayor, Manager, and public informed.
- o Maintain contact with Water Operations Manager.
- o Assess disaster/damage.
- o Determine or authorize emergency response.
- o Prepare warning information for users.
- o Oversee operations.
- Water Operations Manager
 - o Keep Public Works Director informed.
 - o Maintain contact with crew(s).
 - o Assess available equipment and resources.
 - o Formulate plan for corrective action.
 - o Execute response action.
 - o Document incident and response action.
- Field Staff
 - o Take immediate action to protect life.
 - o Note damage and apparent cause.
 - o Notify Water Utility office.
 - o Keep Water Supervisor informed.
 - o Assist in taking corrective action.
- Office Staff
 - o Contact emergency services, as appropriate.
 - o Answer incoming phone calls.
 - o Maintain radio contact with crews.
- Police Chief
 - o Maintain crowd and traffic control.
 - o Provide security.
- Fire Chief
 - o Provide fire control.
 - o Provide emergency aid.

General Field Response

The initial reaction by City personnel to an emergency is to take prompt action to remove any immediate threat to public health or safety. Where appropriate, bystanders may be warned, traffic diverted, valves shut off, dangerous materials removed, or other necessary action taken, provided it can be done without further risk to the public or City staff.

Next, the Water Operations Manager is contacted and informed as to the damage and apparent cause. This individual can then dispatch a crew to isolate the problem or damaged facility. Meanwhile, the damage is more thoroughly assessed and a determination made as to the materials and equipment necessary for correction. It may be necessary to decide between a temporary solution that can be accomplished quickly and a permanent one that may take more time. It is essential that the City's repair supplies inventory and a list of materials suppliers are kept up-to-date and readily accessible to avoid unnecessary delay in restoration of service.

Throughout the emergency, radio contact is maintained between work crews, the Water Operations Manager, and other key participants to enhance coordination of the corrective effort. It is important that City administrators are kept apprised of the emergency to permit proper public notification.

12.4.3 Emergency Response Actions

A summary of system components potentially impacted by various types of emergencies is shown in Table 12-3. Actions to be taken in response to several of these situations are described below.

Table 12-3. Potential Disaster Effects

Disaster Type	Storage	Wells	Transmission Network	Distribution System	Telemetry and Control System	Power Supply System
Earthquake	X	X	X	X	X	X
Severe windstorm	X	X			X	X
Ice/snow storm (freezing conditions)	X	X		X	X	X
Flooding		X	X	X		X
Fire	X	X			X	X
Volcanic eruption	X	X	X	X	X	X
Drought		X				
Contamination of water supply	X	X		X		
Water main break	X	X	X	X	X	X
Vandalism	X	X	X	X	X	X
Explosion/bomb blast	X	X	X	X	X	X
Nuclear warfare	X	X	X	X	X	X
Bio-Terrorism	X	X	X	X	X	X

Emergency: Earthquake

Description - A major earthquake, with a magnitude of 5.0 or greater on the Richter scale, and intensity of 9 or greater on the Modified Mercalli scale, could disrupt the source, transmission, pumping, storage, and distribution components of the water system. In addition, power failures and interruption to conventional transportation and communication systems may occur.

Response - Water personnel will anticipate critical water use needs for fire fighting and medical facilities resulting from an earthquake. These should be given due priority in assessing the emergency, preparing damage reports, and organizing repair efforts. Crews are equipped to maintain constant radio contact, barricade hazardous areas, shut off valves to isolate broken mains, move soil and debris, turn off water services, and make repairs. They are also prepared to help residents secure a safe supply of drinking water.

Since they are hidden from view and at least as susceptible to ground movement as above-ground structures, pipelines, wells, and other buried facilities require closer attention in the event of an earthquake. The water system will be checked thoroughly for any unexplained drop in line pressure, reduction in flow rate, pump failure, leakage, or other signs of damage.

Emergency: Flooding

Description - Centralia's location at the confluence of the Chehalis and Skookumchuck Rivers makes it vulnerable to floods in either drainage basin. The largest potential flood impacts on Centralia's water system are inundation and contamination of wells, loss of power, and washed out mains. Other important impacts include overload of the wastewater plant, inundation of other structures, transportation disruptions, and competing demands on City resources.

Response - Water personnel will anticipate the facilities that will most likely be impaired by flooding. All major system components, however, must be checked thoroughly to assess physical damage as well as evidence of contamination. Particular attention should be given to wells in low-lying areas and all locations where mains cross flooded streams. Once collected, damage reports can be evaluated to determine the items that need immediate attention to assure continued water service.

Crews are equipped to maintain constant radio contact, construct temporary diversion dams, barricade hazardous areas, shut off valves to isolate broken mains, pump or bail flooded facilities, move soil and debris, turn off water services, and make repairs. They are also prepared to help residents secure a safe supply of drinking water. The City's ample water storage capacity is an important resource that can be utilized until sources, that have been inactivated by flooding or other natural disasters, can be returned to service.

Emergency: Power Failure

Description - Short- and long-term interruptions in power supply can occur for a variety of reasons and may or may not be associated with emergencies which would otherwise affect the water system. In addition, power outages may be localized to one or more blocks or may affect the entire region. Facilities most affected by this type of emergency include source and booster pumping, telemetry equipment, and communications systems.

Response - In addition to their field response, water personnel will immediately contact the City Light Department to determine the nature, extent, and expected duration of the power outage. Reservoirs would enable several days of uninterrupted water service to the Central, Cooks Hill, and Ham Hill zones, under moderate demand conditions. The Davis Hill, Zenkner, and Seminary Hill zones, however, rely on continuous pumping and would require backup power to serve water to customers while electrical service was down.

Emergency: Contamination of Source of Supply

Description - Contamination can occur in the groundwater supplies and may be the result of man-made practices or natural occurrences. The system's wells tap into open, relatively shallow aquifers in and near the City which can be susceptible to contamination from various land uses. Should a chemical spill or severe erosional condition contaminate a supply during the peak demand period, some curtailment of service may be necessary.

Response - Initial response will be to isolate the affected source from the rest of the system. Next, it will be necessary to determine the specific cause and remove it as quickly as possible. This may be a simple matter such as in the event of a minor spill or may require a long period of time, resources, and specialized assistance for larger, more complicated problems. Appropriate measures for source removal and site cleanup should be determined according to the type, location, nature, and entry path of the contaminant.

In addition to their field response, City personnel will ensure that appropriate health authorities are contacted. At a minimum, this includes the Lewis County Environmental Health Director and the DOH Regional Engineer. Staff need to determine, if possible, the extent of contamination in the system and prepare an appropriate public information program.

Emergency: Emergency Bio-Terrorism

Description – An act of bio-terrorism could affect the entire water system, from production to storage and distribution. In addition, power supply and facilities control could be interrupted, causing additional failures.

Response – Personnel will respond to alarms in place for power control and intrusion. They will notify the proper individuals who will re-establish control, isolate the system, test as needed, and notify customers of outage. Utility managers will notify the proper authorities and ensure support to affected areas until safe return to service is assured.

12.4.4 Public/Press Information

As a public water supplier, the City has an obligation to properly inform its customers of emergencies which may affect water service. Wherever possible, press releases and other public statements will be prepared in advance and delivered through a designated spokesperson. According to the extent and type of emergency, the Mayor, City Manager, Public Works Director, or Water Operations Manager may be an appropriate choice for this role. This individual must have a good understanding of the water system and the emergency at hand. In addition, she/he must be trained in public information and liability issues in order to provide assurance that essential information is presented in a manner which best serves the public interest.

12.5 Routine and Preventive Maintenance

Good preventive maintenance is both cost-effective and a deterrent to emergency conditions. By following a set schedule of maintenance activities, the City can ensure efficient and reliable

system operation, extend life of equipment, and provide an early warning of mechanical breakdown. The City follows a schedule of monitoring and maintaining facilities throughout the distribution system. The maintenance reporting procedures for the system are included in Appendix L. Also in Appendix L are sample notification letters used for cross-connection control as well as customer complaint forms.

Records of maintenance activities are kept on separate forms for wells, treatment facilities, reservoirs, valves, hydrants, pump, meters, and cross connection control devices.

Preventive maintenance also requires adequate security to prevent or discourage unauthorized use, theft, or vandalism to City facilities. All major equipment is securely locked while unattended. This includes all buildings, vaults, sources, reservoirs, material storage areas, and fences designed to secure such facilities. Brush, tall grass, and trees are trimmed back from security fences to improve surveillance and thus discourage potential trespassers. The major facilities are also included in routine police and sheriff's department security patrols, and nearby residents are encouraged to report suspicious activities.

12.6 Water Quality Public Notification, Record Keeping, and Customer Complaint Procedures

12.6.1 Public Notification

The City is required to provide periodic reports to DOH which summarize the results of water quality testing. If any MCLs are exceeded, both DOH and the public must be notified in accordance with methods specified in WAC 246-290-71001 through 246-290-71007.

DOH, through WAC 246-290-71001 (which in turn references 40 CFR 141.201 through 208) has defined situations that require water purveyors to notify customers of what the circumstances are and what actions are being taken to address certain acute issues. Violations and other situations are categorized into three tiers, based upon the degree of potential adverse impacts to human health. The most common situations listed in the three tiers are as follows:

Tier 1 (details found in Table 1 of 40 CFR 141.202 (a))

- a) Violation of the MCL for total coliforms when fecal coliform or E. coli are present in the system, or when there is a failure to test for fecal coliform or E. coli when required.
- b) Violation of the MCL for nitrate, nitrite, or total nitrate and nitrite, or failure to perform required confirmation sampling.
- c) Certain situations when there is a violation of the MRDL for chlorine dioxide.
- d) Certain situations when there is a violation of the turbidity MCL.
- e) Certain situations when there is a violation of the Surface Water Treatment Rule, Interim Enhanced Surface Water Treatment Rule, or Long Term 1 Enhanced Surface Water Treatment Rule treatment technique requirement.
- f) Occurrence of a waterborne disease outbreak or other waterborne emergency.

- g) Other violations or situations with significant potential to have serious adverse effects on human health.

Tier 2 (details found in Table 1 of 40 CFR 141.203 (a))

- a) All MCL, MRDL, and treatment technique requirement violations, except those classified as Tier 1.
- b) Violations of the monitoring and testing procedure requirements, where DOH determines that a Tier 2 notice is required rather than a Tier 3 notice.
- c) Failure to comply with the terms and conditions of any variance or exemption in place.

Tier 3 (details found in Table 1 of 40 CFR 141.204 (a))

- a) Monitoring violations that do not fall under Tiers 1 or 2.
- b) Failure to comply with a testing procedure that does not fall under Tiers 1 or 2.
- c) Operation under a variance or exemption.
- d) Availability of unregulated contaminant monitoring results.
- e) Exceedance of the fluoride secondary MCL.

In addition, WAC 246-290-71001 requires that purveyors notify customers when the system is issued a departmental order, fails to comply with a departmental order, or is issued a category red operating permit.

Public notification distribution requirements are set forth according to the Tier system. In general, the timing and manner of public notifications are as follows:

Tier 1 (details found in 40 CFR 141.202 (b) and (c))

- a) Public notice shall be provided as soon as possible but no later than 24 hours after the system learns of the violation.
- b) DOH shall be contacted as soon as possible but no later than 24 hours after the system learns of the violation.
- c) At a minimum, one of the following forms of delivery is to be used:
 - a. Broadcast media (radio, television).
 - b. Conspicuous posting.
 - c. Hand delivery of notice.
 - d. Another method approved by DOH.

Tier 2 (details found in 40 CFR 141.203 (b) and (c))

- a) Public notice shall be provided as soon as possible but no later than 30 days after the system learns of the violation.
- b) The public notice must be repeated every three months as long as the violation or situation persists, unless DOH determines that another frequency is warranted.
- c) At a minimum, the form of delivery must meet the following:

- a. Mail or direct delivery.
- b. Any other method reasonably calculated to reach other persons regularly served by the system, such as publication in a local newspaper, posting in public places, etc.

Tier 3 (details found in 40 CFR 141.204 (b) and (c))

- a) Public notice shall be provided no later than one year after the system learns of the violation or situation.
- b) The public notice must be repeated every year as long as the violation or situation persists.
- c) Instead of individual Tier 3 notices, an annual report may be used to detail all violations and situations that occurred during the year.
- d) The form of delivery is to meet the same requirements as that for Tier 2 notices.

12.6.2 Recordkeeping

The City is also responsible for maintaining certain records for specified periods. These requirements are listed in Table 12-4.

Table 12-4. Retention of Records of Operation and Analysis

Event	Period of Retention
Bacteriological Analysis	5 years
Turbidity Analysis	5 years
Chemical Analysis	10 years
Records of Action Taken to Correct MCL Violations	3 years after last violation.
Records Regarding a Variance or Exemption	10 years following expiration of Variance or Exemption.
Records Concerning Public Notification	3 years after Date of Notification.
Chlorine Residual	3 years (copies sent to DOH monthly)

12.6.3 Customer Complaints

All customer complaints are reviewed and addressed in a timely manner. Most water utility related complaints are associated with leaks that are fixed as quickly as the utility can respond to them. The City maintains a log of all customer complaints related to water quality.

12.7 Cross Connection Control Program

As stipulated by WAC 246-290-490, all cross connections between the City's water system and a non-potable supply of water are prohibited. It is the purveyor's responsibility to prevent

contamination of the public water system by cross connections. An effective program requires coordination between the purveyor, customer, building inspector, and health department. Basic to an effective program is enabling local ordinances and trained personnel to enforce and monitor the elimination of cross connections.

Centralia's cross connection control regulations are established by City Ordinance No. 2123, passed by the City Council in March 2004. The Ordinance prohibits the presence of cross connections and directs that water service be discontinued or refused to customers which fail to comply.

The City's Cross Connection Control Program is provided in Appendix M. This document contains the details regarding how the cross connection program is implemented.

12.8 System Reliability

12.8.1 Summary of Water System Reliability Characteristics

Water Right Adequacy

As discussed in Section 7, the City's water rights are more than adequate to meet water demands within the 20-year planning horizon and beyond.

Source Reliability

The City utilizes multiple groundwater sources; thus, if one of their primary wellfields is unavailable for maintenance purposes or other reasons, the other sources can be relied upon to meet demands.

During an emergency, the City also has an intertie with the City of Chehalis that can be opened to provide an additional supply.

The City will be increasing its source reliability by developing additional groundwater sources, using water rights acquired from TransAlta.

Facility Reliability

Analyses of the City's source, pumping and storage facilities are provided in Sections 7 and 8. As noted in those portions of this WSP, the City's distribution storage reservoirs provide sufficient standby storage to meet more than two days of average day demand. Pump stations serving boosted pressure zones contain two pumps, with each capable of meeting maximum day (and where necessary in closed pressure zones, peak hour) demands.

12.8.2 Water Shortage Response Planning

Emergency response planning is a key component of overall water system reliability. Part of emergency response is the development of a Water Shortage Response Plan (WSRP) that details actions taken during various levels of water shortages. During minor water shortages,

only public information and voluntary conservation measures may be necessary to ensure adequate water supply. During extreme shortages, mandatory curtailment and rationing may be required.

Having a WSRP plan in place provides the City with an established plan on how to address shortages. It assists customers in understanding what they can do to reduce water usage and what to expect if the shortages become more severe.

The City's WSRP is contained within Chapter 15.05 of the Centralia Municipal Code (see Appendix C). The plan provides a three-stage approach to addressing a water supply shortfall event. Each stage provides an increasingly aggressive set of actions to be implemented as drought conditions become more severe.

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13. Capital Improvement Program

This chapter describes the methodology used in developing the City's water system Capital Improvement Program (CIP), and presents the costs and schedules for projects planned for implementation between 2021 and 2041.

13.1 Development of CIP

The CIP was prepared by first identifying projects that address water system needs or deficiencies, as documented in earlier chapters of the WSP. In addition, recurring or annual capital projects related to system maintenance (e.g., water main replacement programs) have also been included in the list of improvements.

A 20-year implementation schedule of the projects was then developed. Generally, projects of higher priority (i.e., those that address current system needs) were scheduled for implementation within the 10-year planning horizon (2021-2031). Projects that serve anticipated future needs associated with system growth, or are less critical to system operation, were scheduled for implementation between 2031 and 2041. Detailed scheduling of the higher priority projects was based primarily upon the City's existing forecast of project implementation timelines. Where applicable, the timing of water system projects has been coordinated with sewer and street improvements planned for the same locations.

Planning-level (AACE¹ Class 5) cost estimates have been developed for each capital project included in the 2021-2041 CIP. Generally, each project cost includes the following components:

- **Base construction cost.** Includes all labor and material costs needed to construct a project. For pipeline and valving projects, construction costs were estimated based upon unit construction costs derived from bid tabulations for recent and similar Lewis and Thurston County water distribution projects.
- **Sales tax.** Calculated as 8.2 percent (the 2021 local tax rate) of the base construction cost.
- **Construction contingency.** Takes into account the uncertainties associated with estimating project costs at this planning level. Calculated as 30 percent of the total of base construction plus sales tax.
- **Design engineering.** Includes City and consultant design costs, and other related cost items, such as permitting and construction administration. For most projects, this is calculated as 25 percent of the base construction cost. However, a higher percentage of the base construction cost is used for projects with more complex design or permitting needs.

¹ Association for the Advancement of Cost Engineering.

These elements are summed to determine the total project-level cost estimate for a project, as expressed in 2021 dollars. Planning-level cost estimates are summarized in Table 13-1 and project locations are indicated in Figure 13-1.

Table 13-1. Capital Improvement Program (2021-2041)

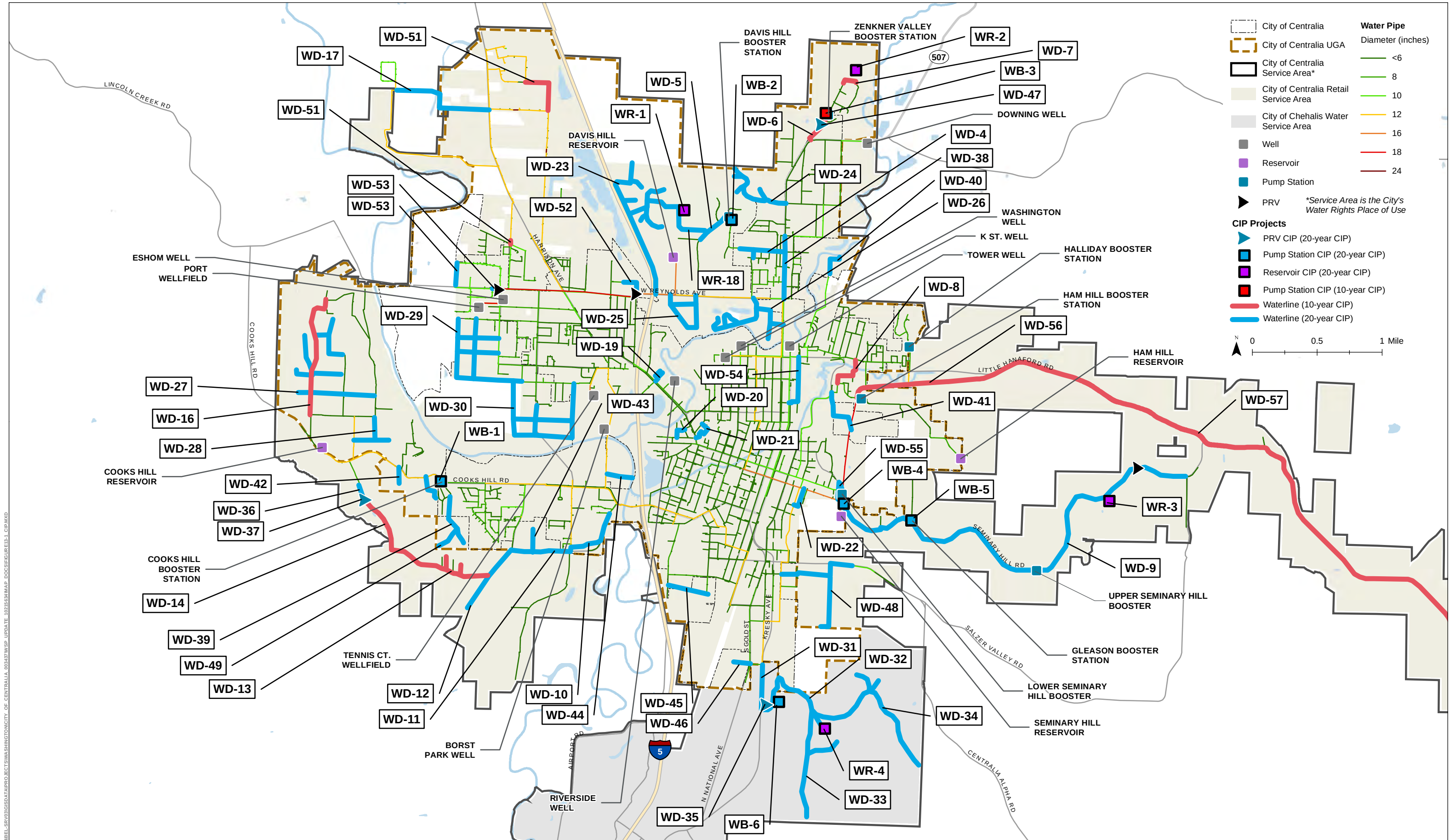
Project No.	Description	Purpose of Project ⁽²⁾	Financing Source ⁽³⁾	Base Project Cost (2021 Dollars)	Schedule and Cost of Improvements (in thousands of 2021 dollars) ⁽⁴⁾													10-yr CIP TOTAL	2031-2041 ⁽⁶⁾	20-yr CIP TOTAL
					2021	2022	2023	2024	2025	2026	2027	2028	2029	2030						
Water System Projects																				
Water Supply																				
WS-1	Borst Park Groundwater Treatment Facility	Growth/Improve	LT	17,600		721	1,061	8,687	8,948						19,417	17,600	37,017			
Water Storage																				
WR-1	Upper Davis Hill Reservoir (0.25 MG)	Growth	Dev	550											0	739	739			
WR-2	Zenkner Hill Reservoir (0.175 MG)	Growth	Dev	382											0	513	513			
WR-3	Upper Seminary Hill Reservoir (0.30 MG)	Growth	Dev	656											0	882	882			
WR-4	Widgeon Hill Reservoir (0.30 MG)	Growth	Dev	656											0	882	882			
Water Pump Stations																				
WB-1	Upgrade Cooks Hill Booster PS (110 gpm)	Deficiency	OI	365											0	491	491			
WB-2	Upgrade Davis Hill Booster PS (300 gpm and 1,000 gpm Fire Pump)	Deficiency	OI	365											0	491	491			
WB-3	Upgrade Zenkner Valley Booster PS (1,000 gpm Fire Pump)	Deficiency	OI	323											0	434	434			
WB-4	Upgrade Seminary Hill Booster PS (1,000 gpm Fire Pump)	Deficiency	OI	532											0	715	715			
WB-5	Upgrade Gleason Booster PS (1,000 gpm Fire Pump)	Deficiency	OI	532											0	715	715			
WB-6	New Widgeon Hill Booster PS (320 gpm)	Growth	Dev	748											0	1,006	1,006			
Water Distribution System (Piping)																				
WD-1	Annual Piping Renewal and Replacement (Annual Cost)	Improve	OI	78	78	80	83	85	88	90	93	96	99	102	894	894	1,787			
WD-2	(Number not Used)																			
WD-3	Leak Detection	Improve	OI	15	15	15	16	16	17	17	18	18	19	20	172	172	344			
WD-4	Upsize Lines from 6" to 8" on Roanoke St (2,200 LF)	Deficiency	OI	764											0	1,027	1,027			
WD-5	Upsize Lines from 6" to 8" in Davis Hill Zone (1,500 LF)	Deficiency	OI	520											0	698	698			
WD-6	Upsize Lines from 6" to 8" on Zenkner Valley Rd (1,900 LF)	Deficiency	OI	657		677									677	0	677			
WD-7	Complete Loop with 6" in Zenkner Valley Zone (500 LF)	Deficiency	OI	138		142									142	0	142			
WD-8	Upsize Lines from 4" to 8" on Logan, Yakima, And Madrona (800 LF)	Deficiency	OI	275		284									284	0	284			
WD-9	Upsize Lines from 6" to 8" on Seminary Hill Rd (19,000 LF)	Deficiency	OI	6,535											0	8,782	8,782			
WD-10	Upsize Lines from 4" to 8" on Military Rd (2,350 LF)	Deficiency	OI	811											0	1,089	1,089			
WD-11	Upsize Lines to 12" and install new 12" loop in Graf Rd area (2,700 LF)	Deficiency	OI	1,116											0	1,500	1,500			
WD-12	Upsize Lines from 2" to 10" on Scammon Creek Rd (1,600 LF)	Deficiency	OI	551											0	740	740			
WD-13	Upsize Lines from 4" to 8" on Blanchard Rd (3,900 LF)	Deficiency	OI	1,346		1,386									1,386	0	1,386			
WD-14	Upsize Lines from 2" to 8" on Blanchard Rd (3,000 LF)	Improve	OI	1,039		1,070									1,070	0	1,070			
WD-15	(Number not Used)																			
WD-16	Add 8" on Joppish Rd (5,300 LF)	Deficiency	OI	1,834		1,889									1,889	0	1,889			
WD-17	Complete Loop with 12" on Goodrich Rd (4,500 LF)	Growth	Dev	1,850											0	2,486	2,486			
WD-18	Add 8" Line to connect to reservoir (1,500 LF)	Growth	Dev	626											0	842	842			
WD-19	Upsize Lines from 2" to 6" on High Street (860 LF)	Improve	OI	243											0	326	326			
WD-20	Upsize Lines to 6" on Latona, Aurora and Denny (1,260 LF)	Improve	OI	351											0	471	471			
WD-21	Upsize Lines from 2" to 6" on Orton Street (1,090 LF)	Improve	OI	305											0	410	410			
WD-22	Upsize Lines from 2" to 6" on Buckner (1,550 LF)	Improve	OI	427											0	574	574			
WD-23	Add 12" Lines on Blair and 8" lines on Delano and Padrick (9,520 LF)	Growth	Dev	3,582											0	4,814	4,814			
WD-24	Add 6" Lines on Delano and Padrick Roads, and 6" and 8" lines in UGA (6,290 LF)	Growth	Dev	2,172											0	2,919	2,919			
WD-25	Add 6" Lines off Reynolds (West side of UGA) (4,280 LF)	Growth	Dev	1,161											0	1,561	1,561			
WD-26	Add 6" and 8" Lines off Reynolds (East side of UGA) (6,630 LF)	Growth	Dev	2,281											0	3,066	3,066			
WD-27	Add 8" Lines in Cooks Hill area (North and West Portions of UGA) (10,000 LF)	Growth	Dev	3,443											0	4,627	4,627			
WD-28	Add 8" Lines in Cooks Hill area (South Portions of UGA) (3,000 LF)	Growth	Dev	1,039											0	1,397	1,397			
WD-29	Add 6" Lines in Game Farm UGA area (West portion) (10,510 LF)	Growth	Dev	2,831											0	3,804	3,804			
WD-30	Add 6" Lines in Game Farm UGA area (South portion) (11,360 LF)	Growth	Dev	3,059											0	4,112	4,112			

Table 13-1. Capital Improvement Program (2021-2041)

Project No.	Description	Purpose of Project ⁽²⁾	Financing Source ⁽³⁾	Base Project Cost (2021 Dollars)	Schedule and Cost of Improvements (in thousands of 2021 dollars) ⁽¹⁾												
					2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	10-yr CIP TOTAL	2031-2041 ⁽⁴⁾	
WD-31	Add 12" Lines (upstream of new Widgeon Hill booster station) (2,100 LF)	Growth	Dev	870											0	1,170	1,170
WD-32	Add 12" Lines (from Widgeon Hill booster station to new reservoir) (3,540 LF)	Growth	Dev	1,454											0	1,954	1,954
WD-33	Add 8" and 12" Lines (Widgeon Hill transmission to South) (5,800 LF)	Growth	Dev	2,249											0	3,022	3,022
WD-34	Add 8" and 12" Lines (Widgeon Hill transmission to East) (8,240 LF)	Growth	Dev	3,197											0	4,297	4,297
WD-35	Widgeon Hill 8" PRV	Growth	Dev	107											0	143	143
WD-36	Extend 8" Lines on Blanchard (1,740 LF)	Improve	OI	611											0	821	821
WD-37	Cooks Hill 8" PRV	Improve	OI	107											0	143	143
WD-38	Upsize Lines from 10" to 12" on Reynolds and Pearl Street (2,360 LF)	Improve	OI	965											0	1,297	1,297
WD-39	Upsize lines from 4" and 6" to 8" on Spring Lane (1,410 LF)	Improve	OI	490											0	658	658
WD-40	Add 6" Lines on Central Blvd (900 LF)	Growth	Dev	246											0	330	330
WD-41	Add 6" Lines on Roswell Road and upsize 2" to 8" (2,070 LF)	Growth	Dev	565											0	759	759
WD-42	Add 6" Lines South of Summerside (1,750 LF)	Growth	Dev	474											0	637	637
WD-43	Add 6" Lines West of Scammon Creek (890 LF)	Growth	Dev	244											0	328	328
WD-44	Add 6" Lines on Nick Road (840 LF)	Growth	Dev	230											0	309	309
WD-45	Add 8" Lines South of South Street (1,660 LF)	Growth	Dev	581											0	780	780
WD-46	Add 8" Lines on Scott-Johnson Road (680 LF)	Growth	Dev	244											0	328	328
WD-47	Zenkner 8" PRV	Improve	OI	107											0	143	143
WD-48	Upsize lines from 6" to 8" on State, 2" and 4" to 8" on Alvord (5,250 LF)	Improve	OI	1,975											0	2,654	2,654
WD-49	Add 8" lines on Spring Lane (2,430 LF)	Growth	Dev	918											0	1,234	1,234
WD-50	Upsize lines from 6" to 10" on S Scheuber Rd (6,200 LF)	Deficiency	OI	2,153											0	2,893	2,893
WD-51	New 12" loop from Kuper Rd (2,100 LF) and upsize 10" to 12"on Sandra Ave (100 LF)	Deficiency	OI	909		937									937	0	937
WD-52	Upsize lines from 10" to 14" on Industrial Dr (1,000 LF)	Deficiency	OI	413											0	555	555
WD-53	Install new 12" on Gallaher Rd (1,000 LF) and upsize 10" to 14" on Galvin Rd (300 LF)	Deficiency	OI	537											0	722	722
WD-54	Upsize pipes to 6" on E 2nd St and B St (2,300 LF)	Deficiency	OI	644											0	866	866
WD-55	Install new 8" piping on Seiminary Hill Rd and S Baker St (1300 LF)	Deficiency	OI	451											0	607	607
WD-56	Replace 18" Gravity Line Phase 1 (16"; Ham Hill to McAtee; 3,915 LF)	Improve	OI	898		925									925	0	925
WD-57	Replace 18" Gravity Line Phase 2 (8"; McAtee to east; 31,600 LF)	Improve	OI	6,320										8,246	8,246	0	8,246
Water Operations and Management ⁽⁶⁾																	
WM-1	Wellhead Protection Plan Updates	O&M	OI	13		13				15				17	45	45	91
WM-2	Water System Plan Updates	O&M	OI	91										159	159	214	374
WM-3	Conservation Plan Implementation	O&M	OI	13	13	13			15	15			16	17	89	89	179
WM-4	(Number not Used)																
WM-5	Water Rate Study	O&M	OI	39					44						44	59	103
Total Costs of Water System Improvements				89,875	106	8,154	1,160	8,789	9,111	138	111	114	134	8,561	36,377	97,839	134,216

Notes:

- (1) Costs are escalated from Base Project Cost (2021 dollars) to stated year of construction, assuming a 3% annual increase in costs.
- (2) Purpose of Project: Deficiency = Addresses deficiencies identified in the Water System Plan; Improve = Does not address a deficiency, but improves overall system operation/reliability; Growth = Required to address growth/expansion of the distribution system; O&M = Necessary for proper system maintenance.
- (3) Source of Funding: OI = Operating Income; Dev = Developer Funded/Contributed; LT = Long Term Debt.
- (4) Total costs associated with projects implemented in 2031 through 2041. Specific years of project implementation are noted where applicable.
- (5) One-time O&M expenditures that are covered by O&M funds, not through the capital budget.



To account for inflation and the increase of construction costs over time, the base project-level costs have been escalated to their anticipated year of construction. It is impossible to predict accurately the rate at which construction costs will increase over the 2021-2041 period; however, a conventional method to estimate such increases is to examine cost index trends of past years.

The City used the Engineering News Record Construction Cost Index history to determine the appropriate rate of cost increase throughout the planning horizon. The national indices indicate construction costs increased at an annual average of approximately 3% from 2013-2019. The timeframe excludes 2020 due to the potential effects of the COVID-19 pandemic on cost increases. Therefore, 3% annual cost growth was used to determine costs of projects in future years.

Where applicable, design costs are scheduled one year in advance of construction costs, to reflect the phasing typically used for larger projects.

13.1.1 Source and Treatment (WS) Improvements

Borst Park Groundwater Treatment Facility (WS-1, 10-year CIP): This item refers to the development of a new groundwater treatment facility, to be located at Borst Park. Using water rights acquired from TransAlta, this project will involve the rehabilitation of the two existing wells, development of new groundwater wells, and design/construction of a new treatment facility similar in nature to the Tennis Court treatment facility, providing for chlorination, corrosion control (via air stripping), and fluoridation. This will be an on-going project, consisting of many phases, from planning to design and then construction. The project cost included in Table 13-1 is based on preliminary, conceptual-level engineering that was conducted in 2021, and includes costs related to new wells, a treatment facility, connection to the distribution system, and associated design and permitting costs.

13.1.2 Water Reservoir (WR) Improvements

The following improvements consist of new reservoirs. While projects WR-1 through WR-3 would increase reliability and fire flow availability in specific existing areas of the distribution system, they likely will be implemented only when triggered by growth or development pressures in each specific area. This is most certainly true of WR-4, which will not be implemented if the Widgeon Hill area is not developed. As such, all reservoir projects are planned for implementation after the 10-year planning horizon, as growth pressures in these areas are assumed to be minimal during the near term.

Upper Davis Hill Reservoir (WR-1, 20-year CIP): This project consists of the construction of a new 250,000 gallon storage reservoir to serve the Davis Hill pressure zone. The tank will provide an additional level of reliability to the pressure zone, address existing fire flow deficiencies, and support anticipated growth. This improvement is not needed solely to address existing fire flow deficiencies if the pump station upgrade project (WB-2) and associated pipeline projects (WD-4 and WD-5) are implemented. Therefore, it is assumed this project will be implemented only if triggered by growth needs.

Zenkner Hill Reservoir (WR-2, 20-year CIP): This project consists of the construction of a new 175,000 gallon storage reservoir to serve the Zenkner Valley pressure zone. The tank will provide

an additional level of reliability to the pressure zone, and will address existing fire flow deficiencies. This improvement is not needed solely to address existing fire flow deficiencies if the pump station upgrade project (WB-3) and associated pipeline project (WD-7) is implemented.

Upper Seminary Hill Reservoir (WR-3, 20-year CIP): This project consists of the construction of a new 300,000 gallon storage reservoir to serve the Seminary Hill pressure zone. The tank will provide an additional level of reliability to the pressure zone, and will address existing fire flow deficiencies. This improvement is not needed solely to address existing fire flow deficiencies if the pump station upgrade projects (WB-4 and WB-5) and associated pipeline project (WD-9) is implemented, or if it is determined that existing available fire flows are sufficient to meet needs in this area.

Widgeon Hill Reservoir (WR-4, 20-year CIP): This project consists of the construction of a new 300,000 gallon storage reservoir to serve the Widgeon Hill pressure zone. The tank will support anticipated growth in this area that was previously within the City's Urban Growth Area (UGA) area, but which has been recently transferred to the City of Chehalis' water service area.

13.1.3 Water Booster Pump Station (WB) Improvements

The following projects consist of improvements to existing booster pump stations or construction of new pump stations. Similar to the reservoir projects described in the previous section, the implementation of these improvements will likely be triggered by growth or development pressures in their respective portions of the distribution system. As such, they are planned for beyond the 10-year planning horizon.

Cooks Hill Booster Pump Station Upgrade (WB-1, 20-year CIP): This project consists of an upgrade to the existing Cooks Hill pump station. The station will be modified to provide 110 gpm of additional pumping capacity, in order to meet projected 20-year supply deficiencies (as discussed in Section 7.2.3).

Davis Hill Booster Pump Station Upgrade (WB-2, 20-year CIP): This project consists of an upgrade to the existing Davis Hill pump station. The station will be modified to provide 300 gpm of pumping capacity, in order to meet projected 20-year peak hour demand (as discussed in Section 7.2.5) and increase fire flow pumping capacity to 1,000 gpm. If the Upper Davis Hill Reservoir is installed, the peak hour demand deficiencies are eliminated without upgrading the pump station and fire flow is supplied by the reservoir.

Zenkner Valley Booster Pump Station Upgrade (WB-3, 20-year CIP): This project consists of an upgrade to the existing Zenkner Valley pump station. The station will be modified to increase the fire flow pumping capacity. If the Zenkner Hill Reservoir is installed, no improvement is necessary to the pump station as fire flow will be provided by the reservoir.

Seminary Hill Booster Pump Station Upgrade (WB-4, 20-year CIP): This project consists of an upgrade to the existing Seminary Hill pump station. The station will be modified to provide 1,000 gpm of fire flow pumping capacity. If the Upper Seminary Hill reservoir is installed, no improvement is necessary to the pump station as fire flow will be provided by the reservoir.

Gleason Booster Pump Station Upgrade (WB-5, 20-year CIP): This project consists of an upgrade to the existing Gleason pump station. The station will be modified to provide 1,000 gpm of fire flow pumping capacity. If the Upper Seminary Hill reservoir is installed, no improvement is necessary to the pump station as fire flow will be provided by the reservoir.

Widgeon Hill Booster Pump Station (WB-6, 20-year CIP): This involves construction of a 320 gpm pump station to serve anticipated growth in the Widgeon Hill area. The station will be designed to operate in conjunction with the Widgeon Hill Reservoir (see note above about this area now being in the City of Chehalis UGA).

13.1.4 Water Distribution System (WD) Improvements

Annual Piping Renewal and Replacement (WD-1, 10-year CIP): This item refers to the continuation of the City's existing water main replacement program. The goal of the program is to reduce the City's amount of unaccounted-for water by the replacement of aging and deteriorated pipelines. This program is a component of the City's conservation program, as discussed in Section 4.

Leak Detection (WD-3, 10-year CIP): This consists of annual investigations by leak detection specialists to identify leaks in the water distribution system. This City typically conducts leak detection over a two-three week period each year, with the goal of investigating the entire system every four years. This aids in prioritizing projects in the renewal and replacement program.

Upsize Waterlines on Roanoke St (WD-4, 20-year CIP): This project involves the upsizing of 6" main on Roanoke Street and a 2" between Prairie Rose Street and Roanoke Street with approximately 2,200 LF of 8" pipe to address fire flow deficiencies.

Upsize Waterlines in Davis Hill Zone (WD-5, 20-year CIP): This project involves the upsize of the 6" waterline in Roanoke Street within the Davis Hill zone with approximately 1,500 LF of 8' pipe to address fire flow deficiencies.

Upsize Waterlines on Zenkner Valley Rd (WD-6, 10-year CIP): This project involves increasing the existing unlooped 6" AC waterline on Zenkner Valley Road from Pearl St to Northridge Dr with approximately 1,900 LF of 8" pipe to address fire flow deficiencies.

Complete Loop in Zenkner Valley Zone (WD-7, 10-year CIP): This project creates a loop between Zenkner Valley Road and Northridge Drive with approximately 500 LF of 6" pipe to address fire flow deficiencies.

Upsize Waterlines on Logan, Yakima, and Madrona (WD-8, 10-year CIP): This project increases the existing 4" waterline on Logan Street with approximately 800 LF of 8" pipe to address fire flow deficiencies.

Upsize Waterlines on Seminary Hill Road (WD-9, 20-year CIP): This project increases the existing 6" waterline on Seminary Hill Road in the Seminary Hill zone with approximately 19,000 LF of 8" pipe to address fire flow deficiencies.

Upsize Waterlines on Military Road (WD-10, 20-year CIP): This project increases the existing 4" waterline on Military Road with approximately 2,350 LF of 8" pipe to address fire flow deficiencies.

Upsize Waterlines on Graf Road (WD-11, 20-year CIP): To address fire flow deficiencies, this project upsizes 200 LF of 6" AC pipe on Scheuber Rd north of the Graf Rd intersection to 12" pipe. The project also upsizes 1,100 LF of 4" AC pipe on Graf Rd to 12" pipe. The project also extends the Graf Rd piping to tie in with piping on Scammon Creek Rd by adding 1,400 LF of new 12" pipe.

Upsize Waterlines on Scammon Creek Road (WD-12, 20-year CIP): This project increases the existing 2" waterline on Scammon Creek Road with approximately 1,600 LF of 10" pipe to address fire flow deficiencies.

Upsize Waterlines on Blanchard Road (WD-13, 10-year CIP): This project increases the existing 4" waterline on Blanchard Road with approximately 3,900 LF of 8" pipe to address fire flow deficiencies.

Upsize Waterlines on Blanchard Road (WD-14, 10-year CIP): This project increases the existing 2" waterline continuing west on Blanchard Road with approximately 3,000 LF of 8" pipe.

8" Waterline on Joppish Road (WD-16, 10-year CIP): This project installs approximately 5,300 LF of 8" waterline on Joppish Road to create a loop to River Heights Road and increase fire flow in the Cooks Hill zone.

Create Loop on Goodrich Road (WD-17, 20-year CIP): This project installs approximately 4,500 LF of 12" waterline from Harrison Avenue along Goodrich Road to create a loop to a dead end 6" waterline to allow for future growth.

Upper Davis Hill Reservoir 8" waterline Connection (WD-18, 20-year CIP): This project installs approximately 1,500 LF of 8" waterline in the Davis Hill zone to connect to the Upper Davis Hill Reservoir.

Upsize Small Diameter Waterlines in Central Part of City (WD-19 through WD-22, 20-year CIP): These projects increase small diameter piping in the central part of the City with 6" waterlines.

New Pipes to Serve Growth in Northern Part of City (WD-23 through WD-26, 20-year CIP): These projects involve the construction of new distribution mains in the northern portion of the City to extend water service to newly developed areas.

New Pipes to Serve Growth in Cooks Hill Area (WD-27 through WD-30, 20-year CIP): These projects involve the construction of new distribution mains to extend water service to newly developed areas in the Cooks Hill pressure zone as well as the Game Farm area (i.e., near the high school).

New Pipes to Serve Growth in Widgeon Hill Area (WD-31 through WD-34, 20-year CIP):

These projects involve the construction of new distribution mains in and around the Widgeon Hill pressure zone to extend water service to areas of potential new development.

Widgeon Hill PRV (WD-35, 20-year CIP): This project involves the construction of a pressure reducing valve (PRV) to allow water from the Widgeon Hill pressure zone to flow into the Central Zone, to aid in maintaining pressures (i.e., during fire fighting or other high flow events).

8" Waterline on Blanchard Road (WD-36, 20-year CIP): This project installs approximately 1,750 LF of 8" waterline on Blanchard Road to create a connection to the existing waterline on Blanchard for the installation of the Cooks Hill PRV (WD-37).

Cooks Hill PRV (WD-37, 20-year CIP): This project involves the construction of a PRV to allow water from the Cooks Hill pressure zone to flow into the Central Zone, to aid in maintaining pressures (i.e., during fire fighting or other high flow events). The PRV station should be located at an elevation below the highest service connections in the Central Zone along Blanchard Road to allow these high elevation (low pressure) connections to shift to the Cooks Hill Zone.

New and Upsized Pipes to Serve Growth throughout the City (WD-38 through WD-46 and WD-49, 20-year CIP): These projects involve the upsizing of some existing lines and construction of new distribution mains in various areas to be developed throughout the Central pressure zone.

Zenkner Hill PRV (WD-47, 20-year CIP): This project involves the construction of a PRV to allow water from the Zenkner Valley pressure zone to flow into the Central Zone, to aid in maintaining pressures (i.e., during fire fighting or other high flow events). This project should only be completed if the Zenkner Hill Reservoir (WR-2) is completed.

Address Fire Flow Deficiencies on State and Alvord Streets (WD-48, 20-year CIP): This project involves the upsizing of distribution mains in State and Alvord Streets to address fire flow requirements.

Address Fire Flow Deficiencies on S Scheuber Rd (WD-50, 20-year CIP): This project involves the upsizing of the existing 6" PVC distribution main on S Scheuber Rd south of the Graf Rd intersection with 6,200 LF of 10" pipe to allow for fire flow goals to be reached for the full stretch of piping along S Scheuber Rd.

Port of Centralia Park II Fire Flow Improvements (WD-51, 10-year CIP): The current available fire flow for the Port of Centralia Park II is approximately 3,500 gpm but has a fire flow goal of 5,000 gpm. This project includes several distribution improvements to reach the fire flow goal for the area.

- Extend the waterline on Robert Thompson Rd to the east and then south to Kuper Rd with 2,100 LF of 12" pipe to create a loop to feed the Port of Centralia Park II.
- Upsize approximately 100 LF of 10" CI pipe on Sandra Ave just north of the intersection with Ives Rd with 12" to eliminate a bottleneck of 10" pipe.

- Adjust the PRV settings of the Eshom Rd PRV (located at the intersection of Eshom Rd and Galvin Rd) with a 100 psi setting.

Industrial Drive Fire Flow Improvements (WD-52, 20-year CIP): The current available fire flow for the Industrial Dr area is approximately 3,000 gpm but has a fire flow goal of 5,000 gpm. This project upsizes the existing 10" CI pipe (1,000 LF) on Industrial Dr to 14" to reach the fire flow goal for the area.

Galvin Rd Industrial Area Fire Flow Improvements (WD-53, 20-year CIP): The current available fire flow for the industrial area along Galvin Rd is approximately 2,500 gpm but has a fire flow goal of 5,000 gpm. This project adds approximately 1,000 LF of 12" along Gallaher Rd between Galvin Rd and Northpark Dr to create a new pipe loop. The project also upsizes 300 LF of 10" DI with 14" on Galvin Rd between Steelhammer Ln and Eshom Rd to remove a bottleneck in the system.

Address Fire Flow Deficiency on B Street (WD-54, 20-year CIP): This project would upsize the existing 6" CI and 2" GI pipe on E 2nd St from N Tower Ave to B St, and the existing 2" PVC, 6" CI, and 4" AC pipe on B St from E 2nd St to E 6th St with 2,300 LF of 6" pipe to improve fire flows.

Address Low Pressure Area around Baker Street (WD-55, 20-year CIP): This project would shift a portion of the Central zone to the Seminary Hill zone along Baker Street and Seminary Hill Road that currently experience low pressures and limit available fire flow to the rest of the Central zone. This would be done by installing approximately 1,300 LF of 8" from the discharge side of the Seminary Hill Pump Station along Seminary Hill Road and Baker Street.

Replace 18" Gravity Main from Ham Hill to McAtee – Phase 1 (WD-56, 10-year CIP): This project will replace approximately 3,915 linear feet of existing 18-inch water main with 16-inch pipe from Ham Hill Road to McAtee Road, abandon an existing water main, and install valves and two fire hydrants. The existing water main is old and prone to leaks. Due to the location of the line it is difficult to find and repair the leaks. Replacing the line using pipe bursting technology allows the City to replace the main without excavating on steep hillsides, private property and the China Creek Phase 1 property. This method saves time, money and reduces construction impacts to area residents. The addition of two fire hydrants improves fire protection for area residents.

Replace 18" Gravity Main from Ham Hill to McAtee – Phase 2 (WD-57, 10-year CIP): This project will replace approximately 31,600 linear feet of existing 18-inch water main with 8-inch pipe from McAtee Road to the east. The City will replace the difficult to access and wetland sections as a matter of priority, then replace the remaining pipes in multiple stages.

13.2 Operational and Management Improvements

Operational and management (O&M) improvements are listed in Table 13-1 and are summarized below. These represent one-time O&M expenditures that are paid for through O&M funds, not through the capital budget.

Wellhead Protection Plan Updates (WM-1): This item refers to the periodic updates and implementation actions associated with the wellhead protection plan (e.g., updates to the

inventory of potential contaminant sources). Budget is provided every four years to address this need.

Water System Plan Updates (WM-2): This consists of the periodic (i.e., every ten years) update to the water system plan.

Conservation Plan Implementation (WM-3): This includes annual costs associated with implementation of the conservation plan. This covers items such as public education (e.g., mailed and distributed brochures), consumer assistance, etc. Other, more costly conservation activities are considered separately, such as annual pipeline renewal and replacement (WD-1) and leak detection (WD-3).

Water Rate Study (WM-5): This item refers to periodic rate studies. For budgeting purposes, it is assumed a rate study is conducted once every 5-10 years.

14. Financial Plan

14.1 Introduction

The effective implementation of a Water System Plan (WSP) is dependent upon accurately developing a document that can be financially supported by the utility, will meet State and local regulatory requirements, and provides the flexibility to deal with unforeseen changes. Requirements from the Department of Health (DOH) are outlined in WAC 246-290-654, which include:

(j) Financial program, including demonstration of financial viability by providing:

- (i) A summary of past income and expenses;*
- (ii) A one-year balanced operational budget for systems serving one thousand or more connections or six-year balanced operations budget for systems serving less than one thousand connections;*
- (iii) A plan for collecting the revenue necessary to maintain cashflow stability and to fund the capital improvement program and emergency improvements; and*
- (iv) An evaluation that has considered:*
 - a. The affordability of water rates; and*
 - b. The feasibility of adopting and implementing a rate structure that encourages water demand efficiency.*

The discussion below presents elements of this WSP which address each of these issues. It is important to note that the financial plan presented herein is an overview of the water system financial position.

A crucial component of the review is how the water system Capital Improvement Plan (CIP) will be reflected in the analysis. Identifying both the cost and timing of CIP projects to be pursued, as well as how they will be funded (Bonds, Grants, Rate Revenue, Loans and/or combinations of each), can significantly impact the water utility's rate revenue requirement.

Based on how these projects are approached from a financial perspective, the review takes an in-depth look at financial performance measures such as the debt service coverage ratio, as well as any existing obligations to fund reserves or renewal and replacements.

This chapter also projects the utility's financial position over time to gauge the relative merits or consequences of specific CIP financing strategies. Monitoring actual changes in financial performance over time will also help indicate when and where actions may be needed to maintain or improve the utility's financial health throughout the process.

The City completed a rate study in 2019. The rate study was used as a basis for developing the financial forecast for this chapter along with the City's updated budget.

14.2 Past Period Financial History

The past five years of financial information for the water utility (Table 14-1) were examined to gain an understanding of the past performance of the utility, and at the same time, gain perspective on its current financial status.

Table 14-1. Historical Revenues and Expenses FY 2015-2019

Account Name	2015 Actual	2016 Actual	2017 Actual	2018 Actual	2019 Actual
Operating Revenue					
Charges for Services	\$5,095,014	\$5,039,204	\$5,188,714	\$5,430,915	\$5,597,080
Interest Earnings	10,609	28,783	45,774	133,687	163,552
Interfund Loan Repayment	75,120	225,219	0	0	0
Capital Facility Charges	95,893	150,923	257,312	219,628	218,065
Miscellaneous	37,063	21,087	172,534	34,408	935,075
Total Operating Revenue	\$5,313,700	\$5,465,216	\$5,664,334	\$5,818,637	\$6,913,772
Operating Expenses					
Salaries	\$1,211,549	\$1,219,655	\$1,317,570	\$1,226,730	\$1,285,972
Benefits	577,221	534,563	579,514	593,525	606,531
Supplies	256,896	227,818	215,364	291,443	220,214
Other Services & Charges	686,855	811,690	797,442	1,142,771	955,605
Intergovernmental	0	5,084	5,349	33,382	0
Interfund	741,287	733,241	758,652	751,700	812,420
Total Operating Expenses	\$3,473,808	\$3,532,050	\$3,673,891	\$4,039,551	\$3,880,741
Debt Service					
Debt Principal	\$439,647	\$435,256	\$435,775	\$435,898	\$379,411
Debt Interest	44,482	39,400	33,486	28,094	22,393
Total Debt Service	\$484,128	\$474,656	\$469,261	\$463,992	\$401,804
Capital Outlay					
Total Capital Outlay	\$1,289,850	\$880,782	\$1,338,718	\$1,229,707	\$1,596,201
Fund Balance Used	\$0	\$0	\$0	\$0	\$0
Operating Revenues Less Expenses, Debt, & Capital Outlay	\$65,913	\$577,728	\$182,464	\$85,388	\$1,035,026

As can be seen from Table 14-1, the City has been able to fund both O&M and capital costs with rate revenue. During the FY 2015 through FY 2019 period, the City's capital costs have averaged \$1.3 million per year. The amount of revenue remaining after all costs is largely dependent on the level of capital spending that year. Excess revenue remaining at the end of the year are held in reserve to be used for future capital needs. The City has a policy to increase their water rates at inflationary levels on an annual basis.

14.3 Development of the Financial Plan

The development of the six-year financial plan is intended to demonstrate the City's ability to meet its capital improvement needs, while maintaining sufficient rate levels to support those needs. The financial plan was developed to review the projected revenues and expenses of the water system for Fiscal Years (FY) 2021-2026. The City's FY 2020 water system budget was used as a starting point. Cost projections for future years were obtained by applying annual escalation factors to the City's 2020 budget in addition to the capital plan proposed in this WSP. The escalation factors used to project the financials were obtained from the 2019 rate study.

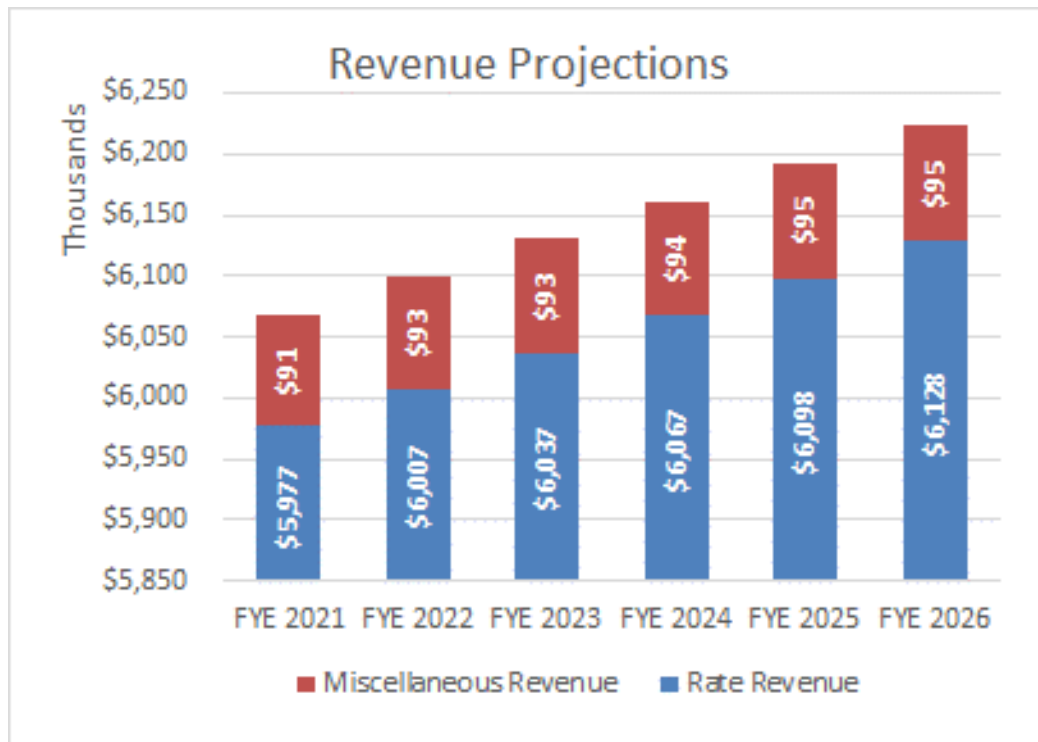
14.3.1 Water Utility Revenues

The first component of the financial plan reviews the revenues of the water system. There are two primary types of revenues received from operations: rate revenues and miscellaneous revenues. Rate revenues are projected to be \$5,977,234 in FY 2020. While the demand forecast in Chapter 3 of this WSP uses a growth rate of approximately 1.76 percent for residential customer categories, the financial plan assumes revenue growth from water rates will be lower than this, at 0.5% (see Table 14-2). Using the lower growth rate was consistent with the 2019 rate study and it is generally a good approach when forecasting revenue to be conservative with revenue estimates.

Table 14-2. Escalation Factors

	Budget	Projected					
	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026
Revenues:							
Customer Growth	Budget	0.50%	0.50%	0.50%	0.50%	0.50%	0.50%
Expenses:							
Labor	Budget	3.50%	3.50%	2.25%	2.25%	2.25%	2.25%
Benefits	Budget	7.50%	7.50%	7.50%	7.50%	7.50%	7.50%
General Inflation	Budget	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%
Interest:							
	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
New Debt Service:							
Revenue Bond							
Term in Years	20	20	20	20	20	20	20
Rate	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%
Issuance Cost	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%

With these assumed growth rates, rate revenues are anticipated to increase to approximately \$6,128,167 by FY 2026. Miscellaneous revenues total \$90,000 in FY 2020 and increase to approximately \$95,000 in FY 2026. Total revenues available to offset the operating and capital needs of the water system total \$5,967,285 in FY 2020, increasing to \$6,223,657 by FY 2026.

Figure 14-1. Revenue Projections

14.3.2 Water Utility Expenses

The second part of the financial plan is a review of the expenses of the utility. These include operating & maintenance expenses, capital outlays funded from rates, taxes/transfer payments, and debt service. These items are summarized below.

Operation & Maintenance Expenses. The FY 2020 budget was used as a starting point for the O&M expenses of the water system. O&M expenses were categorized into salaries, benefits, supplies, and other services and charges. Annual escalation factors (Table 14-2) were applied to the FY 2020 costs to obtain projected costs. It should be noted that no extraordinary costs were assumed as part of the projected costs. O&M expenses begin at \$3,796,356 in FY 2020 and are projected to rise to \$4,695,236 in FY 2026.

Capital Improvement Projects from Rates. Capital improvement projects are related to the infrastructure of the water utility. Capital improvement projects are of an ongoing basis and are generally divided into three types or categories. These categories are capital improvements which are related to renewal and replacements, growth related facilities, and regulatory related improvements. Renewal and replacements are, as the name suggests, the replacement of existing and worn out (depreciated) facilities. Growth related facilities, on the other hand, are those related to system expansion, system upgrades and new customers. Regulatory improvements are those mandated by State or Federal agencies for items like water quality.

One goal of the analysis developed herein is to generally fund capital projects from rates in an amount equal to or greater than the annual depreciation expense for the water utility. Depreciation expense was \$747,000 per the 2018 financial statement. The City has been funding an average of \$1.26 million per year from current rate revenue exceeding the 2018 annual depreciation of

\$747,000. It should be noted that depreciation expense will not cover the cost of renewal and replacement of existing infrastructure due to the impacts of inflation.

The capital projects outlined in Section 13 of this WSP document are incorporated as a part of this financial plan (see Table 14-3). Capital project costs for the six-year period 2021-2026 range from \$93,000 to \$9.1 million per year. The funding for these projects is provided from a combination of rate revenue, capital facility charges, and new debt beginning in 2024

Taxes. The water system has two tax obligations. First, the state utility excise tax is calculated as 5.029% of the rate revenues of the utility. Second, interfund taxes are calculated as 10% of the rate revenue. Total taxes for the time period range from \$867,000 in FY 2020 to \$1,165,000 in FY 2026. The projected tax payments for the period assumes no tax rate change over time.

Debt Service. There are currently three outstanding debt issues related to the water system. One issue is from the Washington State Drinking Water Revolving Fund (SRF) and two are from the Washington State Public Works Trust Fund (PWTF). The total debt obligations for all three loans combined are approximately \$400,000 in FY 2020. Each of the debt issues currently outstanding are set to mature during the analysis period. The PWTF loan is scheduled to mature in FY 2022 while the remaining two SRF loans are scheduled to mature in FY 2023 and FY 2024.

A low interest loan amount of \$12 million is included in FY 2024 for \$5 million, and FY 2025 for \$7.5 million (see Table 14-3). An interest rate of 1.58 percent, 1 percent issuance fee and term of 20 years was assumed for the projected low interest loan.

Figure 14-2. Water Utility Expenses

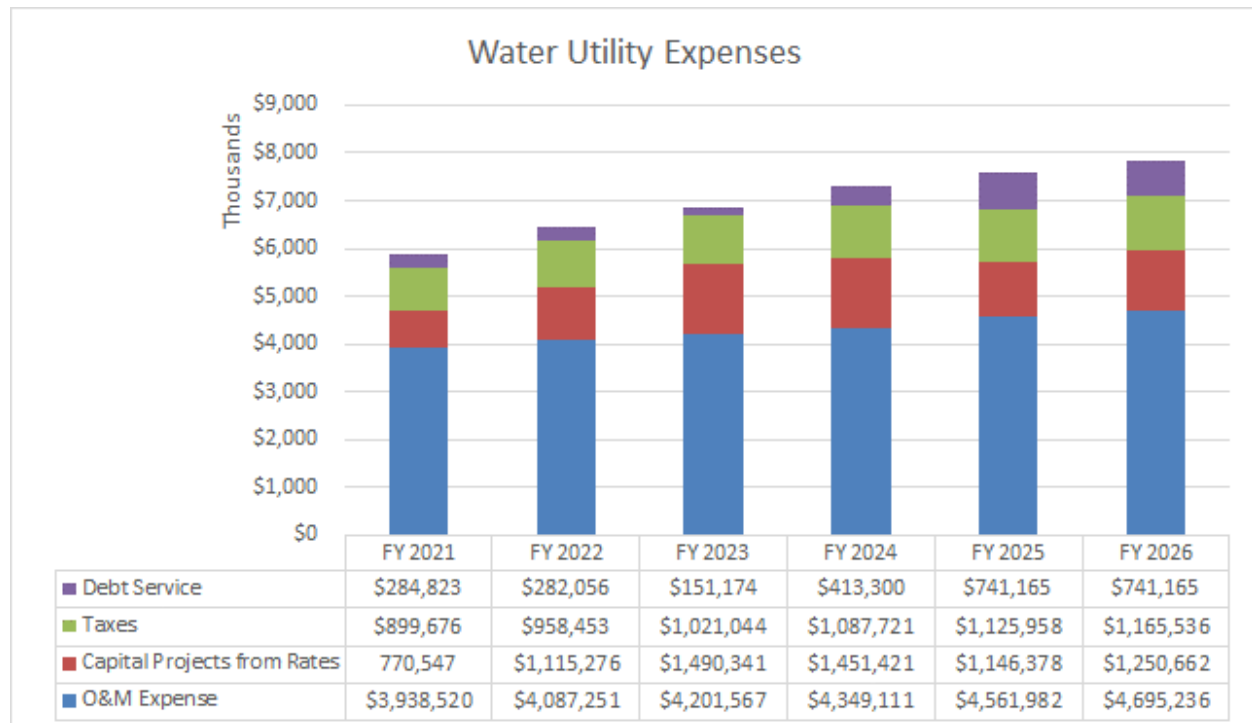


Table 14-3. Summary of Capital Construction Fund

	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026
Beginning Fund Balance	\$7,085,649	\$8,316,066	\$9,186,573	\$2,380,277	\$2,853,773	\$668,837	\$395,433
Plus:							
Annual Capital Transfer	3,812,103	770,547	1,115,276	1,490,341	1,451,421	1,146,378	1,250,662
Grants	0	0	0	0	0	0	0
Interest Income	0	83,161	91,866	23,803	28,538	6,688	3,954
Total Beginning Fund Balance	\$10,897,751	\$9,169,773	\$10,393,715	\$3,895,717	\$4,335,904	\$1,821,904	\$1,650,049
Less: Capital Projects							
Budgeted Capital Projects	\$2,581,686	\$0	\$0	\$0	\$0	\$0	\$0
Water Supply	0	0	721,000	1,060,900	8,687,180	8,947,795	0
Water Storage	0	0	0	0	0	0	0
Water Pump Stations	0	0	0	0	0	0	0
Water Distribution System	0	92,948	7,406,027	98,609	101,567	104,614	107,752
Total Capital Outlays	\$ 2,581,686	\$92,948	\$8,127,027	\$1,159,509	\$8,788,746	\$9,052,409	\$107,752
Plus: Outside Funding Sources							
Excess Operational Fund Balance	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Capital Facility Charges	0	109,748	113,589	117,565	121,679	125,938	130,346
Revenue Bond Proceeds	0	0	0	0	0	0	0
New Low-Interest Loan Proceeds	0	0	0	0	5,000,000	7,500,000	0
Total Outside Funding Sources	0	109,748	113,589	117,565	5,121,679	7,625,938	130,346
Ending Fund Balance	\$8,316,066	\$9,186,574	\$2,380,277	\$2,853,772	\$668,838	\$395,433	\$1,672,643

The capital improvement financing plan above assume that all the projects outlined in the master plan will be completed. The major funding sources for the capital projects are assumed to be a combination of rates, Capital Facility Charges (CFCs) and low-interest loans. It is helpful that the City's current debt is set to mature within the analysis period rather than issuing new debt on top of existing debt service. A result of using revenue bonds and low interest loans for financing purposes will be an increase in debt service which will have a direct impact on rates because the level of new debt exceeds the amount of debt that is scheduled to mature. This combination of financing capital is appropriate and prudent for purposes of reviewing the financial/rate viability of the proposed plan. It should be noted that the City has other funding sources available for capital improvements such as grants and loan programs. These other funding sources are discussed in more detail below.

It should be noted that the City has significant capital improvement projects outside of the time period reviewed. It is important during the development of rates that these future projects be included in the rate setting discussion as they can have significant impacts.

14.3.3 External Sources of Funds

There are outside agency grants and loan funding programs that can be used to fund a portion of the City's Capital Improvement Plan (CIP). The City has in the past been effective at securing these grant and loan funds and should continue to closely monitor future opportunities to obtain these potential funding sources which allow the City to minimize rate impacts. It is important to note that these sources rarely provide full funding of a construction project. The City will need to supplement these funds with other sources of revenue to ensure that implementation of the recommended capital improvement projects occurs. Provided below is a summary of potential funding sources that may be applicable to the City's upcoming capital improvement projects.

- Drinking Water State Revolving Fund
- Public Works Trust Fund
- Rural Development
- Water Infrastructure Finance and Innovation Act
- Other External Funding Sources

A brief description of these funding sources is provided below.

Drinking Water State Revolving Fund (DWSRF). DOH manages these funds. Under the reauthorized Safe Drinking Water Act (SDWA), funding is appropriated to states to develop their Drinking Water State Revolving Fund (DWSRF) loan programs. Each state receives annual allocations in the form of a Capitalization Grant. DWSRF loans are available to all community public water systems, and non-profit, non-community public water systems, except federally owned and state-owned systems. Loans are provided to water systems for capital improvements that increase public health protection and compliance with regulations. Additionally, loans are intended to protect the health of the people of Washington by ensuring safe and reliable drinking water.

Loans ranked and awarded to communities based on an established scoring criterion. As of 2014 US steel and iron products are required for projects fully or partially funded by the DWSRF. Loans must focus on construction and address a single identified problem or need. If multiple areas are applicable and in need of funding separate loan applications must be submitted. A few notable ineligible projects and activities include projects that focus on future population growth and water systems expansion and purchase of water rights.

Subsidized loans are granted to communities based on affordability determined by an affordability index based on the community's median household income and the water systems water rates. Subsidized loans are awarded based on available funds with a maximum subsidy of 50% principal forgiveness.

The interest rates of the loan are generally 1.0 to 1.5 percent based on a community affordability index calculation. Non-subsidized loans are also assessed a 1.0 percent loan fee. interest rate, with a 1.0 percent loan fee, for a term of up to 20 years and a maximum of \$5 million. No local match is necessary for the loan.

Public Works Board Loan (Public Works Trust Fund). The Public Works Board (PWB) Loan program is a loan program set up by the Legislature to assist cities, towns, counties, or special districts with funding for different types of public works projects. The program is administered by the Washington State Department of Commerce. Eligible projects include repair, replacement or creation of domestic water systems, sanitary sewer systems storm water sewer systems roads, streets, solid waste and recycling facilities and bridges. Eligible project must meet policy objectives which include:

- Efficient use of State Resources
- Preservation and enhancement of health and safety
- Abatement of pollution and protection of the environment
- Creation of new, family wage jobs, and avoidance of shifting existing jobs from one Washington State community to another
- Foster economic development
- Efficiency in delivery of goods and services transportation
- Reduce the overall cost of public infrastructure.

There are three types of loans available, construction, pre-construction and emergency. Projects are awarded based on a scoring method that is then ranked against all other applicants. PWB Loans are awarded to communities by scoring applications based on a set of predetermined criteria then funding the highest scores until budgeted funds are exhausted.

The maximum loans per biennial budget are \$10 million for construction, \$1 million for both pre-construction and emergency loans. The terms are variable based on need but can range from 1 to 20 years for construction and emergency loans and a maximum of 5 years for pre-construction loans. No local match is required for PWBL loans. Debt service coverage is not imposed on the PWBL loan. The interest rates for non-distressed communities are established by multiplying the average of 11 general obligation bond index rates by 50%.

Communities that are determined to be distressed, as measured by an affordability index similar to the DWSRF, may receive loan forgiveness of up to 5% of principal for construction loans.

U.S. Department of Agriculture, Rural Development (RD). Loan monies are available to rural areas with less than 10,000 population. This program is funded RD for the preliminary engineering, design, construction, and start-up of new water system facility projects. The application process allows for a thorough review of the engineering, environmental, and financial impacts of proposed projects before extending a loan offer. The RD loan program offers interest rates lower than municipal bonds and up to a 40-year term. The RD loan program requires some form of interim financing, as loan monies are made available after completion of the construction activity.

U.S. Environmental Protection Agency, Water Infrastructure Finance and Innovation Act (WIFIA). The program is eligible for a broad range of water and wastewater infrastructure projects. Interest rates are set at U.S. Treasury rates and can be financed over a maximum of 35 years from substantial completion of the project. The program is limited to a minimum of \$20 million for large communities and \$5 million for communities with a population less than 25,000. A key limitation to the program is that the loan amount cannot exceed 49 percent (%) of the total project costs and the project cannot exceed 80 percent (%) of federal funding.

Provided below are additional funding sources available to the City for funding capital improvements.

Other External Funding Sources

Revenue Bonds. Revenue bonds are another external source of funding for capital projects. The sale of revenue bonds is the most common source of funds for construction of major utility improvements. Water rate revenue and charges are the main source of funds for debt service (principal and interest) payments. A key benefit of revenue bonds is the exemption of federal income tax.

A determination of the utility's ability to repay debt is an important consideration. A debt service coverage ratio (total revenue, less O&M and tax expenses, divided by the debt service payments requiring a coverage ratio) is calculated and the utility's finances are reviewed in order to verify debt payments will be feasible. Coverage ratios of 1.25 (25 percent more than the debt payment) are typical, but coverage of 1.5 is a more prudent financial target for financial planning purposes.

Utility Local Improvement Districts/Special Assessment Districts. Similar to revenue bonds, other bond financing approaches include utility local improvement districts (ULIDs), special assessment districts (SADs) and other funding for projects that serve and benefit a limited service area within the City's total service area. The costs of those improvements are shared only by those customers benefiting from those improvements.

Developer Contributions. Some projects are identified in the capital improvement program with an expectation to be funded through developer projects. Where possible, the City attempts to leverage development related projects to lower costs of City funded capital projects.

While the above list of possible funding opportunities for the City is not exhaustive, it does highlight the most probable outside funding sources available to the City for its capital improvement program. Provided below is a summary of a key resource that may be helpful for the City to identify possible funding opportunities.

Infrastructure Assistance Coordinating Council. One key resource in identifying other funding programs is the Infrastructure Assistance Coordinating Council (Council). The Council is a non-profit organization comprised of state and local agencies whose function is to provide assistance in securing funding for infrastructure repair and development. The purpose of the Council is to assist local governments in coordinating funding efforts for infrastructure improvements. This is an important resource as the Council will be aware of any new funding opportunities that may arise.

14.4 Summary of the Financial Projections

A summary of the financial plan and resulting financial status of the water system is provided in Table 14-4. This is an abbreviated summary of the detailed analysis that was developed for the City, summarizing the major elements of the City's analysis, along with its findings.

As can be seen from Table 14-4, in order for the City to fund the full capital plan (as detailed in Table 14-3), new low interest loans and rate adjustments will be required. The plan shown in Table 14-4 uses potential additional rate adjustments of 6 percent (%) for FY 2022 through FY 2024 and 3 percent (%) per year thereafter. The rate adjustments shown are cumulative in each year. Therefore, the total cumulative adjustment required to rates over the six-year period is projected to be 26.08 percent (%).

Two additional indicators of financial viability are reserve levels and debt service coverage ratios. As can be seen in Table 14-4, the debt service coverage ratio is currently 4.53. This indicates strong financial results and will remain above 2.70 during the analysis period after rate adjustments are incorporated.

Table 14-5 shows that the minimum balance for the working capital reserve is 60 days of O&M expenses and taxes. This equates to a minimum reserve of \$792,000 in FY 2020, rising to \$923,000 in FY 2026. The working capital reserve target is projected to be met in all years of the forecast period.

Table 14-4. Summary of the Revenue Requirements FY 2020 to 2026

	Budget FY 2020	Projected					
		FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026
Revenue							
Rate Revenue	\$5,876,973	\$5,977,234	\$6,007,120	\$6,037,156	\$6,067,342	\$6,097,678	\$6,128,167
Miscellaneous Revenue	90,013	90,502	92,524	93,198	93,887	94,703	95,490
Total Sources of Funds	\$5,966,986	\$6,067,736	\$6,099,644	\$6,130,354	\$6,161,229	\$6,192,381	\$6,223,657
Expenses							
O&M Expenses	\$3,796,356	\$3,925,528	\$4,060,489	\$4,201,567	\$4,349,111	\$4,503,494	\$4,665,115
Additional O&M to Support CIP	155,896	12,991	26,762	0	0	58,487	30,121
Capital Outlays from Rates	393,197	770,547	1,115,276	1,490,341	1,451,421	1,146,378	1,250,662
Taxes	867,468	899,676	958,453	1,021,044	1,087,721	1,125,958	1,165,536
Debt Service	287,589	284,823	282,056	151,174	116,834	0	0
New Debt Service	0	0	0	0	296,466	741,165	741,165
Total Revenue Requirements	\$5,500,505	\$5,893,566	\$6,443,037	\$6,864,125	\$7,301,552	\$7,575,482	\$7,852,599
Balance/(Deficiency) of Funds	\$466,481	\$174,170	(\$343,188)	(\$733,566)	(\$1,140,186)	(\$1,383,101)	(\$1,629,218)
Total Increase/(Decrease) as a % of Rates	-7.94%	-2.91%	5.71%	12.15%	18.79%	22.68%	26.59%
Potential Rate Adjustment		0.00%⁽¹⁾	6.00%	6.00%	6.00%	3.00%	3.00%
Additional Revenue with Rate Adjustment		\$0	\$360,427	\$746,192	\$1,158,959	\$1,382,627	\$1,615,071
Net Balance/(Deficiency) of Funds	\$466,481	\$174,170	\$17,239	\$12,626	\$18,774	(\$474)	(\$14,146)
Additional Rate Adjustment After Proposed	-7.94%	-2.91%	-0.29%	-0.21%	-0.31%	0.01%	0.23%
Average Residential Bill Comparison							
After Proposed Rate Adjustment	\$58.37	\$59.03	\$62.57	\$66.33	\$70.31	\$72.41	\$74.59
Monthly Bill Difference	\$0.00	\$0.66	\$3.54	\$3.75	\$3.98	\$2.11	\$2.17
Cumulative Bill Difference	\$0.00	\$0.66	\$4.20	\$7.96	\$11.94	\$14.04	\$16.22
Debt Service Coverage Ratio - All Debt							
Before Rate Increase	4.53	4.80	4.30	6.63	1.75	0.79	0.55
After Proposed Rate Increase	4.53	4.80	5.58	11.56	4.56	2.73	2.82

(1) FY 2021 is a scheduled consumer price index adjustment (CPI) of 1.13%, no additional adjustment proposed.

Table 14-5. Summary of Reserves FY 2020 to FY 2026

	Budget	Projected					
	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026
Operating Reserve							
Beginning Reserve Fund Balance	\$608,000	\$615,000	\$795,320	\$820,512	\$840,048	\$865,049	\$873,225
Plus: Balance of Funds	8,603,486	180,320	25,192	19,535	25,001	8,177	(5,414)
less: Transfer of Surplus to Capital Fund	(8,596,486)	0	(0)	(0)	0	0	0
Ending Fund Balance	\$615,000	\$795,320	\$820,512	\$840,048	\$865,049	\$873,225	\$867,812
Minimum 60 Days (O&M + Transfers)	\$792,283	\$795,320	\$820,513	\$840,048	\$865,049	\$900,793	\$923,452
Capital Reserves							
Beginning Reserve Fund Balance	\$7,085,649	\$8,316,066	\$9,186,573	\$2,380,277	\$2,853,773	\$668,837	\$395,433
plus: Rate Funded System Reinvestment	3,812,103	770,547	1,115,276	1,491,637	1,453,594	1,146,378	1,250,662
plus: Capital Facility Charges	0	109,748	113,589	117,565	121,679	125,938	130,346
plus: Loan Proceeds	0	0	0	0	5,000,000	7,500,000	0
plus: Interest Earnings	0	83,161	91,866	23,803	28,538	6,688	3,954
less: Funds Used for Capital Projects	(2,581,686)	(92,948)	(8,127,027)	(1,159,509)	(8,788,746)	(9,052,409)	(107,752)
Ending Fund Balance	\$8,316,066	\$9,186,573	\$2,380,277	\$2,853,773	\$668,837	\$395,433	\$1,672,643
Target Ending Fund Balance (1.5% of Plant in Service)	<i>\$464,510</i>	<i>\$466,366</i>	<i>\$468,303</i>	<i>\$468,372</i>	<i>\$473,927</i>	<i>\$474,001</i>	<i>\$474,077</i>
Equipment Replacement Reserve							
Beginning Reserve Fund Balance	\$854,548	\$861,685	\$832,083	\$880,466	\$788,392	\$886,987	\$988,381
Plus: Balance of Funds	86,699	94,095	95,509	97,737	98,595	101,395	104,259
less: Transfer of Surplus to Capital Fund	(79,562)	(123,698)	(47,126)	(189,810)	0	0	0
Ending Fund Balance	\$861,685	\$832,083	\$880,466	\$788,392	\$886,987	\$988,381	\$1,092,640

14.5 Review of the City's Current Water Rates

The City has adopted water rates to meet their financial requirements. Table 14-6 shows the current adopted water rates of the City for one customer category: single-family residential customers inside City limits. For this category of water use the rate structure includes a minimum monthly charge, plus an "inclined block" structure that applies higher rates at higher levels of consumption. This type of rate structure encourages customers to manage their water consumption. The typical monthly bill for an Inside-City residential customer with a 3/4" meter and 10 CCF usage would be \$59.03 per month. Customers outside City limits have a similar rate structure but with higher rate levels.

Table 14-6. Overview of the City's Current (2021) Water Rates for Single-Family Residential Customers

	Category	Charge
2021 Minimum Monthly Charge		
Inside City Limits - Single Family Residential	¾ inch meter	\$21.53/month
	1 inch meter	\$29.27/month
	1 ½ inch meter	\$45.60/month
	2 inch meter	\$68.24/month
2021 Consumption Charge		
Inside City Limits - Single Family Residential		
	Block One	
	Block Two	
	Block Three	
	(0-5 ccf)	\$3.20/ ccf
	(6-15 ccf)	\$4.30/ ccf
	(Over 15 ccf)	\$5.33/ ccf

CCF = One Hundred Cubic Feet

Rates for customer categories other than single-family residential also include a minimum monthly charge, but apply uniform rates instead of inclined block rates. These rate structures apply to multi-family residential, commercial/industrial and irrigation customers. These categories are also broken down into Inside-City and Outside-City categories, with differing rates for each.

Another aspect of the water systems water rates that should be considered is affordability to the customers. A common method of determining if water rates are affordable is to calculate the water rates as a percentage of median household income. The Environmental Protection Agency (EPA) has historically stated that the annual water cost billed to customers that is in excess of 2 percent of Median Household Income (MHI) is considered unaffordable. Table 14-7 summarizes the affordability calculation where the average annual single-family bill with 10 CCF of consumption is shown as a percent of MHI.

Table 14-7. EPA Affordability Calculation

	2017	2018	2019	2020	2021
Median Household Income (MHI)	\$39,324	\$40,815	\$42,449	\$43,595	\$44,772
Estimated Annual Single Family Water Bill	\$656	\$671	\$686	\$700	\$708
Water Costs as % of MHI	1.7%	1.6%	1.6%	1.6%	1.6%

For table 14-7 above, MHI was taken from the US Census Bureau for the City of Centralia. 2020 and 2021 MHI were estimated using the 10-year average MHI annual growth of 2.7%. For the City of Centralia water rates to exceed the EPA 2% affordability threshold, Rates would have to increase in excess of 126%.

In 2026 the affordability threshold is estimated to be 1.7% after adjusting MHI by 2.7% per year and the potential water rate adjustments. Table 14-8 summarizes the single-family water rates with the assumed rate adjustments proposed in 14-4.

Table 14-8. Overview of the City's Potential Future Water Rates for Single-Family Residential Customers

	Category	2022	2023	2024	2025	2026	
Minimum Monthly Charge Inside City Limits - Single Family Residential							
	¾ inch meter	\$ 22.82	\$ 24.19	\$ 25.64	\$ 26.41	\$ 27.20	/month
	1 inch meter	31.03	32.89	34.86	35.91	36.98	/month
	1 ½ inch meter	48.34	51.24	54.31	55.94	57.62	/month
	2 inch meter	72.33	76.67	81.27	83.71	86.22	/month
Consumption Charge Inside City Limits - Single Family Residential							
	Block One (0-5 ccf)	\$ 3.39	\$ 3.60	\$ 3.81	\$ 3.93	\$ 4.04	/ccf
	Block Two (6-15 ccf)	4.56	4.83	5.12	5.28	5.43	/ccf
	Block Three (Over 15 ccf)	5.65	5.99	6.35	6.54	6.73	/ccf

14.6 Conclusion

Potential rate increases are needed to cover the capital projects in this plan. The City has successfully acquired low interest loans in the past and this plan assumes they will fund portions of the capital plan with new low interest loans which will allow for rates to remain as low as possible.

Appendix A. WFI

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WATER FACILITIES INVENTORY (WFI) FORM

ONE FORM PER SYSTEM

Quarter: 1
Updated: 12/13/2019

Printed: 6/30/2021
WFI Printed For: On-Demand
Submission Reason: Pop/Connect Update

RETURN TO: Central Services - WFI, PO Box 47822, Olympia, WA, 98504-7822

1. SYSTEM ID NO. 12200 D	2. SYSTEM NAME CENTRALIA PUBLIC WORKS - WATER	3. COUNTY LEWIS	4. GROUP A	5. TYPE Comm
6. PRIMARY CONTACT NAME & MAILING ADDRESS ANDY N. OIEN [MANAGER] 1100 N TOWER AVENUE CENTRALIA, WA 98531		7. OWNER NAME & MAILING ADDRESS CENTRALIA WATER DEPARTMENT, P.W. DIRECTOR CITY OF KIM ASHMORE 1100 N TOWER AVENUE CENTRALIA, WA 98531		
STREET ADDRESS IF DIFFERENT FROM ABOVE ATTN ADDRESS CITY STATE ZIP		STREET ADDRESS IF DIFFERENT FROM ABOVE ATTN ADDRESS CITY STATE ZIP		
9. 24 HOUR PRIMARY CONTACT INFORMATION		10. OWNER CONTACT INFORMATION		
Primary Contact Daytime Phone: (360) 330-7512		Owner Daytime Phone: (360) 330-7512		
Primary Contact Mobile/Cell Phone: (360) 508-6083		Owner Mobile/Cell Phone: (360) 520-9197		
Primary Contact Evening Phone: (xxx)-xxx-xxxx		Owner Evening Phone:		
Fax: (360) 330-7516 E-mail: xxxxxxxxxxxxxxxxxxxxxx		Fax: E-mail: xxxxxxxxxxxxxxxxxxxxxx		
11. SATELLITE MANAGEMENT AGENCY - SMA (check only one)				
☒ Not applicable (Skip to #12) ☐ Owned and Managed SMA NAME: SMA Number: ☐ Managed Only ☐ Owned Only				
12. WATER SYSTEM CHARACTERISTICS (mark all that apply)				
☐ Agricultural ☒ Commercial / Business ☒ Day Care ☒ Food Service/Food Permit ☒ 1,000 or more person event for 2 or more days per year ☒ Hospital/Clinic ☒ Industrial ☐ Licensed Residential Facility ☒ Lodging ☒ Recreational / RV Park ☒ Residential ☒ School ☐ Temporary Farm Worker ☒ Other (church, fire station, etc.):				
13. WATER SYSTEM OWNERSHIP (mark only one)				14. STORAGE CAPACITY (gallons)
☐ Association ☒ City / Town ☐ County ☐ Federal ☐ Investor ☐ Private ☐ Special District ☐ State				8,000,000

- SEE NEXT PAGE FOR A COMPLETE LIST OF SOURCES -

WATER FACILITIES INVENTORY (WFI) FORM - Continued

1. SYSTEM ID NO. 12200 D		2. SYSTEM NAME CENTRALIA PUBLIC WORKS - WATER										3. COUNTY LEWIS					4. GROUP A		5. TYPE Comm	

15	16 SOURCE NAME	17 INTERTIE	18 SOURCE CATEGORY												19 USE		20		21 TREATMENT					22 DEPTH	23	24 SOURCE LOCATION				
Source Number	LIST UTILITY'S NAME FOR SOURCE AND WELL TAG ID NUMBER. Example: WELL #1 XYZ456 IF SOURCE IS PURCHASED OR INTERTIED, LIST SELLER'S NAME Example: SEATTLE	INTERTIE SYSTEM ID NUMBER	WELL	WELL FIELD	WELL IN A WELL FIELD	SPRING	SPRING FIELD	SEA WATER	SURFACE WATER	RANNEY / INF. GALLERY	OTHER	PERMANENT	SEASONAL	EMERGENCY	SOURCE METERED		NONE	CHLORINATION	FILTRATION	FLUORIDATION	IRRADIATION (UV)	OTHER	DEPTH TO FIRST OPEN INTERVAL IN FEET	CAPACITY (GALLONS PER MINUTE)	1/4, 1/4 SECTION	SECTION NUMBER	TOWNSHIP	RANGE		
S01	12250/Chehalis-Kresky Ave (2 Way)	12250 P													X	Y	X								3125	SW SE	20	14N	02W	
S02	North Tower AFC731		X											X	Y		X		X				72	400	SE NE	05	14N	02W		
S03	K Street AFC723		X										X		Y		X		X				93	750	SW NW	05	14N	02W		
S04	ESHOM AFC729 WW				X							X			Y						X		72	1200	NE NW	07	14N	03W		
S05	Riverside AFC724 CT6 Required		X											X	Y		X		X				80	700	NW SW	05	14N	02W		
S06	Washington AFC722		X											X	Y	X							88	1000	NW NW	05	14N	02W		
S07	Downing AFC730		X											X	Y		X		X				147	700	SW SW	28	15N	02W		
S08	Borst WF (S10 & 11) CT6 Required			X										X	Y				X				38	2012	NW NE	07	14N	02W		
S09	Tennis Court WF (S012 & 13)			X								X			Y				X		X		51	1805	SW NE		14N	02W		
S10	Borst Park Well #1 AFC728 WW				X									X	Y		X						38	812	NW NE	07	14N	02W		
S11	Borst Park Well #2 AFC727 WW				X									X	Y		X						40	1200	NW NE	07	14N	02W		
S12	Tennis Court Well #1 AFC725 WW				X							X			Y		X				X		55	605	NE SW	06	14N	02W		
S13	Tennis Court Well #2 AFC726 WW				X							X			Y		X				X		51	1300	NE SW	06	14N	02W		
S14	Fords Prairie #1 WW				X							X			N						X		40	600	NW NE	01	14N	03W		
S15	Fords Prairie #2 WW				X							X			N						X		38	400	NW NE	01	14N	03W		
S16	Port District WF (S04,14,15)			X								X			Y		X		X		X		38	2200	NW NE	01	14N	03W		

WATER FACILITIES INVENTORY (WFI) FORM - Continued

1. SYSTEM ID NO.	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
12200 D	CENTRALIA PUBLIC WORKS - WATER	LEWIS	A	Comm

	ACTIVE SERVICE CONNECTIONS	DOH USE ONLY! CALCULATED ACTIVE CONNECTIONS	DOH USE ONLY! APPROVED CONNECTIONS
25. SINGLE FAMILY RESIDENCES (How many of the following do you have?)		7202	Unspecified
A. Full Time Single Family Residences (Occupied 180 days or more per year)	5682		
B. Part Time Single Family Residences (Occupied less than 180 days per year)	0		
26. MULTI-FAMILY RESIDENTIAL BUILDINGS (How many of the following do you have?)			
A. Apartment Buildings, condos, duplexes, barracks, dorms	510		
B. Full Time Residential Units in the Apartments, Condos, Duplexes, Dorms that are occupied more than 180 days/year	1520		
C. Part Time Residential Units in the Apartments, Condos, Duplexes, Dorms that are occupied less than 180 days/year	0		
27. NON-RESIDENTIAL CONNECTIONS (How many of the following do you have?)			
A. Recreational Services and/or Transient Accommodations (Campsites, RV sites, hotel/motel/overnight units)	0	0	
B. Institutional, Commercial/Business, School, Day Care, Industrial Services, etc.	831	831	
	28. TOTAL SERVICE CONNECTIONS	8033	

29. FULL-TIME RESIDENTIAL POPULATION													
A. How many residents are served by this system 180 or more days per year? <u>17170</u>													

30. PART-TIME RESIDENTIAL POPULATION	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
A. How many part-time residents are present each month?												
B. How many days per month are they present?												

31. TEMPORARY & TRANSIENT USERS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
A. How many total visitors, attendees, travelers, campers, patients or customers have access to the water system each month?	9130	9130	9130	9460	9460	10660	10660	10660	9460	9130	9130	9130
B. How many days per month is water accessible to the public?	30	30	30	30	30	30	30	30	30	30	30	30

32. REGULAR NON-RESIDENTIAL USERS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
A. If you have schools, daycares, or businesses connected to your water system, how many students, daycare children and/or employees are present each month that are NOT already included in the residential population?	9301	9301	9301	9301	9301	2042	2042	2042	9301	9301	9301	9301
B. How many days per month are they present?	30	30	30	30	30	30	30	30	30	30	30	30

33. ROUTINE COLIFORM SCHEDULE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
	30	30	30	30	30	20	20	20	30	30	30	30

34. NITRATE SCHEDULE	QUARTERLY	ANNUALLY	ONCE EVERY 3 YEARS
(One Sample per source by time period)			

35. Reason for Submitting WFI:
☐ Update - Change
 ☐ Update - No Change
 ☐ Inactivate
 ☐ Re-Activate
 ☐ Name Change
 ☐ New System
 ☐ Other _____

36. I certify that the information stated on this WFI form is correct to the best of my knowledge.

SIGNATURE: _____	DATE: _____
PRINT NAME: _____	TITLE: _____

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<u>WS ID</u>	<u>WS Name</u>
12200	CENTRALIA PUBLIC WORKS - WATER

Total WFI Printed: 1



Water Facilities Inventory (WFI)

Report Create Date: 6/30/2021
Water System Id(s): 12200D
Print Data on Distribution Page: ALL
Print Copies For: DOH Copy
Water System Name: ALL
County: -- Any --
Region: ALL
Group: ALL
Type: ALL
Permit Renewal Quarter: ALL
Water System Is New: ALL
Water System Status: ALL
Water Status Date From: ALL **To:** ALL
Water System Update Date: ALL **To:** ALL
Owner Number: ALL
SMA Number: ALL
SMA Name: ALL
Active Connection Count From: ALL **To:** ALL
Approved Connection Count: ALL **To:** ALL
Full-Time Population From: ALL **To:** ALL
Water System Expanding: ALL
Source Type: ALL
Source Use: ALL
WFI Printed For: On-Demand

Appendix B. Intertie agreement with Chehalis

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AGREEMENT FOR WATER SYSTEM INTERTIE

THIS AGREEMENT, made and entered into this 25th day of January, 1999, by and between the **CITY OF CHEHALIS, WASHINGTON AND THE CITY OF CENTRALIA, WASHINGTON**, hereby agree as follows:

For purposes of this Agreement, the City of Centralia and/or the Centralia water system shall be referred to as "Centralia;" the City of Chehalis and/or the Chehalis water system, shall be referred to as "Chehalis;" and the water system intertie between and connecting the Centralia and Chehalis water systems shall be referred to as "intertie."

SECTION 1. PURPOSE. The purpose of the intertie shall be to provide or supplement water supplies to either city's water distribution system in the event of a failure of source, transmission line, distribution system line(s) treatment facilities, or other major emergency or disaster. Such emergency water service provided by the intertie is intended for short-term emergency contingency supply purposes. The intertie is not capable of, or intended to provide base or peak supply quantities.

SECTION 2. OPERATION AND MAINTENANCE. The operation and maintenance responsibilities and procedures for the intertie shall be as follows:

A. Chehalis shall operate, maintain, control and own the 12-inch waterline valve located eleven (11) feet south of the south right-of-way line of Scott Johnson Road and fifteen (15) feet more or less east of the westerly line of the Kresky Avenue right-of-way, hereinafter referred to as the "Chehalis valve," and all piping, appurtenant fittings and assemblies southerly of said valve.

B. Centralia shall operate, maintain, control and own the 12-inch waterline valve located thirty-two (32) feet north of the south right-of-way line of Scott Johnson Road and eighteen (18) feet more or less east of the westerly line of the Kresky Avenue right-of-way, hereinafter referred to as the "Centralia valve," and all piping, appurtenant fittings and assemblies northerly of said valve.

C. Chehalis and Centralia shall jointly operate, maintain, control and own the section of waterline, all appurtenant fittings and assemblies located between the Chehalis valve and the Centralia valve.

D. Operation of the intertie will be under the sole control of Centralia and Chehalis. The intertie shall not be utilized by either party without the specific prior notification and approval of both cities. After such approval has been provided, the two cities shall cooperatively activate the intertie. It shall be the responsibility of each city to operate valves in their distribution system to accommodate the pressure difference of the host supplier.

E. If the system for which water supply is requested is or becomes unable to provide water, the intertie shall be shut off/disconnected and all water transfer ceased.

F. The two cities shall monitor water quality at the intertie and shall continue to be responsible for water quality monitoring within their respective systems.

SECTION 3. COSTS FOR SUPPLIED WATER. To the extent possible, each city shall monitor and track water quantities transferred and received, and, based upon this information, the city that supplies such water shall determine or estimate charges based on that city's current water rates calculated and/or estimated rate charges and other costs associated with the transfer of water shall be billed to the receiving city. Although the intertie does not currently have metering devices, they may be added in the future.

SECTION 4. ADMINISTRATION.

A. Revision of this Agreement may be periodically deemed appropriate. Any subsequent intertie agreement signed by both cities shall nullify this Agreement.

B. This Agreement is to be mutually beneficial and perpetual. In the event that this Agreement should cease to be of benefit, it may be dissolved by mutual consent or by either party after thirty (30) days of the date the other party received written notice of intent to terminate this Agreement.

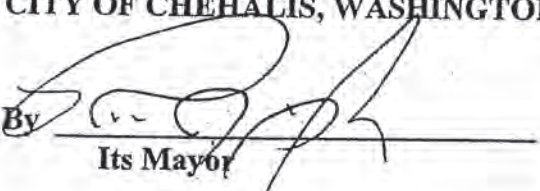
C. Emergency service is not intended to provide water for extended periods or at frequent intervals. Approval of repeated requests for water through the intertie within a short interval will be at the discretion of the providing city.

D. The City of Chehalis Public Works Director and the City of Centralia Utilities Director shall jointly administer this Agreement.

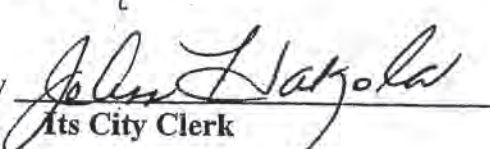
EXECUTED IN DUPLICATE on the date and year first above written.

CITY OF CHEHALIS, WASHINGTON

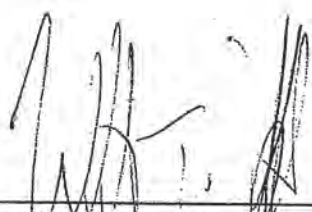
By


Its Mayor

Attested by


Its City Clerk

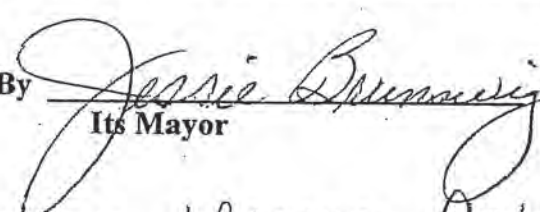
Approved as to
form and content by


Its City Attorney



CITY OF CENTRALIA, WASHINGTON

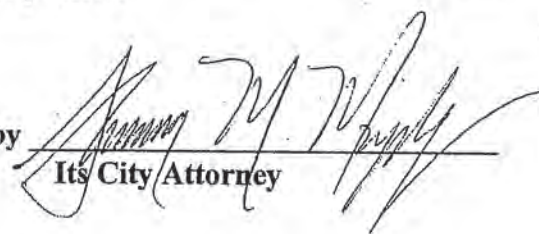
By


Its Mayor

Attested by


Its City Clerk

Approved as to
form and content by


Its City Attorney

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Appendix C. Centralia Municipal Code Water Utility Policies

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Chapter 15.04

RULES AND REGULATIONS

Sections:

- 15.04.010 Acronyms.**
- 15.04.020 Definitions.**
- 15.04.030 Application for service.**
- 15.04.040 Availability of service.**
- 15.04.050 Connection to public sanitary sewer system required.**
- 15.04.060 Capital facilities charge.**
- 15.04.065 Waiver of the wastewater capital facility charges.**
- 15.04.070 Meters required—Commercial and residential.**
- 15.04.080 Standard service line installation fee.**
- 15.04.090 Establishment of service account and request for turn on.**
- 15.04.100 Billing—Combined with other utilities.**
- 15.04.110 Water rates.**
- 15.04.120 Minimum monthly charges.**
- 15.04.130 Low-income senior citizen customers and low-income totally disabled customers.**
- 15.04.140 Charge for use of water.**
- 15.04.150 Minimum monthly charges—Multiple dwellings.**
- 15.04.160 Minimum monthly charges—Fire protection services.**
- 15.04.170 Booster surcharges.**
- 15.04.180 Fire service line rate.**
- 15.04.190 Fire hydrants—Installation and relocation.**
- 15.04.200 Fire hydrants—Charges for service—Firefighting only.**

- 15.04.210 Fire hydrants—Charges for service—Water use.
- 15.04.220 Fire hydrants—Tampering with.
- 15.04.230 *Repealed.*
- 15.04.240 Temporary shutoff service charge.
- 15.04.250 Termination of service—Nonpayment.
- 15.04.260 Termination of service—Condemned buildings.
- 15.04.270 Termination of service—Backflow.
- 15.04.280 Lien for delinquent and unpaid charges.
- 15.04.290 Liability for damage.
- 15.04.300 Fluoridation authorized.
- 15.04.310 Meters—Installation and placement.
- 15.04.320 Water shut-off—Customer requested.
- 15.04.330 Meters—Replacement and testing.
- 15.04.340 Meters—Reimbursement for destruction.
- 15.04.350 Meters—Sizing.
- 15.04.360 Access to premises.
- 15.04.370 Unlawful water connections.
- 15.04.380 Nonliability of city for service interruptions or variances.
- 15.04.390 City to control connection.
- 15.04.400 Backflow and cross connections—Purpose.
- 15.04.410 Cross connection control program—Adoption of state regulations.
- 15.04.420 Backflow prevention assembly requirement.
- 15.04.430 Backflow—Installation requirements—Adoption of state regulations as they now exist or hereafter amended.

15.04.440 Backflow—Testing and repairs.

15.04.450 Backflow—Costs of compliance.

15.04.460 Violation—Penalty.

15.04.470 Effective date of charges.

Prior legislation: Ords. 1183 and 2043.

15.04.010 Acronyms.

“ANSI” means the American National Standards Institute.

“AWWA” means the American Water Works Association.

“BAT” means backflow assembly tester (WAC 246-290-490).

“CCF” means one hundred cubic feet.

“CMC” means the Centralia Municipal Code.

“CCS” means cross-connection control specialist.

“DCDA” means double check detector assembly.

“DCVA” means double check valve assembly.

“IAPMO” means International Association of Plumbing and Mechanical Officials.

“PNWS” means the Pacific Northwest Section of the AWWA.

“RCW” means the Revised Code of Washington.

“RPBA” means reduced pressure backflow assembly.

“RPDA” means reduced pressure detector assembly.

“UL” means Underwriters Laboratories Incorporated.

“UPC” means Uniform Plumbing Code.

“WAC” means the Washington Administrative Code. (Ord. 2123 § 3 (part), 2004).

15.04.020 Definitions.

For the purpose of this chapter, the following terms and phrases shall be defined as set forth below:

- A. "Director" means the utilities director of the city of Centralia or his/her designee.
- B. "Air gap" means twice the diameter of the supply piping measured vertically from the overflow rim of the receiving vessel, and in no case be less than one inch, when unaffected by vertical surfaces (sidewalls); and three times the diameter of the supply piping, if the horizontal distance between the supply pipe and a vertical surface (sidewall) is less than or equal to three times the diameter of the supply pipe, or if the horizontal distance between the supply pipe and intersecting vertical surfaces (sidewalls) is less than or equal to four times the diameter of the supply pipe and in no case less than one and one-half inches.
- C. "Authorized employee" means a city of Centralia employee authorized to access customer's premises at all reasonable times for the purposes of inspecting water supply, piping and plumbing; inspecting, testing or repairing water department equipment; and for reading water meters.
- D. "Backflow" means the undesirable reversal of flow of water or other substances through a cross-connection into the public water system or consumer's potable water system.
- E. "Backflow agreement" means a notarized and recorded legal document containing the legal description of the real property where the well is located. The agreement releases the city from any liability resulting from a backflow incident that might occur as a result of a cross-connection between the well and the city's water system.
- F. "Backflow assembly tester" means a person holding a valid BAT certificate issued in accordance with Chapter 246-292 WAC.
- G. "Backflow prevention assembly" means an RPBA, RPDA, DCVA, DCDA, PVBA or SVBA of make, model, and size that is approved by the State Department of Health. Assemblies that appear on the current approved backflow prevention assemblies list developed by the University of Southern California Foundation for Cross-Connection Control and Hydraulic Research or other entities acceptable to the department are considered approved by the department.
- H. "Backpressure" means a pressure caused by a pump, elevated tank or piping, boiler or other means on the consumer's side of the service connection that is greater than the pressure provided by the public water system and which may cause backflow.
- I. "Backsiphonage" means backflow due to a reduction in system pressure in the city's distribution system and/or consumer's water system.

- J. "City" means the city of Centralia.
- K. "City council" means the governing body of the city of Centralia.
- L. "City manager" means the city manager of the city of Centralia or his/her designee.
- M. "Combination fire protection system" means a fire sprinkler system that:
1. Is supplied only by city water;
 2. Does not have a fire department pumper connection; and
 3. Is constructed of approved potable water piping and materials that serve both the fire sprinkler system and the consumer's potable water system.
- N. "Commercial" means any nonresidential customer who engages in business activities or combination of business and residential activities if combined through a single meter service.
- O. "County" means Lewis County or any other county in which the city's water distribution system is located.
- P. "Cross connection" means any actual or potential physical connection between a public water system or the consumer's water system and any source of non-potable liquid, solid, or gas that could contaminate the potable water supply by backflow.
- Q. "Cross-connection control program" means the administrative and technical procedures that the city implements to protect the public water system from contamination via cross-connections as required in WAC 246-290-490.
- R. "Cross-connection control specialist" means a person holding a valid CCS certificate issued in accordance with Chapter 246-292 WAC.
- S. "Customer" means each person, business, property owner, water user or other entity billed by the city for the use or availability of the public water system in the Centralia water system service area.
- T. "Double check detector assembly" means an approved assembly consisting of two independently operating check valves, loaded to the closed position by springs or weights, and installed as a unit with, and between, two resilient seated shutoff valves and having suitable connections for testing, and unions at the ends of the assembly, with the addition of a factory installed bypass which includes an approved double check valve assembly, complete with resilient seated shutoff valves and unions at the ends of the assembly and test cocks.

U. "Double check valve assembly" means an approved assembly consisting of two independently operating check valves, loaded to the closed position by springs or weights, and installed as a unit with, and between, two resilient seated shutoff valves and unions at the ends of the assembly and having suitable connections for testing.

V. "Flow-through fire protection system" means a fire sprinkler system that:

1. Is supplied only by city water;
2. Does not have a fire department pumper connection;
3. Is constructed of approved potable water piping and materials to which sprinkler heads are attached; and
4. Terminates at a connection to a toilet or other plumbing fixture to prevent the water from becoming stagnant.

W. "Income" as used herein means gross income as defined in Section 6(a) of the Internal Revenue Code of 1954, as now in effect or hereafter amended, plus any and all social security retirement and/or disability payments, Veterans Administration retirement and/or disability payments, Railroad Retirement Board pension and/or disability payments, and payments received from any other public or private pension, retirement, profit-sharing and disability plans, and unemployment compensation.

X. "Industrial" means a manufacturing, school, hospital, processing, or similar type enterprise using an average greater than six hundred thousand gallons of water per month.

Y. "Local administrative authority" means the local official, board, department, or agency authorized to administer and enforce the provisions of the Uniform Plumbing Code as adopted under Chapter 19.27 RCW.

Z. "Low income senior citizen" shall be defined as sixty-two years of age or older and whose total income, including that of his or her spouse or cotenant, does not exceed the amount specified in RCW 84.36.381(5)(b)(ii) as the same now exists or is hereafter amended.

AA. "Low income totally disabled" shall be defined as any person who has been classified as totally disabled by the Social Security Administration and whose total income does not exceed the amount provided for low income senior citizen customers.

BB. "Multiple dwelling" means residential duplexes, apartment buildings, condominiums, mobile home parks, trailer courts or similar types of multiple dwelling arrangements.

CC. "Multiple family residential" means a building or portion thereof designed or used as a residence by two or more families and containing two or more dwellings.

DD. "Overhead" means all costs and expenses, including administrative overhead and equipment replacement, chargeable directly to the operation and maintenance of the water facility.

EE. "Person" means any individual, partnership, firm, company, corporation, association, joint stock company, trust, estate, any federal, state, or local governmental agency or entity, or any other entity whatsoever, or their legal representatives, agents, or assigns.

FF. "Premises" means public or private property, home, building, apartment house, condominium, trailer court, or mobile home park utilized under one ownership on one parcel of property and under a single control with respect to use of water and responsibility for payment therefor.

GG. "Pressure vacuum breaker assembly" means an approved assembly consisting of a spring loaded check valve loaded to the closed position, an independently operating air inlet valve loaded to the open position and installed as a unit with a union and between two resilient seated shutoff valves and with suitable connections for testing. It is designed to protect against back-siphonage only.

HH. "Public sewer" means a common sewer system directly controlled by public authority.

II. "Public water" means a common water system directly controlled by public authority.

JJ. "Reduced pressure backflow assembly" shall mean an approved assembly containing two independently acting approved check valves together with a hydraulically operated, mechanically independent pressure differential relief valve located between the check valves and at the same time below the first check valve. The assembly shall include properly located test cocks and tightly closing, resilient seated shut-off valves at the ends of the assembly, and unions at the ends of the assembly.

KK. "Residential service" means water service to a single-family or multifamily dwelling using water for domestic use.

LL. "Single-family residential" means a building designed or used for only residence purposes and containing one dwelling only, including mobile homes when not located in a mobile home park, condominiums, and excluding multiple family dwellings, apartments, and motels.

MM. "State" means the state of Washington.

NN. "Unapproved auxiliary water supply" means a water supply (other than the city's water supply) on or available to the consumer's premises that is either not approved for human consumption by the health agency having jurisdiction or is not otherwise acceptable to the city.

OO. "Uniform Plumbing Code" means the code adopted under RCW 19.27.031(4) and amended under Chapter 51-46 WAC. This code establishes statewide minimum plumbing standards applicable within the property lines of the consumer's premises.

PP. "Utilities director" means the utilities director of the city of Centralia or his/her designee.

QQ. "Water main" means the pipe laid in a public right-of-way, street, alley, or easement owned by the city, and used or intended for the distribution of water to customers through service lines, and may also be referred to as "main."

RR. "Water meter" means any device used for the measurement of water delivered to an individual location, customer or user.

SS. "Water system" means all water source, supply and quality facilities, transmission pipelines and storage facilities, pumping plants, distribution mains and appurtenances, vehicles and materials storage facilities.

TT. "Water utility" means the entity which is responsible for the operation, maintenance, upgrade, and improvement of the water system serving the city of Centralia and surrounding areas. (Ord. 2123 § 3 (part), 2004).

15.04.030 Application for service.

A person desiring the installation of a water service line to a building or property shall submit an application therefor upon a form provided by the city. If such building or property is located outside the city limits, the applicant must provide written confirmation from the county that the building or property conforms to applicable county zoning and land use requirements. However, where the city and county have an interlocal agreement regarding zoning, the requirements of that document shall prevail. Application must be submitted, approved, and appropriate fees paid at least sixty days prior to the applicant's requested meter installation date. Whether such water service is inside or outside the city limits, the applicant by applying therefor and accepting such service shall be deemed bound by the current and future ordinances of the city affecting such water service. (Ord. 2123 § 3 (part), 2004).

15.04.040 Availability of service.

The installation of any water service line is dependent on the available water distribution facilities. The city is not required to install a water service line in areas not within the city's designated service territory, or areas not served by the existing water distribution system, or where the system is inadequate to handle the increased demand that would result from the applicant's proposed use or for such other reasons as deemed appropriate by the utilities director. (Ord. 2123 § 3 (part), 2004).

15.04.050 Connection to public sanitary sewer system required.

The city of Centralia will not provide city water hookups and services to any real property located within a designated critical aquifer area which is not served by and connected to a public sewer system. Areas not in designated critical aquifer areas, located within the urban growth area or land adjacent, may have water service provided without a requirement for sanitary sewer service. The utilities director may review individual cases for exception to this restriction. (Ord. 2123 § 3 (part), 2004).

15.04.060 Capital facilities charge.

A. So that the property owners shall bear their equitable share of the cost of the water system as authorized in RCW 35.92.025, there shall be paid a capital facilities charge at the time of approval for all new water service connections as follows:

Non-Pressure Zone

Capital Facilities Charge Effective January 1:

Meter Size	2009	2010	2011
3/4 inch	\$2,330	\$3,141	\$3,953
1 inch	\$3,890	\$5,246	\$6,601
1 and 1/2 inch	\$7,758	\$10,460	\$13,163
2 inch	\$12,417	\$16,743	\$21,069
3 inch	\$24,857	\$33,517	\$42,177
4 inch	\$38,835	\$52,365	\$65,895
6 inch	\$77,647	\$104,698	\$131,750
8 inch	\$124,239	\$167,523	\$210,808

Pressure Zone

Capital Facilities Charge Effective July 1, 2000:

3/4 inch	\$ 6,004
1 inch	15,011
1 and 1/2 inch	30,022
2 inch	48,035
3 inch	96,070
4 inch	150,110
6 inch	300,220

On January 1st of each year beginning in 2012, capital facility charges shall be adjusted to reflect the annual percentage increase of the Engineering News Record Construction Cost Index as published for November of the preceding year. Calculation of the change in the index is made by dividing the current index for November by the preceding index for November and subtracting one.

B. The charge set forth in this section shall be in addition to and separate from the standard service installation fees and other charges as set forth in the following sections of this chapter.

C. When a request or requirement for a larger meter is made, credit for the old meter shall be based on the current capital facilities charge.

D. For projects not completed within one hundred eighty days after applicable fees are paid, the capital facilities charge shall be refunded to the applicant subject to a five percent processing fee. The one hundred eighty days will be extended for the same period as any building permit extension. Applicant shall be charged fee rates in effect at time of payment. Latecomer fees are nonrefundable.

E. Connection application approval and payment of all connection charges, including capital facilities charges, permit fees, and latecomer fees, shall attach to the parcel indicated on the application and shall be construed as running with the land.

F. All capital facility fees collected shall be classified as restricted funds for capital system additions and improvements. (Ord. 2379 § 1, 2016; Ord. 2224 § 1, 2008; Ord. 2123 § 3 (part), 2004).

15.04.065 Waiver of the wastewater capital facility charges.

From June 1, 2019, to May 31, 2021, the city of Centralia shall waive the wastewater capital facility charge as adopted in CMC 15.04.060 for single-family residences located within the critical aquifer area as adopted under Chapter 16.18 CMC. (Ord. 2432 § 1, 2019).

15.04.070 Meters required—Commercial and residential.

All new connections, whether inside or outside the city limits shall be metered.

A. Commercial. One meter may serve more than one business if in the same building, if separate buildings, separate meters are required.

B. Residential. Separate meters shall be required for all single-family residences. All motels, hotels, trailer courts, recreational vehicle parks, multidwellings, condominiums, planned unit developments, and apartments may be served by one meter. (Ord. 2123 § 3 (part), 2004).

15.04.080 Standard service line installation fee.

A. Installations three-fourth inch and larger shall be charged for the cost of labor, equipment and materials, plus overhead. The construction of a new standard service installation by the city of Centralia for water shall include all labor, equipment, pipe and fittings from the water main to the meter, including parts for setting the meter and the meter box or vault. Any payment or partial payment that may be made by the applicant according to the rates herein shall not in any manner affect the city's ownership to the pipe, fittings, and meter, or its right to handle the same in any manner deemed advisable. Charges for such services beyond the initial estimate shall be billed to the customer and, if unpaid sixty days thereafter, shall be turned over to a collection agency as designated by the city. As well, the city may use other legal remedies including but not limited to lien and discontinuation of service.

B. Irrigation meters shall be allowed for all water customers who are also connected to the city sewer system. However, no connections which return water to the sewer are permitted. The city will provide the irrigation meter and installation of the meter without cost to all new irrigation meter customers who document that they have installed a water conserving irrigation system or water conserving landscaping. This category of service would not require payment of capital facilities charge.

C. Capital facilities charges are set forth in CMC 15.04.060 based on the size of the meter. Capital facilities charges for fire protection services shall be based on the size of the detector meter placed in the fire protection service vault. Refer to the capital facilities charges set forth in CMC 15.04.060.

D. Installation of fire service lines may be installed by a private contractor as pre-approved by the city water utility. (Ord. 2149 § 1, 2005; Ord. 2123 § 3 (part), 2004).

15.04.090 Establishment of service account and request for turn on.

Refer to Chapter 13.02 CMC for establishment of service account and request for turn on. (Ord. 2123 § 3 (part), 2004).

15.04.100 Billing—Combined with other utilities.

The billings for water services of the city of Centralia will be combined with the billings for all other municipal utility services of the city of Centralia as set forth in Chapter 13.02 CMC. Delinquency or nonpayment of all or any portion of said billing shall subject the consumer of such services from the city of Centralia to the provisions of this chapter. (Ord. 2123 § 3 (part), 2004).

15.04.110 Water rates.

All customers served by the city of Centralia water system shall be charged at the rates listed in CMC 15.04.120 through 15.04.210.

On January 1st of each year beginning in 2014, the rates shall be adjusted to reflect the annual percentage increase in the United States Consumer Price Index, All Urban Consumers (CPI-U) for November of the preceding year as shown in the release from the Bureau of Labor Statistics. Calculation of the change in the index is made by dividing the current index for November by the preceding index for November and subtracting one. (Ord. 2224 § 2, 2008; Ord. 2145 § 1, 2004; Ord. 2123 § 3 (part), 2004).

15.04.120 Minimum monthly charges.

Minimum monthly charges are as listed below. For service less than thirty days, a minimum of one month shall be charged.

Inside City Limits—Single-Family Residential

Meter

Size	2009	2010	2011	2012	2013
3/4 inch	\$14.50	\$15.95	\$17.60	\$18.30	\$19.03
1 inch	\$19.44	\$21.43	\$23.93	\$24.89	\$25.89
1 and 1/2 inch	\$29.89	\$32.99	\$37.28	\$38.77	\$40.32
2 inch	\$44.35	\$49.01	\$55.80	\$58.03	\$60.35

Inside City Limits—Multiple-Family Residential

Meter

Size	2009	2010	2011	2012	2013
3/4 inch	\$15.99	\$17.77	\$19.75	\$20.54	\$21.36
1 inch	\$21.99	\$24.48	\$27.52	\$28.62	\$29.76

Meter

Size	2009	2010	2011	2012	2013
1 and 1/2 inch	\$35.07	\$39.11	\$44.44	\$46.22	\$48.07
2 inch	\$52.69	\$58.82	\$67.26	\$69.95	\$72.75
3 inch	\$115.27	\$128.83	\$148.41	\$154.35	\$160.52
4 inch	\$167.23	\$186.95	\$215.67	\$224.30	\$233.27
6 inch	\$307.52	\$343.84	\$397.24	\$413.13	\$429.66

Inside City Limits—Commercial/Industrial**Meter**

Size	2009	2010	2011	2012	2013
3/4 inch	\$14.65	\$17.00	\$19.23	\$20.00	\$20.80
1 inch	\$20.03	\$23.28	\$26.64	\$27.71	\$28.82
1 and 1/2 inch	\$31.70	\$36.90	\$42.70	\$44.41	\$46.19
2 inch	\$47.50	\$55.35	\$64.47	\$67.05	\$69.73
3 inch	\$104.30	\$121.67	\$142.83	\$148.54	\$154.48
4 inch	\$150.86	\$176.03	\$206.96	\$215.24	\$223.85
6 inch	\$276.40	\$322.58	\$379.82	\$395.01	\$410.81

Inside City Limits—Irrigation**Meter**

Size	2009	2010	2011	2012	2013
3/4 inch	\$14.86	\$16.51	\$18.24	\$18.97	\$19.73

Meter

Size	2009	2010	2011	2012	2013
1 inch	\$20.10	\$22.36	\$25.00	\$26.00	\$27.04
1 and 1/2 inch	\$31.31	\$34.89	\$39.42	\$41.00	\$42.64
2 inch	\$46.68	\$52.06	\$59.22	\$61.59	\$64.05
3 inch	\$103.23	\$115.30	\$132.32	\$137.61	\$143.11
4 inch	\$148.42	\$165.81	\$190.54	\$198.16	\$206.09
6 inch	\$269.92	\$301.57	\$347.00	\$360.88	\$375.32

Outside City Limits—Single-Family Residential**Meter**

Size	2009	2010	2011	2012	2013
3/4 inch	\$21.75	\$23.93	\$26.40	\$27.46	\$28.56
1 inch	\$29.17	\$32.14	\$35.89	\$37.33	\$38.82
1 and 1/2 inch	\$44.83	\$49.49	\$55.93	\$58.17	\$60.50
2 inch	\$66.52	\$73.52	\$83.70	\$87.05	\$90.53

Outside City Limits—Multiple-Family Residential**Meter**

Size	2009	2010	2011	2012	2013
3/4 inch	\$23.98	\$26.66	\$29.62	\$30.80	\$32.03
1 inch	\$32.98	\$36.72	\$41.27	\$42.92	\$44.64
1 and 1/2 inch	\$52.60	\$58.67	\$66.66	\$69.33	\$72.10

Meter

Size	2009	2010	2011	2012	2013
2 inch	\$79.04	\$88.24	\$100.88	\$104.92	\$109.12
3 inch	\$172.90	\$193.24	\$222.61	\$231.51	\$240.77
4 inch	\$250.84	\$280.42	\$323.51	\$336.45	\$349.91
6 inch	\$461.27	\$515.77	\$595.86	\$619.69	\$644.48

Outside City Limits—Commercial/Industrial**Meter**

Size	2009	2010	2011	2012	2013
3/4 inch	\$21.98	\$25.50	\$28.84	\$29.99	\$31.19
1 inch	\$30.05	\$34.92	\$39.96	\$41.56	\$43.22
1 and 1/2 inch	\$47.55	\$55.35	\$64.05	\$66.61	\$69.27
2 inch	\$71.26	\$83.03	\$96.70	\$100.57	\$104.59
3 inch	\$156.45	\$182.51	\$214.24	\$222.81	\$231.72
4 inch	\$226.30	\$264.05	\$310.44	\$322.86	\$335.77
6 inch	\$414.60	\$483.87	\$569.73	\$592.52	\$616.22

Outside City Limits—Irrigation**Meter**

Size	2009	2010	2011	2012	2013
3/4 inch	\$22.29	\$24.76	\$27.36	\$28.45	\$29.59
1 inch	\$30.15	\$33.55	\$37.50	\$39.00	\$40.56

Meter Size	2009	2010	2011	2012	2013
1 and 1/2 inch	\$46.97	\$52.34	\$59.13	\$61.50	\$63.96
2 inch	\$70.02	\$78.10	\$88.83	\$92.38	\$96.08
3 inch	\$154.84	\$172.95	\$198.48	\$206.42	\$214.68
4 inch	\$222.64	\$248.71	\$285.81	\$297.24	\$309.13
6 inch	\$404.87	\$452.36	\$520.49	\$541.31	\$562.96

(Ord. 2224 § 3, 2008; Ord. 2212 § 2, 2008; Ord. 2123 § 3 (part), 2004).

15.04.130 Low-income senior citizen customers and low-income totally disabled customers.

A. Low-income senior citizen customers and low-income totally disabled customers may qualify for the following residential minimum monthly meter charge. The following rates do not apply to multiple-family structures.

Low-Income (less than 1 inch meter)

	2009	2010	2011	2012	2013
Inside City Limits	\$12.18	\$13.40	\$14.78	\$15.37	\$15.98
Outside City Limits	\$18.27	\$20.10	\$22.18	\$23.07	\$23.99

B. All low-income senior citizen customers and low-income totally disabled customers applying for low-income senior citizen customer or low-income totally disabled customer exemptions herein provided shall furnish to the customer service center of the city of Centralia, Washington, a claim for exemption. Should the financial status of the customer no longer exempt them as outlined in RCW 84.36.381(5)(b)(ii), the customer shall notify the customer service center within thirty days of the change in their income status. (Ord. 2224 § 4, 2008; Ord. 2212 § 3, 2008; Ord. 2123 § 3 (part), 2004).

15.04.140 Charge for use of water.

Water used in increments of one hundred ccf or portions thereof shall be in addition to the monthly service charge and will be charged as follows:

**Inside City Limits—Single-Family Residential
and Low-Income**

	2009	2010	2011	2012	2013
Block One (0—6 ccf)	\$2.09	\$2.29	\$2.62	\$2.72	\$2.83
Block Two (6—15 ccf)	\$2.75	\$3.05	\$3.50	\$3.64	\$3.79
Block Three (Over 15 ccf)	\$3.41	\$3.81	\$4.37	\$4.54	\$4.72

**Inside City Limits—All Other Customer Classes—All
Usage**

	2009	2010	2011	2012	2013
Multifamily Residential	\$2.23	\$2.49	\$2.86	\$2.97	\$3.09
Commercial/Industrial	\$2.14	\$2.49	\$2.92	\$3.04	\$3.16
Irrigation	\$3.41	\$3.81	\$4.37	\$4.54	\$4.72

**Outside City Limits—Single-Family Residential
and Low-Income**

	2009	2010	2011	2012	2013
Block One (0—6 ccf)	\$3.13	\$3.44	\$3.94	\$4.10	\$4.26
Block Two (6—15 ccf)	\$4.12	\$4.58	\$5.25	\$5.46	\$5.68
Block Three (Over 15 ccf)	\$5.11	\$5.71	\$6.56	\$6.82	\$7.09

**Outside City Limits—All Other Customer Classes—All
Usage**

2009 2010 2011 2012 2013

	2009	2010	2011	2012	2013
Multifamily Residential	\$3.35	\$3.74	\$4.29	\$4.46	\$4.64
Commercial/Industrial	\$3.21	\$3.74	\$4.38	\$4.56	\$4.74
Irrigation	\$5.11	\$5.71	\$6.56	\$6.82	\$7.09

(Ord. 2224 § 5, 2008; Ord. 2212 § 4, 2008; Ord. 2123 § 3 (part), 2004).

15.04.150 Minimum monthly charges—Multiple dwellings.

Where water from one meter serves more than one building housing separate residences, housekeeping rooms, apartments, condominiums, or multiplex structures, the minimum monthly billing shall be based on the meter size. (Ord. 2123 § 3 (part), 2004).

15.04.160 Minimum monthly charges—Fire protection services.

Monthly charges for fire protection services shall be based on the size of the service line from the city water main as outlined in CMC 15.04.180. (Ord. 2123 § 3 (part), 2004).

15.04.170 Booster surcharges.

Where, due to high elevation of property served, it is necessary for extra pumping units to be installed to raise the water pressure beyond the normal operating pressure in the distribution system, a per month charge shall be made to offset the extra pump operating and maintenance costs.

Booster Surcharges					
	2009	2010	2011	2012	2013
Inside City Limits	\$13.48	\$15.03	\$17.06	\$17.74	\$18.45
Outside City Limits	\$13.48	\$15.03	\$17.06	\$17.74	\$18.45

(Ord. 2224 § 6, 2008; Ord. 2212 § 5, 2008; Ord. 2123 § 3 (part), 2004).

15.04.180 Fire service line rate.

A. On fire protection services only where detector-type meters are installed and where no consumption is to be allowed except for fires or testing, the monthly charge shall be as follows:

Inside City Limits—Fire Service Line Rate

Line Size	2009	2010	2011	2012	2013
1 and 1/2 inch	\$15.12	\$15.12	\$15.12	\$15.12	\$15.12
2 inch	\$15.12	\$15.12	\$15.12	\$15.12	\$15.12
4 inch	\$61.67	\$61.67	\$61.67	\$61.67	\$61.67
6 inch	\$88.92	\$88.92	\$88.92	\$88.92	\$88.92
8 inch	\$122.11	\$122.11	\$122.11	\$122.11	\$122.11

Outside City Limits—Fire Service Line Rate

Line Size	2009	2010	2011	2012	2013
1 and 1/2 inch	\$23.13	\$23.13	\$23.13	\$23.13	\$23.13
2 inch	\$23.13	\$23.13	\$23.13	\$23.13	\$23.13
4 inch	\$92.51	\$92.51	\$92.51	\$92.51	\$92.51
6 inch	\$133.32	\$133.32	\$133.32	\$133.32	\$133.32
8 inch	\$183.11	\$183.11	\$183.11	\$183.11	\$183.11

B. If water is used through fire protection services for fires, no charge will be made if the consumer gives notice to the city utilities within ten days after the use of such water. In the event the consumer does not give notice to the city utilities within ten days after the use of such water, the consumer shall be charged ten times the amount registered on the meter.

C. Deliberate misuse of a detector-type meter shall be a violation of CMC 15.04.460. (Ord. 2224 § 7, 2008; Ord. 2212 § 6, 2008; Ord. 2159 § 1, 2005; Ord. 2123 § 3 (part), 2004).

15.04.190 Fire hydrants—Installation and relocation.

Fire hydrant installation and relocation shall be performed by the water utility or by a contractor approved by the city. The customer shall be charged the cost of labor, equipment and materials, plus overhead. If unpaid sixty days thereafter, shall be turned over to a collection agency as designated by the city. As well, the city may use other legal remedies including but not limited to lien and discontinuation of service. (Ord. 2123 § 3 (part), 2004).

15.04.200 Fire hydrants—Charges for service—Firefighting only.

All public fire hydrants installed outside the corporate city limits under special agreement with the city shall be charged to the appropriate fire district or agency at the rate of eight dollars per hydrant per month. (Ord. 2123 § 3 (part), 2004).

15.04.210 Fire hydrants—Charges for service—Water use.

A. Use of city water through fire hydrants for all public and private agencies, excepting fire departments and districts, shall be metered by an approved fire hydrant meter. Billing shall be as follows:

1. Based on minimum monthly charges as outlined in CMC 15.04.120 and 15.04.140, and based on outside city rates.
2. Hydrant meter rental at ten dollars per day.
3. Overhead.
4. Lost or damaged meters shall be billed at the current cost of replacement or repair.

B. Any party failing to comply with payment requirements under subsection (A)(4) of this section shall be required to pay a one thousand five hundred dollar deposit for any future use of a city owned fire hydrant meter.

Requests for water through fire hydrants must be approved by the water department prior to use of the hydrant. An approved backflow assembly may be required. (Ord. 2123 § 3 (part), 2004).

15.04.220 Fire hydrants—Tampering with.

It shall be a violation of this chapter for any person other than an authorized employee of the city of Centralia to operate, alter, change, remove, disconnect, connect with, or interfere or attempt to interfere in any manner with any fire hydrant owned or used by the city without first obtaining permission from the utilities department. (Ord. 2123 § 3 (part), 2004).

15.04.230 Rates—Industrial, schools, and hospitals.

Repealed by Ord. 2224. (Ord. 2212 § 7, 2008: Ord. 2123 § 3 (part), 2004).

15.04.240 Temporary shutoff service charge.

Service calls for temporary shutoff may be charged the cost of labor, equipment, materials, plus overhead, which billing, if unpaid, sixty days thereafter, shall be turned over to a collection agency as designated by the city. As well, the city may use other legal remedies including but not limited to lien and discontinuation of service. (Ord. 2123 § 3 (part), 2004).

15.04.250 Termination of service—Nonpayment.

Delinquency and nonpayment of one or more water service charges shall be sufficient cause for termination of service. If a customer account does not have electric service, then termination shall be by cessation of water service. Water service shall not be restored until the delinquent utility bill and a fifty-dollar service fee have been paid. Water service restored after standard hours of work shall be charged a one-hundred-fifty-dollar service fee. The standard hours of work are defined as Monday through Friday eight a.m. to five p.m., excluding holidays. (Ord. 2409 § 1, 2018: Ord. 2123 § 3 (part), 2004).

15.04.260 Termination of service—Condemned buildings.

Whenever a premise supplied with water has been found by the appropriate authorities to be unsafe, dangerous to human life or unfit for human habitation, and notice of such finding has been received by the water utility from said authorities, the utilities director shall direct the domestic water service to be discontinued at such premises. Water service to such premises shall not be restored until the owner and/or agent has secured a release or clearance from said authorities. (Ord. 2123 § 3 (part), 2004).

15.04.270 Termination of service—Backflow.

Continued use of non-approved cross connections or failure to repair or replace inadequate or faulty assemblies, or not allow testing or access to premises, except in accordance with this chapter, shall be a violation of this chapter and may result in penalties as outlined in CMC 15.04.460, and shall also be sufficient cause for the immediate discontinuance of public water service to the premises. (Ord. 2123 § 3 (part), 2004).

15.04.280 Lien for delinquent and unpaid charges.

A. The city shall have a lien for delinquent and unpaid charges against the premises for which the water has been furnished; provided, that the owners of, or the owners of a delinquent mortgage on, the premises may give written notice to the city in accordance with RCW 35.21.290 to cut off services to the premises. From and after the giving of such notice and the payment or tender of the then delinquent and unpaid charges against the premises for such services and cutoff charge, the city shall have no lien on the premises for such services thereafter furnished, nor shall the owner of or the owner of the delinquent mortgage on the premises be held for the payment thereof. Nothing herein, however, shall be construed as impairing any vested rights or liens which have accrued to the city prior to the passage of the ordinance codified in this chapter.

B. The lien as provided in this section may be enforced by terminating the service until the delinquent and unpaid charges are paid. (Ord. 2123 § 3 (part), 2004).

15.04.290 Liability for damage.

In the event damage is caused by any person, firm or corporation to the city's water system, the city reserves the right to repair same and charge such responsible party the cost of labor, equipment, material, plus overhead, which billing, if unpaid, sixty days thereafter, shall be turned over to a collection agency as designated by the city. As well, the city may use other legal remedies including but not limited to lien and discontinuation of service. (Ord. 2123 § 3 (part), 2004).

15.04.300 Fluoridation authorized.

A source of fluoridation shall be added to the city of Centralia water supply as codified by the city in CMC 6.04.010 (Ordinance 1066), under the rules and regulations of the Washington State Department of Public Health. Such addition shall be administered in a manner approved by the state director of public health, and in accordance with the laws of the state of Washington. (Ord. 2123 § 3 (part), 2004).

15.04.310 Meters—Installation and placement.

The city shall have the right to place or replace a meter on a service and to remove the same at any time, and when so doing, the meter shall remain the property of the city of Centralia. Final meter placement shall be determined by city water utility staff.

If a service line and meter are requested to be placed on private property, a signed and recorded agreement or easement indicating an approved alternative location for placement of a backflow assembly, double detector-check, and/or fire service meter is required prior to placement of services. (Ord. 2123 § 3 (part), 2004).

15.04.320 Water shut-off—Customer requested.

Customers shall not use the city's valve for purposes of shutting off the water. In the event the customer finds it necessary to shut water off the customer shall contact the city. Charges as outlined in CMC 15.04.240 may apply. (Ord. 2123 § 3 (part), 2004).

15.04.330 Meters—Replacement and testing.

If any meter is out of order or in for repair, an average charge based on the previous four months use shall be charged. If a water consumer questions the accuracy of a meter, and requests that it be tested, such consumer shall contact the city and the city will contact a certified vendor to test the meter. If the test on the meter indicates that the meter is recording the water in an amount in excess of one hundred three percent of the water actually delivered to the consumer, the excess charge of the previous three readings shall be credited to the consumer's account. If the meter test shows the meter to be accurate within one hundred three percent of the water actually delivered to the consumer, the consumer shall be responsible for all charges including the cost of labor, equipment, testing, and material, plus overhead, which billing, if unpaid, sixty days thereafter, shall be turned over to a collection agency as designated by the city. As well, the city may use other legal remedies including but not limited to lien and discontinuation of service. (Ord. 2123 § 3 (part), 2004).

15.04.340 Meters—Reimbursement for destruction.

Whenever any meter is lost, damaged, destroyed or stolen, the responsible party shall reimburse to the city of Centralia water department for meter replacement, the cost of labor, equipment and material, plus overhead, which billing, if unpaid, sixty days thereafter, shall be turned over to a collection agency as designated by the city. As well, the city may use other legal remedies including but not limited to lien and discontinuation of service. (Ord. 2123 § 3 (part), 2004).

15.04.350 Meters—Sizing.

Water meters shall be of a size large enough to register the quantity of water used without overloading the rated capacity of the meter. If, on review of the water use records, the water meter of any customer exceeds the rates recommended in the Uniform Plumbing Code, the city may replace the meter with an appropriate size as outlined in the AWWA Standards. When there is a requirement for a larger size meter, the capital facilities charge will be the difference between the old meter size and the new meter size plus the cost of labor, equipment, material, and overhead, which billing, if unpaid, sixty days thereafter, shall be turned over to a collection agency as designated by the city. As well, the city may use other legal remedies including but not limited to lien and discontinuation of service. (Ord. 2123 § 3 (part), 2004).

15.04.360 Access to premises.

Authorized employees of the city, with proper identification, shall have access during reasonable hours to all parts of a premises and within the building to which water is supplied. If city employees are refused access to premises supplied by city water, after reasonable notice has been given, it shall constitute a violation of this chapter and may result in penalties as outlined in CMC 15.04.460.

If any water user refuses access to a premise or to the interior of a structure at reasonable times and on reasonable notice for inspection by a cross-connection specialist appointed by the city, a reduced pressure backflow assembly may be installed, at the customer's expense, at the service connection to the premise. (Ord. 2123 § 3 (part), 2004).

15.04.370 Unlawful water connections.

Unless authorized by the city water utility, it is unlawful for any person:

- A. To make any connection with any city water reservoir, well, main, pipe, storm sewer or other transmission line in such a manner as to take water from same without its passage through a meter or other instrument installed for the purpose of registering the quantity of water so obtained;
- B. To make any connection or reconnection with a city water main or pipe on property where the city is rendering service or to turn on or off or in any manner interfere with any valves, stop cock, or other appliances connected therewith;
- C. To supply water through an existing meter or service to additional dwelling units without city authorization.

Any customer having had an unauthorized water supply through the city's distribution system, shall pay on an estimated basis, for the water used for the period during which such unauthorized service may have been obtained.

The customer shall be required, at their own expense, to disconnect the unauthorized service in accordance with the provisions of this chapter within twenty-four hours after the date of the receipt of a notice in writing issued by the administrative authority.

If the customer fails to repair or replace such connection within the time provided, the administrative authority is authorized to disconnect the unauthorized service. All expenses incurred, together with applicable interest, in accordance with state law, shall be assessed against the property upon which the said building or structure is situated and shall become a lien thereon. Such lien may be enforced by termination of some or all of the utility services provided to the property or in any other manner authorized by law. Such total amount, when collected, shall be paid into the proper utility fund.

Violation of any provisions of this section and failure to pay for all costs incurred may constitute a violation of this chapter and may result in penalties as outlined in CMC 15.04.460. (Ord. 2123 § 3 (part), 2004).

15.04.380 Nonliability of city for service interruptions or variances.

A. The city will use all reasonable means to provide an adequate and continuous water service for all customers, but in case the water service is interrupted or reduced, for any cause, the city shall not be liable for any injuries or damages resulting therefrom, and such interruption or reduction in service shall not give rise to any cause of action as for a breach of agreement for service.

B. The city makes no commitment as to the volume of water available, pressure per square inch or continuity of service, and will not be liable for injuries or damages due to insufficient volume, inadequate pressure, water quality, or interruption of service.

C. The city is not responsible for damage to premises beyond the meter when a request for water turn on or turn off has been initiated by the customer. (Ord. 2123 § 3 (part), 2004).

15.04.390 City to control connection.

The city shall own, operate, control, and maintain all pipe, fittings, and connections from the water main up to and including the meter. This includes water meters regardless if on private property, in a vault, in a building, or in the public right-of-way. The property owner shall be responsible for maintenance of all pipe and fittings from the meter to their premise. (Ord. 2123 § 3 (part), 2004).

15.04.400 Backflow and cross connections—Purpose.

The purpose of these regulations is to protect the water supply of the city from contamination or pollution due to any existing or potential cross-connections. Cross connections are prohibited and shall not be created, installed, used or maintained within the city's water distribution system, except in accordance with this chapter, and shall meet the requirements as set forth in WAC 246-290-490, and WAC 51-46-0603 of the UPC as they presently exist or hereafter amended. (Ord. 2123 § 3 (part), 2004).

15.04.410 Cross connection control program—Adoption of state regulations.

The CCS shall develop the city's cross-connection control program following the rules and regulations of WAC 246-290-490. The CCS may refer to the current Manual of Cross-Connection Control (USC Manual) or the current Cross-Connection Control Manual Accepted Procedure and Practice (PNWS—AWWA Manual), or such other current references approved by the Department of Health as they presently exist or hereafter amended. (Ord. 2123 § 3 (part), 2004).

15.04.420 Backflow prevention assembly requirement.

Backflow prevention assemblies approved for use by the Washington State Department of Health shall be installed at the service connection, or a location acceptable to the city, in each of the following circumstances:

- A. Those premises and services identified by WAC 246-290-490 as high hazards;
- B. On premises having any one or more cross-connections as that term is defined in CMC 15.04.020(P);
- C. Internal cross-connections that are not correctable, or intricate plumbing arrangements which make it impractical to ascertain whether or not cross-connections exist;
- D. Unduly restricted entry so that inspections for cross-connections cannot be made with sufficient frequency or with sufficient notice to assure that cross-connections do not exist;
- E. Materials of a toxic or hazardous nature being used such that, if backsiphonage or backpressure should occur, a health hazard could result;
- F. Fire protection systems other than flow-through or combinations systems require RPDA for systems with chemical addition or using unapproved auxiliary water supply and DCDA for all other fire protection systems, and shall be consistent with WAC 51-46-0603 of the UPC as now exists or hereafter amended;

- G. Irrigation systems with chemical injection require RPBA. All other irrigation systems require a DCVA;
- H. All properties having an unapproved auxiliary water supply interconnected with the city's water supply shall install a reduced pressure backflow assembly at the service connection or have the option to abandon the well as prescribed in WAC 173-160-415. Backflow agreements shall be executed and recorded for all wells on sites that have not been legally abandoned and are not connected directly to the city's water system;
- I. The choice and application of backflow assemblies in specific circumstances shall comply with WAC 246-290-490;
- J. Installation of backflow prevention assemblies will be approved by the city's CCS as deemed to be necessary. (Ord. 2123 § 3 (part), 2004).

15.04.430 Backflow—Installation requirements—Adoption of state regulations as they now exist or hereafter amended.

All installers of backflow assemblies (includes plumbing contractors, landscape contractors, or private citizens) shall obtain a plumbing permit prior to installation of a backflow assembly. All inspections of the installation shall be conducted as required in CMC 15.04.440.

To ensure proper operation and accessibility of all backflow prevention assemblies, the following requirements shall apply to the installation of these assemblies:

- A. Procedures for installing and testing backflow assemblies shall be in accordance with WAC 246-290-490 and the city of Centralia Development Standards as presently exist or hereafter amended;
- B. Assemblies must be installed at the point of delivery of the water supply, before any branch in the line, on private property located just inside of the property line, or a location acceptable to the city;
- C. Assemblies must be protected from freezing and other severe weather conditions;
- D. All backflow assemblies to be installed shall be of a type and model approved for use in Washington State by the Department of Health. (Ord. 2123 § 3 (part), 2004).

15.04.440 Backflow—Testing and repairs.

All backflow assemblies installed, relocated or repaired within the territory served by the city water system shall be tested immediately upon installation and at least annually thereafter by a state-

certified tester. Test results shall be immediately reported to the city's CCS. All BATs who test within the city's distribution system must be registered with the city's CCS by supplying a copy of their BAT certification and an annual copy of their test kit calibration certification.

All such assemblies found not functioning properly shall be immediately repaired or replaced by the water user. If any such assembly is not immediately repaired or replaced, the city may deny or discontinue water to the premises. All testing and repairs are the financial responsibility of the property owner.

Failure to do so shall be a violation of this chapter and may result in penalties as outlined in CMC 15.04.460. (Ord. 2123 § 3 (part), 2004).

15.04.450 Backflow—Costs of compliance.

All costs associated with purchase, installation, inspections, testing, replacement, maintenance, parts, and repairs of the backflow assembly are the financial responsibility of the property owner. (Ord. 2123 § 3 (part), 2004).

15.04.460 Violation—Penalty.

A. Violations for failure to comply with any of the provisions of this chapter are declared to be misdemeanors, and conviction therefor shall subject the offender to a fine not to exceed one thousand-nine hundred dollars, plus costs and penalty assessments, or imprisonment in jail for not to exceed ninety days, or to both such fine and imprisonment.

B. In addition to the foregoing criminal sanctions and not in any way a limitation thereof, persons alleged to be violating any provision of this chapter may be subject to termination of water service by the city upon being given ten days written notice by certified mail, return receipt requested, directed to such person's address as last shown on the city records, informing them of the alleged violation and informing them that failure to correct such violation will result in termination of such service at the end of the ten-day period; provided, however, this subsection does not apply to termination of service due to nonpayment of the utility billing. Any work accomplished by customer request and billed for time, materials, equipment and overhead, or to repair damage caused by a customer and so billed, may be added to the customer's bill and be subject to all applicable penalties including, but not limited to, lien and discontinuance of service. (Ord. 2123 § 3 (part), 2004).

15.04.470 Effective date of charges.

Rates set forth in this chapter shall be in full force and effect with the January 2009 billing. (Ord. 2224 § 9, 2008: Ord. 2212 § 8, 2008).

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Appendix D. Local Government Coordination

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Appendix E. SEPA Checklist

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SEPA ENVIRONMENTAL CHECKLIST

Purpose of checklist:

Governmental agencies use this checklist to help determine whether the environmental impacts of your proposal are significant. This information is also helpful to determine if available avoidance, minimization or compensatory mitigation measures will address the probable significant impacts or if an environmental impact statement will be prepared to further analyze the proposal.

Instructions for applicants:

This environmental checklist asks you to describe some basic information about your proposal. Please answer each question accurately and carefully, to the best of your knowledge. You may need to consult with an agency specialist or private consultant for some questions. You may use "not applicable" or "does not apply" only when you can explain why it does not apply and not when the answer is unknown. You may also attach or incorporate by reference additional studies reports. Complete and accurate answers to these questions often avoid delays with the SEPA process as well as later in the decision-making process.

The checklist questions apply to all parts of your proposal, even if you plan to do them over a period of time or on different parcels of land. Attach any additional information that will help describe your proposal or its environmental effects. The agency to which you submit this checklist may ask you to explain your answers or provide additional information reasonably related to determining if there may be significant adverse impact.

Instructions for Lead Agencies:

Please adjust the format of this template as needed. Additional information may be necessary to evaluate the existing environment, all interrelated aspects of the proposal and an analysis of adverse impacts. The checklist is considered the first but not necessarily the only source of information needed to make an adequate threshold determination. Once a threshold determination is made, the lead agency is responsible for the completeness and accuracy of the checklist and other supporting documents.

Use of checklist for nonproject proposals:

For nonproject proposals (such as ordinances, regulations, plans and programs), complete the applicable parts of sections A and B plus the [SUPPLEMENTAL SHEET FOR NONPROJECT ACTIONS \(part D\)](#). Please completely answer all questions that apply and note that the words "project," "applicant," and "property or site" should be read as "proposal," "proponent," and "affected geographic area," respectively. The lead agency may exclude (for non-projects) questions in Part B - Environmental Elements –that do not contribute meaningfully to the analysis of the proposal.

A. Background [\[HELP\]](#)

1. Name of proposed project, if applicable: **City of Centralia 2021 Water System Plan**
2. Name of applicant: **City of Centralia, Public Works Department**

3. Address and phone number of applicant and contact person:

**Mr. Kim Ashmore
Public Works Director
City of Centralia
1100 N. Tower Ave.
Centralia, WA 98531
(360) 330-7512**

4. Date checklist prepared: **August 11, 2021**

5. Agency requesting checklist: **Washington State Department of Health**

6. Proposed timing or schedule (including phasing, if applicable): **Approval of plan in 2021. Implementation of plan over twenty (20) year period with plan updates every ten (10) years.**

7. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain. **Yes. The plan includes capital improvements related to water system improvements, as well as proposed development of a new source of supply at Borst Park using Skookumchuck River water rights.**

8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal. **None other than what is contained in the plan.**

9. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain. **Zoning and planning changes affecting the City's water service area may impact projects described in the plan.**

10. List any government approvals or permits that will be needed for your proposal, if known. **Determination of consistency with planning assumptions by the Centralia Department of Community Development and Lewis County Community Development Department. Approval by Centralia City Council. Approval by WA State Department of Health.**

11. Give brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page. (Lead agencies may modify this form to include additional specific information on project description.)

Water System Plan Update for the City of Centralia water system, serving approximately 7,200 service connections and 18,500 persons from several groundwater wells. The Plan was developed to meet the requirements of WAC 246-290 and provide comprehensive planning to meet the future water supply requirements for the service area served by the City of Centralia.

12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic

map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist.

The City of Centralia's water system service area is located in northern Lewis County, Washington. See Figure 1-1 in the Plan.

B. Environmental Elements [\[HELP\]](#)

1. Earth [\[help\]](#)

a. General description of the site:

(circle one): Flat, rolling, hilly, steep slopes, mountainous, other _____

Areas include varied terrain, though much of future system expansion will likely take place in hilly areas.

b. What is the steepest slope on the site (approximate percent slope)?

Unknown; slope of area varies.

c. What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any agricultural land of long-term commercial significance and whether the proposal results in removing any of these soils.

Plan includes a large area, which includes all of the listed soil types.

d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe.

Soils in the vicinity of specific construction projects will be evaluated during the design of each project.

e. Describe the purpose, type, total area, and approximate quantities and total affected area of any filling, excavation, and grading proposed. Indicate source of fill.

Requirements for filling and grading will be evaluated during the design of specific construction projects.

f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe.

Proper construction practices should minimize erosion.

g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)?

This will be evaluated as new facilities are designed.

h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any:

Proper construction practices will minimize runoff from the site and restore disturbed areas as quickly as possible to prevent erosion.

2. Air [\[help\]](#)

- a. What types of emissions to the air would result from the proposal during construction, operation, and maintenance when the project is completed? If any, generally describe and give approximate quantities if known.

Typical emissions from construction and construction equipment during construction of specific projects.

- b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe.

N/A

- c. Proposed measures to reduce or control emissions or other impacts to air, if any:

Proper mufflers and air emissions control equipment devices will be maintained on construction equipment. Disturbed areas will be wetted to control dust.

3. Water [\[help\]](#)

- a. Surface Water: [\[help\]](#)

- 1) Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into.

North Fork Newaukum River, Skookumchuck River, Chehalis River, China Creek, and several small unnamed streams.

- 2) Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans.

Future projects described in Plan may include work near or crossing surface water bodies. Detailed construction descriptions and plans have not yet been developed.

- 3) Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material.

Information not available at this time.

- 4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known.

Information not available at this time.

- 5) Does the proposal lie within a 100-year floodplain? If so, note location on the site plan.

Exact locations of future projects is unknown. Mitigation measures from any work that may occur within a floodplain will be addressed during the design of that work.

- 6) Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge.

None are anticipated.

b. Ground Water: [\[help\]](#)

- 1) Will groundwater be withdrawn from a well for drinking water or other purposes? If so, give a general description of the well, proposed uses and approximate quantities withdrawn from the well. Will water be discharged to groundwater? Give general description, purpose, and approximate quantities if known.

Yes. Water will be withdrawn from existing and future groundwater wells, to provide potable water supply to the City of Centralia. No discharges to groundwater are anticipated.

- 2) Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals. . . ; agricultural; etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve.

Does Not Apply

c. Water runoff (including stormwater):

- 1) Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? If so, describe.

Stormwater will be diverted around construction sites. Stormwater drainage will be considered during the design of new facilities.

- 2) Could waste materials enter ground or surface waters? If so, generally describe.

Proper construction practices will prevent waste materials from entering ground or surface waters.

- 3) Does the proposal alter or otherwise affect drainage patterns in the vicinity of the site? If so, describe.

No

d. Proposed measures to reduce or control surface, ground, and runoff water, and drainage pattern impacts, if any:

Anticipated project measures include diversions of stormwater around construction sites, proper dewatering practices, and consideration of stormwater drainage during design of new facilities. Wellhead protection is addressed in this Plan as well (see Section 11).

4. **Plants** [\[help\]](#)

- a. Check the types of vegetation found on the site:

____deciduous tree: alder, maple, aspen, other
____evergreen tree: fir, cedar, pine, other
____shrubs
____grass
____pasture
____crop or grain
____Orchards, vineyards or other permanent crops.
____wet soil plants: cattail, buttercup, bullrush, skunk cabbage, other
____water plants: water lily, eelgrass, milfoil, other
____other types of vegetation

No detailed survey of the area was taken. However, there is a wide range of vegetation in the service area, including most listed above.

- b. What kind and amount of vegetation will be removed or altered?

Specific types of vegetation removed during future work is unknown.

- c. List threatened and endangered species known to be on or near the site.

Not researched. This will be evaluated during implementation of specific projects.

- d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any:

This will be considered during implementation of specific projects.

- e. List all noxious weeds and invasive species known to be on or near the site.

Not researched. This will be evaluated during implementation of specific projects.

5. **Animals** [\[help\]](#)

- a. List any birds and other animals which have been observed on or near the site or are known to be on or near the site.

No detailed survey of the area was taken. However, several of the animals and birds listed below may exist in the area.

Examples include:

birds: hawk, heron, eagle, songbirds, other:
mammals: deer, bear, elk, beaver, other:
fish: bass, salmon, trout, herring, shellfish, other _____

- b. List any threatened and endangered species known to be on or near the site.

Not researched. This will be evaluated during implementation of specific projects.

c. Is the site part of a migration route? If so, explain.

Not researched. This will be evaluated during implementation of specific projects.

d. Proposed measures to preserve or enhance wildlife, if any:

Exact locations of future projects and wildlife mitigation measures will be addressed during specific project design.

e. List any invasive animal species known to be on or near the site.

Not researched. This will be evaluated during implementation of specific projects.

6. Energy and Natural Resources [\[help\]](#)

a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc.

Electricity will be used for heating, lighting, pumping, and telemetry associated with some projects. Gasoline and diesel fuel will be used for construction equipment and generators.

b. Would your project affect the potential use of solar energy by adjacent properties?

If so, generally describe.

Generally, no. However, proposed storage reservoirs will block some sun, affecting adjacent properties.

c. What kinds of energy conservation features are included in the plans of this proposal?

List other proposed measures to reduce or control energy impacts, if any:

Energy efficient pumps and equipment will be used wherever possible.

7. Environmental Health [\[help\]](#)

a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal?

If so, describe.

Proper safety precautions will be taken when buried utilities are encountered during trenching operations. No other hazards are known.

1) Describe any known or possible contamination at the site from present or past uses.

Not researched. This will be evaluated during implementation of specific projects.

2) Describe existing hazardous chemicals/conditions that might affect project development and design. This includes underground hazardous liquid and gas transmission pipelines located within the project area and in the vicinity.

This will be evaluated during implementation of specific projects.

3) Describe any toxic or hazardous chemicals that might be stored, used, or produced during the project's development or construction, or at any time during the operating life of the project.

This will be evaluated during implementation of specific projects.

- 4) Describe special emergency services that might be required.
This will be evaluated during implementation of specific projects.
- 5) Proposed measures to reduce or control environmental health hazards, if any:
This will be evaluated during implementation of specific projects.

b. Noise

- 1) What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)?
None
- 2) What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site.
Short-term noise during construction from construction activities and long-term background noise from booster station pumps.
- 3) Proposed measures to reduce or control noise impacts, if any:
Booster station pumps will be installed inside a pump house or in a vault. Proper mufflers will be used on all construction equipment.

8. Land and Shoreline Use [\[help\]](#)

- a. What is the current use of the site and adjacent properties? Will the proposal affect current land uses on nearby or adjacent properties? If so, describe.
The Plan affects many areas with various uses, ranging from undeveloped to residential, commercial, and industrial. See Figure 2-1 in the Plan for a depiction of City zoning. The plan itself has no effect on current land use.
- b. Has the project site been used as working farmlands or working forest lands? If so, describe. How much agricultural or forest land of long-term commercial significance will be converted to other uses as a result of the proposal, if any? If resource lands have not been designated, how many acres in farmland or forest land tax status will be converted to nonfarm or nonforest use?
Not recently.
 - 1) Will the proposal affect or be affected by surrounding working farm or forest land normal business operations, such as oversize equipment access, the application of pesticides, tilling, and harvesting? If so, how:
No.
- c. Describe any structures on the site.
The service area is large and contains many residential, commercial, recreational, and public structures.

d. Will any structures be demolished? If so, what?

None anticipated, but depends upon final selection of new reservoir and pump station sites.

e. What is the current zoning classification of the site?

Varies throughout the service area, including residential, commercial, industrial, and public (see Figure 2-1).

f. What is the current comprehensive plan designation of the site?

Varied, similar to the above-mentioned zoning classifications.

g. If applicable, what is the current shoreline master program designation of the site?

Depends upon final selection of sites for new facilities.

h. Has any part of the site been classified as a critical area by the city or county? If so, specify.

Depends upon final selection of sites for new facilities.

i. Approximately how many people would reside or work in the completed project?

The service area population is expected to increase from an estimated 18,458 people in 2020 to a projected 26,280 people in 2040.

j. Approximately how many people would the completed project displace?

No displacement anticipated.

k. Proposed measures to avoid or reduce displacement impacts, if any:

Does Not Apply

l. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:

The Plan has been reviewed by Lewis County Community Development Department and the City of Centralia Department of Community Development to ensure consistency with applicable comprehensive plans, land use plans, and planning assumptions, including growth rates.

m. Proposed measures to reduce or control impacts to agricultural and forest lands of long-term commercial significance, if any:

None anticipated

9. Housing [\[help\]](#)

- a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing.

Does Not Apply

- b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing.

Does Not Apply

- c. Proposed measures to reduce or control housing impacts, if any:

Does Not Apply

10. Aesthetics [\[help\]](#)

- a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed?

The tallest proposed structures are likely to be new water reservoirs that could be as much as 120 feet high. Final site selection and acquisition will determine the height of the reservoirs. Exterior building material will be selected during design.

- b. What views in the immediate vicinity would be altered or obstructed?

Depends on selection of reservoir sites.

- c. Proposed measures to reduce or control aesthetic impacts, if any:

Aesthetic impacts, exteriors, and landscaping will all be considered during design of future facilities.

11. Light and Glare [\[help\]](#)

- a. What type of light or glare will the proposal produce? What time of day would it mainly occur?

Unknown at this time.

- b. Could light or glare from the finished project be a safety hazard or interfere with views?

Unknown at this time. Light or glare that is a safety hazard or interferes with views is not anticipated.

- c. What existing off-site sources of light or glare may affect your proposal?

Does Not Apply

- d. Proposed measures to reduce or control light and glare impacts, if any:

Impacts from light and glare will be considered during design of future facilities.

12. Recreation [\[help\]](#)

- a. What designated and informal recreational opportunities are in the immediate vicinity?

Many parks and recreational facilities exist in the service area.

- b. Would the proposed project displace any existing recreational uses? If so, describe.

Unknown at this time.

- c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any:

Mitigation of impacts on recreation will be considered during design of future facilities.

13. Historic and cultural preservation [\[help\]](#)

- a. Are there any buildings, structures, or sites, located on or near the site that are over 45 years old listed in or eligible for listing in national, state, or local preservation registers? If so, specifically describe.

Not researched. This will be evaluated during implementation of specific projects.

- b. Are there any landmarks, features, or other evidence of Indian or historic use or occupation? This may include human burials or old cemeteries. Are there any material evidence, artifacts, or areas of cultural importance on or near the site? Please list any professional studies conducted at the site to identify such resources.

This will be evaluated during implementation of specific projects

- c. Describe the methods used to assess the potential impacts to cultural and historic resources on or near the project site. Examples include consultation with tribes and the department of archeology and historic preservation, archaeological surveys, historic maps, GIS data, etc.

This will be evaluated during implementation of specific projects

- d. Proposed measures to avoid, minimize, or compensate for loss, changes to, and disturbance to resources. Please include plans for the above and any permits that may be required.

Mitigation of impacts on historic and cultural sites will be considered during design of future facilities.

14. Transportation [\[help\]](#)

- a. Identify public streets and highways serving the site or affected geographic area and describe proposed access to the existing street system. Show on site plans, if any.

Major public streets and highways are shown on Figure 1-1 in the Plan.

- b. Is the site or affected geographic area currently served by public transit? If so, generally describe. If not, what is the approximate distance to the nearest transit stop?

No.

- c. How many additional parking spaces would the completed project or non-project proposal have? How many would the project or proposal eliminate?

Does Not Apply

- d. Will the proposal require any new or improvements to existing roads, streets, pedestrian, bicycle or state transportation facilities, not including driveways? If so, generally describe (indicate whether public or private).

Access roads to reservoir and pump station sites may be required. New or replacement water lines in existing streets will require repair of the streets.

- e. Will the project or proposal use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe.

Does Not Apply

- f. How many vehicular trips per day would be generated by the completed project or proposal? If known, indicate when peak volumes would occur and what percentage of the volume would be trucks (such as commercial and nonpassenger vehicles). What data or transportation models were used to make these estimates?

A significant increase in vehicular trips is not anticipated. Visits to pump stations and reservoir sites for inspection and maintenance will be necessary. Vehicular traffic will increase temporarily during construction when construction workers drive to and from the construction sites.

- g. Will the proposal interfere with, affect or be affected by the movement of agricultural and forest products on roads or streets in the area? If so, generally describe.

None are anticipated.

- h. Proposed measures to reduce or control transportation impacts, if any:

None are anticipated.

15. Public Services [\[help\]](#)

- a. Would the project result in an increased need for public services (for example: fire protection, police protection, public transit, health care, schools, other)? If so, generally describe.

Water services will be provided as dictated by need. Water service by itself will not cause the need for public services to increase.

- b. Proposed measures to reduce or control direct impacts on public services, if any.

Growth within the service area will be determined by zoning, land use, and needs or restrictions. Water services will be provided based on need. Projects in the Plan will improve water service and fire protection in the service area.

16. Utilities [\[help\]](#)

- a. Circle utilities currently available at the site:

electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system,
other _____

Depends upon locations of future facilities.

- b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed.

Depends upon the specific needs for each future facility.

C. Signature [\[HELP\]](#)

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature: _____

Name of signee _____

Position and Agency/Organization _____

Date Submitted: _____

D. Supplemental sheet for nonproject actions [\[HELP\]](#)

(IT IS NOT NECESSARY to use this sheet for project actions)

Because these questions are very general, it may be helpful to read them in conjunction with the list of the elements of the environment.

When answering these questions, be aware of the extent the proposal, or the types of activities likely to result from the proposal, would affect the item at a greater intensity or at a faster rate than if the proposal were not implemented. Respond briefly and in general terms.

1. How would the proposal be likely to increase discharge to water; emissions to air; production, storage, or release of toxic or hazardous substances; or production of noise?
Water service alone does not cause any of the mentioned situations. Some minor temporary impacts may occur during construction.

Proposed measures to avoid or reduce such increases are:

Proper construction practices will avoid or reduce temporary impacts.

2. How would the proposal be likely to affect plants, animals, fish, or marine life?
The projects proposed in this Plan are not anticipated to affect plants, animals, fish, or marine life. Measures for protection or conservation will be considered during project design.

Proposed measures to protect or conserve plants, animals, fish, or marine life are:

Design decisions and construction procedures will follow all proper procedures and practices to minimize impacts on plants, animals, fish, and marine life.

3. How would the proposal be likely to deplete energy or natural resources?
Energy will be used to construct new facilities and operate equipment after facilities are constructed. There will be an increase in ground and surface water withdrawal corresponding to growth projections outlined in the Plan.

Proposed measures to protect or conserve energy and natural resources are:

Appropriate reviews, approvals, and permits will be obtained before planned construction projects so as to protect and conserve energy and natural resources. The Plan includes a water conservation plan identifying activities to be implemented by the City. Energy-efficient equipment will be considered wherever possible.

4. How would the proposal be likely to use or affect environmentally sensitive areas or areas designated (or eligible or under study) for governmental protection; such as parks,

wilderness, wild and scenic rivers, threatened or endangered species habitat, historic or cultural sites, wetlands, floodplains, or prime farmlands?

No such effects are anticipated.

Proposed measures to protect such resources or to avoid or reduce impacts are:

All regulations concerning sensitive or protected areas will be followed during implementation of projects described in the Plan.

5. How would the proposal be likely to affect land and shoreline use, including whether it would allow or encourage land or shoreline uses incompatible with existing plans?

No such effects are anticipated.

Proposed measures to avoid or reduce shoreline and land use impacts are:

None

6. How would the proposal be likely to increase demands on transportation or public services and utilities?

The Plan responds to a projected increase in needs for water service resulting from projected population growth in the service area. Increase in demands on public services and utilities resulting from growth will be determined by zoning, land use plans, and restrictions or needs. Water service in itself will not increase the demand for public services.

Proposed measures to reduce or respond to such demand(s) are:

Source development, storage construction, and transmission and distribution system improvements.

7. Identify, if possible, whether the proposal may conflict with local, state, or federal laws or requirements for the protection of the environment.

The Plan is consistent with good management practices for water resources and does not conflict with current laws and regulations. The Plan conforms with all laws and requirements for the protection of the environment.

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Appendix F. Reclaimed Water

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Attachment 9: Water Reclamation Checklist for Systems with 1,000 or more Connections

The Municipal Water Supply - Efficiency Requirements Act, Chapter 5, Laws of 2003 (Municipal Water Law), amended Chapter 90.46 of the Revised Code of Washington (RCW) to require public water systems serving 1000 or more connections to evaluate opportunities for reclaimed water when completing their water system plans (WSP). This checklist may be used to ensure that your WSP includes sufficient information about opportunities for reclaimed water and your system's efforts to develop those opportunities.

Water System Name: City of Centralia Date: 12/20/05
 PWS ID: 12200 D

✓	1. An evaluation of water reclamation opportunities is found in the WSP on pages: <u>4-5</u> At a minimum, include the following in your evaluation of reclamation opportunities: • An inventory of large water users. • Identification of potential reclaimed water users. • Estimates of how much water could be saved by development of reclaimed water projects • Identification of opportunities that your system intends to pursue within the next six years • A brief analysis of the financial and operation feasibility of identified opportunities The form on the opposite side of this page is provided to assist you in conducting an inventory of potential users and estimate savings. Use of this form is <u>optional</u>.
✓	2. Provide the results of that evaluation. <u>NA - see item 3</u> If new or additional reclaimed water opportunities are available, include a brief description of activities you are considering undertaking or those activities you will undertake to pursue development of those opportunities. If reclaimed water opportunities are not available, include a brief description of the interaction with the local wastewater facility (or other entity within the area you serve that may be a generator of reclaimed water) to evaluate opportunities to develop reclaimed water.
✓	3. If evaluation of water reclamation is not included because such an evaluation has been completed by the wastewater facility, or other entity, please <u>include a copy of that evaluation</u>. <u>→ see enclosed documentation</u>
✓	4. If water reclamation is mandated for this water system through local government agreement, contract, local regulations, ordinances, or other mechanism, please provide a copy of the governing mechanism. <u>NA</u>
✓	5. If reclaimed is available within the service area of your water system please include the following information: <u>NA</u> • Name of Facility • Class of Water Received (A, B, C or D) • Reclamation Permit Number • Amount of Reclaimed Water received • A brief description of how this water is used, including information on cross connection control • Date when your utility began receiving reclaimed water

From the City's ~~Water~~ Wastewater Treatment Plant Facilities Plan (January 2002).

Reclaimed Water Potential Use Checklist

✓

Est. Annual
Use

Est.
Annual
Savings

Crop Irrigation

- Trees
- Sod
- Nursery
- Pasture
- Irrigation of Food Crops

NA
see item 3

Landscape Irrigation

- Cemeteries
- Freeway Landscapes
- Other Restricted Landscape Areas
- Golf Courses
- Parks
- Playgrounds
- Schoolyards
- Other Open Access Areas
- Residential Landscapes

Ponds

- Landscape Impoundments
- Recreational Impoundments

Water Trucks

- Street Sweeping
- Fire fighting & protection
- Washing of Corporation Yards, Lots, and Sidewalks
- Dust Control (Dampening Unpaved Roads, Other
- Dampening Soil for Compaction (Construction Sites, Landfills, Pipelines, etc.)

Other

- Toilet and Urinal Flushing
- Lift Stations
- Ship Ballast
- Fish Hatchery Basins
- Washing Aggregate and Making Concrete
- Flushing of Sanitary Sewers
- Industrial Boiler Feed
- Industrial Cooling
- Industrial Process

Environmental Uses

- Streamflow Augmentation
- Aquifer recharge
- Wetland Mitigation
- Other

*Other uses not listed above:

5.4 Description of Other Utilities Facilities

The City is interested in exploring the possibility of consolidating all of its utilities departments at a centralized location and updating its facilities, including the water and street departments. Figures 5-1 and 5-2 show a number of facilities that are not part of a WWTP, but are being considered at this time to be located at a WWTP site. These facilities include a larger administration building, larger maintenance building, garages and sheds, paved storage areas, and the Eshom well air stripper. They are shown to allow the cumulative impact of these facilities to be addressed in the project EIS. Funding for these projects would not be part of the WWTP project. These optional facilities are presented on the conceptual layout for a new WWTP (Figure 5-1) to help the City in evaluating the desirability and feasibility of consolidating and updating some departments.

5.4.1 Administration Building

The administration building shown in Figures 5-1 and 5-2 is a 9,700-square-foot (ft²), two-story structure. Of this square footage, 5,200 ft² is estimated for the wastewater utility, and the remainder would be for general utility administration and other departments.

5.4.2 Maintenance Building

The maintenance building shown is a 54,000-ft² building, which is assumed to be two stories for about one-third of the floor space. The wastewater portion of the facility would be 5,000 ft², and the remaining space would be for other departments.

5.4.3 Garages and Sheds

The following enclosed and covered facilities have been requested for consideration:

- Streets equipment storage—10,900 ft²
- Wastewater heated garage—2,500 ft²
- Wastewater decant building—3,000 ft²
- Water open garage—5,400 ft²
- Wastewater collection garage—2,800 ft²

5.4.4 Paved Storage, Access Roads, and Parking

Approximately 96,000 square feet of paved storage, access roads, and parking is shown for other departments, the environmental education center, or additions to the facilities typically provided under state and federal funding for new WWTPs.

5.5 Water Reclamation and Reuse

Water reclamation and reuse is a concept that is gaining recognition in Washington as both a water supply option and a wastewater discharge alternative. Reclaimed water can provide an alternate water resource for applications that would otherwise be limited by traditional water supplies. It is also a relatively drought-proof water supply because wastewater as a source is relatively consistent regardless of the climatological conditions. In addition, the public may find that water reuse is more economically and environmentally sound than the

development of the more traditional water supplies, such as dams. For wastewater discharges, water reuse might present an opportunity for an overall decrease in pollution or provide the ability to meet more stringent water quality requirements when it replaces conventional wastewater discharges to sensitive surface waters.

The State of Washington Departments of Health and Ecology have issued Water Reclamation and Reuse Standards (Reuse Standards) that were finalized in 1997. The standards are primarily based on a specified level of treatment, for which in turn is based on the end use of the reclaimed water. The treatment requirements of the use of reclaimed water are divided into four designated classes with Class A being the most highly treated with the greatest number of allowable uses and Class D being the most restrictive level.

The City's existing WWTP could provide a viable source for production and delivery of reclaimed water. A discussion with the City's Citizen's Advisory Committee resulted in a recommendation that a reclamation facility be considered for producing a Class A effluent sized for average day flows (1.5 to 2.5 mgd), to be used during dry periods. With the proposed WWTP expansion and relocation, water reuse could be an integral part of the facility operations. The effluent currently discharged to the Chehalis River meets the requirements for Class B water. With the addition of coagulation and filtration, and improved disinfection, there would be no restriction on the types of applications the reclaimed water could be used for. Reclaiming this effluent would provide an additional benefit of reducing discharge for the Chehalis River during dry periods, when the river is most sensitive to incoming loadings.

The most common use of reclaimed water is for landscape irrigation. A number of parks and open space areas within the City's service area could potentially be evaluated for the use of reclaimed water. Factors to consider in the feasibility of reclaimed water for landscape irrigation is that the seasonal nature of the use often limits the economic incentives to developing such a project and transmission costs should be minimized to reduce costs.

Water reuse is often a viable supply source for various commercial businesses and industries. The volume and quality of water required varies greatly depending on the business and use.

Water reuse requires a separate distribution system for the reclaimed water. The most economical projects are those that are able to install dual distribution systems with new construction. The cost for a new reclaimed water distribution piping system is typically the largest capital expenditure of any reuse project.

With the recent Reuse Standards, reclaimed water can also be used to enhance wetlands and provide a source of water for groundwater recharge. These uses are often considered mitigations for various situations, such as the granting of additional water rights.

Based on the interest of the Citizens Advisory Committee, an engineering report could be developed to quantify the reuse potential within the City, particularly in the areas of landscape irrigation, indirect discharge to wetlands, and industrial use.

Appendix G. Communication from Fire Marshal

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To: Andy Oien
Subject: RE: [External]RE: Water System Plan--Fire Flows

From: Kevin Anderson <kanderson@riversidefire.net>
Sent: Thursday, April 29, 2021 5:28 PM
To: Andy Oien <AOien@cityofcentralia.com>
Subject: [External]RE: Water System Plan--Fire Flows

CAUTION:This email originated from outside the City of Centralia's network. Do not click links or open attachments unless you are expecting this email and know the contents are safe.

Andy,

The fire flow requirement for one and two family dwellings, Group R-3 and R-4 buildings and townhouses is listed at 1000 GPM for 1 hour for square footage under 3,600. This information is included in Table B105.1(1) of the 2018 edition of the International Fire Code. This flow requirement exists for the areas within the Centralia City Limits only. For one and two family dwellings within the City's UGA, the Washington Survey and Ratio Bureau's 'Tender Credit' flow requirement of a minimum of 250 GPM for 30 minutes has been adopted per CMC 18.04.010.

At present, there are no known areas within the City's water system that would require a fire flow exceeding 5000 GPM for 5 hours.

At present, there are no known areas of concern within areas zoned for commercial/industrial development. All new construction will be required to comply with existing fire flow provisions of IFC, Appendix B.

To address future system development, the greatest areas of existing weakness occur where supplying residential development within the UGA areas. The Mayberry Rd/Rancho Rd area is one example of where access to hydrants is inadequate.

Please let me know if you need any additional information.

Thanks!!

Kevin Anderson
Assistant Chief & Fire Marshal
Riverside Fire Authority
1818 Harrison Ave
Centralia, WA 98531
(O) 360-736-3975
(C) 360-508-6455

From: [Andy Oien](#)
Sent: Wednesday, April 28, 2021 10:22 AM
To: [Kevin Anderson](#)
Subject: Water System Plan--Fire Flows

Hello Kevin,

The Water Dept. is updating the Water System Plan, as per the DOH requirements. This is typically done every six years. The last plan had 1,000 GPM minimum for residential, and the maximum of 5,000 GPM for 5 hours.

1. Are the assumptions/minimum requirements noted in the last WSP still applicable? A few related sub questions are:
 - a. Is there a new standard minimum or goal for single-family residential, different than 1,000 GPM?
 - b. Is there an area served by the City where the RFA needs/wants more than 5,000 GPM for 5 hours (coming from multiple hydrants)
2. Are there any specific commercial/industrial areas of concern that RFA has? If so where are those and what is the nature of the issue? Specifically, is there a flow you would like to see in certain areas that you think is not presently available from the water distribution system? The point of this question is not that the City is suggesting the water dept. will necessarily be upgraded to meet the desire, but it is something that we could factor into the analysis while working with the hydraulic model.

Thank you,

Andy Oien
Water Operations Manager
Centralia Public Works
360.330.7512

This document may not be a confidential document. Emails and text messages sent by City employees and City Council members during the course of business, may constitute a public record, making this communication subject to the Washington State Public Records, RCW Chapter 42.56. This document may be available to the public for disclosure

Appendix H. Construction Standards and Specs for Water

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CHAPTER 2 WATER

2.01 General

Any extension of the City of Centralia Water System must be approved by the City of Centralia Public Works Department. All extensions must meet or exceed the requirements of the Washington State Department of Health, the adopted City of Centralia Water Comprehensive Plan and the Riverside Fire Authority.

It is the developer's responsibility, as part of designing and planning for any development, to ensure that adequate water for both domestic use and fire protection will be provided. The developer must show, on the proposed plans, how water will be supplied and whether adequate water volumes at acceptable pressure and velocity will be attained in case of fire. An engineering analysis will be required if it appears that the system might be inadequate.

Anyone who wishes to connect to the City's water system should contact the Public Works Department for a water connection fee estimate. The estimate will show the approximate cost that will be due to the City for a water line connection.

Before any water meters will be put into service, all public works improvements must be completed and approved, including the granting of right-of-way or easements, as-built drawings submitted and accepted, and all applicable fees must be paid.

Issuance of building permits for new construction of single-family subdivisions shall not occur until final City of Centralia Public Works Department approval is given. For commercial projects, building permits may be issued upon completion and acceptance of the required fire protection facilities. A construction bond, in accordance with Section 1.14 of the Guidelines, will be required for the remaining public works improvements. Certificate of Occupancy will not be issued until final City of Centralia Public Works Department approval is given for all improvements.

2.02 Design Standards

The design of any water extension/connection shall conform to City standards and any applicable standards as set forth herein and in Sections 1.02 and 1.06.

The layout of extensions shall provide for the future continuation and/or "looping" of the existing system as determined by the City. In addition, main extensions shall be extended as required in Section 1.18.

The "General Notes" found in the Standard Detail Section shall be included on any plans dealing with water system design.

2.03 Main Line

- 2.03.1 Water mains shall be sized to provide adequate domestic plus fire flow at the required residual pressure. Fire flow requirements will be determined by the Riverside Fire Authority. However, the quantity of water required will in no case be less than 750 GPM at 20 psi residual pressure.

The minimum water main size where a fire hydrant is required shall be 6 inches in diameter where looped and 8 inches in diameter to the last fire hydrant where not looped, as long as fire flow and domestic requirements can be met. Larger size mains are required in specific areas outlined in the Centralia Water Comprehensive Plan. Nothing shall preclude the City from requiring the installation of a larger sized main in areas not addressed in the Water Comprehensive Plan if the City determines a larger size is needed to meet fire protection and domestic requirements or for future service.

All water mains 6 inches in diameter and larger which may be extended or looped, will end with an approved gate valve and blind flange, so as to not interrupt service when further extension work takes place.

- 2.03.2 All pipe for water mains shall have push-on type flexible gasketed joints and shall comply with one of the following types:

Ductile Iron Pipe: Shall conform to AWWA C151 Class 52 and have a cement mortar lining conforming to AWWA C104. All pipes shall be joined using non-restrained joints which shall be rubber gaskets, push-on type, conforming to AWWA C111. Ductile iron pipe is required for all new water mains 12 inches in diameter and larger, and for all fire hydrant laterals.

PVC Pipe: Sizes from 4 to 10 inches in diameter shall meet AWWA C900 standards. No solvent weld joint pipe will be allowed in the City system.

- 2.03.3 All fittings for ductile iron pipe or PVC pipe shall be ductile iron compact fittings conforming to AWWA C153 or AWWA C110 and C111. All shall be cement mortar lined conforming to AWWA C104. All fittings shall be connected by flanges or mechanical joints. Where required, mega-lug retainer glands shall be used. In special cases on steep slopes pipe restraints may be required as directed by the City Engineer. If required the pipe restraint system will be a 600 series as manufactured by Romal Industries, Inc.

- 2.03.4 All ductile iron pipe shall have brass wedges inserted at all joints for continuity to allow surface tracing by pipe locator.

All PVC pipe shall have a toning (tracer) wire installed with it. The wire shall be 12 gauge coated copper wire and shall be taped to the top of the pipe to prevent movement during backfilling. It shall be laid loosely enough to prevent stretching and damage, and shall be brought up and tied off at the valve body or meter setting.

- 2.03.5 The minimum cover for all water mains from top of pipe to finish grade shall be 30 inches or as approved.

2.04 Connection to Existing Water Main

The developer's engineer shall be responsible for determining the scope of work for connection to existing water mains. A minimum of ten working days' notice is required to schedule taps, or cut-ins. A right-of-way permit is required prior to connection to an existing main.

It is the contractor's responsibility to field verify the location and depth of the existing mains and the fittings required to make the connections to the existing mains.

2.05 Service Interruption

The contractor shall give the City a minimum of ten working days' notice of any planned connection to an existing pipeline. This includes all cut-ins and live taps. Notice is required so that any disruptions to existing services can be scheduled. The City will notify customers involved or affected 24 hours in advance of the water service interruption. The contractor shall make every effort to schedule water main construction with a minimum interruption of water service. In all situations, the City shall dictate scheduling of water main shutdowns so as not to impose unnecessary shutdowns during specific periods to existing customers.

The contractor is responsible for providing the necessary excavation and shoring to provide access to the existing water main for the City to make the tap. The excavating and shoring shall conform to L & I standards for worker safety. In the event the contractor does not have shoring conforming to L & I standards, the City will shut the job down until such shoring is in place.

2.06 Hydrants

- 2.06.1 The lead from the service main to the fire hydrant shall be ductile iron cement mortar lined Class 52, no less than 6 inches in diameter and a maximum of 50 feet in length. Greater than 50-foot lengths will require oversizing, as designed by an engineer.
- 2.06.2 Fire hydrants shall have two, 2.5-inch outlets and one 4.5-inch pumper port outlet. Threads shall be #498. The valve opening shall be 5.25-inch diameter. The hydrant shall have a positive and automatic barrel drain and shall be of the "safety" or breakaway style. A Storz coupler shall be provided for the pumper port.

Hydrants shall be Dresser M & H Reliant Style 929 or Mueller Centurion. All hydrants shall be bagged until the system is approved.

2.06.3 The Public Works Department and Riverside Fire Authority work together to insure that adequate hydrant spacing and installation are achieved.

Unless otherwise required by the governing authority, the following guidelines shall apply for hydrant number and location:

1. At least one hydrant shall be installed at all intersections.
2. Hydrant spacing of 250 feet shall be required in all areas except single-family and duplex residential areas.
3. Hydrant spacing shall be as required by the International Fire Code.
4. When any portion of a proposed building is in excess of 150 feet from a water supply on a public street, on-site hydrants shall be required. Such hydrants shall be located per the Riverside Fire Authority and easements for such hydrants shall be granted to the City.

2.06.4 Fire hydrants shall be set as shown in standard detail number 2-12.

2.06.5 Requirements regarding use, size and location of a fire department connection (FDC) and/or post indicator valve will be determined by the Riverside Fire Authority. Location of FDC's shall be shown on water plans.

2.06.6 Fire hydrants must be installed, tested and accepted prior to the issuance of a building permit.

2.07 Valves

All valves and fittings shall be ductile iron with ANSI flanges or mechanical joint ends; All existing valves shall be operated by City employees only.

Valves shall be installed in the distribution system at sufficient intervals to facilitate system repair and maintenance, but in all cases there shall be at least one valve every 600 feet. Generally, there shall be two valves on each tee and three valves on each cross. Specific requirements for valve spacing will be made at the plan review stage.

2.07.1 System Gate Valves, 4 to 12 inches: The design, materials and workmanship of all gate valves shall conform to AWWA C515, latest revision. Gate valves shall be resilient wedge non-rising stem (NRS) with two internal O-ring stem seals. Gate valves shall be Mueller, M & H, Waterous, Kennedy, or American AVK.

Gate valves shall be used on all 2 to 10 inches in diameter lines.

- 2.07.2 Butterfly Valves: Shall conform to AWWA C504, Class 250, with ductile iron short body and O-ring stem seals. Butterfly valves shall be Mueller, Dresser, Pratt, or American Darling.
- 2.07.3 Valve Box: All valves shall have a standard R 910 ductile iron water valve box set to grade, with a 6-inch ASTM 3034 SDR 35 PVC riser from valve to within 4 to 6 inches of valve box. If valves are not set in paved area, a 3-foot by 3-foot by 4-inch concrete pad shall be set around each valve box at finished grade. In areas where valve box falls in road shoulder, the ditch and shoulder shall be graded before placing asphalt or concrete pad. Valve box lids shall be ductile iron and marked "water". See standard drawing 2-09.
- 2.07.4 Tapping Valves: All tapping valves shall be resilient seal, full open models manufactured by Mueller, Kennedy, or Clowe.

2.08 Casing

Steel casing pipe shall be schedule 20 steel or equal. Casing pipe and spacers shall be sized for pipe being installed. The casing pipe shall be sand-packed after the water pipe is installed.

2.09 Air and Vacuum Release Valve

Air and vacuum release valves (ARV) shall be APCO 147C or Clay valve combination air release valve. Installation shall be as shown on standard drawing 2-13.

The installation shall be set at the high point of the line when required. Where possible, pipes are to be graded to prevent the need for an ARV. ARV's may not be required when services are in the vicinity.

2.10 Blowoff Assembly

If a fire hydrant is not located at the end of a dead end main, a blowoff assembly is required. On water mains which will be extended in the future, the valve which operates the blowoff assembly shall be the same size as the main and provided with a concrete thrust block. The pressure rating for blowoff assemblies shall be 200 psi. Adequate drainage must be available for use of the assembly under operating conditions. Installation is to be as shown on standard drawing 2-08.

2.11 Backflow Prevention

All water system connections to serve buildings or properties with domestic potable water which have a private well, fire sprinkler or fire service system, or irrigation system on site shall comply with the minimum backflow prevention requirements as established by the Washington State Department of Health (DOH) and City of Centralia, Centralia Municipal Code (CMC). Other potentially hazardous situations not listed here but covered in these regulations must also comply.

The installation of required backflow assemblies and/or air gaps is vital to protect the existing water system and users from possible contamination. All backflow prevention assemblies shall be of a type and model approved by DOH and/or the City and shall be installed as required.

The City shall have the authority to perform inspections on all backflow prevention assemblies connected to the City's water system and shall be provided access to the premises to inspect.

The owner of the property is required to submit the results of the initial and annual thereafter tests/inspections of all assemblies, made by a state-certified Backflow Assembly Tester, promptly to the Water Utility. All assemblies not passing a test must be repaired immediately. Water service may be disconnected for failed tests, failure to test as required, improper installation or by-passing an assembly or air gap.

The Water Utility (Centralia Public Works) shall receive the certificate for testing of all backflow prevention assemblies before the certificate of occupancy is released on any building. A list of approved testers may be obtained from DOH or the City.

Riverside Fire Authority will test the fire line and obtain the certificate for underground piping. The Riverside Fire Authority will under no circumstances test their portion of underground until the Centralia Public Works has observed test and approved their main up to the fire line.

2.12 Service Connection

2.12.1 All service connections relating to new development shall be of the appropriate size and installed by the developer at the time of main line construction. After the lines have been constructed, tested and approved, the owner may apply for a water meter. The City will install a water meter after the application has been made and all applicable fees have been paid. Water meters will only be set after the entire system is inspected and approved.

2.12.2 When water is desired to a parcel fronting an existing main but not served by an existing service, an application must be made to the City. Upon approval of the application and payment of all applicable fees, the City will tap the main, and install the meter and box.

2.12.3 Service lines shall be domestic, type K soft copper tubing, minimum pressure class 200 psi, grade SDR 9 copper tube size. HDPE Class 200 psi CTS ($\frac{3}{4}$ -inch and 1-inch services only) may be used. Services larger than 1-inch diameter may be Schedule 40 PVC. Service lines shall be installed a minimum of 45 degrees off the main. Tracer wire (12-gauge coated wire) shall be installed on HDPE and PVC service lines as described in Section 2.03.4.

Service saddle shall be ductile iron with double stainless steel straps. All clamps shall have a rubber gasket.

Corporation stops shall be all U.S. brass and shall be Ford or Mueller with cc threads conforming to AWWA C800 unless using a service saddle. If using a service saddle, threads will be I.P.T. Stainless steel inserts shall be used with compression grip nut.

- 2.12.4 Single water meters will not be allowed for service to more than one building. An approved backflow prevention system must be installed in conjunction with any master meter. Any deviations from this must be granted by the City Engineer and Centralia Public Works Director.
- 2.12.5 Services larger than 2-inch shall contact the Centralia Water Department to determine the appropriate vault size for the meter.
- 2.12.6 All facilities listed on the Department of Health Cross Connection Control Table 9 are required to have backflow prevention devices on the service line.

2.13 Required Separation Between Water Lines and Sanitary Sewers

The basic separation requirements apply to all gravity and pressure sewers of 24-inch diameter or less; larger sewers may create special hazards because of flow volumes and joint types and accordingly require additional separation requirements. The special construction requirements given are for the normal conditions found with sewage and water systems. More stringent requirements may also be necessary in areas of high groundwater, unstable soil conditions, and so on. Any site conditions not conforming to conditions described in this section will require assessment and approval of the appropriate state and local agencies.

- 2.13.1 Horizontal and Vertical Separation (Parallel): A minimum horizontal separation of 10 feet between sanitary sewers and any existing potable water line and a minimum vertical separation of 18 inches between the bottom of the water line and the crown of the sewer shall be maintained. The distance shall be measured edge to edge.
See Figure 2-1 of Standard Plan 2-19.
- 2.13.2 Unusual Conditions (Parallel): When local conditions prevent the separations described above, a sewer may be laid closer than 10 feet horizontally or 18 inches vertically to a water line upon approval by the City Engineer provided:
 - 1. It is laid in a separate trench from the water line.
 - 2. The elevation of the crown of the sewer line must be at least 18 inches below the bottom of the water line. When this vertical separation cannot be obtained, the sewer shall be constructed of materials and joints that are equivalent to water main standards of construction and shall be pressure tested to ensure water tightness prior to backfilling. Adequate restraint should be provided to allow testing to occur.
 - 3. Additional mitigation efforts, such as impermeable barriers, may be required.
 - 4. The sanitary sewer may not be placed closer than 5 feet from a water line.See Figure 2-2 of Standard Plan 2-19.

2.13.3 Vertical Separation (Perpendicular):

The contractor shall maintain a minimum of 18 inches of vertical separation between sanitary sewers and water mains. If minimum vertical separation is not met, then standards for water-sewer separation in Department of Ecology's Criteria for Sewage Works Design shall apply.

The longest standard length of water pipe shall be installed so that the joints will fall equidistant from any sewer crossing. In some cases where minimum separation cannot be maintained, it will be necessary to encase the sewer line in ductile iron pipe. See water main general notes Number 14.

2.14 Irrigation

All irrigation systems shall be installed with an approved backflow prevention assembly approved by DOH and/or City of Centralia.

Irrigation sprinklers shall be installed so as not to wet any public street or sidewalk.

2.15 Staking

All surveying and staking shall be done by an engineering or surveying firm capable of performing such work. The engineer or surveyor directing such work shall be licensed by the State of Washington. Staking shall be maintained throughout construction.

A pre-construction meeting shall be held with the City Engineer before staking has ~~is~~ begun. All construction staking shall be inspected by the City Engineer prior to construction.

The minimum staking of water lines shall be as follows:

2.15.1 The centerline alignment shall be staked every 25 feet (50 feet in tangent sections) with cuts and/or fills to bottom of trench, maintaining 36 inches of cover over pipe. Centerline cuts are not required when road grade is to finished subgrade elevation.

2.15.2 The location of all fire hydrants, hydrant flanges elevations, tees, water meters, and other fixtures shall be staked within the cut or fill to finished grade.

2.16 Trench Excavation

- 2.16.1 Clearing and grubbing where required shall be performed within the easement or public right-of-way as permitted by the City and/or governing agencies. Debris resulting from the clearing and grubbing shall be disposed of by the owner or contractor in accordance with the terms of all applicable permits and/or regulations.
- 2.16.2 Trenches shall be excavated to the line and depth designated by the City to provide a minimum of 30 inches of cover over the pipe. Except for unusual circumstances where approved by the City, the trench sides shall be excavated vertically and the trench width shall be excavated only to such widths as are necessary for adequate working space as allowed by the governing agency. The trench shall be kept free of water until joining is complete. Surface water shall be diverted so as to not enter the trench. The developer/contractor shall maintain sufficient pumping equipment on the job to insure that these provisions are carried out.
- 2.16.3 The contractor shall perform all excavation of every description and whatever substance encountered and boulders, rocks, roots, and other obstructions shall be entirely removed or cut out to the width of the trench and to a depth 6 inches below water main grade. Where materials are removed from below water main grade, the trench shall be backfilled to grade with material satisfactory to the City and thoroughly compacted.
- 2.16.4 Trenching and shoring operations shall not proceed more than 100 feet in advance of pipe laying without approval of the City, and shall be in conformance with Washington Industrial Safety and Health Administration (WISHA) and Occupational Safety and Health Administration (OSHA) safety standards.
- 2.16.5 The bottom of the trench shall be finished to grade with hand tools in such a manner that the pipe will have bearing along the entire length of the barrel. The bell holes shall be excavated with hand tools to sufficient size to make up the joint.
- 2.16.6 The contractor shall maintain the presence of a "competent person", as defined by the Washington State Department of Labor and Industries, when any trench excavation and backfill work is being done at the project site.

2.17 Thrust Blocking

Location of thrust blocking shall be shown on plans. Thrust block concrete shall be Class B poured against undisturbed earth. A plastic barrier shall be placed between all thrust blocks and fittings. See standard drawings number 2-10 and 2-18 for thrust block locations and calculations.

2.18 Backfilling

Backfilling shall not commence until the pipe installation has been inspected and approved.

Backfilling and surface restoration shall closely follow installation of pipe so that not more than 100 feet is left exposed during construction hours without approval of the City. Selected backfill material shall be placed and compacted around and under the water mains by hand tools to a height of 6 inches above the top of the water main. The remaining backfill shall be compacted to 95 percent of the maximum density in traveled areas, 90 percent outside traveled areas. Where governmental agencies other than the City have jurisdiction over roadways, the backfill and compaction shall be done to the satisfaction of the agency having jurisdiction. If suitable backfill material, as determined by the City, is not available from trenching operations, the City may order the placing of bedding conforming to WSDOT/APWA Standard Specifications Section 9-03.15 around the water main and gravel base conforming to Section 9-03.10, same document, for backfilling the trench. At the conclusion of each day the trench shall be totally backfilled or steel plates shall be used so that no open excavation is left overnight.

2.19 Street Patching and Restoration

See Sections 4.15 and 4.16 for requirements regarding street patching and trench restoration.

2.20 Hydrostatic Tests

Prior to the acceptance of the work, the contractor shall conduct a hydrostatic test on the installation in accordance with Section 7-09.3(23) of the current version of the Washington State Department of Transportation Standard Specifications. Any leaks or imperfections developing under said pressure shall be remedied by the contractor. The main shall be tested between valves. Insofar as possible, no hydrostatic pressure shall be placed against the opposite side of the valve being tested. Test pressure shall be maintained while the entire installation is inspected by the City.

The contractor shall provide all necessary equipment and shall perform all work connected with the tests. Tests shall be made after all connections have been made and the roadway section is constructed to subgrade. This is to include any and all connections as shown on the plan. The contractor shall perform the test to assure that the equipment to be used for the test is adequate and in good operating condition and that the air in the line has been released before requesting the City to witness the test. Only authorized personnel shall operate isolation valves.

See Section 2.11 for testing responsibilities for backflow prevention devices.

2.21 Sterilization and Flushing

Sterilization of water mains shall be accomplished by the contractor in accordance with the requirements of DOH and AWWA standards and in a manner satisfactory to the City. At no time shall chlorinated water from a new main be flushed into a body of fresh water. This is to include lakes, rivers, streams, drainage ways, and any and all other waters where fish or other natural water life can be expected.

When proper chlorine concentration has been established throughout the line, the valves shall be closed and the line left undisturbed for 24 hours. The line shall then be thoroughly flushed. Water samples will then be taken by the contractor in the presence of the City's Inspector, at least 24 hours after the flushing. Should the initial treatment result in an unsatisfactory bacteriological test, and/or the water in the new line(s) fail to hold a chlorine residual, the chlorination procedure shall be repeated by the contractor until satisfactory results are obtained. Samples can only be taken on Mondays, Tuesdays, and Wednesdays until noon, due to lab scheduling constraints. Testing and sampling shall take place after all underground utilities are installed and compaction of the backfill within the roadway section is complete. The developer/contractor is responsible for the cost of all testing.

2.22 Pump Station

When a pump station is required to provide the necessary flows for a new development, the developer shall construct and be responsible for all cost of the pump station. The new pump station shall be designed by a licensed engineer to City of Centralia standards. The standards will be provided to the developer at the time of design. A pump station will only be allowed when there is no gravity alternative. The City will make the final determination on whether a pump station will be allowed.

2.23 Electrical

All electrical and housing for electrical equipment used for storage and/or distribution shall be designed to Centralia Public Works Development Standards at the time of development. The standards will be provided by the City.

LIST OF DRAWINGS

CHAPTER 2: WATER

<u>Drawing Title</u>	<u>Number</u>
Water Main Installation General Notes	
Typical Meter Placement	2-01
3/4" Single Meter Service	2-02
1" Single Meter Service	2-03
1 1/2" Single Meter Service	2-04
2" Single Meter Service	2-05
3/4" - 1" Dual Meter Service	2-06
1"- Dual Meter Service	2-07
2" Blowoff Assembly.....	2-08
2" Blowoff Assembly (Non-Pavement Areas).....	2-08A
Standard Valve Box	2-09
Standard Blocking Detail.....	2-10
Live Tap and Cut in Tee	2-11
Fire Hydrant	2-12
Air and Vacuum Valve Assembly	2-13
Double Check Detector Assembly w/Fire Dept. Connections	2-14
Double Check Detector Assembly w/o Fire Dept. Connections	2-15
Double Check Valve Assembly - Small (Below Ground Installation)	2-16
Reduced Pressure Backflow Assembly	2-17
Thrust Loads	2-18
Water and Sewer Separation Detail	2-19

Appendix I. Coliform Monitoring Plan

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Coliform Monitoring Plan for: 12200D Centralia Public Works-Water Department

A. System Information

Plan Date: 2018

Water System Name Centralia Water Department	County Lewis	System I.D. Number 12200D
Name of Plan Preparer Andy Oien	Position Water Manager	Daytime Phone 360-508-6083
Sources: DOH Source Number, Source Name, Well Depth, Pumping Capacity	S01 - 12250/Chehalis-Kresky Ave (2 Way) intertie, S02 - N. Tower Well - inactive, monitoring well location S03 - K Street AFC723, 93 ft, 750 gpm S04 - ESHOM AFC729 WW, 72 ft, 1200 gpm S05 - Riverside AFC724 CT6 Required, inactive S06 - Washington AFC722, 88 ft, 1000 gpm, inactive CT6 S07 - Downing AFC730, 147 ft, 700 gpm, inactive S08 - Borst WF (S10 & 11), 38 ft, 2000 gpm, inactive CT6 S09 - Tennis Court WF (S012 & 13), 69 ft, 1800 gpm S10 - Borst Park Well #1 AFC728 WW, 72 ft, 812 gpm S11 - Borst Park Well #2 AFC727 WW, 65 ft, 700 gpm S12 - Tennis Court Well #1 AFC725 WW, 87 ft, 605 gpm S13 - Tennis Court Well #2 AFC726 WW, 69 ft, 1300 gpm S14 - Fords Prairie #1 WW, 70 ft, 600 gpm S15 - Fords Prairie #2 WW, 66 ft, 400 gpm S16 - Port District WF (S04,14,15), 66 ft, 2200 gpm	
Storage: List and Describe	Seminary Hill Reservoir-4.5 MG, Davis Hill Reservoir-2.5 MG, Cooks Hill Reservoir-760,000 gallons, Ham Hill Reservoir-230,000 gallons.	
Treatment: Source Number & Process	S09 & S16 provide chlorination, fluoridation, and aeration. S03 provides chlorination and fluoridation.	
Pressure Zones: Number and name	Central, Davis Hill, Seminary Hill, Ham Hill, Cooks Hill, Winterwood Estates, Zenkner Valley.	
Population by Pressure Zone	TBD, population has changed since 2013 WSP. Central Zone supplies water to the majority of Centralia's population.	
Number of Routine Samples Required Monthly by Regulation:	<u>30</u>	
Number of Sample Sites Needed to Represent the Distribution System:	<u>30</u>	
*Request DOH Approval of Triggered Source Monitoring Plan?	Yes ☐ No ☒	

*If approval is requested a fee will be charged for the review.

B. Laboratory Information

Laboratory Name <u>Lewis County Water Lab</u>	Office Phone 360-748-2718 After Hours Phone 360-748-2718
Address 2025 NE Kresky Avenue Chehalis WA 98532 (360) 740-2718	Cell Phone 360-740-2718 Email _____
Hours of Operation 8:00-5:00 M-F	
Contact Name <u>Vanessa Ruelas</u>	
Emergency Laboratory Name <u>Water Management</u>	Office Phone 253-531-3121 After Hours Phone 253-531-3121
Address 1515 80th St E, Tacoma, WA 98404	Cell Phone - - - Email <u>customerservice@watermanagment.com</u>
Hours of Operation 8am-5pm M-F, Saturday 9am-12pm	
Contact Name <u>Laura Tankersley</u>	

C. Wholesaling of Groundwater

	Yes	No
We are a consecutive system and purchase groundwater from another water system.	☐	☒
If yes, Water System Name: Contact Name: Telephone Numbers Office - - - After Hours - - -		
We sell groundwater to other public water systems.	☐	☒
If yes, Water System Name: Contact Name: Telephone Numbers Office - - - After Hours - - -		
If yes, Water System Name:		

D. Routine, Repeat, and Triggered Source Sample Locations*
See 4 attachments.

Location/Address for <u>Routine</u> Sample Sites	Location/Address for <u>Repeat</u> Sample Sites	Groundwater Sources for Triggered Sample Sites**
X1. 3630 Southworth	1-1. 3508 Galvin	S 16
	1-2. 3630 Southworth	S 16
	1-3. 1504 Eshom	S 16
		S
		S
X2. 1621 Harrison	2-1. 1741 Harrison	S 16
	2-2. 1621 Harrison	S 16
	2-3. 1509 Harrison	S 16
		S
		S
X3. 2600 Reynolds	3-1. 2640 Reynolds	S 16
	3-2. 2600 Reynolds	S 16
	3-3. 2424 Reynolds	S 16
		S
		S
X4. 939A W Roanoke	1-1. 939 W Roanoke	S 16
	1-2. 939A W Roanoke	S 16
	1-3. 2314 Woodhaven	S 16
		S
		S
X5. 2318 N Pearl	2-1. 2311 N Pearl	S 16
	2-2. 2318 N Pearl	S 16
	2-3. 2404 N Pearl	S 16
		S
		S
X6. 3008A Zenkner Valley	3-1. 401 George Anthony	S 16
	3-2. 3008A Zenkner Valley	S 16
	3-3. 3010 Zenkner Valley	S 16
		S
		S
X7. 816A W 6th	2-1. 814 W 6th	S 16
	2-2. 816A W 6th	S 16
	2-3. 801 W 6th	S 16
		S
		S
X8. 606A W 7th	3-1. 1231 N Washington	S 16
	3-2. 606A W 7th	S 16
	3-3. 1228 N Washington	S 16
		S
		S

Location/Address for <u>Routine</u> Sample Sites	Location/Address for <u>Repeat</u> Sample Sites	Groundwater Sources for Triggered Sample Sites**
X9. 1217 N Tower	1-1. 1210 N Tower	S 16
	1-2. 1217 N Tower	S 16
	1-3. 1220 N Tower	S 16
		S
		S
X10. 1100 N Tower	2-1. 1117 N Tower	S 16
	2-2. 1100 N Tower	S 16
	2-3. 1027 N Tower	S 16
		S
		S
X11. 1326 Maple Valley	3-1. 1205 Marion	S 16
	3-2. 1326 Maple Valley	S 16
	3-3. 1415 Winterwood	S 16
		S
		S
X12. 924A Ham Hill	1-1. 916 Ham Hill	S 16
	1-2. 924A Ham Hill	S 16
	1-3. 1014 Ham Hill	S 16
		S
		S
X13. 1707 Seminary Hill	2-1. 1701 Seminary Hill	S 09
	2-2. 1707 Seminary Hill	S 09
	2-3. 1802 Seminary Hill	S 09
		S
		S
X14. 1000 Seminary Hill	3-1. 925 Seminary Hill	S 09
	3-2. 1000 Seminary Hill	S 09
	3-3. 1410 Seminary Hill	S 09
		S
		S
X15. 220 N Tower	2-1. 208 N Tower	S 09
	2-2. 220 N Tower	S 09
	2-3. 305 N Tower	S 09
		S
		S
X16. 512 N Tower	3-1. 544 N Tower	S 09
	3-2. 512 N Tower	S 09
	3-3. 500 N Tower	S 09
		S
		S

Location/Address for <u>Routine</u> Sample Sites	Location/Address for <u>Repeat</u> Sample Sites	Groundwater Sources for Triggered Sample Sites**
X17. 1815 Cooks Hill	1-1. 1809 Cooks Hill	S 09
	1-2. 1815 Cooks Hill	S 09
	1-3. 1900 Cooks Hill	S 09
		S
		S
X18. 619 Harrison	2-1. 701 Harrison	S 09
	2-2. 619 Harrison	S 09
	2-3. 609 Harrison	S 09
		S
		S
X19. 1201 Belmont	3-1. 1100 Harrison	S 16
	3-2. 1201 Belmont	S 16
	3-3. 1305 Belmont	S 16
		S
		S
X20. 1211 Harrison	1-1. 1215 Harrison	S 16
	1-2. 1211 Harrison	S 16
	1-3. 1107 Johnson	S 16
		S
		S
X21. 902 Johnson	2-1. 908 Johnson	S 16
	2-2. 902 Johnson	S 16
	2-3. 2320 Borst	S 16
		S
		S
X22. 3320 Borst	3-1. 3306 Borst	S 09
	3-2. 3320 Borst	S 09
	3-3. 3323 Borst	S 09
		S
		S
X23. 1818 Harrison	2-1. 1732 Harrison	S 16
	2-2. 1818 Harrison	S 16
	2-3. 1905 Harrison	S 16
		S
		S
X24. 3123A Cooks Hill	3-1. 3421 Cooks Hill	S 09
	3-2. 3123A Cooks Hill	S 09
	3-3. 3119 Cooks Hill	S 09
		S
		S

Location/Address for <u>Routine</u> Sample Sites	Location/Address for <u>Repeat</u> Sample Sites	Groundwater Sources for Triggered Sample Sites**
X25. 1820 Cooks Hill	1-1. 1740 Cooks Hill	S 09
	1-2. 1820 Cooks Hill	S 09
	1-3. 1900 Cooks Hill	S 09
		S
		S
X26. 1004 Ellsbury	2-1. 910 Ellsbury	S 09
	2-2. 1004 Ellsbury	S 09
	2-3. 1218 Borthwick	S 09
		S
		S
X27. 600 W Locust	3-1. 420 Centralia College Blvd	S__ 09
	3-2. 600 W Locust	S 09
	3-3. 718 Centralia College Blvd	S__ 09
		S
		S
X28. 1107 Grand	1-1. 1030 S Gold	S 09
	1-2. 1107 Grand	S 09
	1-3. 1126 S Gold	S 09
		S
		S
X29. 1410 S Tower	2-1. 1315 S Tower	S 09
	2-2. 1410 S Tower	S 09
	2-3. 206 E Floral	S 09
		S
		S
X30. 1622 S Gold	3-1. 1610 S Gold	S 09
	3-2. 1622 S Gold	S 09
	3-3. 1704 S Gold	S 09
		S
		S
X31.	2-1.	S
	2-2.	S
	2-3.	S
		S
		S
X32.	3-1.	S
	3-2.	S
	3-3.	S
		S
		S

*NOTE: If you need more than three routine samples to cover the distribution system, attach additional sheets as needed.

**** When you collect the repeats, you must sample every groundwater source that was in use when the original routine sample was collected.**

Important Notes for Sample Collector:

- **Sample early in each month**
- **Sample M-W only (per County Lab rules)**
- **Use only pre-designated sites each month**
- **Use good sample techniques**
- **Document anything unusual at sample locations that may impact water quality**
- **Notify Water Manager if any problems arise**

E. Reduced Triggered Source Monitoring Justification (add sheets as needed):

We will sample both Tennis Court and Fords Prairie Wellfield in the event coliform is found in a routine sample. Both TC and FP Wellfields provide all the source water for the City. If our seasonal well (K ST) was operating we would sample there also.

F. Routine Sample Rotation Schedule

Month	Routine Site(s)	Month	Routine Site(s)
January	30, S09 & S16	July	20, S09 & S16
February	30, S09 & S16	August	20, S09 & S16
March	30, S09 & S16	September	30, S09 & S16
April	30, S09 & S16	October	30, S09 & S16
May	30, S09 & S16	November	30, S09 & S16
June	20, S09 & S16	December	30, S09 & S16

G. Level 1 and Level 2 Assessment Contact Information

Name Mike Gray	Office Phone 360-330-7512 After Hours Phone 360-520-3636
Address 1100 N Tower Ave	Email mgray@cityofcentralia.com
Name Andy Oien	Office Phone 360-330-7512 After Hours Phone 360-330-7512
Address 1100 N Tower Ave	Email aoien@cityofcentralia.com

H. *E. coli*-Present Sample Response

Distribution System <i>E. coli</i> Response Checklist				
Background Information	Yes	No	N/A	To Do List
We inform staff members about activities within the distribution system that could affect water quality.	☒	☐	☐	☐
We document all water main breaks, construction & repair activities, and low pressure and outage incidents.	☒	☐	☐	☐
We can easily access and review documentation on water main breaks, construction & repair activities, and low pressure and outage incidents.	☒	☐	☐	☐
Our Cross-Connection Control Program is up-to-date.	☒	☐	☐	☐
We test all cross-connection control devices annually as required, with easy access to the proper documentation.	☒	☐	☐	☐
We routinely inspect all treatment facilities for proper operation.	☒	☐	☐	☐
We identified one or more qualified individuals who are able to conduct a Level 2 assessment of our water system.	☒	☐	☐	☐
We have procedures in place for disinfecting and flushing the water system if it becomes necessary.	☒	☐	☐	☐
We can activate an emergency intertie with an adjacent water system in an emergency.	☒	☐	☐	☐
We have a map of our service area boundaries.	☒	☐	☐	☐
We have consumers who may not have access to bottled or boiled water.	☒	☐	☐	☐
There is a sufficient supply of bottled water immediately available to our customers who are unable to boil their water.	☒	☐	☐	☐
We have identified the contact person at each day care, school, medical facility, food service, and other customers who may have difficulty responding to a Health Advisory.	☐	☐	☐	☒
We have messages prepared and translated into different languages to ensure our consumers will understand them.	☒	☐	☐	☒
We have the capacity to print and distribute the required number of notices in a short time period.	☒	☐	☐	☐
Policy Direction	Yes	No	N/A	To Do List
We have discussed the issue of <i>E. coli</i> -present sample results with our policy makers.	☒	☐	☐	☐
If we find <i>E. coli</i> in a routine distribution sample, the policy makers want to wait until repeat test results are available before issuing advice to water system customers.	☐	☐	☐	☐
(Cont.)				

Distribution System <i>E. coli</i> Response Checklist				
Potential Public Notice Delivery Methods	Yes	No	N/A	To Do List
It is feasible to deliver a notice going door-to-door.	☒	☐	☐	☐
We have a list of all of our customers' addresses.	☒	☐	☐	☐
We have a list of customer telephone numbers or access to a Reverse 9-1-1 system.	☒	☐	☐	☐
We have a list of customer email addresses.	☐	☐	☐	☐
We encourage our customers to remain in contact with us using social media.	☐	☐	☐	☒
We have an active website we can quickly update to include important messages.	☒	☐	☐	☐
Our customers drive by a single location where we could post an advisory and expect everyone to see it.	☐	☒	☐	☐
We need a news release to supplement our public notification process.	☒	☐	☐	☐

Distribution System <i>E. coli</i> Response Plan
If we have <i>E. coli</i> in our distribution system we will immediately: 1. Call DOH. 2. Collect repeat and triggered source samples per Part D. Collect additional investigative samples as necessary. 3. Inspect our water system facilities, including FP and TC Treatment plants. 4. Talk with Water Department Staff to see if anything unusual has occurred. 5. Review new construction work, water main breaks, and any pressure outages that may have occurred recently. 6. Look for unprotected cross connections, review known protected cross connections in the area. 7. Discuss with DOH whether to issue a Health Advisory based on the findings of steps 3-6.

***E. coli*-Present Triggered Source Sample Response Checklist –
All Sources**

Background Information	Yes	No	N/A	To Do List
We review our sanitary survey results and respond to any recommendations affecting the microbial quality of our water supply.	☒	☐	☐	☐
We address any significant deficiencies identified during a sanitary survey.	☒	☐	☐	☐
There are contaminant sources within our Wellhead Protection Area that could affect the microbial quality of our source water, and If yes, we can eliminate them.	☐ ☐	☒ ☐	☐ ☒	☐ ☐
We routinely inspect our well site(s).	☒	☐	☐	☐
We have a good raw water sample tap installed at each source.	☒	☐	☐	☐
After we complete work on a source, we disinfect the source, flush, and collect an investigative sample.	☒	☐	☐	☒
Public Notice	Yes	No	N/A	To Do List
We discussed the requirement for immediate public notice of an <i>E. coli</i> -present source sample result with our water system's governing body (board of directors or commissioners) and received direction from them on our response plan.	☐	☐	☐	☒
We discussed the requirement for immediate public notice of an <i>E. coli</i> -present source sample result with our wholesale customers and encouraged them to develop a response plan.	☐	☐	☒	☐
We have prepared templates and a communications plan that will help us quickly distribute our messages.	☒	☐	☐	☐

<i>E. coli</i>-Present Triggered Source Sample Response Checklist – Source S__*				
Alternate Sources	Yes	No	N/A	To Do List
We can stop using this source and still provide reliable water service to our customers.	☒	☐	☐	☐
We have an emergency intertie with a neighboring water system that we can use until corrective action is complete (perhaps for several months).	☒	☐	☐	☐
We can provide bottled water to all or part of the distribution system for an indefinite period.	☒	☐	☐	☐
We can quickly replace our existing source of supply with a more protected new source.	☒	☐	☐	☐
Temporary Treatment	Yes	No	N/A	To Do List
This source is continuously chlorinated, and our existing facilities can provide 4-log virus treatment (CT = 6) before the first customer. If yes, at what concentration? __1__ mg/L	☒	☐	☐	☐
We can quickly introduce chlorine into the water system and take advantage of the existing contact time to provide 4-log virus treatment to a large portion of the distribution system.	☒	☐	☐	☐
We can reduce the production capacity of our pumps or alter the configuration of our storage quantities (operational storage) to increase the amount of time the water stays in the system before the first customer to achieve CT = 6.	☒	☐	☐	☐
We can alter the demand for drinking water (maximum day or peak hour) through conservation messages to increase the time the water is in the system prior to the first customer in order to achieve 4-log virus treatment with chlorine.	☒	☐	☐	☐

*NOTE: If your system has multiple sources, you may want to complete a separate checklist for each source.

<i>E. coli</i>-Present Triggered Source Sample Response Plan – Source S01-S16
If we have <i>E. coli</i> in Source S01-S16 water we will immediately: 1. Call DOH. 2. Look for an alternate uncontaminated source—try a different well or wellfield 3. Increase free chlorine residual to 1 MG/L before first customer 4. Notify all customers through broadcast media, signage, and phone calls 5. Investigate the problem, talk with Water Department Staff to see if anything unusual has occurred. 6. Provide bottled water as a backup. 7. Begin compliance monitoring per DOH directions.

System Map

Appendix J. Consumer Confidence Report

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2020 Water Quality Report

The City of Centralia is proud to report that of the more than 100 possible contaminants we regularly test for at our water supply sources, we have not exceeded any State or Federal limits. The City of Centralia will notify you immediately if there is ever any reason for concern about our water.

WATER SOURCES

Last year the City of Centralia provided water for its customers from the Tennis Court and the Port District well fields. In 2020 City wells delivered 739 million gallons of water to approximately 7,150 service connections through more than 136 miles of pipe.

Centralia's water is classified as groundwater, meaning it comes from drilled wells. Underground water can be susceptible to contamination from above ground activities that might leak contaminants through the ground to the aquifer. It's everyone's responsibility to protect our drinking water. To help protect groundwater, dispose of used oil, gas, pesticides, insecticides, etc. properly. Don't pour them on the ground or into sinks or toilets. Contact our local Hazo - Hut for hazardous waste information and recycling at (360) 740-1221.

Inside this issue:	
<i>Water Sources</i>	1
<i>Health Information</i>	1
<i>Lead and Copper</i>	2
<i>Water Conservation</i>	2
<i>Backflow Prevention</i>	2
<i>Water Quality Monitoring Results</i>	3
<i>Contact Information</i>	4

HEALTH INFORMATION

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants in drinking water does not necessarily indicate that the drinking water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the Environmental Protection Agency hotline at 1-800-424-4372 (Region 10 - Pacific Northwest) or going to the EPA Region 10 (Pacific Northwest) website.

It is important to remember that some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised people with cancer undergoing chemotherapy, people who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice from their health care providers about drinking water. EPA/CDC guidelines on appropriate means to lessen the risk of infection by cryptosporidium and other microbial contaminants are available from the Safe Drinking Water hotline at 1-800-426-4791.

Contaminants that may be present in groundwater before treatment include: Microbial contaminants, from broken sewer lines, septic systems, agricultural livestock operations and wildlife. Inorganic contaminants, such as salts and metals, which can be naturally occurring or result from urban storm water runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming. Pesticides and herbicides from a variety of sources such as agriculture and residential uses. Radioactive contaminants which are naturally occurring. Organic chemical contaminants, including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production and can also come from gas stations, urban storm water runoff, and septic systems.

The primary treatment methods for water supplied to Centralia consumers are air stripping, chlorination, and fluoridation. Air stripping is described on page 2. Chlorine is used to disinfect the water supply. The level of chlorine in the water at any one time is between 0.2 and 1.2 parts per million (ppm). The EPA has established that the Maximum Residual Disinfectant Level (MRDL) of chlorine added to drinking water as 4 ppm and the Maximum Residual Disinfectant Level Goal (MRDLG) also as 4 ppm. Fluoride is added to aid in the prevention of tooth decay. Fluoride levels are maintained at values between 0.5 and 0.9 ppm. The EPA has established the Maximum Contaminant Level Goal (MCLG) for fluoride added to the water as 4 ppm.

LEAD AND COPPER

The Tennis Court and Port District well fields were designed to help Centralia comply with Lead and Copper regulations and to lower corrosion by increasing the pH of the water through air stripping. Air stripping is a treatment process where large volumes of air are forced through the water to remove dissolved gases and volatile substances. Since the Tennis Court and Port District well air strippers have been on line, the pH of our water has increased from approximately 6.7 to 7.7.

Based upon our test results, pH adjustment has been effective in reducing lead and copper levels in our drinking water to levels that are well below the Federal/State maximum contamination level. Even so, we are required to provide the following notice from the Environmental Protection Agency about the health effects of lead and copper.

“Infants and children who drink water containing lead in excess of the action level could experience delays in their physical or mental development. Children could show slight deficits in attention span and learning abilities. Adults who drink this water over many years could develop kidney problems or high blood pressure. Some people who drink water containing copper in excess of the action level over a relatively short amount of time could experience gastrointestinal distress. Some people who drink water containing copper in excess of the action level over many years could suffer liver or kidney damage. People with Wilson’s Disease should consult their personal doctor.”

As a result of the City’s excellent water quality, the Department of Health has reduced our sample schedule to thirty samples once every three years. Thirty samples were collected and analyzed in 2020; all the samples were below the action levels for lead and copper (see water quality monitoring results on page 3).



WATER CONSERVATION

The Water Department continued to take an active role in water conservation in 2020. We repaired 101 leaks, of which 27 were main breaks and 74 service lines. Also, 20 service lines were replaced. These repairs, when added up, saved millions of gallons of lost water in 2020. The Water Department has a radio read meter system that has a customer leak detection function built in. This system notifies us of possible leaks on the customer side of the meter that will save the customer money when it is repaired.

Collection of data is a major part of water conservation efforts. The Water Department records information on water production, consumption, and sales of water as well as water used to clean reservoirs, control dust, fight fires, and flush the water system. The Water Department also has information available on how customers can reduce the amount of water they use.



BACKFLOW PREVENTION

What is backflow? Backflow occurs when potentially contaminated water (or other substances) enters into the public water system or consumers’ drinking water through cross-connection to a private well or other unprotected source such as a yard sprinkler system.

Washington Administrative Code 246-290-490 requires water purveyors to implement a cross-connection control program. City of Centralia adopted Ordinance No. 1786 in March of 2004 to protect its drinking water from cross-connections by requiring backflow prevention devices under certain specific conditions.

ALL INSTALLERS OF BACKFLOW ASSEMBLIES (THIS INCLUDES PLUMBING CONTRACTORS, LANDSCAPE CONTRACTORS OR PRIVATE CITIZENS) MUST OBTAIN A PLUMBING PERMIT FROM THE BUILDING INSPECTOR AT CITY HALL. FAILURE TO DO SO MAY RESULT IN THE WATER BEING SHUT OFF TO PROTECT THE HEALTH AND SAFETY OF CENTRALIA RESIDENTS.

If you have any questions, or would like help identifying potential backflow hazards, please contact the staff at the Centralia Public Works Water Department, (360) 330-7512.

WATER QUALITY MONITORING RESULTS FOR 2020

This table shows some of the results of water quality monitoring by the City of Centralia. **TEST RESULTS SHOW THAT YOUR WATER MEETS OR SURPASSES ALL FEDERAL AND STATE STANDARDS FOR PUBLIC DRINKING WATER.** The water quality information presented in the table is from the most recent round of testing done in accordance with the regulations. All data shown was collected during the last calendar year unless otherwise noted in the table. Not all of the specific contaminant groups such as volatile organic chemicals (VOCs), inorganic chemicals (IOCs), or synthetic organic chemicals (SOCs) are required to be monitored every year. The Washington State Department of Health has reduced the monitoring requirements for these groups because previous testing has shown that our sources meet all applicable EPA and Department of Health standards. Volatile organic chemicals were tested for in 2020 and all were non-detectable. Inorganic chemicals were tested for in 2020 and all were in compliance with Department of Health standards. A complete list of contaminant information can be obtained by calling Centralia Public Works at (360) 330-7512.

Contaminant	Unit	MCL	MCLG	Maximum Test Results	Sample Range	Compliance	Major Sources of Contamination
Radium 228 (2015)*	pCi/L	5	0	ND	N/A	Yes	Erosion of natural deposits
Arsenic (2019)*	ppb	10	10	<0.001	N/A	Yes	Erosion of natural deposits; runoff from industrial or agricultural uses
Copper (2020)*	ppm	(AL) 1.3	1.3	<0.077	<0.02-0.077	Yes	Corrosion of household plumbing systems
Lead (2020)*	ppb	(AL) 0.015	0	<0.0013	<0.001-0.0013	Yes	Corrosion of household plumbing systems
Nitrate (2020)*	ppm	10	10	4.83	2.28-4.83	Yes	Runoff from fertilizer use; leaching from septic tanks; erosion of natural deposits
Total Trihalomethanes (TTHM) (2020)*	ppm	80	N/A	2.28	1.34-9.51	Yes	By-product of drinking water chlorination
Haloacetic Acids (HAA) (2020)*	ppb	60	N/A	ND	ND-1.31	Yes	By-product of drinking water chlorination

We are required to monitor your drinking water for specific contaminants on a regular basis. Results of regular monitoring are an indicator of whether or not your drinking water meets health standards.

AL (action level): The highest level of a contaminant that is allowed in drinking water.

MCL (maximum contaminant level): The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available technology.

MCLG (maximum contaminant level goal): The level of a contaminant in drinking water below which there is no known or expected risk to health, allowing an adequate margin of safety.

mg/L (milligrams per liter):

MRDL (maximum residual disinfectant level): The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant (chlorine) is necessary for control of microbial contaminants.

MRDLG (maximum residual disinfectant level goal): The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

pCi/L (Pico Curies per liter): A measure of radioactivity. EPA considers 50 pCi/L to be the level of concern for beta particles.

ppb (parts per billion)/ μ g/L (micrograms per liter): Equivalent to 1/2 of a dissolved aspirin tablet in approximately 50,000 gallons of water.

ppm (parts per million)/mg/L (milligrams per liter): Equivalent to 1/2 of a dissolved aspirin tablet in approximately 50 gallons of water.

N/A (Not applicable or not available)

ND (Not detectable)

< (Indicates less than)

* (Date of most recent sampling)



The City of Centralia's Department of Health System
ID number is 12200D

If you have any questions regarding this report or
need more information,
please contact Centralia Public Works:

Phone: (360) 330-7512

Fax: (360) 330-7516

Mail: 1100 North Tower Avenue
Centralia, Washington 98531

Additional Information:

EPA Safe Drinking Water Hotline 1-800-426-4791

Department of Health
Southwest Operations (360) 236-3030

Para obtener una versión en español, visite una de
nuestras ubicaciones:

500 N Perla,
Torre 1100 N

o en el sitio web de nuestra ciudad @
www.cityofcentralia.com

Appendix K. D/DBP Compliance Monitoring Plan

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DBP Monitoring Plan **(Annual Schedule)**

This template should be used by:

- * Surface water systems who serve less than 500 population
- * Surface water systems who serve between 500-3,300 population on reduced monitoring
- * Groundwater systems who serve less than 10,000 population
- * Groundwater systems who serve 500-99,999 population on reduced monitoring

For more information, refer to the Reference Sheets on the separate tabs

System Name:	Centralia Public Works--Water
PWSID#:	12200D
Population:	17,170
Type of Source Water:	Groundwater
Completed by:	Andy Oien
Date:	8/18/2021

Monitoring Requirements

Monitoring Frequency:	Annual
Number of TTHM Samples Required:	2
Number of HAA5 Samples Required:	2

Monitoring Locations and Month Assigned

Monitoring Location (Name of Site)	Month Assigned
2318 N. Pearl ST	June
1622 S. Gold ST	June

Determining Compliance for TTHM and HAA5

Our system is required to monitor annually. Compliance will be achieved if the TTHM and the HAA5 at each monitoring location is less than or equal to 0.080 mg/L for TTHM and less than or equal to 0.060 mg/l for HAA5. If these levels are exceeded the monitoring frequency will be increased to quarterly.

To qualify for reduced monitoring:

The TTHM LRAA must be less than or equal to 0.040 mg/l AND the HAA LRAA must be less than or equal to 0.030 mg/l at each monitoring location.

If your system is on reduced annual monitoring, to remain on reduced monitoring:

The TTHM LRAA must be less than or equal to 0.060 mg/l AND the HAA LRAA must be less than or equal to 0.045 mg/l at each monitoring location. If these levels are exceeded, but the MCL is not exceeded, the monitoring frequency will be returned to quarterly.

Disinfectant Residual Monitoring

Chlorine residuals must be measured at the same time and place as routine or repeat coliform samples
MRDL for chlorine and chloramines = 4.0 mg/l as Cl₂

Determining Compliance for disinfectant residuals

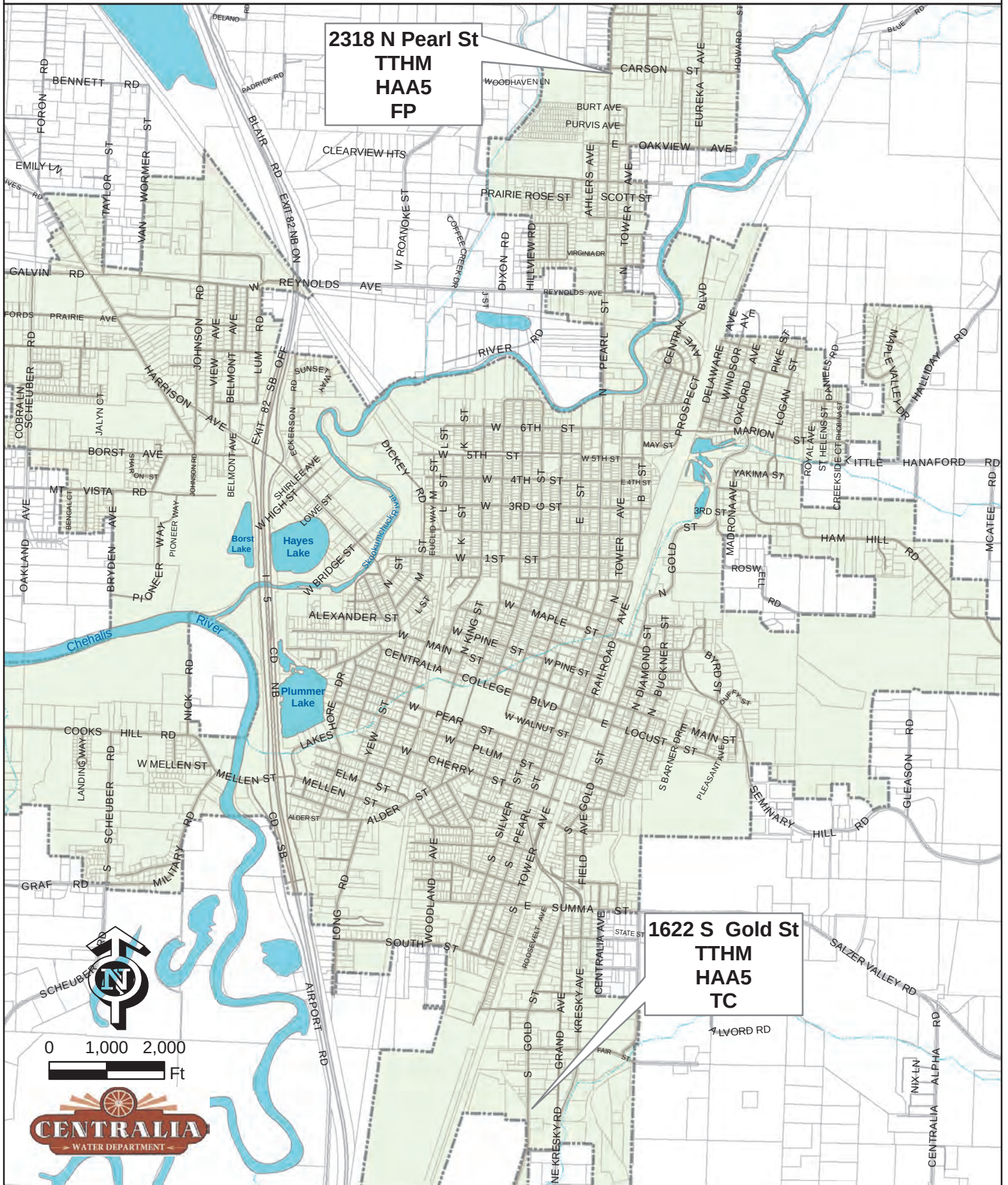
Compliance is based on the running annual average (RAA) of 12 consecutive months

Daily residual measurements will / will not be included in the compliance calculations (circle one)

(Attach a distribution map with sample locations. You will need to print a hard copy for your records and make it available upon request. You do not need to submit a copy to DOH. If you need this publication in an alternate format, call (800) 525-0127. For TTY/TDD call (800) 833-6388.)

Stage 2 DBP Monitoring Plan

Distribution Map of Sample Locations



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Appendix L. Maintenance Reporting Procedures

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Appendix I-1

Procedures for Operations and Maintenance

1. Routine Procedures

1.1 Routine Operation and Preventative Maintenance

This section contains a listing of all the routine operation preventative maintenance activities for City facilities. Activities are listed for daily, weekly, monthly, quarterly, semi-annually, and yearly frequencies for the following facilities.

- Wells
- Reservoirs
- Booster Pump Stations
- Pressure Reducing Stations
- Fire Hydrants
- Valves
- Water Mains

1.2 Wells Maintenance Activity and Frequency

The following activities are performed on the City's wells at the frequency identified. Exhibit I-1 lists typical troubleshooting activities which are followed.

Daily

- Record meter reading of water pumped.
- Record hours of pump operation.
- Record chlorine used.
- Check chlorinators.
- Visual check of well, equipment, and surroundings.

Quarterly

- Record system pressure.
- Check for unusual vibration, noise, or temperature.
- Check operation of ventilation blowers.
- Check operation of automatic valves.
- Grease motor bearings.
- Take unchlorinated sample to Health Department for bacteriological analysis.
- Record pumping rate by recording or timing flow meter.

- Record amps draw on each leg.
- Check oil level in motors.
- Record pumping water level after pump has been running at least 3 hours. Record time pump has been running.
- Record static water level after pump has been idle at least 3 hours. Record time pump has been idle.
- Check packing glands, adjust as necessary, install new packing as necessary.

Semi-annually

- Conduct and record well discharge, drawdown, and recovery tests. Pump must be idle 3 hours prior to test. Must pump until drawdown stabilizes. Record time from pump shutdown to static level recovery.

1.3 Reservoirs Maintenance Activity and Frequency

The following activities are performed on the City's reservoirs at the frequency identified.

Daily

- Visual check for overflow.
- Visual check for leaks.
- Visual check of locks, fences, vandalism.

Weekly

- Visual inspection of all components for leaks, etc.
- Check that all security locks are in place.
- Check valve vaults for leaks.

Quarterly

- Check for presence of surface film.
- Condition of access hatch.
- Condition of access ladder.

Annually

- Check condition of interior paint.
- Check for deposits on wall or bottom.
- Condition of foundation and structural support.
- Check condition of exterior paint.
- Operate all valves.
- Booster Pump Station Maintenance Activity and Frequency

1.4 Booster Pump Station Maintenance Activity and Frequency

The following activities are performed on the City's Booster Pump Stations at the frequency indicated.

Weekly

- Check and record suction and discharge pressures.
- Check for unusual vibration, noise, or temperature.
- Check time on hour meters and record.
- Check for leaks.
- Check and record water meter reading.
- Check locks.

Monthly

- Check operation of pressure switch controls if so equipped.
- Check operation of pump alteration.
- Check operation of heater and exhaust fans.

Annually

- Rebuild/replace motors and pumps as needed.
- Check and record Amps draw, each leg.
- Grease motor bearings.

1.5 Pressure Reducing Stations Maintenance Activity and Frequency

The following activities are performed on the City's Pressure Reducing Stations (PRVs) at the frequency indicated.

Quarterly

- Make general visual inspection.
- Record inlet and outlet pressures.
- Check for leaks and proper drainage.
- Check for damage or vandalism to vault.
- Exercise valve from fully open to fully closed by venting and pressurizing top chamber.
- Check PRV downstream setting, and pressure sustaining setting if equipped.

Exhibit I1-1 (cont)**B - Pump Operates but Delivers Little or No Water**

Cause of Trouble	How to Check	How to Correct
1. Pump may be air locked.	Stop and start pump several times, waiting about one minute between cycles. If pump then resumes normal delivery, air lock was the trouble.	If this test fails to correct the trouble, proceed as below.
2. Water level in well too low.	Well production may be too low for pump capacity. Restrict flow of pump output, wait for well to recover, and start pump.	If partial restriction corrects trouble, leave valve or cock at restricted setting. Otherwise, lower pump in well if depth is sufficient. Do not lower if sand clogging might occur.
3. Discharge line check valve installed backward.	Examine check valve on discharge line to make sure that arrow indicating direction of flow points in right direction.	Reverse valve if necessary.
4. Leak in drop pipe.	Raise pipe and examine for leaks.	Replace damaged section of drop pipe.
5. Pump check valve jammed by drop pipe.	When pump is pulled after completing "4" above, examine connection of drop pipe to pump outlet. If threaded section of drop pipe has been screwed in too far, it may be jamming the pump's check valve in the closed position.	Unscrew drop pipe and cut off portion of threads.
6. Pump intake screen blocked.	The intake screen on the pump may be blocked by sand or mud. Examine.	Clean screen, and when reinstalling pump, make sure that it is isolated several feet above the well bottom - preferably 10 feet or more.
7. Pump parts worn.	The presence of abrasive in the water may result in excessive wear on the impeller, casing, and other close-clearance parts. Before pulling pump, reduce setting on pressure switch to see if pump shuts off. If it does, worn parts are probably at fault.	Pull pump and replace worn components.
8. Motor shaft loose.	Coupling between motor and pump shaft may have worked loose. Inspect for this after pulling pump and looking for worn components, as in "7" above.	Tighten all connections, set screws, etc.

Exhibit I1-1 (cont)
C - Pump Starts Too Frequently

Cause of Trouble	How to Check	How to Correct
1. Pressure switch defective or out of adjustment.	Check setting on pressure switch and examine for defects.	Reduce pressure setting or place switch.
2. Leak in pressure tank above water level.	Apply soap solution to entire surface of tank and look for bubbles indicating air escaping.	Repair or replace tank.
3. Leak in plumbing system.	Examine service line to house and branches for leaks.	Repair leaks.
4. Discharge line check valve leaking.	Remove and examine.	Replace if defective.
5. Air volume control plugged.	Remove and inspect air volume control.	Clean or replace.
6. Snifter valve plugged.	Remove and inspect snifter valve.	Clean or replace.

Exhibit I1-1 (cont)
D - Fuses Blow When Motor is Running

Cause of Trouble	How to Check	How to Correct
1. Incorrect voltage.	Check line voltage terminals in the control box (or connection box in the case of 2-wire models) with a voltmeter. Make sure that the voltage is within the minimum-maximum range prescribed by the manufacturer.	If voltage is incorrect, contact power company for service.
2. Overheated overload protection box.	If sunlight or other source of heat has made box too hot, circuit breakers may trip or fuses blow. If box is hot to the touch, this may be the problem.	Ventilate or shade box, or remove from source of heat.
3. Defective control box components (skip this for 2-wire models).	Using an ohmmeter, determine the resistance across the running capacitor. When contact is made, the ohmmeter needle should jump forward, and then drift back slowly. No movement indicates an open capacitor (or defective relay points); no resistance means that the capacitor is shorted. Using an ohmmeter, check the relay coil. Its resistance should be as shown in the manufacturer's literature. Recheck ohmmeter reading across running capacitor. With a good capacitor, no movement of the needle indicates relay points.	Replace defective components.
4. Defective motor winding or cable.	Check the resistance of the motor winding by using an ohmmeter on the proper terminals in the control box (see manufacturer's wiring diagram). The resistance should match the ohms specified in the manufacturer's data sheet. If too low, the motor winding may be shorted; if the ohmmeter needle doesn't move, indicating high or infinite resistance, there is an open circuit in the motor winding. Ground one lead of the ohmmeter onto the drop line or well casing, then touch the other lead to each motor wire terminal. If the ohmmeter needle moves appreciable when this is done, there is a ground in either the cable or the motor winding.	If neither cable or winding is defective - shorter, grounded, or open - pump must be pulled and serviced.
5. Pump becomes sand-locked.	If the fuses blow while the pump is operating, sand or grit may have become wedged in the impeller, causing the rotor to lock. To check this, pull the pump.	Pull pump, disassemble, and clean, before replacing, make sure that sand has settled in well. If well is chronically sandy, a submersible should not be used.

Exhibit I1-1 (cont)
E - Pump Won't Shut Off

Cause of Trouble	How to Check	How to Correct
1. Defective pressure switch.	Arcing may have caused pressure switch points and other parts of switch for defects.	Clean points or replace switch.
2. Water level in well too low.	Well production may be too low for pump capacity. Restrict flow of pump output, wait for well to recover, and start pump.	If partial restriction corrects trouble, leave valve or cock at restricted setting. Otherwise, lower pump in well if depth is sufficient. Do not lower if sand clogging might occur.
3. Leak in drop line.	Raise pipe and examine for leaks.	Replace damaged section of drop pipe.
4. Pump parts worn.	The presence of abrasive in the water may result in excessive wear on the impeller, casing, and other close-clearance parts. Before pulling pump, reduce setting on pressure switch to see if pump shuts off if it does, worn parts are probably at fault.	Pull pump and replace worn components.

Exhibit I1-1 (cont)
F - Motor Does Not Start, but Fuses Don't Blow

Cause of Trouble	How to Check	How to Correct
1. Overload protection out.	Check fuses or circuit breaker to see that they are operable.	If fuses are blown, replace. If breaker is tripped, reset.
2. No power.	Check power supply to control box (or overload protection box) by placing a voltmeter across incoming power lines. Voltage should approximate nominal line voltage.	If no power is reaching box, contact power company for service.
3. Defective control box.	Examine wiring in control box to make sure all contacts are right. With a voltmeter check voltage at motor wire terminals. If no voltage is shown at terminals wiring is defective in control box.	Correct faulty wiring or tighten loose contacts.
4. Defective pressure switch.	With a voltmeter check voltage across pressure switch while the switch is closed. If the voltage drop is equal to the line voltage the switch is not making contact.	Clean points or replace switch.

May 09, 1997

Customer
Utilities Department
1401 W. Mellen Street
Centralia, WA 98531

Account #: CENTRALIA

Ref : 1401 W. Mellen Street
Centralia, WA 98531

Dear Customer:

One of the requirements State Health Regulations impose on all water purveyors, is that they have a program for identifying and eliminating cross connections to the potable water system.

Our goal is to assure that all our residents receive safe drinking water and we believe that our program to identify and eliminate any possible cross connections is a vital link towards this goal. We want to assure our customers that the very last user on our water line has water that is just as safe as the very first user and that nothing has entered the system in between.

Pursuant to City of Centralia Ordinance No. 1786 regulating our Backflow Prevention Program our cross connection specialists will be conducting a SURVEY of the potable water system in building(s) under your control. This survey is needed to identify those areas within the potable water system that require protection against backflow. We will be contacting you in the near future to set up an appointment to inspect your property(s) and we appreciate your cooperation.

Should you require further information on the Backflow Prevention Program, please contact me at (360) 330-7512.

Sincerely,

Vic Ray
Water Quality Technician

May 09, 1997

Customer
Utilities Department
1401 W. Mellen Street
Centralia, WA 98531

Account #: CENTRALIA

Ref : 1401 W. Mellen Street
Centralia, WA 98531

Dear Customer:

The installation of a Backflow Prevention Device on your water line was required to help protect the potable water system. This device prevents backflow of water from your internal uses into the public water mains.

Water backflow can be caused by a variety of factors, one of which is an increase in the water pressure on 'your side' of the water main. One cause of increased pressure is a hot water heater. As water is heated, it expands, increasing pressure. This increase in pressure would force a small amount of water from your system into the public water lines. Since the backflow prevention device that was installed prevents water from backflowing into the water system, a pressure buildup in your system has NO RELEASE. Because of this potential buildup in pressure you must take precautions that will prevent the possible EXPLOSION of your system due to thermal expansion caused by a hot water heater.

In order to avoid the potentially dangerous situation sited above you may need to have a pressure compensating/releasing mechanism placed on your water line. If one of these mechanisms is required, a plumber would be able to help you choose one and install it.

If you have any questions, please contact this office.

Sincerely,

Vic Ray
Water Quality Technician

cc: file

May 09, 1997

Customer
Utilities Department
1401 W. Mellen Street
Centralia, WA 98531

Due Date : / /
Account #: CENTRALIA
Device ID: 3
Mfg/Model:
Serial # :

Ref : 1401 W. Mellen Street
 Centralia, WA 98531

Hazard :
Location:

Dear Customer:

According to our records, it is time for the annual test of the backflow prevention assembly(s) installed on your water service or within your plumbing system. This test is required by the City of Centralia's Cross Connection Control Program, which carries the approval of the State Department of Health.

A successful test of the assembly(s) must be completed by a Certified Backflow Assembly Tester possessing a valid Certification. The test results are to be sent to this department on the enclosed Test Report Form. Test results must be received by our office no later than the date listed above.

Enclosed, for your convenience, is a listing of Washington certified tester in the area.

If you have any questions, or cannot meet the deadline, call me at 330-7512

Your prompt attention to this matter would be greatly appreciated.

Sincerely,

Vic Ray
Water Quality Technician

May 09, 1997

Customer
Utilities Department
1401 W. Mellen Street
Centralia, WA 98531

Due Date : / /
Account #: CENTRALIA
Device ID: 3
Mfg/Model:
Serial # :

Ref : 1401 W. Mellen Street
 Centralia, WA 98531

Hazard :
Location:

Dear Customer:

We previously sent you a letter requesting an annual test be performed on the Backflow Prevention Assembly(s) installed on your plumbing system. Annual testing of backflow assemblies is required by our Backflow Prevention Program and the State Department of Health.

To date we have not received an acceptable test report to indicate that the backflow prevention assembly(s) is in working order. A successful test of each assembly must be completed by a Certified Tester and the results sent to this department on an Approved Test Report Form. The test results must be received by this office no later than the date listed above.

If you have any questions or cannot meet the deadline, please call me at 330-7512.

Sincerely,

Vic Ray
Water Quality Technician

2ND NOTICE

May 09, 1997

Customer
Utilities Department
1401 W. Mellen Street
Centralia, WA 98531

Test Due Date : / /
Account #: CENTRALIA
Device ID: 3
Model:

Ref : 1401 W. Mellen Street
 Centralia, WA 98531

Hazard :
Location:

Dear Customer:

Our records show that you have been notified twice of your need to have an annual test report completed on your plumbing system's Backflow Prevention Assembly. This is required by City of Centralia Ordinance No. 1786 and backed by the State Department of Health. Please be aware that state regulations require the Department of Health to order a supplier of water to DISCONTINUE water service to any premises where a known cross connection exists. To date we have not received an acceptable test report to indicate that the testing on your Backflow Assembly has been completed.

A successful test of the Backflow Prevention Assembly above must be completed by a Certified Tester, and the results sent to this department on an approved Test Report Form. The test results must be received by our office no later than the date listed above.

If you have any questions contact this office. This is your LAST NOTIFICATION. Your water will be TERMINATED on the date listed above unless we receive the proper test results.

Sincerely,

Vic Ray
Water Quality Technician

cc: Craig Nelson, City Manager
Dick Southworth, Utilities Administrator
Ken Kadow, Water Operations Supervisor

THIRD AND FINAL NOTICE!

May 09, 1997

Customer
Utilities Department
1401 W. Mellen Street
Centralia, WA 98531

Install Due Date : / /
Account #: CENTRALIA
Device ID: 3
Model:

Ref : 1401 W. Mellen Street
 Centralia, WA 98531

Hazard :
Location:

Dear Customer:

After completing our survey we found several deficiencies regarding backflow prevention that will need to be addressed:

A reduced pressure backflow assembly will need to be installed on the incoming water line to the facility.

Reduced pressure backflow assemblies will need to be installed on the incoming water lines to each of the house keeping rooms where chemicals are mixed.

Each utility sink, where chemicals or soaps are mixed, needs a hose bib backflow preventer installed on the faucet.

A reduced pressure backflow assembly will need to be installed on any make up water line to the boiler or hot water heating system.

The single check valve on the fire system is not an approved backflow assembly. Upgrade of the fire system against backflow shall be required at the time any expansion or remodeling is planned.

Upon installation, a successful test of each Reduced Pressure Backflow assembly must be completed by a certified tester and the results sent to this department no later than the date indicated above. One of the requirements State Health Regulations impose on all water purveyors, is that they have a program for identifying and eliminating cross connections to the City water system. Backflow Prevention Assemblies, if operating properly, eliminate the possibility of a backflow incident occurring.

Included is a list of State certified testers, test reports, information on installation requirements, and thermal expansion.

If you have any questions, or cannot meet the deadline, please telephone me at 330-7512.

Thank you for your cooperation in helping us to deliver safe drinking water to our customers.

Sincerely,

Vic Ray
Water Quality Technician

Enc: 9

Vic Ray, CCS1
Centralia Water Utility
1401 West Mellen Street

Centralia, WA 98531
Phone: 360 330-7512 FAX: 360 330-7516

Device ID#: 3 Act #: CENTRALIA
Address: 1401 W. Mellen Street
Customer
Utilities Department
Centralia, WA

BACKFLOW PREVENTION
ASSEMBLY TEST REPORT
Next test due: / /
Installed : / /

Device:
Type :
Mfg :
Model :
Size :
Serial #:

Hazard:

Location:

circle one: ATVB PTVB DCVA DCDA RPPA RPPDA

Reduced Pressure Principal Assembly			Back YES
Double Check Valve Assembly			Pressure NO
Differential Pressure Relief Valve			Line PSI
Check Valve #1	Check Valve #2		PVB
Initial Closed Tight	Closed Tight	Opened at PSID	Air Inlet Opened at
Leaked RP PSID	Leaked	Did not Open	Did not Open
Repairs: Cleaned	Cleaned	Cleaned	Check Valve
Replaced: Rubber Kit	Replaced: Rubber Kit	Cleaned Sensing Line(s)	Held at PSID
Other	Other	Replaced: Rubber Kit	Leaked
		Other	Cleaned
			Replaced: Rubber Kit
			Other
Final Closed Tight	Closed Tight	Opened at PSID	Air Inlet
PSID	PSID		Check Valve

The above report is certified to be true.

Initial Test by: Date/Time Pass/Fail Tester Number Test Kit

Repaired by:

Final Test by:

Comments:

Acknowledged:

Appendix I-3 Water Complaint Form

WATER QUALITY COMPLAINTS

Date of Call _____ *Site Address* _____
Complainant _____ *Phone #* _____

Complaint Description

Remarks



Stormwater and the Aquifer

Many of us have lived in Western Washington long enough to know that it does rain here occasionally. This rain water will collect pollutants when it hits the ground and travels to catch basins or drains. This water that flows across the land is called stormwater runoff. For example, runoff from parking lots pick up oil and grease dripped from cars, asbestos from worn brake linings, and zinc from tires. Pesticides, herbicides, and fertilizers are washed off from landscaped areas, and soils are washed away from construction sites. Any substance found on the ground can wind up in stormwater runoff.

This stormwater runoff ultimately finds its way into our local streams, rivers, and lakes.

The City of Centralia's Municipal Water Department obtains water from groundwater wells. These wells are fed by underground aquifers which in turn are fed by above ground water sources like streams, rivers, and lakes.

Putting oil, antifreeze, detergents, and other material into the storm drainage system is the same as dumping them right into a stream, lake, or river.

Your help in preventing contaminants from entering water bodies or storm drains will also keep our water aquifers from becoming contaminated.

Thank you,

The City of Centralia Water Department

1100 N. Tower Ave.
Centralia, Washington 98531-5044
Phone (360) 330-7512 • Fax (360) 330-7516

STORM WATER INFORMATION

WHAT IS STORM WATER?

In general terms, stormwater is rainfall or snow melt that flows over the ground. Impervious surfaces such as rooftops, driveways, sidewalks, and streets prevent stormwater runoff from naturally soaking into the ground. Stormwater runoff can pick up pollutants such as fertilizers, pesticides, animal waste, debris, and oil and other toxins. This untreated runoff flows into storm drains and eventually reaches streams, rivers, lakes, and oceans.

THE CHEHALIS RIVER WATERSHED

The City of Centralia lies within the Chehalis River Watershed. A watershed is the region draining into a river system, or other body of water. In this case, the receiving waters are the Chehalis River.

STORMWATER AND THE CITY OF CENTRALIA

The City of Centralia has developed a Stormwater Management Plan (SWMP), outlining the City's efforts to prevent stormwater pollution and minimize runoff. Generally, the SWMP has five components: public education, public outreach, formation of a program to identify and prevent contamination of stormwater (illicit discharge), regulations for new development, redevelopment and construction, as well as a pollution prevention program to be implemented within the City. Currently, the City is responsible for the maintenance of 22 miles of storm pipes, 2,115 catch basins, dry wells and manholes.

Centralia's unique location on the banks of the Chehalis River makes it extremely important that stormwater runoff be adequately treated and discharged in the cleanest form possible. The Chehalis River flow includes not only the water that runs between its banks, but also all the water that enters from the lands that line its shores. Working together the City of Centralia and its community can improve the quality of our valuable water resources, ensuring availability for future generations.

WHAT IS AN ILLICIT DISCHARGE?

An illicit discharge is defined as "any discharge into a municipal storm sewer system that is not composed entirely of stormwater." Some of the pollutants that fall into this category are:

- Car wash wastewater
- Gas and motor oil
- Kitchen grease/oil
- Household cleansers
- Paints
- Pesticides
- Solvents
- Vehicle Spills
- Weed Killers
- Pet Waste

FEDERAL REGULATIONS

Stormwater controls began with the Federal Clean Water Act (CWA), originally drafted in 1972.

The U.S. Environmental Protection Agency (EPA) is directly responsible for enforcing the CWA. The intent of the Clean Water Act is to restore all "water of the United States" to "fishable" and "swimmable" conditions. Under this act, all discharges to public water require a National Pollution Discharge Elimination System (NPDES) permit. Changes made to the CWA by Congress in 1987 required that all municipalities apply for NPDES permits.

The stormwater permitting process was divided in two parts. Phase I applies to municipalities of more than 100,000 people. Phase II requirements apply to all municipalities of more than 10,000. Industrial dischargers, construction sited on one acre or more and other large property owners. The State of Washington is one of the last states to comply with Federal Phase II requirements.

In order to comply with Western Washington Municipal Stormwater NPDES Permit requirements, the City of Centralia will undertake several economic, infrastructure, personnel, and organizational adjustments by 2011.

All of Centralia's stormwater, running through pipes, ditches, and ponds, must be managed according to the requirements of the stormwater permit, which was issued to the City of Centralia in February 2007. A full copy of the permit and the SWMP is available on the City's website at:

<http://www.centraliaguide.com/centralia>.

PREVENTING RUNOFF POLLUTION BEGINS AT HOME

PET WASTE contains bacteria, viruses and parasites which can threaten human health and nutrients that can cause algae blooms and recreational water closures.

- *Clean up after pets using a scooper or plastic grocery bag. Seal the bag before placing it in the trash.*
- *Use a covered litter box outside for cats.*

FERTILIZERS contain nitrogen and phosphorus primary nutrients responsible for algae growth. As algae decays it uses up oxygen in water that fish need to survive.

- *"Grasscycle!" Leave grass clippings on the lawn to act as a natural fertilizer and soil conditioner.*
- *Never fertilize before it rains.*
- *Use drop spreaders instead of broadcast spreaders for more precise fertilizer application.*
- *Keep fertilizer off sidewalks, streets and driveways.*

PESTICIDES & HERBICIDES are poisonous and pose a health threat to humans, plants and beneficial insects.

- *Weed by hand and use natural predators such as ladybugs to control pests.*
- *Use native plants which are pest and disease resistant.*
- *Use pesticides as a last resort - read the label, use sparingly and spot treat only.*
- *Never apply pesticides before it rains.*

YARD WASTE, such as leaves and grass clippings, that are blown into streets, storm drains or drainage ditches can cause algae blooms, oxygen depletion and fish kills in waterways. Clogged storm drains and ditches can also cause property flooding.

- *Do not blow or sweep yard waste into a street, storm drain, ditch or waterway.*
- *Leave grass clippings on the lawn to act as a natural fertilizer and soil conditioner.*
- *Compost leaves and grass clippings and use as a mulch for flower beds, landscape beds and gardens.*
- *Bag or containerize waste for yard waste collection.*



OVER-WATERING can cause lawn disease and can transport fertilizers, pesticides and yard waste into waterways.

- Soil should be nearly dry before watering.
- Water slowly so that water doesn't run off the soil.
- Use a can to measure the amount of water you are putting on the lawn; 1/2-1" is plenty of water for most lawns.
- Water the lawn, not the sidewalks, street or driveway.
- Water in the early morning to discourage disease and reduce evaporation.
- Plant drought and disease-tolerant native plants to reduce watering needs.

CAR WASHING soaps and detergents destroy the external mucus layers of fish that protect them from bacteria and parasites. Many detergents contain phosphates which promote excessive algae and aquatic weed growth.

- Wash your car on the grass to let soap and dirt be filtered naturally by the soil. It will not harm the grass.

- Use phosphate-free soaps and detergents.
- Use a commercial car wash; the dirty water is sent to a wastewater treatment plant or is recycled on-site.

AUTO FLUIDS are sometimes poured down storm drains or leaked onto the pavement.

- Properly dispose of auto fluids. Recycle used oil, antifreeze and batteries at an auto parts store or the county landfill.
- Clean up vehicle leaks or fluid spills immediately. Kitty litter or sawdust absorb spills well.

HOUSEHOLD HAZARDOUS WASTE (HHW) such as paint, cleaners or other household chemicals often contain toxins, heavy metals and nutrients. When these pollutants enter waterways, they impact water quality, wildlife and human health.

- Properly dispose of all HHW.

- Read labels carefully and use products correctly.
- Use non-toxic product alternatives.
- Do not pour HHW down storm drains or household drains.

SEPTIC SYSTEMS that are poorly maintained or leaking can release nutrients and bacteria into the environment. This can cause algae blooms, groundwater contamination and public health concerns.

- Inspect and pump your septic system every 3-5 years.
- Do not park on the septic system drain field or add chemicals to the septic tank.
- Reduce the amount of solids entering the system from garbage disposals and other means.

YOUR PART...

WHY SHOULD I HAVE TO PAY FOR STORMWATER MANAGEMENT?

The stormwater fee pays for the required stormwater management program. Each property owner in the City pays their "fair share" to plan, construct, maintain, test for pollutants, and operate the city-wide stormwater system.

The stormwater drainage system includes curbs/ gutters, underground pipes, swales, drainage right-of-ways, canals, retention ponds lakes, and waterways.

Everyone who lives in the City of Centralia benefits when the stormwater system is well managed.

The entire system is constructed and maintained for the benefit of all Centralia residents. You may not have a problem on your property or in your neighborhood, but the runoff from your property and your neighbors' property contributes to the City's overall stormwater system.

WHAT CAN I DO TO HELP?

If you observe stormwater runoff pollution occurring, such as dirty water leaving a construction site, someone dumping trash or chemicals into our drainage system, raw sewage discharges or other environmental concerns, please call: City of Centralia Utilities 360-330-7512.

Chichalis River
at Mellen Street



Stormwater Division

1100 N. Tower Ave
360-330-7512



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Appendix M. Cross Connection Control Program

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Centralia Utilities

Combination

Cross-Connection Control Program

Purpose:

The purpose of the City of Centralia Utilities cross-connection control program shall be to protect the public water system, as defined in WAC 246-290-010, from contamination via cross-connections.

General:

Except where specifically designated herein, all words used in this procedure shall carry their customary meanings. Words used in the present tense include the future, and plural includes the singular: The word “shall” is always mandatory; the word “may” denotes a use of discretion in making a decision.

Definitions:

“Approved air gap” means a physical separation between the free-flowing end of a potable water supply pipeline and the overflow rim of an open or nonpressurized receiving vessel. To be an air gap approved by the department, the separation must be at least:

- Twice the diameter of the supply piping measured vertically from the overflow rim of the receiving vessel, and in no case be less than one inch, when unaffected by vertical surfaces (sidewalls); and:
- Three times the diameter of the supply piping, if the horizontal distance between the supply pipe and a vertical surface (sidewall) is less than or equal to three times the diameter of the supply pipe, or if the horizontal distance between the supply pipe and intersecting vertical surfaces (sidewalls) is less than or equal to four times the diameter of the supply pipe and in no case less than one and one-half inches.

“Approved atmospheric vacuum breaker” means an AVB of make, model, and size that is approved by the department. AVBs that appear on the current approved backflow prevention assemblies list developed by the University of Southern California Foundation for Cross-Connection and Hydraulic Research or that are listed or approved by other nationally recognized testing agencies (such as IAPMO, ANSI, or UL) acceptable to the local administrative authority are considered approved by the department.

“Approved backflow preventer” means an approved air gap, an approved backflow prevention assembly, or an approved AVB. The terms “approved backflow preventer,” “approved air gap,” or “approved backflow prevention assembly” refer only to those approved backflow preventers relied upon by the purveyor for the protection of the public water system. The requirements of WAC 246-290-490 do not apply to backflow preventers installed for other purposes.

“Approved backflow prevention assembly” means an RPBA, RPDA, DCVA, DCDA, PVBA, or SVBA of make, model, and size that is approved by the department. Assemblies that appear on the current approved backflow prevention assemblies list developed by the University of Southern California Foundation for Cross-Connection control and Hydraulic Research or other entity acceptable to the department are considered approved by the department.

“Assessment of risk” shall express the results of an evaluation of a health, system, or plumbing hazard. The evaluation required in making a determination of the type of backflow preventer needed to isolate a specific cross connection (e.g., a plumbing fixture), or a group of cross connections contained within a facility or complex of facilities (e.g., a shopping mall) is comprised of the following steps:

- Determine the degree of potential health hazard risk to the public water system. (In assessing the purveyor’s risk of contamination of the public water system, if knowledge of the degree of hazard posed by a substance is not known, the purveyor must assume that it is high. Generally, almost all substances other than potable water are considered a health hazard of some degree).
- Determine the high or low probability that a cross-connection may occur.
 1. The probability increases that an existing cross-connection will go undetected as the complexity of a piping system increases.
 2. Piping changes will create new cross-connections, or change the operating conditions from backsiphonage to backpressure conditions.
 3. A backflow preventer could be by-passed or removed from service.
 4. A substance could be changed or increased in strength.
 5. A substance may deteriorate, and thus become a health hazard.
 6. A substance, when combined with the chemicals in the potable water supply, or when exposed to certain piping material, may react and form a compound that poses a health hazard, such as CO₂ mixing with water to form carbonic acid that leaches copper from a service pipe.
 7. A substance, if it contains a bacteriological contaminant, could become a health hazard long after it enters the potable water supply, through bacteria re-growth.
- Determine the risk level acceptable to the purveyor, and
- Determine the reliability required of the backflow preventer.

“Authorized agent” means any person who:

- Makes decisions regarding the operation and management of a public water system whether or not he or she is engaged in the physical operation of the system;
- Makes decisions whether to improve, expand, purchase, or sell the system; or
- Has discretion over the finances of the system.

“Backflow” means the undesirable reversal of flow of water or other substances through a cross-connection into the public water system or consumer’s potable water system.

“Backflow assembly tester” means a person holding a valid BAT certificate issued in accordance with chapter 246-292 WAC.

“Backpressure” means a pressure (caused by a pump, elevated tank or piping, boiler, or other means) on the consumer’s side of the service connection that is greater than the pressure provided by the public water system and which may cause backflow.

“Backsiphonage” means backflow due to a reduction in system pressure in the purveyor’s distribution system and/or consumer’s water system.

“Combination fire protection system” means a fire sprinkler system that:

- Is supplied only by the purveyor’s water;
- Does not have a fire department pumper connection; and
- Is constructed of approved potable water piping and materials that serve both the fire sprinkler system and the consumer’s potable water system.

“Consumer” means any person receiving water from a public water system from either the meter, or the point where the service line connects with the distribution system if no meter is present. For purposes of cross-connection control, “consumer” means the owner or operator of a water system connected to a public water system through a service connection.

“Consumer’s water system” as used in WAC 246-290-490, means any potable and/or industrial water system that begins at the public water system point of delivery; that is, at the immediate downstream side of the water meter, and is located on the consumer’s premises. The consumer’s water system includes all auxiliary sources of supply, storage, treatment, and distribution facilities, piping, plumbing, and fixtures under the control of the consumer.

“Contaminant” means a substance present in drinking water that may adversely affect the health of the consumer or the aesthetic qualities of the water.

“Cross-connection” means any actual or potential physical connection between a public water system or the consumer’s water system and any source of nonpotable liquid, solid, or gas that could contaminate the potable water supply by backflow.

“Cross-connection control program” means the administrative and technical procedures the purveyor implements to protect the public water system from contamination via cross-connections as required in WAC 246-290-490.

“Cross-connection control specialist” means a person holding a valid Washington State Cross-Connection Control Specialist certificate issued in accordance with chapter 246-292 WAC.

“Cross-connection control summary report” means the annual report required by the department that describes the status of the purveyor’s cross-connection control program.

“Department” means the Washington state department of health or health officer as identified in a joint plan of operation in accordance with WAC 246-290-030(1).

“Direct service connection” means a service hookup to a property that is contiguous to a water distribution main and where additional mains or extensions are not needed to provide service.

“Distribution system” means all piping components of a public water system that serve to convey water from transmission mains linked to source, storage and treatment facilities to the consumer excluding individual services.

“Flow-through fire protection system” means a fire sprinkler system that:

- Is supplied only by the purveyor’s water;
- Does not have a fire department pumper connection;
- Is constructed of approved potable water piping and materials to which sprinkler heads are attached; and
- Terminates at a connection to a toilet or other plumbing fixture to prevent the water from becoming stagnant.

“Health hazard” shall mean any condition, device, or practice in a water supply system and/or its operation that creates or may create, a danger to the health and well being of a customer.

“Health officer” means the health officer of the City, county, City-county health department or district, or an authorized representative.

“High health cross-connection hazard” means a cross-connection which could impair the quality of potable water and create an actual public health hazard through poisoning or spread of disease by sewage, industrial liquids or waste.

“In-premise protection” means a method of protecting the health of consumers served by the consumer’s potable water system, located within the property lines of the consumer’s premises by the installation of an approved air gap or backflow prevention assembly at the point of hazard, which is generally a plumbing fixture.

“Local administrative authority” means the local official, board, department, or agency authorized to administer and enforce the provisions of the Uniform Plumbing Code as adopted under chapter 19.27 RCW (WAC 51-46-0603).

“Low health cross-connection hazard” means a cross-connection that could cause an impairment of the quality of potable water to a degree that does not create a hazard to the public health, but does adversely and unreasonably affect the aesthetic qualities of such potable waters for domestic use.

“Potable” means water suitable for drinking by the public.

“Premise isolation” means a method of protecting a public water system by installation of approved air gaps or approved backflow prevention assemblies at or near the service connection or alternative location acceptable to the purveyor (at the point where the water purveyor no longer has legal jurisdiction and/or authority to control the water system) to isolate the consumer’s water system from the purveyor’s distribution system.

“Plumbing hazard” shall mean a cross-connection in a consumer’s potable water system that may permit backsiphonage in the event of a negative pressure in the supply line.

“Public water system” is defined and referenced under WAC 246-290-020.

“Purchased source” means water a purveyor purchases from a public water system not under the control of the purveyor for distribution to the purveyor’s consumers.

“Purveyor” means an agency, subdivision of the state, municipal corporation, firm, company, mutual or cooperative association, institution, partnership, or person or other entity owning or operating a public water system. Purveyor also means the authorized agents of such entities.

“Resident” means an individual living in a dwelling unit served by a public water system.

“Service connection” means a connection to a public water system designed to provide potable water to a single-family residence, or other residential or nonresidential population.

“System hazard” shall mean a threat to the physical properties of the public or the consumer’s potable water system by a material not dangerous to health but aesthetically

objectionable that would have a degrading effect on the quality of the potable water in the system.

“Unapproved auxiliary water supply” means a water supply (other than the purveyor’s water supply) on or available to the consumer’s premises that is either not approved for human consumption by the health agency having jurisdiction or is not otherwise acceptable to the purveyor.

“Used water” means water which has left the control of the purveyor.

“Water quality coordinator” shall be that person employed by Centralia Utilities that is certified as a Washington State cross-connection control specialist and is qualified to administer a cross-connection control program.

Code Authority and Enforcement:

The enforcement of this cross-connection control program in the area served by the City will be in accordance with WAC 246-290-490, Cross-connection control, effective April 9, 1999, City of Centralia Utilities Ordinance No. 2123 dated March 23, 2004 and the City of Centralia Utilities Cross-Connection Control Program.

General Policy:

It is the intention of this policy to provide for the permanent abatement or control of all cross-connections under the control of the water purveyor of the City of Centralia Utilities. Where it is officially, actually and/or economically unfeasible to find, eliminate or to permanently control all cross-connections of the consumer’s water system, and when it is mandated by WAC 246-290-490 and/or deemed necessary by the City’s water quality technician, who is also the City’s certified Cross-Connection Control Specialist (CCS), there shall be installed at the City water service connection or alternative location acceptable to the purveyor an approved backflow prevention assembly commensurate with the assessed degree of hazard posed by the consumer’s water system upon the public water supply.

The following methods of cross-connection control are considered minimum protection at the water service connection at the property line:

1. The public water supply to any premise listed under WAC 246-290-490(4)(b)(i)(ii)(iii)(Table 9) shall require an approved air gap separation or an approved reduced pressure backflow assembly installed immediately downstream of the domestic water service connection, prior to any branch connections.

2. The public water supply to any premise on which material dangerous to health or toxic substances are stored or handled, and which, in the assessment of the City CCS poses a potential high health cross-connection hazard to the public water system, shall

require an approved air gap separation or an approved reduced pressure backflow assembly installed immediately downstream of the domestic water service connection, prior to any branch connections.

3. The public water supply to any premise where entry is restricted so that inspection for cross-connections cannot be made with sufficient frequency or at sufficient short notice to assure that cross-connections do not exist shall require an approved air gap separation or an approved reduced pressure backflow assembly installed immediately downstream of the domestic water service connection, prior to any branch connections.

4. The public water supply to any premise having a repeated history of cross connections being established or re-established, shall require an approved air gap separation or an approved reduced pressure backflow assembly installed immediately downstream of the domestic water service connection, prior to any branch connections.

5. The public water supply to any premise which has an unapproved auxiliary water supply on or available to the consumer's premises that is either not approved for human consumption by the health agency having jurisdiction or is not otherwise acceptable to the purveyor, and with no known cross-connections, shall require an approved air gap separation or an approved reduced pressure backflow assembly installed immediately downstream of the domestic water service connection, prior to any branch connections.

6. The public water supply to any premise which has internal cross-connections that are not correctable or which has complex plumbing arrangements that make it impractical to ascertain whether or not cross-connections exist, shall require an approved air gap separation or an approved reduced pressure backflow assembly installed immediately downstream of the domestic water service connection, prior to any branch connections.

7. The public water supply to any premise which has a heat exchanger or a solar hot water system shall require a risk assessment inspection by the City CCS to determine the level of backflow protection that may be required to be installed immediately downstream of the domestic water service connection, prior to any branch connections.

8. The public water supply to a fire system which will contain any chemical additives, including food-grade additives, shall require an approved reduced pressure backflow assembly (or reduced pressure detector assembly) installed immediately downstream of the public water service connection, prior to any branch connections or alternative location acceptable to the purveyor.

9. The public water supply to a fire system with no chemical additives shall require an approved double check valve assembly (or double check detector assembly) installed immediately downstream of the public water service connection, prior to any branch connections.

10. The public water supply to any premise which poses a high probability of changes in the use of water by tenants, such as, but not limited to, shopping malls or strip malls, shall require an approved double check valve assembly installed immediately downstream of the domestic water service connection, prior to any branch connections.

11. The public water supply to any premise where cross-connections are unavoidable or not correctable, such as, but not limited to, tall buildings (over 30 feet), or water booster pump systems, shall require an approved double check valve assembly installed immediately downstream of the water service connection, prior to any branch connections.

Coordination, and delineation of responsibilities with local administrative authorities:

The control of cross-connections requires cooperation between the water purveyor, the local administrative authority, the health officer and the consumer.

- WAC 246-290-490(1)(d): The purveyor's responsibility for cross-connection control shall begin at the water supply source, include all the public water treatment, storage, and distribution facilities, and end at the point of delivery to the consumer's water system, which begins at the downstream end of the service connection or water meter located on the public right-of-way or utility-held easement.
- WAC 246-290-490(1)(e): Under the provisions of this section, purveyors are not responsible for eliminating or controlling cross-connections within the consumer's water system. Under chapter 19.27 RCW, the responsibility for cross-connections within the consumer's water system, i.e., within the property lines of the consumer's premises, falls under the jurisdiction of the local administrative authority, i.e., the City of Centralia Building Official.
- WAC 246-290-490(2)(d): The purveyor shall coordinate with the City's building official in all matters concerning cross-connection control. The purveyor shall document and describe such coordination, including delineation of responsibilities, in the written cross-connection control program.

The City CCS shall make available to all local administrative agencies the information maintained in the City cross-connection control program files, which may include, but is not limited to: (1) a master list of all premises that have been isolated from the City water system in accordance with the City cross-connection control program; (2) information concerning any internal cross-connections that come to the attention of the City CCS during risk assessment evaluations of premises; and (3) notification of any termination of water service for failure to comply with the requirements of WAC 246-290-490, City of Centralia Utilities Ordinance No. 2123, and/or the City of Centralia Utilities Cross-Connection Control Program.

Risk Assessment Survey:

A risk assessment survey for cross-connections and sanitary hazards requires a water use evaluation of new and existing buildings, structures, and grounds. The systematic evaluation shall be prioritized by risk to public health and shall be conducted as outlined below:

1. Upon application for a water service connection, the property owner (applicant) shall complete an application for City water service, which shall be reviewed by the City CCS. The City CCS shall make a determination of the risk posed to the public water system by the property owner's water system. The City CCS shall classify the water service connection as either a high health hazard or a low health hazard cross-connection, and shall specify the need and identify the type of backflow protection required (if applicable) for premise isolation backflow protection.
2. The City CCS shall review all water system related plans and specifications to assess the following:
 - The actual or potential health hazard or contamination risk to the public water system
 - The complexity of any existing and/or proposed water piping system
 - The probability of occurrence of cross-connections within a property owner's water system
 - The determination of what cross-connections might constitute acceptable risks
 - The determination of the reliability required of any backflow prevention assembly utilized within a facility or mandated for premise isolation
 - The actual or potential use and/or availability of any unapproved auxiliary water supply systems
 - The storage and handling of material dangerous to health or toxic substances which, if introduced into the water system, would constitute a system, plumbing, or health hazard.

If, upon review, it is determined that any of these conditions will exist, the City CCS will advise the property owner in writing that such cross-connections exist, and will, as a courtesy, offer technical guidance in eliminating or controlling such cross-connections. If the City CCS determines that the property owner's water system represents a potential health hazard risk to the City's water system, such as, but not limited to, WAC 246-290-490(4)(b)(Table 9) facilities and/or systems, an approved backflow prevention assembly commensurate with the assessed degree of hazard shall be required for premise isolation at the water service

connection, notwithstanding any point of hazard, point of use, or fixture protection existing within the property lines of the premises.

3. During the construction phase of any new building, structure, or ground installation, a City cross-connection control specialist (City CCS) shall perform the required premise isolation cross-connection control inspection. Upon completion of the inspection, but prior to the establishment of a water service connection, the City CCS shall advise the property owner/authorized agent, that subject cross-connection control inspection has been made and advise if any additional backflow protection is required. The City CCS shall advise the property owner/authorized agent that it is the property owner's responsibility to have a Washington State certified backflow assembly tester (BAT) test the backflow assembly prior to use of the water service, and that annual testing is required thereafter.

The City CCS provides for the customer a list of BATs that have been approved by the City CCS. BAT approval depends upon the tester having current copies of test equipment calibration and certification on file with the City CCS. The City may also make use of an internet-based resource as a tool for ensuring customers are provided updated lists of currently certified backflow assembly testers (BATs). This tool was developed by the Washington Environment Training Center (WETRC) under contract to Department of Health, with the purpose of providing and maintaining a public list of certified BATs. The resource is located at www.wetrc.org. Certified BAT information is accessed at the site by first selecting the "Backflow Assembly Tester" link on the website's home page. Then, the "BAT Public Listing" link is selected. It is on this page that updated lists of currently certified BATs may be viewed by County or by individual BAT name.

The customer is also notified by letter that their annual testing is due. The City CCS shall attend and witness the initial test of all backflow assemblies installed under City jurisdiction. It is the responsibility of the property owner/authorized agent to contact the City CCS and coordinate an appointment time for the City CCS to attend and witness the required test of a backflow assembly (24 hour advance notice required).

Existing Buildings, Structures, and Grounds:

The City CCS will evaluate all high health hazard premises, all commercial and/or industrial premises, all premises with fire systems, all premises with water systems using booster pumps, and all premises with buildings 30' or more in height to insure premise isolation protection has been provided at the water service connection. Premises to be evaluated will be selected in order from an established list prioritized by expected degree of health hazard and/or risk of contamination. Premises not on the established priority list that come to the attention of the City CCS, and upon evaluation are determined

deficient in required premise isolation backflow protection, shall be brought into current compliance without regard to any established priority list. Inspections of residential properties will not be routinely conducted unless those properties pose a potential health hazard risk to the district water supply, and for any reason, come to the attention of the City CCS.

The initial evaluation shall proceed according to the following steps:

1. A priority list shall be established using existing water service records, telephone directory yellow page listings, and other resources as beneficial.
2. Beginning with the highest rated health hazard on the program's priority list, the City CCS will make a risk assessment evaluation of each property for actual or potential cross-connections and/or any conditions that might tend to contaminate the district water system.
3. Upon completion of the risk assessment evaluation, the City CCS will determine whether or not premise isolation backflow protection will be required, and will determine the level of protection required commensurate with the assessed degree of hazard.
4. The City CCS will prepare a written report to the file system that will include, but is not limited to, the following:
 - a. A list of all cross-connections found, their location, and any optional methods of elimination or control.
 - b. Any applicable drawings, sketches, blueprints, or photos.
 - c. A summary of the findings, recommendations and requirements for corrective actions, and a time (normally a maximum of 90 days) in which the corrective action must be completed.
5. The City CCS shall notify the property owner/authorized agent, in writing, of the City's requirement for premise isolation backflow protection. The code enforcement letter shall include the requirements for corrective actions and a corrective action completion date. One copy of the completed letter shall reside in the City's cross-connection control program jacket file for the facility (UbiQuati).
6. On the corrective action completion date, the City CCS shall contact the property owner/authorized agent and ask if the corrective actions have been completed. If the corrective actions have been completed, the City CCS shall inspect each required premise isolation backflow assembly located at the district water service connections to the property. If the

corrective actions are in progress but more time is required for completion, a new completion date may be set by the City CCS. If corrective actions have been disregarded, the district shall take appropriate corrective action within its authority, per WAC 246-290-490(2)(j)(i)(ii)(iii), City of Centralia Utilities Ordinance No. 2123, and the City Cross-Connection Control Program, which may include, but is not limited to, denying or discontinuing water service to a consumer's premises until the cross-connection hazard is eliminated or controlled to the satisfaction of the City CCS.

7. When all required actions have been completed, a copy of the completed required actions letter shall be placed in the cross-connection control file for the property, together with all copies of correspondence, notes, related documents and any completed backflow assembly test report forms.
8. Reinspection of premise isolation for each premise found to be subject to this procedure shall be accomplished annually, if possible, or more often if the degree of hazard so indicates, or whenever there is a change in the use of the premises.

Annual Notification of Testing:

The City CCS sends out a written first notice for testing to all customers having installed backflow prevention assemblies, and allows customers 30 days to schedule the test with a City-approved BAT. The CCS provides a list of certified testers acceptable to the City (i.e., those having current copies of certification and test kit calibration on file) and a test report.. If a customer does not respond, a second notice is sent out, allowing one week to schedule with a tester. If the customer does not respond, a third and final notice (via certified mail) is sent out, allowing 10 days to have the test report returned to the Utilities office. If the customer does not respond, water service is shut off. Copies of third notices are sent to the Utilities Director, City Building Official, City Attorney, and Water Manager.

Records and Reports:

Cross-Connection Control Program File System:

1. A separate jacket file shall be established by the City CCS, for each individual customer that requires the installation of a premise isolation backflow prevention assembly. Jacket files shall be filed in alphabetical sequence by premise name or customer name (last name first, first name last). A computer software database will be utilized for compiling and

extracting information required for tracking compliance as well as Department of Health annual summary reporting.

2. The following information shall be maintained in each individual jacket file:

- (a) Copies of all correspondence with customer relative to cross-connection control
- (b) Copies of evaluation reports, complete with field drawings (if applicable)
- (c) Copies of all completed backflow assembly test report forms
- (d) Copies of all reports or correspondence pertaining to enforcement action, cross-connections, or backflow incidents.

Backflow Incident Response Plan:

The City CCS will participate in developing a backflow incident response plan that will be part of the water system's emergency response program as required by WAC 246-290-415(2). The incident response plan will include, but will not be limited to:

- Notification of affected population;
- Notification and coordination with other agencies, such as DOH, the City Building Inspector, and the local health jurisdiction;
- Identification of the source contamination;
- Isolation of the source contamination and the affected area(s);
- Cleaning, flushing, and other measures to mitigate and correct the problem;
- Application of corrective action to prevent future backflow occurrences.

The City CCS will use the most recently published edition of the manual, *Backflow Incident Investigation Procedures*, published by the PNWS-AWWA as a supplement to the Backflow Incident Response Plan described above.

Public Education:

At site plan review meetings, the CCS hands out a backflow prevention guidelines list to all potential water customers (see Exhibit A). In addition, the CCS includes a section on backflow prevention in the annual Consumer Confidence Report distributed to all water system customers.

Reclaimed Water:

Reclaimed water requirements do not apply to the City's water system, because at the present time there is no reclaimed water use outside of that at the wastewater treatment plant.

EXHIBIT A

Backflow Prevention Guidelines

Backflow means the undesirable reversal of flow of potentially contaminated water or other substances, through a cross-connection, into the public water system or consumers' drinking water. Backflow may occur due to either backsiphonage or backpressure. Cross-connections are prohibited and must be protected by an air gap or an approved backflow assembly.

- 1. All installers of backflow assemblies (this includes plumbing contractors, landscape contractors or private citizens) are required to obtain a plumbing permit from the Building Inspector at City Hall. Failure to do so shall be in violation of City ordinance and may be subject to termination of water service.**
- 2. All backflow assemblies shall be installed with adequate space consideration for testing, repair, and maintenance. All backflow assemblies must be tested prior to going into service and annually thereafter by a State licensed tester. The required test form(s) must be completed and returned to Centralia Utilities, 1100 North Tower Avenue. Test forms can be obtained by calling 360 330-7512. An improperly installed backflow assembly will not be accepted and will have to be redone.**
- 3. Thermal water expansion and/or water hammer downstream of a backflow assembly can cause excessive pressure. In order to avoid a potentially dangerous situation, a pressure compensating or releasing device may need to be installed on your water line. A plumber would be able to evaluate the situation and make a responsible recommendation.**
- 4. Testing and maintenance of backflow assemblies are the responsibility of the customer.**
- 5. Only State approved assemblies shall be installed.**
- 6. All State and local installation requirements and plumbing codes shall be followed.**
- 7. Fire system vaults shall be a standard concrete vault with a bottom. The lid shall be diamond plated aluminum with a hinged double door.**
- 8. A sump pump may be required in some vault situations where soil types prohibit adequate drainage.**
- 9. All lawn sprinkler systems require, as minimum protection, a double check valve assembly.**
- 10. City water customers who also have a private well may require backflow protection on the service line.**
- 11. Adequate freeze protection shall be provided when needed.**
- 12. An inspection of the installation shall be conducted before final approval is issued.**
- 13. For questions regarding applications needing backflow prevention, installation requirements, or inspections contact Vic Ray (Cross-Connection Specialist) at 360 330-7512.**

Appendix N. Water Rights Self- Assessment

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Water Right Self-Assessment Form for Water System Plan

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

Water Right Permit, Certificate, or Claim # *If water right is interruptible, identify limitation in yellow section below	WFI Source # If a source has multiple water rights, list each water right on separate line	Existing Water Rights Qi= Instantaneous Flow Rate Allowed (GPM 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-CV1P31	North Fork Newaukum R.	7.4 cfs = 3,333 gpm		5,376													
Cert. 562-D	S09	700		186													
Cert. 563-D	S03	900		238													
Cert 564-D	S06, S14, S15	1,400		372													
G2-*04714 (Cert. 4491-A)	S04	1,200		1,920													
G2-00168C	S05	1,000			1,600												
G2-24010C	S09	1,300		1,568	432												
G2-28212C	S04	200			320												
G2-28214C	S06, S14, S15, S16		1,400		1,886												
G2-28215C	S03		900		1,214												
CG2-00731 (LEWI-15-01)	S04	70		6													
	TOTALS =	10,103 ¹		9,666 ¹		2,741	4,029	2,259	5,451	6,782	8,321 ²	5,945	10,726 ²	10,740	4,363 ²	9,415	7,256 ²

Column Identifiers for Calculations:

A

B

C

=A-C

D

=B-D

E

= A-E

F

=B-F

G

=A-G

H

=B-H

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
G2-28782	New, for S02	3-18-1993	700		1129	
G2-22908	New, for Eshom well cleanup	3-15-2000	4000			6440
S2-30405	New – Skookumchuck River	4-13-2007	26 cfs		Not stated	
G2-30763	New- Borst Park, et alia	1-31-2020	8,333		8,961	

NOTES: 1. The cumulative total of groundwater rights only, without counting the inactive Newaukum River source, is 7,710 afy of additive Qa and 6,770 gpm of additive Qi.

2. The G2-30763 water right application is expected to be approved and active by the 10-year planning horizon and is therefore incorporated in the total Qi and Qa water rights in the 10- and 20- year planning horizon calculations.

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				10-Year Forecasted Purchase				20-Year Forecasted Purchase			
				Current quantity purchased through intertie				Forecasted quantity purchased through intertie				Forecasted quantity purchased through intertie			
	<u>Maximum Qi</u> Instantaneous Flow Rate	<u>Maximum Qa</u> Annual Volume		<u>Maximum Qi</u> Instantaneous Flow Rate	<u>Current Excess or (Deficiency) Qi</u>	<u>Maximum Qa</u> Annual Volume	<u>Current Excess or (Deficiency) Qa</u>	<u>Maximum Qi</u> 10-Year Forecast	<u>Future Excess or (Deficiency) Qi</u>	<u>Maximum Qa</u> 10-Year Forecast	<u>Future Excess or (Deficiency) Qa</u>	<u>Maximum Qi</u> 20-Year Forecast	<u>Future Excess or (Deficiency) Qi</u>	<u>Maximum Qa</u> 20-Year Forecast	<u>Future Excess or (Deficiency) Qa</u>
1															
2															
3															
TOTALS =															

Column Identifiers for Calculations:

A

B

C

=A-C

D

=B-D

E

=A-E

F

=B-F

G

=A-G

H

=B-H

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:

1. The “Wellfield” designation approved for certain EWUA water rights include Wells 1, 1R, 2, 3, 4, 5, 6, 7A, 7B, 7C, 8, 9, 10, and 12