CITY OF McCLEARY

Water System Plan

G&O #14234
November 2020

Gray & Osborne, Inc.

CITY OF MCCLEARY

GRAYS HARBOR COUNTY **WASHINGTON**

WATER SYSTEM PLAN

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36494
REGISTERED
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G&O #14234
NOVEMBER 2020

Gray & Osborne, Inc.
CONSULTING ENGINEERS

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CHAPTER 1

WATER SYSTEM DESCRIPTION

OBJECTIVE

SCOPE OF WORK

This Water System Plan (Plan) is an update of previous water system plans prepared for and adopted by the City of McCleary (City) in accordance with requirements set forth in Chapter 246-290 of the Washington Administrative Code (WAC) (Water Regulations). Previous water system plans include a 1999 Plan and a 2008 Plan. The latter was prepared by Parametrix. This Plan meets all requirements of Part 246-290-100 WAC, including revisions of the Water Regulations known as the Water Use Efficiency Rule adopted in February 2007, and as further detailed in the Washington State Department of Health (DOH) Water System Planning Handbook, as well as the needs and concerns of McCleary. Prior to 2016, Water System Plans had to be updated every 6 years. In 2016, DOH adopted changes to WAC 246-290-100 that allow new plans to be valid for up to 10 years.

This Plan covers the following topics:

- Current and Projected Water System Capacities and Demands
- Water System Analysis
- Water Use Efficiency (Conservation)
- Water Source Protection Requirements
- Water System Operations Program Requirements
- Water System Design Standards
- Capital and Non-Capital Improvement Plan
- Financing Plan

CHAPTER OBJECTIVE

The objective of this chapter is to present background information for McCleary's Plan. Subjects covered include the following:

- Ownership and Management
- System Background
- Existing System
- Related Planning Documents
- Service Area Characteristics
- Water System Policies

OWNERSHIP AND MANAGEMENT

SYSTEM NAME AND DOH ID NUMBER

The name of the water system on the DOH data system is *"City of McCleary."* The DOH public water system ID number is **52250 U**.

TYPE OF OWNERSHIP

The City of McCleary operates a Group A, Community public water system pursuant to DOH Water Regulations.

MANAGEMENT STRUCTURE

McCleary is a Code City operated under a Mayor-Council form of government in accordance with RCW 35A.12. The Mayor has the responsibility of appointing the Public Works Director, who is responsible for overseeing the Building Official, Public Works Planning Assistant, Light and Power, Water/Wastewater, and Public Facilities operation and maintenance. The City Council is responsible for enacting policies that govern the operation of the City and the Public Works Director carries out those policies. The water system is managed and maintained by the Water Manager and Treatment Plant Operator. Responsible parties involved with the water system operation are included in Table 1-1.

TABLE 1-1

McCleary Water System Management Structure

Title	Name	Water System Responsibility
Mayor	Brenda Orffer	Policy Implementation
City Council Position 1	Dustin Richey	General Policy
City Council Position 2	Brycen Huff	General Policy
City Council Position 3	Jaron Heller	General Policy
City Council Position 4	Ben Blankenship	General Policy
City Council Position 5	Joy Iversen	General Policy
Public Works Director	Todd Baun	Policy Implementation
Clerk-Treasurer	Wendy Collins	Policy Implementation
Utility Accounts Manager	Lori Ann Hanson	Billing/Questions
Water Manager	Kevin Trewhella	Operation/Maintenance
Public Works Assistant	Paul Morrison	Operation/Maintenance
Water Plant Operator	Jon Ehresmann	Operation/Maintenance

The Water Plant Operator, Mr. Ehresmann reports to the Water Manager, Mr. Trewhella, who reports to the Public Works Director, Mr. Baun, who reports to the Mayor. Mr. Ehresmann holds the following DOH certifications: Water Distribution Manager 2, Water Treatment Plant Operator 1, and Cross Connection Control Specialist. The Public Works Director holds a Water Distribution Manager 2 certification.

WATER FACILITIES INVENTORY FORM

A copy of City's Water Facilities Inventory (WFI) form, updated May 19, 2017, is included in Appendix A. The WFI indicates 663 full-time single-family residential connections, 15 apartment buildings, condos, or duplexes, 102 full-time residential units in apartments, condos, duplexes, 0 recreational services, and 64 institutional, commercial/business, school, day care, or industrial services, for a total of 829 service connections. The WFI indicates an estimated full-time residential population of 1,600, an estimated temporary and transient population of 15,000 monthly year round. In addition, McCleary serves an estimated regular non-residential population of 653 people per month during the school year. This encompasses all months except July and August when the non-residential population is reduced to 270.

CONTACTING CITY OF MCCLEARY WATER DEPARTMENT

The City of McCleary's mailing address and telephone number for the Water Department is:

City of McCleary
100 South 3rd Street
McCleary, Washington 98557
Phone: (360) 495-3667

In addition, the Director of Public Works can be contacted by email at the following:

toddb@cityofmccleary.com

SYSTEM BACKGROUND

HISTORY OF WATER SYSTEM DEVELOPMENT AND GROWTH

Location

The City of McCleary is located in Grays Harbor County, Washington, approximately 20 miles west of Olympia. The City is approximately 2 miles in area and is situated in portions of Sections 11, 12, 13, and 14, Township 18 North, Range 5 West, Willamette Meridian. Figure 1-1 shows the vicinity map for the McCleary area.

History

The area, now called McCleary, was first under the ownership of the Northern Pacific Railroad Company through a land grant given by President Harrison. At that time several homesteads occupied the area that is now the downtown portion of the City of McCleary.

In 1897, Mr. Henry McCleary from Guernsey County, Ohio, began a small cedar lumber mill. The City of McCleary was then considered a "company town" because the McCleary Mill owned most of the buildings, homes, and utilities. The mill and the community continued to grow and prosper through 1910, and the mill expanded to include a door manufacturing company.

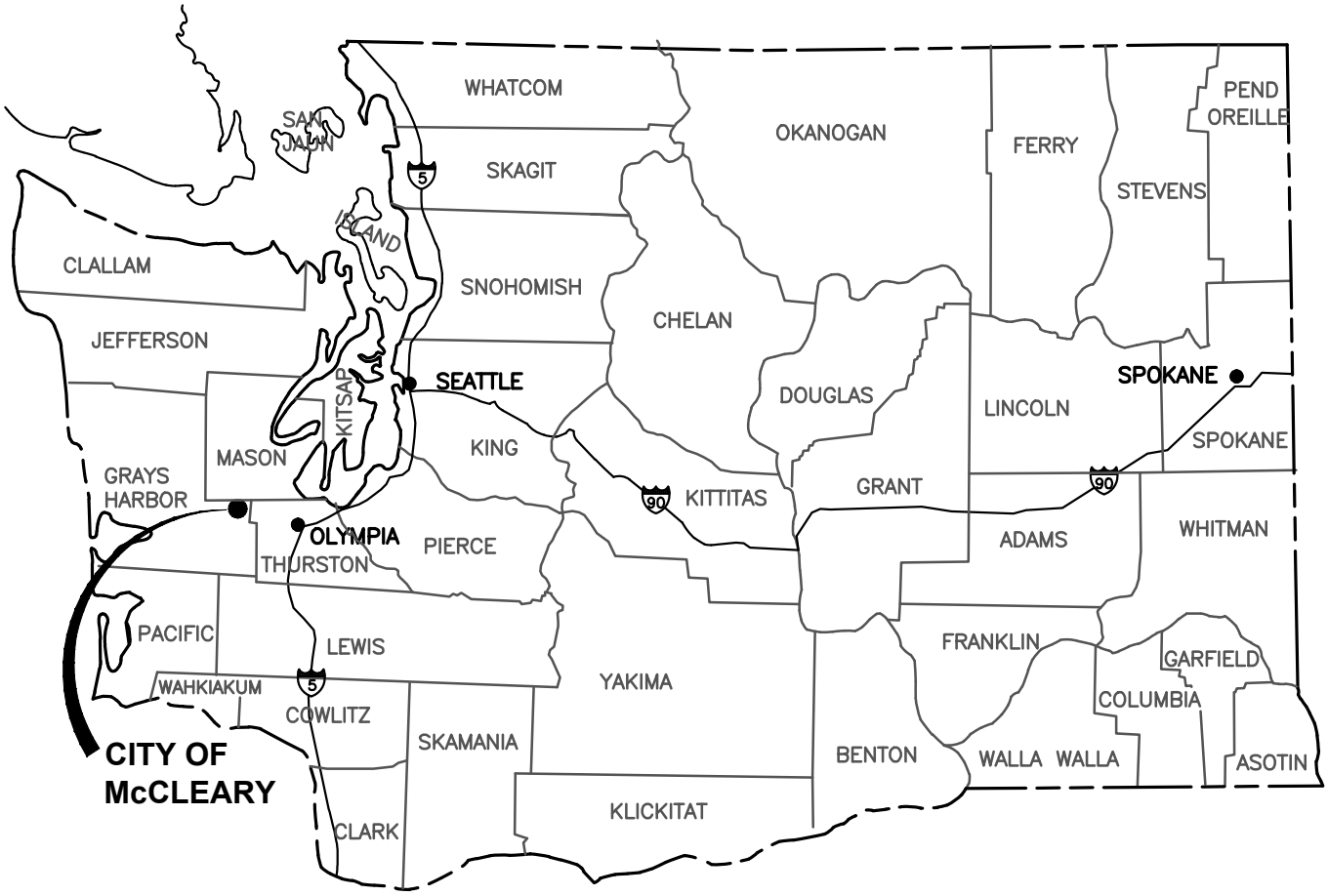
For the next 10 years, the community went through a period of rapid growth and construction that included digging "Sam's Canal" along Maple Avenue, which provides much of the storm water drainage for the City.

The community continued to grow and prosper until the onset of the Great Depression of 1929. The sawmill closed 2 years later due to lack of available local timber. Then in January of 1942, Simpson Logging Company purchased the mill and the McCleary door manufacturing company. Shortly after purchase of the factory, Simpson encouraged the community to incorporate into a city.

The City of McCleary incorporated on January 9, 1943, with a population of 1,200. Through its initial incorporation, the City of McCleary purchased the water and power utility from Simpson Timber Company. Simpson completed some improvements to these utilities prior to the sale; however, the need for adequate fire protection and sanitary sewer service resulted in an expansion and upgrade to the City's utilities during the 1950s. In 1952, a two-stage wastewater treatment plant, sanitary sewer collection system, new water mains, and a storage tank were constructed. Over the years, upgrades and modifications to these facilities occurred to meet growth needs, as well as regulatory requirements.

Projects Completed since the last WSP

Table 1-2 includes a summary of projects completed since the last Water System Plan was approved in 2008.



CITY OF McCLEARY

FIGURE 1-1
VICINITY MAP

Gray & Osborne, Inc.
CONSULTING ENGINEERS

TABLE 1-2

Water System Projects since 2008

Project	Year Constructed
Recoating Interior of 150,000 Gallon Reservoir	2010
Recoating Interior of 500,000 Gallon Reservoir	2010
Install Pyrolusite Catalytic Oxidation and Filtration Treatment System for Iron and Manganese	2012
Rehabilitate Well 2	2012
Rehabilitate Well 3	2013
South 6th Street Improvements (install 400 feet of 6-inch)	Installed 180 lf - 2007
Well 1 Decommissioned	2013
Install Reservoir Level Transducers	2014
Meter Replacement Program	Ongoing
Meter Reading/Billing Software and Equipment	Ongoing since 2009

Current Conditions

Today, the City of McCleary's water system includes two wells located north of the downtown area, a 150,000-gallon and a 500,000-gallon reservoir located east of downtown, and approximately 65,000 linear feet of water mains throughout the City.

GEOGRAPHY

Topography within the City's service area ranges from approximately 262 feet above mean sea level (MSL) at the west end of the City to 426 feet above MSL at the City's reservoirs. The city center lies at approximately 280 feet.

ADJACENT AND NEARBY PURVEYORS

There are no Group A water systems immediately adjacent to the City of McCleary water system. The City of Elma's Group A water system is located approximately 10 miles west of McCleary. Thurston County PUD owns one Group A (328-Pit) and two Group B (370-Sky Acres, 330-Olin) water systems north of McCleary and one Group B (329-Heslep) immediately south of McCleary. Individual domestic wells primarily serve the neighboring properties.

The Simpson door manufacturing facility is an industry that is centrally located in the City of McCleary. The Simpson Timber Company owns and maintains a fire protection system at their door manufacturing facility. This is a non-potable system dedicated entirely for fire protection of the facility. The McCleary water system supplies the door manufacturing facility with potable water for domestic use. The source of Simpson's fire protection system is Wildcat Creek. Simpson Timber has water rights for Wildcat Creek and owns a dam, which impounds approximately 6 acre-feet (ac-ft) of water. A 22-inch

diameter water transmission main carries water from the dam to Simpson's pumping facility. This pumping facility has a 3,850 gallon per minute (gpm) capacity at 110 pounds per square inch (psi). The following pumps provide the facilities pumping capacity:

- 1,500 gpm: Pump with 200-hp Direct Drive Diesel Motor
- 850 gpm: Pump with Electric Motor
- 500 gpm: Pump with Electric Motor
- 500 gpm: Pump with Gasoline Powered Motor

The pumping facility pumps water directly to the fire protection system within the door manufacturing facility, which includes a 750,000-gallon reservoir located on a hill northeast of the facility at an elevation 185 feet above the manufacturing facility. The water transmission main from the reservoir to the manufacturing facility is 12 inches in diameter and is approximately 2,100 feet in length.

EXISTING SYSTEM

This section describes the components of the existing McCleary Water System. Figure 1-2 shows the configuration of the water system and the locations of the system's various components.

The McCleary Water System consists of two wells and two reservoirs. The wells pump through the water distribution system to two reservoirs located on a ridge east of the City. The system consists of a single pressure zone with an overflow elevation of 472 feet. The service area ranges in elevation from 262 feet to 377 feet.

SOURCE OF SUPPLY

The City is supplied by two wells in a wellfield. The wellfield is located north of the City, near the intersection of Summit and Larson Roads in the east half of the northwest quarter of Section 11, Township 18 North, Range 5 West.

There are two wells in this wellfield that provide service to the McCleary Water System. A third well, Well 1, was decommissioned in 2013. In 2012 and 2013, the wells were inspected and rehabilitated using sonic and mechanical cleaning methods prior to installation of new pumps. Table 1-3 presents data for the two active wells.

OLIN #330 (031704)
GROUP B
8 CONNECTIONS

SKY ACRES #370 (10233L)
GROUP B
4 CONNECTIONS

PIT #328 (05956V)
GROUP A
16 CONNECTIONS

WELL NO. 2

WELL NO. 3

RESERVOIR SITE

HESLEP #329 (542016)
GROUP B
9 CONNECTIONS

McConkey Ln.
McConkey Ave.
Olin Ave.
Luscombe Ct.
Elma Hicklin Rd. E.
County Line Rd.
WSDOT
Tornquist Rd.
Wildcat Rd.
Summit Rd.
Lynch Rd.
Larson Rd.
Virgil Ln.
108
Elma Hicklin Rd. W.
Beck St.
S.R. 108
1st St.
Mommsen Rd.
Stillson Rd.
Vestal Ln.
Church Rd.
Ash St.
W Simpson Ave (SR 108)
9th St.
8th St.
10th St.
Maple St.
Birch St.
Stoney Ln.
Elma McCleary Rd.
S.R. 8
Fir St.
Pine St.
2nd St.
6th St.
4th St.
Main St.
3rd St.
Oak St.
Cedar St.
Hemlock St.
Marissa Ln.
McCleary Rd.
Overlake Ln.
Old Sand Creek Rd.
Heslep Ln.
WSDOT
McCleary Rd.
Mox Chehalis Rd. E.
8
Crow Ln.
Mox Chehalis Rd.
Mox Chehalis Branch Rd.
Foreman Rd.
Mann Ln.

N

0 1,600 3,200 Feet

Legend:

- EXISTING WELL
- EXISTING RESERVOIR
- 3/4" WATER LINE
- 1" WATER LINE
- 1 1/4" WATER LINE
- 1 1/2" WATER LINE
- 2" WATER LINE
- 3" WATER LINE
- 4" WATER LINE
- 6" WATER LINE
- 8" WATER LINE
- 10" WATER LINE
- RETAIL SERVICE AREA
- SERVICE AREA
- CITY LIMITS

CITY OF McCLEARY

FIGURE 1-2
WATER SYSTEM BASEMAP
AND WATER SERVICE AREA MAP

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TABLE 1-3

McCleary Water System Wells

	Well 2	Well 3
Year Constructed	1952	1962
Year Rehabilitated	2012	2013
Casing Diameter (inches)	20	16
Ground Elevation	300	300
Casing Depth (feet bgs)	94	93
Static Water Depth (feet)	38	38
Motor	US Motors	US Motors
Motor Serial Number	BF43	BF50
Pump Manufacturer	Robbco	Robbco
Horse Power	40	50
RPM	1,800	1,800
Volts	460/230v	460/230v
Model Number	9CLE Stage 7	9CHE Stage 6
Pump Serial Number	212271	212272
Pump Type	Turbine	Turbine
Flow Rate (gpm)	400	500
Pump Diameter (inches)	6.6875 inches	6.6875 inches
Meter	6-inch, 1,000 gpm	6-inch, 1,000 gpm

WATER RIGHTS

The City of McCleary has water rights for its two sources of supply; Well 2, and Well 3. In 2013, the City filed a "Showing of Compliance Declaration" to allow the Well 1 water rights to be used on Wells 2 and 3. Table 1-4 includes the City's existing water rights.

TABLE 1-4

Water Rights

Source	Water Right Number[(1)]	Type	Instantaneous Withdrawal (gpm)	Annual Withdrawal (acre-ft/yr)	Primary or Supplemental
Well 1[(2)]	G2-*02136CWRIS	Municipal	200	320	Primary
Well 2	G2-*02598CWRIS	Municipal	400	640	Primary
Well 3	G2-*06087CWRIS	Municipal	500	673	Primary
Total			**1,100**	**673[(3)]**	

(1) Ecology has assigned CWRIS tracking numbers for older water rights that have different numbers assigned to the application, permit, and certificate:
Water Right G2-*02136CWRIS includes Application No. 02136, Permit No. 01986, and Certificate No. 00956.
Water Right G2-*02598CWRIS includes Application No. 02598, Permit No. 02448, and Certificate No. 01326.
Water Right G2-*06087CWRIS includes Application No. 06087, Permit No. 05291, and Certificate No. 04371.

(2) The City filed a "Showing of Compliance Declaration" with Ecology to allow these rights to be used by Wells. 2 and 3. This well was decommissioned in 2013.

(3) Water Right G2-*06087CWRIS states that the total withdrawal under all existing water rights shall not exceed 673 acre-ft/yr.

Copies of the City's Water Rights Permits are included in Appendix B. In addition, a copy of the City's Water Rights Self-Assessment is also included in Appendix B.

TREATMENT

Prior to the treatment system upgrade, the City exceeded the secondary maximum contaminant level (MCL) for manganese (0.05 mg/L) for Wells 2 and 3 and consistently approached the MCL for iron (0.30 mg/L) for Well 3. In 2013, the City installed a pyrolusite catalytic oxidation/filtration treatment system for the removal of iron and manganese.

The treatment equipment is sized to treat the City's largest source of 500 gpm (Well 3). During higher demand situations, when both wells are required to meet system demand, the treatment plant treats only water from Well 3, and the water from Well 2 bypasses the treatment system and is blended into the filtered water. This arrangement maximizes the use of the treatment facilities and minimizes the amount of iron and manganese in the finished water, since Well 2 has both lower flow and lower levels of iron and manganese. The filtration equipment consists of four 48-inch diameter pressure vessels.

Treatment with potassium permanganate is required because the source water includes active silica. Potassium permanganate is added first to neutralize any active silica in the source water, and then sodium hypochlorite is injected into the raw water coming into the water treatment plant (WTP) to oxidize the iron and manganese. A continuous chlorine

residual analyzer is installed downstream of the chlorine injection point to ensure adequate chlorine residual downstream of the filters. Chlorine is utilized both to oxidize iron and manganese in the pyrolusite treatment process and as a disinfection agent. The media is backwashed periodically (generally once per day, depending on water quality) to remove accumulated iron and manganese oxides.

STORAGE

There are two welded steel reservoirs in the system, a 500,000-gallon tank and a 150,000-gallon tank, which are located at the highest point in the system. A chain link fence encloses the two storage facilities. The 500,000-gallon reservoir is approximately 50 feet in diameter and 35 feet high. The 150,000-gallon reservoir is 30 feet in diameter and 30 feet high. The reservoirs were built in the 1970s and 1950s, respectively and were last recoated in 2010/2011.

Two transducers in the 500,000-gallon reservoir provide online level reporting. Reservoir level is communicated via radio to a Human Machine Interface (HMI) located at the WTP operations building.

The wells pump into the distribution system, and the hydraulic grade line (HGL) is set by the level of the reservoirs.

Table 1-5 includes a summary of the City's storage facilities.

TABLE 1-5

Storage Facilities

Name	Gross Capacity (gallons)/ Material	Base Elevation (feet MSL)(1)	Overflow Elevation (feet MSL)(1)	Year Built	Height (feet)	Diameter (feet)
500,000-Gallon Reservoir	514,079 Welded Steel	437	472	1970s	35	50
150,000-Gallon Reservoir	158,630 Welded Steel	442	472	1950s	30	30

(1) Feet MSL refers to Feet above Mean Sea Level.

BOOSTER PUMP STATIONS

The City has no booster pump stations.

TRANSMISSION AND DISTRIBUTION SYSTEM

The McCleary Water System is comprised of mostly asbestos cement (AC) pipe with smaller quantities of polyvinyl chloride (PVC), ductile iron (DI), cast iron, and steel pipe.

Table 1-6 shows approximate quantities of piping in the system and their respective diameters.

TABLE 1-6

Pipe Material, Size, and Length

Pipe Size	Pipe Material (feet)				Total
	PVC/PE	AC	DI/Cast	Steel	
10-inch	6,590	-	-	-	6,590
8-inch	9,505	6,640	4,620	-	20,765
6-inch	3,470	18,240	3,960	-	25,670
4-inch	100	7,660	390	-	8,150
2-inch	770	-	-	3,140	3,910
Total	**20,435**	**32,540**	**8,970**	**3,140**	**65,085**

TELEMETRY AND CONTROL

The City installed reservoir level transducers in 2014. A radio telemetry system relays water level in the reservoirs to the HMI at the WTP operations building.

INTERTIES

The City of McCleary has no interties with other water systems.

RELATED PLANNING DOCUMENTS

The following documents were consulted in the preparation of this Plan:

State of Washington Source Water Protection, Case Study: City of McCleary Public Water Supply Wells, January 2008.

The purpose of this study (Horsley Witten Group, Inc.) was to assess the conditions of the City of McCleary's public water supply with respect to water quantity and water quality, and provide recommendations for protection and management strategies for future growth to both county and city officials. The Case Study was financed jointly by Grays Harbor County, the City of McCleary, the Washington State Department of Health, and the Department of Community, Trade, and Economic Development.

Wildcat Creek Aquifer Hydrology, Regulatory Alternative, and Recommendations – Final Report, prepared for Grays Harbor County and The City of McCleary, June 2008.

This report prepared for Grays Harbor County and The City of McCleary by Jim Arthur and the Pacific Groundwater Group describes what is known about the Wildcat Creek Aquifer and recommends actions for its protection and management. The Report was financed jointly by Grays Harbor County, the City of McCleary, the Washington State Department of Health, and the Department of Community, Trade, and Economic Development.

Water Comprehensive Plan – City of McCleary, Parametrix, September 2008.

This document utilized an approximate one percent growth rate based on growth trend information from the Grays Harbor Utilities Comprehensive Plan, 1991. The Plan identified a future population of 1,550 people for year 2007 and forecasted a population of 2,036 in 2028. ERUS in 2007 were estimated at 964 and projected to be 1,174 in 2028. Maximum Day Demand (MDD) in 2007 was approximately 984,000 gallons and projected to be 1.2 million gallons in 2028.

Development Standards – City of McCleary, revised November 2009.

This manual was prepared to provide a graphic and written representation of minimum standards for construction of public improvements within the public right-of-way, easements, city properties, and on private property relating to utilities which are connected to the basic city utility system. The application of this manual has been coordinated with the most recent edition of the Standard Specifications for Road, Bridge, and Municipal Construction, published by the Washington State Department of Transportation and the American Public Works Association.

Wellfield Improvements Project Report – City of McCleary, Gray & Osborne, Inc., March 2012.

The City of McCleary contracted with Gray & Osborne, Inc., to complete a Pre-Design Report for the Wellfield Improvements identified in its *2008 City of McCleary Water System Plan* (Parametrix, May 2008). The potential improvements include:
(1) Decommission Well 1 and demolish the existing Well 1 building; (2) Replace Well 2 pump, piping, electrical, and building; (3) Replace Well 3 pump, piping, and electrical; (4) Construct a new Water Treatment Plant to remove iron and manganese; (5) Reconfigure the existing wellfield piping.

SERVICE AREA CHARACTERISTICS

EXISTING WATER SERVICE AREA

The City's existing water service area encompasses the entire City of McCleary city limits and a few adjacent areas outside city limits. Figure 1-2 shows the existing water service area boundary. The City does not currently provide wholesale water to any other water systems.

SERVICE AREA AND RETAIL WATER SERVICE AREA

The City of McCleary has identified a water service area and retail water service area as shown in Figure 1-2. The City continues to evaluate the possibility of extending water service to small non-contiguous Group A and Group B water systems managed by the Thurston County Public Utility Department north and south of McCleary's city limits. These water systems include: Sky Acres (Group B, 4 connections), Olin (Group B, 8 connections), Pit (Group A, 16 connections) to the north of McCleary and Heslep Estates (Group B, 9 connections) to the south of McCleary.

EXISTING LAND USE AND ZONING

Figure 1-3 shows the existing land use within the City of McCleary. The majority of the water system is zoned residential; however, the City also has a significant portion of land zoned industrial. The major industrial property owner is Simpson. In 2013, a large tract of industrial land was sold to an entity that produces steel pipe. Figure 1-4 shows the City of McCleary zoning map (amended 2016) which depicts the City's various zoning designations. Zoning outside of city limits but within the City's water service area in shown in Figure 1-4A.

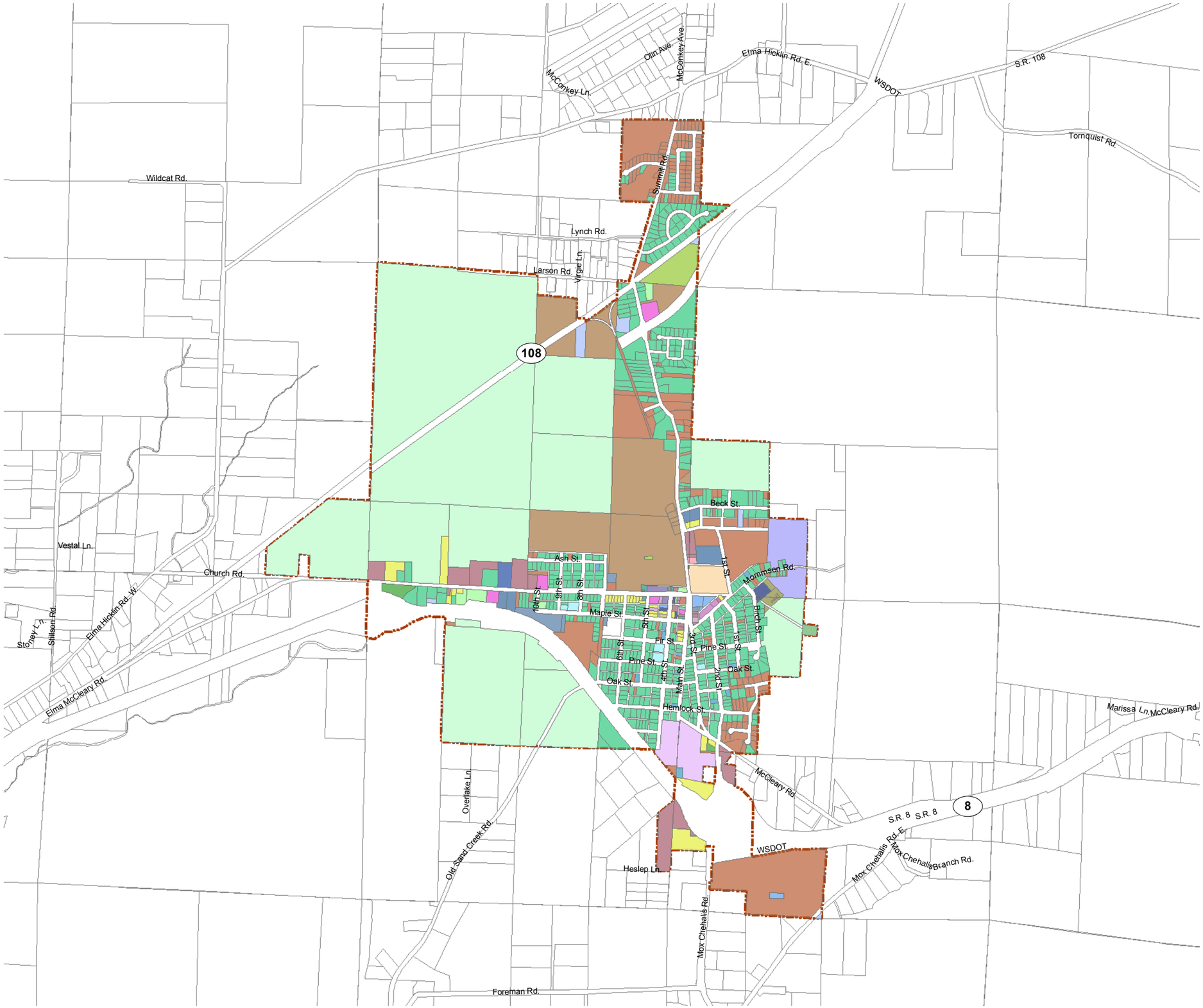
The following section describes each of the zoning designations within the City of McCleary and includes both a statement of purpose and a description of characteristics typifying lands under each designation, as described in the City of McCleary Municipal Code, Title 17.

Single-Family Residential (R-1)

The single-family residential (R-1) district provides for uses, structures, and activities compatible with neighborhoods consisting predominately of single-family dwelling units and designated manufactured homes.

Multi-Family Residential (R-2)

The multi-family residential (R-2) district provides for uses, structures, and activities compatible with neighborhoods with a mix of single-family dwelling units, designated manufactured homes, and multi-family dwelling units.



CITY OF McCLEARY

FIGURE 1-3
EXISTING LAND USE DESIGNATIONS

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N

0 1,600 3,200
Feet

Legend:

ZONING:

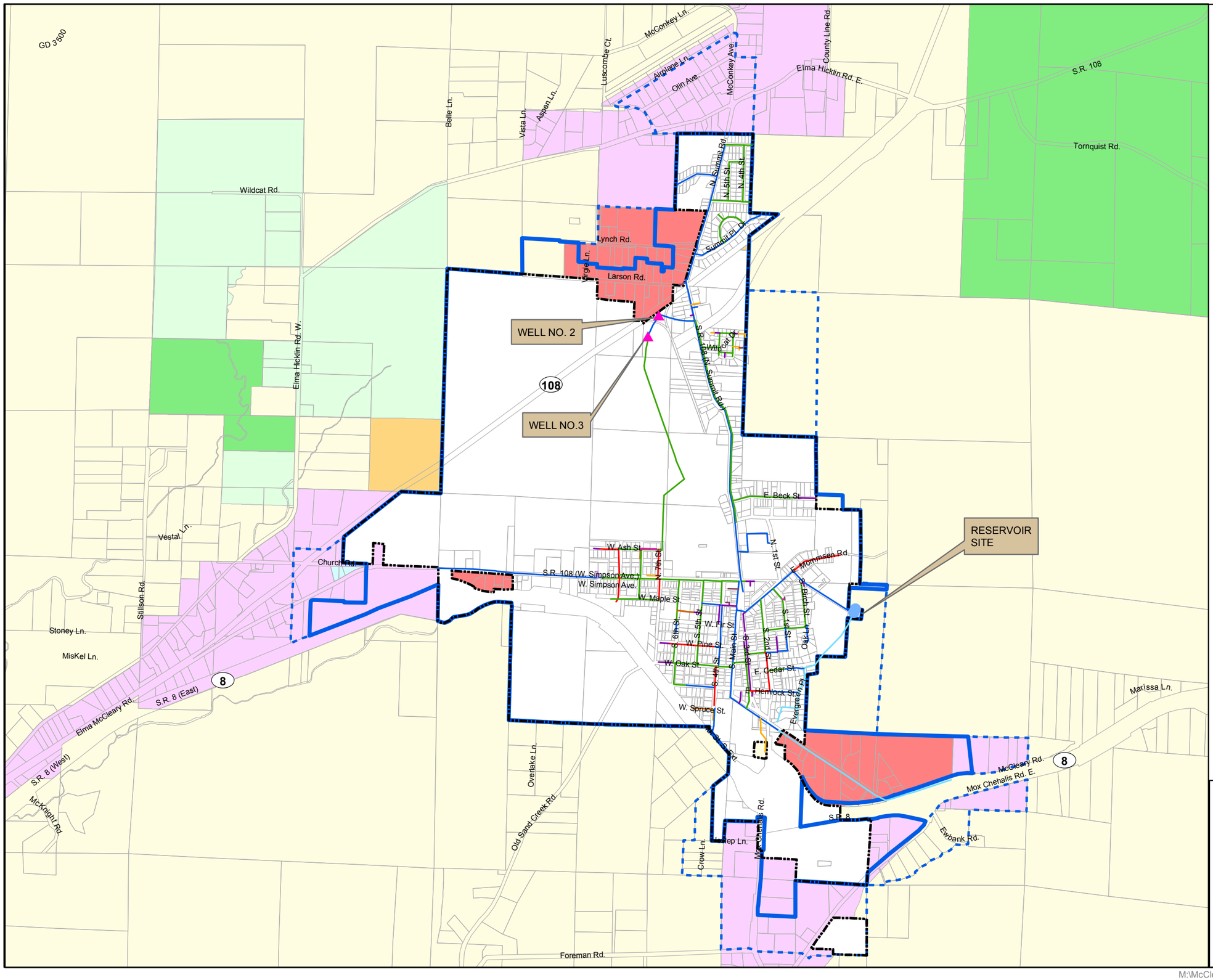
- R1 - Single Family Residential
- R2 - Multiple Family Residential
- R3 - Manufactured Home Park
- C1 - Downtown District
- C2 - General Commercial District
- C3 - Highway Commercial
- I - Industrial District
- F/OS - Forest Open Space District

CITY OF McCLEARY

FIGURE 1-4
ZONING MAP (2017)

Gray & Osborne, Inc.
CONSULTING ENGINEERS

M:\McCleary\14234.00 Water System Plan\Figures\FIG 1-4 ZONING.mxd



Legend

- EXISTING WELL
- EXISTING RESERVOIR
- 3/4" WATER LINE
- 1" WATER LINE
- 1 1/4" WATER LINE
- 1 1/2" WATER LINE
- 2" WATER LINE
- 3" WATER LINE
- 4" WATER LINE
- 6" WATER LINE
- 8" WATER LINE
- 10" WATER LINE
- RETAIL SERVICE AREA
- SERVICE AREA

County Zoning:

- County A1 Agricultural Use
- County A2 Long Term Agricultural Use
- County C2 General Commercial
- County G5 General Development Five
- County I2 Industrial
- County R2 General Residential
- County RR Rural Residential
- City Limits

Source: Grays Harbor County GIS; Gray & Osborne, Inc.

N

0 900 1,800 3,600 Feet

CITY OF McCLEARY

FIGURE 1-4A
WATER SERVICE AREA BOUNDARY
AND ADJACENT COUNTY ZONING

Gray & Osborne, Inc.
CONSULTING ENGINEERS

M:\McCleary\14234.00 Water System Plan\Figures\FIG 1-4 WATSYS_ZONING.mxd

Manufactured Home Park (R-3)

The manufactured home park (R-3) district provides for uses, structures, and activities compatible with neighborhoods with a mix of single- and multi-family dwelling units, designated manufactured homes, and manufactured homes in manufactured home parks.

Downtown (C-1)

The downtown (C-1) district provides for a wide range of small to medium commercial uses and professional offices concentrated in the historic downtown area of the City. Uses in this district serve the needs of the immediate area as well as tourists to the community. The C-1 district is a compact, intensive activity center that emphasizes pedestrian access to and between businesses.

General Commercial (C-2)

The general commercial (C-2) district provides for large retail, personal and professional offices, storage, recreational vehicle parks, and light manufacturing activities outside the downtown (C-1) district that depend on arterial or highway traffic, large lot sizes, or uses not appropriate for the C-1 district.

Highway Commercial (C-3)

The highway commercial (C-3) district provides for highway-oriented or vehicle-oriented uses that can benefit from highway exposure. Residential uses are not permitted.

Industrial (I)

The industrial (I) district provides space for manufacturing, storage, agriculture, forestry, wholesale sales, outdoor storage, trans-shipment, and other intensive uses that meet environmental regulations but require separation from residential and commercial uses in the City.

Forest/Open Space (F/OS)

The forest and open space (F/OS) district protect the City's natural resources and open spaces. Land uses in this zone include commercial forest lands, non-commercial forests, critical areas with restricted development potential, undeveloped parkland, and areas protected by open space designations or long-term conservation easements.

SERVICE AREA AGREEMENTS

The City of McCleary has no service area agreements with other local water purveyors.

GROWTH MANAGEMENT ACT CONSIDERATIONS

Grays Harbor County does not plan under the Growth Management Act (GMA); therefore, the City of McCleary also does not plan under GMA and does not have an Urban Growth Area (UGA).

WATER SYSTEM POLICIES

SERVICE AREA POLICIES

The purpose of this section is to identify and define the policies that affect the development of the McCleary water system. Following are the policies, as well as the water service regulations defined in the McCleary Municipal Code (MMC) under Title 13. This section also provides a guideline for water service requests from both inside and outside of the service area boundaries, and a guide for development of the water system. Chapters 13.04, 13.08, 13.20, 13.24 and 13.34 for the MMC (Appendix C) and City of McCleary Development Standards revised November 2009 (Appendix D) provides further information.

Policies

Ownership of Mains and Service Connections: The ownership of all mains, service connections, and appurtenances in the public street, alleys, or utility rights-of-way shall be vested fully in the city and the person responsible for the construction of such mains shall relinquish, by bill of sale or other appropriate instrument of conveyance, all interest in the ownership of such mains upon acceptance by the City; provided, however, that all private systems existing at the time of the passage of the ordinance codified in this chapter remain under private ownership unless dedicated to the city under the provisions of this chapter and with the approval of the council.

The city shall operate, control, and maintain all approved and accepted components of the city water system in the public streets or utility rights-of-way up to and including the meter, but shall not be responsible beyond the meter. The owner of the property served shall be responsible for maintenance of all pipe and fittings from the meter to his premises. No alteration shall be made to any connection nor shall any connection be made to the city water system without the approval of the superintendent.

Administration and Enforcement: The City administrator or designee is charged with administration and enforcement of this chapter. Water service to any premises served by the City water system may be discontinued for any violation or abridgment of the provisions of this chapter after due notice thereof.

In the event water service is discontinued for failure to comply with provisions of this chapter, it shall remain terminated for the duration of such noncompliance.

The city administrator shall have the authority to from time to time to establish rules and regulations in relation to the implementation and operation of the system; provided that such rules and regulation shall, prior to their effective date, be submitted to the council for its approval.

Wholesaling of Water: The City is currently not wholesaling any water. However, if authorized by the City Council, Section 13.04.140 allows the wholesaling of water where service through an individual meter is not practical. The MMC states that authorization may be granted to a community or a group of individual users served by a common master meter, if the plans are reviewed and approved by the City Engineer. The City shall install the master meter at the applicant's expense and the City shall thereafter maintain, own, and control the master meter. The water service beyond the master meter shall be the responsibility of the members served by the connection. Once approval is granted for a particular community or development, any additional connections require a separate application process and approval.

Wheeling Water: The City of McCleary does not currently have a policy for wheeling of water. Because the system is remote, consideration of this policy is a low priority at this time.

Annexation Policy: In accordance with City Council policy, any property not within the existing city limits must sign an agreement to annex into the City, prior to obtaining water service. If a water main is within 200 feet of the City's water system, the owner is required to connect to the City's system if the service area is within the existing city limits.

Service Application: All applications for water service shall be made at the office of the clerk-treasurer or at such other place as the council may hereafter designate by resolution and upon such form as may be prescribed by the clerk-treasurer.

Every such application shall be made by the owner of the property to be furnished, or by its authorized agent, and the applicant shall state fully and truly all the purposes for which the water may be required.

Service Connection - General: Except as otherwise provided for herein, or unless approved by the council, no premises shall hereafter be connected to the water supply system of the city unless there is a standard main owned by the City in the public right-of-way adjacent thereto.

When a permit has been obtained for the installation of a water service, the authorized representative of the City shall cause the premises described in the application to have available to it a connection to the water system by the installation of a service pipe extending from the main to the property line and a stopcock and water meter placed within the right-of-way. Every separate premises shall have its own separate meter

installed. The City shall be reimbursed for the cost of such installation at such rate as may be established by written resolution of the council.

Service connections to the premises itself shall be installed by the property owner. Any such installation by the property owner or authorized representative thereof shall be coordinated with city staff so as to allow the City to carry out such review and inspection of the installation and testing as may be deemed necessary and appropriate by the City.

All connections to City service shall conform to the standard specifications and regulations of the City.

Service Connection – Hook-up and Meter Charge: All persons connecting to the water system of the city shall pay, in advance of connection to the water system, a hook-up and water meter charge in accordance with the schedule set forth by resolution of the council. In every case, title to the water meter, meter box, and service connection lines shall be and remain with the City. The hook-up and water meter charge shall be established from time to time by resolution of the council to reimburse for all time and materials including, but not limited to, meter, fittings, and restoration.

Service Connection - Temporary: Water service may be supplied to premises on a temporary basis during the construction of a building thereon or during the construction of a standard main to service such premises. Applications for temporary service shall state fully the purposes for which temporary service is requested and such other information as may be required by the City. All costs required for installation and removal of the elements of such temporary service which may be carried out by the City shall be paid by the applicant prior to approval of such application.

Upon cessation of the need for which the temporary service was requested, the owner or authorized representative thereof shall immediately notify the city in writing thereof and such temporary service shall forthwith be terminated or converted to permanent service.

When a permit has been obtained for the installation of temporary water service, the authorized representative of the City shall cause the premises described in the application to have available to it a connection to the water system by the installation of a service pipe extending from the main to the property line and a stopcock and water meter placed within the right-of-way. Every separate premises shall have its own separate meter installed.

Service connections to the premises itself shall be installed by the property owner. Any such installation by the property owner or authorized representative thereof shall be coordinated with city staff so as to allow the City to carry out such review and inspection of the installation and testing as may be deemed necessary and appropriate by the City.

All connections to City service shall conform to the standard specifications and regulations of the City.

Service Connection – Wholesale Consumers: The council may authorize water service to a community or group of individual users to be furnished through a common master meter upon finding that service through individual meters is not practicable. Where service through a common master meter is authorized, the master meter shall be installed by the city at applicant's expense and shall thereafter by maintained, owned, and controlled by the City.

Application for water service under the provisions of this section shall be made on the forms furnished by the City for that purpose, which shall include as a minimum, a detailed description of the premises to be served, the name and nature of the person or entity to be responsible for the service and connection charges, the circumstances precluding service by individual meters, and such other information as the council may deem necessary.

Detailed plans of all community water systems to be served by a master meter, and all modifications thereof, shall, prior to connection, be submitted for review by the Engineer.

Community water service as provided for in this section shall be limited to those premises described in the application. Service to additional premises shall require a separate application and approval.

The ownership, operation, and maintenance of a community water system beyond the master meter shall be vested in and the responsibility of the members of such group so served.

Service Connection – Installation of Main: Whenever application is made for water service to premises with no main in the adjacent street, a standard main must be installed prior to connection. The installation of such standard mains shall conform to the comprehensive water plan for the City and shall conform to the standard specifications and regulations of the City.

A standard main may be installed by and at the expense of the owner(s) of the premises to be served thereby, pursuant to plans approved by the city engineer.

Design and Performance Standards Policy: All new connections are required to meet the minimum design and performance standards as required by Section 13.04.050 of the City of McCleary Municipal Code (MMC). New standards may be adopted from time to time upon the recommendation of the engineer, and a copy of the standards is maintained on file at the Office of the Clerk-Treasurer. The current design performance standards are any line installed over 150 feet must be at least 8 inches in diameter and maintain a static water pressure of 30 psi and fire flow pressure of 20 psi. Looped mains may be 6 inches in diameter as long as the fire flow standards and peak-hour needs are achieved. The material requirements are included in the development standards. A main that meets the operational requirements and the material requirements is considered a standard main.

The City of McCleary Development Standards, revised November 2009, provides the Standard Specifications and Standard Details required for new development.

Formation of Local Improvement Districts Outside Legal Boundaries: New facilities, extensions, and/or improvements may be financed by the applicant or by the formation of a Local Improvement District. In either case, water system extensions, improvements, or new facilities will be constructed in accordance with the City's extension policies, technical standards, and specifications.

Urban Growth Areas: The City of McCleary is not officially designated as an urban growth boundary area, because Grays Harbor County has not had sufficient population and growth rates to warrant compliance with the Growth Management Act.

Latecomer Agreements: The City of McCleary currently has one latecomer agreement in effect. If a property owner requests a latecomer agreement, then the conditions of the agreement will be reviewed by the City Council prior to the proposed improvements.

Oversizing Policy: The developer is responsible for the cost of installing water main that meet the City's minimum design criteria, performance standards, and DOH requirements. The City of McCleary may require the installation of an oversized main and pay the additional cost associated with purchasing the larger main.

Cross-Connection Control Policy: The City Council, under the direction of the City Engineer, may require the installation of backflow prevention devices on any premises receiving water under the provisions outlined in MMC Section 13.04.200. The owner of the property shall pay the total cost of the installation, and the type of protective device shall conform to the provisions of WAC 248-54-500 and the policies outlined in the Cross-Connection Control Policy adopted by the City Council. A copy of the Cross-Connection Control Program is included in Appendix E.

Extension Policy: Upon receipt of an application for a new service where there is no main adjacent to the street or right-of-way, a standard main must be installed prior to connection. The owner of the premises that the connection is benefitting shall pay all costs associated with the extension. The costs are determined by the City Council on the advice of the City Engineer based upon the prevailing costs for the necessary material, labor, and equipment, as well as the other provisions outlined by MMC Section 13.04.150. In accordance with the Development Standards, the main must extend across the property frontage to the furthest property line.

No substandard or temporary mains shall be installed or connected to the water system unless approved by the City Council as outlined in Section MMC 13.04.160.

Duty to Serve

Municipal water suppliers have a duty to provide service to all new connections within their retail service area if the purveyor has sufficient capacity and water rights, is consistent with adopted local plans and regulations, and can provide service in a timely and reasonable manner. The City generally installs new facilities within 2 weeks of the connection requirements being completed when the water main is already at the property line. Appendix F includes the Department of Health Fact Sheet for the Duty to Provide Service Requirement (revised November 2017 DOH 331-366).

CONDITIONS OF SERVICE

The City may provide facilities for the distribution of water within the service area boundaries in accordance with land use plans and policies approved and adopted by the City Council. The following sections define the specific requirements that facilitate the implementation of the City's service area policies. This section also outlines the City's expectations to provide services, as well as the customer's responsibilities.

Ownership

The City has the responsibility to own, operate, control, and maintain all approved and accepted components of the City's water system in the public streets or utility right-of-way up to and including the service meter. The City is responsible for the portion of the water service beyond the public right-of-way contained within easements dedicated to the City. The City is not responsible for utilities contained within private (parcel owner to parcel owner) easements.

Providing Service

The City may provide water within its service area as long as system capacity is available. Water service is provided upon acceptance of an application and receipt of required deposits from the property owner. Properties not abutting a standard main can receive service as outlined below and in MMC Section 13.04.150:

- A standard main is constructed according to City policies to provide service.
- All new service mains shall conform to the City's Development Standards.

No alterations shall be made to any connection, nor shall any connection be made to the City's water system without approval as outlined in MMC Section 13.04.060.

Meter Reading and Billing

It is the City's policy to have all water customers metered. Meters shall be read and bills sent monthly. Meter readings shall be made as nearly as possible on the same cycle date.

Variations in reading periods of five days or less caused in part by holidays, Saturdays, Sundays, and differences in lengths of calendar months shall not be construed as a change. The City may estimate meter readings for billing purposes when its meter reader is unable to gain access to the premises on their regularly scheduled meter-reading trip, when the meter has been tampered with or is not functioning properly, or when circumstances beyond the control of the City make reading of meters impracticable or impossible.

CUSTOMER RESPONSIBILITIES

Access

The customer shall grant reasonable access to enable the City to inspect the water service facilities on the premises of the customer to ensure that the services conform to the requirements of MMC Chapter 13.04.

Connection between Meter and Point of Access

It is the customer's responsibility to maintain the connection between the meter and any point of access on the customer's property as stated in MMC Section 13.04.060.

Connection Fees

Extension of the water system to serve additional customers, properties, tracts, or subdivisions will be paid for by the individuals that are benefitting from the extension. The applicant (hereinafter "Applicant" or "Developer") for water service extensions are responsible for financing the entire cost of the extension(s). Costs paid by the applicant include but are not limited to the following:

- New system components and component installation.
- The replacement of existing system components when necessary for making the extension or improvement and upgrades to meet City standard requirements, such as fire flow, which are associated with the applicant's project.

In addition, each parcel owner is required to pay a connection fee outlined in Appendix C as required by the City.

All persons connecting to the City's water system shall pay, in advance of connection to the water system, a hookup and water meter service charge in accordance with the schedule set forth by resolution of the City Council.

A service connection initiated by application of an owner desiring to increase the size or change the location of an existing connection shall be deemed an original connection and

the cost of installation shall be borne by the owner of the premises served by such a connection. However, no additional connection fee will be charged.

Meter and Materials Requirements

All service connections to the City water system shall be metered. Water meters shall be sized to provide adequate domestic water service to the customer. Minimum water meter sizes shall be determined by the number of units being served and are summarized in Table 1-7.

TABLE 1-7

Minimum Meter Requirements

Number of Equivalent Residential Units (ERUs)	Size of Meter
1 – 2	3/4-Inch
3 – 5	1-Inch
6 – 10	1-1/4-Inch
11 – 20	1-1/2-Inch

All requests for water service to six or more units through a single meter shall be subject to approval by the City Council and shall be reviewed by the City Engineer. The City Engineer shall size all water service connections larger than 20 units.

Consent for Inspection, Maintenance, and Repair Service

Properly identified authorized employees of the water department shall have free access, at reasonable hours of the day, to all premises served by the City's water system for the purpose of inspecting these services to verify conformity with the Water System Plan as outlined in MMC Section 13.04.090. Access includes, but is not limited to, the following maintenance duties:

- Read meters.
- Connect or disconnect a water service connection.
- Inspect and repair a portion of the City's water system.
- Remove or install meters or other equipment, including customer-owned cross-connection control devices.

Connection Responsibility

No premises shall hereafter be connected to the City's water system unless there is a standard main owned by the City in a public right-of-way adjacent to the actual connection or within a dedicated easement conveyed to the City. All connections to the

City's water system shall conform to the Standard Specifications and the McCleary Municipal Code.

Design Standard Requirements

All new construction or additions to the City's water system will meet the design requirements adopted by the City Council, under recommendation of the City Engineer, in MMC Section 13.04.050.

COMPLAINTS

Policy for Dealing with Complaints

The City is required to document customer complaints and respond in a timely manner. The City generally receives complaints at City Hall in-person or in-writing or through customer contact with staff in the field. Telephone complaints are also received and logged by City staff at City Hall and forwarded to the appropriate staff person. Most complaints are minor and are addressed immediately.

Complaint Record Keeping

Telephone logs of complaints and written complaints are maintained at City Hall. The City utilizes a simple complaint form to document the complaint and the response to the complaint. Following documentation of the City response, the form is filed at City Hall. The City maintains a complaint and resolution file.

CHAPTER 2

BASIC PLANNING DATA

Basic planning data essential for the assessment of the requirements for City of McCleary Water System to meet future water demands is presented in this chapter. Information includes historical growth and water demands, population projections as established by the Office of Financial Management (OFM), and projections of future water demand. Information is used to evaluate the capability of the existing system and determine future needs based on projected trends for the next 20 years.

CURRENT SYSTEM DEMANDS

In this section current system demands are examined in terms of total production, production per capita, and sales per connection by customer class in the McCleary service area. This information is later used to project future water system demands and evaluate water use efficiency.

WATER PRODUCTION

McCleary has two active wells that provide source capacity for the water system. Monthly water production data is shown in Figure 2-1 in millions of gallons per month. Production by each well is differentiated by a different color fill in the bar graph with the total monthly production indicated by the total height of each bar. There are some months when one well or the other did not produce water.

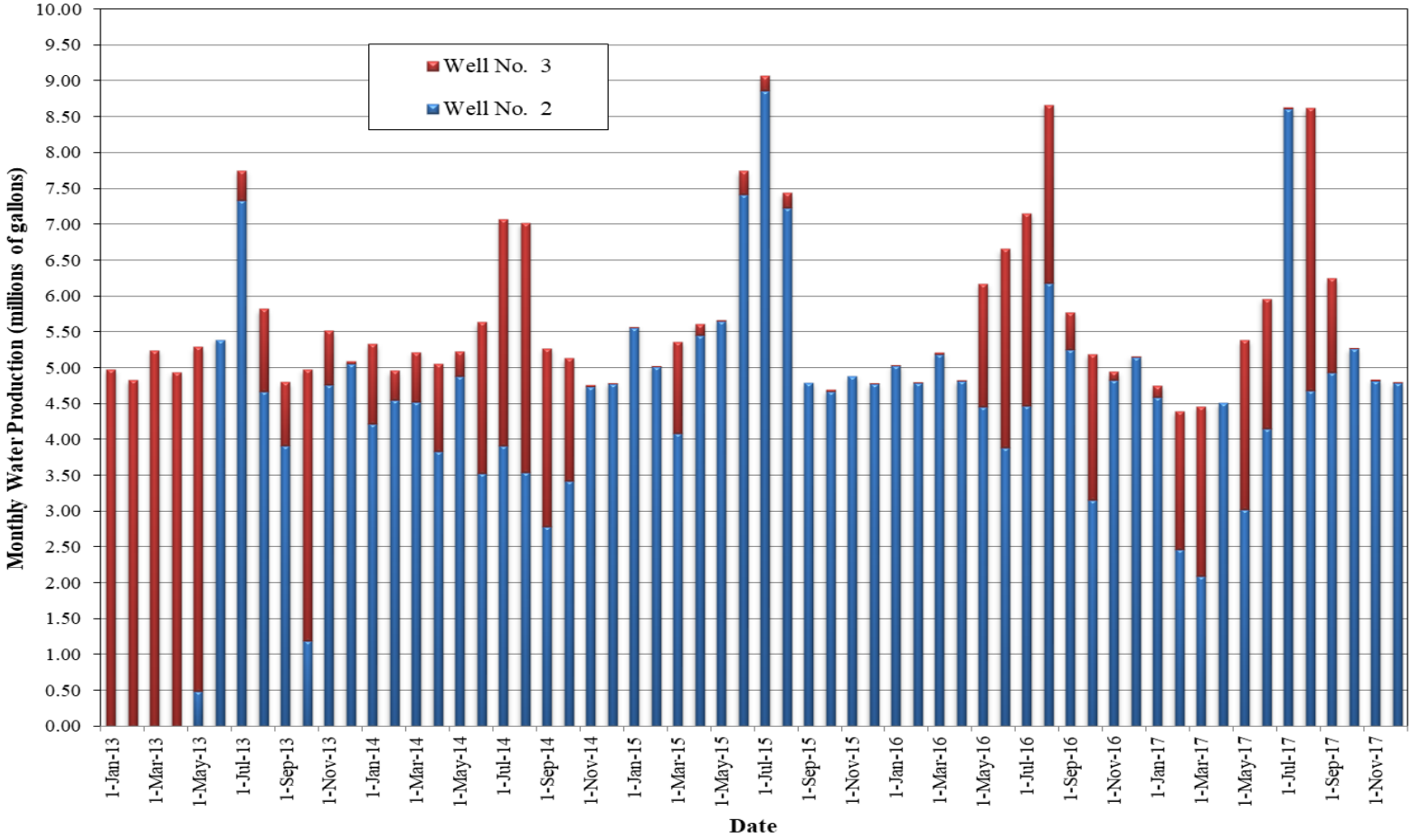


FIGURE 2-1

Monthly Production by Source

Total annual production per source is summarized in Table 2-1. Well 2 had the highest single year annual production at 68.4 MG in 2015. Well 3's highest production year was 2013 with 31.8 MG. Total average annual production for both wells over the 5-year period, 2013 – 2017 was 67.6 MG. Water production peaked in 2015.

TABLE 2-1

Total Annual Production by Source (Millions of Gallons)

Source	2013	2014	2015	2016	2017	Average
Well 2	32.8	48.7	68.4	57.2	53.9	52.2
Well 3	31.8	16.7	2.2	12.4	14.0	15.4
Total Production	64.6	65.4	70.6	69.6	67.8	67.6

TOTAL SERVICE CONNECTIONS

McCleary keeps records of water use by meter types: flatrate, commercial, less than 1-inch, equal to or greater than 1-inch, and 4-inch. There is a single 4-inch, which is located at the Wastewater Treatment Plant (WWTP). All of the meters less than 1-inch are residential. These less than 1-inch meters are furthered classified as being in-city and out of city. Table 2-2 shows the average number of service connections for each meter type.

TABLE 2-2

History of Service Connections by Meter Size

Meter Type	2013	2014	2015	2016	2017	Average
Flatrate	39	39	41	41	39	40
Commercial	34	35	35	35	36	35
Less than 1-inch (In City)	594	599	600	619	641	611
Less than 1-inch (Out of City)	26	26	27	27	27	27
1-inch and Greater	10	11	11	12	13	11
WWTP	1	1	1	1	1	1
No Service	0	0	0	0	0	0
Total	704	711	714	735	756	724

WATER SALES

Total Sales by Meter Size

McCleary maintains water billing records by meter type. Meters are read electronically on a monthly basis. The average number of meters for December 2017 was 756.

Average monthly water sales (in gallons) by meter type from January 2013 through December 2017 are summarized in Table 2-3.

TABLE 2-3

Total Average Monthly Water Sales by Meter Type (Gallons)

Meter Type	2013	2014	2015	2016	2017	Average
Flatrate	0	60	1,727	3,138	0	985
Commercial	146,253	242,621	181,090	187,808	175,814	186,717
Less than 1-inch (In City)	2,806,138	2,996,512	3,114,030	2,980,097	3,251,785	3,029,712
Less than 1-inch (Out of City)	117,035	135,480	160,877	135,482	126,979	135,170
1-inch and Greater	269,299	251,808	316,147	381,475	508,130	345,372
WWTP	869,559	1,074,104	879,904	1,017,051	692,264	906,576
No Service	5,794	569	1,355	5,112	9,390	4,444
Total	4,214,076	4,701,154	4,655,130	4,710,162	4,764,361	4,608,977

Monthly water sales by meter type from January 2013 through December 2017 are shown in Figure 2-2. The largest users of water by meter type are residential. The summer peaks are clearly defined in the data shown.

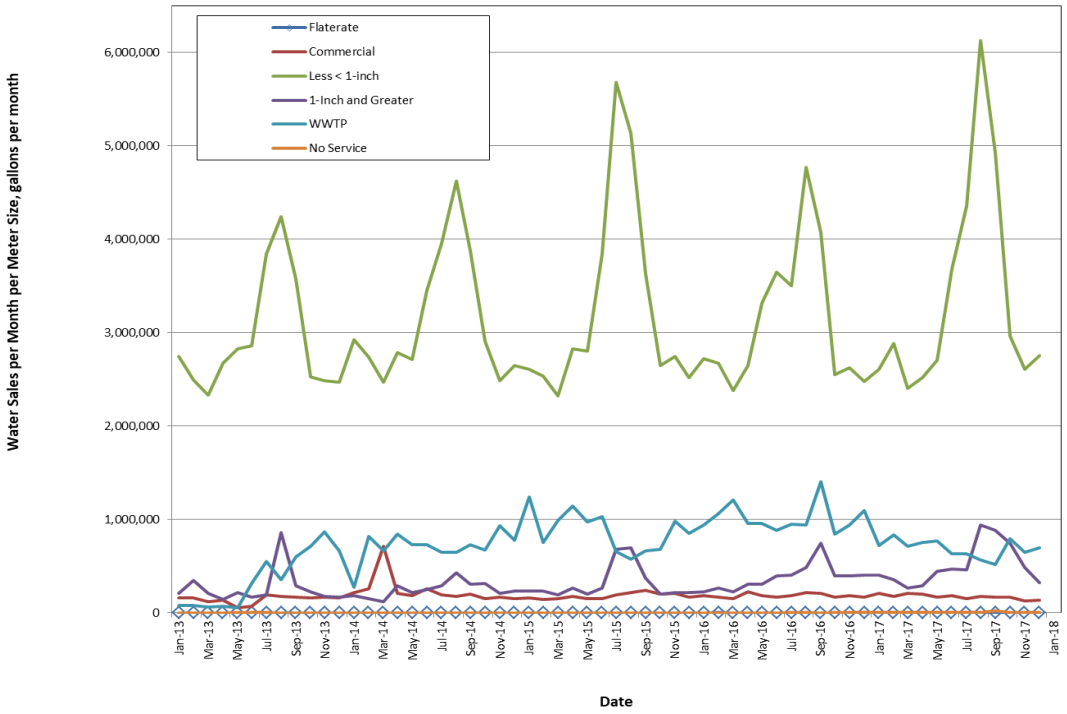


FIGURE 2-2

Average Monthly Water Sales in Gallons by Meter Type

Figure 2-3 shows average water sales per day per connection for each meter size. Trending demonstrates that use over the period is steady for meters less than 1 inch (residential) and commercial meters. Meters 1-inch and greater demonstrate a doubling in water use per meter from approximately 750 gpd to 1,500 gpd. There is only a single 4-inch meter in the system, located at the Wastewater Treatment Facility, and the trend over the period shows a significant increase until early 2016, then an equally significant decrease in water use. Residential water use is discussed in more detail below.

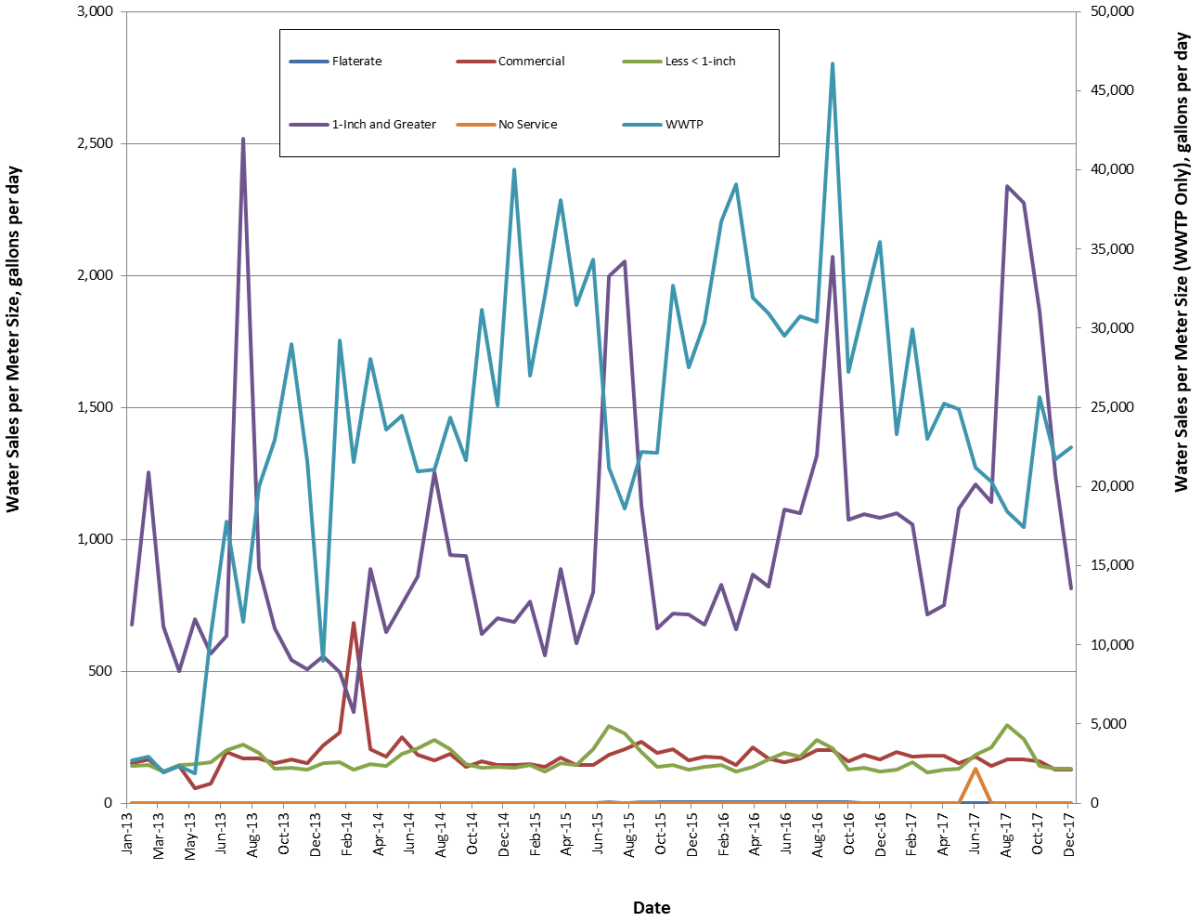


FIGURE 2-3

Daily Average Water Sales in Gallons by Meter Type

Due to the high water use rates of the large 4-inch WWTP meter, a different scale was added on the right-hand vertical axis for only that meter size to better show the other meter types. Figure 2-4 shows average metered daily water use for only meters less than 1-inch in size (residential meters). A linear trend line has been added which demonstrates the slight increase in water use per connection over the 5-year period from approximately 157 gallons per day per connection to approximately 169 gallons per day per connection.

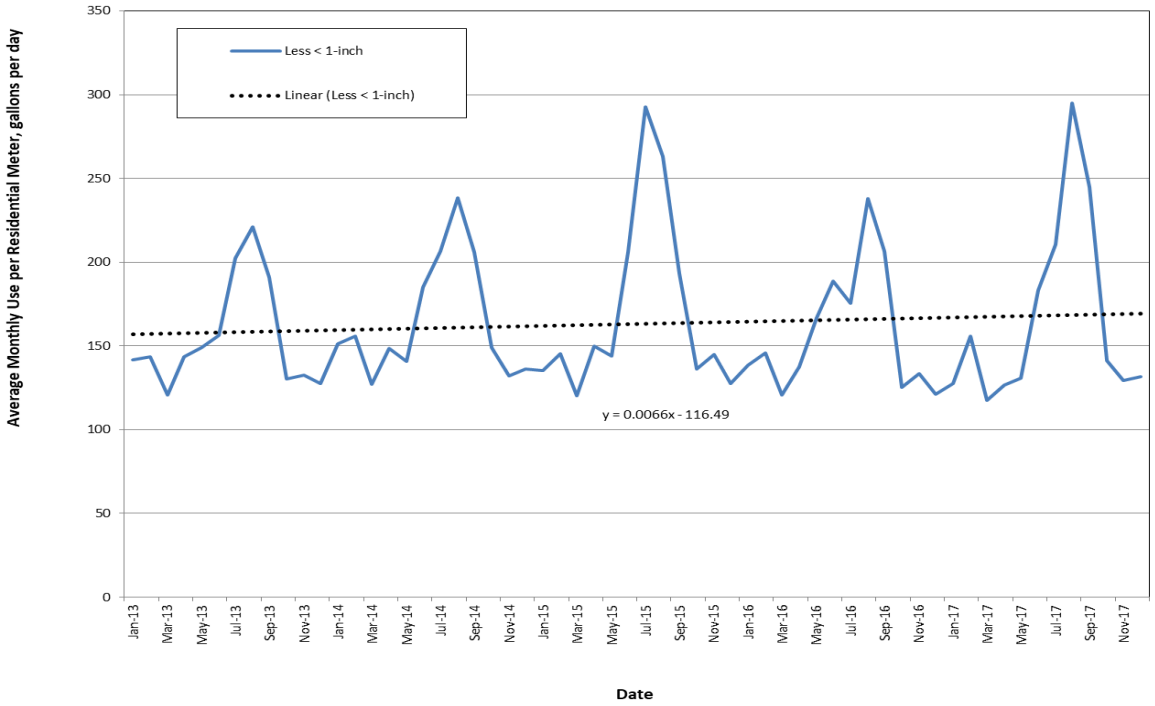


FIGURE 2-4

Average Daily Water Sales per Residential Meter

Minimum monthly average, maximum monthly average, and overall average daily water use in gallons per day per meter by meter type is summarized in Table 2-4 for years 2013-2017. The in-city and out-of-city meters less than 1-inch have been combined.

TABLE 2-4

Minimum, Maximum, and Average Daily Water Use by Meter Type (gpd per meter)

Water Usage	Flaterate	Commercial	Less than 1-inch	1-inch and Greater	WWTP	No Service
Minimum	0	58	118	345	1,883	0
Maximum	3	682	295	2,518	46,726	129
Average	1	177	163	984	24,116	2

DISTRIBUTION SYSTEM LEAKAGE

Distribution System Leakage (DSL) is defined in the Water Use Efficiency Rule as the difference between metered water into the distribution system and authorized water usage, including the sum of water sales, metered non-sale water usage, and estimated unmetered water usage. Monthly water production, authorized usage, and estimated DSL are shown in Figure 2-5. Linear trend lines indicate that water production and consumption are trending upwards while monthly authorized use and DSL are trending downwards for the 5-year reporting period.

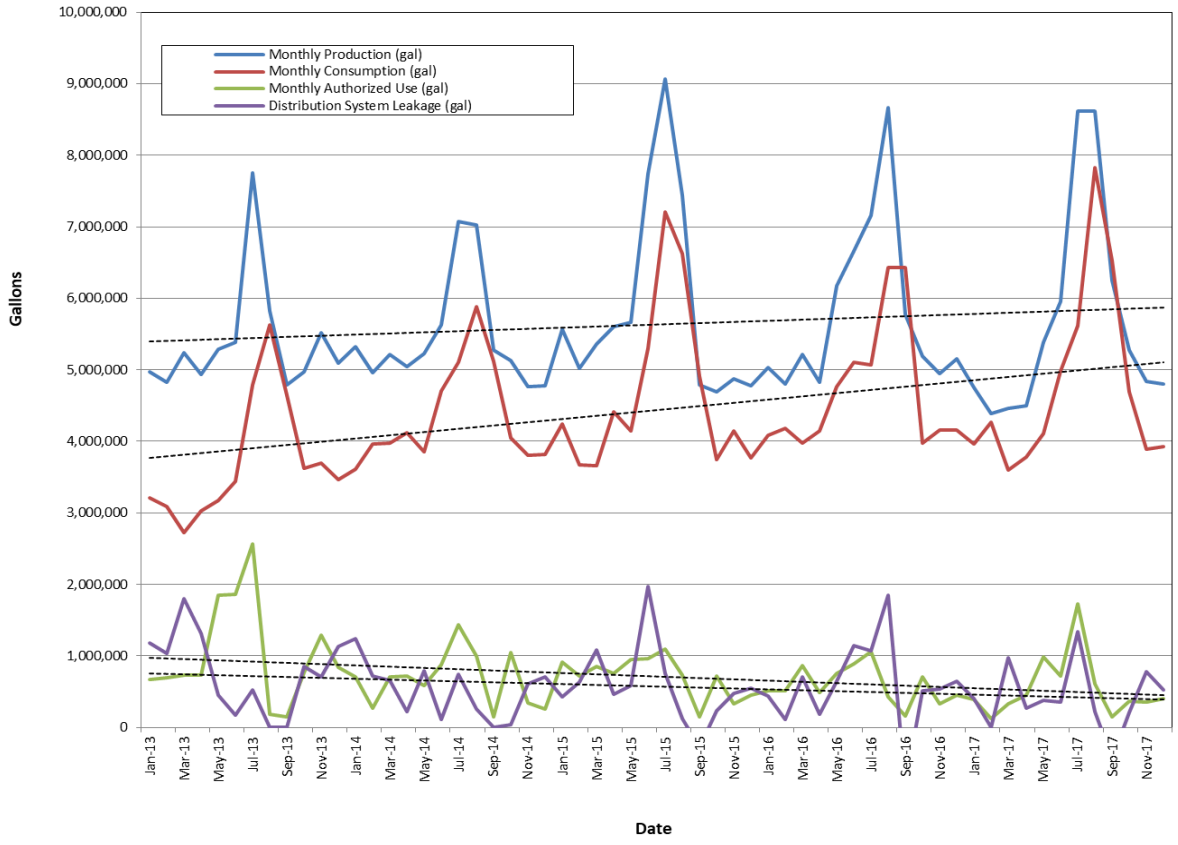


FIGURE 2-5

Production, Authorized Use and Distribution System Leakage

The Water Use Efficiency Rule sets a goal for the 3-year running average of DSL not to exceed 10 percent of water production. Annual total water production, consumption, authorized use (accounted for water usage), DSL, Percent DSL, and 3-year running average percent DSL are summarized in Table 2-5. The City's 3-year running average for DSL for the last 5 years is below 10 percent.

TABLE 2-5

Annual Water Production, Authorized Usage and DSL

Water Use Factor	2013	2014	2015	2016	2017	Average
Total Well Production	64,616,675	65,439,590	70,596,547	69,568,624	67,819,605	67,608,208
Total Metered Consumption	44,521,282	52,008,392	55,856,138	56,490,113	57,172,336	53,209,652
Accounted for Water						
Hydrant Flushing	6,075,242	3,021,901	3,248,427	2,828,251	1,670,875	3,368,939
Fire Department Training	458,160	405,260	349,260	294,260	162,380	333,864
Reservoir Inspection/Drain	1,722,000	380,000	300,000	-	475,000	575,400
Structure Fire	130,000	12,000	160,250	160,000	4,000	93,250
Illegal Burn	-	-	56,000	56,000	56,000	33,600
Well Testing	2,700,000	-	86,400	-	-	557,280
Pump to Waste	432,000	427,600	427,600	599,200	599,200	497,120
Backwash	773,800	972,300	1,386,500	1,189,500	1,019,500	1,068,320
Other[(1)]	59,300	2,867,138	2,630,153	2,038,576	2,627,439	2,044,521
Total Accounted for Water	12,350,502	8,086,199	8,644,590	7,165,787	6,614,394	8,572,294
DSL	7,744,891	5,344,999	6,095,819	5,912,724	4,032,875	5,826,261
Percent DSL	12.0%	8.2%	8.6%	8.5%	5.9%	8.6%
3-Yr Running DSL Average			9.6%	8.4%	7.7%	

(1) Other includes miscellaneous uses of water that the City staff record but have not been further differentiated here and include uses such as water for the chlorine analyzer operation, seasonal watering of City flower beds/pots, school triangle watering, dust suppression, equipment cleanup, Bear Festival road cleanup, line jetting etc.

WATER DEMAND FACTORS

Certain water system demand factors are critical in evaluating the system's requirements to meet demands. Following the DOH Water System Design Manual, demand factors are generally standardized on the basis of the Equivalent Residential Unit, or ERU. One ERU is roughly the equivalent demand of a single-family residential unit. Each residential unit has an average day demand (ADD) factor and a maximum day demand (MDD) factor. In addition, the water system as a whole has a peak hour demand (PHD) associated with the total number of ERUs being served by the system.

Equivalent Residential Unit

The Equivalent Residential Unit (ERU) is a method of evaluating water use based on the equivalent number of residences represented by various categories of water use. The value of an ERU is based on the average of the last five years of water use in the City. Residential connections are always counted as one ERU per residence, regardless of the

actual average water use by residential users in any given year. For planning purposes, the average residential water use rate for the 2013-2017 period of **163 gallons per day will represent the value of one ERU** (104,051gpd / 638 meters = 163 gpd per residential unit).

The value of 104,051 gpd was derived from Table 2-3 as the sum of the average monthly water sales for meters Less than 1-inch (In City) of 3,029,712 average gallons per month plus the Less than 1-inch (Out of City) of 135,170 average gallons per month for a total of 3,164,882 gallons per month. This value times 12 months equals 37,978,584 gallons per year, which is then divided by 365 days and equals 104,051 gallons per day.

The value of 638 meters was derived from Table 2-2 and is the sum of the average Less than 1-inch (In City) and the Less than 1-inch (Out of City) meters.

Maximum Day Production

Maximum day production data provided by the City of McCleary is summarized in Table 2-6. The date of maximum day production, the total water usage for that date, the annual average daily water production for the year, and the ratio of maximum day to average day are shown. Maximum day production includes water production from both wells. The maximum ratio of maximum day production to average daily water production was 4.00 in 2016. However, upon further investigation it was determined this excessive volume of production was the result of an operational decision to run the wells in manual mode all night. This resulted in overflowing the reservoir for an indeterminate period of time. Therefore, this maximum day has been discounted and the next highest maximum day has been used, which occurred on August 4, 2014. The minimum ratio is 2.33 in 2013. For planning purposes, a maximum day to average day ratio of 3.04 will be used.

TABLE 2-6

Maximum Day Water Production(1)

Maximum Day Date	Maximum Day Production, gpd	Annual Average Day, gpd	Maximum Day to Average Day Ratio
24-Jul-13	413,300	177,032	2.33
4-Aug-14	545,628	179,287	3.04
25-Aug-15	438,100	193,415	2.27
8-Jul-16	760,751	190,078	4.00(2)
25-Jul-17	507,700	185,861	2.73
Minimum			2.33
Maximum			3.04

(1) The Maximum Day Water Production quantities were taken from the Water Treatment Plant reporting forms.

(2) July 8, 2016 Maximum Day Production of 760,751 gallons was investigated due to its uncharacteristically high production volume. It was found to be an operational lapse. The wells were left in manual mode overnight and overflowed the reservoir. Therefore, this value has been discounted and is not being used as the maximum day.

Peak Hour Demand

The DOH Water System Design Manual provides a formula for estimating system Peak Hour Demand (PHD). The formula is as follows:

$$PHD = (MDD/1440)\,[(C)(N) + F] + 18$$

Where
- PHD = Peak Hourly Demand, (gallons per minute)
- C = Coefficient Associated with Ranges of ERUs
- N = Number of ERUs
- F = Factor Associated with Ranges of ERUs
- MDD = Maximum Day Demand, (gpd per ERU)

For systems with greater than 500 ERUs, C = 1.6 and F = 225. The value for MDD is the ADD value of 163 gpd per ERU times the MDD to ADD ratio of 3.04, which yields an MDD value of 496 gpd per ERU. Inserting the value of 496 gpd per ERU for MDD in the PHD formula, yields the following formula for Peak Hour Demand:

$$PHD = 0.55 \times N + 95$$

The above system demand factors are summarized in Table 2-7, below.

TABLE 2-7

Summary of Water System Demand Factors

Demand Factor	Value
Average Day Demand (ADD) per ERU, gpd	163
Maximum Day to Average Day Factor	3.04
Maximum Day Demand (MDD) per ERU, gpd	496
Peak Hour Demand (PHD) system-wide, gpm	0.55 x N + 95

CURRENT EQUIVALENT RESIDENTIAL UNITS

To apply the ERU factors to non-residential uses, it is necessary to assign an equivalent number of ERUs to the non-residential uses. Using the average residential water demands over the last 5-year period (163 gpd per ERU), the total ERUs served by the City is estimated in Table 2-8. Based on this evaluation, the City average water production equates to 1,136 ERUs (185,228 gpd / 163 gpd = 1,136 ERUs). In addition,

each Customer Class (meter type) is given an equivalent use as though it were a residential unit. That is, the average gallons per day for each customer class is divided by the average number of gallons used by an individual residential unit (163 gpd). Table 2-8 shows the ERU value for each customer class (meter type) based on data from 2013 through 2017.

TABLE 2-8

Average ERUs per Usage Class

Meter Type	Average Gallons per Year	Average Gallons per Day	Equivalent Residential Units (ERUs)
Flaterate	10,446	29	0
Commercial	2,240,606	6,139	38
Less than 1-inch(1)	37,978,593	104,051	638
1-inch and Greater	4,144,461	11,355	70
WWTP	8,798,596	24,106	148
No Service	36,951	101	1
Total Accounted For Water	8,572,294	23,486	144
DSL	5,826,261	15,962	98
Total	**67,608,208**	**185,228**	**1,136**

(1) Less than 1-inch includes both In City and Out of City usage and meters.

PROJECTED FUTURE POPULATION AND WATER DEMANDS

GROWTH RATE

Historic population growth in McCleary shown in Figure 2-6 translates to an approximate growth rate of 0.5 percent per year over the 46-year data period (1968 to 2014). This same rate of growth will be used to project the future rate of growth in the City.

HISTORIC POPULATION AND GROWTH RATES

To estimate future water resource and system facility needs it is important to estimate the future system growth rate. This is accomplished by a review of historic growth trends. The Washington State Office of Financial Management (OFM) provides Intercensal Population Estimates for cities and towns from approximately 1968 to 2014. Figure 2-6 shows the population of McCleary from 1968 to 2014. While there have been a few small population declines over the period, the data shows an overall trend of slow growth. The trendline indicates that the population has increased approximately 363 persons over the 46-year period, or 7.9 persons per year. This translates to approximately 0.5 percent growth per year.

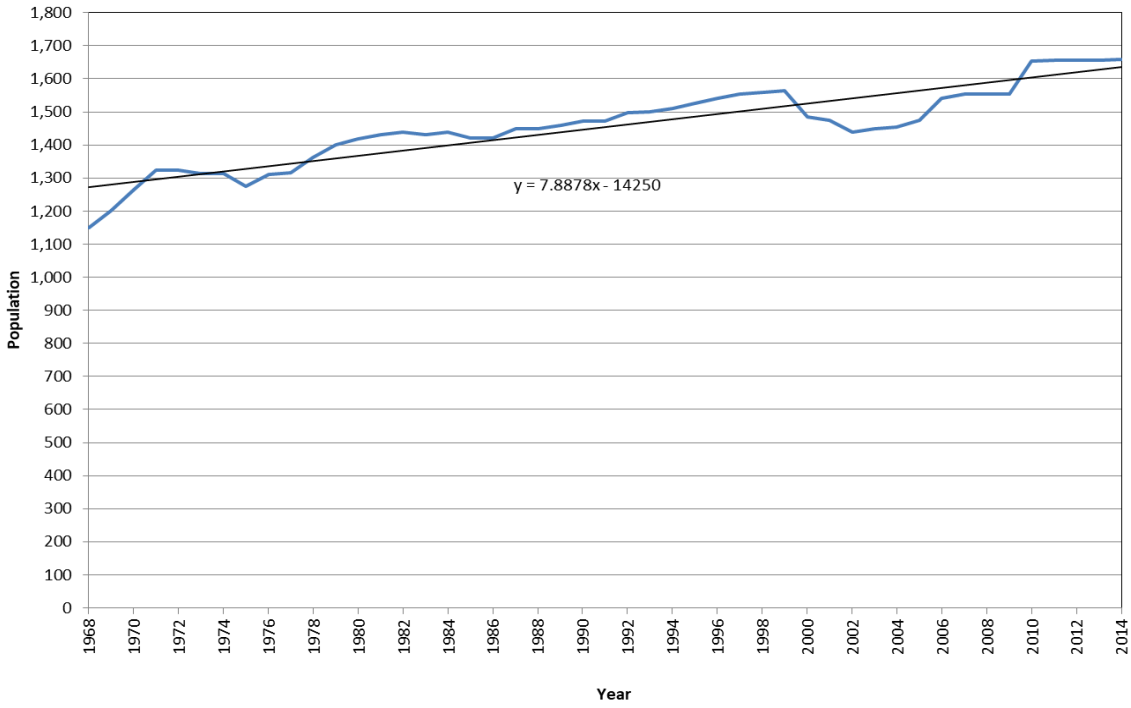


FIGURE 2-6

City of McCleary Population History

PROJECTED POPULATION

Based on the population estimate of 1,660 at of the end of 2014, and the estimated service area population annual growth of 0.5 percent, service area population is estimated to increase as shown in Table 2-9.

TABLE 2-9

Projected Population

Year	Service Area Population Projection
2018	1,692
2019	1,699
2020	1,707
2021	1,715
2022	1,723
2023	1,731
2024	1,739
2025	1,747
2026	1,755
2027	1,763
2028	1,770
2029	1,778
2030	1,786
2031	1,794
2032	1,802
2033	1,810
2034	1,818
2035	1,826
2036	1,834
2037	1,841

FUTURE SYSTEM DEMANDS

To project future water demands, ERUs are projected forward at an annual growth rate of approximately 0.5 percent from the estimated total of 1,136, which is the average for years 2013 and 2017 plus a future DSL rate of 8.6 percent. The future DSL rate of 8.6 percent is based on the average of the 3-year rolling average DSL rate from 2013 to 2017, presented in Table 2-5. Table 2-10 shows the City of McCleary's projected water demands. Annual demand in millions of gallons (MG) is projected as average day demand times 365 days per year divided by one million. Annual demand in acre-feet is annual demand in MG times 3.0689 acre-feet per MG.

TABLE 2-10

Projected Water Production

Year	ERUs[1]	Average Day Production, (gpd)[2]	Maximum Day Production, (gpd)[3]	Peak Hour Production, (gpm)[4]	Annual Production, (MG)[5]	Annual Production, (Ac-Ft)[6]
2018	1,142	186,094	566,273	723	67.92	208.5
2019	1,147	187,024	569,105	726	68.26	209.5
2020	1,153	187,959	571,950	729	68.61	210.5
2021	1,159	188,899	574,810	732	68.95	211.6
2022	1,165	189,844	577,684	736	69.29	212.7
2023	1,171	190,793	580,572	739	69.64	213.7
2024	1,176	191,747	583,475	742	69.99	214.8
2025	1,182	192,706	586,393	745	70.34	215.9
2026	1,188	193,669	589,325	748	70.69	216.9
2027	1,194	194,638	592,271	752	71.04	218.0
2028	1,200	195,611	595,233	755	71.40	219.1
2029	1,206	196,589	598,209	758	71.75	220.2
2030	1,212	197,572	601,200	762	72.11	221.3
2031	1,218	198,560	604,206	765	72.47	222.4
2032	1,224	199,552	607,227	768	72.84	223.5
2033	1,230	200,550	610,263	772	73.20	224.6
2034	1,237	201,553	613,314	775	73.57	225.8
2035	1,243	202,561	616,381	778	73.93	226.9
2036	1,249	203,573	619,463	782	74.30	228.0
2037	1,255	204,591	622,560	785	74.68	229.2

(1) ERUs are projected forward from the estimated total of 1,136 ERUs for the end of 2017 (average of 2013 and 2017), plus an assumed future DSL rate of 8.6 percent.

(2) Average Day Production is projected forward as ADD per ERU from Table 2-7 times the estimated ERUs for the given year.

(3) Maximum Day Production is projected forward as MDD per ERU from Table 2-7 times the estimated ERUs for the given year.

(4) Peak Hour Production is projected forward using the PHD formula from Table 2-7 and the estimated ERUs for the given year.

(5) Annual Production in MG is Average Day Production from this table times 365 days per year.

(6) Annual Production in Ac-Ft/Yr is Annual Production in MG times 3.0689 acre-feet per MG.

EFFECTS OF WATER CONSERVATION

It is anticipated that the value of an ERU will change as the water system grows. With promotion of water conservation, the water usage represented by an ERU may go down. Also, with the extension of new water mains and replacement of old water mains, the DSL rate may also decrease. This is discussed further in Chapter 4 of this Water System Plan. However, for projection of water system needs, it is more conservative to assume that water usage per ERU will not decrease.

CHAPTER 3

WATER SYSTEM ANALYSIS

OBJECTIVE

The objective of this chapter is to determine if system improvements are necessary to meet water quality standards and to meet projected demands. This chapter includes the following elements:

- System Design and Construction Standards
- Water Quality Analysis
- System Facilities Analysis
- Water System ERU Capacity Limits
- Water System Deficiencies

Based on these analyses, a summary of deficiencies and options to improve compliance with the required standards are identified. Project costs and prioritization of recommended improvements are presented in Chapter 8, Capital Improvement Program.

SYSTEM DESIGN AND CONSTRUCTION STANDARDS

The City of McCleary has adopted system design, water quality, and construction standards. These standards are summarized in the following sections.

DESIGN STANDARDS

Performance and design criteria typically address the sizing and reliability requirements for source, storage, distribution, and fire flow. WAC 246-290 contains general criteria and standards that must be followed in development of public water systems. In addition, the Washington State Department of Health (DOH) has published its 2009 Water System Design Manual that provides more specific guidance for water system design.

DOH relies on various publications, agencies and the utility itself to establish design criteria. The following gives a brief description of the most widely recognized performance and design standards.

WAC 246-290, Group A Public Water Systems, Washington State Department of Health (March 2012).

This is the primary drinking water regulation utilized by the Washington State Department of Health (DOH) to assess capacity, water quality, and overall compliance with drinking water standards.

Water Use Efficiency Rule, Washington State Department of Health (January 2007).

The Water Use Efficiency Rule is a collection of revisions to WAC 246-290. The revisions add and amend certain definitions, add Water Use Efficiency requirements to water system planning requirements and small water system management plans, add a new section requiring installation of water service meters, and add new sections on Water Use Efficiency Planning, including Purpose and Applicability, Water Use Efficiency Program, Distribution System Leakage Standard, Water Use Efficiency Goal Setting, and Water Use Efficiency Performance Reports.

Water System Design Manual, Washington State Department of Health (December 2009).

These standards serve as guidance for the preparation of plans and specifications for Group A public water systems in compliance with WAC 246-290.

Standard Specifications for Road, Bridge, and Municipal Construction, Washington State Department of Transportation, American Public Works Association (2014).

These standards include detailed specifications for materials and workmanship of a wide variety of public works projects, including installation of public water supply facilities and restoration or facilities impacted by water main construction and repair.

In addition, the City of McCleary has adopted the following standards for water system design and construction.

City of McCleary, Development Standards, (Adopted December 13, 2006, Revised November 18, 2009).

These standards include detailed specifications for materials and workmanship for installation of water main extensions, including piping installation details, thrust blocking, in-line valves, fire hydrants, air release valves, service connections of

various types, sample stations, blowoffs, metering vaults, backflow prevention, and pavement restoration applicable to developer extensions.

Design Criteria

Table 3-1 lists the suggested design criteria from the DOH Water System Design Manual and the City of McCleary policies with regard to each criterion for general facility requirements.

TABLE 3-1

General Facility Requirements

Standard	DOH Water System Design Manual (December 2009)	McCleary Water System Standard
Average Day and Maximum Day Demand	Average Day Demand (ADD) should be determined from previous metered water consumption and production data. Maximum Day Demand (MDD) should be determined by metered production.	Average day demand is **163 gpd/**ERU based on historical data. The maximum day to average day factor is 3.04 based on historical data. The maximum day demand is **496 gpd/**ERU based on historical data. Calculations are included in Chapter 2 of this Plan.
Peak Hour Demand	Peak hour demand is determined using the following equation: PHD = (MDD/1440)[(C)(N) + F] + 18 where C = Coefficient from DOH Table 5-1 N = Number of connections, ERUs F = Factor from DOH Table 5-1	Peak hour demand is determined by applying the DOH Water System Design Manual Formula where MDD=496, C=1.6, and F=225, which simplifies to the equation: **PHD=0.55 x N+95**
Fire Flow Standard	The minimum fire flow shall be determined by the local fire authority.	McCleary has adopted the International Fire Code (IFC).
Minimum System Pressure	The system should be designed to maintain a minimum of 30 psi in the distribution system under peak hour demand and 20 psi under fire flow conditions during MDD.	Same as DOH Standard.

TABLE 3-1 – (continued)

General Facility Requirements

Standard	DOH Water System Design Manual (December 2009)	McCleary Water System Standard
Maximum System Pressure	Regulations do not address maximum system pressure. The Water System Design Manual, Chapter 8, part 8.1.7, recommends that pressures should not exceed 100 psi. The International Building Code requires less than 80 psi in structures.	McCleary's goal is to maintain distribution system pressures below 100 psi.
Source	Source capacity must be able to meet maximum day demand. Source capacity should be able to replenish fire suppression storage in 72 hours while supplying MDD to the system.	Same as DOH Standard.
Reliability	Redundancy in all critical pumping systems. Backup power supply for all critical pumping systems.	Same as DOH Standard. McCleary does not have a backup power supply.
Storage	The sum of: Operational Storage Volume sufficient to prevent excessive pump cycling. Equalizing Storage $V_{ES} = (Q_{PH} - Q_S) * 150$ Standby Storage $V_{SB} = (2 * ADD * N) - t_m * (Q_S - Q_L)$ (with a 200 gpd/ERU minimum) Fire Suppression Storage V_{FSS} (if required) = NFF * T where ADD = Average Day Demand, gpd/ERU N = number of ERU's Q_{PH} = Peak Hour Demand, gpm Q_S = Capacity of all sources, excluding emergency sources, gpm Q_L = Capacity of largest source, gpm t_m = Daily pump source run time, min (using 1,440 min/day) NFF = Needed Fire Flow, gpm T = Fire flow duration, min	Same as DOH Water System Design Manual, using the formulas provided in the manual, Chapter 9.

TABLE 3-1 - (continued)

General Facility Requirements

Standard	DOH Water System Design Manual (December 2009)	McCleary Water System Standard
Minimum Pipe Sizes	The diameter of a transmission line shall be determined by hydraulic analysis. The minimum size of a distribution line shall be 6 inches in diameter, except for dead-end lines not providing fire flow and only as justified by a hydraulic analysis.	Minimum of 8 inches in diameter or 6 inches if the lines are looped. The only exception is a dead-end line with no possibility of future expansion (may be 2-inch diameter).
Reliability Recommen-dations	Sources capable of supplying MDD within an 18-hour period. Sources meet ADD with largest source out of service. Back-up power equipment for pump stations unless there are two independent public power sources. Provision of multiple storage tanks. Standby storage equivalent of ADD x 2, with a minimum of 200 gpd/ERU. Low and high level water storage alarms. Looping of distribution mains when feasible. Pipeline velocities not > 8 fps at PHD. Flushing velocities of 2.5 fps for all pipelines.	Same as DOH Water System Design Manual, Chapter 5.
Valve and Hydrant Spacing	Sufficient valving should be placed to keep a minimum of customers out of service when water is turned off for maintenance or repair. Fire hydrants on laterals should be provided with their own auxiliary gate valve.	Valve clusters located so each leg of main can be isolated. Maximum lateral hydrant spacing of 600 feet.

Fire Suppression Standards

The City of McCleary has adopted the International Fire Code (IFC) fire flow standards. However, the City of McCleary has limited fire flow capabilities within portions of its water system. The following fire-flow standards are applicable for buildings:

> The minimum fire-flow and flow duration requirements for one- and two-family dwellings having a fire-flow calculation area that does not exceed 3,600 square feet shall be 1,000 gallons per minute for one hour. Fire-flow and flow duration for dwellings having a fire-flow calculation area in excess of 3,600 square feet shall not be less than that specified in Table B105.1, located in Appendix D. A

reduction in required fire flow of 50 percent is allowed when the building is equipped with an approved sprinkler system.

Fire hydrant standards and spacing are provided in Section 301.2 of the City of McCleary Development Standards located in Appendix D.

Simpson Door Company, a large commercial employer located within the City of McCleary city limits has its own fire suppression system.

CONSTRUCTION STANDARDS

Construction Standards set forth the actual materials and construction standards that Contractors, developers, and the City must follow when constructing water system facility improvements. The McCleary Development Standards, including developer extension requirements, are included in a separate document entitled *City of McCleary Development Standards (revised November 18, 2009),* applicable sections are included in Appendix D.

WATER QUALITY STANDARDS

The McCleary Water System is a public water supply system regulated by the Washington State Department of Health Drinking Water Regulations, WAC 246-290, the latest edition of which is dated March 2012, as well as sections of the Code of Federal Regulation (CFR) Title 40, Parts 141 and 143, adopted by reference in WAC 246-290. A summary of the water quality regulations is included in Appendix H. Since the McCleary Water System is supplied by only groundwater sources, only the groundwater regulations apply.

WATER QUALITY ANALYSIS

The following sections evaluate the record of water quality for the McCleary Water System. Water quality analysis is divided into the categories of Source Water Quality, Delivered Water Quality, Water Quality Reporting/Monitoring, and Water Quality Complaints. Water quality standards that apply to McCleary's wells are included under Source Water Quality. Water quality standards that apply to the water distribution system, including coliform, lead and copper, disinfectant byproducts, and asbestos are discussed under the heading of Delivered Water Quality. A review of water quality reporting requirements, relative to water quality monitoring completed, is included under the heading Water Quality Reporting/ Monitoring, and a review of water quality problems and complaints is included under the heading, Water Quality Complaints. Appendix H includes a summary of the Water Quality Standards and a summary of McCleary's water quality sampling exceedance results on record.

SOURCE WATER QUALITY

As described in Chapter 1, the McCleary Water System has two well sources. Both sources are chlorinated. Each source is also treated with an oxidation/filtration process for iron and manganese oxidation and removal. When both sources run simultaneously, only one source is treated and water quality objectives are obtained through blending of sources.

Inorganic Chemical and Physical Water Quality

General IOC Tests

Inorganic chemical (IOC) and physical water quality monitoring results for the most recent McCleary Water System sampling is summarized in Table 3-2. The Maximum Contaminant Level (MCL) for all inorganic chemical and physical water quality parameters for which there are MCLs are listed in the right hand column. Table 3-2 shows no exceedances of inorganic water quality standards in the samples taken most recently for each well. NOTE: samples are collected after treatment. **Therefore, the City of McCleary is in compliance with the standards for Inorganic Contaminants.**

TABLE 3-2

Inorganic Chemical Sampling Results

Source Number	S-02	S-02	S-03	S-03	
Well Number	Well 2	Well 2	Well 3	Well 3	
Sample Date	11/06/07	09/10/13	11/06/07	12/09/13	MCL
Primary Contaminants – All results mg/L[(1)] unless otherwise noted					
Antimony	<0.005	<0.003	<0.005	<0.003	0.006
Arsenic	<0.002	<0.001	<0.002	0.002	0.010
Barium	<0.100	<0.010	<0.100	<0.010	2.000
Beryllium	<0.003	<0.0003	<0.003	<0.0003	0.004
Cadmium	<0.002	<0.0001	<0.002	<0.0001	0.005
Chromium	<0.010	<0.007	<0.010	<0.007	0.100
Copper	<0.020	"[(2)]	"	"	1.3[(3)]
Cyanide	<0.050	<0.010	<0.050	<0.010	0.200
Fluoride	<0.200	"	"	"	4.00[(4)]
Lead	<0.002	0.001	<0.002	0.001	0.015[(3)]
Mercury	<0.0005	<0.0002	<0.0005	<0.0002	0.002
Nickel	<0.040	<0.005	<0.040	<0.005	0.100
Nitrate-N	<0.200	"	"	"	10.00
Nitrite-N	<0.200	<0.100	<0.200	<0.100	1.00

TABLE 3-2 – (continued)

Inorganic Chemical Sampling Results

Source Number	S-02	S-02	S-03	S-03	
Well Number	Well 2	Well 2	Well 3	Well 3	
Sample Date	11/06/07	09/10/13	11/06/07	12/09/13	MCL
Selenium	<0.005	<0.002	<0.005	<0.002	0.050
Sodium	10.000	14.000	17.000	12.000	20(5)
Thallium	<0.002	<0.001	<0.002	<0.001	0.002
Total Nitrite/Nitrate	<0.400	"	"	"	10.00
Turbidity (NTU)	0.200	0.200	0.400	<0.100	--(6)
Chloride	13.000	28.000	30.000	27.000	250.0
Fluoride	<0.200	"	"	"	2.00(4)
Iron	<0.100	"	0.280	<0.100	0.300
Manganese	0.080	0.010	0.130	<0.010	0.050
Silver	<0.010	"	"	"	0.100
Sulfate	3.000	1.000	"	<1.000	250.0
Zinc	<0.200	"	"	"	5.00
Color (color units)	<5.000	"	"	"	15.00
Conductivity (µmho/cm)(7)	176.000	220.000	238.000	194.000	700.0
Hardness (as $CaCO_3$)	76.000	78.000	0.000	78.000	None

(1) mg/L indicates milligrams per liter. A milligram is one thousandth of a gram and one liter of water weighs approximately one thousand grams, so one mg/L is equivalent to one part per million (ppm).

(2) Ditto mark (") indicates "same as last value to the left".

(3) The standards for Lead and Copper are distribution system action levels based on 90th percentile distribution sample values.

(4) Fluoride has both a primary and a secondary MCL. Concentrations above the secondary MCL (2.0 mg/L) cause aesthetic problems, while concentrations above the primary MCL (4.0 mg/L) are a public health concern.

(5) Sodium does not actually have an MCL, but EPA has established a level of 20 mg/L as a level of concern for individuals on low sodium diets.

(6) The turbidity MCL applies only to untreated surface water sources. Since the McCleary Water System is fed exclusively by groundwater, turbidity requirements do not apply.

(7) A µmho is a micro-mho, or 1 millionth of a mho (pronounced "mō"). A mho is a unit of electrical conductance, the inverse of an ohm, a unit of electrical resistance. One mho of electrical conductance is capable of transmitting 1 amp of electrical current across a potential of 1 volt. One µmho of conductance will transmit 1 millionth of an amp (1 micro-amp) at 1 volt, or 1 amp at 1 million volts (one megavolt).

Annual Nitrate Tests

IOC samples include annual nitrate samples at the entry point to the distribution system. NO_3 is always monitored annually and is not dependent on any other rule or sampling schedule. Table 3-3 summarizes the results from the last individual nitrate sampling

conducted for each active source. **All nitrate test results are well below the MCL of 10 mg/L, so the City of McCleary is in compliance with the standard for nitrate.**

TABLE 3-3

Nitrate Monitoring Results(1)

Source	Well No.	10/10/2017	9/8/2015	8/19/2014	11/13/2012	08/02/2011
S-01(2)	2 and 3	<0.20	<0.20	<0.20	--	--
S-02	2	--	--	--	--	--
S-03	3	--	--	--	<0.20	<0.20

Note: The MCL for Nitrate is 10 mg/L

(1) All sample results are mg/L.

(2) S-01 is a wellfield comprised of Wells 2 and 3 (S-02 and S-03).

Radionuclides

Results of all radionuclide testing since April 2003 are shown in Table 3-4. **All radionuclide samples are well below their respective MCLs; therefore, the City of McCleary is in compliance with all radionuclide standards.**

TABLE 3-4

Test Results for Radionuclides(1)

Date	Analyte	Source No.			MCL (pCi/L)
		S-01	S-02	S-03	
07/20/2010	Gross Alpha	<3.0	--	--	15.0
	Radium 228	<1.0	--	--	5.0
10/26/2009	Gross Alpha	<3.0	--	--	15.0
	Radium 228	<1.0	--	--	5.0
03/14/2006	Radium 228	--	<1.0	<1.0	5.0
05/10/2005	Radium 228	--	<1.0	<1.0	5.0
04/28/2003	Gross Alpha	--	ND(3)	ND	15.0

(1) All radionuclide test results are picocuries per liter (pCi/L).

(2) S-01 is a wellfield comprised of Wells 2 and 3 (S-02 and S-03).

(3) ND signifies the parameter was Not Detected.

Volatile Organic Chemicals

Source Volatile Organic Chemicals (VOC) samples were collected on the dates indicated in Table 3-5 and included all sampling since October 2004. No VOCs were detected either above the Maximum Contaminant Level (MCL) or State Reporting Limit (SRL) in

any of the source VOC samples. **Therefore, the City of McCleary is in compliance with the standards for VOCs.**

TABLE 3-5

VOC Sampling History

Source Number	S-01[(1)]	S-02	S-03
Well Number(s)	2 and 3	2	3
12/17/2013	NE[(2)]		
09/10/2013		NE[(2)]	
09/24/2012	NE[(2)]		
05/22/2012	NE[(2)]		
10/26/2009	NE[(2)]		
08/14/2006			NE[(2)]
10/05/2004			NE[(2)]

(1) S-01 is a wellfield comprised of Wells 2 and 3 (S-02 and S-03).
(2) NE signifies the parameter did Not Exceed either the MCL or State Reporting Limit.

Synthetic Organic Chemicals

Synthetic Organic Chemicals (SOC) samples taken by the City of McCleary are summarized in Table 3-6. The dates that are shown are the most recent samples taken for that particular panel. No SOCs were detected either above the Maximum Contaminant Level (MCL) or State Reporting Limit (SRL) in any of the source SOC samples. **Therefore, the McCleary Water System is in compliance with the standards for SOCs.**

TABLE 3-6

SOC Sampling History

Source Number	S-01	S-02	S-03
Well Number(s)	2 and 3	2	3
Panel	Sample Collection Date		
Insecticide	--	07/12/2006	07/12/2006
Herbicide	10/26/2009	07/12/2006	07/12/2006
Pesticide	10/26/2009	07/12/2006	07/12/2006

DELIVERED WATER QUALITY

Delivered water quality applies to a number of water quality monitoring requirements of the water distribution system. Monitoring of delivered water quality is necessary because some water quality parameters have been demonstrated to change in the distribution

system, or even in the plumbing of buildings. The following sections summarize delivered water quality monitoring by the City of McCleary.

Coliform Bacteria Monitoring

WAC 246-290-300(3) sets distribution system coliform monitoring requirements, and WAC 246-290-310(2) sets coliform bacteria maximum contaminant levels. In general, a coliform MCL violation occurs when two or more coliform samples in one sampling period have detectable coliform bacteria. An Acute MCL occurs if any of the coliform positive samples are positive for Fecal Coliform or E. Coli. A Non-Acute MCL occurs when none of the coliform positive samples are positive for Fecal Coliform or E. Coli.

The number of coliform samples required per monitoring period is based on the population served during the monitoring period. Each monitoring period is a calendar month. The City of McCleary is required to take three distribution system coliform samples each month except in July and August, when only two coliform samples are required. As the population grows, the monitoring requirements will also increase.

On April 1, 2016, a Revised Total Coliform Rule replaced the original Total Coliform Rule. It requires systems vulnerable to contamination to find and fix problems and pathways that could allow pathogens to enter the distribution system. It requires water systems to assess their entire system – from sample collection point to source of supply and submit an assessment report to DOH within 30 days after a specific "trigger" event. There are two levels of assessment: a Level 1 Assessment is triggered by lower-risk events and a basic water system evaluation can be performed by anyone familiar with the water system. A Level 2 Assessment is triggered by a confirmed E. coli or repeated total coliform contamination. A detailed evaluation is required and must be performed by an individual with specific state-required qualifications.

The key provisions of the Revised Total Coliform Rule include:

- Began April 1, 2016 for all water systems.
- Maintains the coliform monitoring schedule on the system's WFI form.
- Requires assessments and corrective actions.
- Changes the Acute Maximum Contaminant Level (MCL to E. coli MCL and removes Non-Acute MCL.
- Requires updating or revising coliform monitoring plans.
- Changes monitoring, reporting, and public notification requirements.
- Requires startup procedures for seasonal systems.

A copy of the City of McCleary's updated Coliform Monitoring Plan (CMP) to reflect the Revised Total Coliform Rule is included in Appendix I.

The distribution coliform monitoring record since 2000 was reviewed for this Plan. In the record that was reviewed, there were three positive coliform samples for the period, occurring in August 2000, October 2002, and March 2008. In each case, follow-up coliform samples indicated no presence of coliform. Therefore, none of the three positive coliform test results represent an MCL violation, since no sampling period included two or more samples with detectable coliform bacteria. However, the March 2008 sampling indicated a presence of both Total Coliform and E. Coli, which signals an Acute MCL violation. **Since March 2008, the City of McCleary has been in compliance with the coliform standards.**

Disinfectant Byproduct Monitoring

Disinfectant byproducts include Total Trihalomethanes (TTHMs) and five different species of Haloacetic Acids (HAA5). Samples are required to be taken for disinfection by-products at a variety of points in the distribution system. A copy of McCleary's Disinfectant Byproduct (DBP) Monitoring Plan is located in Appendix I.

Required sampling under the Stage 1 DBP rule began in 2004. Under the Stage 1 rule, systems were able to average the results for all sample locations in order to meet the MCL for each regulated DBP. The Stage 2 rule requires that each individual sample location meet the running annual average MCL. The Stage 2 rule states the system must meet 80 µg/L and 60 µg/L as the Locational Running Annual Averages (LRAAs) for TTHMs and HAA5s, respectively. Systems were required (unless waived) to identify new high TTHM and HAA5 locations by conducting an Initial Distribution System Evaluation (IDSE). The rule also requires population-based monitoring for all systems, with an allowance for reduced monitoring if initial monitoring averages less than half the MCLs for TTHM and HAA5. The compliance date with the Stage 2 DBPR monitoring for systems serving less than 10,000 people was October 1, 2013. According to 40 CFR 141.621(a)(2), ground water systems serving between 500 and 9,999 people have an initial sampling frequency of two samples per year during the month of highest DBP concentrations. Sampling must include dual samples at each monitoring location.

Table 3-7 shows the number of DBP samples collected from the distribution system since 2007. Results for TTHMs over that period ranged from less than 0.5 µg/L to a high of 13.3 µg/L. Results for HAA5s over the same period were always measured at less than 15.0 µg/L, which was the State Reporting Limit. No samples were above the Maximum Contaminant Level (MCL). **Therefore, McCleary is in compliance with the DBP rule.** It appears that the sampling locations include four unique sites rather than two locations, each with two samples.

TABLE 3-7

TTHM and HAA5 Sampling History

Date	Sample Location	Number of TTHM samples	Number of HAA5 samples
09/26/2017	Distribution	1	1
08/23/2016	Distribution	1	1
09/8/2015	Distribution	1	1
09/02/2014	Distribution	1	1
09/10/2013	Distribution	4	4
10/05/2010	Distribution	1	1
10/09/2007	Distribution	1	1

Asbestos

Asbestos fibers are measured as million fibers per liter, greater than 10 micrometers in length (MFL>10 μm). The MCL is 7 MFL>10 μm. WAC 246-290-300(2)(b)(v) requires distribution system monitoring for asbestos in accordance with 40 CFR 141.23(b). The Federal regulation requires one sample during the first 3 years of each 9-year sampling cycle, unless the state grants a waiver to asbestos sampling based on a demonstrated lack of vulnerability to asbestos in both the source water and the distribution system. If an asbestos sample is required, it is to be taken under conditions where asbestos contamination is most likely to appear.

A sample was collected in December 2010 from the distribution system. The result from the sample was less than 0.1290 MFL, which is well below the 7 MFL MCL. **Therefore, McCleary is in compliance with the asbestos standard.**

Lead and Copper Monitoring

Lead and copper monitoring are conducted to determine if lead or copper are leaching out of waterlines at a rate that produces concentrations that are a health concern. The rule requires that 90 percent of the representative samples do not exceed the action levels for either lead or copper. If more than the allowable number of samples exceed the action level for either lead or copper, then the water system must take action to reduce the corrosivity of the water, or take other actions such as water service line replacement, to reduce the level of lead and copper at the tap. The action level for lead is 0.015 mg/L and the action level for copper is 1.3 mg/L.

McCleary's last lead and copper samples were collected in September 2016 from service connection taps within the water distribution system. At that time, a total of 10 samples were collected from the water system.

Table 3-8 summarizes McCleary's lead and copper monitoring results. **The data shows that McCleary is in compliance with the lead and copper standards.**

TABLE 3-8

Lead and Copper Monitoring Results

Constituent	Sample Date	90th Percentile Level	Highest Level	Action Level
Lead, mg/L	Aug/Sept 2016	0.002	0.007	0.015
Copper, mg/L	Aug/Sept 2016	0.16	0.24	1.3

WATER QUALITY REPORTING/MONITORING

WAC 246-290-72001 requires the water system to distribute a Consumer Confidence Report (CCR) annually to each customer. In 2019, McCleary issued a report titled, *City of McCleary Consumer Confidence Report 2019* that directed the public to contact McCleary City Hall to review water testing results (Appendix G). The City of McCleary will continue to issue a CCR to its customers annually as it has done in the past.

Water quality monitoring is required for regulatory compliance and to monitor water system conditions. The DOH distributes a Water Quality Monitoring Schedule (WQMS) that defines monitoring schedules and sampling locations for each water purveyor. Table 3-9a provides the 2018 monitoring schedule for the McCleary Water System. Table 3-9b provides the required monitoring schedule for the years following. Appendix H includes a copy of the Water Quality Monitoring Schedule for the upcoming years.

TABLE 3-9a

McCleary Water System Water Quality Monitoring for 2018

Monitoring Required	Sample Location	Month
Total Trihalomethane (THM)	Distribution	September
Halo-Acetic Acids (HAA5)	Distribution	September
Bacteriological	Distribution	2 samples monthly (July and August) and 3 every other month
Nitrate	Source (S-01)	October
Herbicides	Source (S-01)	October

TABLE 3-9b

McCleary Water System Water Quality Monitoring Schedule 2018

Monitoring Required	Sample Location	Schedule/Status
Lead/Copper	Distribution	One set of 10 samples by August 2019
Asbestos	Distribution	Collect one sample by October 2019
Bacteriological	Distribution	Two samples each in July and August and three every other month/Refer to WFI (Appendix A)
Volatile Organics (VOC)	Source (S-01)	One sample by October 2019
Iron	Source (S-01)	One sample by May 2019
Manganese	Source (S-01)	One sample by June 2019

WATER QUALITY COMPLAINTS

McCleary responds to customer complaints as soon as possible. Telephone calls are returned promptly to determine the nature of the complaint. If additional action is required, the complaint is logged on that customer's billing record. A "Service Order" is generated by a customer service representative. The "Service Order" is filed after the field personnel respond to the complaint and indicate corrective action has been completed. "Service Orders" are kept on file for a minimum of 1 year from the initial complaint.

Prior to completion of the Water Treatment Plant, complaints regarding water discoloration and sulfurous smelling water (both hot and cold) were recorded weekly. Following completion of the new Water Treatment Plant, complaints have been reduced regarding discoloration and sulfurous smelling water (hot only) to two or three times annually.

SYSTEM FACILITIES ANALYSIS

The following sections evaluate the existing water system facilities in terms of their capacities, physical conditions, and performance capabilities. Facilities are evaluated relative to existing and projected requirements based on growth and demand projections from Chapter 2.

SOURCE OF SUPPLY

A description of McCleary's source of supply was presented in Chapter 1. The City of McCleary operates two source wells, Well 2 and Well 3, with a current pumping capacity of 400 gpm and 500 gpm, respectively. The existing sources are equipped to produce a maximum of 1,296,000 gpd. Wells 2 and 3 were rehabilitated in 2012 and 2013, respectively. The rehabilitation included new motors and pumps for each well,

mechanical cleaning of each well, sonic cleaning of Well 2, and a new section of well screen for Well 3.

According to Department of Health Design Standards, source production capacity at a minimum must be sufficient to supply maximum day demands. Maximum day and average day demands must also comply with the maximum instantaneous and maximum annual withdrawal limitations of associated water rights.

Water Rights Analysis

A summary of McCleary's existing water rights is provided in Table 1-4 of Chapter 1. McCleary has a total instantaneous water right capacity of 1,100 gpm and an annual primary water right capacity of 320 acre-ft/yr. Supplemental annual withdrawal expands the right to a total of 673 acre-ft/yr. An analysis of McCleary's instantaneous water rights versus current source pumping capacity is presented in Table 3-10 and an analysis of McCleary's annual water rights versus annual pumping history is presented in Table 3-11. This analysis is based on existing water rights. McCleary's Water Rights Self-Assessment form is included in Appendix B. While Well 1 has been decommissioned, the City does retain the water rights associated with the well and has filed a "Showing of Compliance Declaration" to use these rights on Wells 2 and 3.

TABLE 3-10

Instantaneous Production Capacity versus Water Right Analysis

Source	Current Pumping Capacity (gpm)	Maximum Instantaneous Withdrawal Permitted by Existing Water Rights (gpm)	Water Right Surplus/ (Deficit), (gpm)
Well 1	0(1)	200	200
Well 2	400	400	0
Well 3	500	500	0
Total	**900**	**1,100**	**200**

(1) Well 1 has been decommissioned but the City of McCleary retains the water rights for this well for use with Wells 2 and 3.

McCleary has total annual water rights of 673 acre-ft/yr.

TABLE 3-11

Annual Production Capacity versus Water Right Analysis

Source	Annual Withdrawal (acre-ft/yr)	Annual Withdrawal Permitted by Existing Water Rights (acre-ft/yr)	Water Right Surplus/(Deficit) (acre-ft/yr)	Supplemental Annual Water Rights (acre-ft/yr)
Well 1	0	320	320	--
Well 2	160.2(1)	(2)	(2)	640
Well 3	47.3(1)	(2)	(2)	673
Total	**207.5**	**673**	**465.5**	**673**

(1) Average from five years of water use (2013 – 2017).

(2) Water Right G2-*06087CWRIS states that the total withdrawal under all existing water rights shall not exceed 673 acre-ft/yr.

Table 3-12 shows projected maximum day production in 18 hours of pumping versus the existing instantaneous water rights.

TABLE 3-12

Projected Instantaneous Water Right Analysis

Year	Projected Maximum Day Production (gpm)(1) (18 hours of pumping)	Existing Instantaneous Water Rights (gpm)	Instantaneous Water Rights Surplus/(Deficit), gpm (18 Hours of Pumping)
2018	524	1,100	576
2019	527	1,100	573
2020	530	1,100	570
2021	532	1,100	568
2022	535	1,100	565
2023	538	1,100	562
2024	540	1,100	560
2025	543	1,100	557
2026	546	1,100	554
2027	548	1,100	552
2028	551	1,100	549
2029	554	1,100	546
2030	557	1,100	543

TABLE 3-12 – (continued)

Projected Instantaneous Water Right Analysis

Year	Projected Maximum Day Production (gpm)[(1)] (18 hours of pumping)	Existing Instantaneous Water Rights (gpm)	Instantaneous Water Rights Surplus/(Deficit), gpm (18 Hours of Pumping)
2031	559	1,100	541
2032	562	1,100	538
2033	565	1,100	535
2034	568	1,100	532
2035	571	1,100	529
2036	574	1,100	526
2037	576	1,100	524

(1) Projected Maximum Day Production is from Table 2-10.

Table 3-12 shows that McCleary is projected to have sufficient instantaneous water rights throughout the 20-year planning period when pumping 18 hours per day.

Table 3-13 compares the projected average annual withdrawal requirement (projected average day demand) with existing annual water rights.

TABLE 3-13

Projected Average Annual Withdrawal Water Right Analysis

Year	Projected Annual Production[(1)]		Permitted Annual Withdrawal (acre-ft)	Projected Surplus/ (Deficit) (acre-ft)
	(MG)	(acre-ft)		
2018	67.92	208.5	673	464.5
2019	68.26	209.5	673	463.5
2020	68.61	210.5	673	462.5
2021	68.95	211.6	673	461.4
2022	69.29	212.7	673	460.3
2023	69.64	213.7	673	459.3
2024	69.99	214.8	673	458.2
2025	70.34	215.9	673	457.1
2026	70.69	216.9	673	456.1
2027	71.04	218.0	673	455.0
2028	71.40	219.1	673	453.9
2029	71.75	220.2	673	452.8

TABLE 3-13 – (continued)

Projected Average Annual Withdrawal Water Right Analysis

Year	Projected Annual Production[(1)] (MG)	Projected Annual Production[(1)] (acre-ft)	Permitted Annual Withdrawal (acre-ft)	Projected Surplus/ (Deficit) (acre-ft)
2030	72.11	221.3	673	451.7
2031	72.47	222.4	673	450.6
2032	72.84	223.5	673	449.5
2033	73.20	224.6	673	448.4
2034	73.57	225.8	673	447.2
2035	73.93	226.9	673	446.1
2036	74.30	228.0	674	446.0
2037	74.68	229.2	675	445.8

(1) Projected Annual Production is from Table 2-10.

As shown in Table 3-13, McCleary is not projected to require additional annual water rights within the 20-year planning period.

Source Capacity Analysis

The Water System Design Manual published by DOH, requires that source production capacity meet or exceed maximum day demands of the water system. The Department of Health recommends that source(s) capacity is capable of supplying maximum daily demands within an 18-hour period. Table 3-14 summarizes the projected maximum daily demands in million gallons per day (mgd) versus available source capacity in both 24 hours and 18 hours of pumping. The source capacity of 0.972 mgd (in 18-hours of pumping) is sufficient to meet the projected maximum daily demands throughout the entire 20-year planning period.

TABLE 3-14

Projected Demand Versus Source Capacity Analysis

Year	Projected Maximum Day Demand (gpd)	Existing Source Capacity with 24 hours of Pumping (gpd) (1)	Existing Source Capacity with 18 hours of Pumping (gpd) (2)	Source Capacity Surplus/(Deficit) (gpd)(3)
2018	566,273	1,296,000	972,000	405,727
2019	569,105	1,296,000	972,000	402,895
2020	571,950	1,296,000	972,000	400,050
2021	574,810	1,296,000	972,000	397,190
2022	577,684	1,296,000	972,000	394,316
2023	580,572	1,296,000	972,000	391,428
2024	583,475	1,296,000	972,000	388,525
2025	586,393	1,296,000	972,000	385,607
2026	589,325	1,296,000	972,000	382,675
2027	592,271	1,296,000	972,000	379,729
2028	595,233	1,296,000	972,000	376,767
2029	598,209	1,296,000	972,000	373,791
2030	601,200	1,296,000	972,000	370,800
2031	604,206	1,296,000	972,000	367,794
2032	607,227	1,296,000	972,000	364,773
2033	610,263	1,296,000	972,000	361,737
2034	613,314	1,296,000	972,000	358,686
2035	616,381	1,296,000	972,000	355,619
2036	619,463	1,296,000	972,000	352,537
2037	622,560	1,296,000	972,000	349,440

(1) Based on operating all well pumps 24 hours per day.
(2) Based on operating all well pumps 18 hours per day.
(3) Assumes source capacity with 18 hours pumping.

STORAGE ANALYSIS

The nominal volume of a water reservoir is generally the name given to a reservoir based on an approximation of the gross volume of the reservoir, which is the amount of water the reservoir could hold if filled all the way to the top of the reservoir wall. However, in most cases, a reservoir cannot be filled to the top of the wall and a reservoir also cannot, under normal operational conditions, be drained completely while meeting system demand.

The DOH Water System Design Manual, Chapter 9, identifies the following components of reservoir storage volume:

- Operational Storage
- Equalizing Storage
- Standby Storage
- Fire Suppression Storage
- Dead Storage

Figure 3-1 shows a typical reservoir's storage capacity.

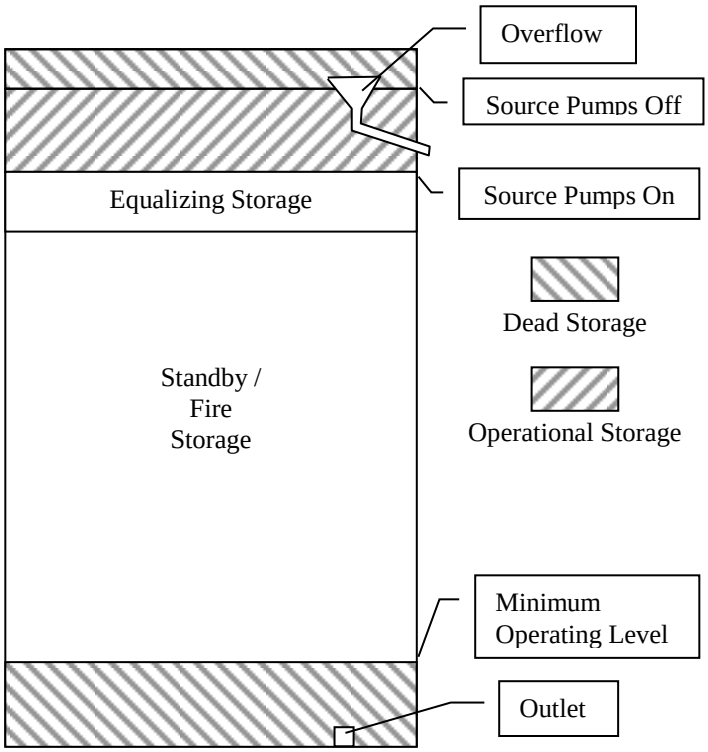


FIGURE 3-1

Typical Storage Capacity Schematic

Operational Storage

Operational storage is the volume of the reservoir used for control of the water system source facilities that feed the reservoir. This volume is dependent upon the sensitivity of the reservoir water level sensors and the tank configuration necessary to prevent excessive cycling of source pump motors. It is typically the volume between the lowest pump on call and the highest pump off call. Operational storage is in addition to other storage components, thus providing a factor of safety for equalizing, standby, and fire suppression components.

Equalizing Storage

Equalizing storage is typically used to meet diurnal demands which exceed the average day and maximum day demands. The volume of equalizing storage required depends on peak system demands, the magnitude of diurnal water system demand variations, the source production rate, and the mode of system operation. Sufficient equalizing storage must be provided in combination with available water sources and pumping facilities such that peak system demands can be satisfied.

Equalizing storage is calculated using the following equation:

$$V_{ES} = (Q_{PH} - Q_S) \times 150 \text{ minutes}$$

Where

V_{ES} = Equalizing storage component (gallons)
Q_{PH} = Peak hourly demand (gpm)
Q_S = Total source of supply capacity, excluding emergency sources (gpm)

Peak hour demands are determined by applying an hourly peaking factor to the maximum day demand. This peaking factor was determined by using the DOH formula for peak hour demand found in Section 5.2.4 on page 32 of the Water System Design Manual, December 2009.

Standby Storage

Standby storage is provided in order to meet demands in the event of a system failure such as a power outage, an interruption of supply, or break in a major transmission line. The amount of standby storage is based on the reliability of supply and pumping equipment, standby power sources, and the anticipated length of time the system could be out of service.

Standby storage is calculated using the following equation:

$$SB_{TMS} = (2 \text{ days})(ADD)(N) - t_m(Q_S - Q_L)$$

Where

SB_{TMS} = Standby storage component for a multiple source system (gallons)
ADD = Average day demand for the system (gpd/ERU)
N = Number of ERUs
Q_S = Sum of all installed and continuously available sources of supply, except emergency sources (gpm)

Q_L = Largest capacity source available to the system (gpm)
t_m = Time that remaining sources are pumped on the day when the largest source is not available (minutes)

Although standby storage volumes are intended to satisfy the requirements imposed by system customers for unusual situations and are addressed by WAC 246-290-420, the DOH Water System Design Manual recommends that the standby storage volume be not less than 200 gallons/ERU.

Fire Suppression Storage

Fire suppression storage is provided to ensure that the volume of water required for fighting fires is available when necessary. Fire suppression storage also reduces the impact of firefighting on distribution system water pressure. The amount of water required for firefighting purposes is specified in terms of rate of flow in gallons per minute (gpm) and an associated duration. Fire flows must be provided at a residual water system pressure of at least 20 pounds per square inch (psi). The City has adopted the International Fire Code in Section 15.04.010 of the McCleary Municipal Code; however, the City has limited fire flow capabilities within portions of its water system.

Fire suppression storage is calculated using the following equation:

$$FSS = (FF)(t_m)$$

Where:

FSS = Volume of fire suppression storage component (gallons)
FF = Fire flow rate, expressed in gpm, as specified by fire protection authority
t_m = Duration of FF rate, expressed in minutes

Note: The Standby Storage component or the Fire Suppression Storage component, whichever volume is smaller, can be excluded from a water system's total storage requirement provided that such practice is not prohibited by: (1) a locally developed and adopted Coordinated Water System Plan; (2) local ordinance; or (3) the local fire protection authority or County Fire Marshal (reference WAC 246-290-235(4)).

Per the DOH Water System Design Manual, Fire Suppression and Standby Storage components may be "nested," whereby the smaller storage component is deleted from calculations.

Appendix D includes a letter from the City of McCleary Fire Chief, Paul Nott dated October 17, 2019 approving the nesting of fire suppression and standby storage.

Dead Storage

Dead Storage includes the volume in a reservoir below the minimum operating level and above the maximum operating level. It is also considered to be any portion of the storage volume that is below the hydraulic gradeline established by the bottom of the Equalizing Storage Volume required to provide a minimum domestic service pressure of 30 psi to any service meter or service line at the property boundary. A second system pressure requirement is that fire flow pressure during maximum day flow must meet a minimum of 20 psi based on the hydraulic grade line established by the bottom of Standby and Fire Suppression Storage volumes. Any storage volume below this level is also considered dead storage. These provisions are intended to prevent the construction of homes in areas of the distribution system with substandard operating pressure.

The maximum water service elevation in the McCleary water service area is approximately 386 feet in elevation.

In order to maintain a minimum of 30 psi to all customers, the minimum reservoir water level must be maintained above an elevation of 455.3 feet (386 + 30 x 2.31 = 455.3). Since no equalizing storage is required (see Table 3-16), the bottom of the Equalizing Storage Volume is equivalent to the Source On Elevation of 467 feet. Since this Source On Elevation is greater than the required 455.3 feet, there is no dead storage associated with the Equalizing Storage Volume.

In order to maintain a minimum of 20 psi to all customers, the minimum reservoir water level must be maintained above the elevation of 432.2 ft (386 + 20 x 2.31 = 432.2). Since the base elevation of both reservoirs is above this elevation, there is no dead storage associated with the Standby and Fire Suppression Storage volumes.

The only dead storage in McCleary's reservoirs is the volume in each reservoir below the minimum operating level and above the Source Off Elevation.

Table 3-15 summarizes the available and dead storage in each reservoir in the system.

Effective Storage

The amount of effective storage a water system needs will be referred to as the Effective Storage Requirement. The Effective Storage Requirement is based on the sum of Equalizing, Standby, and Fire Suppression storage unless the local fire authority allows nesting of storage in which case the lesser of Standby or Fire Suppression storage can be subtracted from the total storage requirement.

TABLE 3-15

Reservoir Dimension and Capacity Analysis

Parameter	500,000-Gallon Reservoir	150,000-Gallon Reservoir
Top of Wall Elevation, feet	35	30
Overflow Elevation, feet	472	472
Source Off Elevation, feet	471.5	471.5
Source On Elevation, feet	467	467
Minimum Operating Level, feet	439	446
Base Elevation, feet	438	445
Diameter, feet	50	30
Specific Volume, gallons/foot	14,688	5,288
Total Specific Volume, gallons/foot	19,976	
Nominal Storage Volume, gallons	500,000	150,000
Total Nominal Storage Volume, gallons	650,000	
Gross Storage Volume, gallons	499,391	142,767
Total Gross Storage Volume, gallons	642,158	
Operational Storage Volume, gallons	66,096	23,795
Total Operational Storage Volume, gallons	89,890	
Effective Storage Volume, gallons	411,263	111,040
Total Effective Storage Volume, gallons	522,303	
Dead Storage, gallons	22,032	7,932
Total Dead Storage Volume, gallons	29,963	

Table 3-16 summarizes McCleary's storage capacity analysis.

TABLE 3-16

Storage Capacity Analysis

Year	Operational, MG[(1)]	Equalizing, MG[(2)]	Standby, MG[(3)]	Fire Suppression, MG[(4)]	Total Required Storage, MG[(5)]	Total Storage, MG[(6)]	Dead Storage, MG[(7)]	Total Available Storage, MG[(8)]	Storage Surplus/(Deficit), MG[(9)]
2019	89,890	0	229,478	180,000	499,368	642,158	29,963	612,194	112,826
2020	89,890	0	230,625	180,000	500,515	642,158	29,963	612,194	111,679
2021	89,890	0	231,778	180,000	501,669	642,158	29,963	612,194	110,526
2022	89,890	0	232,937	180,000	502,827	642,158	29,963	612,194	109,367
2023	89,890	0	234,102	180,000	503,992	642,158	29,963	612,194	108,202
2024	89,890	0	235,272	180,000	505,163	642,158	29,963	612,194	107,032
2025	89,890	0	236,449	180,000	506,339	642,158	29,963	612,194	105,855
2026	89,890	0	237,631	180,000	507,521	642,158	29,963	612,194	104,673
2027	89,890	0	238,819	180,000	508,709	642,158	29,963	612,194	103,485
2028	89,890	0	240,013	180,000	509,903	642,158	29,963	612,194	102,291
2029	89,890	0	241,213	180,000	511,104	642,158	29,963	612,194	101,091
2030	89,890	0	242,419	180,000	512,310	642,158	29,963	612,194	99,885
2031	89,890	0	243,631	180,000	513,522	642,158	29,963	612,194	98,673
2032	89,890	0	244,850	180,000	514,740	642,158	29,963	612,194	97,455
2033	89,890	0	246,074	180,000	515,964	642,158	29,963	612,194	96,230
2034	89,890	0	247,304	180,000	517,194	642,158	29,963	612,194	95,000
2035	89,890	0	248,541	180,000	518,431	642,158	29,963	612,194	93,763
2036	89,890	0	249,783	180,000	519,674	642,158	29,963	612,194	92,521

TABLE 3-16 – (continued)

Storage Capacity Analysis

Year	Operational, MG[(1)]	Equalizing, MG[(2)]	Standby, MG[(3)]	Fire Suppression, MG[(4)]	Total Required Storage, MG[(5)]	Total Storage, MG[(6)]	Dead Storage, MG[(7)]	Total Available Storage, MG[(8)]	Storage Surplus/(Deficit), MG[(9)]
2037	89,890	0	251,032	180,000	520,923	642,158	29,963	612,194	91,272
2038	89,890	0	252,287	180,000	522,178	642,158	29,963	612,194	90,017

(1) Operational storage is computed as the sum of the operating ranges for both the City of McCleary reservoirs. Operational storage volumes can be modified slightly by changing the "pump on call" and "pump off call" set points.

(2) Equalizing Storage Requirement is always zero because existing source capacity of 900 gpm is greater than peak hour demand for the entire planning period.

(3) Standby Storage Requirement is always 200 gallons times the number of ERUs because source capacity with the largest source out of service is always greater than twice average day demand.

(4) Fire Suppression Storage Requirement of 180,000 gpm is based on the minimum fire flow of 1,500 gpm for a duration of 2 hours from the International Fire Code, Table B105.1 Minimum Required Fire-Flow and Flow Duration for Buildings.

(5) Total Storage Requirement is the sum of Operational, Equalizing, and the greater of Standby or Fire Suppression Storage.

(6) The Total Storage is the Total Gross Storage Volume from Table 3-15.

(7) Dead storage is from Table 3-15.

(8) Total Available Storage is computed as Total Storage minus Dead Storage.

(9) The Storage Surplus/(Deficit) is computed as the Total Available Storage minus the Total Required Storage.

TREATMENT ANALYSIS

Disinfection

The City of McCleary installed a new bulk sodium hypochlorite disinfection system in 2013. The system consists of a single 1,000-gallon double wall HDPE storage tank with liquid level gauge, secondary containment, three sodium hypochlorite feed pumps, and associated feed piping and valves.

As the sodium hypochlorite degrades, by-products such as chlorate are formed. To minimize solution strength degradation and by-products formation, bulk sodium hypochlorite solutions are typically diluted with water to a 4 percent solution. The City of McCleary feeds sodium hypochlorite at a concentration of 4 percent.

According to the Department of Health Sanitary Survey Report (9/12/2013) the system has had a difficult time maintaining a detectable and steady chlorine residual throughout the distribution system. Since the chlorine residual leaving the WTP is relatively stable, it is suspected that the distribution water quality has changed and is affecting the distribution chlorine residuals. **DOH recommends that a study of the distribution water quality be conducted to determine the cause of chlorine demand within the distribution system and possible methods of reducing it.**

No specific study has been undertaken by the City to address the DOH recommendation; however, with the operation of the new Water Treatment Plant, low chlorine residuals in the distribution system do not appear to be persistent.

Pyrolusite Catalytic Oxidation and Filtration

In order to treat the City's water that is high in iron and manganese, McCleary installed a Pyrolusite catalytic oxidation/filtration treatment system manufactured by ATEC Systems. This media is able to adsorb large amounts of manganese due to its surface area and manganese dioxide content. Typically, a small dose of chlorine is added to the water prior to entering the Pyrolusite filter to help initiate the oxidation and adsorption reaction in the media and to maintain the media in an oxidized state. The manganese oxide media helps to catalyze the oxidation and precipitation of manganese oxides. The media is backwashed periodically (generally once per day depending on water quality) to remove accumulated iron and manganese deposits.

Active silica, if present in the source water, can bind to the surface or the Pyrolusite filter media and reduce the catalytic properties of the media, thereby compromising the capabilities of the treatment system. Pilot testing determined the source water includes active silica. Therefore, treatment with potassium permanganate is required. Potassium permanganate is added at a dosage rate of 0.3 mg/L to neutralize any silica that is in the source water, and then sodium hypochlorite is injected into the raw water coming into the

Water Treatment Plant (WTP) to oxidize the iron and manganese and keep the filter media in an oxidized state. The potassium permanganate feed system consists of a 50-gallon saturator, secondary containment, and two potassium permanganate feed pumps.

The oxidation/filtration system installed in 2013 consists of four ATEC filters, each rated at 125 gpm. Loading rate on the filters is 10.2 gpm/sf. ATEC filters backwash at 345 gpm for five minutes. There is a 12-hour run-time per filter.

According to the Department of Health Sanitary Survey Report (9/12/2013), condensation in the WTP building caused water to pool on the floor in areas without drainage. **Ventilation in the treatment building needs to be improved in order to avoid condensation of water on tanks utilized in the treatment process. In addition, all piping in the WTP should be labeled.**

Operation staff has indicated that condensation has been effectively mitigated by use of the dehumidifier and increasing ventilation.

Backwash water is diverted to a pond located outside the WTP building, which then discharges to the sanitary sewer system.

DISTRIBUTION SYSTEM ANALYSIS

The existing distribution system consists of approximately 12 miles of pipe ranging in size from 2-inch to 10-inches in diameter.

A significant proportion of the distribution system is comprised of Asbestos-Cement (AC) pipe. Generally, for planning purposes, this type of pipe is given an effective service life of 50-75 years. Therefore, McCleary has initiated an AC pipe replacement program beginning with the oldest AC mains being replaced first.

The McCleary Water System has installed radio read water meters for its service customers.

Hydraulic Modeling

This section presents information on the computer hydraulic model of the City of McCleary's water system and the results of hydraulic analyses conducted to evaluate the existing and future capabilities of the water system.

The operation of a water system involves dynamic interactions between various water system components, including source, storage, and distribution system facilities. These interactions and their effect on the level of service provided to McCleary's customers are dependent on the distribution and magnitude of water demands within the system and the

performance characteristics of the water system facilities. In addition, infrequent high water demand events, such as firefighting and other emergencies, can significantly alter the normal flow patterns and pressures in the water system. These factors must be considered in analyzing the ability of a water system to provide for future demands, while maintaining an adequate level of water service to customers.

The development of a computer hydraulic model, which can accurately and realistically simulate the response of a water system under a variety of conditions and scenarios, has become an increasingly important element in the planning, design, and analysis of municipal water systems. The Washington State Department of Health's WAC 246-290 requires hydraulic modeling as a component of water system comprehensive plans.

Hydraulic Modeling Software

McCleary's water system has been analyzed using MWHSoft's H_2ONet hydraulic modeling software, which operates in an AutoCAD computer-aided design and drafting environment. The H_2ONet model that was created includes all of McCleary's source, distribution, and storage facilities.

The H_2ONet model is configured with a graphical user interface. Each water system element, including pipes, pumps, nodes, and reservoirs is assigned a unique graphical representation within the model. Each element is assigned a number of attributes specific to its function in the actual water system. Typical element attributes include spatial coordinates, elevation, water demand, pipe lengths, diameters and friction factors, pump curves and control settings, and critical water levels for reservoirs. With attributes of each system element as the model input, the H_2ONet software produces the model output in the form of flows and pressures throughout the simulated water system.

Model Assumptions

Prior to the calibration of the hydraulic model, the basic layout of the water system is recreated within the model. The lengths, diameters, and connection points of system piping are assigned using an updated base map of the water system. The locations of normally closed valves and check valves are also found on water system base maps, while the critical elevations of McCleary's reservoirs are taken from design drawings and operator correspondence. The assumptions regarding the modeling of McCleary's water source and system demands are included in the following sections.

Sources

McCleary's source of supply includes two wells. All sources were assumed to be off during peak hour demand scenarios. Well 2 (400 gpm) was assumed to be operating during fire flow scenarios.

System Demands

A key element in the hydraulic modeling process is the distribution of demands throughout the water system. Total demand on the system is based on the existing and projected demands from Chapter 2.

Seven demand sets are used in the hydraulic analysis.

- **2015 Average Day Demands:** These demands were used for the calibration of the model.

- **2015 Peak Hour Demands:** These demands were used to verify the system is able to currently meet the DOH standards to supply domestic water at a minimum system wide pressure of 30 psi.

- **2015 Maximum Day Demand plus Fire Flow:** These demands were used to evaluate the system's ability to currently meet the maximum day demands plus required fire flows at DOH's requirement of 20 psi.

- **2021 Peak Hour Demands:** These demands were used to verify the system is able to meet the DOH standards to supply domestic water at a minimum system wide pressure of 30 psi within the 6-year planning period.

- **2021 Maximum Day Demand plus Fire Flow:** These demands were used to evaluate the system's ability to meet the maximum day demands plus required fire flows at DOH's requirement of 20 psi within the 6-year planning period.

- **2035 Peak Hour Demands:** These demands were used to verify the system is able to meet the DOH standards to supply domestic water at a minimum system wide pressure of 30 psi within the 20-year planning period.

- **2035 Maximum Day Demand plus Fire Flow:** These demands were used to evaluate the system's ability to meet the maximum day demands plus required fire flows at DOH's requirement of 20 psi within the 20-year planning period.

Model Calibration

The calibration of a hydraulic model provides a measure of assurance that the model is an accurate and realistic representation of the actual system. For McCleary's model, field measurements from March 23, 2012 are used for the calibration process.

Fire Hydrant Tests

The H_2ONet hydraulic model of McCleary's water system was calibrated using data obtained from fire hydrant tests at various locations throughout the water system. Five fire hydrant tests were conducted with the assistance of McCleary personnel on March 23, 2012. During these tests, static and residual pressures were recorded as McCleary staff opened hydrants and flow was recorded. Field results were used to calibrate the hydraulic model through verification and adjustment of pipe type, sizes, roughness coefficients, and elevations.

The testing locations include multiple points throughout the distribution system. A description of each testing location is presented in Table 3-17.

TABLE 3-17

Hydrant Testing Locations

Test Number	Pressure Hydrant Location	Flow Hydrant Location
1	H-74: East end of McCleary Road	H-75: East end of McCleary Road
2	H-22: Intersection of Hemlock Street and 4th Street	H-64: Intersection of Hemlock Street and 6th Street
3	H-38: Intersection of 6th Street and Simpson Avenue	H-39: Intersection of 6th Street and Maple Street
4	H-29: West end of Simpson Avenue	H-30: West end of Simpson Avenue
5	H-95: Intersection of North 4th Street and East Buck Street	H-91: Intersection of East Buck Street and Summit Road

The system conditions at the time of each test were recorded. Reservoir water levels and approximate system demand were both recorded during the testing time period. Well 2 was assumed to be operating during calibration testing. A summary of the system conditions during the hydrant testing is presented in Table 3-18. The system conditions at the time of testing were replicated in the hydraulic model during the calibration process.

TABLE 3-18

System Conditions during Hydrant Testing

Facility	Water Level[(1)]
500,000-gallon Reservoir	34 feet
150,000-gallon Reservoir	29 feet

(1) Water level varied across each of the hydrant tests. The level indicated represents the average level.

Calibration Procedures

Using the system conditions for each hydrant test, the hydraulic model was used to generate static pressure and residual pressure at the measured hydrant flow rate. The total system demand at the time of the hydrant tests was assumed to be equal to the average day demand for the water system. Model output was generated at points in the model equivalent to the locations of the hydrant tests.

Model output for static pressure was generated by running the model under average day demand. Model output for residual pressure was generated at each hydrant test location by placing an added demand equal to the measured hydrant flow rate and recording the resulting pressure at the point where residual pressure was measured.

Calibration Results

The friction factors for the pipes in the modeled system are adjusted throughout the calibration process until the model output best approximates the measured values. Hazen-Williams C-factors ranging from 130 to 140 were used throughout the system as they provide the best agreement with field tests. The friction factors for the pipe also compensate for system losses through valves and pipe fittings.

The values measured in the hydrant flow tests are compared to the model output values in Table 3-19.

TABLE 3-19

Calibration Results

Test No.[1]	Flow (gpm)	Static Pressure (psi)			Residual Pressure (psi)			$\Delta S - \Delta R$[2]
		Field	Model	Difference	Field	Model	Difference	
1	1,210	63	64	1.0	55	50	-4.6	5.61
2	1,233	66	67	1.3	46	44	-1.5	2.86
3	1,363	92	92	0.4	72	74	2.2	-1.76
4	1,087	96	95	-0.6	45	45	0.4	-0.96
5	978	67	66	-1.1	32	34	1.7	-2.78

(1) See Table 3-17 for a description of the testing locations.
(2) $\Delta S - \Delta R$ is equal to the static pressure difference minus the residual pressure difference.

Calibration of the hydraulic model produced results that varied from 0 to 4.6 psi of actual field test data for static and residual pressure. Hydraulic models are required to be within 5 psi of measured pressure readings for long-range planning, according to the DOH Design Manual, Table 8-1.

Model Conditions

Model input assumptions have significant impacts on peak hour and fire flow results. Table 3-20 shows the reservoir levels during each scenario. No well pumps were running for any of the scenarios. During peak hour scenarios, the reservoir levels have been lowered to reflect depletion of operational and equalizing storage. During fire flow scenarios, fire suppression storage has also been removed to represent system conditions near the end of the maximum design fire flow event.

TABLE 3-20

Model Conditions

Modeling Scenario	500,000-Gallon Reservoir Level (ft)	150,000-Gallon Reservoir Level (ft)
2015 Residential Fire Flows[1]	27.5	22.5
2015 Commercial Fire Flows[1]	21.5	16.5
2015 Peak Hour Demand[2]	30.5	25.5
2021 Residential Fire Flows[1]	27.5	22.5
2021 Commercial Fire Flows[1]	21.5	16.5
2021 Peak Hour Demand[2]	30.5	25.5
2035 Residential Fire Flows[1]	27.5	22.5
2035 Commercial Fire Flows[1]	21.5	16.5
2035 Peak Hour Demand[2]	30.5	25.5

(1) Only Well 2 is in service.
(2) No wells are in service.

System Analysis

Peak Hour Analysis

According to WAC 246-290, the pressure in the distribution system must be greater than 30 psi under peak hour conditions with equalizing storage removed. Furthermore, the DOH Water System Design Manual (2009), Section 9.3.2 requires that a water system must maintain a minimum pressure of 20 psi in the distribution system under peak hour demand conditions with standby storage removed. McCleary's existing distribution system was modeled under 2015, 2021, and 2035 peak hour demand conditions with and without the corresponding quantity of standby storage removed. Model output results are located in Appendix J. Table 3-21 summarizes the minimum system pressure and location for the peak hour demand analysis. As shown in Table 3-21, no system deficiencies were identified.

TABLE 3-21

Summary of Peak Hour Demand Analysis Results

Scenario	Total System Demand (gpm)	Minimum System Pressure (psi) with Standby Storage Removed(1)	Minimum System Pressure (psi) with Standby Storage Intact(2)	Location of Minimum System Pressure	Deficiencies
2015 Peak Hour	649	25.7	30.8	Intersection of Evergreen Place and Cedar Street	None
2021 Peak Hour	666	25.5	30.8	Intersection of Evergreen Place and Cedar Street	None
2035 Peak Hour	708	25.0	30.7	Intersection of Evergreen Place and Cedar Street	None

(1) 20 psi is required.
(2) 30 psi is required.

Available Fire Flow Analysis

The DOH Water System Design Manual (2009) states that a water system should be designed to provide adequate fire flow under maximum day demand conditions, while maintaining a minimum system pressure of 20 psi. A system wide available fire flow

map, located in the back sleeve of the Plan, illustrates McCleary's available fire flow under buildout maximum day demand conditions. The results of fire flow modeling for 2015, 2021, and 2035 peak day demand are included in Appendix J. Table 3-22 summarizes the results of the fire flow analysis.

TABLE 3-22

Summary of Fire Flow Analysis Results

Location and Node	Required Fire Flow (gpm)	2015 Minimum Available Fire Flow (gpm)(1)	2021 Minimum Available Fire Flow (gpm)(1)	2035 Minimum Available Fire Flow (gpm)(1)
H-74: East end of McCleary Road	1,000	1,806	2,102	2,100
H-22: Intersection of Hemlock Street and 4th Street	1,000	1,309	2,112	2,109
H-38: Intersection of 6th Street and Simpson Avenue	1,500	1,872	2,254	2,251
H-29: West end of Simpson Avenue	1,500	1,054	1,851	1,849
H-95: Intersection of North 4th Street and East Buck Street	1,000	852	1,085	1,084
H-21: City Hall	1,500	1,941	2,626	2,619
H-33: Wastewater Treatment Plant	1,500	693	1,846	1,844
H-63: McCleary K-8 School	1,500	1,835	2,411	2,405

(1) Well 2 is assumed to be operating for each fire flow scenario.

The hydraulic model did identify a few problems. Many of the problems identified relate to fire hydrants served by undersized water mains (4-inch). Each of the problems identified by hydraulic modeling are detailed below:

- The 4-inch waterline along Ash Street west of 9th Street is undersized and does not provide the required 1,000 gpm fire flow.
- The 4-inch waterline along 9th Street from Simpson Avenue to the WWTP does not provide the required 1,500 gpm fire flow.
- The 4-inch waterline along Pine Street from 5th Street to 6th Street does not provide the required 1,000 gpm fire flow.
- The 4-inch waterline along 4th Street from Oak Street to Spruce Street does not provide the required 1,000 gpm fire flow.

- The 4-inch waterline from Birch Street east along Mommsen Road does not provide the required 1,000 gpm fire flow.

- The required 1,500 gpm fire flow is not available along the western portion of Simpson Avenue.

WATER SYSTEM ERU CAPACITY LIMITS

WATER QUALITY

McCleary meets all applicable DOH regulations required for water quality. McCleary has consistently provided a high quality of drinking water to its service area.

WATER RIGHTS

As shown in Tables 3-12 and 3-13, McCleary has adequate water rights to meet projected 10- and 20-year growth demands of the system.

Instantaneous Water Right Capacity Limit

From Table 1-4, the City of McCleary has 1,100 gpm of instantaneous water rights. Assuming that these rights would need to be exercised in 18 hours per day, the instantaneous water rights limit can be calculated as follows:

$$\text{Instantaneous Water Rights Connections Limit} = \frac{1{,}100 \text{ gpm} \times 1{,}080 \text{ min/day}}{496 \text{ gpd per ERU}} = 2{,}395 \text{ ERUs}$$

However, assuming that use of these rights could be exercised over 24 hours per day, the instantaneous water rights limit would be calculated as follows:

$$\text{Instantaneous Water Rights Connections Limit} = \frac{1{,}100 \text{ gpm} \times 1{,}440 \text{ min/day}}{496 \text{ gpd per ERU}} = 3{,}194 \text{ ERUs}$$

Annual Water Right Capacity Limit

From Table 1-4, the City of McCleary has 673 acre feet (AF/Y) of annual water rights and the Average Day Demand per ERU from Table 2-7 is 163 gpd. The limit on ERUs due to the annual water right can be calculated as follows:

$$\text{Annual Water Rights Connections Limit} = \frac{673 \text{ AF/Y} \times 325{,}851 \text{ gal/AF}}{365 \text{ days/year} \times 163 \text{ gpd per ERU}} = 3{,}686 \text{ ERUs}$$

SOURCE CAPACITY

The minimum required design criteria for a water system is that it should be capable of meeting a maximum day of water demand in one day (24 hours) of water production. From Table 3-14 it can be seen that McCleary has adequate source capacity to meet this criteria. However, to provide additional system reliability, the recommended source capacity would meet maximum day demands in 18 hours of pumping. Table 3-14 shows McCleary meets this recommended capacity criteria throughout the 20-year planning period. To determine the number of ERUs supportable by the existing source capacity using the 18-hour reliability criteria, we take the total amount of water that can be produced in 18 hours of operation and divide that by the maximum day demand per ERU as follows:

$$\text{Source Production Capacity Connections Limit} = \frac{900 \text{ gpm} \times 1{,}080 \text{ min/day}}{496 \text{ gpd per ERU}} = 1{,}960 \text{ ERUs}$$

Source capacity is based on all existing wells and pumps in production.

TREATMENT CAPACITY

Treatment capacity meets or exceeds all regulatory requirements.

STORAGE CAPACITY

Following the 20-year planning period ending in year 2037, the population is predicted to reach 1,841 and the City of McCleary will not have a storage deficit predicted over that period. To determine the number of ERUs supportable by the existing storage, the storage required for various numbers of ERUs is calculated until the result is a storage volume greater than the existing effective storage. Table 3-23 shows that the existing storage can support up to 2,274 ERUs.

TABLE 3-23

Summary of Storage Requirement Limit

ERUs	Recommended Effective Storage, gallons				Existing Effective Storage, gallons[4]	Storage Surplus/ (Deficit), gallons
	Equalizing[1]	Standby[2]	Fire Suppression	Total[3]		
2,274	67,310	454,800	180,000	522,110	522,303	193
2,275	67,400	455,000	180,000	522,400	522,303	(97)

(1) Equalizing storage is calculated based on the estimated source capacity of 900 gpm.
(2) Standby storage is computed as 200 gallons times the projected number of ERUs.
(3) Total Recommended Storage is the sum of Equalizing Storage plus the greater of Standby Storage or Fire Suppression Storage since nesting is allowed.

(4) Existing Effective Storage Capacity is from Table 3-15.

DISTRIBUTION SYSTEM CAPACITY

From a capacity standpoint, the distribution system meets all regulatory requirements except where undersized mains (4-inch) prevent delivery of fire flow.

Table 3-24 summarizes the City of McCleary's water system capacity limits.

TABLE 3-24

Water System Capacity Limits

Limiting Factor	ERU Limit	Year 2018 ERUs(1)	Available ERUs, Surplus/(Deficit)
Installed Source Capacity	1,960	1,142	818
Instantaneous Water Rights	3,194	1,142	2,052
Annual Water Rights	3,686	1,142	2,544
Storage Capacity, Water System Design Manual	2,274	1,142	1,132

(1) Projected ERU value in year 2018 from Table 2-10 based on existing total usage ERU value for 2017 plus 8.6 percent DSL.

WATER SYSTEM DEFICIENCIES

WATER QUALITY DEFICIENCIES

No current water quality deficiencies have been identified.

WATER RIGHTS DEFICIENCIES

No deficiencies.

SOURCE CAPACITY DEFICIENCIES

There are currently no known source capacity deficiencies. The City of McCleary installed an emergency generator to supply emergency power to the well pumps and emergency functions at the Water Treatment Plant in 2018.

TREATMENT DEFICIENCIES

There are no known treatment deficiencies or system limitations that exist within the McCleary water system.

STORAGE DEFICIENCIES

No deficiencies.

DISTRIBUTION SYSTEM DEFICIENCIES

Distribution system deficiencies were determined as a result of the hydraulic analysis discussed earlier in this chapter. In addition, the McCleary water system has approximately half of its distribution system comprised of aging AC water main. The City of McCleary has a water main replacement program that replaces the most vulnerable mains systematically prior to failure. Vulnerability is determined by the age and material of the water main, the frequency of leaks noted and repaired, and the number of customers that are serviced by a particular main. Additionally, as opportunities arise, such as road reconstruction or another utility line service, water main replacements will be conducted. Water distribution mains that are scheduled to be replaced on account of condition or hydraulic deficiencies include:

- D-1. Replace approximately 250 linear feet of 4-inch water main with 8-inch water main on Ash Street west of 9th Street.
- D-2. Replace approximately 500 linear feet of 4-inch water main with 8-inch water main on 9th Street from Simpson Avenue to the WWTP.
- D-3. Replace approximately 360 linear feet of 4-inch water main with 8-inch water main on Pine Street from 5th Street to 6th Street.
- D-4. Replace approximately 800 linear feet of 4-inch water main with 8-inch water main on 4th Street from Oak Street to Spruce Street.
- D-5. Replace approximately 850 linear feet of 4-inch water main with 8-inch water main on Mommsen Road, east of Birch Street.
- D-6 (A-C). Construct a 5,260 linear foot 8-inch diameter water main from the wellfield to the west end of Simpson Avenue.

These projects are discussed further in Chapter 8, Capital Improvement Program.

CHAPTER 4

WATER USE EFFICIENCY PROGRAM

OBJECTIVE

The objectives of this chapter are to identify the conservation and water use efficiency requirements pertaining to the City of McCleary water system, evaluate past conservation efforts, and describe McCleary's water use efficiency plan for the next 10 years.

WATER USE EFFICIENCY PLANNING REQUIREMENTS

In 1989, the Washington Legislature passed the Water Use Efficiency Act (43.20.230 RCW), which directed DOH to develop procedures and guidelines relating to water use efficiency. In response to this mandate, Ecology, the Washington Water Utilities Council, and DOH jointly published a document titled *Conservation Planning Requirements* (1994). In 2003, the Municipal Water Supply – Efficiency Requirements Act (Municipal Water Law) was passed. This legislation amended RCW 90.03 to require additional conservation measures. The Municipal Water Law applies to all Municipal Water Suppliers. Among other things, the Municipal Water law directed DOH to develop the Water Use Efficiency Rule (WUE Rule), which was adopted January 22, 2007. In addition, DOH has developed a WUE Rule guidance document titled "Water Use Efficiency Guidebook" (WUE Guidebook) dated January 2011 (DOH Publication #331-375). The WUE Guidebook supersedes and replaces the 1994 Conservation Planning Requirements. Therefore, the WUE Rule and the WUE Guidebook now provide all the currently effective water use efficiency planning requirements.

WATER USE EFFICIENCY RULE

The WUE Rule consists of a series of amendments to existing sections and addition of new sections to WAC 246-290, the Group A Public Water System Regulations, and sets additional requirements for public water purveyors. The WUE Rule is comprised of four sections:

1. Planning requirements
2. Metering requirements
3. Distribution leakage standard
4. Goal setting and performance reporting requirements

The WUE Guidebook is intended to provide guidance and clarification on the requirements of the WUE Rule, and not to establish any additional requirements. The requirements of the WUE Rule are discussed in the following sections.

PLANNING REQUIREMENTS

The Planning Requirements of the WUE Rule include the following:

- Estimation of the amount of water saved through implementation of the system's WUE program over the past 6 years.
- Description of the water system's WUE goals.
- Selection of WUE measures.
- For each WUE measure selected, either:
    - Inclusion of a plan to implement the measure, or
    - Evaluation of selected water use efficiency measures to show that they are not cost effective.

These WUE Rule planning requirements are addressed in the following sections:

ESTIMATION OF WATER SAVED

Annual water consumption, monthly authorized use and Distribution System Leakage (DSL) from Figure 2-5 is shown here as Figure 4-1 together with their respective trend lines. Unmetered authorized uses are discussed in detail in Chapter 2.

The units of water consumption on the primary vertical axis are shown in gallons and the horizontal axis units are months. The linear regression trendline shows average consumption has increased by approximately 260,000 gallons per year over the 5-year period.

The unmetered authorized consumption rate has decreased by approximately 95,000 gallons per year over the 5-year period.

The DSL rate also decreased by approximately 70,000 gallons per year over the same 5-year period.

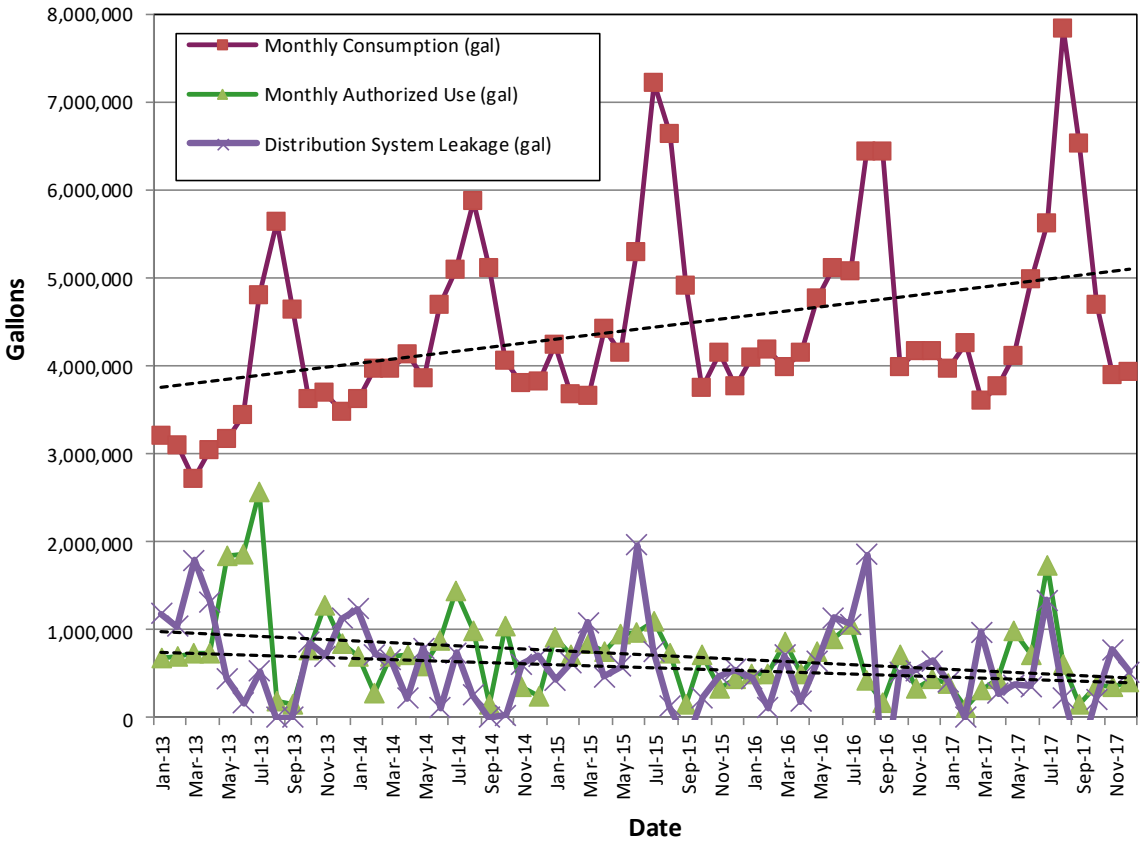


FIGURE 4-1

Water Use Trend

WATER USE EFFICIENCY GOALS

The WUE Rule requires that the "governing body of the public water system shall establish water use efficiency goals within 1 year of the effective date of this rule." The WUE Rule further requires that WUE Goals must "be set in a public forum that provides opportunity for consumers and the public to participate and comment on the water use efficiency goals."

There are two approaches to water use efficiency: demand-side and supply-side conservation. Demand-side conservation measures are those measures that decrease the quantity of water used by customers, either through more efficient water use or a voluntary decrease in water use. Supply-side conservation measures are those measures that increase the efficient delivery and tracking of the water available.

The WUE Goal (Objective) from McCleary's last Water System Plan was to reduce the City's annual water production by 2 percent.

As a part of this Water System Plan Update, McCleary has updated these goals as follows:

- Demand Side Goal: Reduce per ERU consumption 2 percent in 6 years.

- Supply Side Goal: Maintain DSL below 10 percent through 2021.

SELECTED WATER USE EFFICIENCY MEASURES

The WUE Rule requires that water systems with between 500 and 1,000 service connections must implement or evaluate a minimum of four water use efficiency measures. The WUE Guidebook further states that water use efficiency measures that are required in other portions of the WUE Rule cannot be counted as measures to be selected under this requirement. Measures required in other portions of the WUE Rule include the following:

- Installation of source and service meters if meters are not already present;
- Regular calibration of meters;
- Development and implementation of a water loss control program if distribution system leakage exceeds 10 percent; and
- Education of consumers about water use efficiency practices once per year.

Measures that the WUE Guidebook suggests can count toward satisfying the required number of water use efficiency measures include the following:

- Implementation of a conservation rate structure.
- Implementation of a water reclamation program.
- Customer assistance in repair of leaks in customer service lines and in homes.
- Additional consumer education, such as student education and consumer education at fairs.
- Bills showing water consumption history.

Implementation of measures by customer class count as separate measures for each customer class for which they are implemented. McCleary classifies customers by meter type: commercial, less than 1 inch (In-City limits and Outside City limits), 1 inch and greater, and the Wastewater Treatment Plant (WWTP). Therefore, the McCleary water system has a total of five customer classes; however, the WWTP constitutes a single connection. While this single connection has the greatest potential for water savings due to its large volume of current usage, it will not be counted as a customer class since it is operated by the City. Therefore, there are a total of four customer classes.

The City has adopted the following WUE Measures:

Customer Assistance in Repair of Leaks

- Leak detection and repair program assistance to customers between the meter and the service for all customer classes. (Four Measures)

Education of Consumers

- An educational booth at the City's annual "Bear Festival" that highlights water use efficiency practices. (Four Measures)

Customer Billings

- The City of McCleary's new water billing software shows the customer their water consumption history. This measure is ongoing and continues to benefit the water system on a monthly basis as customers review their bills.

Implementation of a Water Savings Program

- The City of McCleary will institute a leak-detection program consisting of systematically checking each main line in the water system for leaks beginning with the oldest main first. The City has utilized Evergreen Rural Water for assistance detecting leaks in waterlines that were thought to be leaking, in the past, which resulted in the elimination of a number of smaller waterlines. For the future, the City will purchase their own listening equipment to monitor for leaks. (One Measure)

The City of McCleary is currently implementing at least nine WUE measures.

The City of McCleary is utilizing the following additional WUE Measures in order to attain their stated goal; however, these measures likely cannot be counted towards the total number of measures required since it could be viewed as a meter calibration element, which is mandatory:

- The completion of replacement of standard water meters with new radio-transmitting, automatic read meters.

- The City of McCleary's new water billing software shows customers their water consumption history.

IMPLEMENT OR EVALUATE WATER USE EFFICIENCY MEASURES

The McCleary water system is currently implementing at least nine WUE Measures, which meets the minimum requirement. Since the minimum number of WUE Measures is being implemented, no evaluation of the cost effectiveness of conservation measures is required.

METERING REQUIREMENTS

The WUE Rule requires all sources and customer service connections be metered by January 22, 2017. McCleary currently meters all sources, and all customers, and implements a water meter replacement program to assure meter accuracy. Therefore, no further action is required to comply with this requirement.

DISTRIBUTION SYSTEM LEAKAGE STANDARD

The WUE Rule set a leakage standard of 10 percent or less of finished water production. The 3-year rolling average for Distribution System Leakage (DSL) is defined as the sum of all water metered into the distribution system over a 3-year time period, less the sum of all metered water uses, and known or credibly estimated unmetered uses, out of the distribution system over the same time period. Known or credibly estimated unmetered uses include uses such as construction, firefighting and water main flushing.

Under WAC 246-290-820 (4) (e), "If the average distribution system leakage calculated under subsection (2) of this section is greater than 10 and less than 20 percent of total water produced and purchased, the water loss control action plan must assess data accuracy and data collection."

As shown in Chapter 2, Table 2-5, the 3-year rolling average DSL for the McCleary water system averaged 8.6 percent for the 5-year period from 2013-2017. Therefore, a water loss control action plan is not required.

As a development of this Water System Plan, McCleary has carefully reviewed and assessed all water production and water sales data, all unmetered water use estimation, and all water production and use record keeping, assuring that the DSL determinations are accurate. In addition, McCleary is actively upgrading its remaining conventional water meters with new radio read meters to improve measurement accuracy.

WATER LOSS CONTROL ACTION PLAN

Since McCleary's rate of DSL is below the 10 percent threshold, the City is not required as part of the Water Use Efficiency Program under WAC 246-290-820 to complete a Water Loss Control Action Plan (WLCAP).

GOAL SETTING AND PERFORMANCE REPORTING

Pursuant to the WUE Rule, McCleary must set water use efficiency goals and report progress annually. McCleary's water use efficiency goals have been addressed in preceding sections of this chapter. The annual report must include the following:

- Total source production
- Distribution system leakage in percentage and volume
- Goal description, schedule, and progress toward meeting goals

The City of McCleary has been submitting this report annually.

GOAL SETTING

The WUE Rule requires that water conservation goals must include a measurable outcome, address water supply or demand characteristics, and include an implementation schedule. The goal setting process must be held through a public forum and be re-evaluated every 6 years. Goals have been re-evaluated and adopted with this document and in every subsequent Water System Plan update.

The City of McCleary WUE Goals, as described in a previous section of this chapter were established in a public forum as required. The prior public forum was held at City Hall on April 28, 2010.

TARGET WATER SAVINGS PROJECTIONS

Table 4-1 provides the projected average day demand with the goal of reducing water demands. According to McCleary's Water Use Efficiency Annual Performance Report for 2017, the customer goal was a reduction of 2 percent in the average use per ERU. This 2 percent reduction over 6 years equates to an approximate reduction of 0.33 percent in average use per ERU per year. Table 4-1 shows the corresponding projected production with these water use efficiency measures applied. The number of ERUs is the same as projected in Chapter 2, Table 2-10.

TABLE 4-1

Projected Production with Water Use Efficiency Measures

Year	No. of ERUs[(1)]	Average Consumption per ERU, gpd/ERU[(2)]	Average Production with Water Use Efficiency, gpd[(3)]
2018	1,142	162	185,480
2019	1,147	162	185,792
2020	1,153	161	186,105
2021	1,159	161	186,418
2022	1,165	160	186,732
2023	1,171	160	187,046
2024	1,176	159	187,041
2025	1,182	159	187,977
2026	1,188	159	188,917
2027	1,194	159	189,861
2028	1,200	159	190,810
2029	1,206	159	191,764
2030	1,212	159	192,723
2031	1,218	159	193,687
2032	1,224	159	194,655
2033	1,230	159	195,629
2034	1,237	159	196,607
2035	1,243	159	197,590
2036	1,249	159	198,578
2037	1,255	159	199,571

(1) ERUs are from Table 2-10, including historic distribution system leakage rates.
(2) Average consumption per ERU is 163 gpd per ERU.
(3) Assumes DSL is equivalent to 8.6 percent throughout the planning period.

Table 4-2 compares the average day production with and without estimated water use efficiency savings from Table 4-1. At the end of the 10-year planning period (2028), meeting the water use efficiency goals could account for an average savings of 4,800 gpd, or 5.4 ac-ft/yr. At the end of the 20-year planning period (2037), meeting efficiency goals could account for an average savings of 5,021 gpd, or 5.6 ac-ft/yr. If this water use efficiency goal were maintained, the net water savings over the 20-year planning period would be 79.6 acre-feet, or an average of approximately 4.0 ac-ft/yr.

TABLE 4-2

Projected Water Use Efficiency Savings

Year	Average Day Production without Water Use Efficiency		Average Day Production with Water Use Efficiency		Potential Water Use Efficiency Savings	
	gpd	ac-ft/yr	gpd	ac-ft/yr	gpd	ac-ft/yr
2018	186,094	208.5	185,480	207.8	614	0.7
2019	187,024	209.5	185,792	208.1	1,232	1.4
2020	187,959	210.5	186,105	208.5	1,855	2.1
2021	188,899	211.6	186,418	208.8	2,481	2.8
2022	189,844	212.7	186,732	209.2	3,112	3.5
2023	190,793	213.7	187,046	209.5	3,747	4.2
2024	191,747	214.8	187,041	209.5	4,705	5.3
2025	192,706	215.9	187,977	210.6	4,729	5.3
2026	193,669	216.9	188,917	211.6	4,753	5.3
2027	194,638	218.0	189,861	212.7	4,776	5.4
2028	195,611	219.1	190,810	213.7	4,800	5.4
2029	196,589	220.2	191,764	214.8	4,824	5.4
2030	197,572	221.3	192,723	215.9	4,848	5.4
2031	198,560	222.4	193,687	217.0	4,873	5.5
2032	199,552	223.5	194,655	218.0	4,897	5.5
2033	200,550	224.6	195,629	219.1	4,921	5.5
2034	201,553	225.8	196,607	220.2	4,946	5.5
2035	202,561	226.9	197,590	221.3	4,971	5.6
2036	203,573	228.0	198,578	222.4	4,996	5.6
2037	204,591	229.2	199,571	223.5	5,021	5.6
Total Savings						**79.6**

WATER USE DATA REPORTING

The WUE Rule requires annual reporting of water use data. The first annual reports were due July 1, 2008, for municipal water suppliers with 1,000 or more service connections, and annually by July 1 each year thereafter. The most recent Annual Performance Report was submitted to DOH in January 2018. Table 4-3 summarizes the water use data collection requirements.

TABLE 4-3

Summary of Water Use Data Collection

Data Type	Unit of Measure	Collection Frequency	Comments
Water Production	Gallons	Monthly	Total by month and by year.
Water Sold	Gallons	Billing Period	Total sold by customer class for each billing period.
Estimated Unmetered Water Use	Gallons	Billing Period	Estimate and record unmetered water uses for each billing period.
Estimated Identified and Corrected Water System Leaks	Gallons	Billing Period	When leaks are discovered and repaired, the leakage rate and duration are estimated and the resultant leakage volume for the billing period is estimated and recorded.
Accounted-for Water	Gallons	Billing Period	The sum of Water Sold and Estimated Unmetered Water Use.
Distribution System Leakage	Gallons	Billing Period	The difference between monthly Water Production and monthly Accounted-for Water.
Percent Distribution System Leakage	Percent	Billing Period	Distribution System Leakage divided by Water Production times 100. Calculate for each billing period, for each year and for a 3-year running average. If 3-year running average exceeds 10 percent, further actions are required to reduce Distribution System Leakage.

WATER USE EFFICIENCY PROGRAM DEVELOPMENT AND LEVEL OF IMPLEMENTATION

The following sections describe McCleary's water use efficiency program development and levels of implementation.

CUSTOMER PROGRAMS

General

Demand management measures are those expected to be performed or used by the customers of the McCleary water system. Approaches to implementing these demand management measures include voluntary cooperation, mandatory restrictions, and/or regulatory requirements. Due to current water availability, only voluntary cooperation

and new water efficient fixture regulations are considered as viable choices for improving McCleary's conservation program.

A voluntary conservation program is considered appropriate for all customers. The method of distributing and installing conservation devices will affect the degree of the program success. The rate of installation has to be weighed against the cost of the program. While utility installation of devices is generally more labor intensive, resulting in higher costs, the retention rate is also higher, leading to increased savings. Customer installation of the devices will result in a significantly lower cost, but a correspondingly less effective program. The City of McCleary does not have any additional employees available to install conservation devices, and the program base is not large enough to justify hiring additional personnel specifically for that purpose. Therefore, customer installation is the only cost-effective method of implementing this element of the program.

Codes

Revisions to the State Plumbing Code provide the regulatory incentive to install water efficient toilets and fixtures in all new and remodeled construction projects. These revisions include among many changes, a requirement of 1.6-gallon toilets and 2.5 gpm showerheads.

Retrofit Kits

The City of McCleary has considered participating with the Bonneville Power Administration (BPA) low-flow showerhead rebate and distribution program for electric water heating customers. Although the program of direct installation of the conservation devices is required, showerheads and faucet aerators can be purchased at local hardware stores for customer installations. A retrofit program will be reviewed for its effectiveness in the distribution of the water conservation devices. The specific measures to be considered include: low flow showerheads, faucet aerators, and leak detection kits. The low cost and easily installed items can be distributed by (1) mailing devices to customers upon request; and (2) allowing pick-up of the devices at the utility office. It is estimated that each residence retrofitted with the devices may save approximately 40 gallons per day.

Toilet Leak Detection Kits

A non-toxic dye tablet is put in the toilet tank to color the tank water. Dyed water will appear in the lower bowl if the tank flapper is leaking. A 1984 study by the US Department of Housing and Urban Development (HUD) showed an average toilet leak accounted for 5 to 13 percent of the total interior water use. It has also been estimated about 20 percent of toilets leak. Tablets cost less than $0.50 per package of two. The tablets can be easily supplied upon customer request and can be prominently displayed at the billing payment counter.

GENERAL ACTIVITIES

Water Rate Schedule

There are three general types of water rate structures: declining, flat, and inclining. Under a declining block rate structure, as customer usage increases, the rate the customer pays per additional unit of water declines. Under a flat rate structure, the charge per unit of consumption stays the same across all consumption levels. Under an inclining block structure, as a customer's usage increases, the rate the customer pays per additional unit of water increases. McCleary has an inclining block rate structure.

Consumption History

The customer bill format at some utilities can be changed to show the percentage of increase or decrease in water use compared to the same period in the previous year. This allows customers to track their own conservation progress. Also, a bill that shows the customer's usage relative to the average for the customer class will help to inform the customer how their usage compares to others.

Public Information/Education

A strong public information and education program is essential to the success of individual programs and to build an overall conservation ethic among McCleary's water customers. Furthermore, McCleary's efforts to improve its operation system (such as leak repair) should be publicized. This will let customers know that the City is proactive.

Program components include information on low water use landscaping and lawn water scheduling. Each of these elements has been developed by other utilities and are applicable to McCleary's service area. While educational activities may be extensive and cover several different efforts, it is difficult to quantify the savings that are associated with these general activities.

Water Reclamation

The WUE Rule requires that water utilities with more than 1,000 service connections include an evaluation of water reclamation and reuse opportunities in their water system plans. Since the City of McCleary has less than 1,000 water service connections, it is not required to evaluated water reclamation and reuse.

REGIONAL CONSERVATION PROGRAMS

The effects of a customer conservation program extend beyond the water service area. For example, Seattle Public Utilities heavily promoted water conservation to its customers in 2001 and communities throughout Puget Sound experienced a decrease in

consumption. As the WUE Rule takes effect, neighboring water systems will likely increase their conservation efforts, thus increasing awareness of the need to conserve.

SOURCE OF SUPPLY ANALYSIS

OPTIMIZING USE OF CURRENT SUPPLIES

The City of McCleary has increased the efficiency of its water system in the past 10 years by finding and repairing water system leaks, by requiring compliance with state planning requirements for efficient fixtures for all new construction, by promoting water conservation amongst their customers, and by improved water accounting. The City of McCleary plans to continue these efforts to further optimize its water supply.

ENHANCED CONSERVATION MEASURES

As technology for water leak detection and repair advances, and as more water efficient building fixtures and appliances become the standard, water conservation will be further enhanced by implementation of standard building codes and replacement of aging fixtures and appliances with newer, more water efficient units.

WATER RIGHT CHANGES

Based on Tables 3-12 and 3-13, the City of McCleary's instantaneous water rights of 1,100 gpm and annual water rights of 673 acre-ft/yr are adequate through the entire 20-year planning period at current use rates and projected growth.

ARTIFICIAL RECHARGE

At this time there are no plans for any kind of artificial recharge of the Wildcat Creek Aquifer in the McCleary area.

WATER SUPPLY CHARACTERISTICS

The WUE Guidebook indicates that a Water Use Efficiency Program should include a description of the water system source characteristics. The source characteristics for the McCleary water system are thoroughly described in Chapters 1 and 3, and in related Appendices of this Plan.

CHAPTER 5

WELLHEAD PROTECTION PROGRAM

OVERVIEW

Water from underground aquifers, commonly referred to as groundwater, forms the primary source of drinking water for an estimated 65 percent of Washington state residents. The City of McCleary relies on groundwater as its primary source. Groundwater is pumped from two wells in a single wellfield located north of the City, near the intersection of Summit and Larson Roads. Each of the wells has a casing depth of approximately 94 feet below the ground surface (bgs). The location of the wells is shown on Figure 1-3, and details of the wells are included in Chapter 1 and listed in Table 1-3.

To protect groundwater supplies, the Environmental Protection Agency (EPA) and the Department of Health (DOH) require public water utilities to develop a wellhead protection program as a component of their water system comprehensive plans. The purpose of a wellhead protection program is to provide local utilities with a proactive program for preventing groundwater contamination. A successful wellhead protection program consists of a number of components that must be developed before the plan can be fully implemented. The major components of the plan are described below and form the basis of the following chapter.

- General Water Supply *Background*.
- A *Susceptibility Assessment* determining the susceptibility to contamination.
- A *delineated Wellhead Protection Area* (WHPA), based on all reasonably available hydrogeologic information, including the Susceptibility Assessment.
- An *inventory* within each WHPA of potential sources of contamination.
- A *spill response plan* for each WHPA containing documentation for coordination with local first responders.
- *Contingency plans* for providing alternate sources of drinking water in the event that contamination does occur and management recommendations to reduce the likelihood that potential contaminant sources will pollute the drinking water supply.

Multiple reports have been completed that describe and discuss the City of McCleary's Wellhead Protection, Aquifer Hydrology, and Susceptibility. These reports include:

- **Wildcat Creek Aquifer Hydrology, Regulatory Alternative, and Recommendations – Final Report, prepared for Grays Harbor County and The City of McCleary, June 2008.**

  This report prepared for Grays Harbor County and The City of McCleary by Jim Arthur and the Pacific Groundwater Group describes what is known about the Wildcat Creek Aquifer and recommends actions for its protection and management. The Report was financed jointly by Grays Harbor County, the City of McCleary, the Washington Department of Health, and the Department of Community, Trade, and Economic Development. The full report is included in Appendix L.

- **State of Washington Source Water Protection, Case Study: City of McCleary Public Water Supply Wells, January 2008.**

  The purpose of this study (Horsley Witten Group, Inc.) was to assess the conditions of the City of McCleary's public water supply with respect to water quantity and water quality, and provide recommendations for protection and management strategies for future growth to both county and city officials. The Case Study was financed by jointly Grays Harbor County, the City of McCleary, the Washington Department of Health, and the Department of Community, Trade, and Economic Development. The study is included in Appendix L.

BACKGROUND

The above reports and case studies describe the existence and extent of the Wildcat Creek Aquifer, which serves as the source for McCleary's potable water. The most current report, *Wildcat Creek Aquifer Hydrology, Regulatory Alternative, and Recommendations – Final Report*, details the Wildcat Creek Aquifer and recommends actions for its protection and management.

The City of McCleary draws its water from the Wildcat Creek Aquifer in Grays Harbor County. In addition to the City of McCleary, the Wildcat Creek Aquifer provides water to several hundred individual domestic wells, three Group B public water system wells, and two Group A public water system wells. The Wildcat Creek Aquifer is a semi-confined aquifer located within sedimentary deposits that partly fill a northeast-to southwest oriented valley. The aquifer material consists mostly of sand and gravel that are fragments of rocks from the southeastern Olympic Mountains and northern Cascades.

The Wildcat Creek Aquifer has a confining layer of glacial till that extends throughout the aquifer. This aquifer resides within the advance outwash material beneath the till, not in the thin outwash material at the surface. Pacific Groundwater Group's analysis in the *Wildcat Creek Aquifer Hydrology* Report defined the aquifer's key traits:

- There is a single aquifer.
- City of McCleary wells are drilled through the overlying till into this aquifer.
- The semi-confining effect of the till accounts for the upward pressure in the City's wells.
- While some recharge comes from the surrounding hillsides, most recharge percolates down from precipitation falling directly on the land surface overlying the aquifer. There is little contribution via fractures in basalt.
- Because of its silty or clay matrix, the till delays the percolation of rainwater down to the aquifer. That delay provides some protection against aquifer contamination but also lowers the recharge rate.

Approximately one-third of the aquifer lies within the City of McCleary, including the downtown commercial district and the Simpson mill. The land in the very center of the aquifer is zoned industrial but, except for the 14-acre site of a former pole yard, is currently undeveloped. Port Blakely operated the pole yard for several years but only to peel poles, which were then shipped to another company and location for treatment.

As a result of the *Wildcat Creek Aquifer Hydrology* Report and Case Studies, an amendment to the County Code to designate the Wildcat Creek Aquifer as a Critical Aquifer Recharge Area was completed (Appendix L) but repealed in 2010. In addition, an Interlocal Agreement between Grays Harbor County and the City of McCleary to protect and manage the Wildcat Creek Aquifer by coordinating land use development and establishing the Wildcat Creek Aquifer Joint Management Program was adopted in October 2009 (Appendix L).

SUSCEPTIBILITY ASSESSMENT

Susceptibility is determined by conditions that affect the movement of groundwater, and thus contaminants, from the land surface into the aquifer. Susceptibility is a qualitative measure of how quickly and how far groundwater must travel to reach a water source (in this case McCleary's wells). Confining layers are critical to susceptibility determinations. In general, a confining layer is any earth material that does not readily transmit water. Typically layers of clay or shale may act as a confining layer, depending upon their thickness and lateral extent. When confining layers are present, wells are less susceptible

to contamination because they impede the movement of contaminants from the land surface into underlying aquifers.

McCleary's well reports indicate that confining materials were identified at the 30- to 36-foot level below ground surface. A confining layer exists between the water bearing zone (38 to 90 feet) and the land surface. The well construction can be expected to provide a significant level of protection from contaminants originating at the land surface near the well.

Based on the information provided in the Ground Water Contamination Susceptibility Assessment Survey Form (Appendix L), DOH has classified the wells as having a moderate susceptibility rating.

The Susceptibility Assessment is also used to classify the vulnerability of each water source. Vulnerability is composed of two factors: the physical susceptibility (as noted previously) and the source's risk of exposure to contaminants. The risk of exposure to contaminants is determined by whether or not contaminants were used in the area, or detected in the water supply. DOH has issued a moderate vulnerability rating for the City's sources (based on past Chemical Monitoring Worksheets for Waivers and Waiver Renewals).

Copies of well construction logs for each of McCleary's wells are included in Appendix L.

SANITARY CONTROL AREAS

The first component of a wellhead protection area is the protective area required by WAC 246-290-135 (sanitary control area). This area should already be tightly controlled by the public water supply to minimize any direct contamination at the wellhead. It should be managed to reduce the possibility of surface flows reaching the wellhead and traveling down the casing. All public water systems are encouraged to have a wellhouse or a fenced area around each wellhead. This helps protect individual wells from any direct introduction of contaminants.

The City of McCleary owns the property where each well is located. The 100-foot sanitary control area encompassing the new Well 2 is comprised of a circular gravel driveway extending approximately 50 feet from the well. Beyond that the control area consists mostly of trees and includes a backwash pond and an access road that passes in front of the wellhouse. The backwash pond is a settling basin for the WTP backwash process. The pond was constructed with an asphalt bottom and adjacent to a manhole structure equipped with a pump and force main connected to the City's sanitary sewer. Backwash is not allowed to infiltrate and is pumped directly to the City's sewer system. The access road is gated to exclude private vehicle access. In addition, the sanitary control area contains a railway spur line that connects to the main railway, which is

approximately 160 feet from the wellhead. Railway maintenance includes annual herbicide application on the railway bed. This is outside the 100-foot sanitary control area; however, application of herbicides within this proximity does pose a limited concern.

The 100-foot sanitary control area encompassing the new Well 3 is comprised predominantly of trees. The access road also runs adjacent to the wellhouse.

WHPA DELINEATIONS

The first step in developing a wellhead protection program is to establish the land areas around each well from which groundwater may be flowing to the well. These areas which may potentially contribute pollutants to the groundwater are referred to as Zones of Contribution (ZOCs). The time-of-travel for a given ZOC is determined by estimating the travel distance in feet of a hypothetical particle of water traveling through the aquifer to a pumping well over a selected period of time. ZOCs require proper land use management to minimize the possibility of contaminants entering the groundwater system. The most commonly accepted tools for delineating wellhead protection zones are the calculated fixed radius method, analytical models, and numerical models. These methods are discussed below.

METHODS OF DELINEATION

Calculated Fixed Radius Method

The simplest groundwater model is the calculated fixed radius (CFR) method. In this method, ZOCs are delineated by concentric areas around each well. In the CFR method, the delineations are calculated based on projected groundwater withdrawal rates and known or assumed aquifer characteristics.

Analytical Models

The analytical model requires the incorporation of basic hydrological information and certain physical characteristics of the aquifer and well. Major assumptions and simplifications to the hydrogeologic regime occur in analytical modeling, but the incorporation of the hydraulic gradient and hydrogeologic boundaries allows for a more realistic representation of the groundwater flow regime than in the CFR method.

Numeric Method

The numeric method requires significantly more data. In numeric modeling, a grid is superimposed over the study area. Each square in the grid, called a cell, is characterized by physical parameters which are estimated from data collected from a variety of sources.

The sources may include well logs, geologic and hydrogeologic maps, geophysical data, groundwater elevation data, stream flow discharge and meteorological data.

The numeric method generates more accurate results than the CFR or analytical model methods. However, numeric models are very costly to develop. Consequently, numeric models are more commonly used by large utilities with complex aquifers which have the resources to collect the extensive model input required.

ANALYSIS

The City of McCleary has delineated their one, 5- and 10-year times of travel Zones of Contribution with the use of multiple groundwater models and a hydrogeologic characterization of the Wildcat Creek Aquifer performed by Hart Crowser (1994). The groundwater models that were utilized included PLASM (Prickett and Lonquist, 1971) and GWPATH (Shafer, 1987b). Hart Crowser conducted a capture zone analysis to determine areas where the McCleary wellfield is most vulnerable to land use impacts. The analysis used a numerical modeling method, with input from the aquifer pumping test conducted at one of the City's wells in July 1993.

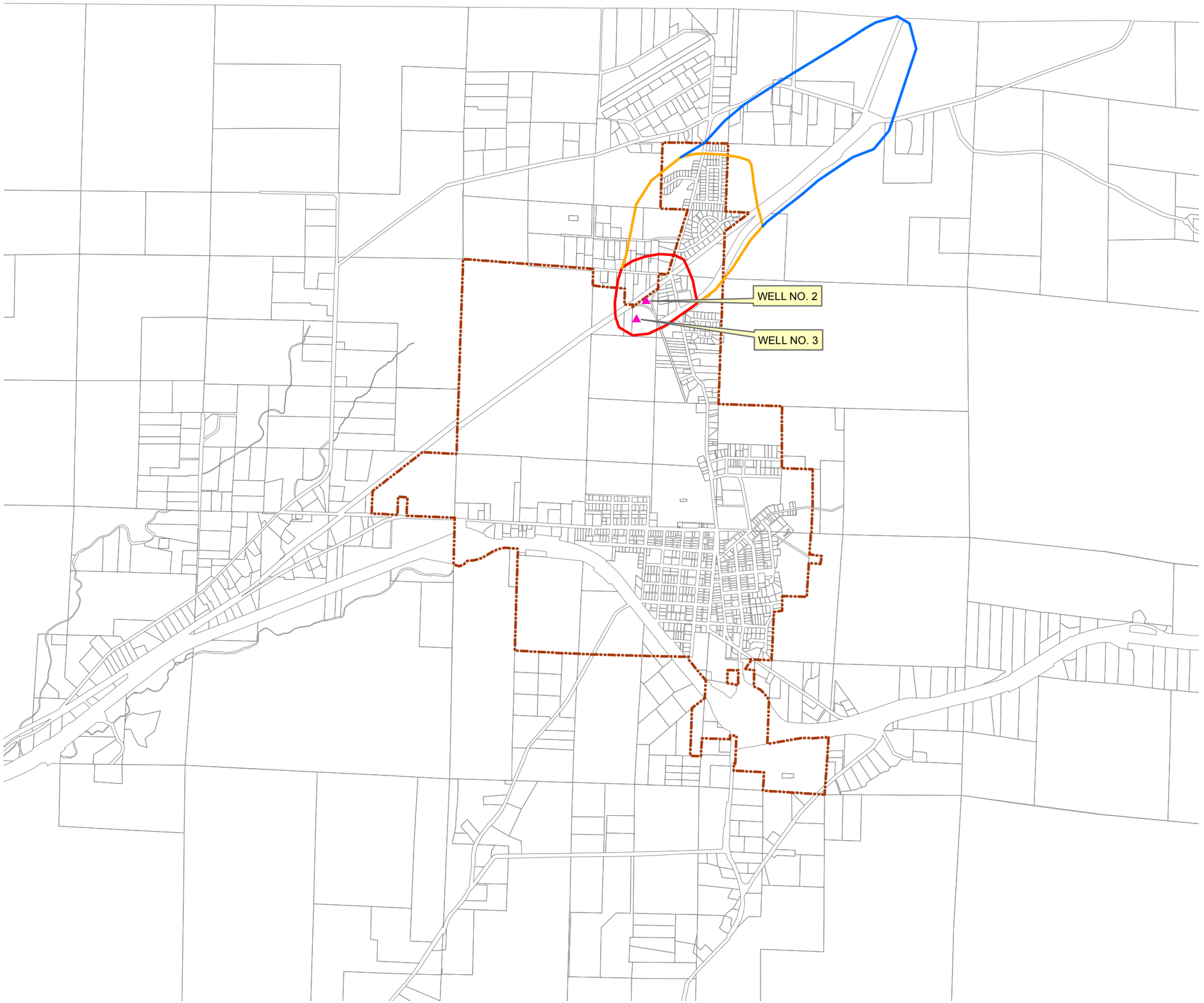
The aquifer recharge area is assumed to be all the area within the geologic boundaries of the valley. The capture zone for the wellfield is an elongated ellipsoidal area that was originally proposed to be approximately 5,000 feet in length and 1,000-feet wide at its widest point. The shape of the capture zone tends in a northeasterly direction from the wellhead. However, due to uncertainties of the hydraulic properties within the aquifer, the Pacific Groundwater Group has recommended that the width of 10-year time-of-travel capture zone be increased by approximately 50 percent to the west and to the east, the zone extends to the railroad line and highway to include the potential for spills from traffic utilizing those transportation corridors.

While this larger capture zone does not cover the entire area from which water may be influencing City wells, it does sufficiently cover the area that could contribute contaminants to the wells. In addition to the added protection of the expanded capture zone, the glacial till that covers the entire Wildcat Creek Aquifer provides additional filtration for septic effluent and delays the vertical movement of contaminants down into the aquifer.

Figure 5-1 shows the City's Zones of Contribution and the perimeter of the Wildcat Creek Aquifer (Pacific Groundwater Group, June 2008).

CONTAMINANT SOURCE INVENTORY

An essential element of wellhead protection is an inventory of all potential sources of groundwater contamination in and around the delineated WHPAs. The purpose of the inventory is to identify past, present, and proposed activities that may pose a threat to the



N

0 2,000 4,000 Feet

Legend:

- WELL
- CITY LIMITS

ZONES OF CONTRIBUTION:

- 1- YEAR
- 5-YEAR
- 10-YEAR

CITY OF McCLEARY

FIGURE 5-1
WELLHEAD PROTECTION MAP
ZONES OF CONTRIBUTION

Gray & Osborne, Inc.
CONSULTING ENGINEERS

Document Path: M:\McCleary\14234.00 Water System Plan\Figures\ZOC.mxd

well or surrounding area. The inventory can also help to plan management strategies and establish a mailing list to notify businesses located within the WHPAs.

INVENTORY DATA SOURCES

The inventory of potential contaminant sources was compiled using various data sources. Field surveys were conducted in order to inventory potential sources of contamination and identify land use activities which may pose threats to groundwater quality. In addition, Ecology maintains a contaminant database that lists businesses that handle and store potential contaminants. The following databases were used to create the inventory for the McCleary WHPAs:

- Washington State Department of Ecology Facility Site Atlas: The Washington State Department of Ecology maintains an interactive map showing regulated facilities and locations of historic spills and leaks at the following web site:

  https://fortress.wa.gov/ecy/facilitysite/MapData/MapSearch.aspx

  The web site links to the Underground Storage Tank Program, including records of registered underground storage tanks and underground storage tanks that are known to have leaked, the Dangerous Waste and Materials Generators program, including locations of registered dangerous waste and materials handlers, Title III Hazardous Materials sites, including locations of regulated facilities that treat, store or dispose of hazardous materials in sufficient quantity to pose a threat to the community, regulated Waste Dischargers, and Confirmed and Suspected Contamination Sites. This web site was accessed and a list of facilities in McCleary's Zones of Contribution area was obtained.

- General Web Searches: General web searches were made for various businesses that have a potential to cause groundwater contamination, including dry cleaners, auto repair shops, paint shops, and metal plating.

POTENTIAL CONTAMINANT SOURCES

Field surveys indicate that the community is subject to a limited number of land use activities within the Zones of Contribution. The wells are located between residential and undeveloped land on the northern boundary of the community. Residential areas can be a source of contamination when uninformed or uncaring property owners misuse or improperly dispose of hazardous chemicals. The most prevalent potential threat to clean water posed in residential areas are individual residential septic systems. The Washington Department of Health regulates septic systems in terms of permit review, land area requirements, and site characteristic evaluations (WAC 246-272C -0110, -0120,

-0125). The Grays Harbor County Department of Health is responsible for enforcement of septic system regulations.

A majority of the 5- and 10-year Zones of Contribution are forested private timberland. The areas that are used for timber production all have very young stands and will not be harvestable for decades.

Appendix L includes a list of all property owners and mailing addresses within the City's 10-year Zone of Contribution. The appendix also includes the letter and the wellhead protection figure (Figure 5-1) that was mailed to all those property owners notifying them of their property's location within the City's wellhead protection area and activities within that area may have the potential to adversely affect groundwater quality.

An additional potential threat is accidental spillage of hazardous materials transported along State Route 108 or the Puget Sound and Pacific Rail corridor, both of which lie within the 1-, 5-, and 10-year time of travel zones. These potential threats are discussed in more detail under Spill/Incident Response Program and Contingency Planning section of this chapter.

The most direct pathway for contamination to threaten the quality of local groundwater is surface water seepage along well casings. Poorly sealed wells and those with deteriorated (rusted and/or cracked) casings can allow surface water to migrate into the aquifer. This is caused by inadequate well construction and pertains to both abandoned wells and wells currently in service. Proper maintenance and periodic inspection of wells can minimize this threat. Additionally, the existence and location of abandoned wells are generally poorly documented. If an abandoned well is located, the Department of Health and Ecology will be contacted for the latest abandonment and documentation procedures.

Two facilities were identified from the Department of Ecology Facility Site website and no other facilities were identified through general web searches. These facilities are described as follows:

Site 1: Brogan Anensen Summit Place

This site is listed as Facility/Site: 7392 on Ecology's website and describes the site as a Construction Stormwater General Permit for excavating and foundation work under Ecology's Water Quality Program. The end date listed was December 16, 2010. All indications show this site no longer active. This facility was located on the perimeter of the 5-year Zone of Contribution. Construction at this site may have an impact on surface water, but impacts to groundwater are doubtful.

Site 2: Port Blakely Tree Farms - McCleary

This site is listed as Facility/Site: 22438661 on Ecology's website and describes the site as an Underground Storage Tank (March 20, 2000) under Ecology's Toxics Program. The Ecology record indicates that this site was previously listed as a Leaking Underground Storage Tank (LUST) Facility with an ending date of November 24, 1992). This facility is located in the ten-year Zone of Contribution.

Facilities identified above are listed in Table 5-1, and shown in Figure 5-1.

TABLE 5-1

Wellhead Protection Area Potential Sources of Contamination

Site No.	Site Name	Ecology Identifier No.	Site Address	Brief Description
1	Brogan Anensen Summit Place	7392	Lat: 47.0764 Long: -123.268	Excavating and Foundation Work
2	Port Blakely Tree Farms McCleary	22438661	Lat: 47.07594 Long: -123.25802	Underground Storage Tank

In addition to facilities identified on the Ecology Facility Site website and located by internet web searches, it should also be noted that the area inside McCleary's City limits is served by the city's sanitary sewer system. The City limits are included in portions of the 1-, 5-, and 10-year Zones of Contribution as shown in Figure 5-1. There are no other community sewer systems within McCleary's Zones of Contribution. Therefore, all other wastewater from any businesses and residences is disposed of in septic tank/drainfield disposal systems.

Potential Sources of Contamination by Wellhead Protection Zone

Sites identified in Table 5-1 are indicated by the Zone of Contribution in Table 5-2.

TABLE 5-2

Sites by Wellhead Protection Zone

Zone of Contribution	Sites	Other
1-year	None	Residential Septic Tank Drainfields, State Route 108, and the Puget Sound and Pacific Rail corridor
5-year	None	Residential Septic Tank Drainfields, State Route 108, and the Puget Sound and Pacific Rail corridor
10-year	1,2	Residential Septic Tank Drainfields, State Route 108, and the Puget Sound and Pacific Rail corridor

TYPICAL CONTAMINANTS FROM TYPICAL CONTAMINANT SOURCES

Landfills

A landfill is a disposal facility in which solid waste is permanently placed. Minimum functional standards for solid waste hauling are regulated by the Washington State Department of Ecology under WAC 173-304. These regulations set siting and closure criteria, performance standards, and operating requirements for landfills. Abandoned and improperly maintained landfills and dump sites are often a major source of groundwater contamination. Leachate from landfills poses a threat to groundwater quality should it migrate to the water table. The Department of Ecology is responsible for mitigating dump site cleanup when potentially hazardous leachates are present.

There are no known active or abandoned landfills within the wellhead protection ZOCs for the City of McCleary wellfield.

Commercial and Industrial Activity

Areas of commercial and industrial land use are located within most wellhead protection boundaries. Businesses that may contribute contaminants to the groundwater include dry cleaners, gas stations and other businesses with fuel storage tanks, auto repair shops, metal plating facilities, asphalt and concrete facilities, and machine shops. Wastes generated at these businesses include substances such a petroleum products, solvents, surfactants, heavy metals, and other organic materials. These wastes can potentially enter the groundwater system through inadequate disposal practices or accidental spills. Table 5-3 presents typical commercial and industrial activities and the potentially hazardous chemicals that may be associated with them.

TABLE 5-3

Chemicals Associated with Commercial and Industrial Activities

Commercial/Industrial Activity	Contaminants
Automobile/Truck Service	waste oils, solvents, acids, paints, soaps
Dry Cleaners	solvents (perchloroethylene, petroleum solvents, Freon) spotting chemicals (trichloroethane, methylchloroform, ammonia, peroxides, hydrochloric acid, rust removers, amyl acetate)
Cemeteries	fertilizers, pesticides
Country Clubs/Golf Courses	fertilizers, herbicides, pesticides, swimming pool chemicals, automotive wastes
Electric/Electronic Equipment Manufacturers	nitric, hydrochloric and sulfuric acid, heavy metal sludges, ammonium persulfate, cutting oil and degreasing solvent, corrosive soldering flux, waste plating solution, cyanide, methylene chloride, perchloroetheylene, trichloroethane, acetone methanol
Furniture/Wood Manufacturing	paints, solvents, degreasing and solvent recovery sludge
Metal Plating Shops	sodium and hydrogen cyanide, metallic salts, alkaline solutions, acids, solvents, heavy metal contaminated wastewater/sludge
Lawns and Gardens	fertilizers, herbicides, pesticides
Painters, Publishers	solvents, inks, dyes, oils, miscellaneous organics, photographic chemicals
Sand and Gravel Mining	diesel fuel, motor oil, hydraulic fluids
Scrap, Salvage and Junkyards	used oil, gasoline, antifreeze, PCB contaminated oils, lead acid batteries

The siting and operation of facilities that treat, store, or dispose of hazardous waste are subject to the requirements of the Resource Conservation and Recovery Act (RCRA), Subtitle C. In Washington State, the Department of Ecology regulates facilities that generate more than 220 pounds of hazardous waste per month under WAC 173-303, Dangerous Waste Regulations. The regulations are significant in that they establish a number of requirements for these facilities including surveillance and monitoring, record keeping, performance and design criteria, and siting and closure procedures. Ecology divides the facilities into three levels of hazardous waste accumulation: Level 1 facilities generate 2,200 pounds of waste per month or more; Level 2 facilities generate between 220 and 2,200 pounds per month; and Level 3 facilities generate less than 220 pounds. Level 3 generators are exempt from the regulations. All Level 1 and 2 facilities must initially file a report of their activities with Ecology and update those activities annually.

A summary of those activities is published by Ecology, thereby allowing water purveyors the opportunity to determine the types of activities present within their WHPA.

Underground Storage Tanks

Underground storage tanks (USTs) and leaking underground storage tanks (LUSTs) can be a major threat to groundwater quality. Petroleum products, which may contain impurities that are mobile in the groundwater system, are the most commonly stored substances in USTs. The EPA estimates that 35 percent of all USTs could be leaking. The most common causes of leaks are structural failure, corrosion, improper fittings, and improper installation.

Ecology regulates underground storage tanks in Washington State under WAC 173-360. The regulations require that owners and operators of underground storage tanks comply with the following sections of the regulations:

- Notification, reporting, and record keeping.
- Performance standards and operating closure requirements.
- Registration and licensing.
- Financial responsibility.

As of July 1, 1991, owners and operators of all existing nonexempt underground storage tanks must have a permit from Ecology. A valid permit is a requirement for delivery of regulated substances. The permit must be updated annually.

Underground storage tank inspections are performed by Ecology primarily through the information developed in the permitting process. Ecology maintains a file on all permitted USTs in Washington State, as required by RCRA, Subtitle 1. The file provides the site name and address, tank identification number, date of installation, size, tank status, and the substance stored at the site.

Septic Systems

Grays Harbor County Health Department is responsible for regulating and permitting residential and small commercial on-site sewage treatment systems within the county, excluding federal facilities. Contaminants associated with septic tank effluent include pathogenic organisms, toxic substances, and various nitrogen compounds, including ammonia and nitrate, that are highly soluble in water. Most septic drain fields discharge treated sewage effluent to the unsaturated zone above unconfined aquifers. Contaminants from drain fields can percolate to the saturated zone and contaminate groundwater supplies.

A properly designed septic system can provide reasonable protection from groundwater contamination by pathogenic organisms. Nitrate and ammonia discharging from septic

systems are generally in small enough amounts that they are sufficiently diluted in the groundwater. An improperly designed septic tank/drainfield in excessively porous soils, however, can allow pathogens to reach groundwater unimpeded. Evidence of this type of septic system failure is not readily visible since drainage from these systems does not cause ponding or odor problems. Contamination from this type of source is very difficult to trace. There are three practical means of protecting a water supply from this type of problem: (1) Make sure that all new septic systems installed in areas of the wellhead protection zone are carefully designed and properly installed. (2) Ensure that existing systems are properly maintained by pumping septic tanks on a regular basis. (3) Educate property owners regarding the proper use and maintenance of their systems.

Perhaps the largest threat to groundwater from septic systems is their improper use. Septic systems are neither designed to remove most chemical wastes from water nor are they capable of removing these substances. Solvents, fuels, waste oil, photo chemicals and a large number of other wastes pass through septic systems without any effective treatment. Many solvents also pass relatively easily through low permeability geologic strata. Therefore, one of the most effective actions that can be taken within a WHPA to improve protection from septic systems is to reduce the amount of inappropriate materials being disposed of through these systems. This may be done through public education and assistance with proper toxic waste disposal. If people are informed as to what should not be dumped into a septic system and the reasons why, and if they are assisted in finding a more appropriate way to dispose of toxic wastes, the likelihood that they will dispose of toxic wastes to their septic systems will be reduced. Generally, information regarding the proper storage and disposal of hazardous wastes and a convenient location for waste drop-off will reduce dumping into septic systems more effectively than an enforcement program. It is virtually impossible to police or regulate the dumping of toxic wastes into individual septic systems.

Accidental Spills

Accidental spills or releases of contaminants can potentially impact groundwater supplies. Potential sources of spills and leaks include underground storage tanks, roadway or railway accidents, and poor disposal practices. The Gray Harbor County Emergency Management Agency will respond to emergency situations, such as public water supply contamination. The Grays Harbor County Emergency Management Agency contact number is (360) 249-3911, Ext. 1575.

The Washington State Patrol is the first responder for hazardous material spills on state and interstate highways. The State Patrol then notifies the Department of Ecology, who in turn authorizes an independent contractor to clean up the spill.

Confirmed or Suspected Contamination Sites

Under the Model Toxics Control Act Cleanup, WAC 173-340, the Department of Ecology is responsible for ensuring all hazardous waste sites are properly remediated. This includes confirmed and suspected sites of contamination as well as LUSTs. A separate inventory for each, which includes the status of cleanup efforts, is maintained by Ecology. Ecology conducts an initial site investigation within 90 days of learning of a potentially contaminated site. If this investigation shows that remediation action is required, the site will appear on the Confirmed and Suspected Contaminated Sites Report. The sites are also given a Washington Ranking Mode BIN number between one and five. A rank of one indicates the greatest assessed risk to human health and the environment. The contaminant type and the affected media, such as groundwater, is also noted. Once the remedial action has been completed, Ecology's Toxics Cleanup Program determines if the site can be removed from the list.

MANAGEMENT STRATEGIES

WHPAs have been defined and potential sources of contamination have been identified. In order for this to result in actual protection for the City of McCleary's wells, a management plan must be put into place. The goals of a management plan are to:

- Reduce the likelihood that potential groundwater contaminants will be disposed, spilled, leaked or otherwise discharged in the WHPA such that they could contaminate groundwater.

- Increase the likelihood that any potential groundwater contaminants which do get disposed, spilled, leaked or otherwise discharged in the WHPA will get cleaned up before they reach the public water supply wells.

- Detect any groundwater contamination that may occur before public health is affected.

- Develop a plan of action for the possible event that McCleary's water supply should become contaminated.

Minimum requirements for a WHPA management plan are specified in WAC 246-290-135(c). These requirements include the following:

1. Notification to owners/operators of known or potential sources of contamination within the WHPA of the findings of the wellhead protection plan.

2. Notification to regulatory agencies and local governments of the boundaries and findings of the WHPA.

3. Documentation of coordination with local emergency incident responders (including police, fire and health departments), including notification of WHPA boundaries, results of the susceptibility assessment, inventory findings, and a contingency plan.

4. Completion of a contingency plan to assure that water system customers will have an adequate supply of potable water in the event of temporary or permanent loss of the principal source of supply.

In order for the City of McCleary to protect its existing wellfield from contamination and manage its resources in a responsible manner if contamination should occur, the City will take the following actions.

- Notify Brogan Anensen Summit Place and the Port Blakely Tree Farms (McCleary) of their presence in the City of McCleary WHPA.

  The City of McCleary will ensure that any business that could potentially contaminate the McCleary wellfield be aware that they lie within or near the WHPA. Notification letters and wellhead protection inventory maps will be sent to the owners/operators of potential contaminant sources.

- Initiate a public education campaign to convey the importance of proper use and maintenance of septic systems. Notify private property owners and their tenants with existing on-site septic systems and undeveloped lots of their presence within the City of McCleary WHPA.

  The City of McCleary or Grays Harbor County (depending on which jurisdiction the septic system is located) will ensure that the owners/tenants with on-site septic systems that could potentially contaminate the City of McCleary wellfield be aware that they lie within the WHPA. Notification letters and wellhead protection inventory maps will be sent to the owners/occupants of potential contaminant sources.

- Monitor for nitrates annually.

  Contaminants associated with septic systems include pathogenic organisms, toxic substances, and nitrogen compounds. The City of McCleary will not only be aware of non-compliance with MCLs for nitrates, but also trends of increased nitrate levels over a period of time. Increasing nitrate levels could be an indication of source contamination.

- Coordinate with county and local emergency incident responders to implement a spill/response program as outlined further in this chapter.

  The City of McCleary will ensure that local and county agencies are aware of the location of the WHPAs. Notification letters and WHPA maps will be sent to the local fire department, Grays Harbor County planning, health and emergency management agencies, and the Department of Ecology.

- Signage instilling the importance of water supply protection.

  The City of McCleary has posted metal signs reading, "WATER SUPPLY PROTECTION AREA" in the area around the wellfield to help foster greater awareness of the groundwater protection needs within the immediate vicinity of the wellhead.

- Implement the contingency plan outlined in this chapter to ensure that an adequate supply of potable water is provided in the event of temporary or permanent loss of the principal supply.

SPILL/INCIDENT RESPONSE PROGRAM

Spill response planning is an important aspect of both an emergency management plan and a wellhead protection program. Specific response procedures for WHPAs must be determined prior to the occurrence of a contamination incident. The information obtained as a result of the susceptibility assessment and the WHPA inventory can be used to determine what types of spill response measures are necessary for the protection of drinking water sources. In order to be accepted by local emergency responders, spill response procedures for WHPAs will be realistic and easily implemented.

In order for spill response procedures to be effectively executed, coordination, cooperation, and communication among the responding agencies, organizations, and individuals is imperative. Depending on the magnitude and type of the release, any of the following organizations may be involved in a spill response for a WHPA in Washington State.

- *Department of Ecology (Ecology):* The Spill Response Team is responsible for determining the source and cause of the release, and responsible party. If the responsible party is unknown, Ecology will investigate to determine who is responsible and ensure that containment, clean-up, and disposal proceedings begin. Ecology's 24 Hour Spill Response can be contacted at (360) 407-6300.

- *Department of Health (DOH):* The Department of Health is developing a set of standard operating procedures, in conjunction with organizations such as Ecology's Spill Operations Section and the Association of Fire Chiefs that first responders can use in WHPAs, critical aquifer recharge areas, and other sensitive groundwater areas. DOH also provides laboratory support and services to assist in the clean-up effort, if necessary.

- *Department of Transportation (DOT):* The Washington State DOT can provide spill response assistance through traffic control, equipment, and personnel for non-hazardous clean-up activities on state and interstate highways.

- *Grays Harbor County Emergency Management Agency:* Grays Harbor County has a department designated to respond to emergency situations, such as public water supply contamination. The Grays Harbor County contact number is (360) 249-3911 ext. 1575.

- *City of McCleary Water Department Staff:* Initial response to a hazardous spill will most likely be made by City of McCleary staff or first responders from the local fire department.

CONTINGENCY PLANNING

Contingency planning is an important component of a wellhead protection program. If McCleary's wellfield must be taken offline due to contamination, a contingency plan provides immediate mitigation. A properly prepared and updated contingency plan helps ensure that the water system and local officials are prepared to respond to emergency situations. Contingency planning also includes provision of alternative sources of drinking water. The following steps are necessary for the development of an effective contingency plan:

- Identify maximum capacities of the existing system as to source, distribution system and water rights restrictions. Assume loss of the largest source and reevaluate.
- Evaluate the expansion options of the existing system's capacities relative to existing water rights.
- Identify existing or potential interties with other public water systems.
- Evaluate current procedures and make recommendations on contingency plans for emergency events.

Chapters 2 and 3 of this Plan have documented the existing and future capacity of the water supply, storage and distribution system. This report also documents that McCleary

has maintained storage capacity in excess of the minimum required by DOH regulations for back-up purposes.

There are no immediate water purveyors in the vicinity of McCleary to make the possibility of an intertie feasible. Since the two wells in the wellfield are located adjacent to one another, any contamination experienced in one well will be readily transmitted to the other well.

If, in spite of the best efforts of the City of McCleary and the owners/operators of potential contamination sources to protect the groundwater resources, contamination does occur, the following contingency plan elements will be implemented:

- Contact the appropriate agency to deal with any spill, leak or contamination event as noted in Chapter 6.

- Isolate the contamination source from the system. During a hazardous spill event, securing a backhoe or other equipment to remove the contaminated material will be conducted. The City has interlocal agreements with neighboring utilities for heavy equipment, if needed. Utilize the remaining storage to supply customers.

- Inform McCleary customers through use of local media and door to door notification.

- Impose outdoor watering restrictions and usage curtailment as required.

- Supplement the storage tanks with water hauled from a nearby public water system and/or provide bottled water, if needed.

- In the event of long-term loss of use of one or more wells, investigate a new well site for additional source capacity.

CHAPTER 6

OPERATION AND MAINTENANCE PROGRAM

OBJECTIVE

The objective of this chapter is to provide an evaluation of the City of McCleary's Operation and Maintenance (O&M) Program and its ability to assure satisfactory management of the water system operations in accordance with WAC 246-290-100, -300, -310, -320, -440, -480, and -490 and WAC 246-292-020, -050, and -090. The City maintains specific water system component related documentation for use by operation's personnel. This information is considered sensitive information and is not intended for general distribution to the public.

The O&M Program includes the following elements:

- Water System Management and Personnel.
- Operator Certification.
- System Operation and Control.
- Comprehensive Monitoring Plan.
- Emergency Response Program.
- Safety Procedures.
- Cross-Connection Control Program.
- Customer Complaint Response Program.
- Recordkeeping and Reporting.
- O&M Improvements.

The following sections are presented as an assessment of the adequacy of each section of McCleary's Operation and Management Program.

WATER SYSTEM MANAGEMENT AND PERSONNEL

Waterworks Operator Certification, specified in WAC 246-292, requires all Class A water systems in Washington State to retain in their employment, individuals who are certified, by examinations, as competent in water supply operation and/or management. The Washington State Department of Health (DOH) determines the required level and number of certified positions based on the population and complexity of the water system. Minimum education and experience requirements for the various certification levels are detailed in the Water Works Operators Certification Regulations, published by the DOH.

OPERATOR CERTIFICATION

According to the 2013 Sanitary Survey, the WTP requires operation by a Basic Treatment Operator (BTO). According to DOH's Waterworks Operator Certification Chapter 246-292 of the WAC, DOH will reclassify the BTO classification to a Water Treatment Plant Operator 1 if the operator has 12 months experience and meets certain requirements. Mr. Jon Ehresmann meets these requirements. Water Distribution Managers (WDM) perform or manage routine on-site duties in the distribution system of a public water system that serves more than 250 people. The City of McCleary water system is required to have two certified operators. McCleary complies with WAC 246-292 by employing the personnel listed in Table 6-1.

TABLE 6-1

Water Certification List

Name	Certification	Certification Number
Jon Ehresmann	Water Distribution Manager 2 Water Treatment Plant Operator 1 Cross-Connection Control Specialist	9902
John Allardin	Water Distribution Manager 2	11163
Todd Baun	Water Distribution Manager 2	10100
Joe Pittman	Water Distribution Manager 3	12170
Kevin Trewhella	Not Certified	

PROFESSIONAL GROWTH REQUIREMENTS

In order to promote and maintain expertise for the various grades of operator certification, Washington State requires that all certified operators complete not less than three Continuing Education Units (CEU) within each 3-year period. Programs sponsored by both Washington Environmental Training Resources Center (WETRC) and the American Waterworks Association (AWWA) Pacific Northwest Subsection are the most popular sources of CEUs for certified operators in Washington State.

http://www.doh.wa.gov/ehp/dw/Our_Main_Pages/training.htm

Besides providing CEUs, operator training is an important component in maintaining a safe and reliable water system. At a minimum, all personnel performing water system related duties should receive training in the following areas.

- Confined space
- Trenching and shoring

- Traffic flagging
- Asbestos cement pipe safety
- Cross-Connection Control

McCleary's certified operators all complete CEUs on a regular basis. All certified operators have received training in the areas listed above.

SYSTEM OPERATION AND CONTROL

The City of McCleary staff is responsible for the daily operations of its wells, treatment facilities, telemetry equipment, storage facilities, and distribution system.

MAJOR SYSTEM COMPONENTS

The identification of major system components was completed in Chapters 1 and 3. McCleary supplies water to its customers with the use of the following major system components:

- Source of Supply – two wells
- Treatment Systems
  - Potassium Permanganate
  - Sodium Hypochlorite
  - Pyrolusite catalytic oxidation / filtration
- Water Storage – two reservoirs
- Distribution System

Source of Supply

The City of McCleary currently operates two wells, Well 2 and Well 3. Well 2 has a capacity of 400 gpm and Well 3 has a capacity of 500 gpm. The total capacity of the wells is 900 gpm. The current output of the well pumps installed is 900 gpm.

Treatment System

McCleary installed a Pyrolusite catalytic oxidation/filtration treatment system manufactured by ATEC Systems for iron and manganese removal.

Treatment with potassium permanganate is required because the source water includes active silica. Potassium permanganate is added first to neutralize any silica that is in the source water followed by sodium hypochlorite injection into the raw water to oxidize the iron and manganese. Chlorine is utilized both as an oxidation catalyst in the pyrolusite treatment process and as a disinfectant agent. The filter media is backwashed regularly to remove the accumulated iron and manganese deposits.

Water Storage

The City of McCleary operates two storage tanks with nominal capacities of 150,000 gallons and 500,000 gallons, and a total gross capacity of 672,700 gallons. Both are constructed of welded steel.

Distribution System

The distribution system is a looped network that has been constructed over the last 75 years and includes approximately 12 miles of piping ranging in size from 2 to 10 inches. The system is comprised of pipes made from Polyvinyl Chloride (PVC), Asbestos Cement (AC), Cast Iron (CI), Ductile Iron (DI), Polyethylene (PE), and galvanized iron. Approximately half of the distribution system is comprised of AC waterline.

Operation and Control

The water system operations are controlled by a computerized PLC/HMI system. Reservoir level transducers relay water levels via radio telemetry to the PLC located in the Water Treatment Plant operations building. The PLC is interfaced with a desktop computer HMI system that allows limited direct control of the PLC. The wells and Water Treatment Plant are called to operate based on reservoir water levels.

The HMI system utilizes WIN-911 emergency telephone notification capability in the case of a system failure. After an alarm is detected from the automated process, WIN-911 notifies a list of users about the alarm condition via an SMS, e-mail, pager, or voice call.

The City of McCleary has extensive manufacturer's Operation and Maintenance Manuals (five volumes) for well field control.

COMPREHENSIVE MONITORING PLAN

WATER QUALITY MONITORING

The City of McCleary receives an annual report from the Department of Health defining water quality tests and associated testing frequencies. The monitoring requirements are found in Appendix H. An analysis of McCleary's most current test results can be found in Chapter 3. McCleary is also required to publish a Consumer Confidence Report (CCR) every year to describe any deficiencies the water system may have to its customers. A copy of the most recent CCR can be found in Appendix G.

PREVENTIVE MAINTENANCE PROGRAM

The most cost-effective method for maintaining a water system is to provide a planned preventive maintenance (PM) program. A planned PM program can provide the optimum level of maintenance activities for the least total maintenance cost. The routine maintenance procedures for each system component are as follows.

Wells

Routine maintenance for the wells includes keeping records of water meter totalizer and flow rate readings for each well, discharge pressures, periodic sounding of the static and pumping water levels in each well, and keeping the facilities clean. Water quality samples must be taken at each well as required by the Washington State Department of Health. Summaries of the total annual production of each well are maintained. Records are maintained of the original well construction, any modifications to the well construction, all equipment installed in each well and all service performed on the equipment.

The well site is visited daily. Pumps are visually inspected, motor lubricating oil checked, and shaft lubrication inspected. Once each month the well is sounded for water levels during various operating conditions.

Treatment

Routine maintenance for the treatment systems include record keeping of all chemical feed mix preparation, chemical feed usage, chemical dosage, and chlorine residual following treatment. Treatment documentation and performance records are maintained for each well at the Water Treatment Plant.

Reservoirs

Improperly maintained reservoirs can cause contamination in public water systems. This is a result of contaminants entering the reservoir through cracks or openings at the vent, overflow, or drain screens. Deteriorating hatch cover seals and vandalism can also compromise reservoir water quality. Poorly designed and maintained reservoirs can hamper the emergency operation of a water system. If reservoir drains are not functioning properly, it may be impossible to purge a contaminant from the system. Written documentation of reservoir maintenance must be completed with each inspection and repair, and a copy of the report retained on file. A sample storage inspection report form is included in Appendix M.

Periodic Maintenance

Storage tanks are visited daily and tank interiors are inspected annually and cleaned as required. Exterior cleaning and painting of tanks is conducted as required.

It is important that each reservoir is cleaned and inspected for leaks at least once every 5 years. This involves taking one of the reservoirs out of service, draining it completely and inspecting the condition of the interior and exterior paint. Observe the extent and depth of any pitting in the reservoir surface. Check the floor and footings for any leaks or cracks. Check the roof of the reservoir for rust and cracking. In the event of a coating failure of either the interior or exterior of the storage tank, a National Association of Corrosion Engineers (NACE) certified inspection should be scheduled to evaluate the condition of the coating and the tank and formalize a repair plan.

Periodic maintenance of the reservoirs will include the following. Vent screens and the integrity of the access hatch and other openings into the reservoir will be inspected quarterly. Any opening that may allow the entry of insects or small animals will either be sealed or screened accordingly.

Cleaning and Disinfection

The exterior of the reservoirs will be pressure washed every 5 years to remove the build-up of moss and algae. The interior walls and bottoms of the reservoirs will be cleaned prior to disinfection to remove all dirt and loose material. These interior surfaces should be cleaned by thorough sweeping or scrubbing. The floor and lower walls of the reservoirs may be suitably cleaned from a jet of water from a hose nozzle. Care should be taken to remove any scaffolding, planks, tools, rags or other materials not a part of the structure.

The reservoirs can be adequately disinfected by the direct application of a strong chlorine solution to the inner surfaces of the structure. A 200 ppm available chlorine solution is prepared by dissolving one ounce of High Test Hypochlorite - HTH (65 percent calcium hypochlorite) to 24 gallons of water, or by diluting one gallon of household bleach in 260 gallons of water. The HTH powder should be made into a paste and then added to the water. This solution can be applied with suitable brushes or spray equipment. The solution should thoroughly coat all exposed surfaces, including the inlet/outlet piping and drain piping, such that the piping should have available chlorine of not less than 10 ppm when filled with water.

The disinfected surface should remain in contact with the strong chlorine solution for at least 30 minutes, after which potable water may be admitted. The inlet/outlet and drain piping should be purged of the 10 ppm chlorinated water, and the reservoir filled to overflow level.

After the disinfection procedure is completed, and before the reservoir is placed in service, water from the full reservoir shall be sampled and tested for coliform organisms. Subject to satisfactory bacteriological testing, the remaining water may be delivered to the distribution system.

Internal Coatings

The internal coating will have a thorough checkup every 5 years. The recommended procedure is a photo or video inspection of the interior walls.

External Coatings

Recoating of the exterior will be considered every 10 to 15 years. Also, this inspection will note the condition of anchor bolts, access ladder, balcony, hatches, riser pipes, safety railings and any other appurtenances.

Distribution System

The City maintains a supply of material to fix leaks as they occur, as well as remove and replace short lengths of pipe. Since a large portion of the existing distribution system is AC pipe, all operators should be certified in handling asbestos. Olympic Clean Air Agency (ORCAA) has the authority to regulate asbestos. A copy of ORCAA, Rule 6.3.4, regulating the proper procedures for asbestos cement removal and disposal is included in Appendix M.

Water Main Flushing

The entire water system is systematically flushed over the course of a year. This is accomplished by using uni-directional flushing procedures to flush approximately eight percent of the total system, or about 5,425 lineal feet, each month with scouring velocities.

Flushing Procedures

Before initiating the comprehensive flushing program, staff reviews distribution maps and plans for each month's flushing. The following procedures are adapted from guidance provided by the AWWA, 1986:

- Determine the initial clean source of flushing water, sections of mains to be flushed at a given time, the valves to be used in each case, and the order in which the sections will be flushed. Start at or near one of the interties or sources and work outward so as not to disturb sediments in unflushed portions of the system. If possible, schedule work so that each zone can be completed by the end of the day or so that a natural stopping point is

reached. If this is not done, fire protection may be severely restricted. Ensure that all flushing water used comes from areas previously cleaned or from mains large enough to resist sediments being stirred up by the flow. The length of main being flushed as short as possible, especially on small pipe. This will minimize pressure losses in the system and the length of time each customer may be delivered dirty water.

- Assure that an adequate amount of flushing water at sufficiently high pressure is available and that it can be disposed of safely. Use a rate of flow required to produce a velocity of 2.5 fps in pipes as follows:

Pipe Diameter, inches	2	3	4	6	8	10	12
Flow Rate for 2.5 fps, gpm	25	56	98	221	392	612	882

- Do not flush a large main supplied by a single smaller main; the volume available is usually inadequate for flushing. Hydrant pressure or pitot gauges are useful in determining flushing rates.

- Prior to flushing, notify the following parties:

  a. Fire department and water utility billing office.
  b. Other utilities, such as gas, electric, and telephone companies, who may have underground facilities in the area.
  c. Those customers who may be inconvenienced by reduced pressure or dirty water, including:

     - Food service establishments
     - Hospitals, nursing homes, and other health facilities
     - Customers with special medical needs, such as home dialysis.

- Isolate the section to be flushed from the system. Close valves slowly to prevent water hammer.

- Open the fire hydrant or blowoff valve slowly until the desired flow rate is obtained. When flushing from a dry-barrel fire hydrant, use the gate valve upstream of the hydrant for throttling purposes. Open the hydrant valve fully to prevent water from escaping into the ground through the fire hydrant barrel drain.

- Direct flushing water away from traffic, pedestrians, and private land. Ensure that flushing water drains to an appropriate storm sewer or watercourse without causing excessive flooding of streets, underground

utility vaults, or private property; the utility may be held responsible for any accidents or damage related to the released water.

- Prevent heavily contaminated water from discharging to sensitive natural watercourses. Check with the City of McCleary sewer utility for conditions of disposal to the sanitary sewer. If sewer disposal is unavailable, flushing into a tanker truck may be necessary.

- If water contains chlorine, dechlorinate waters discharging to sensitive natural streams per Ecology standards. Following are the steps of dechlorination:

  a. Estimate the rate of flushing. This may be estimated from previous hydrant flow tests or flushing data. If no data is available, open flushing valve just long enough to take a pitot gauge measurement. Calculate the flushing rate using a formula from the AWWA guidance manual.

  b. Determine the chlorine residual in the main using a suitable field test kit.

  c. Prepare a dechlorinating agent solution to be pumped into the flushing discharge using a positive displacement chemical feed pump.

  d. Simultaneously flush main and pump dechlorinating agent into the discharge.

- Check system pressure at a nearby hose bib. If pressure is less than 20 psi, throttle the flow through the hydrant. When possible, check system pressures in higher or remote areas of the pressure zone to ensure that pressures do not drop below 20 psi. This may necessitate a two-man crew with radios.

- Record the date, time, location, pressure zone, size and length of main; and estimate the flushing flow rate and velocity, and time required to clear. Take samples noting the water's odor, color, turbidity, and the presence of any visible objects or organisms.

- When the flushing water is clear, close the hydrant or blowoff valves slowly.

- Keep records of which valves are opened and closed. If, at the end of a day's work, valves normally open are left closed, alert the fire department.

- Proceed to the next section to be flushed and repeat these procedures.

Dead-End Waterlines

The City of McCleary has a minimal number of dead-end mains in the system and currently flushes them on an as-needed basis. Dead-end waterlines are susceptible to water quality problems and should be flushed regularly to remove stagnant water and debris which may have been deposited.

Distribution System Valve Maintenance

Good preventative maintenance dictates that all valves be exercised regularly. The DOH recommends that valves be exercised on a regular (annual or semi-annual) basis to keep them in good working condition and to extend their service life. Records should be kept on valve maintenance. On average, it is estimated that a two man crew can exercise about 30 valves daily. A three man crew can repair or replace about 1.5 valves per day, depending on size and location. A general rule of thumb dictates that approximately 5 percent of all valves checked should be assumed to be in need of repair or replacement. Valves that do not close tightly should be removed, repaired or replaced. An important aspect of distribution system valve maintenance and record keeping is to ensure distribution valves are completely open. A partially closed valve can seriously reduce peak day operation and fire flow supply. A sample valve repair / maintenance / inspection report form is included in Appendix M.

Hydrant Maintenance

Fire hydrant maintenance in the system is conducted by the fire district by written agreement. Hydrants are flushed and inspected twice a year. On average, a two man crew can flow test and check about eight hydrants daily. It is important to maintain good records of hydrant maintenance. A sample hydrant maintenance / inspection form is included in Appendix M. The following recommended procedure for testing fire hydrants has been adapted from the American Water Works Association (AWWA), 1989:

Maintenance Procedure

- Check appearance of hydrants for visible damage or leaks. Check for residue stains on the hydrant.
- Remove an outlet-nozzle cap and sound for leakage.
- Check for presence of water or ice in the hydrant body with a plumb bob.
- Replace the outlet-nozzle cap. Open the hydrant a few turns and allow air to vent. Tighten the cap.
- Open the hydrant fully.
- Check for leakage at flanges and around outlet nozzles, packing, and seals.

- Partially close the hydrant so the drains open and water flows through under pressure for about 10 seconds, flushing the drain outlets.
- Close the hydrant completely.
- Remove an outlet-nozzle cap and attach a fire hose or some other deflector.
- Open the hydrant and flush.
- Close the hydrant and check operation of the drain valve.
- Check the main valve for leakage.
- Remove all outlet-nozzle caps, clean and lubricate the threads.
- Check chains and cables for free action.
- Replace caps and tighten.
- Check lubrication of operating nut threads.
- Locate and exercise auxiliary valve. Leave open.

Meters

Accurate water metering is an essential financial and conservation oriented component of water system infrastructure. A substantial amount of revenue may be lost through inaccurate metering of residential, commercial, and industrial accounts. Without accurate master or source meter readings, the water utility cannot determine lost and unaccounted for water volumes.

Nonresidential and Commercial Meters

Nonresidential water meters serve high water use customers including apartment complexes, hotels, schools, and commercial and industrial facilities. Typically, meters 2 inches and larger serve this class of customer. The revenue generated by the non-residential and commercial customer is generally quite significant. For this reason, non-residential revenue meters require strict routine maintenance and calibration to avoid lost water revenue. AWWA recommends that utilities test meters 2 to 4 inches on a 1- to 3-year basis, and meters 6 inches and larger on a 2- to 5-year basis.

McCleary provides service to a few high use commercial and industrial services. Currently, there are approximately ten meters that are 1-inch or larger and a single 4-inch meter. It is estimated that a two man crew, on average, can test and conduct maintenance on approximately four meters per day.

Residential Meters

Residential services are also an important source of revenue for a water utility. AWWA recommends the replacement of residential meters on a 10-year basis. For the purposes of this Plan, meters less than 1-inch are considered residential. A suggested schedule for replacement or repair of residential meters is 10 percent annually. All residential meters

in the City of McCleary were upgraded to electronic radio read meters in 2012 through 2014. Commercial meter upgrades were completed in 2015.

INVENTORY OF MATERIALS

McCleary maintains an inventory of parts and supplies including the appurtenances needed to make emergency repairs. At a minimum the materials on hand and included in the inventory include the materials necessary to repair leaks for every size and type of pipe in the system. Spare valves in sizes 10 inch and smaller are included in this inventory.

McCleary has sufficient supplies to repair pipes in the system for sizes ranging from 2 inches to 10 inches. Service line and meter connection repair parts are stocked. 24-hour numbers for local suppliers are available for immediate repair needs.

A stock of required chemicals for water treatment, including sodium hypochlorite is maintained to assure continuous operation of the water system.

RECOMMENDED SCHEDULE

Table 6-2 is a listing and schedule of normal maintenance and operations activities. The frequency listed is a minimum and the actual frequency will be adjusted as necessary to meet system requirements.

TABLE 6-2

Preventive Maintenance Schedule

Frequency	Maintenance Task
Daily	Monitor distribution system and note any suspected leaks
3 Days per Week	Inspect wells and record meter readings
Bi-Monthly	Collect routine coliform samples
Bi-Monthly	Inspect/repair/replace service meters as requested
Daily	Cross connection control program tasks
Annually	Inspect storage reservoirs
As Needed	Flush dead-end lines
As Needed	Inspect/repair hydrants
As Needed	Exercise/repair valves
As Needed	Uni-directional flushing of all mains
As Needed	Calibrate master meters
Every 1 to 10 Years	Drain and clean reservoirs

The maintenance program described here has been developed based on recommendations of the AWWA, the Washington State Department of Health, and Gray and Osborne's experience with water utilities.

EMERGENCY RESPONSE PROGRAM

Water utilities have the responsibility to provide an adequate quantity and quality of water in a reliable manner at all times. To do this, utilities must reduce or eliminate the effects of natural disasters, accidents, and intentional acts. Most utilities routinely deal with small scale emergency situations. Large scale emergency situations occur far less frequently, but may manifest themselves in the same way as the routine emergencies. If a utility is well prepared to handle routine emergencies, they will also be better prepared to handle more disastrous ones.

All Group A water systems are required to develop an Emergency Response Program (ERP) in accordance with WACs 246-290-100 and -440. The purpose of the ERP is to guide personnel through system malfunctions or natural disasters that affect routine system operation. All water systems experience emergencies, including pipe breaks, hydrant ruptures, and short-term power outages. Less frequently, water utilities must deal with natural and manmade disasters. These include: Bomb Threat/Sabotage, Regional Earthquake, Major Power Outage, Flooding/Washouts, Hazardous Spills, Extended Drought, Water System Personnel Injury, Mechanical Failure, Sub-Zero Weather, Brush Fires, Windstorm, and Vandalism. Less extensive emergencies include injury to water system staff and large mechanical failures. The City of McCleary needs to be prepared for all of these types of disasters and should be able to prevent serious impacts to the public health, wide-scale impacts to water service and reduction of firefighting capabilities.

To establish an effective emergency response program, all utility, police, and fire department staff must be trained and assigned specific duties. All personnel will be assigned specific duties for each type of emergency, but the assignments should not be so rigid that another staff member could not also perform the function. All staff will be cross-trained in assignments in case of the following:

- A staff member is absent or injured and unable to perform their assigned duties.
- A disaster occurs which the City is unprepared to handle.
- More staff is required to handle a duty than was anticipated during planning.

The City of McCleary routinely discusses emergency response procedures at their monthly safety meetings.

McCleary responds to an emergency by dispatching an employee to evaluate the emergency or problem. That individual calls for the proper personnel and equipment to handle the emergency. If the emergency exceeds the capabilities of McCleary's resources, aid may be requested from adjacent water utilities.

WATER SYSTEM PERSONNEL EMERGENCY CALL-UP LIST

Table 6-3 lists the telephone numbers for emergency response. A copy of the emergency call-up list is continually updated and visible at City Hall, the Fire and Police Departments, and the wastewater treatment plant. It is the duty of the City Administrator to update the list and discuss call-up procedures periodically at safety meetings.

Customers should call 911 in the event of an emergency.

TABLE 6-3

Emergency Phone List

Agency/Group	Contact	Phone Number
Fire/Police	-- Business Hours Non-Business Hours	911 (360) 495-3107 1-800-281-6944
Washington State Patrol	--	(360) 533-9332
Director of Public Works/Public Facilities Manager	Todd Baun	(360) 495-3667
Water Manager	Kevin Trewhella	(360) 495-3217
On-call Operator	--	1-800281-6944
McCleary Light and Power – Acting Senior Lineman	Paul Nott	(360) 495-4533
City of Elma	Adjacent Purveyor	(360) 482-2212
Thurston PUD	Adjacent Purveyor	(360) 357-8783
Natural Gas	Cascade Natural Gas	1-800-244-4351
Telephone	Century Link	1-800-201-4099
Pipe/Fitting Suppliers	H.D. Fowler	(800) 927-5699
HMI/PLC	Technical Systems Inc.	(800) 509-HELP
Grays Harbor County Department of Emergency Management	Chuck Wallace	(360) 249-3911
Water Management Laboratories	Diane Dumont	(253) 531-3121
Grays Harbor County Division of Environmental Health		(360) 249-4222
State Emergency Response Commission	--	(800) 258-5990

TABLE 6-3 – (continued)

Emergency Phone List

Agency/Group	Contact	Phone Number
WA State Department of Health	SW Regional Office	(360) 236-3030
Washington State Department of Health – Office of Drinking Water	Emergency Hotline Number	(877) 481-4901
Washington Department of Ecology	Emergency Spill Response	(360) 407-6300
State Wide One-Call	Utility Locates	(800) 424-5555
Gray & Osborne, Inc.	Olympia Number	(360) 292-7481

PUBLIC NOTIFICATION

In the event that public notification is required during an emergency, the City of McCleary maintains a list of both television and radio resources that can be provided with news releases regarding the situation. Public notification is mandated by WAC 246-290-71001 in accordance with 40 CFR 141.201 through 208 when the system violates a National Primary Drinking Water Regulation. Public notice content is specified in WAC 246-290-71002. Public notification distribution is specified in WAC 246-290-71003. Public notification mandatory language is specified in WAC 246-290-71004. Special public notification requirements are specified in WAC 246-290-71005. Consumer information is specified in WAC 246-290-71006. Public notification special provisions are specified in WAC 246-290-71007. All of this information can be accessed on the Washington Department of Health Drinking Water website at:

http://www.doh.wa.gov/CommunityandEnvironment/DrinkingWater.

VULNERABILITY ANALYSIS

A Vulnerability Analysis is required in accordance with WAC 246-290-100. The analysis estimates the degree to which the water system may be adversely affected in various emergency situations. The emergency situations that are analyzed include the following: Bomb Threat/Sabotage, Regional Earthquake, Major Power Outage, Flooding/Washouts, Hazardous Spills, Extended Drought, Water System Personnel Injury, Mechanical Failure, Sub-Zero Weather, Brush Fires, Windstorm, and Vandalism.

The Emergency Response Contingency Plan in Appendix N describes the corrective measures from the emergency situations discussed in the previous paragraph.

CONTINGENCY OPERATIONAL PLAN

The City of McCleary has compiled an Emergency Response Contingency Plan which is included in Appendix N. The Emergency Response Contingency Plan was designed to assist employees and management in making quality decisions during times of crisis for the water utility. The Plan is a resource tool providing guidance in determining appropriate actions.

SAFETY PROCEDURES

The City of McCleary currently conducts monthly safety meetings to address material and chemical safety; emergency response procedures; equipment maintenance for normal and emergency use; review of any accidents that may have occurred to city staff or contractors in order to identify and prevent their re-occurrence; and update procedures, as necessary.

POTENTIAL WORK PLACE HAZARDS

Potential work place hazards include confined space entry for vaults and reservoir maintenance and construction related activities. Construction activities such as water main replacement need to address the following issues:

- Standard excavation safety procedures
- Standard operating procedures for working in street right-of-ways
- Excavation, trenching, and shoring
- Head protection
- Foot protection
- Flagger clothing, equipment, signals, rules of conduct
- Sign placement
- Channeling devices

SAFETY AND FIRST AID EQUIPMENT

Employee and public safety is of paramount importance to the City of McCleary. All City employees are trained in CPR and First Aid. All City vehicles are equipped with standard First Aid kits. The City of McCleary well house/water treatment facility is equipped with First Aid equipment relevant to that facility.

Other important safety equipment includes signage that alerts the public of construction taking place along roadsides.

CROSS-CONNECTION CONTROL PROGRAM

The Washington State Department of Health (DOH) requires water utilities to implement and maintain a Cross-Connection Control Program per WAC 246-290-490. The City of McCleary approved Ordinance No. 742 on September 26, 2007, in which Section XIV amends McCleary Municipal Code 13.04.200 and authorizes the type of protective device, its installation, and periodic testing to conform to the provisions of the statute, rule or regulation of the State and any applicable standard specification or regulation of the City (Appendix C). The City's Cross-Connection Control and Backflow Prevention Manual (adopted by Resolution) is included in Appendix E. The purpose of the manual is to protect the health of the water consumer and the potability of the water in the distribution system. Inspection and regulation of all actual or potential cross connections between potable and non-potable systems is required in order to minimize the danger of contamination or pollution of the public potable water supply.

McCleary has established a Cross-Connection Control Program in accordance with the American Waterworks Association's manual, *Accepted Procedure and Practice in Cross-Connection Control, Pacific Northwest Section*.

The City of McCleary maintains a minimum of one Washington State Certified Cross-Connection Specialist (CCS) on its staff at all times. McCleary provides to its residential customers a list of Backflow Assembly Testers (BAT) certified by the State of Washington.

CROSS-CONNECTION CONTROL PROGRAM REQUIREMENTS

WAC 246-290-490 lists 10 minimum elements of a cross-connection control program required for water purveyors. The following paragraphs describe the requirement and summarize the action taken by the City of McCleary for each element. Table 6-4 also summarizes these requirements and provides a description how the McCleary water system currently addresses each element of this regulation.

The City of McCleary's adopted Cross-Connection Control and Backflow Prevention Manual (Appendix E) includes provisions for water shut off when existing cross connections pose a potential health risk or system hazard.

Element 1

Element 1 requires the purveyor to establish legal authority, describe the operating policies and technical provisions, and corrective actions used to ensure that consumers comply with the purveyor's cross-connection control requirements. Through reference, McCleary Municipal Code 13.04.200 requires landowners or water users receiving its water supply from the City of McCleary to conform to applicable regulations of McCleary's Cross-Connection Control and Backflow Prevention Manual.

Element 2

Element 2 pertains to the implementation procedures and schedules for evaluating new and existing connections. Currently, McCleary conducts a review of all new connections during the project approval process. Existing connections retained from the previous year, are tested by certified contractors and included in the device database. A postconstruction site visit is completed by the CCS to verify backflow prevention assemblies (BPAs) have been installed.

Element 3

Element 3 pertains to the procedures of eliminating cross-connections whenever possible or ensuring approved backflow preventers are installed when necessary. McCleary conducts a review of all new connections to the water system and ensures approved backflow prevention devices are installed.

Construction activities are also a concern for cross-connections. The connection to a hydrant during construction activities provides a potential cross-connection hazard that can easily be avoided. The use of an approved BPA is required for all temporary connections to the McCleary water system to prevent back siphonage.

Element 4

Element 4 pertains to the purveyor ensuring that at least one person certified as a CCS is employed to help develop and implement the CCC program. Mr. Jon Ehresmann is the CCS for the City of McCleary.

Element 5

Element 5 is designed to ensure that approved backflow preventers are inspected and/or tested as required. Currently, annual testing for BPAs is the responsibility of any property owner with a BPA on said property. The Owner then hires an approved BPA testing contractor to complete the BPA testing and submits the results to the City of McCleary. All information required by DOH is included on the result slip submitted to McCleary after BPA testing has been completed.

Element 6

Element 6 requires the development and implementation of a backflow prevention assembly testing quality control assurance program including, but not limited to, documentation of tester certification and test kit calibration, test report contents, and time frames for submitting completed test reports. As noted previously, property owners are responsible for testing of the BPAs on their own. All documentation of tester

certification, kit calibration, and test reports are included in the result slip submitted to the City of McCleary.

Element 7

Element 7 requires the purveyor to develop and implement procedures for responding to backflow incidents. In the event of a backflow incident, the McCleary water department must meet the minimum record keeping and reporting requirements listed below.

- Notify DOH no later than the end of the next business day when a backflow incident is known to have contaminated the public water system or occurred within the premises of a consumer served by the water system.

- Document details of backflow incidents on a backflow incident form similar to the form included in the most recent edition of the PNWS-AWWA Manual.

- Include all backflow incident reports in the annual cross-connection program summary report required by WAC 246-290-490.

Element 8

Element 8 requires a consumer education program on cross-connection control. The City of McCleary will provide informational articles on their website instilling the virtues of cross-connection devices. In addition, information is available at the City of McCleary City Hall or by contacting the water department directly by phone.

Element 9

Element 9 pertains to the record keeping of cross-connection control records. As mentioned previously, the McCleary water department maintains a list of cross-connection control devices on file in their computer network. All new cross-connections are added to the list as they are installed.

Element 10

Element 10 pertains to purveyors distributing or receiving reclaimed water. Currently, reclaimed water is not available in the McCleary service area. If reclaimed water use is expected in the future, any cross-connection control requirements imposed by DOH under the required permit for the use of reclaimed water will need to be met.

TABLE 6-4

Minimum Elements of a Cross-Connection Control Program as Required by WAC 246-290-490

Element No.	Description	McCleary Compliance
1	The purveyor shall adopt a local ordinance, resolution, code, bylaw, or other written legal instrument to establish legal authority, describe the operating policies and technical provisions, and corrective actions used to ensure that consumers comply with the purveyor's cross-connection control requirements.	Complete – McCleary has adopted an Ordinance that references Cross-Connection Control.
2	The purveyor shall develop and implement procedures and schedules for evaluating new and existing service connections to assess the degree of hazard posed by the consumer's premises to the purveyor's distribution system and notifying the consumer within a reasonable time frame of the hazard evaluation results.	Complete – The McCleary water system completed an initial survey and conducts an evaluation of new service connections.
3	The purveyor shall develop and implement procedures and schedules for ensuring that: (i) Cross-connections are eliminated whenever possible; (ii) When cross-connections cannot be eliminated, they are controlled by installation of approved backflow preventers commensurate with the degree of hazard; and (iii) Approved backflow preventers are installed.	Complete – Procedures for the elimination of cross-connections and installation of BPAs are established in McCleary's CCC and Backflow Prevention Manual.
4	The purveyor shall ensure that personnel, including at least one person certified as a CCS, are provided to develop and implement the CCC program.	Complete – The City of McCleary has a certified Cross-Connection Control Specialist on staff.
5	The purveyor shall develop and implement procedures to ensure that approved backflow preventers are inspected and/or tested (as applicable) as required.	Complete – Annual BPA inspection is reviewed by McCleary's CCS.
6	The purveyor shall develop and implement a backflow prevention assembly testing quality control assurance program, including, but not limited to, documentation of tester certification and test kit calibration, test report contents, and time frames for submitting completed test reports.	Complete – McCleary water department staff maintain the required documentation. McCleary's CCC Manual includes requirements for testing and repairs.
7	The purveyor shall develop and implement (when appropriate) procedures for responding to backflow incidents.	Complete – Incident response procedures are included in McCleary's CCC Manual.

TABLE 6-4 – (continued)

Minimum Elements of a Cross-Connection Control Program as Required by WAC 246-290-490

Element No.	Description	McCleary Compliance
8	The purveyor shall include information on cross-connection control in the purveyor's existing program for educating consumers about water system operation. Such a program may include periodic bill inserts, public service announcements, pamphlet distribution, notification to new consumers and consumer confidence reports (CCR).	Complete – CCC Program education is included on McCleary's website and at City Hall.
9	The purveyor shall develop and maintain cross-connection control records including list of devices.	Complete – Inventory is complete of known assemblies.
10	Purveyors who distribute and/or have facilities that receive reclaimed water within their water service area shall meet any additional cross-connection control requirements imposed by the DOH under a permit issued in accordance with Chapter 90.46 RCW.	Not Applicable.

BACKFLOW PREVENTION ASSEMBLIES TESTING PROCEDURES

All backflow prevention assemblies shall pass specific tests and inspections conducted by a Washington State certified BAT in accordance with DOH regulations. Costs for all such tests and inspections shall be borne by the consumer. Testing shall be done at the time of installation, which shall become its testing date of record, annually thereafter, and after any repairs or more frequently if tests indicate failure.

Inspections, tests and repairs may be required under City of McCleary supervision. The consumer shall supply the City of McCleary the results of all inspections and annual testing. Scheduling of this work shall be as directed by the City, but in no case less than is required by DOH.

MINIMUM CROSS-CONNECTION CONTROL OPERATING POLICIES

Cross-connections which can be eliminated shall be eliminated. Particular installations which may cause a potential cross-connection include: hospitals, mortuaries, clinics, laboratories, piers and docks, sewage treatment plants, food and beverage processing plants, chemical plants using water processing, metal plating industries, petroleum processing or storage plants, radioactive material processing plants or nuclear reactors, car washes, facilities having an auxiliary water supply and any others specified by the City of McCleary.

When an existing cross-connection poses a potential health or system hazard, the McCleary water department shall shut off water service to the premises until the cross-connection has been eliminated or controlled by the installation of a proper backflow prevention assembly.

Auxiliary Water Supply

1. Where it is apparent that an auxiliary water supply system is available to supply water to the customer's facility or premises (non-well), a Reduced Pressure Backflow Assembly (RPBA) shall be required immediately after the water meter. This requirement is a condition to continue water service from McCleary if the CCS determines that an actual or potential cross-connection does or could exist.

2. All non-decommissioned wells shall be considered either an actual or potential cross connection.

3. When the auxiliary water supply is a well, and the customer abandons the well in accordance with current Department of Ecology (Ecology) and the Washington Department of Health (DOH) guidelines, a Decommission Water Well Report is required to be submitted to the City of McCleary.

WELL ABANDONMENT

Any well within McCleary's water service area which is unusable, abandoned, or whose use has been permanently discontinued, or which is in such disrepair that its continued use is impractical or is an environmental safety or public health hazard shall be decommissioned. The standards for decommissioning a well are contained within WAC 173-160-381.

PENALTY CLAUSE

The City of McCleary shall deny or discontinue water service to any customer failing to cooperate in the installation, maintenance, testing or inspection of backflow prevention assemblies, in accordance with DOH regulations and in accordance with McCleary's disconnection policy.

The City of McCleary's adopted Cross-Connection Control and Backflow Prevention Manual (Appendix E) includes provisions for water shut off when existing cross connections pose a potential health risk or system hazard.

TESTING CROSS-CONNECTION CONTROL ASSEMBLIES

The control or elimination of cross-connections shall be in accordance with the State of Washington Administrative Code (WAC 246-290-490) or its successor.

All backflow prevention assemblies shall pass specific tests and inspections conducted by a Washington State certified BAT in accordance with DOH regulations. Testing shall be conducted at the time of installation, at least annually thereafter, and after any repairs or relocations.

All backflow prevention assembly testing shall be the responsibility of the customer. All costs associated with the testing of a backflow assembly shall be the responsibility of the customer.

A City of McCleary "Cross-Connection Prevention Assembly Test Report" or an equivalent form shall be completed by the BAT. The completed form shall be signed by the BAT and returned to the City of McCleary as proof of a properly operating and tested assembly.

A residential customer may select a BAT of their choice or request the City of McCleary to test the backflow prevention assembly.

McCleary will test residential assemblies for proper operation but will not repair any assembly found to be malfunctioning. Repair of the backflow assembly is the responsibility of the customer and will require inspection/testing by a BAT upon completion of repair.

CUSTOMER COMPLAINT RESPONSE PROGRAM

COMPLAINT AND RESPONSE RECORDKEEPING

McCleary does not keep statistical records on customer complaints. Response to a customer concern is made as soon as possible. Telephone calls are promptly returned to determine the nature of the complaint. If additional action is required, the complaint is logged on that customer's billing record. A "Service Order" is generated by a customer service representative. The service order is filed after the field personnel respond to the problem and indicate corrective action has been completed.

Service orders are kept on file for a minimum of one year from the initial complaint.

RECORDKEEPING AND REPORTING

RECORDKEEPING PROCEDURES

The City of McCleary keeps water system records for water quantity purchased and sold, water quality, and cross-connection data at the McCleary water department office. Bacterial analysis results are kept for a minimum of 5 years. Chemical analysis results are kept for as long as the system is in operation. Records of customer use and water quality records are maintained for a minimum of 10 years. Construction documents, project reports, and any DOH approvals are maintained for the life of the system. Reporting to DOH shall be in accordance with WAC 246-290-480. This requires reporting of:

- Monthly reports before the tenth of the following month
- MCL violation within 48 hours
- Updated WFI on an annual basis
- Bacteriological presence in accordance with WAC 246-290-480 (2)(f)
- Disinfection by-products in accordance with WAC 246-290-300 (7) as specified in 40 CFR 141.134
- Copy of all water quality testing results required by the WAC

OPERATION AND MAINTENANCE IMPROVEMENTS

O&M IMPROVEMENTS RECOMMENDATIONS

As noted in the beginning of this chapter, the McCleary water department has qualified personnel to operate and maintain the water system. The City of McCleary supports staff in maintaining their certifications through continual training programs as required by the certifying organization.

Routine and preventive maintenance requires substantial labor. Items such as valve exercising and meter testing are typically activities that are neglected in the course of operating a water system. However, the City of McCleary allocates sufficient time and effort for routine and preventative maintenance, which allows the staff the opportunity to foresee problems before they become emergencies.

The single most vulnerable component of the McCleary Water System is its wellfield and aquifer. The City water department will remain vigilant in protecting the wellfield and proactive in aquifer protection.

FINANCIAL IMPACT OF RECOMMENDED IMPROVEMENTS

The financial impacts of those improvements are addressed in Chapters 8 and 9 of this document. Chapter 8 discusses the costs and alternatives and Chapter 9 addresses the methods available to finance the improvements and makes recommendations of which financing program is best suited for the customers of the McCleary water system.

CHAPTER 7

DISTRIBUTION FACILITIES DESIGN AND CONSTRUCTION STANDARDS

OBJECTIVE

The objective of this chapter is to document McCleary's design and construction standards to allow McCleary to retain DOH approval to utilize the alternative review process for construction of new and replacement of existing water distribution facilities. Through this process, a purveyor needs no further approval from DOH for distribution project reports, construction documents, or installation of distribution mains.

This chapter includes the following elements:

- System Standards, Policies and Procedures
- Project Review Procedures
- Policies and Requirements for Outside Parties
- Design Standards, Performance Standards and Sizing Criteria
- Construction Standards
- Construction Certification and Follow-up Procedures

SYSTEM STANDARDS, POLICIES AND PROCEDURES

The City of McCleary has developed a comprehensive document titled *City of McCleary Development Standards* (revised November 18, 2009). The document is divided into seven sections as follows:

- Section 1: Engineering Services Plan Review Process
- Section 2: General Plan Requirements
- Section 100: Roadway Design
- Section 200: Stormwater Management
- Section 300: Water System Requirements
- Section 400: Sanitary Sewer System
- Section 500: Grading, Erosion and Sedimentation Control

Copies of Sections 1 and 300 of the Development Standards are included in Appendix D of this Plan.

PROJECT REVIEW PROCEDURES

PERMIT APPLICATION

All applications for utility service installation must be submitted to the City on the Application for Utility Service Installation provided on the City's website at:

http://cityofmccleary.com/vertical/sites/%7B6900A7D9-59CE-4612-823A-FA3E5F25F431%7D/uploads/App_Utility_Service_Installation_2020.pdf

No construction will be authorized until such time as the City has approved the construction drawings. Each utility service application shall be accompanied by:

- An application fee of $127.00.
- The purpose of the service.
- Size of the service.
- The number of Equivalent Residential Units to be Served.
- Type of Commercial or Industrial Use.
- Detailed description of what type of development the utility service(s) will serve, including the approximate date(s) utilities will be activated and if your project will be constructed in phases.
- A site plan showing the locations of all existing or proposed developments on the subject property.

When engineering services are a component of the planning process, the review is governed by the *City of McCleary Development Standards*. All work in City right-of-way requires a permit from the City of McCleary. Prior to any work commencing, the general contractor shall arrange for a preconstruction meeting at City Hall to be attended by all major contractors, representatives of involved utilities, and the City of McCleary. The contractor is responsible to have their set of plans at the meeting.

APPLICATION REVIEW

Each application for a line extension shall be reviewed initially to ascertain whether the proposed line extension application is complete. Complete applications are to be reviewed by the City's Director of Public Works and the City's Legal Counsel in order to determine whether the proposed project will meet City construction standards and will not impair the City's ability to provide full water service to its other customers and by the

City's SEPA official, who will determine if the proposed project complies with the City's SEPA guidelines.

Applications will then be forwarded to the City Council with recommendations. The Council will then consider the recommendations, make the necessary environmental determinations, and either order the issuance of the applicant's line extension permit or reject the application. The issuance of a line extension permit may be made contingent upon any reasonable conditions.

APPROVAL OF PLANS

Proposed extensions of utility lines shall be constructed and installed in accordance with plans prepared by a licensed civil engineer and such plans must be approved by the City through the process outlined in the *City of McCleary Development Standards*. All such extensions must be installed in accordance with the requirements of the City. Construction and all other matters shall require approval by the City prior to construction.

POLICIES AND REQUIREMENTS FOR OUTSIDE PARTIES

EXTENSIONS – WHERE TO BE CONSTRUCTED

Extensions to the existing water mains, Water Service Connections and Customer Service Lines not located upon the premises to be served should be constructed only upon public street or alleys or parcels where the City has recorded easements for such utility purposes. Easements for utilities shall be drafted and signed by the property owner and given to the City prior to final plan approval. Upon completion of the project, the original easement shall be modified, if necessary, and then recorded at the property owner's expense. All such easements and dedications shall be clearly shown on the engineering plans. Easements shall be a minimum of 15 feet in width for water lines. No structures, as defined by the City's zoning code, shall be allowed within easements.

PERFORMANCE BOND

The developer shall furnish to the City a surety bond in a form, and with a surety license to do business as a surety by the State of Washington and approved by the City and in an amount acceptable to the City, which bond shall guarantee the faithful performance of the work on the line extension, payment of all individuals or entities, including state and municipal entities and agencies, who are empowered to create a lien upon the line extension for nonpayment of obligations to those individuals or entities and the replacement of all defective material and workmanship within 1 year after acceptance of the line extension by the City. In some cases, a 2-year bond may be required because of County rules on road restoration.

AGREEMENT

The developer shall sign an agreement, on a form issued by the City, to indemnify, defend and hold harmless the City from any and all liability for damages arising from acts done during or in the preparation for construction of the line extension.

PROOF OF INSURANCE

The developer shall submit proof of the applicant's comprehensive general and automobile liability and property damage insurance, before commencing work, in limits of $5,000,000 bodily injury including death, and $1,000,000 property damage protecting against all claims for personal injury or collapse or explosion damage, arising during or in preparation for construction of line extension.

COSTS

Persons obtaining extensions of City water mains shall pay the City's engineering costs incurred in reviewing the plans, consultations regarding the City's requirement, inspection of the work and administration of the extension of the utility system. The plan review fee shall be paid at the time of submittal. The review process begins when payment of the plan review fee has been made. The permit fee shall be paid prior to the issuance of the permit.

Whenever a main is installed within the corporate limits of the city, the main extension charge to be paid by the owner(s) of the premises to be served shall be determined by the Council on the advice of the engineer based upon the then prevailing average costs for the necessary material, labor, and equipment required in accordance with current practices and the comprehensive water system plan, based upon the average or front footage of property to be served or a combination of acreage and the front footage.

LINE EXTENSION CONSTRUCTION

Upon receipt of the City's line extension permit, the applicant may commence construction of the proposed line extension. In addition to being subject to any conditions placed upon the line extension permit, construction of the line extension shall be subject to the following conditions:

- The applicant shall be responsible for paying all costs of the line extension.

- The applicant shall procure and pay for all permits, licenses, easements, environmental notices, reports, impact statements and for the review thereof, railroad and highway crossing permits and other permits or exemptions necessary for construction of the line extension.

- Connections to existing water mains shall be wet taps through a tapping 'tee' and tapping valve and shall be made by a City-approved contractor. The tapping sleeve shall be epoxy coated, ductile iron or stainless steel. The City shall approve the time and location for these connections.

- Trenching, bedding, and backfill for water mains shall be in accordance with City Standard Detail No. 503.

- All water mains and appurtenances shall be hydrostatically tested at 225 psi in accordance with Section 7-11.3(11) of the Standard Specifications for Road, Bridge, and Municipal Construction.

- Biological test samples will be taken by the City and paid for by the contractor.

- The procedures and acceptance criteria used for sanitizing the line, pressure testing the line and water testing shall conform to state and City standards.

CITY COSTS TO BE BORNE BY DEVELOPER

Any costs reasonably incurred by the City for legal services, accounting services and other services incident to the receipt, study and approval or rejection of this application shall be borne by the developer, and the developer agrees to pay such costs within thirty days of billing by the City. If legal proceedings are instituted to enforce any provision of this agreement, the applicant will pay a reasonable attorney's fee to the City.

DESIGN STANDARDS, PERFORMANCE STANDARDS AND SIZING CRITERIA

The City has adopted the *Standard Specifications for Road, Bridge, and Municipal Construction* by the Washington State Department of Transportation and the American Public Works Association as a standard specification and modified it as required to meet City requirements. This section is a summary of the standards used by the City for its water system. Also presented in the City's Development Standards are standard detail drawing for components such as hydrants, valves, and pipe installations located in Appendix D.

WATER MAINS

Main Sizing. All new water main lines shall be installed to the size as indicated in the City's Comprehensive Plan. The minimum water pipe size shall be 8-inch diameter. The only exception is a dead-end line with no possibility of being expanded in the future and beyond the last fire hydrant, may be 2-inch diameter or as directed by the City Engineer.

Where water mains are to be extended to serve a particular property, the water lines shall be extended along the entire frontage of the property to be served. Looped connections may be required to maintain continuity in the system.

Two-inch blow-off assemblies are required on dead-end water lines, except where fire hydrants are installed at the dead end. The blowoff assembly shall be installed in accordance with City Standard No. 304. Water valves shall be installed along the water line at a maximum spacing of 400 feet and at the intersection of lateral lines.

For single-family residential construction in new subdivisions, the contractor shall furnish and install all materials for the service connection, including the meter setter, except that the City shall furnish and install the meter at the time of occupancy.

For commercial and multi-family construction, the meter setter shall be furnished and installed by the contractor.

FIRE FLOW

The City of McCleary has adopted the International Fire Code (IFC) fire flow standards. However, the City of McCleary has limited fire flow capabilities within portions of its water system. The following fire flow standards are applicable for buildings:

> The minimum fire flow and flow duration requirements for one- and two-family dwellings having a fire flow calculation area that does not exceed 3,600 square feet shall be 1,000 gallons per minute for 1 hour. Fire flow and flow duration for dwellings having a fire flow calculation area in excess of 3,600 square feet shall not be less than that specified in Table B 105.1, located in Appendix D. A reduction in required fire-flow of 50 percent is allowed when the building is equipped with an approved sprinkler system.

SYSTEM PRESSURES

Recommended Domestic – Minimum 30 psi; Maximum 100 psi. The City recommends that customers install Pressure Reducing Valves (PRV) on private lines where necessary. The Uniform Plumbing Code requires PRVs for pressures above 80 psi.

Fire Flow Pressure Minimum is 20 psi.

Normal operating pressures of not less than 40 psi, nor more than 100 psi should be maintained at service connections to the distribution system, except that during periods of peak domestic and fire demand, the pressure shall be not less than 20 psi.

CONSTRUCTION STANDARDS (MATERIALS AND METHODS)

Specifications and standard drawings for water main extensions were adopted by the City in 2006 and revised in 2009. Copies of the Standard Specifications for water are included in Appendix D.

CONSTRUCTION CERTIFICATION AND FOLLOW-UP PROCEDURES

ACCEPTANCE OF LINE EXTENSION

Upon certification of completion of the line extension construction by the Developer's engineer, and acceptance by the City public works director, the applicant shall convey and transfer to the City on forms approved by the City including, but not limited to, warranty bill of sale, the line extension and all easements, permits, and rights necessary to run, operate and maintain the line extension.

The line extension shall not be accepted by the City until:

- Receipts of all material used, labor utilized and the cost thereof are provided the City along with receipts indicating the payment of those costs.
- "As Built" drawings are provided to the City.
- The posting of surety for maintenance for a term of 1 year.

Upon acceptance of the line extension, the City will assume ownership of the line extension and the responsibility for its operation and maintenance.

CHAPTER 8

IMPROVEMENT PROGRAM

OBJECTIVE

The objective of this chapter is to present the City of McCleary Capital Improvement Program, which is composed of projects identified in the previous chapters. These improvements are assessed and prioritized for implementation over 10- and 20-year planning periods. The Improvement Program has been developed in conjunction with the financial capabilities and recommendations presented in Chapter 9, Financial Program.

The chapter includes capital improvement projects for source of supply, storage, distribution, and other identified capital and non-capital improvements. The chapter provides an assessment of alternatives including a cost analysis, identifies the preferred alternatives for each project, and recommends a schedule for the improvements.

IDENTIFICATION OF SYSTEM IMPROVEMENTS

Water system deficiencies identified in previous chapters are summarized in the following sections, together with evaluations of alternatives and planning level cost estimates. Details of planning level cost estimates are included in Appendix P.

CAPITAL IMPROVEMENTS

This section addresses capital improvements, or improvements to physical facilities. Improvements to operations, management or planning are addressed in the following section titled *Non-Capital Improvements*. All costs in this chapter are given in 2020 dollars.

Source of Supply

As described in Chapters 1, 2, and 3, the City has sufficient water rights to meet water system demands for the 20-year planning period. The pumping capacity shown in Table 3-10 is listed as 900 gpm; however, during the drought conditions in summer 2015 only 800 gpm could reliably be withdrawn. Even with the reduced pumping capacity, the City has the capacity to meet water system demands for the 20-year planning period.

SO-1A: Studies and Permitting for New 500 gpm Well (2028)

Estimated project cost in 2020 dollars: $40,000

The Department of Health has requested that the City investigate drilling and equipping a new well which would be supplied by a different aquifer from the aquifer which supplies the City's existing wellfield. This new well would provide additional system redundancy and could serve as a backup water source in the event that the aquifer which supplies the City's existing wellfield becomes contaminated or depleted. The design well flow rate of 500 gpm would match the design flow rate for the City's current highest-capacity well.

The first step in realizing this goal is for the City to hire consulting firm(s) to complete two reports: a Water Rights Evaluation and a Hydrogeological Study. These reports will allow the City to obtain water rights for the new well and to determine where the new well should be drilled. The estimated cost for the Water Rights Evaluation is $15,000, and the estimated cost for the Hydrogeological Study is $25,000, for a total project cost of $40,000.

SO-1B: Drill and Equip New 500 gpm Well (2030)

Estimated project cost in 2020 dollars: $863,000

After the City has obtained water rights for the new well and has determined where the well should be drilled, the next step will be to drill and equip the well, install any necessary treatment facilities, and connect the new well to the existing water distribution system.

A planning-level cost estimate has been included for this project in Appendix P, but it should be noted that the project costs will depend heavily on where the new well is to be located, the required well depth, and the water quality of the new well, all of which will not be known until the Hydrogeological Study (project SO-1A) is completed. It has been assumed for the purposes of the cost estimate that the new well have a design flow rate of 500 gpm, will be located relatively close to the existing distribution system, will involve the installation of a 12-inch casing drilled to a depth of approximately 100 feet, and that the only required treatment will consist of chlorination by means of a sodium hypochlorite feed system. Any or all of these assumptions may need to be revised as a result of the findings of the Hydrogeological Study, which could significantly alter project costs.

Water Treatment Improvements

Water treatment capacity meets or exceeds all regulatory requirements. However, the DOH recommended the City conduct a study of the distribution water quality to determine the cause of chlorine demand within the distribution system and possible

methods of reducing it. Low chlorine residuals in the distribution system no longer appear to be an issue with the City's operation of the new Water Treatment Plant.

Water Storage Improvements

Table 3-16 indicates that the City will maintain a storage surplus through the 20-year planning period. Both the 500,000-gallon and 150,000-gallon welded steel reservoirs were recoated in 2010/2011. Coatings when properly applied can last up to 30 years. Therefore, recoating of the reservoirs is projected to not be needed during this 20-year planning period. However, inspection and cleaning are generally recommended every 7 to 10 years depending on factors such as water quality, ambient environmental conditions, age of the reservoir, and condition of the reservoir. The City of McCleary will plan to have both reservoirs inspected every 7 years and cleaned as necessary.

R-1: Reservoir Cleaning and Repairs (2025 and 2032)

Estimated project cost in 2020 dollars: $10,000 (each cleaning)

The system's reservoirs were inspected and cleaned in 2018. They will be due for another inspection and possible cleaning in 2025 and again in 2032. This will be accomplished by a SCUBA diver with under-water vacuum cleaning equipment. For budget purposes, it is estimated that inspection and cleaning of the reservoirs will cost $10,000.

Water Distribution System Improvements

Distribution system deficiencies were identified and improvements were recommended in Chapter 3.

In general, it is recommended that McCleary continue their Water Main Replacement (WMR) program to maintain a consistent overall water distribution system age. The American Water Works Association (AWWA) reports the "typical" useful service life of pipes in a water distribution system inventory may vary widely, depending on pipe materials, water characteristics, soil characteristics, water main installation methods and materials, water main maintenance and repair practices, and other factors, a water main life expectancy of 65 to 85 years is reasonable[1]. However, as discussed in Chapter 3, the water distribution system is approximately half AC pipe with a useful life expectancy of 50 years or less. The City's water main replacement program replaces the most vulnerable mains systematically prior to failure. Vulnerability is determined by the age and material of the water main, the frequency of leaks noted and repaired, and the number of customers that are serviced by a particular main. Once McCleary completes replacement of the oldest parts of the distribution system, a WMR program based on a

[1] AWWA "Buried No Longer: Confronting America's Water Infrastructure Challenge" (2011).

65- to 85-year replacement schedule should be adequate to keep the water distribution system in good condition.

All water main replacements, no matter the reason for the replacement, constitute the WMR program. Water main replacements are to be scheduled based on water main replacement priorities. Existing failing water mains and existing system flow capacity deficiencies are the highest priorities. If all distribution system deficiencies have been addressed, the next priority would be water distribution system age. As water mains are replaced, they will be sized to meet fire flow standards and fire hydrants will be installed to meet the hydrant spacing standard in cooperation with the local fire district.

Based on Table 1-6, the water system has an estimated total of 65,085 feet (12.3 miles) of water mains. Planning level costs to replace water mains use an estimate of $500,000 per mile. At this rate, the cost of replacing the entire water distribution system is estimated at $6.15 million. To replace the entire distribution system on a 65- to 85-year replacement schedule would require replacement of an average of 1,001 feet (0.19 mile) to 766 feet (0.15 mile) per year, at an estimated annual cost of $95,000 per year on a 65-year replacement schedule, to $75,000 per year on a 85-year replacement schedule, based on 2020 dollars.

Specific water distribution system improvements are summarized in the following sections, including estimated quantities and costs. A 20 percent contingency is included in all of the cost estimates to cover uncertainties that exist at this preliminary planning stage. Cost estimates include engineering and construction management for a combined total of 25 percent of the construction cost. Unit cost estimates are based on an average of recent contractor bids for similar items.

Water Main Deficiencies Identified in Hydraulic Analysis

D-1: Ash Street (2020)

Estimated project cost in 2020 dollars: $35,000

The fire hydrant on the 4-inch line on Ash Street west of 9th Street did not meet the fire flow standard in hydraulic modeling. The project includes replacing approximately 250 linear feet of 4-inch water main with 8-inch water main on Ash Street west of 9th Street. If the City were to use a traditional design-build approach and hire a contractor to complete the work, the total project cost is estimated to be $80,000. The City has determined that it can complete the work with City forces for $35,000.

D-2: 9th Street (2024)

Estimated project cost in 2020 dollars: $151,000

The fire hydrant on the 4-inch line on 9th Street from Simpson Avenue to the Wastewater Treatment Plant (WWTP) did not meet the fire flow standard in hydraulic modeling. The project includes replacing approximately 500 linear feet of 4-inch water main with 8-inch water main on 9th Street between Simpson Avenue and the WWTP.

D-3: Pine Street (2021)

Estimated project cost in 2020 dollars: $45,000

The fire hydrant on the 4-inch line on Pine Street from 5th Street to 6th Street did not meet the fire flow standard in hydraulic modeling. The project includes replacing approximately 360 linear feet of 4-inch water main with 8-inch water main on Pine Street from 5th Street to 6th Street. If the City were to use a traditional design-build approach and hire a contractor to complete the work, the total project cost is estimated to be $148,000. The City has determined that it can complete the work with City forces for $45,000.

D-4: 4th Street (2025)

Estimated project cost in 2020 dollars: $250,000

The fire hydrant on the 4-inch line on 4th Street from Oak Street to Spruce Street did not meet the fire flow standard in hydraulic modeling. The project includes replacing approximately 800 linear feet of 4-inch water main with 8-inch water main on 4th Street from Oak Street to Spruce Street.

D-5: Mommsen Road (2026)

Estimated project cost in 2020 dollars: $236,000

The fire hydrant on the 4-inch line on Mommsen Road, east of Birch Street did not meet the fire flow standard in hydraulic modeling. The project includes replacing approximately 850 linear feet of 4-inch water main with 8-inch water main on Mommsen Road, east of Birch Street.

D-6A: Powerline Corridor (2020 – 2023)

Estimated project cost in 2020 dollars: $116,000

The required 1,500 gpm fire flow is not available along the western portion of Simpson Avenue. Project D-6A, in combination with Projects D-6B and D-6C, will remedy this

deficiency and will replace aging AC water pipe by connecting the Wellfield to the existing main on Simpson Avenue with new 8-inch pipe.

Project D-6A includes the installation of approximately 4,000 linear feet of 8-inch water main from the Wellfield to the east end of Ash Street, not including the crossing of the East Fork of Wildcat Creek (which will be completed as part of project D-6B). It also includes approximately 550 linear feet of 12-inch water main from the Wellfield to Summit Avenue. Because this project involves relatively straightforward construction along an existing utility corridor, it is anticipated that it will be completed by City Public Works staff rather than by a contractor. The City has determined that it can complete the work with City forces, and has already completed approximately 1,200 LF of the project. This leaves approximately 2,800 LF of 8-inch and 550 LF of 12-inch pipe to be constructed with City forces at an estimated cost of $116,000.

D-6B: Trenchless Water Main Installation (2021)

Estimated project cost in 2020 dollars: $308,000

The required 1,500 gpm fire flow is not available along the western portion of Simpson Avenue. Project D-6B, in combination with Projects D-6A and D-6C, will remedy this deficiency and will replace aging AC water pipe by connecting the Wellfield to the existing main on Simpson Avenue with new pipe.

Project D-6B includes the installation of 360 linear feet of new 8-inch water main under East Fork Wildcat Creek and its adjoining wetlands by means of horizontal directional drilling (HDD) and the installation of a total of 40 linear feet of new 8-inch water main on either side of the crossing by means of open-cut construction.

It also includes the installation of two borings under the railroad tracks in the vicinity of the existing wellfield. The boring to the south will be for 8-inch carrier pipe in casing and the boring to the east will be for 12-inch carrier pipe in casing. Each boring will be approximately 30 feet long. Connection to existing site piping will require an additional approximately 30 feet of 8-inch pipe and 70 feet of 12-inch pipe installed by open-cut construction.

Total new pipe included in this project thus includes:

- 8-inch water main installed by open cut: 70 LF
- 12-inch water main installed by open cut: 70 LF
- 8-inch water main installed by Horizontal Directional Drilling: 360 LF
- 8-inch water main in casing under railroad tracks: 30 LF
- 12-inch water main in casing under railroad tracks: 30 LF

D-6C: Ash Street and 8th Street (2023)

Estimated project cost in 2020 dollars: $255,000

The required 1,500 gpm fire flow is not available along the western portion of Simpson Avenue. Project D-6C, in combination with Projects D-6A and D-6B, will remedy this deficiency and will replace aging AC water pipe by connecting the Wellfield to the existing main on Simpson Avenue with new pipe.

Project D-6C includes the installation of 900 linear feet of new 8-inch water main on Ash Street and 8th Street between the east end of Ash Street and Simpson Avenue. This project is separate from Project D-6A because it has been assumed that the project will be completed using a traditional design-build approach and constructed by a contractor (as opposed to Project D-6A, which will be completed by City Public Works staff).

Water Main Deficiencies Identified by City Public Works Staff

D-7: Reservoir Line Replacement (2022)

Estimated project cost in 2020 dollars: $313,000

The existing 8-inch cast iron and wood stave water main from the City reservoirs to Birch Street was installed in the 1940's or earlier and is approaching the end of its useful life. The project includes replacing approximately 1,160 linear feet of 8-inch water main with 12-inch water main. Upsizing this pipe to 12-inch will provide additional system redundancy and improve available fire flow in the distribution system.

D-8: Summit Road Phase 1 (2030)

Estimated project cost in 2020 dollars: $1,028,000

The existing 6-inch and 8-inch AC water mains on Summit Road have been the source of several recent significant leaks that the City has been forced to repair, and these lines are approaching the end of their useful life. The project includes replacing approximately 3,100 linear feel of 6-inch and 8-inch water main with a single new 12-inch water main along Summit Road between the bridge over East Fork Wildcat Creek and Simpson Avenue.

D-9: Summit Road Phase 2 (2032)

Estimated project cost in 2020 dollars: $665,000

The existing 6-inch and 8-inch AC water mains on Summit Road and the road to the City Wellfield are approaching the end of their useful life. The project includes replacing

approximately 1,770 linear feel of 6-inch and 8-inch water main with a single new 12-inch water main along Summit Road.

D-10: Simpson Avenue (2034)

Estimated project cost in 2020 dollars: $741,000

The existing 6-inch AC water main on Simpson Avenue is approaching the end of its useful life. The project includes replacing approximately 2,530 linear feet of 6-inch water main with 8-inch water main along Simpson Avenue between Summit Road and 10th Street.

Water Main Extensions

D-11: Mox Chehalis Road Extension (2036)

Estimated project cost in 2020 dollars: $721,000

In order to serve customers in the City's Future Water Service Area and Retail Water Service Area, an extension of the City's water system across SR 8 is required. The project includes installing 2,270 linear feet of new 8-inch water main, 780 linear feet of which will be installed within a casing under SR 8 using Horizontal Directional Drilling (HDD).

Water Use Efficiency Measures

E-1: Leak Detection and Repair

Estimated project cost in 2020 dollars: $15,000 annually

The annual cost of leak detection and repair will depend on whether the annual efforts cover the entire water system each year or if they are focused on certain areas each year. The cost will also depend on how many leaks are found each year, and the specific circumstances of each leak repair. If numerous leaks are found in a given area, the problem water mains may be replaced under the water main replacement program. For planning and budget purposes $15,000 per year will be allocated to leak detection and repair.

E-2: Water Meter Replacement Program

Estimated project cost in 2020 dollars: $5,000 annually

The City of McCleary has an ongoing water meter replacement program, budgeted at $5,000 per year.

NON-CAPITAL IMPROVEMENTS

There are system needs identified in earlier chapters of this plan that are not capital facilities improvements, but are needed to meet regulatory requirements for water conservation and source protection. These improvements are summarized below.

Water Use Efficiency Measures

E-3: Water Use Efficiency Program Promotion

Estimated project cost in 2020 dollars: $2,500 annually

Water Use Efficiency Program promotion is an ongoing effort for the City of McCleary. Regular distribution of water WUE guidelines and publication of articles promoting conservation through the McCleary website will continue. The estimated cost for program promotion is $2,500 per year.

Wellhead Protection Measures

W-1: Distribute Notifications (2020)

Estimated project cost in 2020 dollars: $1,300

Wellhead protection regulations require that owners of potential sources of contamination within the wellhead protection areas be notified of the fact that the wellhead protection area encompasses their property and advised that any contamination that might emanate from their site has a potential to contaminate the community's drinking water supply. The letters should contain an explanation of the wellhead protection program and a map showing the wellhead protection area. Based on the analysis in Chapter 5, McCleary has two identified potential sources of contamination within their wellhead protection areas. This does not include the Puget Sound and Pacific Rail corridor or individual residential septic systems. Wellhead protection area notices should be sent to these two potential sources listed in Table 5-1. It is advisable also to distribute copies of the wellhead protection maps to owners of all property located within McCleary's wellhead protection areas, advising that disposal of inappropriate substances to septic systems within the wellhead protection areas could contaminate the McCleary water supply. In addition, notices must be provided to regulatory agencies and local governments with permitting authority in the wellhead protection areas, and to emergency incident responders responsible for response in the wellhead protection areas. An estimated 650 mailings at a $2.00 per mailing would cost the City of McCleary approximately $1,300.

Operations Measures

Certain measures have been recommended in Chapter 6 of this Plan, Operation and Maintenance. These recommendations are summarized in the following sections.

O-1: Operations Staff

Operations staffing appears to be adequate at this time. However, the McCleary water department will need to maintain its staff certifications through continued training programs required by the state. No specific budgeted allocation is associated with this project.

Planning Measures

P-1: Water System Plan (2030)

Estimated project cost in 2020 dollars: $60,000

Update Water System Plan: This water system plan will be due for update in 10 years. The estimated cost for a water system plan update is $60,000.

SUMMARY OF RECOMMENDED IMPROVEMENTS

A prioritization schedule and cost summary for the recommended 10- and 20-year improvements are shown in Table 8-1. All costs shown are in 2020 dollars. Figure 8-1 shows all of the site-specific capital improvements detailed in this chapter.

The estimated total cost of all distribution system projects proposed for the 10-year planning period is $1,709,000. This equates to $170,900 per year, which exceeds the minimum of $75,000 per year necessary to replace all the City's distribution mains on an 85-year schedule. Hence, the City is planning to invest adequately in its Water Main Replacement (WMR) Program.

The total estimated cost of all capital and non-capital improvements in the 10-year capital improvement schedule is $1,985,300. This equates to an annual average of $198,530, or a monthly average of $16,544. The total estimated cost of all improvements in the 20-year capital improvement schedule is $4,313,000. It is anticipated that some projects in the 20-year capital improvement schedule may be loan and/or developer-funded.

The City's plan for funding the improvements in the 10-year capital improvement schedule is discussed in Chapter 9.

N

0 1,600 3,200 Feet

Legend:

- EXISTING WELL
- EXISTING RESERVOIR
- 3/4" WATER LINE
- 1" WATER LINE
- 1 1/4" WATER LINE
- 1 1/2" WATER LINE
- 2" WATER LINE
- 3" WATER LINE
- 4" WATER LINE
- 6" WATER LINE
- 8" WATER LINE
- 10" WATER LINE
- RETAIL SERVICE AREA
- SERVICE AREA
- CITY LIMITS

CITY OF McCLEARY

FIGURE 8-1
CAPITAL IMPROVEMENTS

Gray & Osborne, Inc.
CONSULTING ENGINEERS

Document Path: M:\McCleary\14234.00 Water System Plan\Figures\FIG 8-1 CIP rev04.mxd

TABLE 8-1

Summary of Recommended Improvements

Project ID	Description	Estimated Project Cost ($2020)	Estimated Project Cost ($2020)										Totals ($2020)	
			2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2020-2029	2030 - 2039
CAPITAL IMPROVEMENTS														
Source of Supply														
SO-1A	Studies and Permitting for New 500 gpm Well	$40,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$40,000	$ -	$40,000	$ -
SO-1B	Drill and Equip New 500 gpm Well	$863,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$863,000
Storage														
R-1	Reservoir Cleaning and Repairs	$20,000		$ -	$ -	$ -	$ -	$10,000	$ -	$ -	$ -	$ -	$10,000	$10,000
Distribution System														
D-1	Ash Street	$35,000	$35,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$35,000	$ -
D-2	9th Street	$151,000	$ -	$ -	$ -	$ -	$151,000	$ -	$ -	$ -	$ -	$ -	$151,000	$ -
D-3	Pine Street	$45,000	$ -	$45,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$45,000	$ -
D-4	4th Street	$250,000	$ -	$ -	$ -	$ -	$ -	$250,000	$ -	$ -	$ -	$ -	$250,000	$ -
D-5	Mommsen Road	$236,000	$ -	$ -	$ -	$ -	$ -	$ -	$236,000	$ -	$ -	$ -	$236,000	$ -
D-6A	Powerline Corridor	$116,000	$29,000	$29,000	$29,000	$29,000	$ -	$ -	$ -	$ -	$ -	$ -	$116,000	$ -
D-6B	Trenchless Water Main Installation	$308,000	$ -	$308,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$308,000	$ -
D-6C	Ash Street and 8th Street	$255,000	$ -	$ -	$ -	$255,000	$ -	$ -	$ -	$ -	$ -	$ -	$255,000	$ -
D-7	Reservoir Line Replacement	$313,000	$ -	$ -	$313,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$313,000	$ -
D-8	Summit Road Phase 1	$1,028,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$1,028,000
D-9	Summit Road Phase 2	$665,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$665,000
D-10	Simpson Avenue	$741,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$741,000
D-11	Mox Chehalis Road Extension	$721,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$721,000
Water Use Efficiency														
E-1	Leak Detection and Repair	$300,000	$15,000	$15,000	$15,000	$15,000	$15,000	$15,000	$15,000	$15,000	$15,000	$15,000	$150,000	$150,000
E-2	Water Meter Replacement Program	$100,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$50,000	$50,000
Subtotal, Capital Improvements			$84,000	$402,000	$362,000	$304,000	$171,000	$280,000	$256,000	$20,000	$60,000	$20,000	$1,959,000	$4,228,000
NON-CAPITAL IMPROVEMENTS														
E-3	Water Use Efficiency Program Promotion	$50,000	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$25,000	$25,000
W-1	Wellhead Protection Notifications	$1,300	$1,300	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$1,300	$ -
P-1	Water System Plan	$60,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$60,000
Subtotal, Non-Capital Improvements			$3,800	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$26,300	$85,000
TOTAL OF CAPITAL AND NON-CAPITAL IMPROVEMENTS			**$87,800**	**$404,500**	**$364,500**	**$306,500**	**$173,500**	**$282,500**	**$258,500**	**$22,500**	**$62,500**	**$22,500**	**$1,985,300**	**$4,313,000**

CHAPTER 9

FINANCIAL PROGRAM

OBJECTIVE

The objective of this chapter is to analyze the City of McCleary's total costs of providing water service, review the current rate structure to ensure that the current or proposed adjusted rates are adequate to cover the costs of operation and maintenance, and ascertain McCleary's financial capability to implement the 10-year Capital Improvement Plan outlined in Chapter 8.

PAST AND PRESENT FINANCIAL STATUS

This section reviews historic expenses and revenues, and current McCleary water rates.

WATER RATES

Water rates for the City of McCleary are defined in Resolution 623, *A Resolution Relating to Public Services; Repealing Resolution 578; Establishing Rates Charged for Water; Providing for Adjustment; and Providing for Effective Rates*. The City includes 500 cubic feet in its base rate. Each additional 100 cubic feet is charged $1.04. Table 9-1 summarizes the City's existing rates.

TABLE 9-1

Water Rates

Customer Class	Rate Inside City Limits	Rate Outside City Limits
Meters 1" or smaller	$72.50(1)	$108.10(1)
Meters larger than 1"	$93.10(1)	$143.50(1)

(1) Rate is for the first 500 cubic feet. Excess charge of $1.04 per 100 cubic feet.

Resolution No. 686, *A Resolution Relating to Public Services; Establishing and Confirming Fees in Relation to Connection to the City's Utility Systems; Repealing Resolution 656; and Providing for Effective Dates*, lists other fees associated with the water system. Resolution No. 699 suspended the annual adjustment provision in Resolution No. 686. These fees are summarized in Table 9-2.

TABLE 9-2

Other Fees Associated with the City of McCleary Water System

Other Fees	Rate Inside City Limits	Rate Outside City Limits
Connection Fee: Single-Family Residential(1)	$3,000.00	$3,700.00
Connection Fee: Multi-family	(2)	(2)
Connection Fee: Commercial	(3)	(3)
Connection Fee: Industrial	(4)	(4)
Reactivation(5)	$200.00	$200.00
Recommence Provision(6)	$525.00	$525.00

(1) Connection fee is for Single-Family Residential, which equals one Equivalent Residential Unit (ERU) or Base Overall Connection Fee (BOCF).

(2) Multi-family: An Overall Connection Fee (OCF) determined by multiplying the BOCF for the connection requested by a figure representing the ERUs, the applicable ERU figure being derived by application of the standards set forth in the applicable adopted planning document or plan.

(3) Commercial: The OCF shall be determined by the Administrator as a product of the BOCF multiplied by the ERU derived by application of the standards set forth in the applicable adopted planning document or plan as set forth in Resolution 686.

(4) Industrial: Shall be calculated and established by the Administrator based upon the BOCF of the utility connection sought, multiplied by the number of ERUs represented by the utilization for the applicant property derived by application of the standards set forth in the applicable adopted planning document or plan as set forth in Resolution 686.

(5) Reactivation is required if the service is not active for more than six months and less than five years prior to date of application to recommence.

(6) Recommence Provision is required if a service is not active for five years or more prior to date of application to recommence.

HISTORIC EXPENSES, REVENUES AND CASH FLOW

This section reviews historic McCleary water system expenses, revenues and cash flow. This information will be used, together with capital and non-capital improvements identified in Chapter 8, to project future expenses and revenue needs.

Historic Expenses

Historic McCleary expenses are summarized in Table 9-3. Expenses fluctuated in 2019 due primarily to upgrades to the water system that are reflected as capital outlays.

TABLE 9-3

Summary of Historic McCleary Expenses

Expense Category	2015	2016	2017	2018	2019
E911 Service Dispatch	553.65	-	-	-	-
Salaries and Wages	173,196.92	184,935.69	187,686.86	215,043.84	207,165.02
Personnel Benefits	96,438.49	91,124.91	108,798.61	114,478.28	106,857.14
Operating – Supplies	15,980.62	28,521.05	34,473.67	38,953.48	35,382.40
Fuel	4,467.37	3,965.27	4,370.54	5,059.31	5,597.45
Office – Supplies	2,000.01	1,282.31	1,060.74	2,311.55	1,395.56
Professional Services	13,604.26	15,048.61	20,143.24	21,895.39	23,524.23
Prof. Services – Engineering	-	-	-	600.00	-
Prof. Services – WSP	18,613.86	10,347.82	2,307.93	9,495.00	-
Prof. Services Legal	105.60	228.32	3,010.83	1,623.61	281.65
Communications	3,714.67	4,719.73	5,954.16	6,038.35	6,139.38
Travel	187.39	472.35	138.61	314.52	590.57
Advertising	115.33	82.29	74.15	522.62	991.47
Rental/Lease Equipment	14.58	826.66	1,211.70	651.01	1,408.36
Insurance	11,733.30	24,243.59	-	13,389.35	14,417.31
Public Utility Service	13,863.86	13,676.96	16,202.44	18,002.68	18,393.47
Repair and Maintenance	9,394.69	7,847.72	16,050.73	12,294.10	21,880.42
State Permits and Fees	1,582.35	1,701.35	1,456.35	1,456.35	1,456.35
Miscellaneous	844.20	58.05	571.16	596.92	1,156.01
Miscellaneous – Training	2,036.75	387.00	1,424.02	3,191.69	6,161.84
External Taxes	37,671.25	36,580.51	38,898.59	40,516.84	42,295.37
Other Non-Expenditures	-	-	-	-	-
Interfund Loan to C/E for Fire Equip.	-	-	-	65,000.00	-
PWTF Well 2 and 3 – Loan Principal	91,670.71	79,691.20	79,691.20	79,691.20	79,691.20
USDA Bonds – Principal (Loan 5 and 6)	14,500.26	14,975.35	15,466.01	14,191.10	14,656.06
USDA Bond Loan 5 and 6 – Interest	9,201.74	8,726.65	8,235.99	9,510.90	9,045.94
PWTF Loan Repayment – Int, Wells 2 and 3	6,682.70	6,375.30	5,976.84	5,578.39	5,179.93
Capital Outlay – Other Improvement	2,950.47	-	-	-	-
Capital Outlay – System	25,763.83	41,908.10	30,687.53	19,065.54	296,946.50
Capital Outlay – Equipment	18,062.05	5,726.76	10,889.40	1,262.64	51,681.58
Capital Outlay – Building	-	-	-	-	22,417.00
Equipment Replacement Water	-	-	25,000.00	-	-
Transfer Out – Operating	40,000.00	-	40,000.00	40,000.00	73,175.00
Transfer Out – To Managerial Fund	-	-	-	25,000.00	63,175.00
Unreserved Ending Cash/Investments	-	-	-	-	-
PWTF Loan Repayment	-	-	-	-	-
Total Expenditures	**614,950.91**	**583,453.55**	**659,781.30**	**765,734.66**	**1,111,062.21**

Historic Revenues

Historic McCleary revenues are shown in Table 9-4.

TABLE 9-4

Summary of Historic McCleary Revenues

Revenue Category	2015	2016	2017	2018	2019
Water Sales	645,633.85	676,861.24	717,161.37	750,597.13	781,440.49
Other Charges Related to Water	2,983.43	10,252.86	6,660.50	6,203.78	11,686.00
New Water Connections	8,550.00	41,325.00	45,677.66	54,703.14	78,417.50
Investment Interest	518.10	1,596.49	4,269.16	9,521.57	7,493.70
ULID 96-01 Principal	-	2,024.24	624.00	936.00	624.00
Sale of Scrap and Junk	30.07	686.86	-	52.36	370.32
Home Inspection Fee	-	-	-	-	75.00
Other Miscellaneous Revenue	-	607.66	25.00	25.00	237.33
Interfund Loan Principal Fire Equip	-	-	-	10,765.78	54,234.23
Interfund Int. Principal Fire Equip	-	-	-	155.78	373.57
Other Non-Revenues	-	-	-	-	-
Total Revenues	**658,415.99**	**733,697.35**	**774,424.12**	**833,560.22**	**934,961.51**

Historic Cash Flow

Table 9-5 shows historic McCleary cash flow.

TABLE 9-5

Summary of Historic McCleary Cash Flow

Item	2015	2016	2017	2018	2019
Net Revenues(1)	1,105,573.71	1,224,320.15	1,415,290.72	1,589,069.64	1,758,296.49
Total Expenditures	614,950.91	583,453.55	659,781.30	765,734.66	1,111,062.21
Revenues – Expenditures	490,622.80	640,866.60	755,509.42	823,334.98	647,234.28

(1) Net Revenues include Total Revenues from Table 9-4 plus Unreserved Beginning Cash from the previous year (in 2014 the Unreserved Beginning Cash balance was $447,157.72).

PROJECTED EXPENSES AND REVENUES

PROJECTED EXPENSES WITHOUT IMPROVEMENTS

Based on historic expenses as shown in Table 9-3, annual expenses have been projected forward in Table 9-6. Expense categories have been projected at varying rates discussed in the footnotes following Table 9-6. Note that this projection does not include capital and non-capital improvements identified in Chapter 8.

TABLE 9-6

Projected McCleary Expenses Without Improvements

Expense Category	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
E911 Service Dispatch	-	-	-	-	-	-	-	-	-	-
Salaries and Wages[1]	215,395.86	223,953.72	232,851.60	242,102.99	251,721.95	261,723.07	272,121.56	282,933.18	294,174.35	305,862.15
Personnel Benefits[2]	117,505.95	123,221.94	129,215.97	135,501.58	142,092.95	149,004.95	156,253.17	163,853.99	171,824.53	180,182.80
Operating – Supplies[3]	35,362.63	36,423.51	37,516.21	38,641.70	39,800.95	40,994.98	42,224.83	43,491.57	44,796.32	46,140.21
Fuel[3]	4,832.75	4,977.73	5,127.06	5,280.87	5,439.30	5,602.48	5,770.55	5,943.67	6,121.98	6,305.64
Office – Supplies[3]	1,658.34	1,708.09	1,759.33	1,812.11	1,866.47	1,922.46	1,980.14	2,039.54	2,100.73	2,163.75
Professional Services[3]	19,408.44	19,990.69	20,590.41	21,208.13	21,844.37	22,499.70	23,174.69	23,869.93	24,586.03	25,323.61
Prof. Services – Engineering[4]	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00
Prof. Services – WSP	-	-	-	-	-	-	-	-	-	-
Prof. Services Legal[3]	1,081.50	1,113.95	1,147.37	1,181.79	1,217.24	1,253.76	1,291.37	1,330.11	1,370.01	1,411.11
Communications[3]	5,472.66	5,636.84	5,805.94	5,980.12	6,159.52	6,344.31	6,534.64	6,730.68	6,932.60	7,140.57
Travel[3]	350.91	361.44	372.28	383.45	394.95	406.80	419.00	431.57	444.52	457.86
Advertising[3]	367.89	378.92	390.29	402.00	414.06	426.48	439.28	452.45	466.03	480.01
Rental/lease Equipment[3]	847.14	872.55	898.73	925.69	953.46	982.06	1,011.52	1,041.87	1,073.13	1,105.32
Insurance[3]	13,139.41	13,533.59	13,939.60	14,357.79	14,788.52	15,232.18	15,689.14	16,159.82	16,644.61	17,143.95
Public Utility Service[3]	16,508.72	17,003.98	17,514.10	18,039.52	18,580.71	19,138.13	19,712.27	20,303.64	20,912.75	21,540.13
Repair and Maintenance[3]	13,898.34	14,315.29	14,744.75	15,187.09	15,642.70	16,111.98	16,595.34	17,093.20	17,606.00	18,134.18
State Permits and Fees[3]	1,576.47	1,623.76	1,672.47	1,722.65	1,774.33	1,827.56	1,882.38	1,938.85	1,997.02	2,056.93
Miscellaneous[3]	664.63	684.56	705.10	726.25	748.04	770.48	793.60	817.41	841.93	867.19
Miscellaneous-training[3]	2,719.47	2,801.05	2,885.08	2,971.64	3,060.78	3,152.61	3,247.19	3,344.60	3,444.94	3,548.29
External Taxes[3]	40,368.29	41,579.34	42,826.72	44,111.52	45,434.86	46,797.91	48,201.85	49,647.90	51,137.34	52,671.46
Other Non-expenditures	-	-	-	-	-	-	-	-	-	-
Interfund Loan to C/E for Fire Equip.	-	-	-	-	-	-	-	-	-	-
PWTF Well 2 and 3 – Loan Principal	80,000.00	80,000.00	80,000.00	80,000.00	80,000.00	80,000.00	80,000.00	80,000.00	80,000.00	80,000.00
USDA Bonds - Principal (Loan 5 and 6)	13,750.00	13,750.00	13,750.00	13,750.00	13,750.00	13,750.00	13,750.00	13,750.00	13,750.00	13,750.00

TABLE 9-6 – (continued)

Projected McCleary Expenses Without Improvements

Expense Category	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
USDA Bond Loan 5 and 6 – Interest(5)	8,898.64	8,753.73	8,611.19	8,470.97	8,333.02	8,197.33	8,063.85	7,932.54	7,803.36	7,676.30
PWTF Loan – Interest Well 2&3(5)	4,839.04	4,520.59	4,223.10	3,945.18	3,685.55	3,443.01	3,216.43	3,004.76	2,807.02	2,622.29
Capital Outlay – Other Improvement	-	-	-	-	-	-	-	-	-	-
Capital Outlay – System	-	-	-	-	-	-	-	-	-	-
Capital Outlay – Equipment(3)	18,050.22	18,591.73	19,149.48	19,723.96	20,315.68	20,925.15	21,552.91	22,199.49	22,865.48	23,551.44
Capital Outlay – Building	-	-	-	-	-	-	-	-	-	-
Equipment Replacement Water(6)	5,000.00	5,000.00	5,000.00	5,000.00	5,000.00	5,000.00	5,000.00	5,000.00	5,000.00	5,000.00
Transfer Out – Operating(7)	40,000.00	40,000.00	40,000.00	40,000.00	40,000.00	40,000.00	40,000.00	40,000.00	40,000.00	40,000.00
Transfer Out – To Managerial Fund	-	-	-	-	-	-	-	-	-	-
Unreserved Ending Cash/Investments	-	-	-	-	-	-	-	-	-	-
PWTF Loan Repayment	-	-	-	-	-	-	-	-	-	-
Total Expenditures	**662,197.28**	**681,297.00**	**701,196.77**	**721,926.98**	**743,519.43**	**766,007.40**	**789,425.71**	**813,810.78**	**839,200.69**	**865,635.20**

(1) Salaries and Wages have been projected to increase 4.0% per year based on the average % increase in years 2015-2019.
(2) Personnel Benefits have been projected to increase 4.9% per year based on the average % increase in years 2015-2019.
(3) All line items designated with this footnote have been projected to increase 3.0% per year based on the average of the preceding 5 years (2015-2019).
(4) Professional Services – Engineering is projected to remain constant at $500 annually.
(5) USDA Bond Loan 5&6 Interest and PWTF Loan Repayment Interest are projected to decrease by the average % of the preceding 5 years (2015-2019).
(6) Equipment Replacement is projected to remain constant at $5,000 annually.
(7) Transfer Out – Operating is projected to remain constant at $40,000 annually, which is the average of the preceding 5 years (2015-2019).

PROJECTED REVENUES

Based on historic revenues as shown in Table 9-4, annual revenues have been projected forward in Table 9-7. Revenue categories have been projected at varying rates described in the footnotes following Table 9-7.

TABLE 9-7

Projected McCleary Revenues

Revenue Category	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Water Sales[1]	808,009.47	835,481.79	863,888.17	893,260.37	923,631.22	955,034.68	987,505.86	1,021,081.06	1,055,797.82	1,091,694.94
Other Charges Related to Water[2]	7,784.03	8,017.55	8,258.08	8,505.82	8,761.00	9,023.83	9,294.54	9,573.38	9,860.58	10,156.40
New Water Connections[3]	36,000.00	36,000.00	36,000.00	36,000.00	36,000.00	36,000.00	36,000.00	36,000.00	36,000.00	36,000.00
Investment Interest[2]	4,820.20	4,964.80	5,113.75	5,267.16	5,425.18	5,587.93	5,755.57	5,928.24	6,106.08	6,289.27
ULID 96-01 Principal[2]	866.90	892.90	919.69	947.28	975.70	1,004.97	1,035.12	1,066.17	1,098.16	1,131.10
Sale of Scrap and Junk[2]	234.76	241.80	249.06	256.53	264.22	272.15	280.32	288.72	297.39	306.31
Home Inspection Fee	-	-	-	-	-	-	-	-	-	-
Other Miscellaneous Revenue[2]	184.37	189.90	195.60	201.46	207.51	213.73	220.14	226.75	233.55	240.56
Interfund Loan Principal Fire Equip	-	-	-	-	-	-	-	-	-	-
Interfund Int. Principal Fire Equip	-	-	-	-	-	-	-	-	-	-
Other Non-Revenues[2]	341.76	352.01	362.57	373.45	384.65	396.19	408.08	420.32	432.93	445.92
Total Revenues	**858,241.48**	**886,140.76**	**914,986.91**	**944,812.07**	**975,649.48**	**1,007,533.49**	**1,040,499.63**	**1,074,584.64**	**1,109,826.51**	**1,146,264.49**

(1) Water Sales revenues have been projected to increase 3.4 percent per year based on the average percent increase in years 2015-2019.
(2) All line items designated with this footnote have been projected to increase 3.0 percent per year based on the average of the preceding 5 years (2015-2019).
(3) New Water Connections are projected to increase by 12 connections per year.

PROJECTED BALANCE SHEET WITH IMPROVEMENTS

Table 9-8 shows the projected McCleary balance sheet based on projected expenses, revenues, and capital and non-capital improvements. The beginning fund balance for 2020 is revenues minus expenditures at the end of 2019 from Table 9-5. A 3 percent per year inflation rate has been assumed for capital and non-capital improvements after 2020.

TABLE 9-8

Projected McCleary Balance Sheet

Project ID	Project Description	Estimated Cost at Year of Construction[1]									
		2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
CAPITAL IMPROVEMENTS											
Source of Supply											
SO-1A	Studies and Permitting for New 500 gpm Well	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$50,671	$ -
SO-1B	Drill and Equip New 500 gpm Well	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Storage											
R-1	Reservoir Cleaning and Repairs	$ -	$ -	$ -	$ -	$ -	$11,593	$ -	$ -	$ -	$ -
Distribution System											
D-1	Ash Street	$35,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
D-2	9th Street	$ -	$ -	$ -	$ -	$169,952	$ -	$ -	$ -	$ -	$ -
D-3	Pine Street	$ -	$46,350	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
D-4	4th Street	$ -	$ -	$ -	$ -	$ -	$289,819	$ -	$ -	$ -	$ -
D-5	Mommsen Road	$ -	$ -	$ -	$ -	$ -	$ -	$281,796	$ -	$ -	$ -
D-6A	Powerline Corridor	$29,000	$29,870	$30,766	$31,689	$ -	$ -	$ -	$ -	$ -	$ -
D-6B	Trenchless Water Main Installation	$ -	$317,240	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
D-6C	Ash Street and 8th Street	$ -	$ -	$ -	$278,645	$ -	$ -	$ -	$ -	$ -	$ -
D-7	Reservoir Line Replacement	$ -	$ -	$332,062	$ -	$ -	$ -	$ -	$ -	$ -	$ -
D-8	Summit Road Phase 1	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
D-9	Summit Road Phase 2	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
D-10	Simpson Avenue	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
D-11	Mox Chehalis Road Extension	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water Use Efficiency											
E-1	Leak Detection and Repair	$15,000	$15,450	$15,914	$16,391	$16,883	$17,389	$17,911	$18,448	$19,002	$19,572
E-2	Water Meter Replacement Program	$5,000	$5,150	$5,305	$5,464	$5,628	$5,796	$5,970	$6,149	$6,334	$6,524
Subtotal, Capital Improvements		$84,000	$414,060	$384,046	$332,189	$192,462	$324,597	$305,677	$24,597	$76,006	$26,095
NON-CAPITAL IMPROVEMENTS											
E-3	Water Use Efficiency Program Promotion	$2,500	$2,575	$2,652	$2,732	$2,814	$2,898	$2,985	$3,075	$3,167	$3,262
W-1	Wellhead Protection Notifications	$1,300	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
P-1	Water System Plan	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Subtotal, Non-Capital Improvements		$3,800	$2,575	$2,652	$2,732	$2,814	$2,898	$2,985	$3,075	$3,167	$3,262
TOTAL OF CAPITAL AND NON-CAPITAL IMPROVEMENTS		**$87,800**	**$416,635**	**$386,698**	**$334,921**	**$195,276**	**$327,495**	**$308,663**	**$27,672**	**$79,173**	**$29,357**
PROJECTED EXPENSES WITHOUT IMPROVEMENTS[2]		$662,197	$681,297	$701,197	$721,927	$743,519	$766,007	$789,426	$813,811	$839,201	$865,635
PROJECTED EXPENSES INCLUDING IMPROVEMENTS		$749,997	$1,097,932	$1,087,895	$1,056,848	$938,795	$1,093,502	$1,098,088	$841,483	$918,374	$894,993
PROJECTED REVENUES[3]		$858,241	$886,141	$914,987	$944,812	$975,649	$1,007,533	$1,040,500	$1,074,585	$1,109,827	$1,146,264
REVENUES MINUS EXPENSES WITHOUT IMPROVEMENTS		$196,044	$204,844	$213,790	$222,885	$232,130	$241,526	$251,074	$260,774	$270,626	$280,629
REVENUES MINUS EXPENSES INCLUDING IMPROVEMENTS		$108,244	$(211,791)	$(172,908)	$(112,036)	$36,854	$(85,969)	$ (57,589)	$233,102	$191,453	$251,272
BEGINNING FUND BALANCE[4]		$647,234	$755,478	$543,687	$370,779	$258,744	$295,598	$209,629	$152,040	$385,142	$ -
ENDING FUND BALANCE		$755,478	$543,687	$370,779	$258,744	$295,598	$209,629	$152,040	$385,142	$576,595	$827,867
ENDING FUND BALANCE > 1/8 ANNUAL EXPENSES		YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

(1) Costs of capital and non-capital improvements have been projected to increase at 3% per year from current (year 2020) costs. See Table 8-1 for current (year 2020) costs.
(2) Projected Expenses Without Improvements are from Table 9-6.
(3) Projected Revenues are from Table 9-7.
(4) Beginning Fund Balance in 2020 is Revenues – Expenditures for 2019 from Table 9-5. Beginning fund balance for other years is the ending fund balance for the previous year.

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FINANCIAL VIABILITY

According to the Department of Health *Financial Viability Manual*, the financial health of a utility may be judged by employing the following four financial viability tests:

(1) Revenues minus Expenses ≥ 0.
(2) Operating Cash Reserve ≥ 1/8 x Annual Operating Expenses.
(3) Emergency Reserves ≥ Cost of the Most Vulnerable Facility.
(4) Rates ≤ 1.5 percent of Median Household Income (MHI).

(1) The first Financial Viability test is that revenues minus expenses must be greater than or equal to zero. Table 9-5 shows that McCleary's water system revenues have always been greater than expenses over the data period, and Table 9-8 shows that this is projected to continue over the 10-year planning period (see the line item "Revenues Minus Expenses Without Improvements" in the table).

(2) The second Financial Viability test is that operating cash reserves must be greater than one eighth of annual operating expenses. According to the DOH Financial Viability Manual, operating expenses do not include debt or capital costs. Table 9-8 demonstrates that the projected operating cash balance is greater than one eighth of annual operating expenses.

(3) The third Financial Viability test requires the water utility to have an emergency reserve equal to the cost of replacing the system's most vulnerable facility. Based on the recent history of water main breaks, the most vulnerable facility that the utility would be repairing is a major water main. Table 9-8 shows projected ending fund balances ranging from $152,040 to $827,867. The cost for a major water main repair is generally below $50,000. Therefore, the utility has the resources available to respond to replace the system's most vulnerable facility.

(4) The fourth Financial Viability test is that water utility rates should not exceed 1.5 percent of Median Household Income (MHI) for the utility service area. According to the United States Census Bureau's *2013-2017 American Community Survey 5- Year Estimate*, the median household income for the City of McCleary is $50,380. One and one half percent of $50,380 is $755.70 per year or $62.98 per month. As shown in Table 9-1, the City's residential water rate inside city limits is $72.50, which exceeds 1.5 percent of the City's MHI. Therefore, this fourth Financial Viability test is not met by the City.

RATE STRUCTURE ANALYSIS

The City's current rate structure includes both a base charge, which applies to all customers regardless of meter size and a surcharge for water use in excess of 500 cubic feet in a 1-month period. Consumption charges that encourage the efficient use of water

include increasing block rates, which have a per-unit charge that increases as water consumption increases, and seasonal rates, which include an additional charge for water use above a certain threshold during months when system demand is highest.

CONCLUSIONS AND RECOMMENDATIONS

Based on our review of McCleary's water system finances and planned capital and non-capital improvements, the current rate structure is sufficient to fund maintenance, operations, and proposed improvements over the entire 10-year planning period (2020 – 2029). Additional capital improvements as discussed in Chapter 8, such as those proposed outside of the 10-year planning period, could be funded by some combination of rates, developer funding, and/or through loan funding. McCleary may look into the availability of low interest loans from funding sources such as Drinking Water State Revolving Fund (DWSRF) and the United States Department of Agriculture (USDA) Rural Development. Any of these loans would ultimately be paid back through rates. McCleary's water rates exceed the DOH recommended fourth Financial Viability test, which states that water utility rates should not exceed 1.5 percent of the MHI for the utility service area. Therefore, it is recommended that water utility rates should remain stable unless there are changes to the water service area or significant changes within McCleary's customer base.

APPENDIX A

CITY OF MCCLEARY WATER FACILITIES INVENTORY (WFI) 2017

SANITARY SURVEY (2013)

WATER FACILITIES INVENTORY (WFI) FORM

Washington State Department of Health
Division of Environmental Health
Office of Drinking Water

ONE FORM PER SYSTEM

Quarter: 1
Updated: 05/19/2017
Printed: 6/21/2018
WFI Printed For: On-Demand
Submission Reason: No Change

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

1. SYSTEM ID NO.	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
52250 U	MCCLEARY, CITY OF	GRAYS HARBOR	A	Comm

6. PRIMARY CONTACT NAME & MAILING ADDRESS	7. OWNER NAME & MAILING ADDRESS	8. OWNER NUMBER: 003671
TODD A. BAUN [PUBLIC WORKS DIR.] 100 S 3RD ST MCCLEARY, WA 98557	MCCLEARY, CITY OF TODD A. BAUN 100 S 3RD ST MCCLEARY, WA 98557	PUBLIC WORKS DIR.
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) 495-3667		Owner Daytime Phone: (360) 495-3667	
Primary Contact Mobile/Cell Phone: (360) 470-1422		Owner Mobile/Cell Phone: (360) 470-1422	
Primary Contact Evening Phone: (xxx)-xxx-xxxx		Owner Evening Phone:	
Fax:	E-mail: xxxxxxxxxxxxxxxxxxx	Fax: (360) 495-3097	E-mail: xxxxxxxxxxxxxxxxxxx

11. SATELLITE MANAGEMENT AGENCY - SMA (check only one)

- [x] Not applicable (Skip to #12)
- [ ] Owned and Managed
- [ ] Managed Only
- [ ] Owned Only

SMA NAME: _____ SMA Number:

12. WATER SYSTEM CHARACTERISTICS (mark all that apply)

- [ ] Agricultural
- [x] Commercial / Business
- [x] Day Care
- [x] Food Service/Food Permit
- [x] 1,000 or more person event for 2 or more days per year
- [x] Hospital/Clinic
- [x] Industrial
- [x] Licensed Residential Facility
- [ ] Lodging
- [ ] Recreational / RV Park
- [x] Residential
- [x] School
- [ ] Temporary Farm Worker
- [x] Other (church, fire station, etc.): _____

13. WATER SYSTEM OWNERSHIP (mark only one)

- [ ] Association
- [x] City / Town
- [ ] County
- [ ] Federal
- [ ] Investor
- [ ] Private
- [ ] Special District
- [ ] State

14. STORAGE CAPACITY (gallons)

650,000

15	16	17	18 SOURCE CATEGORY										19 USE			20	21 TREATMENT						22	23	24 SOURCE LOCATION			
Source Number	SOURCE NAME 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	SPRING IN SPRINGFIELD	SEA WATER	SURFACE WATER	RANNEY / INF. GALLERY	OTHER	PERMANENT	SEASONAL	EMERGENCY	SOURCE METERED	NONE	CHLORINATION	FILTRATION	FLUORIDATION	IRRADIATION (UV)	OTHER	DEPTH TO FIRST OPEN TERVAL IN FEET	CAPACITY (GALLONS PER MINUTE)	1/4, 1/4 SECTION	SECTION NUMBER	TOWNSHIP	RANGE
S01	WF (S02 & S03)			X									X			Y		X					42	840	NW NE	11	18N	05W
S02	WELL #2 AFG094 12"				X								X			Y	X						42	400	NE NE	11	18N	05W
S03	WELL #3 AFG302 16"				X								X			Y	X						75	500	NE NE	11	18N	05W

WATER FACILITIES INVENTORY (WFI) FORM - Continued

1. SYSTEM ID NO.	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
52250 U	MCCLEARY, CITY OF	GRAYS HARBOR	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?)		765	970
A. Full Time Single Family Residences (Occupied 180 days or more per year)	663	668	
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	15	13	
B. Full Time Residential Units in the Apartments, Condos, Duplexes, Dorms that are occupied more than 180 days/year	102		
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	0
B. Institutional, Commercial/Business, School, Day Care, Industrial Services, etc.	64 76	64	0
28. TOTAL SERVICE CONNECTIONS		829	970

29. FULL-TIME RESIDENTIAL POPULATION 757

A. How many residents are served by this system 180 or more days per year? 1600

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?	15000	15000	15000	15000	15000	15000	15000	15000	15000	15000	15000	15000
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?	653	653	653	653	653	653	270	270	653	653	653	653
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
* Requirement is exception from WAC 246-290	3	3	3	3	3	3	2	2	3	3	3	3

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: _____

STATE OF WASHINGTON

DEPARTMENT OF HEALTH

SOUTHWEST DRINKING WATER REGIONAL OPERATIONS

P.O. Box 47823 Olympia, Washington 98504-7823
TDD Relay 1-800-833-6388

September 12, 2013	City of McCleary ID #52250U	
Nick Bird 100 South 3rd Street McCleary, Washington 98557	County:	Grays Harbor
	System Type:	Group A Community
	Operating Permit Color:	Green
	Surveyor:	Teresa Walker
	Inspection Date:	August 15, 2013

Thank you for meeting with me to conduct a survey of this water system. Sanitary surveys are the Office of Drinking Water's (ODW) way to inspect public water systems through a field visit. ODW is also able to offer technical assistance to help utilities improve their system operations and ensure that public health is protected.

This report documents the findings of this survey. The following summarizes the deficiencies that need your attention.

OTHER FINDINGS- PLEASE RESPOND TO THESE FINDINGS BY NOVEMBER 30, 2013

1. **Please verify that all vents on wellheads and sample taps are screened.**
2. **Make sure all discharge piping is screened.**
3. **Please verify that chemical feed pumps have antisiphon devices internal to the pumps.**
4. **Please provide NSF certification for NaCl2.**
5. **The City has not fully implemented the cross connection control (CCC) program. A database of existing backflow prevention devices should be created, verify testing, and establish procedures for hazard assessments and detailed in the water system plan (WSP) update due in 2015.**
6. **Drains should have covers, flapper screens, or duck bills to prevent animal intrusions.**
7. **Please e-mail photos showing hatch covers and gaskets or other weatherproofing.**
8. **A plant rating for the new treatment plant is enclosed and rates the plant at a Basic Treatment Operator (BTO) level, requiring an operator to be certified as a BTO.**
9. **Operators should be familiar with where source samples (IOCs, VOCs, and SOCs) are taken with the new treatment plant. Samples should be taken prior to distribution, but following treatment.**

RECOMMENDATIONS

10. **This system should plan for installing an emergency generator.**
11. **A study of the distribution water quality may be necessary in order to determine the cause of chlorine demand within the distribution system and possible methods of reducing it.**
12. **Ventilation in the treatment building needs improvement in order to avoid condensation of water on tanks.**

13. **All piping in the treatment plant should be labeled.**
14. **Raw and finished iron should be measured daily in order to determine the removal rate for the new plant.**
15. **Overflow on small reservoir should have drop down to ground level.**

As you complete the items noted above, send me photo verification of the items you have completed. Include the system name, ID number, and the date the deficiencies were corrected. You can send them to me by e-mail at teresa.walker@doh.wa.gov or by mail at PO Box 47823, Olympia, Washington 98504-7823.

As a result of recent regulation changes, all community water systems in Washington have been changed to a three-year sanitary survey cycle. Systems with no coliform violations, no more than one monitoring violation, and no outstanding significant deficiencies from a previous survey can qualify for reduced survey frequency.

Your next survey is **in five years**.

SYSTEM INFORMATION

This system is a community system with approximately 850 service connections. McCleary recently switched from sequestration to filtration for iron and manganese removal and decommissioned one source.

SECTION 1: SOURCE

Source ID #	Name:	Description:	Ecology Tag #
	Wellfield (S02&03)		
S02	Well #2	40 Horsepower (HP) Vertical Turbine	AFG094
S03	Well #3	50 HP Vertical Turbine, 500 gallons per minute (gpm)	AFG302

S02 pumps at 400 gpm and S03 at 500 gpm. S02 is located in the treatment building. S03 is located in a separate building approximately 500 feet from the treatment building. A new ATEC treatment facility was recently installed at S02.

WELLHEAD	Source ID #02		Source ID #03	
	Yes	No	Yes	No
System has well log	☒	☐	☒	☐
Wellcap seal	☒	☐	☒	☐
Openings sealed	☒	☐	☒	☐
Screened vent	☐	☐	☒	☐
Wellhead terminates 6" above grade	☒	☐	☒	☐
Wellhead protected from flooding	☒	☐	☒	☐
Source meter	☒	☐	☒	☐
Pressure gauge	☒	☐	☒	☐
Raw water sample tap	☒	☐	☒	☐
Check valve	☒	☐	☒	☐
Protected from unauthorized access	☒	☐	☒	☐
Adequate sanitary control area	☒	☐	☒	☐
Frequency of routine site visit	Daily		Daily	
Frequency of source meter reading	Continuous		Continuous	

Please verify that all vents on wellheads and sample taps are screened. There was an air gap on control valve discharges. **Make sure all discharge piping is screened.**

Both S02 and S03 have a common manifold prior to treatment. S02 can bypass treatment. Treatment does have a bypass to distribution.

WELL PUMP EQUIPMENT	Source ID #02		Source ID #03	
	Yes	No	Yes	No
Functional pump controls	☒	☐	☒	☐
Generator available	☐	☒	☐	☒
Generator has automatic startup	☐	☒	☐	☒
Generator fuel source				

This system should plan for installing an emergency generator. However, the City also owns the electrical utility within the City so restoring power is usually very fast.

BUILDINGS/ENCLOSURE	Source ID #		Source ID #	
	Yes	No	Yes	No
Facility secure	☒	☐	☒	☐
Structure in good condition	☒	☐	☒	☐

SECTION 2: DISINFECTION

The system uses NaCl2 as an oxidant, but does maintain a chlorine residual in the distribution system.

#	SITE OR LOCATION	TREATMENT TYPE AND CHEMICAL USED	CT PROVIDED
1	Treatment Building	Sodium Hypochlorite	☐

CHEMICAL TREATMENT	1	
	Yes	No
Operated & maintained properly	☒	☐
Redundant equipment available	☒	☐
Schematic of treatment facilities available	☒	☐
Chlorine residual test kit available	☒	☐
Chemical feed proportional to flow	☒	☐
Approved chemicals used	☐	☐

Chlorination reports are submitted monthly. Since the treatment plant went on line (June 2013) the system has had a difficult time maintaining a detectable and steady residual throughout the distribution system. Hoses on the chemical feed pumps have broken. Chlorine residual leaving the treatment plant is relatively steady. It is thought that distribution water quality has changed and that is affecting the distribution chlorine residuals. **A study of the distribution water quality may be necessary in order to determine the cause of chlorine demand within the distribution system and possible methods of reducing it.**

Please provide NSF certification for both NaCl2.

HYPOCHLORITE ADDITION	1	
	Yes	No
Hypochlorite concentration %12.5 to 4%		
Feed solution concentration	1.0 mg/l	
Hypochlorite solution located in separate room	☒	☐

DISINFECTION COMPLIANCE	1	
	Yes	No
Disinfection required	☐	☒
CT required	☐	☐
Minimum CT met at all times	☐	☐
Peak flow used to calculate CT	☐	☐
Monthly report submitted	☐	☐
Residuals maintained in distribution system	☐	☐
Daily residuals recorded	☐	☐

Chlorine residual is variable due to hydrogen sulfide in raw water. The goal is 0.5 mg/L.

SECTION 3: OTHER TREATMENTS

#	TREATMENT PROCESS	CHEMICAL ADDED	PURPOSE	LOCATION IN SYSTEM
1	Oxidation/Filtration	KMnO4, NaCl2	Oxidation of Fe/Mn	Prior to distribution

The system used sequestration with polyphosphates for iron and manganese removal prior to installing a new filter plant in 2013. Four newly installed ATEC filters are rated at 125 gpm each. Loading rate (design) on filters is 10.2 gpm per square feet (gpm/sq ft). ATEC filters backwash at 345 gpm for five minutes. There is 12 hours run time per filter. Treatment does have filter to waste capability.

Plant is automated and operates without personnel present.

Sample taps for raw and finished water should be screened.

KMnO4 (saturator) is injected to prevent silica binding at dosage of 0.3 mg/L. Chlorine is injected prior to filters and the system does maintain a chlorine residual. The plant was operational, but still had some punch list items to be completed. At the time of the inspection, there was a problem with hoses breaking on chemical pumps. Chemical injection piping for NaCl2 is under the concrete, which could present operational problems in the future. There are alarm levels for both NaCl2 and KMnO4. Low chlorine alarm is set at 0.1 mg/l and high chlorine alarm at 2.0 mg/l. They are tested weekly. The low chlorine alarm should be raised in order to maintain an adequate residual. Please consider raising low chlorine set point above 0.2 mg/l. A CL17 continually monitors chlorine in finished water. *Iron and manganese in raw and finished water is measured daily (verify).*

Please verify that chemical feed pumps have antisiphon devices internal to the pumps.

An oil compressor operates pneumatic valves.

Condensation in the building and lack of proper HVAC caused much water pooling on the floor of the building with no drainage. **Ventilation in the treatment building needs improvement in order to avoid condensation of water on tanks.** There are good records kept at the plant and SCADA also monitors flow, valves, and dosages. **All piping in treatment plant should be labeled.**

Backwash is directed to a pond located outside the treatment building, which discharges to the sewer.

TREATMENT	1	
	Yes	No
Operated & maintained properly	☒	☐
Redundant equipment available	☒	☐
Schematic of treatment facilities available	☒	☐
Testing equipment available and used	☒	☐
Chemical feed proportional to flow	☒	☐
Approved chemicals used	☐	☐

Raw and finished iron should be measured daily in order to determine the removal rate for the new plant. Enclosed is information about field iron test kits. Please provide NSF certification for NaCl2.

SECTION 4: DISTRIBUTION SYSTEM

Distribution pipe (approximately 10 miles of pipe is 70 percent AC pipe). There is no annual pipe replacement. Please consider implementing an annual pipe replacement program in the next water system plan (WSP). Water from the sources, proceeds through the treatment plant, into the distribution system and the reservoirs.

FEATURES	Yes	No
Service area and facility map	☒	☐
Minimum pressure requirements met	☒	☐
Service meters (reading frequency **Monthly**)	☒	☐
Leak detection program	☐	☒
Water system leakage (%)	8.5	
Adequate valving for flushing and pipe repair	☒	☐
Blow-offs on dead ends	☒	☐
Routine flushing (frequency **Quarterly**)	☒	☐
Routine valve exercise (frequency _____)	☒	☐

System has installed radio read meters and is flushing regularly due to taste and odor complaints with new treatment system. Hydrogen sulfide complaints. System considering ice pigging distribution lines to minimize taste and odor complaints. Contact Jackie Masters at City of Longview (360-442-5703) for information about ice pigging.

CROSS CONNECTION CONTROL (Community Systems)	Yes	No
System has enabling authority	☒	☐
Ongoing hazard inspections	☐	☒
High hazards identified	☒	☐
High hazards protected	☒	☐
Annual testing	☒	☐
System has installation standards	☒	☐

There are only six backflow prevention devices throughout the system. The cross connection control program has not been fully implemented. There are no ongoing hazard assessments. **The system needs to create a database of existing backflow prevention devices, verify testing, and establish procedures for hazard assessments.**

The City was sued over individual sprinkler system backflow requirements.

SECTION 5: FINISHED WATER STORAGE

The finished water storage has two reservoirs at the same location. The reservoirs are located within the distribution system at the highest elevation.

RESERVOIR	RESERVOIR NAME	DESCRIPTION	YEAR BUILT	TOTAL VOLUME (GAL)
1	Small Steel Tank	Cylindrical Steel		150,000
2	Large Steel Tank	Welded Steel Tank		500,000

Reservoir levels turn well pumps on and off.

Please e-mail photos showing hatch covers and gaskets or other weatherproofing.

HATCH	Reservoir 1		Reservoir 2	
	Yes	No	Yes	No
Locked	☒	☐	☒	☐
Watertight seal or gasket	☒	☐	☒	☐
Over-lapping cover	☒	☐	☒	☐

FEATURES	Reservoir 1		Reservoir 2	
	Yes	No	Yes	No
Separate inlet/outlet	☐	☒	☐	☒
Protected drain outlet	☐	☒	☐	☒
Protected overflow outlet	☒	☐	☒	☐
Screened air vent	☒	☐	☐	☐
Operational water level gauge	☐	☒	☐	☒
Bypass piping or isolation possibility	☒	☐	☒	☐
Protected from unauthorized entry	☒	☐	☒	☐
Low level alarms	☒	☐	☒	☐
Sample tap at outlet	☒	☐	☒	☐

Interior recoated in 2010. Exterior last painted in 2004. **Drains should have covers, flapper screens, or duck bills to prevent animal intrusions.** Reservoirs have low alarms, which use auto dialers. **Overflow on small reservoir should have drop down to ground level. The drain screen for the large reservoir should be secured permanently.**

MAINTENANCE	Reservoir 1		Reservoir 2	
	Yes	No	Yes	No
Frequency of structural and coating inspection	2010		2010	
Frequency of cleaning	5 Years		5 Years	
Frequency of appurtenance inspection	Annual		Annual	
Frequency of routine site visit	Daily		Daily	
Exterior in good condition	☒	☐	☒	☐
Clear of excessive vegetation	☒	☐	☒	☐

The reservoirs are in good conditions. Use of spraying to keep weeds down. Good security.

SECTION 6: PRESSURE TANKS

No pressure tanks on this system.

SECTION 7: BOOSTER PUMPS AND FACILITIES

No booster pumps on this system.

SECTION 8: WATER QUALITY MONITORING AND REPORTING

Refer to the Water Quality Monitoring Report (WQMR) for your monitoring requirements. If you have any questions on source monitoring, please contact Sophia Petro at (360) 236-3046.

CHEMICAL	
Sample Point	Description
1	Sink In Treatment Plant

Operators should be familiar with where source samples (IOCs, VOCs, and SOCs) are taken with the new treatment plant. Samples should be taken prior to distribution, but following treatment.

CHEMICAL	Sample Point	
	Yes	No
Monitoring adequate	☒	☐
ODW WQ data reviewed	☒	☐
Sample collection sites correct	☒	☐
System has prior: ☐ Nitrate results above 5 mg/L ☐ Nitrite results above 0.5 mg/L ☐ Primary MCL ☒ Secondary MCL exceedance(s) ☐ Organic detections ☐ Other ____		

COLIFORM	Yes	No
Monitoring adequate	☒	☐
Monitoring plan adequate	☒	☐
Monitoring plan followed	☒	☐
# of violations since last survey	0	

The system takes three samples per month.

LEAD & COPPER	Yes	No
Monitoring adequate	☒	☐
Results below action level	☒	☐

Due in 2013.

DISINFECTION BYPRODUCTS (DBP)	Yes	No
Monitoring adequate	☒	☐
Monitoring plan adequate	☒	☐
Monitoring plan followed	☒	☐
Results satisfactory	☒	☐

DBPs are very low. Please be aware that Stage 2 DBP is implemented and may change the number of samples the system is required to take. Contact Regina Grimm at (360) 236-3035 if you have DBP questions.

SECTION 9: SYSTEM MANAGEMENT AND OPERATIONS

PROJECT/PLANNING	Yes	No
System approved	☒	☐
Current WSP/SWSMP	☒	☐
Year WSP/SWSMP approved	2009	
Emergency response plan	☒	☐

The system was approved for 970 connections in the 2009 WSP. They are approaching their connection limit. According to the WSP, the limiting factor is source capacity. Nick expressed that they would like an Unspecified approval in the next update as they are approaching their connection limit. Without additional source capacity, the system will maintain this connection limit. The next plan update is due in 2015. Please contact Corina Hayes at (360) 236-3031 for a pre-plan meeting, prior to updating the WSP.

REPORTING	Yes	No	N/A
WFI reviewed and updated with purveyor	☒	☐	---
Consumer confidence report (Communities Only)	☒	☐	☐
Water use efficiency report (Municipal Water Suppliers)	☒	☐	☐
Cross connection control annual report (> 1000 conn)	☐	☐	☒

OPERATOR CERTIFICATION

This system is required to have **two** certified operators.

Name of Operator	Certification Number	Certifications	Mandatory Operator
Jon Ehresmann	9902	WDM2, WTPOIT CCS	☒
John Allardin	11163	WDM2	☐
Todd Baun	10100	WDM1	☐
Joe Pittman	12170	WDM3	☐
Kevin Trewhella		Not Certified	☐

WDS-Water Distribution Specialist; WDM-Water Distribution Manager; WTPO-Water Treatment Plant Operator, BTO-Basic Treatment Operator; CCS-Cross Connection Specialist; BAT-Backflow Assembly Tester

A plant rating for the new treatment plant is enclosed and rates the plant at a BTO level, requiring a BTO operator. Jon could apply for a temporary WTPO1. A copy of the plant rating has been sent to the ODW operator certification office.

If you have any questions or this information is inaccurate, please contact Operator Certification at (800) 525-2536.

OPERATIONS	Yes	No
Operational records maintained	☒	☐
Complaints followed up	☒	☐
Complaints documented	☐	☒
# of complaints recorded at ODW (since last survey)	2	
Operation and maintenance program	☒	☐
Previous survey deficiencies/findings corrected	☒	☐

There were several complaints after the new treatment was installed.

CLOSING

Regulations establishing a schedule of fees, including fees for sanitary surveys, were adopted April 30, 2012 (WAC 246-290-990). The total cost of this survey is $1,836. An itemized invoice showing the remaining amount due of $918 is enclosed.

If you have any questions, please contact me at (360) 236-3032 or by e-mail at Teresa.walker@doh.wa.gov.

Sincerely,

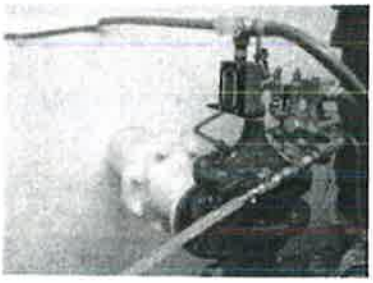
Teresa Walker, P.E.
Office of Drinking Water, Regional Engineer

Enclosures

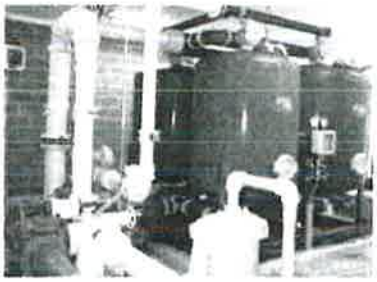
cc: Grays Harbor Environmental Health
Regina Grimm, ODW
Denise Miles, ODW

S02 Well House

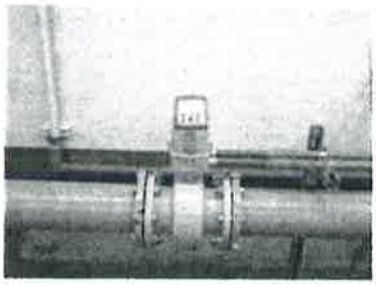
S02



Solenoid Valves



ATEC Filters



New Source Mag Meters

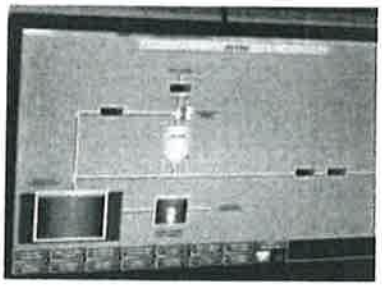
Solenoid Valve Discharge

S03

Chlorination Chem Pumps

Pump Data Sheet

KMnO4 Saturator

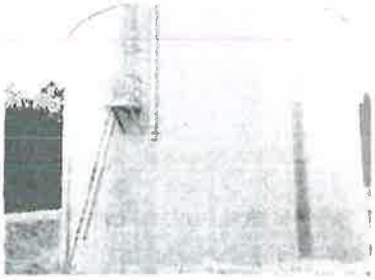


SCADA Screen Shot

Backwash Pond

Plant Piping (Bypass)

CL17 Analyzer



Larger Reservoir

Smaller Reservoir

Overflow Pipe

Reservoir Drain

Washington State Department of Health
Division of Environmental Health
Office of Drinking Water

Office of Drinking Water
INVOICE
Engineering, Planning, and Sanitary Survey Review Form

TO: NICK BIRD
MCCLEARY, CITY OF
100 S 3RD ST
MCCLEARY WA 98557

ATTN: ACCOUNTS PAYABLE DEPT

Invoice Number	SW877
Invoice Date	September 16, 2013
Billing Period	30 days SW

DATE	DESCRIPTION	QTY	COST	AMOUNT
9/13/2013	SURVEY FEE MCCLEARY, CITY OF GRAYS HARBOR COUNTY PWS ID 52250 DATE OF SURVEY: 8/15/2013	1	1	$1836.00
	DOH Share			$918.00
	Total			$918.00
	Payment due within 30 days. Interest shall accrue at 1% per month after 30 days.			

Make Checks Payable to Department of Health
Return Lower Portion to:
Department of Health
PO Box 1099
Olympia, WA 98507-1099

Office of Drinking Water
Engineering, Planning, and Sanitary Survey Review Form

NAME	MCCLEARY, CITY OF
INVOICE NUMBER	SW877
INVOICE DATE	September 16, 2013 SW
AMOUNT	$918.00

Return to:
Department of Health
Revenue Section
PO Box 1099
Olympia, WA 98507-1099

DOH Form #331-332

For persons with disabilities, this document is available on request in other formats. To submit a request, please call 1-800-525-0127 (TTY 1-800-833-6388).

2 044129 00878

WASHINGTON STATE DEPARTMENT OF HEALTH

PURIFICATION PLANT CRITERIA WORKSHEET

ABC Classification: BTO

Water Treatment Plant - address and contact person		
Plant Name	City of McCleary	WA WFI # 52250
Contact Name and Title	Nick Bird Public Works Director	
Address	100 S. 3rd St	
City/State/Zip	McCleary, WA 98557	
Phone and Fax	360-495-3667	

A groundwater supply with only chlorination is considered a distribution system, not a water treatment facility. The addition of any chemical to a public water supply, other than a disinfectant, will be considered a treatment facility and should use this rating worksheet to determine the classification of the facility.* Unless otherwise noted, give full amount of points in the "Your Plant" box.
For example:

	Raw water quality is subject to or has elevated:	Points	Your Plant
Correct:	Taste and/or odor levels	3	3
Incorrect:	Taste and/or odor levels	3	1

Do not double count. If the plant has two horizontal-flow (rectangular basins), **DO NOT** give 10 points, give 5 points. If the plant has more than one type of unit for each process, give points once for each unit.

*With the exception of unit processes installed to allow in-line fluoridation, in-line chlorination, or chemical addition to inhibit corrosion are not included within the scope of the term "purification plant" per WAC 246-292-010.

Item	Points	Your Plant
Size (2 point minimum to 20 point maximum)		
Maximum population or part served, peak day (1 point minimum to 10 point maximum) Examples: 27,000 people served = 3 points 13,000 people served = 2 points (Round up to the next whole number)	1 pt per 10,000 or part	1
Design flow average day or peak month's part flow average day, whichever is larger (1 point minimum to 10 point maximum) Examples: 9.2 MGD = 10 points 4.7 MGD = 5 points (Round up to the next whole number)	1 pt per MGD or part	1
Water supply sources		
Groundwater	3	3
Groundwater under the influence of surface water	5	
Surface water	5	
Average raw water quality varies enough to require treatment changes 10% of the time with a range of 0 to 10 with the following guidelines: Little or no variation = 0 points High variation. (Raw water quality subject to periodic serious industrial waste pollution) = 10 points	0—10	
Raw water quality is subject to or has elevated:		
• Taste and/or odor levels	3	
• Color levels	3	
• Iron and/or manganese levels	5	
• Turbidity levels	5	
• Coliform and/or fecal counts	5	
• Algal growths	5	
Raw water quality is subject to periodic:		
• Industrial and commercial waste pollution	5	
• Agricultural pollution	5	
• Urban runoff, erosion, and storm water pollution	3	
• Recreational use (boating, fishing, etc.)	2	
• Urban development and residential land use pollution	2	
Chemical Treatment/Addition Process		
Fluoridation	5	
Disinfection		
• Gaseous chlorine	5	
• Liquid or powdered chlorine	5	
• Chlorine dioxide	5	
• Ozonization (on-site generation)	10	
pH adjustment (Calcium carbonate, carbon dioxide, hydrochloric acid, calcium oxide, calcium hydroxide, sodium hydroxide, sulfuric acid, other)	5	
Stability or Corrosion Control (Calcium oxide, calcium hydroxide, sodium carbonate, sodium hexametaphosphate, other)	10	

Iron, Ferrous

DOC316.53.01049

1,10-Phenanthroline Method[1] **Method 8146**

0.02 to 3.00 mg/L Fe^{2+} **Powder Pillows or AccuVac® Ampuls**

Scope and application: For water, wastewater and seawater.

[1] Adapted from Standard Methods for the Examination of Water and Wastewater, 15th ed. 201 (1980).

Test preparation

Instrument-specific information

The tables in this section show all of the instruments that have the program for this test. Table 1 shows sample cell and orientation requirements for reagent addition tests, such as powder pillow or bulk reagent tests. Table 2 shows sample cell and adapter requirements for AccuVac Ampul tests.

To use either table, select an instrument, then read across to find the corresponding information for this test.

Table 1 Instrument-specific information for powder pillows

Instrument	Sample cell orientation	Sample cell
DR 6000 DR 3800 DR 2800 DR 2700	The fill line is to the right.	2495402 
DR 5000 DR 3900	The fill line is toward the user.	
DR 900	The orientation mark is toward the user.	2401906 

Table 2 Instrument-specific information for AccuVac Ampuls

Instrument	Adapter	Sample cell
DR 6000 DR 5000 DR 900	—	2427606 
DR 3900	LZV846 (A)	
DR 3800 DR 2800 DR 2700	LZV584 (C)	2122800 

Before starting

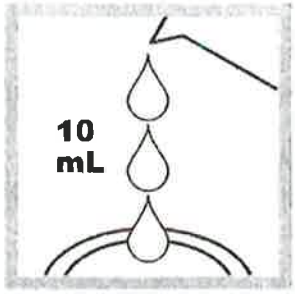
Samples must be analyzed immediately after collection and cannot be preserved for later analysis.

Install the instrument cap on the DR 900 cell holder before ZERO or READ is pushed.

Powder pillow procedure

1. Start program **255 Iron, Ferrous**. For information about sample cells, adapters or light shields, refer to Instrument-specific information on page 1.

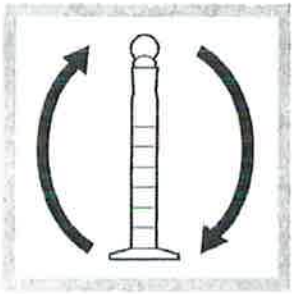
Note: *Although the program name may vary between instruments, the program number does not change.*



2. Prepare the blank: Fill the sample cell with 10 mL of sample.

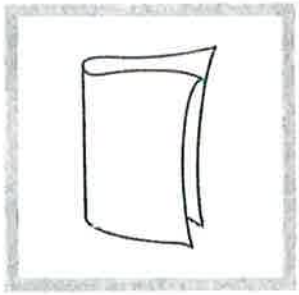
3. Prepare the sample: Fill a mixing cylinder to the 25-mL line with sample.

4. Add the contents of one Ferrous Iron Reagent Powder Pillow to the mixing cylinder.
An orange color shows if ferrous iron is present in the sample



5. Close the cylinder. Invert the cylinder several times to mix.
Undissolved powder does not affect accuracy.

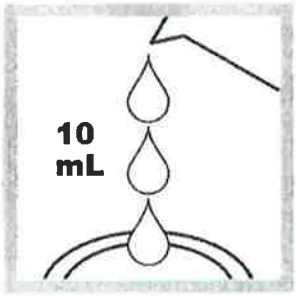
6. Start the instrument timer. A 3-minute reaction time starts.



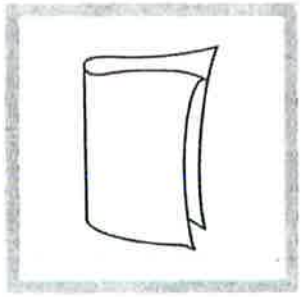
7. When the timer expires, clean the blank.

8. Insert the blank into the cell holder.

9. Push **ZERO**. The display shows 0.00 mg/L Fe^{2+}.

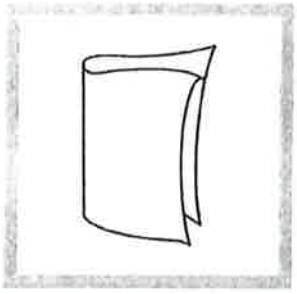


10. Fill a second sample cell with 10 mL of the reacted prepared sample.

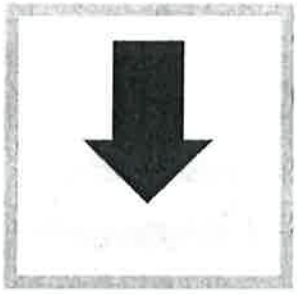


11. Clean the prepared sample.

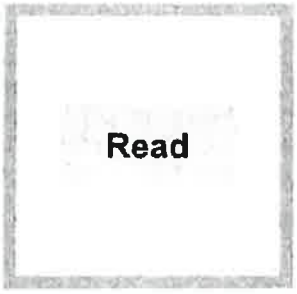
12. Insert the prepared sample into the cell holder.



9. Clean the AccuVac Ampul.



10. Insert the prepared sample AccuVac Ampul into the cell holder.



11. Push **READ**. Results show in mg/L Fe^{2+}.

Accuracy check

Standard solution method

Use the standard solution method to validate the test procedure, reagents and instrument.

Items to collect:

- Ferrous Ammonium Sulfate, hexahydrate
- 1-L volumetric flask, Class A
- 100-mL volumetric flask, Class A
- 2-mL volumetric pipet, Class A and pipet filler
- Deionized water

1. Prepare a 100-mg/L Fe^{2+} ferrous iron stock solution as follows:
   a. Add 0.7022 g of ferrous ammonium sulfate, hexahydrate into a 1-L volumetric flask.
   b. Dilute to the mark with deionized water. Mix well.
2. Prepare a 2 mg/L ferrous iron standard solution as follows:
   a. Use a pipet to add 2.00 mL of the 100-mg/L Fe^{2+} ferrous iron stock solution into a 100-mL volumetric flask.
   b. Dilute to the mark with deionized water. Mix well. Prepare the standard solution immediately before use.
3. Use the test procedure to measure the concentration of the prepared standard solution.
4. Compare the expected result to the actual result.

   Note: *The factory calibration can be adjusted slightly with the standard adjust option so that the instrument shows the expected value of the standard solution. The adjusted calibration is then used for all test results. This adjustment can increase the test accuracy when there are slight variations in the reagents or instruments.*

Method performance

The method performance data that follows was derived from laboratory tests that were measured on a spectrophotometer during ideal test conditions. Users may get different results under different test conditions.

Program	Standard	Precision (95% Confidence Interval)	Sensitivity Concentration change per 0.010 Abs change
255	2.00 mg/L Fe^{2+}	1.99–2.01 mg/L Fe^{2+}	0.021 mg/L Fe^{2+}
257	2.00 mg/L Fe^{2+}	1.98–2.02 mg/L Fe^{2+}	0.023 mg/L Fe^{2+}

APPENDIX B

WATER RIGHTS

WATER RIGHTS SELF-ASSESSMENT

WELL #1

S. F. No. 7261—3-51—3M. 87788.

CERTIFICATE RECORD No. 2 PAGE No. 956-A

STATE OF WASHINGTON, COUNTY OF Grays Harbor

Certificate of Ground Water Right

Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the State Supervisor of Water Resources thereunder.

THIS IS TO CERTIFY THAT TOWN OF McCLEARY, WASHINGTON

[redacted], *has made proof to the satisfaction of the State Supervisor of Water Resources of Washington, of a right to the use of the ground waters of a* well

located within the NE¼ of NE¼ of Sec. 11, Twp. 18 N., Rge. 5 W.W.M.

for the purpose of municipal supply

under and subject to provisions contained in Ground Water Permit No. 1966 *issued by the State Supervisor of Water Resources and that said right to the use of said ground waters has been perfected in accordance with the laws of Washington, and is herby confirmed by the State Supervisor of Water Resources of Washington and entered of record in Volume* 2 *at page* 956-A*; that the right hereby confirmed dates from* September 13, 1951*; that the quantity of ground water under the right hereby confirmed for the purposes aforesaid, is limited to an amount actually beneficially used for said purposes, and shall not exceed* 200 gallons per minute; 320 acre-feet per year. [redacted]

A description of the lands to which such ground water right is appurtenant, and the place where such water is put to beneficial use, is as follows:

Town of McCleary, Grays Harbor County, Washington.

The right to the use of the ground water aforesaid hereby confirmed is restricted to the lands or place of use herein described, except as provided in Sections 6 and 7, Chapter 122, Laws of 1929.

WITNESS the seal and signature of the State Supervisor of Water Resources affixed this 15th *day of* January, 19 52.

Chas. J. Bartholet
State Supervisor of Water Resources

ENGINEERING DATA

S. F. No. 7361—3-51—3M. 27763.

CERTIFICATE RECORD NO. 3 PAGE NO. 1326-A

STATE OF WASHINGTON, COUNTY OF Grays Harbor

Certificate of Ground Water Right

Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the State Supervisor of Water Resources thereunder.

THIS IS TO CERTIFY *That* WATER DEPARTMENT, TOWN OF McCLEARY, WASHINGTON

xx *, has made proof to the satisfaction of the State Supervisor of Water Resources of Washington, of a right to the use of the ground waters of a* well

located within the N½ of NE¼ of Sec. 11, Twp. 18 N., Rge. 5 W.W.M.

for the purpose of municipal supply

under and subject to provisions contained in Ground Water Permit No. 2448 *issued by the State Supervisor of Water Resources and that said right to the use of said ground waters has been perfected in accordance with the laws of Washington, and is herby confirmed by the State Supervisor of Water Resources of Washington and entered of record in Volume* 3 *at page* 1326-A*; that the right hereby confirmed dates from* June 12, 1952*; that the quantity of ground water under the right hereby confirmed for the purposes aforesaid, is limited to an amount actually beneficially used for said purposes, and shall not exceed* 400 gallons per minute; 640 acre-feet per year. ~~for irrigation of~~xxxxxxxxxxxxxxxxxxxxxxx~~acres~~

A description of the lands to which such ground water right is appurtenant, and the place where such water is put to beneficial use, is as follows:

PARCEL NO. 1. That portion of the East 7½ acres of the NW¼ of NE¼ of Sec. 11, Twp. 18 N., Rge. 5 W.W.M., which lies South of the right-of-way of the Summit Branch of the Northern Pacific Railway, except Northern Pacific right of way and except roads.

PARCEL NO. 2. That portion of the N½ of the East 2½ acres of the West 12½ acres of the E½ of NW¼ of NE¼ of Sec. 11, Twp. 18 N., Rge. 5 W.W.M., which lies South of the right of way of the Summit Branch of the Northern Pacific Railway, except Northern Pacific right of way and except roads.

PARCEL NO. 3. That portion of the S½ of the East 2½ acres of the West 12½ acres of the E½ of NW¼ of NE¼ of Sec. 11, Twp. 18 N., Rge. 5 W.W.M., which lies South of the right of way of the Summit Branch of the Northern Pacific right of way and except roads.

PARCEL NO. 4. That portion of the East 5 acres of the West 10 acres of the E½ of NW¼ of NE¼ of Sec. 11, Twp. 18 N., Rge. 5 W.W.M., which lies South of the right of way of the Summit Branch of the Northern Pacific Railway, except Northern Pacific right of way and except roads.

The right to the use of the ground water aforesaid hereby confirmed is restricted to the lands or place of use herein described, except as provided in Sections 6 and 7, Chapter 122, Laws of 1929.

WITNESS the seal and signature of the State Supervisor of Water Resources affixed this 31st *day of* December*, 19*52.

Elio J. Barthaud
State Supervisor of Water Resources

ENGINEERING DATA
DWM

1326

*Ground Water Permit No.*_____

CERTIFICATE OF GROUND WATER RIGHT

Recorded in the office of the State Supervisor of Water Resources, Olympia, Washington, in Book No. _____ *of Ground Water Right Certificates, on page* _____, *on the* _____ *day of* _____, *195*____

STATE OF WASHINGTON,
County of _____ } *ss.*

I certify that the within was received and duly recorded by me in Volume _____ *of Book of Water Right Certificates, at page* _____, *on the* _____ *day of* _____, *19*____

_____

STATE PRINTING PLANT, OLYMPIA, WASH.

S. F. No. 1361—8-60—3M. 62308.

CERTIFICATE RECORD No. 9 PAGE No. 4371-A

STATE OF WASHINGTON, COUNTY OF Grays Harbor

Certificate of Ground Water Right

Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the State Supervisor of Water Resources thereunder.

THIS IS TO CERTIFY That TOWN OF McCLEARY, WASHINGTON

~~of~~ _____, has made proof to the satisfaction of the State Supervisor of Water Resources of Washington, of a right to the use of the ground waters of a well located within SE¼NW¼NE¼ Sec. 11, Twp. 18 N., R. 5 W. W. M., for the purpose of municipal supply under and subject to provisions contained in Ground Water Permit No. 5921 issued by the State Supervisor of Water Resources and that said right to the use of said ground waters has been perfected in accordance with the laws of Washington, and is hereby confirmed by the State Supervisor of Water Resources of Washington and entered of record in Volume 9 at page 4371-A; that the right hereby confirmed dates from October 18, 1961; that the quantity of ground water under the right hereby confirmed for the purposes aforesaid, is limited to an amount actually beneficially used for said purposes, and shall not exceed 500 gallons per minute; 673 acre-feet per year for municipal supply.

Special provisions required by the Supervisor of Water Resources: The total annual withdrawal under all existing rights shall not exceed 673 acre-feet.

A description of the lands to which such ground water right is appurtenant:

Town of McCleary, Grays Harbor County, Washington.

The right to the use of the ground water aforesaid hereby confirmed is restricted to the lands or place of use herein described, except as provided in Sections 6 and 7, Chapter 122, Laws of 1929.

WITNESS the seal and signature of the State Supervisor of Water Resources affixed this 14th day of December, 1962.

State Supervisor of Water Resources.

Water Rights Self-Assessment

For Existing Water Right(s) Status (Year 2015)

Permit, Certificate, or Claim #	Name of Rightholder or Claimant	Priority Date	Source Name / Number	Primary or Supplemental	Existing Water Rights		Existing Consumption		Current Water Right Status (Excess / Deficiency)	
					Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)
Permit/Certif.										
1 956-A [1]	McCleary	9/13/1951	Well No. 1	Primary	200	320 ac/ft	0	0	0	0
2 1326-A[2]	McCleary	6/12/1952	Well No. 2	Primary	400	640 ac/ft	235	101.6 ac/ft	165	571.4 ac/ft
3 4371-A [3]	McCleary	10/18/1961	Well No. 3	Primary	500	673 ac/ft	235	101.6 ac/ft	265	469.8 ac/ft
4										
5										
6										
7										
8										
9										
Claims										
1 None										
TOTAL	*******	*******	*******		**1100**	**673 ac/ft[4]**	**470**	**203.2 ac/ft**	**430**	**469.8 ac/ft**

Intertie Name / Identifier	Name of Purveyor Providing Water	Exiting Limits on Intertie Water Use		Exiting Limits on Intertie Water Use		Exiting Limits on Intertie Water Use	
		Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)
1 NA							
TOTAL	-						

Pending Water Right Application	Name on Permit	Primary or Supplemental	Date Submitted	Pending Water Rights	
				Maximum Instantaneous Flow Rate (Qi) Requested	Maximum Annual Volume (Qa) Requested
1					

(1) Ecology has assigned CWRIS tracking number G2-*02136CWRIS. Well was decommissioned in 2013.

(2) Ecology has assigned CWRIS tracking number G2-*02598CWRIS.

(3) Ecology has assigned CWRIS tracking number G2-*06087CWRIS.

(4) Water Right G2-*06087CWRIS states that the total withdrawal under all existing water rights shall not exceed 673 acre-ft/yr.

Water Rights Self-Assessment

For Six-Year Projected Water Right(s) Status (Year 2021)

Permit, Certificate, or Claim #	Name of Rightholder or Claimant	Priority Date	Source Name / Number	Primary or Supplemental	Existing Water Rights		Future Consumption in Year 2021		Future Water Right Status (Excess / Deficiency)	
					Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)
Permit/Certif.										
1 956-A [1]	McCleary	9/13/1951	Well No. 1	Primary	200	320 ac/ft	0	0	0	0
2 1326-A[2]	McCleary	6/12/1952	Well No. 2	Primary	400	640 ac/ft	242	104.6 ac/ft	158	568.3 ac/ft
3 4371-A [3]	McCleary	10/18/1961	Well No. 3	Primary	500	673 ac/ft	242	104.7 ac/ft	258	463.7 ac/ft
4										
5										
6										
7										
8										
9										
Claims										
1 None										
TOTAL	*******	*******	*******		**1100**	**673 ac/ft[4]**	**484**	**209.3 ac/ft**	**616**	**463.7 ac/ft**

Intertie Name / Identifier	Name of Purveyor Providing Water	Exiting Limits on Intertie Water Use		Exiting Limits on Intertie Water Use		Exiting Limits on Intertie Water Use	
		Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)
1 NA							
TOTAL	-						

Pending Water Right Application	Name on Permit	Primary or Supplemental	Date Submitted	Pending Water Rights			
				Maximum Instantaneous Flow Rate (Qi) Requested		Maximum Annual Volume (Qa) Requested	
1							

(1) Ecology has assigned CWRIS tracking number G2-*02136CWRIS. Well was decommissioned in 2013.

(2) Ecology has assigned CWRIS tracking number G2-*02598CWRIS.

(3) Ecology has assigned CWRIS tracking number G2-*06087CWRIS.

(4) Water Right G2-*06087CWRIS states that the total withdrawal under all existing water rights shall not exceed 673 acre-ft/yr.

Water Rights Self-Assessment

For Twenty-Year Projected Water Right(s) Status (Year 2035)

Permit, Certificate, or Claim #	Name of Rightholder or Claimant	Priority Date	Source Name / Number	Primary or Supplemental	Existing Water Rights		Future Consumption in Year 2035		Future Water Right Status (Excess / Deficiency)	
					Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)
Permit/Certif.										
1 956-A [1]	McCleary	9/13/1951	Well No. 1	Primary	200	320 ac/ft	0	0	0	0
2 1326-A[2]	McCleary	6/12/1952	Well No. 2	Primary	400	640 ac/ft	259	112.2 ac/ft	141	560.8 ac/ft
3 4371-A [3]	McCleary	10/18/1961	Well No. 3	Primary	500	673 ac/ft	260	112.3 ac/ft	240	448.5 ac/ft
4										
5										
6										
7										
8										
9										
Claims										
1 None										
TOTAL	*******	*******	*******		**1100**	**673 ac/ft[4]**	**519**	**224.5 ac/ft**	**581**	**448.5 ac/ft**

Intertie Name / Identifier	Name of Purveyor Providing Water	Exiting Limits on Intertie Water Use		Exiting Limits on Intertie Water Use		Exiting Limits on Intertie Water Use	
		Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)
1 NA							
TOTAL							

Pending Water Right Application	Name on Permit	Primary or Supplemental	Date Submitted	Pending Water Rights			
				Maximum Instantaneous Flow Rate (Qi) Requested		Maximum Annual Volume (Qa) Requested	
1							

(1) Ecology has assigned CWRIS tracking number G2-*02136CWRIS. Well was decommissioned in 2013.

(2) Ecology has assigned CWRIS tracking number G2-*02598CWRIS.

(3) Ecology has assigned CWRIS tracking number G2-*06087CWRIS.

(4) Water Right G2-*06087CWRIS states that the total withdrawal under all existing water rights shall not exceed 673 acre-ft/yr.

APPENDIX C

MCCLEARY MUNICIPAL CODE TITLES 13.04, 13.08, 13.20, 13.24, 13.34

ORDINANCE NO. 742 – AMENDING MUNICIPAL CODE

CONNECTION FEE SCHEDULE

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Home of the Bear Festival

13.04 Water System

13.04.010 Authority to adopt regulations.

The city council shall have the authority to adopt rules and regulations for the control of the municipal water supply system of the city of such content as it may deem necessary and appropriate.

(Ord. 519 § 1, 1987)

13.04.020 Definitions.

Whenever used in this chapter:

"City" means the city of McCleary, Washington, or as indicated by the context, may mean the water department, water superintendent, clerk-treasurer, engineer, or other employee or agent representing the city in the discharge of his/her duties.

"Commercial water service" means water service provided to premises utilized for business or industrial purposes.

"Council" means the city council of the city of McCleary.

"Engineer" means the professional engineer regularly employed or retained by the city as its engineer.

"Mains" means water lines designed or used to serve more than one premises.

"Persons," "customers," "owner," and "occupant" include natural persons of either sex, associations, copartnerships, and corporations where acting individually or by a servant, agent, or employee; the singular number shall be held to include the plural and the masculine pronoun to include the feminine.

"Premises" means a continuous tract of land, building, or group of adjacent buildings under a single control with respect to use of water and responsibility for payment therefor. Subdivisions of such use or responsibility shall constitute a division into separate premises as herein defined.

"Residential water service" means domestic water service (including lawn and garden sprinkling) provided to a residential living unit.

"Service connection" means that portion of the city water supply system connecting the supply system on a premises to the city water distribution main including the tap into the main, the water meter and appurtenances, and the service line from the main to the meter and from the meter to the property line. "Service connection" includes the connections for fire protection as well as for domestic, commercial, and industrial uses.

"Standard or permanent mains" means mains which conform to the standard specifications of the city with respect to materials and minimum diameter.

"Standard specifications" means the specifications set forth in the current volume of "Standard Specifications for Municipal Public Works Construction" prepared and distributed by the Washington State Chapter of the American Public Works Association (APWA).

"Substandard or temporary mains" means mains which do not conform to the standard specifications of the city with respect to materials and/or minimum diameter.

"Superintendent" means the person duly appointed by the mayor of the city as the superintendent of the water department.

(Ord. 519 § 2, 1987)

13.04.030 Service types defined.

Whenever used in this chapter:

A. "Regular" services means performance by the city of the following: tapping of the main, installation of the service pipe from the main to the yoke, installation of the yoke, the meter, the meter box, and installation of necessary valves and appurtenances.

B. "Duplex" services means performance by the city of the following: regular service as defined above and, in addition thereto, a pipe of sufficient size to serve two meters, installation of two meters, two meter boxes, two yokes, and two sets of necessary valves and appurtenances.

C. "Pretapped and preplumbed" service means performance by the city of the following: placement of the meter in the meter yoke.

D. "Pretapped only" service means performance by the city of the following: installation of the valves, meter yokes, meter, and meter box.

(Ord. 519 § 3, 1987)

13.04.040 Comprehensive plan.

A comprehensive water system plan may be prepared for the city by the engineer and a copy of the same shall be maintained on file in the office of the clerk-treasurer. Such plan shall contain as a minimum, the location and specifications of existing facilities of the system, recommendations for correction of existing deficiencies and for improvement of the existing system, and if the system is expanded in the future. The comprehensive water system plan shall be reviewed and updated as deemed necessary by the council.

(Ord. 519 § 4, 1987)

13.04.050 Design standards.

The design standards may be adopted from time to time by the council upon the recommendation of the engineer and a copy of the same may be maintained on file at the office of the clerk-treasurer.

(Ord. 519 § 5, 1987)

13.04.060 Ownership of mains and service connections.

A. The ownership of all mains, service connections, and appurtenances in the public street, alleys, or utility rights-of-way shall be vested fully in the city and the person responsible for the construction of such mains shall relinquish, by bill of sale or other appropriate instrument of conveyance, all interest in the ownership of such mains upon acceptance by the city; provided, however, that all private systems existing at the time of the passage of the ordinance codified in this chapter remain under private ownership unless dedicated to the city under the provisions of this chapter and with the approval of the council.

B. The city shall operate, control, and maintain all approved and accepted components of the city water system in the public streets or utility rights-of-way up to and including the meter, but shall not be responsible beyond the meter. The owner of the property served shall be responsible for maintenance of all pipe and fittings from the meter to his premises. No alteration shall be made to any connection nor shall any connection be made to the city water system without the approval of the superintendent.

(Ord. 519 § 6, 1987)

13.04.070 Reserved

Editor's note—

Ord. No. 794, § II, adopted Apr. 10, 2013, repealed § 13.04.070, which pertained to abandonment of connection and derived from Ord. 519, § 7, adopted 1987.

13.04.080 Administration and enforcement.

A. The city administrator or designee is charged with administration and enforcement of this chapter. Water service to any premises served by the city water system may be discontinued for any violation or abridgment of the provisions of this chapter after due notice thereof.

B. In the event water service is discontinued for failure to comply with provisions of this chapter, it shall remain terminated for the duration of such noncompliance.

C. The city administrator shall have the authority to from time to time establish rules and regulations in relation to the implementation and operation of the system; provided that such rules and regulations shall, prior to their effective date, be submitted to the council for its approval.

(Ord. 742 § 10, 2007: Ord. 519 § 8, 1987)

13.04.090 Inspection of premises.

Authorized employees of the water department, properly identified, shall have free access at reasonable hours of the day, to all premises served by the city water system for the purpose of ascertaining conformity to this chapter.

(Ord. 519 § 9, 1987)

13.04.100 Service--Application.

A. All applications for water service shall be made at the office of the clerk-treasurer or at such other place as the council may hereafter designate by resolution and upon such form as may be prescribed by the clerk-treasurer.

B. Every such application shall be made by the owner of the property to be furnished, or by its authorized agent, and the applicant shall state fully and truly all the purposes for which the water may be required.

(Ord. 519 § 10, 1987)

13.04.110 Service--Connection--General requirements.

A. Except as otherwise provided for herein, or unless approved by the council, no premises shall hereafter be connected to the water supply system of the city unless there is a standard main owned by the city in the public right-of-way adjacent thereto.

B. When a permit has been obtained for the installation of water service, the authorized representative of the city shall cause the premises described in the application to have available to it a connection to the water system by the installation of a service pipe extending from the main to the property line and a stopcock and water meter placed within the right-of-way. Every separate premises shall have its own separate meter installed. The city shall be reimbursed for the cost of such installation at such rate as may be established by written resolution of the council.

C. Service connections to the premises itself shall be installed by the property owner. Any such installation by the property owner or authorized representative thereof shall be coordinated with city staff so as to allow the city to carry out such review and inspection of the installation and testing as may be deemed necessary and appropriate by the city.

D. All connections to city service shall conform to the standard specifications and regulations of the city.

(Ord. 742 § 11, 2007: Ord. 519 § 11, 1987)

13.04.120 Service--Connection--Hook-up and meter charge.

All persons connecting to the water system of the city shall pay, in advance of connection to the water system, a hook-up and water meter charge in accordance with the schedule set forth by resolution of the council. In every case, title to the water meter, meter box, and service connection lines shall be and remain with the city. The hook-up and water meter charge shall be established from time to time by resolution of the council to reimburse for all time and materials, including but not limited to, meter, fittings, and restoration.

(Ord. 519 § 12, 1987)

13.04.130 Service--Connection--Temporary.

A. Water service may be supplied to premises on a temporary basis during the construction of a building thereon or during the construction of a standard main to service such premises. Applications for temporary service shall state fully the purposes for which temporary service is requested and such other information as may be required by the city. All costs required for installation and removal of the elements of such temporary service which may be carried out by the city shall be paid by the applicant prior to approval of such application.

B. Upon cessation of the need for which the temporary service was requested, the owner or authorized representative thereof shall immediately notify the city in writing thereof and such temporary service shall forthwith be terminated or converted to permanent service.

C. When a permit has been obtained for the installation of temporary water service, the authorized representative of the city shall cause the premises described in the application to have available to it a connection to the water system by the installation of a service pipe extending from the main to the property line and a stopcock and water meter placed within the right-of-way. Every separate premises shall have its own separate meter installed.

D. Service connections to the premises itself shall be installed by the property owner. Any such installation by the property owner or authorized representative thereof shall be coordinated with city staff so as to allow the city to carry out such review and inspection of the installation and testing as may be deemed necessary and appropriate by the city.

E. All connections to city service shall conform to the standard specifications and regulations of the city.

(Ord. 742 § 12, 2007: Ord. 519 § 13, 1987)

13.04.140 Service--Connection--Wholesale consumers.

A. The council may authorize water service to a community or group of individual users to be furnished through a common master meter upon finding that service through individual meters is not practicable. Where service through a common master meter is authorized, the master meter shall be installed by the city at applicant's expense and shall thereafter be maintained, owned, and controlled by the city.

B. Application for water service under the provisions of this section shall be made on the forms furnished by the city for that purpose, which shall include as a minimum, a detailed description of the premises to be served, the name and nature of the person or entity to be responsible for the service and connection charges, the circumstances precluding service by individual meters, and such other information as the council may deem necessary.

C. Detailed plans of all community water systems to be served by a master meter, and all modifications thereof, shall, prior to connection, be submitted for review by the engineer.

D. Community water service as provided for in this section shall be limited to those premises described in the application therefor. Service to additional premises shall require a separate application and approval.

E. The ownership, operation, and maintenance of a community water system beyond the master meter shall be vested in and the responsibility of the members of such group so served.

(Ord. 519 § 14, 1987)

13.04.150 Service--Connection--Installation of main.

A. Whenever application is made for water service to premises with no main in the adjacent street, a standard main must be installed prior to connection. The installation of such standard mains shall

conform to the comprehensive water plan for the city and shall conform to the standard specifications and regulations of the city.

B. A standard main may be installed by and at the expense of the owner(s) of the premises to be served thereby, pursuant to plans approved by the city engineer.

(Ord. 742 § 13, 2007: Ord. 519 § 16, 1987)

13.04.160 Substandard mains.

No substandard or temporary mains shall hereafter be installed and connected to the water supply system. Existing substandard mains may be extended to serve additional customers provided the design capacity of such mains are not exceeded and provided the mains are under the ownership of the city. Applications for the extension of a substandard main shall be processed in the same manner as is provided in Section 13.04.100.

(Ord. 519 § 15, 1987)

13.04.180 Water meters.

A. All service connections to the city system shall be metered. Water meters shall be sized to provide adequate domestic water to the customer. Minimum water meter sizes shall ordinarily be determined from the number of units served as follows:

1. 1 -- 2 units	3/4" meter
2. 3 -- 5 units	1" meter
3. 6 -- 10 units	1- 1/4" meter
4. 11 -- 20 units	1- 1/2" meter

B. All requests for service to six or more units through a single meter shall be subject to approval by the council upon review and recommendation of the engineer.

C. Water meters for services larger than twenty units shall be sized by the engineer.

(Ord. 519 § 18, 1987)

13.04.190 Service--Reconnection.

A service reconnection initiated by application of an owner desiring to increase the size or change the location of an existing connection shall be deemed an original connection and the cost thereof shall be borne by the owner of the premises served by such connection.

(Ord. 519 § 19, 1987)

13.04.200 Backflow prevention devices.

The installation of backflow prevention devices on any premises being served by the water system shall be carried out whenever required by any applicable law, rule or regulation or, when in the judgment of the council, acting upon the advice and recommendation of the engineer, the nature and extent of the activities on the premises or materials stored on the premises would present an immediate and dangerous hazard to health should a cross-connection occur. The cost of such device and the installation thereof shall be borne by and carried out by the owner of the premises affected. The type of protective device, its installation, and periodic testing shall conform to the provisions of the then statute, rule or regulation of the state and any applicable standard specification or regulation of the city.

(Ord. 742 § 14, 2007: Ord. 519 § 20, 1987)

13.04.210 Unauthorized turn-on.

A. Should the owner or representative thereof or occupant of any premises turn on the water or suffer or cause the same to be turned on after it has been shut off at the curb cock by the city, water service may again be turned off by the city. In addition to any penalty which may imposed by the municipal court pursuant to the applicable provisions of the municipal code for such action, fees for the costs incurred by the city in restoring the disconnected status and any subsequent reconnection shall be established by resolution of the council.

B. Should the owner or representative thereof or occupant of any premises turn on the water or suffer or cause the same to be turned on without the consent of the city, water service may again be turned off by the city. In addition to any penalty which may be imposed by the municipal court pursuant to the applicable provisions of the municipal code for such action, fees for the costs incurred by the city in disconnecting the service and any subsequent reconnection shall be established by resolution of the council. In addition, the responsible party shall be responsible for paying for the water used at such rate as may be established by the city.

(Ord. 742 § 15, 2007: Ord. 519 § 21, 1987)

13.04.220 Fees.

A verbal or written request for any discontinuance or turn-on of water service to a premises for the convenience of the occupant or owner shall be subject to the payment of such fee, if any, as may be established by resolution of the council.

(Ord. 742 § 16, 2007: Ord. 519 § 22, 1987)

13.04.230 Provision for surcharge.

The council may, upon recommendation of the engineer, coordinator, and clerk-treasurer, impose or retract a surcharge to the basic fee of a water bill. Such a surcharge shall be deposited into a separate fund and authorized expenditure of such fund only for uses outlined at time of surcharge installation. Surcharges may be installed for capital improvements, debt payments of capital improvements, or emergency repair expenditures.

(Ord. 519 § 23, 1987)

13.04.240 Service--Cash deposits.

Deposits shall be required for utilities service as stated in the ordinances of the city.

(Ord. 519 § 24, 1987)

13.04.250 Billing and payments--Single-unit residential.

Monthly statements of charges for water service shall be due and payable at the office of the clerk-treasurer or at such other place or places designated by him on or before the fifteenth day after the statement has been mailed, and are deemed delinquent thereafter. Statements shall cover service charges for the period shown thereon and shall be forwarded by mail to the customer as soon as practicable after each service period.

(Ord. 519 § 25, 1987)

13.04.260 Billing and payments--Multi-unit/single water meter.

Monthly statements of charges for water service shall be due and payable at the office of the clerk-treasurer or at such other place or places designated by him on or before the fifteen day after the statement has been mailed, and are deemed delinquent thereafter. Payment of monthly water charges

shall be as established in the records of the city. Such billing shall not relieve the property of the lien nor the landlord of the ultimate responsibility for the obligation incurred.

(Ord. 519 § 26, 1987)

13.04.270 Nonpayment of charges--Single-unit residential.

Nonpayment of any of the water charges set forth in this chapter shall be sufficient cause for discontinuance of service to the premises notwithstanding the existence of any deposits made as provided in Section 13.04.240. Water service terminated for nonpayment shall not be restored until all charges together with a service fee as stated for restoring service are paid.

(Ord. 519 § 27, 1987)

13.04.280 Nonpayment of charges--Multi-unit/single meter landlords.

Nonpayment of such water charges shall result in a lien against landlord's property. Statements shall cover service charges for the period shown thereon and shall be forwarded by mail to the customer as soon as practicable after each service period. Upon notice to the units upon the premises of the intention to terminate, termination, and reconnection shall be as established in Section 13.04.270.

(Ord. 519 § 28, 1987)

13.04.290 Allocation of payments.

Upon receipt, moneys shall be applied against obligations in the following priority:

A. Any delinquent amount, including late charges, whether for sewer, water, electricity, or garbage;

B. Water;

C. Sewer/garbage;

D. Electrical power.

(Ord. 519 § 30, 1987)

13.04.300 Voluntary termination of utility service.

Unless otherwise specifically requested in writing with the office of the clerk-treasurer, a request to terminate one utility service shall be deemed to constitute a request to terminate all utility services provided by the city to the premises in question.

(Ord. 519 § 31, 1987)

13.04.310 Criminal offense.

Any person who is convicted of tampering with any element of the system, whether in the manner established in Section 13.04.210, by modifying or attempting to modify any meter or any reading thereof, by undertaking any unauthorized connection, by introducing into the water system any substance without the authorization of the council, or in any other manner, shall be guilty of a criminal offense and, upon conviction, shall be punished as provided in Section 1.20.010 of this code, as now existing or hereafter amended or replaced.

(Ord. 519 § 29, 1987)

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13.08 Water Meter Installation

13.08.010 New structures--General provisions.

On and after the first day of June, 1984, all new structures within the city applying for or receiving service shall have their water supplied through a water meter. All meters shall be placed, installed, and maintained within the discretion of the utility department of the city and shall remain the property of the city regardless of whether their location is within or without the corporate limits of the city.

(Ord. 473 § 1, 1984)

13.08.020 Existing water service.

The city may, in its discretion, as to any water service existing as of June 1, 1984, provide for the installation of a water meter and, upon the installation of that water meter, the service of the subscriber shall be deemed to come within the provisions of Section 13.08.010.

(Ord. 473 § 2, 1984)

13.08.030 Installation charges.

The installation of meters pursuant to Section 13.08.010 shall be by the city or its designee and there shall be an installation charge for new meters as follows:

5/8" to 3/4"meter	$125.00
1-inch meter	250.00
2-inch meter	350.00

Larger than 2-inch meter: the cost of the meter plus the cost of labor and equipment for the installation thereof; but in no event less than three hundred fifty dollars.

(Ord. 473 § 3, 1984)

13.08.040 Replacement of meters.

When an existing water meter no longer meets the standards required by the water department of the city, the city shall install a replacement meter at no charge to the owner of the property: provided, however, that the installation of any such replacement meter shall be conditioned upon the meter being located in an accessible place approved by the city water department, protected from damage, and kept under readable circumstances by the owner. The water meter replacement shall be done at no charge to

the owner, provided that the owner shall provide any additional piping which may be required: provided that, in the event that it is the result of theft or damage as a result of negligence of the property owner or the property occupants, it shall be installed at the cost of the property owner.

(Ord. 473 § 4, 1984)

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13.20 Utility Service Deposits

13.20.010 Required when.

On and after the effective date of the ordinance codified in this chapter, prior to the commencement of the delivery of utility services to any service within the service area of the city, whether for electrical service or sewer and water service, such amounts as may be from time to time established by resolution shall be paid to the clerk-treasurer of the city by and as a utility deposit to be held to secure payment of the obligation of the applicant for utility services provided by the city.

(Ord. 493 § 1, 1985)

13.20.020 Payment to precede commencement of service.

No service shall be commenced until the deposits required pursuant to the provisions of this chapter and any resolution adopted pursuant thereto having been paid in full or completed in full.

(Ord. 493 § 2, 1985)

13.20.030 Payment of prior accounts.

At such time as an account is closed, whether voluntarily or involuntarily, then before the individual or guarantor thereof may open a new utility account with the city, the prior account must be paid in full.

(Ord. 493 § 3, 1985)

13.20.040 Deduction of delinquent charges from deposit.

In the event that an account becomes delinquent, then upon giving ten days' prior notice, such portion of the deposit as may be necessary to bring the account in full, including but not limited to all delinquent charges and service costs assessed as a result thereof, may be deducted from the deposit. The deduction shall be related to and associated with the termination of the utility service as a result of nonpayment.

(Ord. 493 § 4, 1985)

13.20.050 Return of deposit.

In the event an applicant is an individual who does not own the location for which the utility service is being sought, then any deposit required shall be returned or any waiver of deposit guarantee, as they may be from time to time authorized by resolution, shall only be released after the utility obligation for that service location has been satisfied in full and the account terminated. Provided that in the event there is a delinquency and it becomes necessary for the city to terminate the service, then any monetary

deposit which has been received shall be first applied to the utility obligation outstanding, including any interest or penalties, and the balance thereof returned to the party providing the guarantee.

(Ord. 493 § 5, 1985)

13.20.060 Waiver of deposit guarantee--Payment of delinquent charges.

In the event that waiver of deposit guarantees are from time to time authorized by resolution, then as to any guarantor who executes such document, that guarantor shall in the event of a delinquency, pay the delinquency upon request therefor by the clerk-treasurer; provided that in the event of a failure to so pay within ten days of the request for payment, then by the terms of any such waiver agreement, the sum in question shall be transferred to the guarantor's account and shall be deemed for all purposes to be a utility service provided to that individual at the location at which the individual guarantor is residing.

(Ord. 493 § 6, 1985)

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13.24 Utility Service Rates

13.24.010 Electrical utility operation regulations.

The city council may from time to time establish rules and regulations, by resolution or otherwise, relating to the operation of its electrical utility.

(Ord. 544 § 2, 1989)

13.24.020 Sewer rates.

Rates and charges for services and materials provided by the sewer, electrical, and solid waste disposal utilities of the city shall be established in the manner set forth within the applicable provisions of this code.

(Ord. 615 § 3, 1994)

13.24.025 Sewer fund--Capital replacement account.

A. There shall be established within the sewer fund a separate account denominated "capital replacement account." Moneys deposited into that account pursuant to the provisions of this section shall be utilized only for capital improvements or replacements in the sewer system of the city.

B. The city council shall set the percentage of the revenues generated by the sewer utility for monthly operating revenues which shall be deposited into this account to be the lesser of ten percent of the total monthly sewer bill, or one dollar seventy-five cents per month.

(Ord. 636 § 1, 1996: Ord. 573 § 1, 1991: Ord. 547 § 1, 1989; Ord. 540 § 3, 1988)

13.24.030 Water rates.

Rates and charges for services and materials provided by the water utility of the city shall be established in the manner set forth within the applicable provisions of this code.

(Ord. 615 § 2, 1994: Ord. 587 § 1, 1991: Ord. 516 § 1, 1987)

13.24.035 Overcharge for service--Reimbursement procedure.

A. Any customer of the city's utility systems, including but not necessarily limited to sewer, water, electrical and solid waste, who contends that there was an overcharge for utility services provided to that customer for which the customer has paid shall submit a claim for reimbursement of such

claimed overcharge within six months of the end of the billing period during which the overcharge allegedly occurred. The claim shall be submitted in writing to the office of the clerk-treasurer and shall contain such information as may from time to time be established by the clerk-treasurer. At a minimum, the claim shall include the following:

1. The name and address of the claimant;

2. The name and address of the customer who/which paid the alleged overcharge, if different than the claimant;

3. The billing period or periods during which the alleged overbilling occurred and the amount claimed for each such billing period;

4. The basis for the claim that the billing/billings were erroneous.

B. Upon receipt of a claim, the city shall undertake in a timely manner a review of the claim. If such a review establishes that the claim is in whole or in part properly founded, the city shall refund the sum so established. If the review results in the city's decision that it is not properly founded, then the claimant shall be so notified. The notification shall be in writing and state the reasons for the city's decision. It shall be either personally delivered to the claimant or his/her/its agent, if any, or mailed to the claimant's address by certified mail, return receipt requested.

C. Upon a total or partial rejection by the city of a claimant's request for reimbursement which has been timely submitted as required by this section, the claimant may take such legal recourse as is deemed appropriate by the claimant.

D. Any claim of the type and nature covered by this section which is not submitted within the time period and in the manner established by subsection A of this section shall be deemed barred and/or waived.

(Ord. 601 § 1, 1993)

13.24.040 Termination of service.

In the event that the city gives a notice of an intent to terminate service for one of its utilities, whether electrical, water, or sewer, as a result of nonpayment of moneys, then the individual who is the recipient of the service shall have the right to appeal that termination notice in the manner provided:

A. The individual shall give notice to the city clerk-treasurer within four days of the receipt of the notice of termination.

B. Upon receipt of the notice of appeal, the clerk-treasurer shall establish a time wherein the ratepayer may appear before the utilities coordinator of the city and submit such information as the ratepayer may deem necessary and appropriate to establish just cause for nontermination of service or the basis for the establishment that the city is in error in either establishing the amount or giving notice of termination.

C. The utility coordinator shall review the matter and determine whether or not the city's position is correct and shall have the authority to affirm the notice of termination, strike the notice of termination, or modify the terms of the notice of termination. No termination of service shall occur until the utility coordinator has issued an opinion, whether oral or written, which has been given to the ratepayer and twenty-four hours have elapsed from such notice.

(Ord. 471 § 4, 1984)

13.24.050 Connection charges.

On and after the effective date of the ordinance codified in this section, such charges as may be established by written resolution of the council shall be paid by a party seeking to obtain connection to the city's water and sewer utility or to modify existing connections to such utilities.

The city administrator shall have the authority to develop and issue such rules, regulations, and forms, as he or she may determine necessary and appropriate in order to administer the program of connections to the city's water and sewer utilities. Any such rule or regulation shall be submitted in writing to the council no less than thirty calendar days prior to its anticipated effective date. If during that period the council either rejects or suspends the effective date, the rule or regulation shall not go into effect until approval by the council. In the event of no action by the council, the regulation shall go into effect upon the date set by the director; provided, that the director may propose and the council may authorize an effective date earlier than the thirty days otherwise required.

(Ord. 722 §§ 2, 3, 2005)

13.24.060 Corrective action--Authority.

In the event that the city becomes aware of the delivery of the city's utility service as the result of an action covered by Section 9.38.910(A) of this code, it shall have the authority to take immediate corrective action to restore the nonprovision of utility service to the premises. Prior to taking such action, the city staff so assigned shall leave a written notice of such action by either posting the notice on the premises or leaving the notice with a person of responsible age who is present at the premises at the time of corrective action.

(Ord. 733 § 2, 2006)

13.24.070 Unused Connections

Any water or sewer connection remaining unused for a period of more than six months, but less than five years, shall be deemed to be inactive and shall not be reactivated until such reactivation fee as may be established by written resolution of the council is paid. Any connection remaining unused for five years or more is deemed closed and a connection shall not be reactivated until a new application has been submitted and approved and such fee as may be established by written resolution of the council has been paid. Where such reconnection or reactivation requires new construction from the property lines to the main, the installation of a different service size, or other construction activity by the city to achieve such reactivation, but in the same location, the fee for such service shall be such amount as may be established by written resolution.

(Ord. No. 794, § I, 4-10-2013)

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City of McCleary
Home of the Bear Festival

13.34 Residential Water Service Requirements

13.34.010 Findings.

The council finds that the public health and safety is harmed by the continued habitation of a premises within the city when it is not being currently provided water to the premises by the municipal water system, approved on-site well, or an approved community system. This harm results from a number of factors including, but not limited to, the practical unavailability of appropriate sewage disposal.

(Ord. No. 781, § I, 8-22-2012)

13.34.020 Mandatory water requirements.

No premises shall be utilized for human habitation unless it has available and is utilizing potable water from the municipal water system, an approved on-site well, or an approved community water system.

A. Any residence or structure within the corporate limits being utilized contrary to the provisions of this section shall be deemed to be a public hazard and nuisance and the director of public works, or his or her designee, is authorized to take such steps as are necessary to prevent and prohibit occupation of the structure or residence until the water service is available and utilized.

B. The authority granted to the director pursuant to sub-section (A) of this section shall include, but is not limited to, taking the following actions:

1. The issuance of a corrective notice under the provisions of Section 8.16.040 of this code, as now existing or hereafter amended or succeeded;

2. The issuance of an order prohibiting occupancy of the premises and requiring its immediate vacation until water service is provided to the residence at a level which is to the reasonable satisfaction of the director; and

3. Enforcement action pursuant to Section 17.40.140 of this code, as now existing or hereafter amended or succeeded.

(Ord. No. 781, § II, 8-22-2012)

13.34.030 Appeals.

Any person aggrieved by enforcement action taken by the director pursuant to Section 13.34.020(B) of this chapter shall have the right to appeal that action under the provisions of Section 8.16.045 of this code, as now existing or hereafter amended or succeeded: Provided that, an appeal shall not stay the implementation of an order to vacate issued pursuant to Section 13.34.020(B).

(Ord. No. 781, § III, 8-22-2012)

13.34.040 Penalties.

It is unlawful for any person to occupy a residence or structure within the corporate limits at such time as it is in violation of the provisions of Section 13.34.030 of this chapter after either:

1. The director has issued an order requiring immediate vacation or

2. The period to correct the problem allowed under the correction notice issued pursuant to Section 13.34.020(B)(1) has elapsed. Any violation shall be subject to processing, enforcement, and penalty under the provisions of Section 17.40.140 of this code, as now existing or hereafter amended or succeeded.

(Ord. No. 781, § IV, 8-22-2012)

ORDINANCE NO. 742

AN ORDINANCE RELATING TO GOVERNMENTAL OPERATION; AMENDING THE FOLLOWING SECTIONS OF THE MUNICIPAL CODE: 2.08.010, 2.08.020, 2.16.010, 2.16.020, 2.16.050, 2.16.080, 2.16.090, 2.28.050, 5.20.010; 13.04.080, 13.04.110, 13.04.130, 13.04.150, 13.04.170, 13.04.200, 13.04.210, 13.04.220, 13.12.170, 13.12.200; & 17.40.120 MMC; REPEALING THE FOLLOWING SECTIONS OF THE MUNICIPAL CODE: §2.16.030, §2.16.040, §2.16.060, §2.16.070, §2.16.100, §2.16.110, §2.16.120, §2.16.130. §2.16.140, §2.16.150, §2.16.160, §2.16.170, §2.16.180, §2.16.190, §2.36.010, §2.36.020; §5.20.020; & §13.04.170; ADDING A NEW SECTION TO CHAPTER 16.04 MMC; AND PROVIDING AN EFFECTIVE DATE.

R E C I T A L S:

1. Since the placement of the Municipal Code into an electronic format, review has been undertaken to identify areas which merit updating, modification, or deletion.

2. That same process has identified one or more areas in which a new section is necessary to recognize the need of the provision of certain flexibility to developers in the construction of structures for marketing purposes prior to final plat approval.

3. It is the intent of the Council and Mayor through the adoption of this ordinance to clarify and enhance the operation of the governmental structure of the City.

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The city administrator, clerk-treasurer, ((~~director of public works,~~)) chief of police, chief of the fire department, municipal court judge, city attorney, as well as all other officers which may be provided for by ordinance or by action of the council and who serve as department heads and whose election is not required by statute, shall be appointed by the mayor, subject to confirmation by a majority vote of the council. To the extent not otherwise required or limited by statute or ordinance, each appointee shall serve at the pleasure of the mayor.

SECTION III: Section 2.16.010 MMC shall be amended to read as follows:

The department of police shall be under the direction and control of the ((~~marshal~~)) Chief of Police, subject to the direction of the mayor. ((~~He shall prosecute before the police justice~~)) The Chief shall be responsible for supervision of the investigation of all violations of city ordinances or state law which come to the Chief's ((~~his~~)) knowledge. ((~~He~~)) So long as the individual is in the custody of the Police Department, the Chief or designee thereof shall have charge of the ((~~prison and~~)) prisoners. ((~~He~~)) The Chief and other members of the Department may pursue and arrest violators of city ordinances and state laws beyond the city limits to the extent allowed by law and shall have and may exercise any and all other authority granted by City ordinance or state law to law enforcement officers.

SECTION IV: Section 2.16.020 MMC shall be amended to read as follows:

The lawful orders of the ((~~city marshal~~)) Chief of Police shall be promptly executed by members of the Department ((~~deputies, police officers and watchmen~~)). Every citizen shall lend ((~~him~~)) members of the Police Department aid, when required, for the arrest of offenders and maintenance of public peace, safety, and order. Appointment of other members of the Department, including officers, shall be carried out in compliance with the applicable provisions of this Code, including those relating to Civil Service, or written resolution of the Council ((~~He may appoint, subject to the approval of the mayor, one or more deputies, including a police for whose acts he and his bondsmen shall be responsible, whose compensation shall be fixed by the council. With the concurrence of the mayor, he may appoint additional policemen for one day only when necessary for the preservation of public order~~)).

SECTION V: §2.16.050 MMC shall be amended to read as follows:

The ((~~city marshall~~) Chief of Police shall perform such other services and duties as the Council by ordinance or resolution may require or authorize.

SECTION VI: §2.16.080 MMC shall be amended to read as follows:

There is ((~~created and established~~)) a police reserve force of such number as may be authorized by written resolution of the Council ((~~not more than twelve members~~)). Each member shall be appointed by the Mayor, upon recommendation of the Chief of Police. Appointment to, service upon, and removal from the reserve force shall be subject to such terms and conditions as may be established by written resolution of the Council (~~(city marshal, with the approval of the mayor)~~).

SECTION VII: §2.16.090 MMC shall be amended to read as follows:

The duties of the police reserve force are to supplement the regular police force in event of a major disaster affecting citizens of the city; to aid in the control of traffic and maintenance of order at parades, and generally policing of large assemblies of people, and in case of a declared emergency to assist the regular police in the protection of life, property, and preservation of peace and order, and such other authority, including police duties, as the Chief of Police may authorize, upon approval of the Mayor ((~~city marshal may specify~~)).

SECTION VIII: §2.28.050 shall be amended to read as follows:

The mayor and council may direct either the planning commission or the planning agency to act as the research and fact finding agency of the municipality for such purposes as may be found appropriate. To that end it may make such surveys,

analyses, researches and reports as are generally authorized or requested by the mayor and council or by the state, with the approval of the mayor and the council. The commission or the planning agency, upon such request or authority may also:

A. Make inquiries, investigations, and surveys concerning the resources of the county;

B. Assemble and analyze the data thus obtained and formulate plans for the conservation of such resources and the systematic utilization and development thereof;

C. Make recommendations from time to time as to the best methods of such conservation, utilization, and development;

D. Cooperate with other commissions or planning agencies and with other public agencies of the municipality, state and United States in such planning, conservation and development;

E. In particular cooperate with and aid the state within its territorial limits in the preparation of the state master plan provided for in RCW 43.21.190 and in advance planning of public works programs; ((~~and~~))

F. Exercise such other authority as may from time to time be authorized pursuant to the provisions of RCW 35A.14, RCW 35A.63 or any other applicable statute, subject to such limitations as may be subsequently set forth by the mayor and council; and

G. To make recommendations to the city council in relation to the control and supervision of all parks belonging to the city including in relation to the establishment of rules and regulations for the government management thereof. Any rule or regulation in relation to the operation of parks shall be subject to enforcement by the police department of the city.

SECTION IX: Section 5.20.010 MMC is amended to read as follows:

For purposes of this code ((~~chapter:A.~~)) "Garage sale" means any event other than a sales activity operating in conjunction with a commercial or retail operation possessing an appropriately issued license from the city, which is advertised by any means whatsoever as a place or location at which members of the public may purchase identifiable or tangible personal property. The term "garage sale" includes by way of representation and not by way of limitation, yard sales, rummage sales, patio sales, or other similar sales.

((~~B. "Year" means the calendar year commencing on the first day of January and terminating upon the thirty-first day of December.~~))

SECTION X: §13.04.080 MMC shall be amended to read as follows:

A. The ((~~crew supervisor~~)) City Administrator or designee is charged with administration and enforcement of this chapter. Water service to any premises served by the city water

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system may be discontinued for any violation or abridgment of the provisions of this chapter after due notice thereof.

B. In the event water service is discontinued for failure to comply with provisions of this chapter, it shall remain terminated for the duration of such noncompliance.

C. The ((~~clerk-treasurer~~)) City Administrator shall have the authority to from time to time establish rules and regulations in relation to the implementation and operation of the system; provided that such rules and regulations shall, prior to their effective date, be submitted to the council for its approval.

SECTION XI: §13.04.110 shall be amended to read as follows:

A. Except as otherwise provided for herein, or unless approved by the council, no premises shall hereafter be connected to the water supply system of the city unless there is a standard main owned by the city in the public right-of-way adjacent thereto.

B. When a permit has been obtained for the installation of water service, the ((~~crew supervisor~~)) authorized representative of the city shall cause the premises described in the application to ((~~be connected with~~)) have available to it a connection to the water system by the installation of a service pipe extending from the main to the property line and a stopcock and water meter placed within the right-of-way. Every separate

premises shall have its own separate meter installed. The City shall be reimbursed for the cost of such installation at such rate as may be established by written resolution of the Council.

C. Service connections to the premises itself shall be installed by (~~(the city at the expense of)~~) the property owner. Any such installation by the property owner or authorized representative thereof shall be coordinated with City staff so as to allow the City to carry out such review and inspection of the installation and testing as may be deemed necessary and appropriate by the City (~~(, which shall be the prevailing cost of such installation at the time thereof. In case of replacement or new service, no service smaller than three-fourths inch shall be installed)~~).

D. All connections to city service shall conform to the standard specifications and regulations of the city.

SECTION XII: §13.04.130 MMC shall be amended to read as follows:

A. Water service may be supplied to premises on a temporary basis during the construction of a building thereon or during the construction of a standard main to service such premises. Applications for temporary service shall state fully the purposes for which temporary service is requested and such other information as may be required by the City. All costs required for installation and removal of the elements of such

temporary service which may be carried out by the City shall be paid by the applicant prior to approval of such application.

B. Upon cessation of the need for which the temporary service was requested, the owner or authorized representative thereof shall immediately notify the ((~~superintendent~~)) the City in writing thereof and such temporary service shall forthwith be terminated or converted to permanent service.

C. When a permit has been obtained for the installation of temporary water service, the authorized representative of the city ((~~crew supervisor~~)) shall cause the premises described in the application ((~~be connected with~~)) to have available to it a connection to the water system by the installation of a service pipe extending from the main to the property line and a stopcock and water meter placed within the right-of-way. Every separate premises shall have its own separate meter installed.

D. Service connections to the premises itself shall be installed by ((~~the city at the expense of~~)) the property owner. Any such installation by the property owner or authorized representative thereof shall be coordinated with City staff so as to allow the City to carry out such review and inspection of the installation and testing as may be deemed necessary and appropriate by the City ((~~which shall be the prevailing cost of such installation at the time thereof. In case of replacement or~~

~~new service, no service smaller than three-fourths inch shall be installed)~~).

E. All connections to city service shall conform to the standard specifications and regulations of the city.

SECTION XIII: §13.04.150 MMC shall be amended to read as follows:

A. Whenever application is made for water service to premises with no main in the adjacent street, a standard main must be installed prior to connection. The installation of such standard mains shall conform to the comprehensive water plan for the city and shall conform to the standard specifications and regulations of the city.

B. A standard main may be installed by and at the expense of the owner(s) of the premises to be served thereby, pursuant to plans approved by the city engineer.

~~C. To the extent that may be allowed by applicable law and subject to the City's agreement to do so, the owner may elect to have a standard main installed by the city upon making payment to the city of the appropriate main extension charges as provided for in this chapter.~~

SECTION XIV: §13.04.200 MMC shall be amended to read as follows:

The ((~~council may require the~~)) installation of backflow prevention devices on any premises being served by the water system shall be carried out whenever required by any

applicable law, rule or regulation or, when in the judgment of the council, acting upon the advice and recommendation of the engineer, the nature and extent of the activities on the premises or materials stored on the premises would present an immediate and dangerous hazard to health should a cross-connection occur. The cost of such device and the installation thereof shall be borne by and carried out by the owner of the premises affected. The type of protective device, its installation, and periodic testing shall conform to the provisions of the then statute, rule or regulation of the State and any applicable standard specification or regulation of the City ((~~Section 248-54-500 of the Washington Administrative Code~~)).

SECTION XV: §13.04.210 MMC shall be amended to read as follows:

A. Should the owner or representative thereof or occupant of any premises turn on the water or suffer or cause the same to be turned on after it has been shut off at the curb cock by the city, water service may again be turned off by the city. ((~~A charge of twenty dollars shall be made for restoring service~~)) In addition to any penalty which may imposed by the Municipal Court pursuant to the applicable provisions of the Municipal Code for such action, fees for the costs incurred by the City in restoring the disconnected status and any subsequent reconnection shall be established by resolution of the Council.

B. Should the owner or representative thereof or occupant of any premises turn on the water or suffer or cause the same to be turned on without the consent of the city, water service may again be turned off by the city. In addition to any penalty which may be imposed by the Municipal Court pursuant to the applicable provisions of the Municipal Code for such action, fees for the costs incurred by the City in disconnecting the service and any subsequent reconnection shall be established by resolution of the Council. In addition, the responsible party shall be responsible for paying for the water used at such rate as may be established by the City.

SECTION XVI: §13.04.220 MMC shall be amended to read as follows:

((~~When a~~)) A verbal or written request ((~~is made which may be responded to during regular working hours~~)) for any discontinuance or turn-on of water service to a premises for the convenience of the occupant or owner shall be subject to the payment of such fee, if any, as may be established by resolution of the Council ((~~, the response thereto shall be classified a regular service and no charge made. Such service outside regular working hours shall be at the rate of twenty dollars per call~~)).

SECTION XVII: §13.12.170 MMC shall be amended to read as follows:

The size, slope, alignment, materials of construction of a building sewer, and the methods to be used in excavating,

placing of the pipe, jointing, testing, and backfilling the trench, shall all conform to the then applicable requirements of the building and plumbing code or other applicable standards, rules and regulations of the city, including but not limited to, the Development Standards. ((~~In the absence of code provisions or in amplification thereof, the materials and procedures set forth in appropriate specifications of the ASTM and WPCF Manual of Practice No. 9 shall apply.~~))

SECTION XVIII: §13.12.200 MMC shall be amended to read as follows:

The connection of the building sewer into the public sewer shall conform to the then applicable requirements of the building and plumbing code or other ((~~applicable~~)) standards, rules and regulations of the city, including but not limited to, the Development Standards ((~~for the procedures set forth in appropriate specifications of the ASTM And WPCF Manual of Practice No. 9~~)). All such connection shall be made gastight and watertight and verified by proper testing witnessed by authorized City personnel. Any deviation from the prescribed procedures and materials must be approved in writing by the utility coordinator before installation.

SECTION XIX: There shall be added to Chapter 16.04 MMC a new section to read as follows:

Before the City grants final approval of the subdivision and subject to compliance with the following

conditions, building permits may be issued for up to four (4) Model Homes/Units that may be constructed on a single tract of land which is in process of being platted:

1. The City has approved a preliminary short plat or subdivision which includes the specific lots upon which the Model Homes/Units are to be located.

2. The ownership of those Model Homes/Units shall remain with the owner of the land contained within the preliminary plat until a final short plat or final subdivision has been approved and recorded.

3. Building and related permits shall be issued only to the property owner or a licensed contractor acting on the owner's behalf.

SECTION XX: Section 17.40.120 MMC is amended to read as follows:

A. Any use that will operate for more than twenty-four hours but less than thirty days is a temporary use and subject to a temporary use permit. Temporary uses are nonrecurring, limited in scope, intensity, and duration and may locate in any zoning district. The property that a temporary use locates on will return, upon its conclusion, to its original condition or use.

B. The following temporary uses are exempt from the temporary use permit process of this section:

1. Garage or rummage sales, as defined in and subject to the provisions of Chapter 5.20, conducted for a period not to

exceed ((~~three~~)) such period of days of offering or operation per sales event as may be allowed under the provisions of Chapter 5.20: PROVIDED FURTHER, ((~~but~~)) no lot shall be the site of more than four sales events in any one three hundred sixty five day period;

2. Contractor's offices, equipment storage sheds, and portable lavatories on site of a permitted active construction project for a duration not exceeding two years;

3. Temporary events conducted for a period not exceeding three days per event and located on public property in any zoning district or on private property in the C-1, C-2 and I zoning districts; and

4. Farmer's markets and roadside produce stands in the C-1, C-2 and I zoning districts.

C. The administrator shall approve or deny all permit applications for any temporary use not exempt under this section upon receiving a complete application. Any temporary use permit application must show evidence that it can meet the following conditions for approval:

1. The proposed temporary use will not be detrimental to the public health, safety, or welfare, nor injurious to property or improvements in the immediate vicinity;

2. The proposed temporary use is compatible with the purpose and intent of the comprehensive plan and all city laws and regulations;

3. The location, days, and hours of operation are compatible with the surrounding area;

4. Adequate parking and traffic control can be provided in a safe manner;

5. Any structures proposed for the temporary use comply with applicable building and fire codes;

6. The proposed temporary use will not cause noise, light, or glare which will cause unreasonable adverse impacts to surrounding land uses. No use shall be made of equipment or material which produces unreasonable vibration, noise, dust, smoke, odor, or electrical interference to the detriment of adjoining property;

7. Any proposed use of public right-of-way is authorized by the city;

8. The property on which the use is located will be returned to the condition it was in before the use. The time is specified for the removal of the temporary use and all physical evidence of the use, and by which time the property shall be completely restored to its previous condition; and

9. Evidence of financial responsibility in a form acceptable to the administrator may be required to assure compliance with the conditions of temporary use permit approval.

D. In granting any temporary use permit, the administrator may attach conditions to the permit necessary to mitigate any possible adverse impacts.

E. The decision of the administrator shall be final unless appealed to the hearing examiner within ten days.

F. A temporary use permit shall become invalid if not exercised within the time prescribed in such permit, or, if the date is not specified, within six months of the effective date thereof. (Ord. 709 § 1 (part), 2004)

SECTION XXI: The following sections of the Municipal Code shall be and hereby repealed: §2.16.030, §2.16.040, §2.16.060, §2.16.070, §2.16.100, §2.16.110, §2.16.120, §2.16.130. §2.16.140, §2.16.150, §2.16.160, §2.16.170, §2.16.180, §2.16.190, §2.36.010, §2.36.020, §5.20.020, & §13.04.170.

SECTION XXII: If any section, subsection, sentence, clause, or phrase of this Ordinance is for any reason held to be invalid or unconstitutional, such decision shall not affect the validity of the remaining portions of this Ordinance. The Council hereby declares that it would have passed this Ordinance and each section, subsection, sentence, clause, and phrase thereof, irrespective of the fact that any one or more sections, subsections, sentences, clauses, or phrases had been declared invalid or unconstitutional, and if for any reason this Ordinance should be declared invalid or unconstitutional, then the original ordinance or ordinances shall be in full force and effect.

SECTION XXIII: This Ordinance shall take effect upon the fifth day following date of publication.

PASSED THIS 26th DAY OF SEPTEMBER, 2007, by the City Council of the City of McCleary, and signed in approval therewith this 26th day of September, 2007.

CITY OF McCLEARY:

Wallace Bentley

WALLACE BENTLEY, Mayor

ATTEST:

D. S. Rostedt

DONNIE ROSTEDT, Clerk-Treasurer

APPROVED AS TO FORM:

DANIEL O. GLENN, City Attorney

STATE OF WASHINGTON)
: ss.
GRAYS HARBOR COUNTY)

I, DONNIE ROSTEDT, being the duly appointed Clerk-Treasurer of the City of McCleary, do certify that I caused to have published in a newspaper of general circulation in the City of McCleary a true and correct summary of Ordinance Number 742 and that said publication was done in the manner required by law. I further certify that a true and correct copy of the summary of Ordinance Number 742, as it was published, is on file in the appropriate records of the City of McCleary.

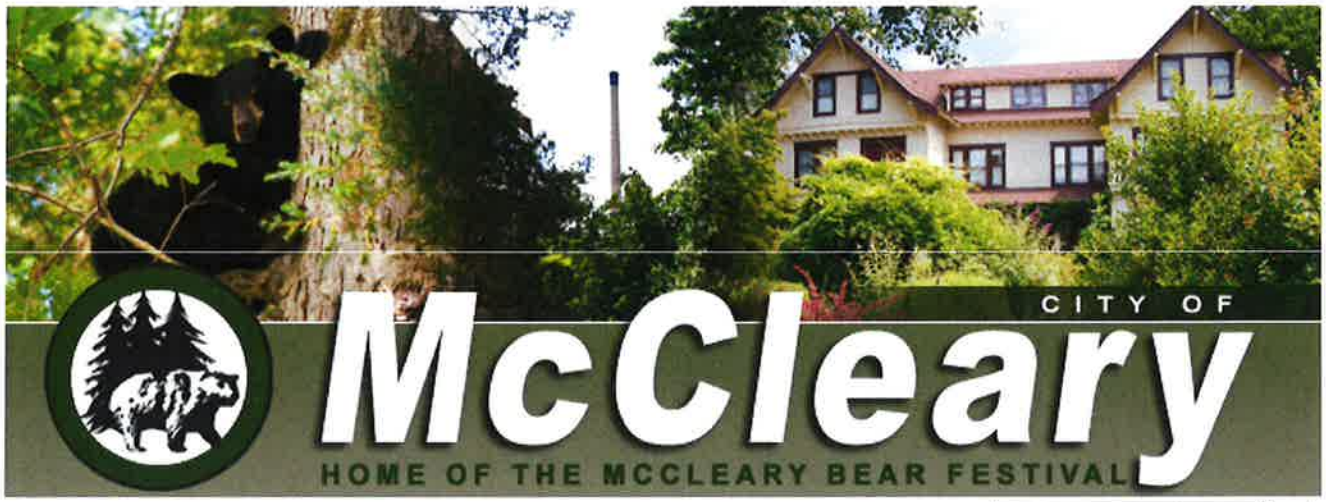
D. S. Rostedt

DONNIE ROSTEDT

SIGNED AND SWORN to before me this 26th day of September, 2007, by DONNIE ROSTEDT.

ARDYCE M TAYLOR
NOTARY PUBLIC
STATE OF WASHINGTON
My Commission expires Dec 05, 2008

NOTARY PUBLIC IN AND FOR THE STATE OF WASHINGTON, Residing at: McCleary
My appointment expires: 12/05/08



In City Departments:

- **City Jobs**
- **Administration**
- **Cemetery**
- **Development Services / Building Department**
- **Fire**
- **Light & Power**
- **Municipal Court**
- **Planning Department**
- **Police**
- **Public Facilities**
- **Water / Wastewater**
- **Utilities**
- **City Water/Power Information**
- **Commonly Asked Questions**

Water Billing News

On **June 17, 2013**, the City Council authorized a grace period until September 1, 2013 for property owners to recommence their in-active water service without being required to pay the fee established in Res. 656.

On **May 9, 2013,** the City Council approved Resolution 656 which

Water

The City of McCleary pumps its water from the Wildcat Creek Aquifer using 1 of 3 wells at the North end of town and stores the water in 2 reservoirs in the South East part of town.

The water portion of your bill goes towards the cost to pump and store the water, disinfect it, debt service, establish a capital program, and to maintain the system in general.

- Resolution 699
- Resolution 686
- Resolution 659
- Resolution 656
- Resolution 655
- Resolution 623

Printer-friendly Version

2018 Water Rates

Rates Per Resolution 623

INSIDE the CITY
Meters 1" or smaller:
$72.50 for 1st 500 cubic feet.
Excess at $1.04 cents per 100 cubic feet (CCF)

Meters larger the 1":
$93.10 for 1st 500 cubic feet.
Excess at $1.04 cents per 100 cubic feet (CCF)

OUTSIDE the CITY
Meters 1" or smaller:
$108.10 for 1st 500 cubic feet.
Excess at $1.04 cents per 100 cubic feet (CCF)

Meters larger the 1":
$143.50 for 1st 500 cubic feet.
Excess at $1.04 cents per 100 cubic feet (CCF)

Hydrant Fill Up
$57.00 plus tax per use, as is applicable, Contact City Hall for this option.

Connection Fees per Resolution 699

Connection Fee (inside city): $3,000.00

Connection Fee (outside city): $3,700.00

establishes reconnection fees for water service based on the length of time the account has been inactive.

If you account is in an inactive status for:
0 - 6mo. No Charge
6 mo. - 5 yrs. $218.00
5 yrs. or more $572.00

Water Meter Set Fee
$339.00

" In accordance with Federal law and U.S. Department of Agriculture policy, this institution is prohibited from discriminating on the basis of race, color, national origin, age, disability, religion, sex, and familial status. (Not all prohibited bases apply to all programs). To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410, or call (800) 795-3272 (voice), or (202) 720-6382 (TDD)."

APPENDIX D

CITY OF MCCLEARY DEVELOPMENT STANDARDS

IFC TABLE B105.1

LETTER FROM CITY OF MCCLEARY FIRE CHIEF APPROVING THE NESTING OF FIRE SUPPRESSION AND STANDBY STORAGE (OCTOBER 17, 2019)

City of McCleary

Home of the McCleary Bear Festival

Development Standards

Adopted December 13, 2006
Revised November 18, 2009

SECTION 1.0 ENGINEERING SERVICES PLAN REVIEW PROCESS

The engineering services plan review process is independent of the review processes of all other city departments. Therefore, plans or other materials requiring engineering review and approval shall be submitted directly to the engineering services. The remainder of this section describes the process and the minimum requirements for submittals.

1.1 Predesign Meeting

Applicants are encouraged to meet with city staff prior to final design and plan submittal. All plans submitted to the Development Services will receive a preliminary review to make sure that they adequately address the minimum requirements of this manual and all applicable development requirements. Any such plans not meeting these requirements will be returned to the applicant or his designated contact person as unacceptable for review.

1.2 Plan Review Fees

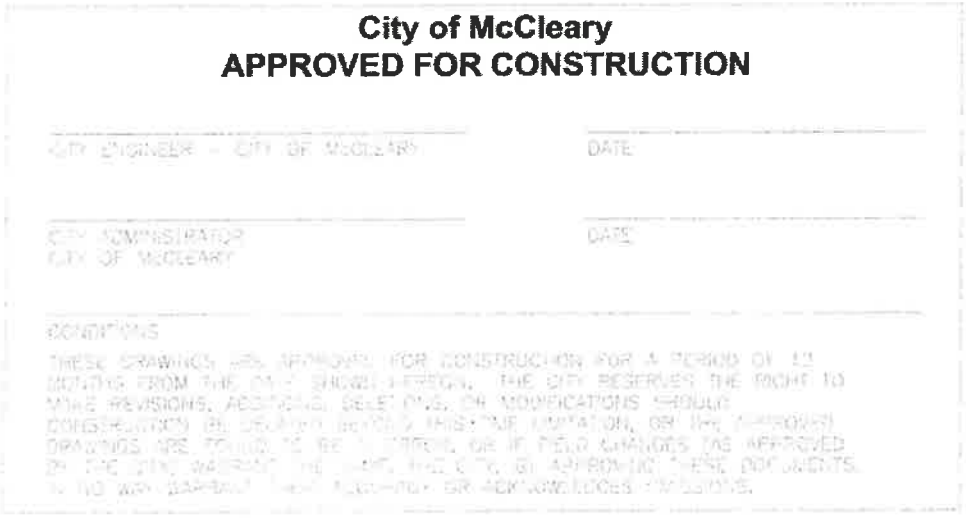
Engineering plan review fees are required separate from other departments review fees. The plan review fee shall be paid at the time of submittal. The review process begins when payment of the plan review fee has been made. The permit fee shall be paid prior to the issuance of the permit.

1.3 Plan Checklists

The engineering services "Plan Review Checklists" are included in this publication (Appendix B) as a guide to help the engineer in the plan preparation process. The City recommends that these checklists be used by the engineer to help facilitate the plan review process.

1.4 Plan Approval

Each sheet of the plans shall have the City of McCleary approval block located adjacent to the design engineer's title block in the lower right-hand corner. The approval block shall be as shown below. The plans shall be considered approved by the City when the approval block on each sheet has been signed by the city engineer or a duly authorized representative.



1.5 **Engineer's Registration Stamp**
Engineering plans and/or calculations submitted for approval shall be stamped by a Washington State licensed professional engineer.

1.6 **Right-of-Way Dedications**
All required right-of-way dedications shall be completed on a "Statutory Warranty Deed" and shall be recorded by Grays Harbor County prior to final plan approval. All easements shall be completed in a format to the City's requirements. Easements for utilities shall be drafted and signed by the property owner and given to the City prior to final plan approval. Upon completion of the project, the original easement shall be modified, if necessary, and then recorded at the property owner's expense. All such easements and dedications shall be clearly shown on the engineering plans. (Forms are available from the City Administrator.)

1.7 **Alternative Methods or Construction Materials Request**
When circumstances warrant, the applicant may request to vary from the design standards set forth in this manual. The applicant should be aware that the City of McCleary design standards are considered minimum requirements. It will be up to the applicant to provide the justification for the request. The applicant shall submit a completed "Alternative Methods or Construction Materials Request" form to the engineering services with the applicable fee. The request will be reviewed by all applicable City departments. The final decision will be by the city administrator. (Forms are available from the City Administrator.)

1.8 **Plan Review Sequence**
The following sequence shall be followed when engineered plans are required for review by the engineering services:

1. Seven (7) blueline sets of engineering plans showing all work outside building footprints including utilities, commercial developments, plats, roads, clearing, grading, and temporary erosion and sedimentation control, and seven (7) sets of stormwater design calculations shall be submitted to the development services for review and approval. The city engineer will review plans for conformance with City development requirements, policies, the standards set forth in this publication, and all other publications referenced herein. Red-line drawings and plan review comments will be returned to the design engineer for corrections.

2. The design engineer shall revise the plans addressing all red-line comments and "Plan Review Checklist" requirements. Seven (7) sets of revised bluelines and the red-line comments shall be resubmitted to the City for a second review.

3. When the plans are acceptable for approval by the City, the original plans shall be submitted for signature. (See Section 1.4 for approval block requirements.) Once signed, the original plans will be returned to the design engineer.

4. One (1) reproducible mylar set and seven (7) blueline sets of the approved plans shall be submitted to the City for public record files. The design engineer shall complete and submit the City's "Estimate of Cost" form (Forms are available from the City Administrator.) with the mylars.

5. Prior to issuance of any construction permits, a preconstruction conference shall be scheduled no sooner than four (4) work days after the City receives its record copies of the approved plans. Contact City Hall to schedule the meeting. The meeting shall be

attended by all contractors that will perform work shown on the approved engineering plans and representatives from all applicable utility companies.

6. All required permits from the City normally may be picked up immediately following the preconstruction meeting provided that all applicable fees required have been paid and the SEPA process is complete.

7. Any changes to the scope of the work as outlined on the approved plans shall be documented on the "Plan Change Request" form provided by the City. The city engineer shall review and give approval of all changes prior to the commencing of any work related to the change. (Forms are available from the City Administrator.)

SECTION 2.0 GENERAL PLAN REQUIREMENTS

2.1 General Information on Plans

Plans submitted for review and approval by the engineering division shall include the following minimum requirements. Any plans submitted not meeting these requirements will not be reviewed further and will be returned to the design engineer for corrections.

1. All plans and calculations shall be prepared, stamped, signed, and dated by a Washington State licensed professional civil engineer.

2. Property surveys shall be performed and stamped by a Washington State licensed professional land surveyor or professional civil engineer.

3. All plans and calculations shall be neat, uncluttered, legible, and in conformance with the requirements herein.

4. Where applicable, shop drawings shall be submitted for review and approval prior to plan approval.

5. All plan sets shall include the City of McCleary Standard Details that are applicable for the project. The details shall be located on a separate plan sheet.

6. All plans shall have an approval block drafted onto the original mylar as shown in Section 1.4.

7. Engineering plans submitted for approval shall be on 24 x 36-inch reproducible black line mylar. No stick-on type material will be allowed.

8. North shall be shown up or to the right on the plans, and in no case will north be shown in opposing directions on the same or connecting sheets. The north arrow shall be located in the upper right corner of the plan sheet.

9. The scale shall be indicated directly below the north arrow and shall be only 1"=20', 30', or 50', with bar scale. Any variation to the scale must be approved by the City in advance of plan submittal.

10. A vicinity map shall be located on the lower right of the first sheet. The scale shall be a minimum of 1" = 1000' and with an approximate 1 square mile with the project site

SECTION 300 WATER SYSTEM REQUIREMENTS

The general design and construction requirements for the City of McCleary shall be those contained in the Standard Specifications for Road, Bridge, and Municipal Construction (hereinafter referred to as the "Standard Specifications"), Washington State Department of Transportation and American Public Works Association, Washington State Chapter, latest edition, unless superseded or amended by the City of McCleary City Standards for Public Works Engineering and Construction (hereinafter referred to as the "City Standards").

301 Water System Design Criteria

301.1 Water Mains

1. All new water main lines shall be installed to the size as indicated in the City's Comprehensive Plan. The minimum water pipe size shall be 8-inch diameter. The only exception is a dead-end line with no possibility of being expanded in the future and beyond the last fire hydrant, may be 2-inch diameter or as directed by the City Engineer.

2. Pipe for water mains shall be ductile iron, shall be thickness Special Class 52 or greater, or C-900 PVC conforming to Section 7-09 of the Standard Specifications. Buried joints shall be Tyton or approved equal and blocked or restrained accordingly. Ductile iron pipe shall be cement lined in accordance with A.S.A Specification A21.4-1964.

3. Connections to existing water mains shall be wet taps through a tapping tee and tapping valve and shall be made by a City-approved contractor. The tapping sleeve shall be epoxy coated or ductile iron. Stainless sleeves shall only be used on AC pipe. The City shall approve the time and location for these connections.

4. Where water mains are to be extended to serve a particular property, the water lines shall be extended along the entire frontage of the property to be served. Looped connections may be required to maintain continuity in the system.

5. All public water mains shall have a minimum cover of 36 inches in improved right-of-way and 48 inches of cover in unimproved right-of-way or easements.

6. All water mains and appurtenances shall be hydrostatically tested at 225 psi in accordance with Section 7-09.3(23) of the Standard Specifications.

7. Two-inch blow-off assemblies are required on dead-end water lines, except where fire hydrants are installed at the dead end. The blow-off assembly shall be installed in accordance with City Standard No. 304. Water valves shall be installed along the water line at a maximum spacing of 400 feet and at the intersection of lateral lines.

8. Minimum distance between sewer and water lines shall be 10 feet horizontally and 18 inches vertically in accordance with Department of Ecology standards.

9. Air relief valves are required at high points in water lines. Air relief valves shall be installed in accordance with City Standard Detail No. 305.

10. Water valves shall be located in clusters when possible and shall be located so that each leg of the main line system can be isolated separately.

11. Easements shall be a minimum of 15 feet in width for water lines. No structures, as defined by the city's zoning code, shall be allowed within easements.

301.2 Fire Hydrants

1. Fire hydrants shall be installed at a maximum lateral spacing of 600 feet.

2. On-site hydrants shall be a maximum of 150 feet from the farthest point of the building(s), or as directed by the fire department.

3. Fire hydrant feed lines shall be installed at right angles to the supply main.

4. The fire hydrant assembly shall be installed in accordance with City Standard Detail No. 303.

5. Easements, when required, shall be a minimum of 5 feet each side of any fire hydrant.

301.3 Water Service Connections

1. For single family residential construction in new subdivisions, the contractor shall furnish and install all materials for the service connection, including the meter setter, except that the City shall furnish and install the meter at the time of occupancy.

2. For commercial and multi-family construction, the meter setter shall be furnished and installed by the contractor.

3. Installation of 3/4-inch or 1-inch water service connections shall be per City Standard Detail No. 308.

4. Installation of 1½-inch or 2-inch water service connections shall be per City Standard Detail No. 309.

5. Where possible, adjacent lots may use dual water services per City Standard Detail No. 308.

302 Water Quality Requirements

302.1 Non-Medical/Dental Commercial Buildings

1. A double check valve assembly (DCVA) is required on the domestic water supply service, immediately downstream of the water meter, prior to any branch connections for all commercial projects.

2. The DCVA shall be installed in accordance with City Standard Detail No. 314.

3. Upon approval of the installation by the city inspector, the DCVA shall be tested by a Washington State certified backflow assembly tester, and the test report results shall be submitted to the City prior to occupancy of the building.

302.2 Medical/Dental Commercial Buildings

1. A reduced pressure backflow assembly (RPBA) is required on the domestic water supply service to any medical or dental building or office space which will contain water-connected equipment such as film processors, autoclaves, aspirators, computer cooling lines, dental cuspidors, dialysis equipment, or any other potential health hazard water connections.

2. The placement of the RPBA shall be determined by the City and shall be installed in accordance with City Standard Detail Nos. 315.1 and 315.2.

302.3 Fire Service Connections

1. A double detector check valve assembly (DDCVA) complete with 3/4-inch bypass DCVA and 5/8-inch Sensus SR water meter reading in cubic feet is required on the fire service line to any building which is equipped with a fire sprinkler system.

2. The DDCVA shall be located in a vault at or near the property line and shall be installed in accordance with City Standard Detail Nos. 313.1 and 313.2.

3. Upon approval of the installation by the city inspector, the DDCVA and the DCVA shall be tested by a Washington State certified backflow assembly tester, and the test report results shall be submitted to the City prior to use of the water system.

4. The domestic water service shall not be connected directly to a fire system service line, but rather shall be a separate connection to the main line.

5. The fire department connection shall be located within 15 feet of a fire hydrant but not less than 10 feet.

6. A ball drip valve is required on the Fire Department Connection (FDC) line when the FDC is lower in elevation than the Double Detector Check Valve Assembly.

7. Any fire system that is required will be designed (from water main through DDCVA to top of riser in building) by a state certified level III designer or civil engineer.

302.4 General Installation

Brass or dielectric unions shall be installed immediately downstream of all backflow assemblies 2-inch and smaller. A Romac #501 (or approved equal)

flanged coupling adapter shall be installed on the immediate upstream side of all backflow assemblies 3-inch and larger.

302.5 Irrigation Facilities

All landscape irrigation systems require backflow protection. The City will determine the type of backflow device required for each installation.

302.6 Air-Vacuum Breakers

Integral air-vacuum breakers are required on all threaded water outlets, including sink faucets, lab faucets, janitor sink faucets, and hose bib faucets.

303 Water System Plan Requirements

The following items shall be shown on the plans:

- Plan and profile in accordance with Section 2.0
- Water pipe including location, length, material, slope, depth, and size
- Detail all new connections to the existing water system
- Identify any possible utility conflicts
- Stationing and reference points
- Valves, meters, and fittings, including size and location
- Fire hydrant protection if hydrant is not protected by street curb and gutter
- Blow-offs at low points or dead ends (2-inch minimum)
- Air and vacuum relief valve at high points
- Pressure reducing valves
- Concrete blocking
- An all-weather maintenance access, including typical cross section of said access road
- Service sizes and locations
- Meter sizes and locations
- Minimum one (1) service per lot
- Proper reference and layout for saw cutting and patching existing streets
- Fire sprinkler system location from public water line to building showing gate valve at main line connection
- Existing and/or abandoned wells

304 Water System Plan Notes

The following notes shall also be shown on the plans.

WATER SYSTEM NOTES:

1. All work in city right-of-way requires a permit from the City of McCleary. Prior to any work commencing, the general contractor shall arrange for a preconstruction meeting at City Hall to be attended by all major contractors, representatives of involved utilities, and the City of McCleary. Contact City Hall to schedule the meeting. The contractor is responsible to have their set of plans at the meeting.

2. After completion of all items shown on these plans and before acceptance of the project, the contractor shall obtain a "punch list" prepared by the city's inspector

detailing remaining items of work to be completed. All items of work shown on these plans shall be completed to the satisfaction of the City.

3. All materials and workmanship shall conform to the Standard Specifications for Road, Bridge, and Municipal Construction (hereinafter referred to as the "Standard Specifications"), Washington State Department of Transportation and American Public Works Association, Washington State Chapter, latest edition, unless superseded or amended by the City of McCleary City Standards for Public Works Engineering and Construction (hereinafter referred to as the "City Standards"),.

4. A copy of these approved plans and applicable city developer specifications and details shall be on site during construction.

5. Any revisions made to these plans must be reviewed and approved by the developer's engineer and the city engineer prior to any implementation in the field. The City shall not be responsible for any errors and/or omissions on these plans.

6. The contractor shall have all utilities verified on the ground prior to any construction. Call (1-800-424-5555) at least 48 hours in advance. The owner and his/her engineer shall be contacted immediately if a conflict exists.

7. Any structure and/or obstruction which requires removal or relocation relating to this project shall be done so at the developer's expense.

8. Biological test samples will be taken by the City and paid for by the contractor.

9. Water mains shall have a minimum cover of 36 inches in improved right-of-way and a minimum of 48 inches in unimproved right-of-way and easements.

10. Pipe for water mains shall be ductile iron or C-900 PVC conforming to Section 7-09 of the Standard Specifications. Ductile iron shall be thickness Class 52 or greater, with tyton or approved equal joints and shall be blocked or restrained accordingly. Ductile iron pipe shall be cement lined in accordance with A.S.A. Specification A 21.4-1964.

11. Connections to existing water mains shall be wet taps through a tapping 'tee' and tapping valve and shall be made by a City-approved contractor. The tapping sleeve shall be epoxy coated, ductile iron or stainless steel. Stainless sleeves shall only be used on AC pipe. The City shall approve the time and location for these connections.

12. All water mains and appurtenances shall be hydrostatically tested at 225 psi in accordance with Section 7-11.3(11) of the Standard Specifications.

13. Fire hydrants shall be installed conforming to City Standard Detail No. 303.

14. Valve marker posts shall be installed where valve boxes are hidden from view or in unpaved areas. The installation shall conform to City Standard Detail No. 312.

15. Resilient seated wedge gate valves shall be used for all mains 12-inches or less in diameter. Butterfly valves shall be used for all mains greater than 12-inches.

16. Fittings for buried water mains shall be ductile iron. Fittings shall be mechanical joint conforming to AWWA Specification C111, unless otherwise approved by the City Engineer.

17. Water main pipe and service connections shall be 10 feet away from building foundations and/or roof lines.

18. Where a water main crosses a railroad, the water line shall be cased with welded steel pipe a minimum of 10 feet beyond each side of the railroad right-of-way. The casing shall have a minimum nominal diameter of two times the water main nominal diameter.

19. Trenching, bedding, and backfill for water mains shall be in accordance with City Standard Detail No. 503.

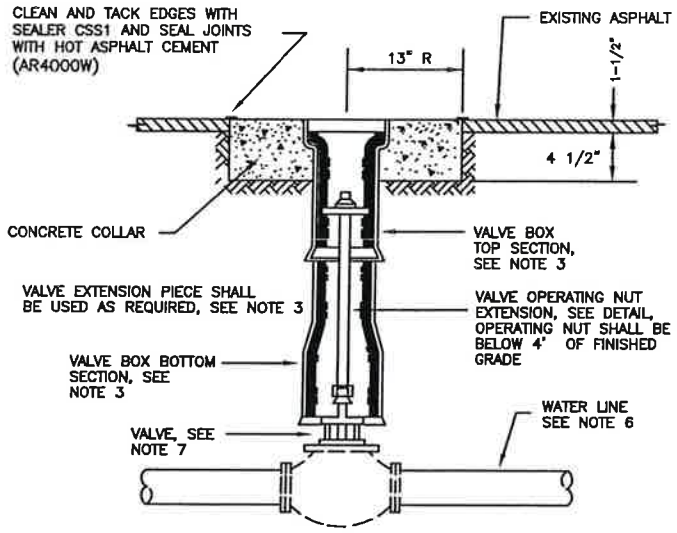
20. All commercial developments, irrigation systems, and multi-family water service connections shall be protected by a double check valve assembly or a reduced pressure backflow assembly as directed by the City, conforming to City Standard Detail Nos. 313 through 315.

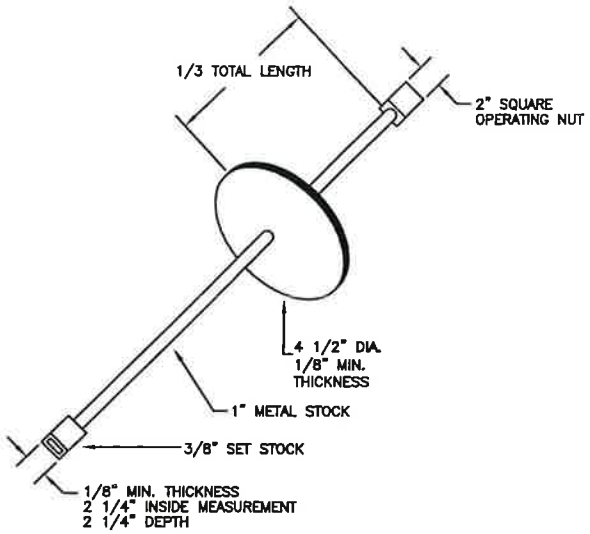
City of McCleary

Home of the McCleary Bear Festival

Appendix A

Water System Details





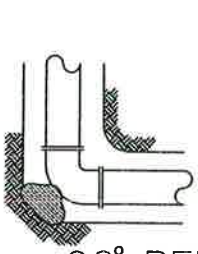
VALVE OPERATING NUT EXTENSION

NOTES:

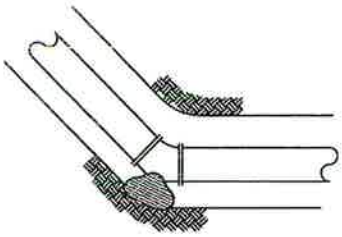
1. VALVE OPERATING NUT EXTENSIONS ARE REQUIRED WHEN THE VALVE NUT IS MORE THAN FOUR (4) FEET BELOW FINISHED GRADE. EXTENSIONS ARE TO BE A MINIMUM OF ONE (1) FOOT LONG, ONLY ONE EXTENSION TO BE USED PER VALVE.
2. ALL VALVE OPERATING NUT EXTENSIONS ARE TO BE MADE OF STEEL, SIZED AS NOTED, AND PAINTED WITH TWO COATS OF METAL PAINT.
3. VALVE BOXES SHALL BE TWO-PIECE, ADJUSTABLE, CAST IRON WITH EXTENSION PIECES (IF NECESSARY), AS MANUFACTURED BY THE VANRICH #940 SEATTLE OR APPROVED EQUAL. THE WORD "WATER" SHALL BE CAST IN RELIEF IN THE TOP.
4. NEAT LINE CUTS SHALL BE SEALED WITH A HOT PAVING GRADE ASPHALT AND FACE OF CUT TACKED.
5. WATER MAINS SHALL BE CONSTRUCTED AND TESTED IN ACCORDANCE WITH DIVISION 7 OF THE STANDARD SPECIFICATIONS.
6. SECTION 7-09.2 OF THE STANDARD SPECIFICATIONS SHALL BE SUPPLEMENTED BY THE FOLLOWING:
   - A. DUCTILE IRON PIPE SHALL CONFORM TO AWWA C 151, THICKNESS CLASS 52, AND THE EXTERIOR SHALL BE COATED WITH COAL TAR VARNISH. PIPE AND FITTINGS SHALL BE MORTAR LINED AND SHALL CONFORM TO AWWA C 104. THE THICKNESS OF THE LINING SHALL BE NOT LESS THAN 1/16" THICK FOR 3" TO 12"PIPE, 3/32" THICK FOR 14" TO 24" PIPE, AND 1/8" THICK FOR 30" INCH TO 54" PIPE. THE CEMENT LINING SHALL CONFORM TO THE REQUIREMENTS OF ASTM C 150.
   - B. JOINTS SHALL BE TYTON PUSH-ON JOINTS, OR APPROVED EQUAL, OR MECHANICAL JOINT TYPE PER AWWA C 111 EXCEPT WHERE FLANGED JOINTS ARE REQUIRED TO CONNECT TO VALVES OR OTHER EQUIPMENT.
   - C. BOLTS AND NUTS FOR BURIED FLANGES LOCATED OUTDOORS ABOVE GROUND OR IN OPEN VAULTS IN STRUCTURES SHALL BE TYPE 316 STAINLESS STEEL CONFORMING TO ASTM A 193, GRADE B8M FOR BOLTS, AND ASTM A 194, GRADE 8M FOR NUTS. BOLTS AND NUTS LARGER THAN ONE AND ONE-QUARTER (1-1/4) INCHES SHALL BE STEEL, ASTM A 307, GRADE B, WITH CADMIUM PLATING, ASTM A 165, TYPE NS.
   - D. BOLTS USED IN FLANGE INSULATION SETS SHALL CONFORM TO ASTM B 193, GRADE B7. NUTS SHALL COMPLY WITH ASTM A 194, GRADE 2H.
   - E. PROVIDE A WASHER FOR EACH NUT. WASHERS SHALL BE OF THE SAME MATERIAL AS THE NUTS.
   - F. ALL FITTINGS SHALL CONFORM TO THE REQUIREMENTS OF AWWA C 110 AND AWWA C 111.
7. SECTION 7-12.2 OF THE STANDARD SPECIFICATIONS SHALL BE SUPPLEMENTED BY THE FOLLOWING:
   - A. RESILIENT SEATED WEDGE GATE VALVES SHALL BE USED FOR TWELVE (12) INCH MAINS AND SMALLER. BUTTERFLY VALVES SHALL BE USED FOR MAINS GREATER THAN TWELVE (12) INCHES.
     1) RESILIENT SEATED WEDGE GATE VALVE: GATE VALVES SHALL CONFORM TO THE LATEST AWWA SPECIFICATIONS FOR COLD WATER, DOUBLE-DISK GATE VALVES, 200 PSI WORKING PRESSURE. THEY SHALL BE IRON-BODIED, BRONZE MOUNTED, NON-RISING STEM, WITH TWO (2) INCH SQUARE NUT. COUNTER-CLOCKWISE OPENING, MECHANICAL JOINT AND / OR FLANGED ENDS (6" VALVES ON FIRE HYDRANT LINES WHICH SHALL BE MECHANICAL JOINTS BY FLANGED). VALVE STEMS SHALL BE PROVIDED WITH O-RING SEALS AND SHALL BE AS MANUFACTURED BY THE MUELLER COMPANY OR APPROVED EQUAL.
     2) BUTTERFLY VALVES: BUTTERFLY VALVES CONFORMING WITH AWWA C 504, CLASS 150 AND SHALL HAVE STANDARD AWWA TWO (2) INCH SQUARE NUT.

FILE: 301VALVES
JOB: 216-1669-025 (01/03)
DATE: 08-25-09

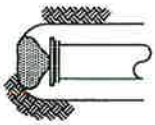
CITY OF McCLEARY
WATER VALVES AND MAINS
STANDARD DETAIL 301



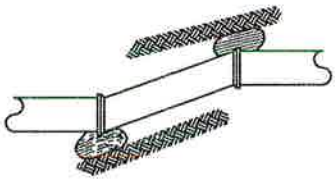
90° BEND



45° BEND

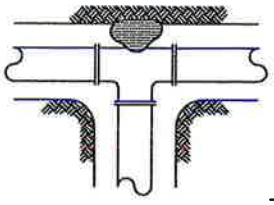


DEAD END

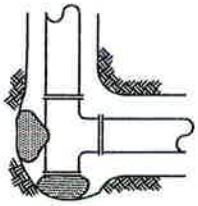


OFFSET

THRU LINE CONNECTION, TEE

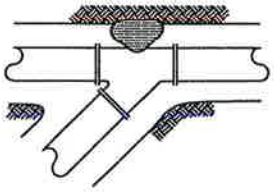


DIRECTION CHANGE, TEE USED AS ELBOW

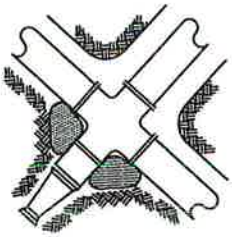


TEE

THRU LINE CONNECTION, TEE

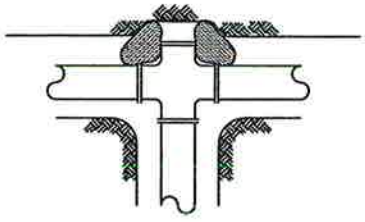


WYE



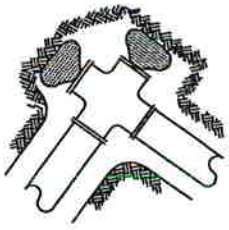
UNBALANCED CROSS

THRU LINE CONNECTION, CROSS USED AS TEE



PLUGGED CROSS

DIRECTION CHANGE, CROSS USED AS ELBOW

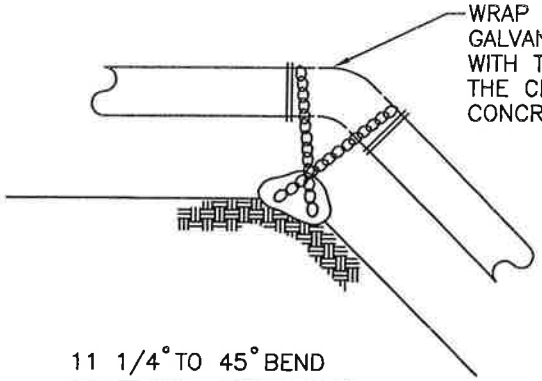


NOTES:

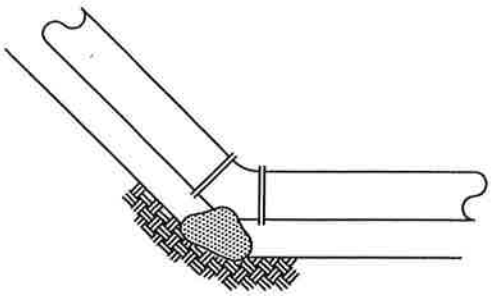
1. THE FOLLOWING PRECAUTIONS MUST BE OBSERVED WHEN CONSTRUCTING THRUST BLOCKS:
   A. BLOCKS MUST BE POURED AGAINST UNDISTURBED SOIL.
   B. THE PIPE JOINT AND BOLTS MUST BE ACCESSIBLE. WRAP IN PLASTIC BEFORE POURING CONCRETE BLOCKING.
   C. CONCRETE SHOULD BE CURED FOR AT LEAST 5 DAYS AND SHOULD HAVE A COMPRESSION STRENGTH OF 2,000 LBS. AT 28 DAYS.
   D. BLOCKS MUST BE POSITIONED TO COUNTERACT THE DIRECTION OF THE RESULTANT THRUST FORCE.
2. ALL PIPE SHALL BE PROPERLY BEDDED, SEE STANDARD DETAIL NO. 503 FOR BEDDING DETAILS
3. CONTRACTOR TO PROVIDE BLOCKING ADEQUATE TO WITHSTAND FULL TEST PRESSURE.
4. DIVIDE THRUST BY SAFE BEARING LOAD TO DETERMINE REQUIRED AREA (IN SQUARE FEET) OF CONCRETE TO DISTRIBUTE LOAD.
5. AREAS TO BE ADJUSTED FOR OTHER PRESSURE CONDITIONS.
6. PROVIDE TWO 1" MINIMUM DIAMETER RODS ON VALVES UP THROUGH 10" DIAMETER. VALVES LARGER THAN 10" REQUIRE SPECIAL TIE ROD DESIGN.

FILE: 302THBK
JOB: 216-1669-025 (01/03)
DATE: 08-25-09

CITY OF McCLEARY
HORIZONTAL THRUST BLOCKING
STANDARD DETAIL 302.1



11 1/4° TO 45° BEND



11 1/4° TO 45° BEND

TABLE 1: BEARING VALVE OF SOIL

SOIL TYPE	LBS./S.F.
ALLUVIAL SOIL	1000
SOFT CLAY	2000
FIRM CLAY	4000
WET SAND	4000
SAND AND CLAY MIXED	4000
FINE DRY SAND	6000
HARD CLAY	8000
COARSE DRY SAND	8000
GRAVEL	12000
GRAVEL AND SAND, WELL CEMENTED	16000
HARDPAN OR HARD SHALE	20000
MEDIUM ROCK	40000
ROCK UNDER CAISSONS	50000
HARD ROCK	160,000

PIPE DIA	TEST PRESSURE PSI	BEND ANGLE	CONCRETE VOLUME $F+^3$	CUBE SIZE F +	CHAIN SIZE	CHAIN EMBEDMENT
4"	200	11.25°	6	1.8	3/8"	17"
		22.5°	12	2.3		
		45°	22	2.8		
6"	200	11.25°	14	2.4	3/8"	17"
		22.5°	27	3.0		
		45°	50	3.7		
8"	200	11.25°	25	2.9	3/8"	17"
		22.5°	48	3.6		
		45°	89	4.5		
10"	200	11.25°	38	3.4	3/8"	17"
		22.5°	75	4.2		
		45°	139	5.2		
12"	200	11.25°	55	3.8	3/8"	17"
		22.5°	108	4.8		
		45°	200	5.8	1/2"	24"
14"	200	11.25°	75	4.2	3/8"	17"
		22.5°	147	5.3	1/2"	20"
		45°	272	6.5	1/2"	27"
16"	200	11.25°	98	4.6	3/8"	17"
		22.5°	192	5.8	1/2"	24"
		45°	355	7.1	3/4"	30"

FILE: 302THBK
JOB: 216-1669-025 (01/03)
DATE: 08-25-09

CITY OF McCLEARY
VERTICAL THRUST BLOCKING
STANDARD DETAIL 302.2

SIZE	TEST PRESSURE PSI	THRUST AT FITTINGS IN POUNDS				
		A	B	C	D	E
		TEE AND DEAD ENDS	90° BEND	45° BEND	22.5° BEND	11.25° BEND
4"	200	3,140	4,440	2,405	1,225	615
6"	200	7,070	9,995	5,410	2,760	1,385
8"	200	12,565	17,770	9,620	4,905	2,465
10"	200	19,635	27,770	15,030	7,660	3,850
12"	200	28,275	39,985	21,640	11,030	5,545
14"	200	38,485	54,425	29,455	15,015	7,545
16"	200	50,265	71,085	38,470	19,615	9,855

SOIL TYPE	SAFE BEARING LOAD PSF
MUCK, PEAT, ETC.	0
SOFT CLAY	1,000
SAND	2,000
SAND AND GRAVEL	3,000
SAND AND GRAVEL CEMENTED WITH CLAY	4,000
HARD SHALE	10,000

NOTES:

① TO DETERMINE THRUST AT PRESSURES OTHER THAN PSI SHOWN, MULTIPLY THE THRUST OBTAINED IN THE TABLE BY THE RATIO OF THE PRESSURE TO 200.

EXAMPLE, THE THRUST ON A 12 INCH, 90° BEND AT 125 PSI.

$$39{,}985 \times \frac{125}{200} = 24{,}991 \text{ LBS}$$

② TO DETERMINE THE VOLUME OF THE THRUST BLOCK:

EXAMPLE, (150 LB/C.F. WEIGHT OF CONCRETE)

24,991 LBS. ÷ 150 LB/C.F. = 166.60 C.F.

166.60 C.F. ÷ 27 C.Y./C.F. = 6.17 C.Y. OF CONC.

③ TO DETERMINE THE BEARING AREA OF THE THRUST BLOCK IN SQUARE FEET (S.F.) SEE TABLE 1, BEARING VALUE OF SOIL:

EXAMPLE:

24,991 LBS. ÷ 3000 LB/S.F. = 8.33 S.F. OF AREA

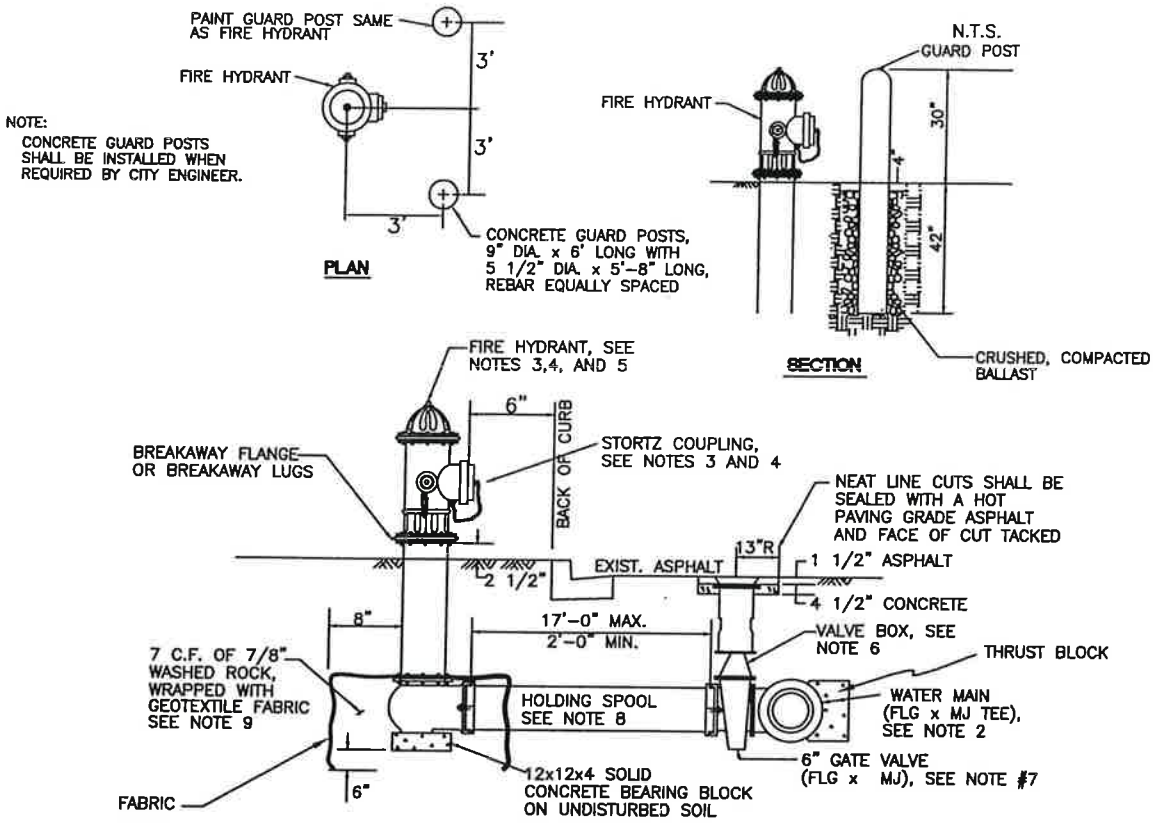
④ CONTRACTOR TO PROVIDE BLOCKING ADEQUATE TO WITHSTAND FULL TEST PRESSURE.

⑤ AREAS TO BE ADJUSTED FOR OTHER PRESSURE CONDITIONS

⑥ PROVIDE TWO 1" MINIMUM DIAMETER RODS ON VALVES UP THROUGH 10" DIAMETER. VALVES LARGER THAN 10" REQUIRE SPECIAL TIE ROD DESIGN.

FILE: 302THBK
JOB: 216-1669-025 (01/03)
DATE: 08-25-09

CITY OF McCLEARY
THURST BLOCKING TABLE
STANDARD DETAIL 302.3



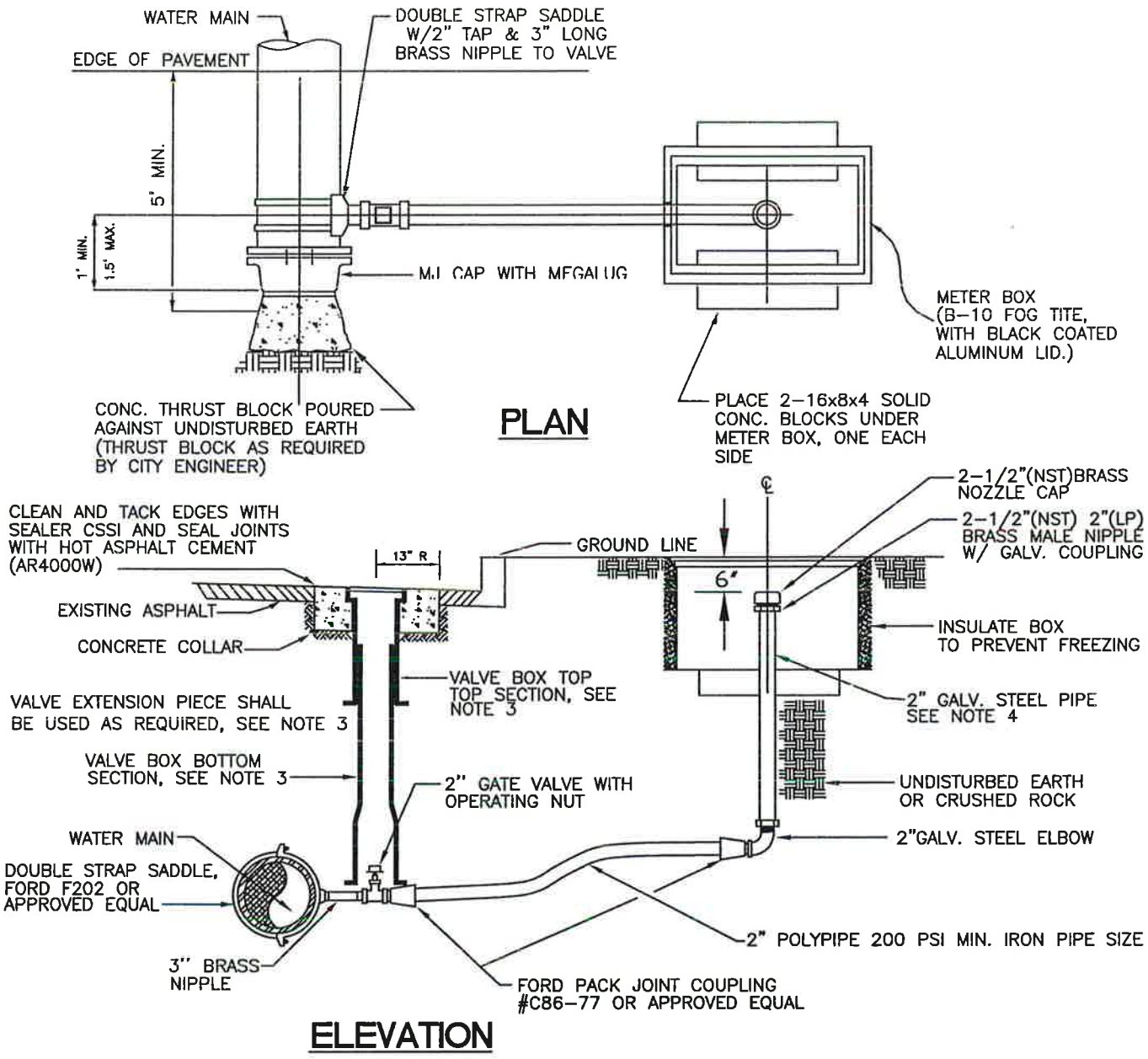
NOTES:

1. ALL MATERIALS AND FITTINGS SHALL BE AS SPECIFIED OR APPROVED EQUAL.
2. WATER MAINS SHALL HAVE A MINIMUM COVER OF 42" IN IMPROVED RIGHT-OF-WAY, AND A MINIMUM 48" IN UNIMPROVED RIGHT-OF-WAY AND EASEMENTS.
3. THE FIRE HYDRANT AND CONCRETE GUARD POSTS SHALL BE PAINTED, PARKER PAINT'S FLAT TRAFFIC YELLOW #2612 OR SAFETY YELLOW #1063 OR AN APPROVED EQUAL. THE FINAL COAT SHALL BE INTERNATIONAL YELLOW NO. 114 OR AN APPROVED EQUAL. THE STORTZ FITTING SHALL NOT BE PAINTED.
4. FIRE HYDRANTS SHALL HAVE TWO 2 1/2" HOSE PORTS (NATIONAL STANDARD THREAD) WITH CAPS AND CHAINS AND ONE 4" PUMPER PORT (TACOMA STEAMER PORT THREAD) WITH A 5" "STORTZ" COUPLING AND BLIND CAP INSTALLED ON THE STEAMER PORT, (STEAMER PORT SHALL FACE THE STREET), 1 1/4" PENTAGONAL OPERATING NUT (COUNTER-CLOCKWISE OPENING), O-RING TYPE STUFFING BOX, AUTOMATIC BARREL DRAINS AND 5 1/4" MAIN VALVE OPENING. HYDRANTS SHALL BE DESIGNED IN A MANNER THAT WILL PREVENT BARREL BREAKAGE WHEN STRUCK BY A VEHICLE. HYDRANTS SHALL CONFORM TO THE LATEST REVISION OF AWWA SPECIFICATIONS NO. C 502-73 FOR FIRE HYDRANTS FOR ORDINARY WATER SERVICE. FIRE HYDRANTS SHALL INCLUDE THE ENTIRE ASSEMBLY COMPLETE, INCLUDING HYDRANT, GATE VALVE AND BOX, CONNECTING PIPING FITTINGS AND ACCESSORIES.
5. FIRE HYDRANTS SHALL BE M & H 929, AVK, MUELLER CENTURION OR AN APPROVED EQUAL.
6. VALVE BOXES SHALL BE TWO-PIECE, ADJUSTABLE, CAST IRON WITH EXTENSION PIECES (IF NECESSARY), AS MANUFACTURED BY THE VANRICH #940 SEATTLE OR APPROVED EQUAL. THE WORD "WATER" SHALL BE CAST IN RELIEF IN THE TOP.
7. GATE VALVES SHALL CONFORM TO THE LATEST AWWA SPECIFICATIONS FOR COLD WATER, RESILIENT SEATED WEDGE GATE VALVES, 200 PSI WORKING PRESSURE. THEY SHALL BE IRON-BODIED BRONZE-MOUNTED, NON-RISING STEM, COUNTER-CLOCKWISE OPENING, MECHANICAL JOINT BY FLANGED. VALVE STEMS SHALL BE PROVIDED WITH O-RING SEALS AND SHALL BE AS MANUFACTURED BY THE MUELLER COMPANY OR APPROVED EQUAL.
8. THE HOLDING SPOOL SHALL BE A MECHANICAL-JOINT (M.J.) HOLDING SPOOL, WITH THE USE OF CLASS 53 DUCTILE IRON PIPE OR THE USE OF MEGA-LUG CONNECTORS WITH CLASS 52 DUCTILE IRON PIPE.
9. THE CONTRACTOR SHALL PLACE A 6 OZ. GEOTEXTILE FABRIC AROUND THE WASHED ROCK AREA. ENDS TO OVERLAP.
10. A FLUORESCENT ORANGE BAG MUST COVER AND BE SECURED TO THE FIRE HYDRANT UNTIL APPROVED FOR USE BY CITY ENGINEER.

FILE: 303FHA
JOB: 216-1669-025 (01/03)
DATE: 08-25-09

CITY OF McCLEARY
FIRE HYDRANT ASSEMBLY

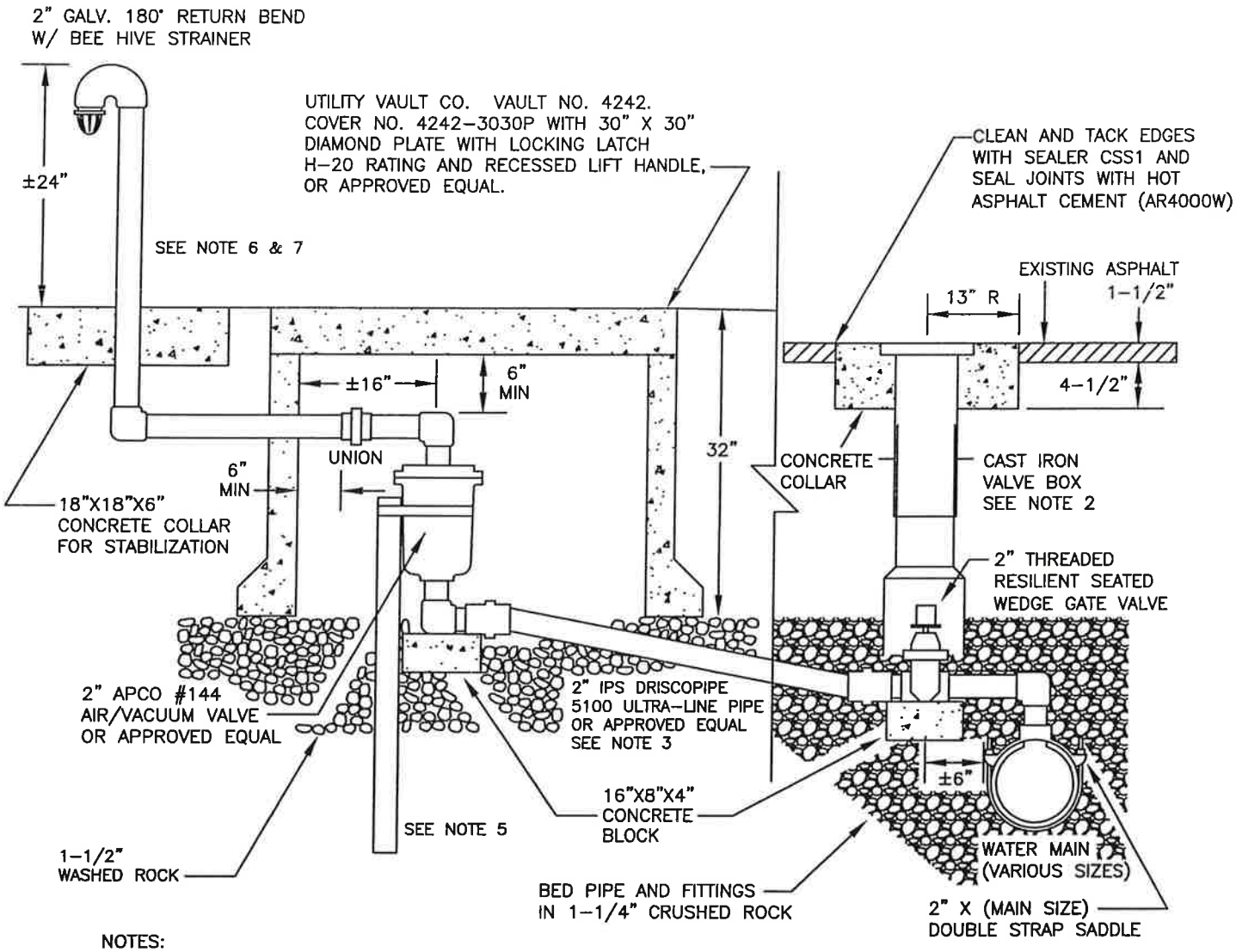
STANDARD DETAIL 303



1. THE OUTLET SHALL BE BRONZE AND BE 2-1/2" NST.
2. WATER MAINS SHALL HAVE A MINIMUM COVER OF 42" IN IMPROVED RIGHT-OF-WAY, AND A MINIMUM OF 48" IN UNIMPROVED RIGHT-OF-WAY AND EASEMENTS.
3. VALVE BOX SHALL BE TWO-PIECE, ADJUSTABLE, CAST IRON WITH EXTENSION PIECE (IF NECESSARY), AS MANUFACTURED BY THE VANRICH #940 SEATTLE OR APPROVED EQUAL. THE WORK "WATER" SHALL BE CAST IN RELIEF IN THE TOP.
4. SPECIFY OVERALL LENGTH 6" SHORTER THAN NORMAL DEPTH OF BURY. MINIMUM OPENING IN METER BOX SHOULD BE 10".

FILE: 304BLWOF
JOB: 216-1669-025 (01/03)
DATE: 08-25-09

CITY OF McCLEARY
2" BLOW OFF ASSEMBLY
STANDARD DETAIL 304



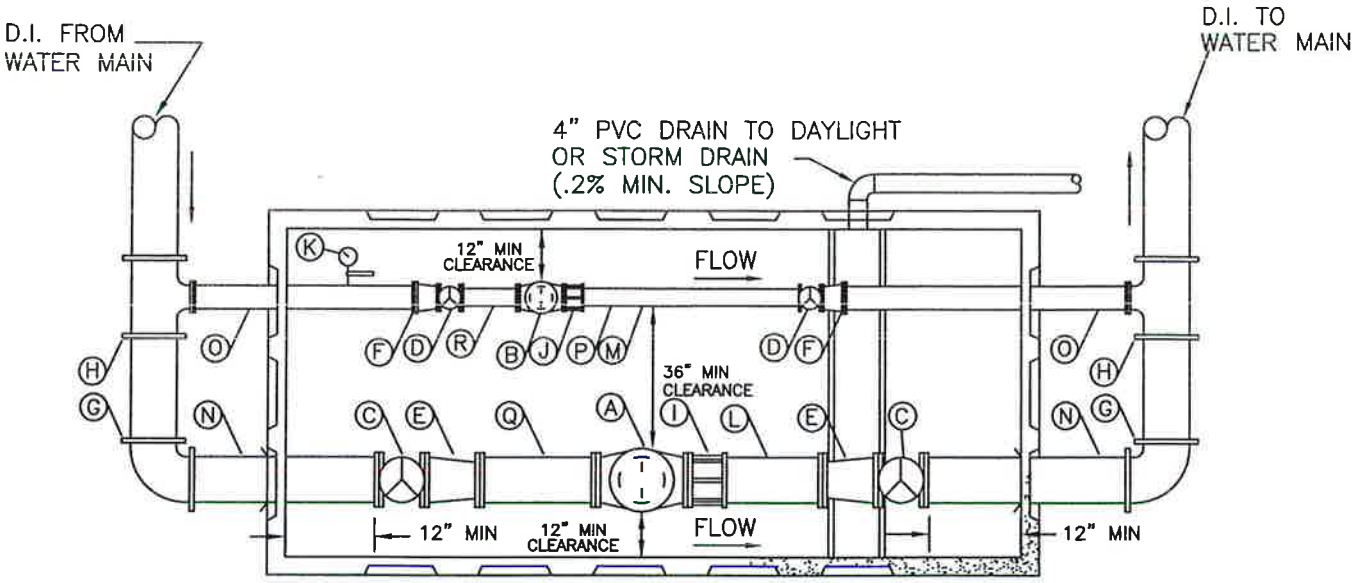
NOTES:

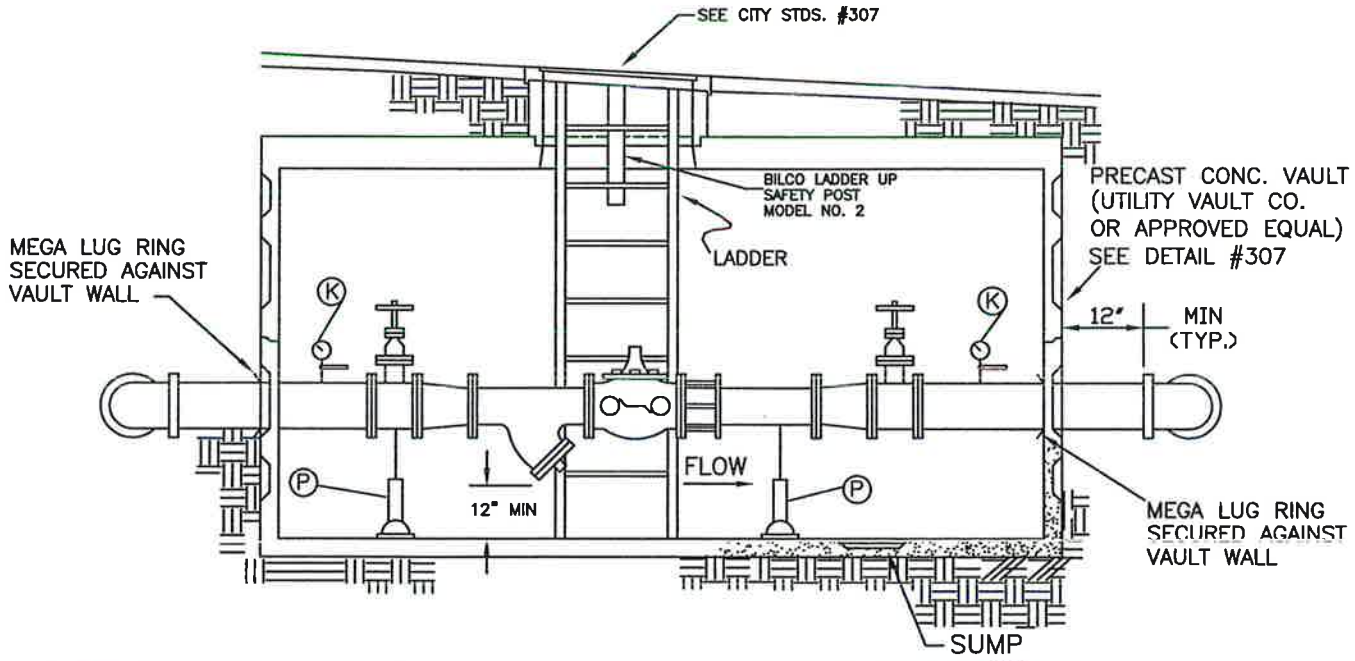
1. ALL FITTINGS FROM THE WATER MAIN TO THE BOTTOM OF THE AIR/VACUUM VALVE SHALL BE BRASS. ALL FITTINGS ABOVE THE AIR/VACUUM VALVE SHALL BE GALVANIZED STEEL. WRAP GALVANIZED PIPE BELOW GROUND WITH 3M TAPE OR EQUAL TO 6" ABOVE GROUND LEVEL.
2. VALVE BOXES SHALL BE TWO-PIECE, ADJUSTABLE, CAST IRON WITH EXTENSION PIECES (IF NECESSARY), AS MANUFACTURED BY THE VANRICH #940 SEATTLE OR APPROVED EQUAL. THE WORD "WATER" SHALL BE CAST IN RELIEF IN THE TOP.
3. 2" DRISCOPIPE (PE PIPE) SHALL HAVE A MINIMUM ONE-DEGREE RISE FROM THE WATER MAIN TO THE AIR/VACUUM VALVE.
4. AIR/VACUUM VALVE VAULT AND VENT RISER TO BE INSTALLED OUT OF THE STREET. EXACT LOCATION TO BE DETERMINED BY THE ENGINEERING DIVISION.
5. TO STABILIZE AIR/VACUUM VALVE, BURY 2" GALVANIZED PIPE ALONG SIDE VALVE. SECURE WITH STAINLESS STEEL STRAP.
6. VENT RISER AND RETURN BEND SHALL BE PAINTED, PARKER PAINT'S SAFETY YELLOW #1063 OR APPROVED EQUAL.
7. IF NEW PLAT, INCLUDE EASEMENT BEHIND SIDEWALK FOR VENT RISER.

FILE: 305AIRVL
JOB: 216-1669-025 (01/03)
DATE: 08-25-09

CITY OF McCLEARY
AIR/ VACUUM VALVE

STANDARD DETAIL 305

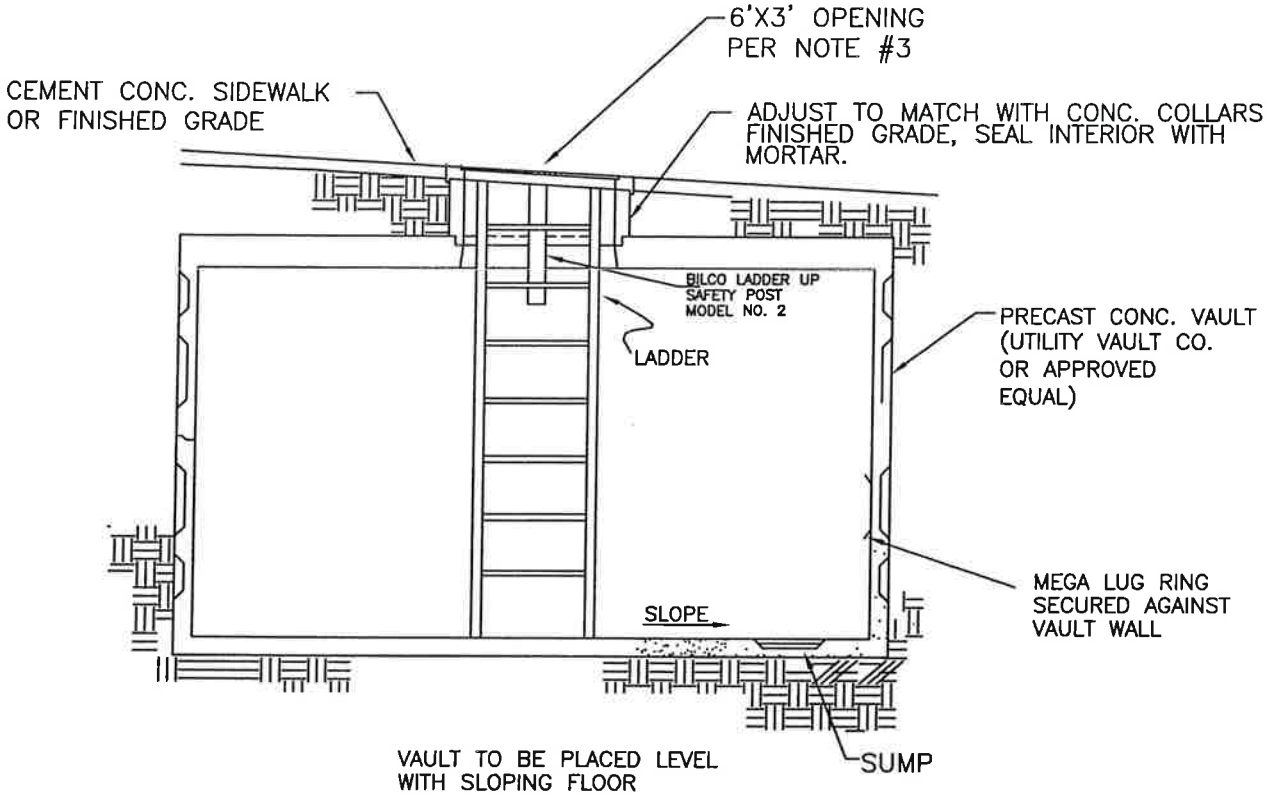




A 8" CLAYTON 906-01AB – CLASS 150 PRESSURE REDUCING VALVE
B 3" CLAYTON 906-01AS – CLASS 150 PRESSURE REDUCING VALVE
C 8" FLANGED HAND WHEEL GATE VALVE (2 REQUIRED)
D 3" FLANGED HAND WHEEL GATE VALVE (2 REQUIRED)
E MAIN LINE SIZEx8" (FLxFL) REDUCER (2 REQUIRED)
F 4"x3" (FLxFL) REDUCER (2 REQUIRED)
G MAIN LINE SIZE (MJxMJ) 90 ELL (2 REQUIRED) (MEGALUG)
H MAIN LINE SIZEx4" (MJxMJxFL) TEE (2 REQUIRED) (MEGALUG)
I 8" FLANGE COUPLING ADAPTER
J 3" FLANGE COUPLING ADAPTER
K PRESSURE GAUGE WITH SHUT-OFF VALVE PETCOCK W/DRAIN (3 REQUIRED)
L 8" (FLxPE) SPOOL (LENGTH AS REQUIRED)
M 3" (FLxPE) SPOOL (LENGTH AS REQUIRED)
N MAIN LINE SIZE (FLxPE) SPOOL (LENGTH AS REQUIRED)
O 4" (FLxFL) SPOOL (LENGTH AS REQUIRED)
P PIPE SUPPORTS (3 REQUIRED)
Q 8" FLANGED WYE STRAINER
R 3" FLANGED WYE STRAINER

FILE: 306PRSTA
JOB: 216-1669-025 (01/03)
DATE: 08-25-09

CITY OF McCLEARY
PRESSURE REDUCING STATION
STANDARD DETAIL 306



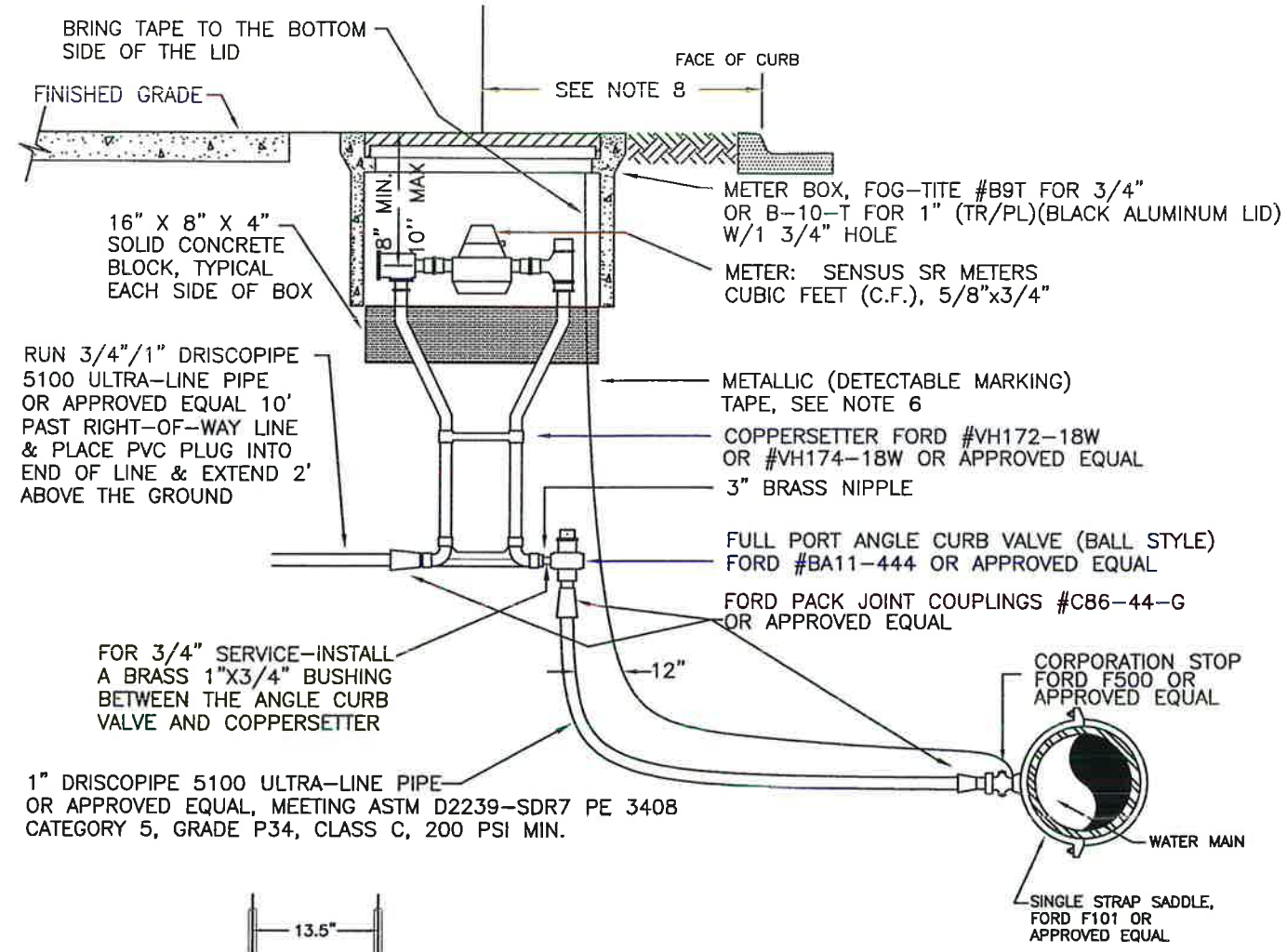
1. A 1/4 HP SUMP PUMP SHALL BE INSTALLED IN THE SUMP PIT OF THE VAULT. IT SHALL BE WIRED PER WASHINGTON STATE ELECTRICAL CODE AND INSPECTED BY AT STATE ELECTRICAL INSPECTOR. THE DISCHARGE PIPE SHALL BE CONNECTED TO THE NEAREST APPROVED ON-SITE STORM DRAINAGE STRUCTURE OR DRAIN TO DAYLIGHT.

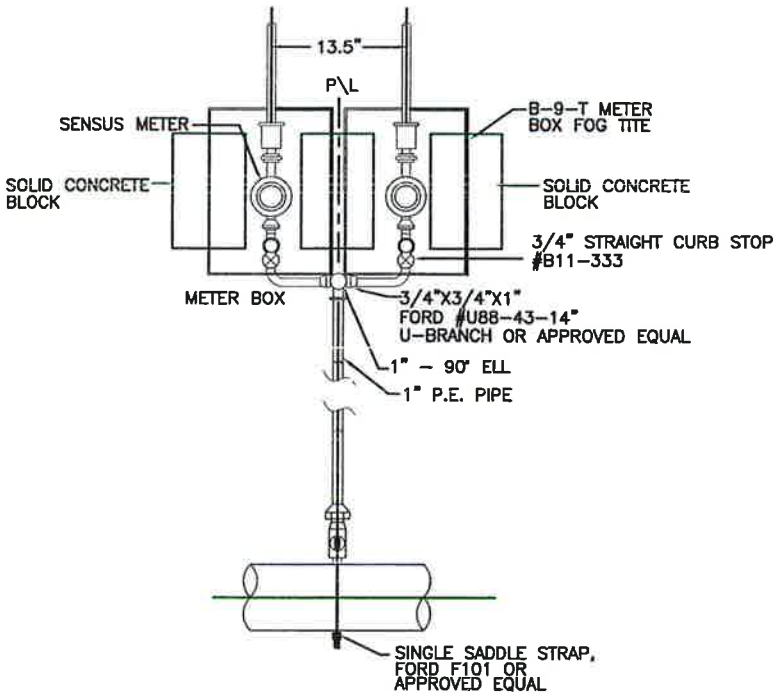
2. THE VAULT SHALL BE A PRECAST CONCRETE VAULT SIZED TO MEET THE CLEARANCE REQUIREMENTS SHOWN ON DETAIL #310

3. REMOVABLE DOORS SHALL BE A MINIMUM OF 6'-0" X 3'-0" DIAMOND PLATE HINGED LOCKING DOORS, WITH HINGES LOCATED AT EACH END OF OPENING. DOORS SHALL HAVE AN H-20 LOAD RATING IN AREAS THAT ARE SUBJECT TO VEHICLE TRAFFIC. DOORS SHALL BE SPRING ASSISTED WITH HOLD OPEN POSITION LOCK.

4. A GALVANIZED LADDER SHALL BE SET INSIDE THE VAULT FOR ACCESS INTO THE VAULT. IT SHALL BE SECURED TO THE VAULT WITH 1/2 " DIA. GALVANIZED BOLTS EPOXIED TO THE VAULT LID AND FLOOR.

5. A BILCO LADDER UP SAFETY POST MODEL NO. 2 SHALL BE ATTACHED TO THE LADDER STEPS.





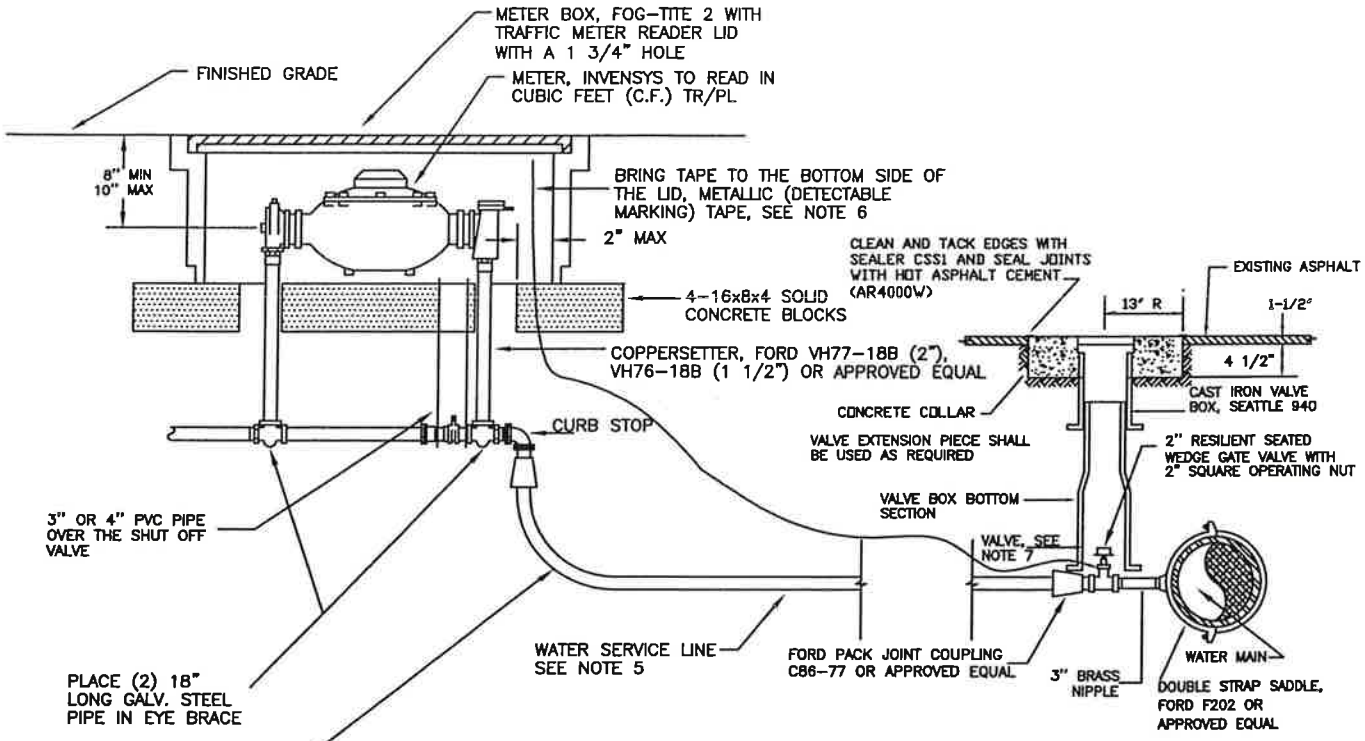
DUAL SERVICE CONNECTION

NOTES:

1. FOR SINGLE FAMILY RESIDENTIAL CONSTRUCTION, THE CITY SHALL SUPPLY AND INSTALL THE WATER METER AT THE TIME OF OCCUPANCY, FOR COMMERCIAL CONSTRUCTION THE CONTRACTOR SHALL SUPPLY AND INSTALL WATER METER.
2. ALL MATERIAL AND FITTINGS SHALL BE AS SPECIFIED OR AN APPROVED EQUAL.
3. THE WATER METER SHALL BE LOCATED IN THE PLANTING STRIP OF ADJACENT TO THE RIGHT-OF-WAY LINE AS DIRECTED BY THE CITY ENGINEER.
4. ALL COUPLINGS SHALL USE PIPE INSERT STIFFENER.
5. THE WATER SERVICE LINE SHALL HAVE 36" OF COVER BELOW FINISHED GRADE WITHIN THE RIGHT-OF-WAY.
6. METALLIC (DETECTABLE MARKING) TAPE SHALL BE COLOR CODED BLUE AND SHALL BE IMPRINTED CONTINUOUSLY OVER ITS ENTIRE LENGTH IN PERMANENT BLACK INK WITH THE MESSAGE "WATER LINE BURIED BELOW" AND THE WORD "CAUTION" PROMINENTLY SHOWN, TAPE SHALL BE A 2" MIN. WIDTH.
7. WATER MAINS SHALL HAVE A MINIMUM COVER OF 36" IN IMPROVED RIGHT-OF-WAY, AND A MINIMUM OF 48" IN UNIMPROVED RIGHT OF WAY AND EASEMENTS.
8. IF SIDEWALK IS ADJACENT TO CURB AND GUTTER THEN LOCATE METERS 12" BEHIND SIDEWALK.

FILE: 308WSC
JOB: 216-1669-025 (01/03)
DATE: 08-25-09

CITY OF McCLEARY
3/4" OR 1"
WATER SERVICE CONNECTION
STANDARD DETAIL 308



NOTES:

1. ALL MATERIALS AND FITTINGS SHALL BE AS SPECIFIED OR AN APPROVED EQUAL.
2. THE WATER METER SHALL BE LOCATED IN THE PLANTING STRIP OR ADJACENT TO THE RIGHT-OF-WAY LINE AS DIRECTED BY THE CITY ENGINEER.
3. WATER MAINS SHALL HAVE A MINIMUM COVER OF 36" IN IMPROVED RIGHT-OF-WAY, AND A MINIMUM OF 48" IN UNIMPROVED RIGHT-OF-WAY AND EASEMENTS.
4. ALL COUPLINGS SHALL USE PIPE INSERT STIFFENER.
5. THE WATER SERVICE LINE SHALL HAVE 36" OF COVER BELOW FINISHED GRADE WITHIN THE RIGHT-OF-WAY.
6. METALLIC (DETECTABLE MARKING) TAPE SHALL BE COLOR CODE BLUE AND SHALL BE IMPRINTED CONTINUOUSLY OVER ITS ENTIRE LENGTH IN PERMANENT BLACK INK THE MESSAGE "WATER LINE BURIED BELOW" AND THE WORD "CAUTION" PROMINENTLY SHOWN, TAPE SHALL BE A 2" MINIMUM WIDTH.
7. FOR A 1 1/2" WATER SERVICE A 2" GATE VALVE SHALL BE USED, AND INSERT A BRASS BUSHING TO REDUCE THE 2" OPENING DOWN TO 1 1/2".
8. VALVE BOXES SHALL BE TWO-PIECE, ADJUSTABLE, CAST IRON WITH EXTENSION PIECES IF NECESSARY, AS MANUFACTURED BY THE VANRICH # 940 SEATTLE OR APPROVED EQUAL. THE WORD "WATER" SHALL BE CAST IN RELIEF IN THE TOP.

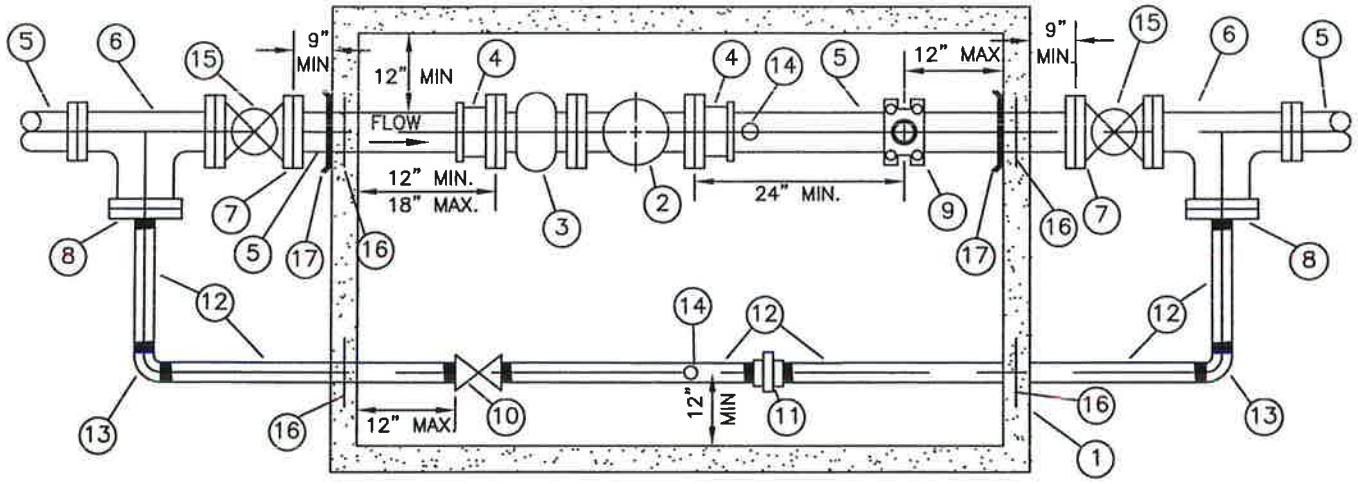
FILE: 309WSC
JOB: 216-1669-025 (01/03)
DATE: 08-25-09

CITY OF McCLEARY
1 1/2" AND 2" WATER SERVICE CONNECTION
STANDARD DETAIL 309

–GENERAL NOTES–

1. ALL PIPE, VALVES, FITTINGS AND OTHER MATERIAL USED SHALL CONFORM TO AWWA STANDARDS (LATEST EDITION).

2. ALL CONSTRUCTION SHALL CONFORM TO WSDOT/APWA STANDARDS SPECIFICATIONS, 1991 EDITION, AND CITY OF PUYALLUP STANDARDS.



1. VAULT, UTILITY VAULT OR APPROVED EQUAL, SIZED TO MAINTAIN CLEARANCES. SEE DETAIL #307
2. *INVENSYS FLANGED TURBO–METER, MODEL W–1000 DR OR INVENSYS COMPOUND SRH METER (CITY'S CHOICE) – READS IN CUBIC FEET TR/PL.
3. *INVENSYS FLANGED STRAINER.
4. FLANGED COUPLING ADAPTER.
5. *DUCTILE IRON PIPE–CLASS 52.
6. *X*X* TEE (MJxFLGxFLG).
7. *GATE VALVE (FLGxMJ).
8. *BLIND FLANGED W/2" THREADED OUTLET.
9. *x2" DOUBLE STRAP D.I. SADDLE W/2" THRD. PLUG.
10. 2" MUELLER 300 LOCKING BALL CURB VALVE B20200.20 OR EQUAL.
11. 2" GALV. UNION
12. 2" THRD. GALV. PIPE–CUT TO LENGTH REQUIRED.
13. 2" THRD. GALV. ELL.
14. 2" ADJUSTABLE PIPE SUPPORT–GALVANIZED.
15. VALVE BOX W/WATER MARKED ON LID.
16. MASTIC AND MORTAR SEAL
17. MEGA LUG

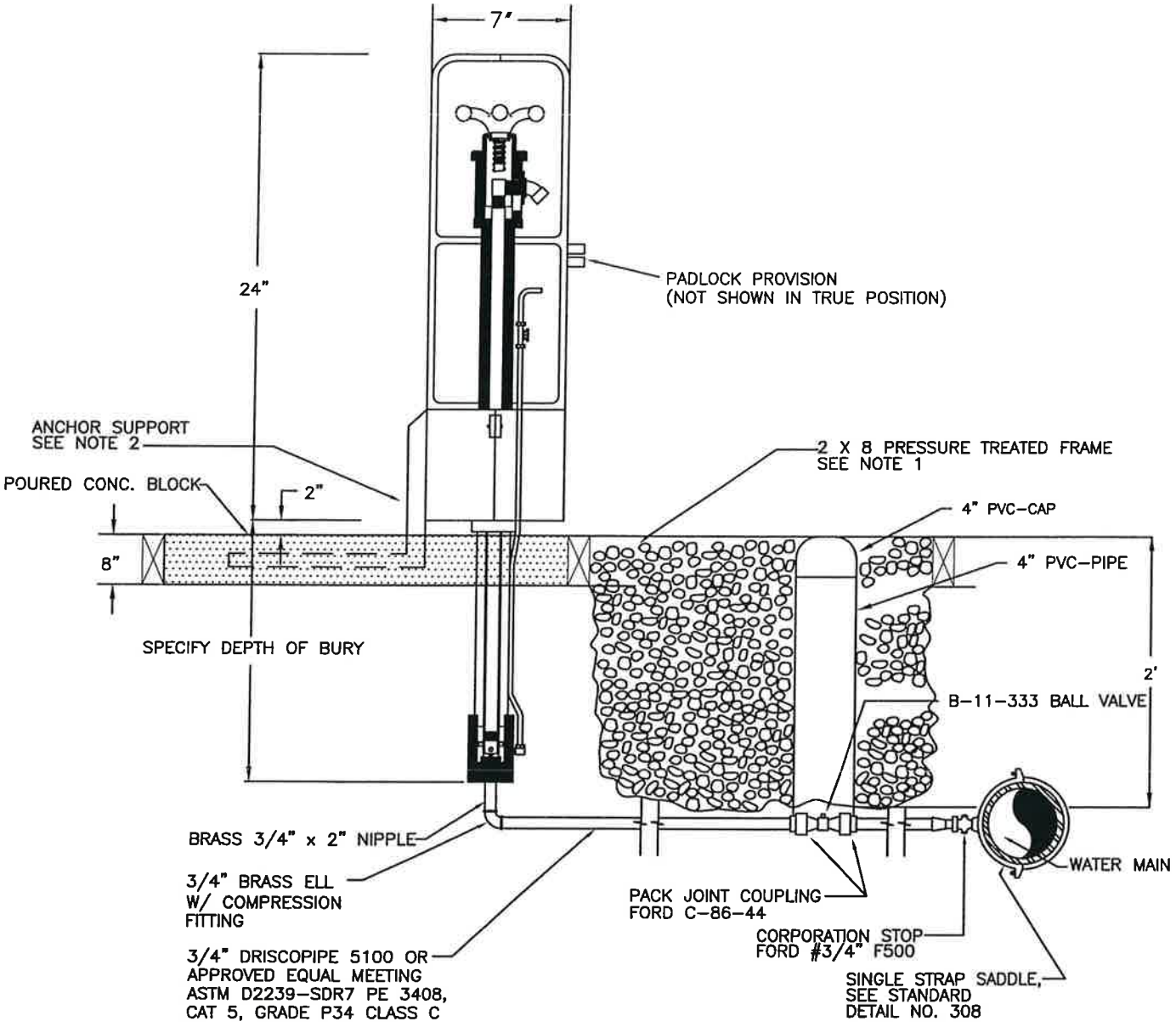
* = 3",4",OR 6" DEPENDING ON SERVICE LINE SIZE

NOTE: APPROVED EQUAL SUBSTITUTIONS MAY BE MADE FOR MOST MATERIALS, EXCEPT THE METER AND THE PIPE.

FILE: 310METER
JOB: 216–1669–025 (01/03)
DATE: 08–25–09

CITY OF McCLEARY
3"-4"-6" WATER METER

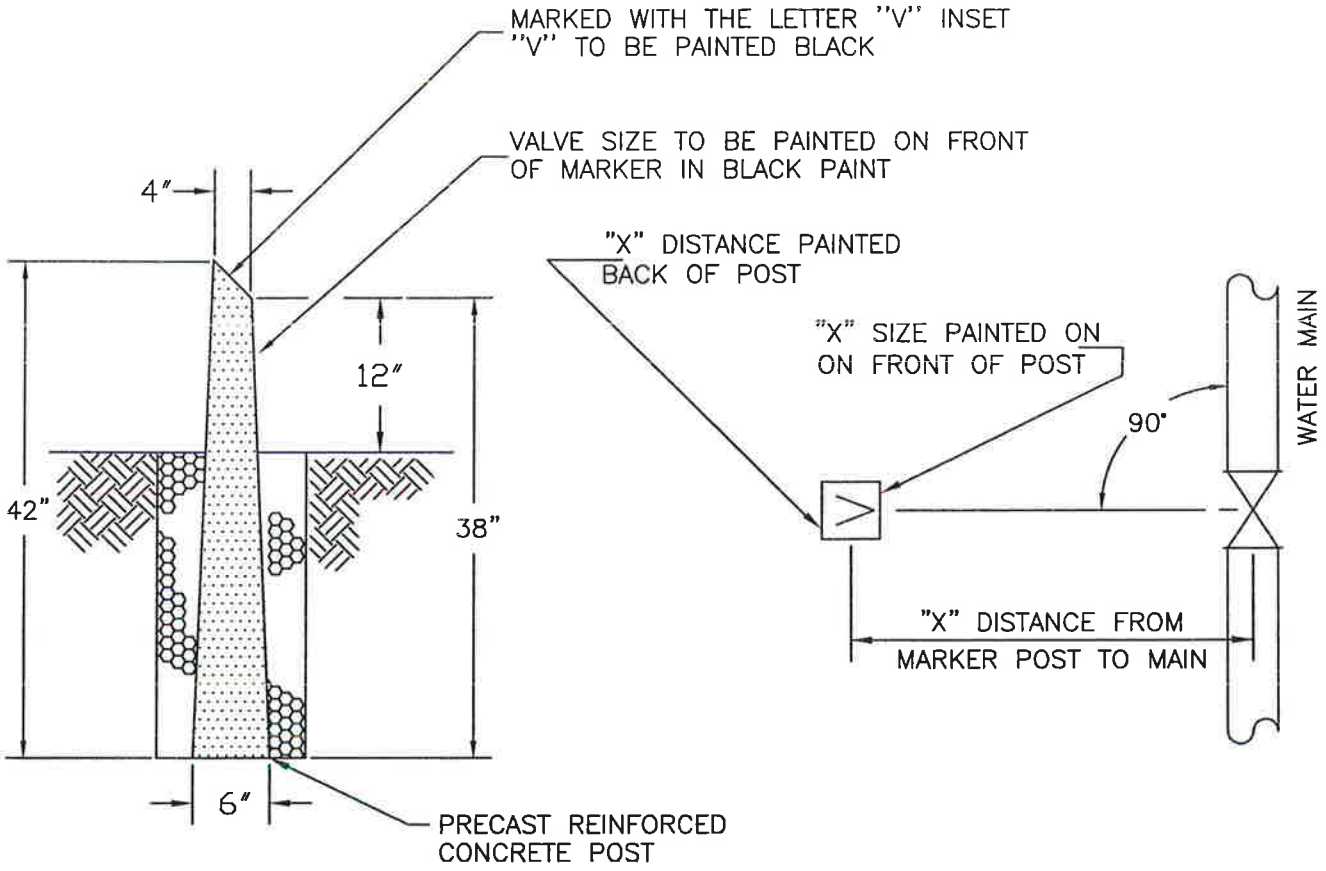
STANDARD DETAIL 310



NOTE:
1. INSTALL A 2' X 4' FRAME MADE OF 2" X 8" PRESSURE TREATED LUMBER, PARTITIONED IN HALF ONE SIDE FILLED WITH CONCRETE AND ONE SIDE EXCAVATED TO A TWO FOOT DEPTH AND FILLED WITH 1/2" TO 3/4" WASHED ROCK
2. INSTALL 3" X 1 1/2" 5 LBS PER FOOT STRUCTURAL CHANNEL CUT AND WELDED TO FORM A 12" X 12" "L" BRACKET ANCHOR SUPPORT. BOLT TO ECLIPSE NO.88 SAMPLE STATION, AND CAST IN POURED CONCRETE BLOCK
3. SPECIFIC PROJECTS MAY REQUIRE SAMPLING STATION TO BE PLACE PARALLEL TO THE WATER MAIN. PLACEMENT OF SAMPLING STATION WILL BE DETERMINED BY THE CITY ENGINEER.

FILE: 311SAMPL
JOB: 216-1669-025 (01/03)
DATE: 08-25-09

CITY OF McCLEARY
SAMPLING
STATION
STANDARD DETAIL 311

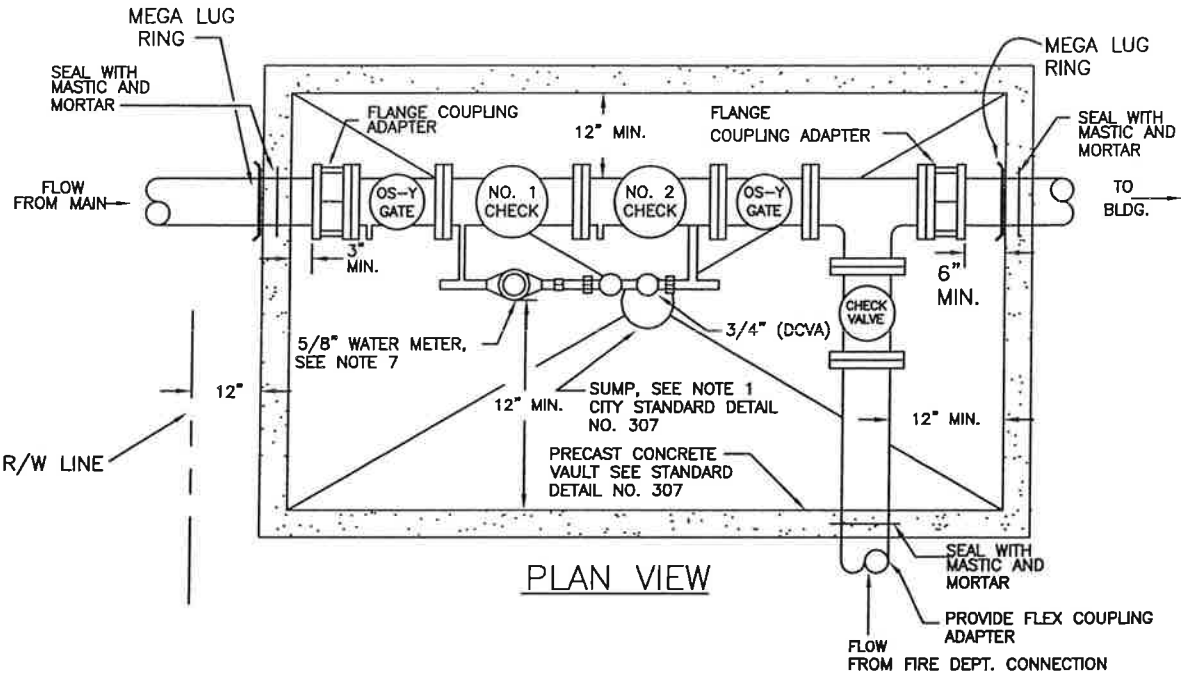


NOTES:

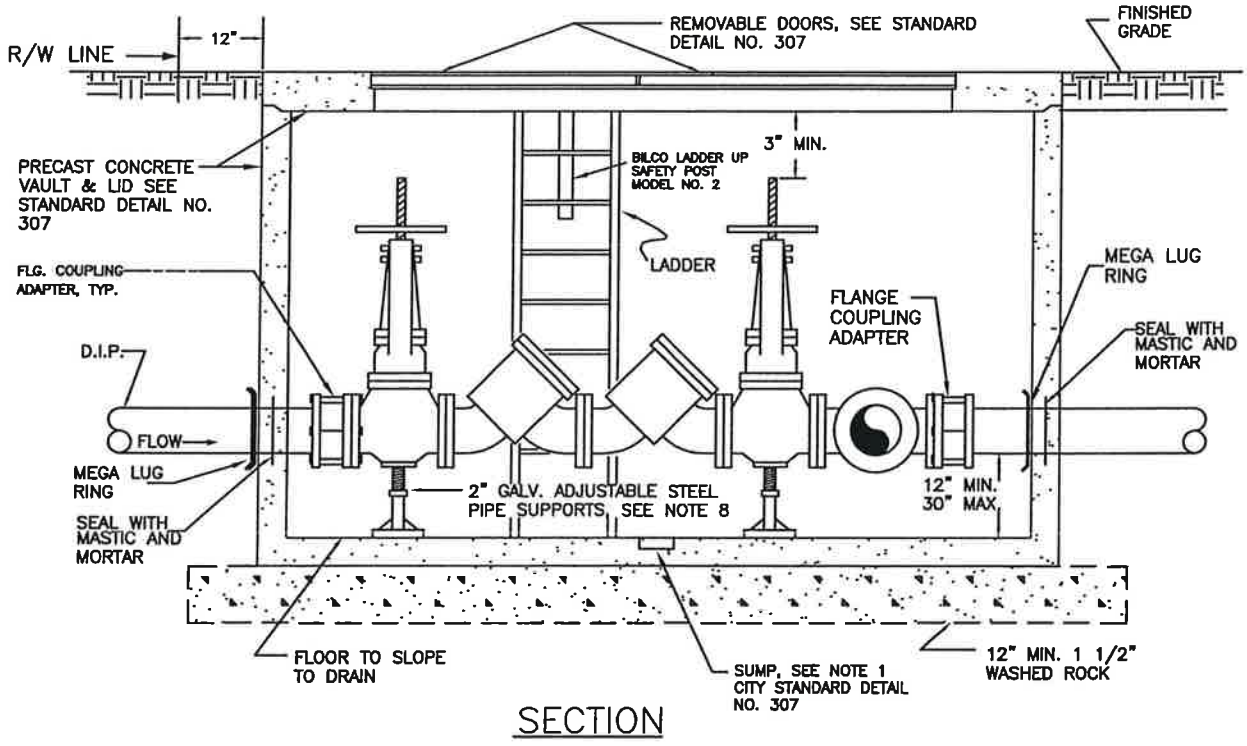
1. PRECAST REINFORCED POST TO BE PAINTED FLAT TRAFFIC YELLOW # 2612 OR SAFETY YELLOW # 1063 BY PARKER PAINT OR APPROVED EQUAL PER THE CITY ENGINEER.
2. THE DISTANCE FROM THE MARKER POST TO THE WATER MAIN SHALL BE PAINTED ON THE BACKSIDE OF THE MARKER POST, THE SIZE OF GATE VALVE SHALL BE PAINTED ON THE FRONTSIDE OF THE MARKER POST, BOTH DONE IN BLACK WITH A 2" HIGH NUMBER.
3. VALVE MARKER POST SHALL BE REQUIRED WHEN EVER THE WATER VALVE IS LOCATED IN AN UNPAVED AREA.
4. THE POST WILL ALSO BE REQUIRED FOR BLOW-OFF ASSEMBLIES IN THE SAME CONDITION AS WATER VALVES.
5. LOCATION OF VALVE MARKER POSTS SHALL BE OFFSET AT RIGHT ANGLES TO EACH LINE VALVE.

FILE: 312VLMKR
JOB: 216-1669-025 (01/03)
DATE: 08-25-09

CITY OF McCLEARY
VALVE MARKER
POST
STANDARD DETAIL 312



PLAN VIEW



SECTION

FILE: 313DDCVA
JOB: 216-1669-025 (01/03)
DATE: 08-25-09

CITY OF McCLEARY
DOUBLE DETECTOR- CHECK VALVE ASSEMBLY INSTALLATION
STANDARD DETAIL 313.1

NOTES FOR: DOUBLE DETECTOR CHECK VALVE ASSEMBLY (DDCVA) INSTALLATION

1. INSTALLATION OF THE APPROVED BACKFLOW ASSEMBLY SHALL BE IN ACCORDANCE WITH THE "ACCEPTED PROCEDURE AND PRACTICE IN CROSS-CONNECTION CONTROL" MANUAL, OF THE CROSS-CONNECTION CONTROL COMMITTEE, PACIFIC N.W. SECTION OF THE A.W.W.A., MAY 1990, 5TH EDITION MANUAL OR CURRENT ADDITION.

2. BACKFLOW ASSEMBLY MUST BE SELECTED FROM WASHINGTON STATE DEPARTMENT OF HEALTH LIST OF BACKFLOW PREVENTION ASSEMBLIES APPROVED FOR INSTALLATION IN WASHINGTON STATE, LATEST EDITION.

3. UPON INSTALLATION OF THE APPROVED BACKFLOW ASSEMBLY, (AND ANNUALLY THEREAFTER), THE ASSEMBLY SHALL BE TESTED BY A WASHINGTON STATE CERTIFIED BACKFLOW ASSEMBLY TESTER, WHO SHALL PROMPTLY FORWARD THE TEST RESULTS TO: THE CITY OF MCCLEARY, WATER QUALITY OPERATIONS, 100 S. 3RD ST. MCCLEARY, WA. 98557, PRIOR TO OCCUPANCY.

4. DOUBLE DETECTOR CHECK VALVE ASSEMBLY OS & Y GATE VALVES SHALL HAVE SUPERVISED TAMPER SWITCHES.

5. ALL ELECTRICAL COMPONENTS SHALL BE INSPECTED BY BY A WASHINGTON STATE ELECTRICAL INSPECTOR.

6. DDCVA MUST BE PURCHASED AS A UNIT. NO MODIFICATIONS TO ASSEMBLY ARE ALLOWED.

7. WATER METER SHALL BE A INVENSYS SR-2/CF OR AN APPROVED EQUAL, READING IN CUBIC FEET.

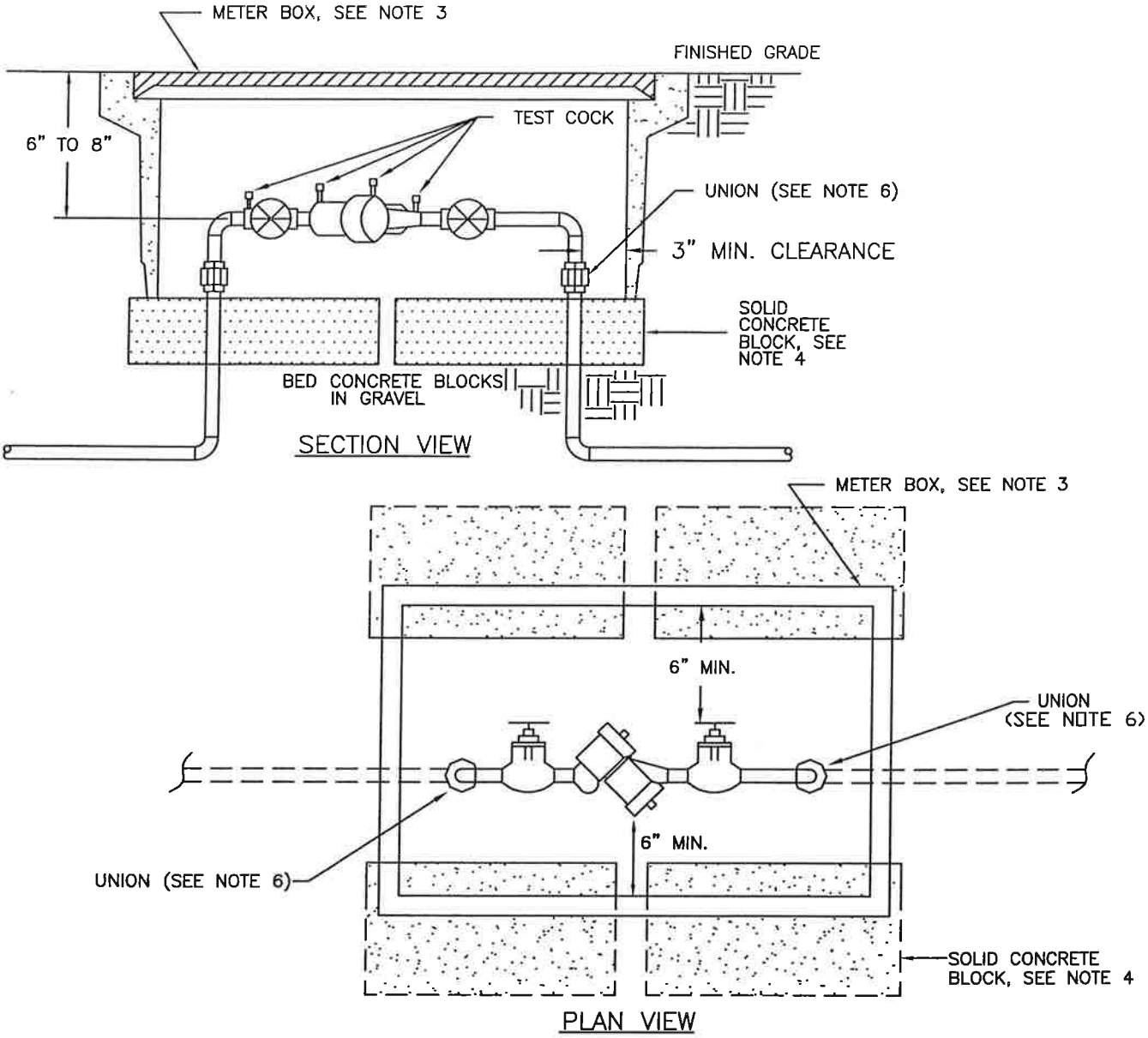
8. PIPE SUPPORTS SHALL BE RUST-PROTECTED WITH ALUMINUM PAINT.

9. THE FIRE DEPARTMENT CONNECTION SHALL BE LOCATED WITHIN 15 FEET OF A FIRE HYDRANT BUT NOT LESS THAN 10 FEET.

10. WHEN DDCVA IS LOCATED WITHIN A BUILDING, THE BALL DRIP SHALL DRAIN TO THE NEAREST APPROVED CATCH BASIN.

FILE: 3130DCVA
JOB: 216-1669-025 (01/03)
DATE: 08-25-09

CITY OF McCLEARY
DOUBLE DETECTOR- CHECK VALVE ASSEMBLY INSTALLATION
STANDARD DETAIL 313.2

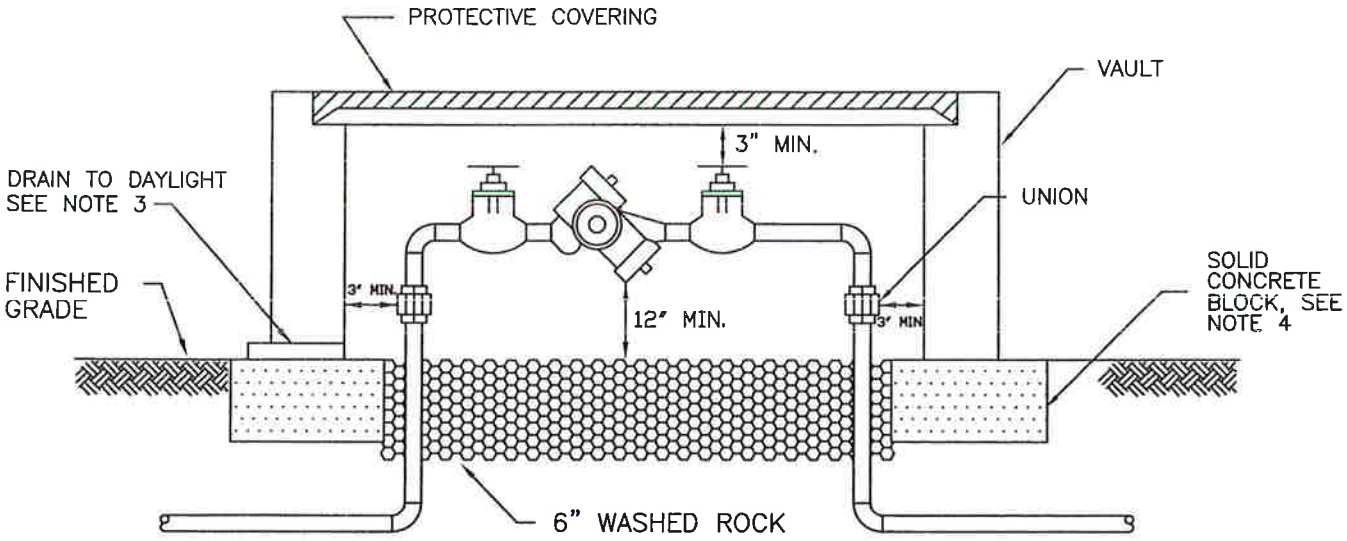


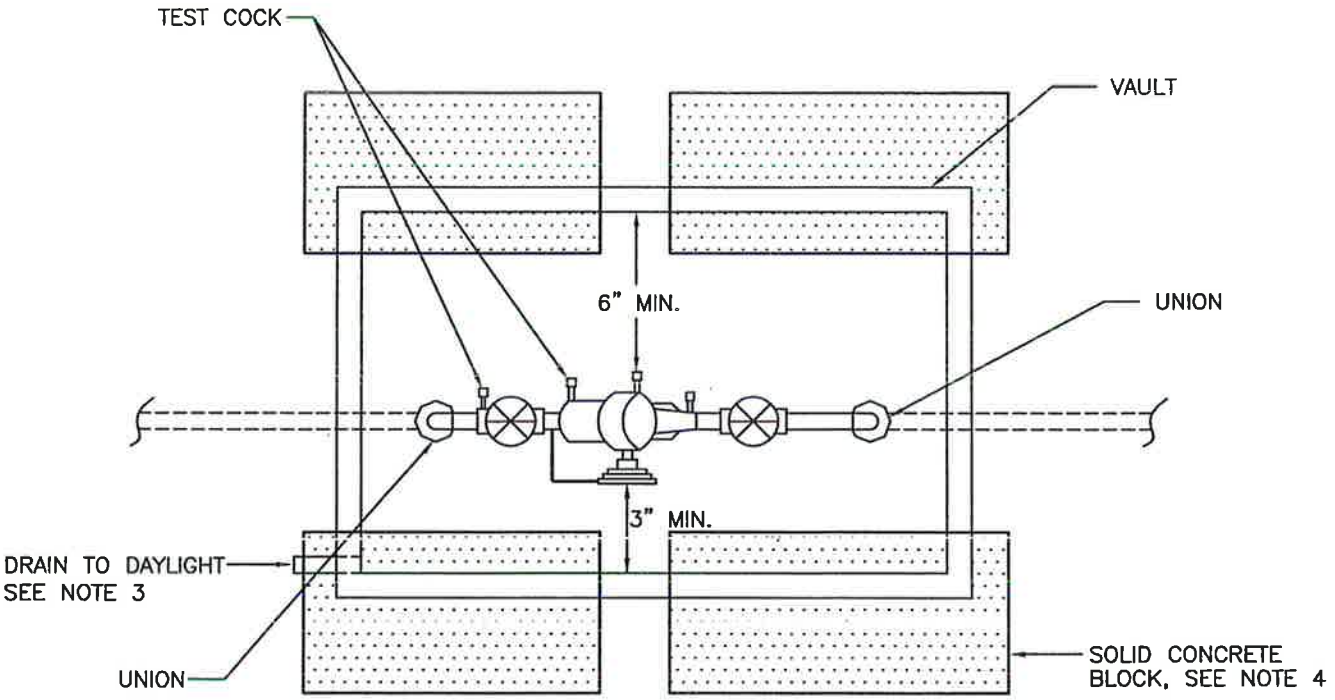
NOTES: 2" AND SMALLER DCVA INSTALLATION

1. DCVA IS TO BE PLACED IMMEDIATELY DOWNSTREAM OF WATER METER. WHEN IRRIGATION SYSTEM IS CONNECTED OFF DOMESTIC WATER LINE DCVA IS TO BE PLACED IMMEDIATELY DOWNSTREAM OF THE BRANCH CONNECTION.
2. DCVA IS TO BE PROTECTED FROM FREEZING.
3. METER BOX SHALL BE LARGE ENOUGH TO ALLOW THE MINIMUM SET BACKS ILLUSTRATED ABOVE. METER BOX LID SHALL BE A TRAFFIC METER READER LID. H-20 LOADING.
4. METER BOX SHALL BE SUPPORTED BY FOUR 16"x8"x4" SOLID CONCRETE BLOCKS
5. DCVA SHALL BE TESTED, UPON INSTALLATION, BY A WASHINGTON STATE CERTIFIED BACKFLOW ASSEMBLY TESTER, AND ANNUALLY THEREAFTER THE REPORT FORM SHALL BE RECEIVED BY THE WATER OPERATIONS INSPECTOR PRIOR TO OCCUPANCY. SEND TEST REPORT FORMS TO CITY OF MCCLEARY, WATER QUALITY OPERATIONS, 100 S. 3RD ST. MCCLEARY WA, 98557.
6. DIELECTRIC UNIONS MUST BE USED TO SEPARATE DISSIMILAR MATERIALS.

FILE: 3140CVA2
JOB: 216-1669-025 (01/03)
DATE: 08-25-09

CITY OF McCLEARY
2" AND SMALLER DOUBLE CHECK VALVE ASSEMBLY INSTALLATION
STANDARD DETAIL 314





FILE: 315RPBA2
JOB: 216-1669-025 (01/03)
DATE: 08-25-09

CITY OF McCLEARY
2" AND SMALLER REDUCED PRESSURE BACKFLOW ASSEMBLY INSTALLATION
STANDARD DETAIL 315.1

1. THE RPBA SHALL BE INSTALLED WITH ADEQUATE SPACE TO FACILITATE MAINTENANCE AND TESTING. IT SHALL BE TESTED AFTER INSTALLATION, BY A WASHINGTON STATE CERTIFIED BACK-FLOW ASSEMBLY TESTER, TO INSURE ITS SATISFACTORY OPERATION BEFORE OCCUPANCY AND ANNUALLY THEREAFTER. SEND TEST RESULTS TO: CITY OF MCCLEARY, WATER QUALITY OPERATIONS, 100 S. 3RD ST. MCCLEARY, WA 98557.

2. AN RPBA SHALL NOT BE INSTALLED IN A PIT BELOW GROUND LEVEL. SEMI-BURIED PITS MAY BE ACCEPTABLE IF THE RPBA IS INSTALLED ABOVE GROUND OR MAXIMUM FLOOD LEVEL IN A VAULT WITH AN APPROVED AIR GAP BETWEEN THE RELIEF VALVE PORT AND A BORE-SIGHTED DAYLIGHT DRAIN.

3. THE PROTECTIVE COVERING FOR THE RPBA MUST INCLUDE A DAYLIGHT DRAIN. THE DRAIN MUST BE ABLE TO BE BORE SIGHTED. IT MUST BE INSTALLED ABOVE GROUND OR MAXIMUM FLOOD LEVEL, WHICHEVER IS HIGHER. THE DRAIN MUST ALSO BE ABLE TO HANDLE THE VOLUME OF WATER THAT POTENTIALLY COULD BE DISCHARGED FROM THE RELIEF VALVE PORT.

4. METER BOX SHALL BE SUPPORTED BY FOUR 16" X 8" X 4" SOLID CONCRETE BLOCKS.

5. RPBA MUST BE PROTECTED FROM FREEZING.

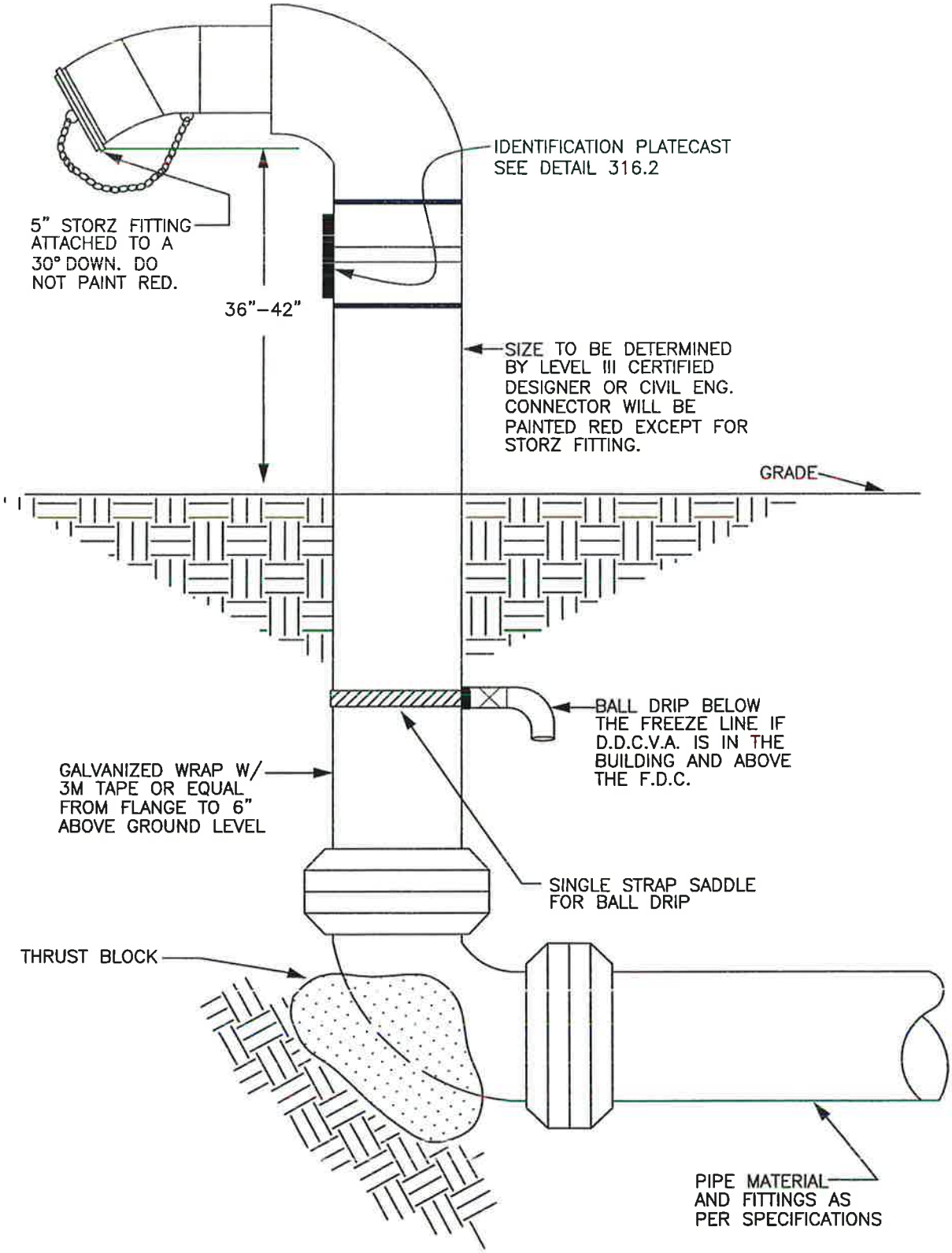
6. AN RPBA INSTALLED MORE THAN FIVE (5) FEET ABOVE FLOOR LEVEL MUST HAVE A PLATFORM UNDER IT FOR THE TESTER OR MAINTENANCE PERSON TO STAND ON. THE PLATFORM MUST BE OSHA APPROVED AND MEET ALL APPLICABLE SAFETY STANDARDS AND CODES.

7 WHEN THE RPBA IS LOCATED INSIDE A BUILDING IT SHALL BE INSTALLED IN A LOCATION WHERE BOTH THE OCCASIONAL SPITTING FROM THE RELIEF VALVE PORT AND THE POSSIBLE CONSTANT DISCHARGE DURING A FOULED CHECK VALVE SITUATION WILL NOT BE OBJECTIONABLE. AN APPROVED AIR GAP FUNNEL ASSEMBLY, EITHER PROVIDED BY THE MANUFACTURER OR FABRICATED FOR THE SPECIFIC INSTALLATION, MAY BE INSTALLED TO HANDLE THE OCCASIONAL SPITTING OF THE RELIEF VALVE DUE TO PRESSURE FLUCTUATIONS. A LINE FROM THIS FUNNEL ASSEMBLY MAY THEN BE RUN TO AN ADEQUATELY SIZED FLOOR DRAIN OF EQUAL OR GREATER SIZE. IT MUST BE EMPHASIZED THAT THE AIR GAP FUNNEL ASSEMBLY WILL HANDLE ONLY THE OCCASIONAL SPITTING AND WILL NOT CONTROL FLOW IN A CONTINUOUS RELIEF SITUATION.

8. GOOD PLUMBING PRACTICE RECOMMENDS A STRAINER WITH BLOWOUT TAPPING AHEAD OF THE RPBA.

FILE: 315RPBA2
JOB: 216-1669-025 (01/03)
DATE: 08-25-09

CITY OF McCLEARY
2" AND SMALLER REDUCED PRESSURE BACKFLOW ASSEMBLY INSTALLATION NOTES
STANDARD DETAIL 315.2



FILE: 316FIRE
JOB: 216–1669–025 (01/03)
DATE: 08–25–09

CITY OF McCLEARY
FIRE DEPARTMENT
CONNECTION
STANDARD DETAIL 316.1

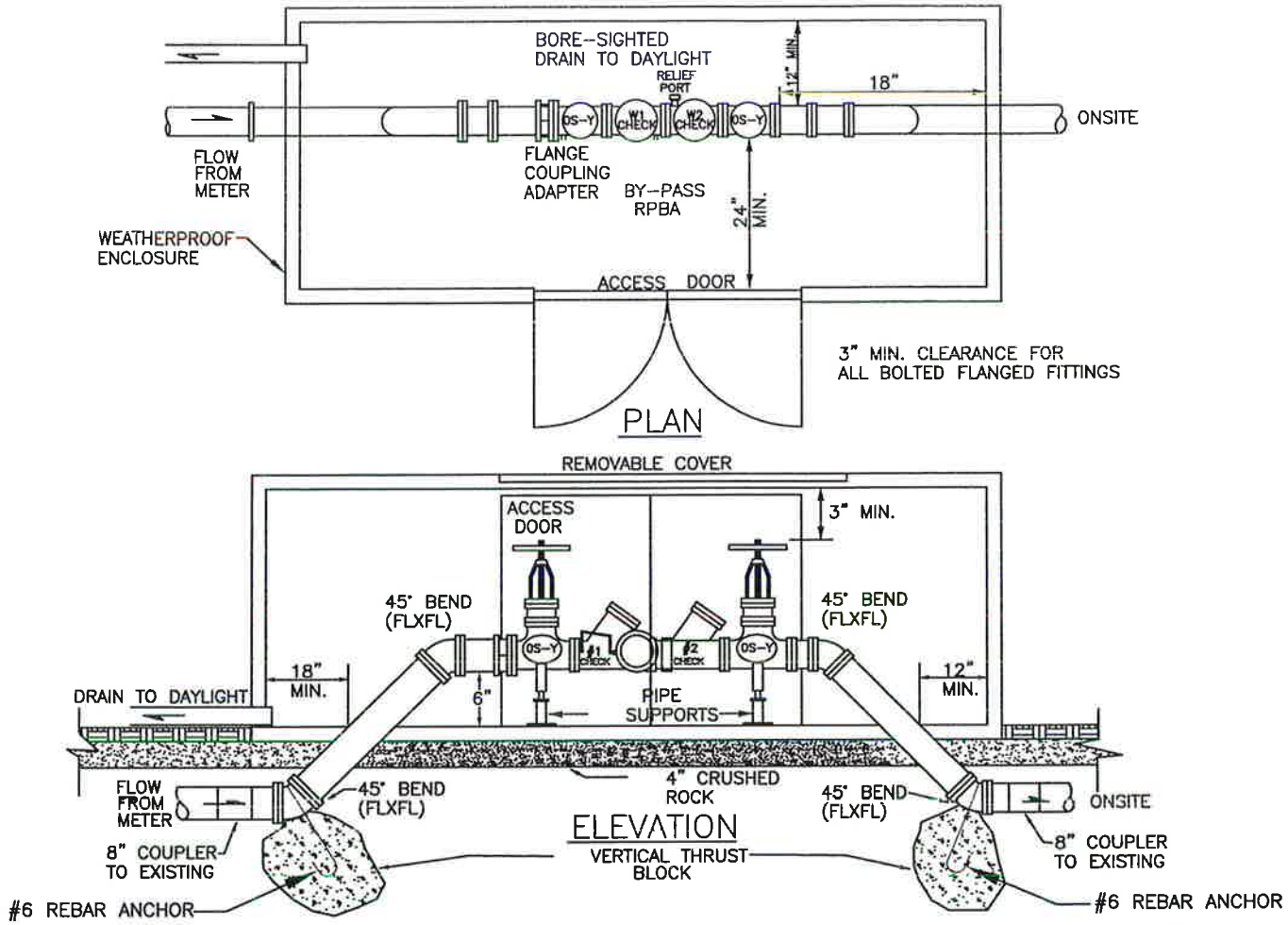
IDENTIFICATION PLATECAST

NOTE:

1. PLATECAST WILL BE BRASS
2. PLATECAST WILL BE 1/4" THICK
3. LETTERS WILL BE ONE INCH HIGH AND RAISED

FILE: 316FIRE
JOB: 216-1669-025 (01/03)
DATE: 08-25-09

CITY OF McCLEARY
FIRE DEPARTMENT
IDENTIFICATION PLATE
STANDARD DETAIL 316.2



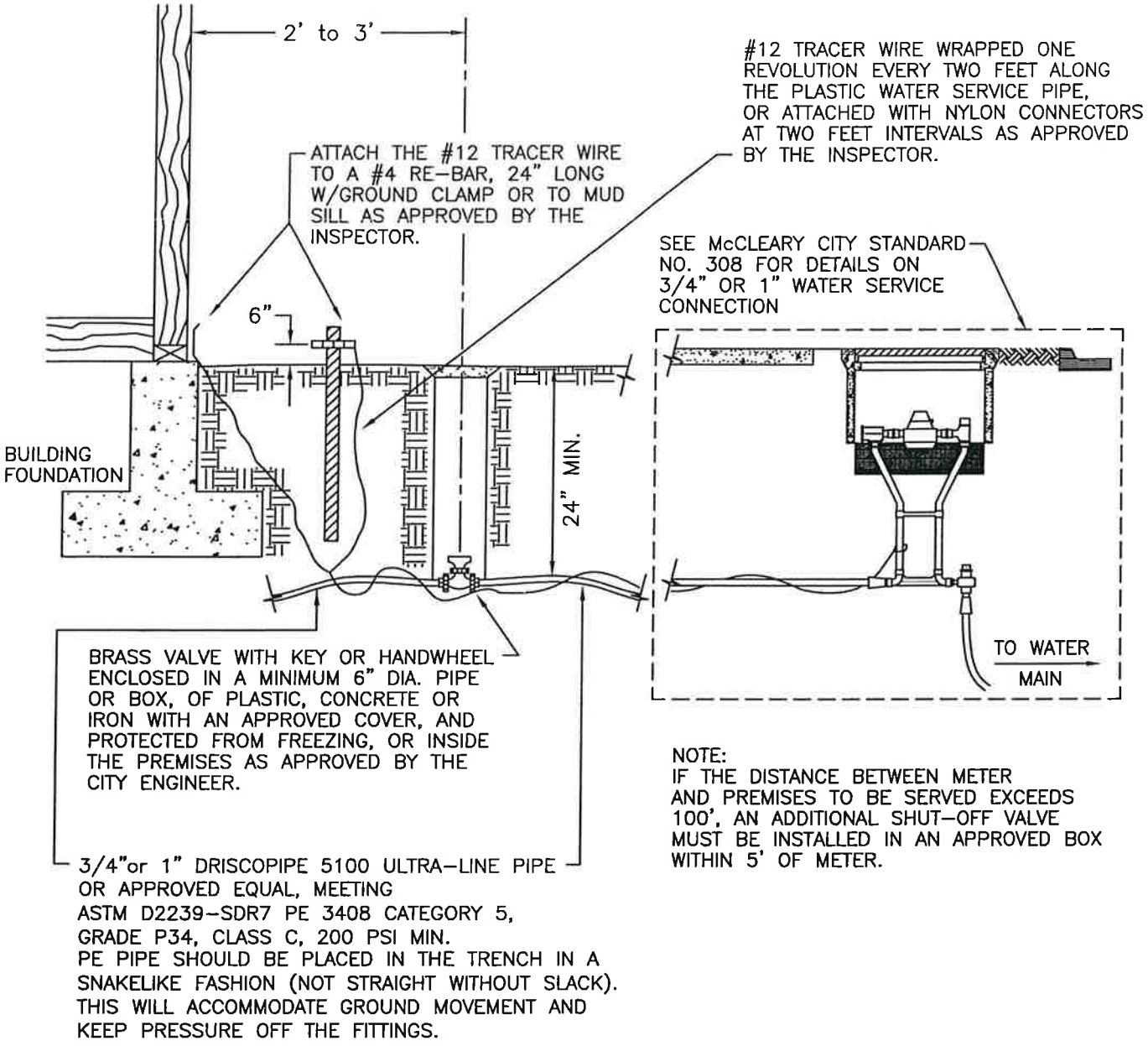
N.T.S.

NOTES:

1. INSTALLATION OF THESE APPROVED BACKFLOW ASSEMBLIES SHALL BE IN ACCORDANCE WITH THE "ACCEPTED PROCEDURE AND PRACTICE IN CROSS-CONNECTION CONTROL" MANUAL, OF THE CROSS-CONNECTION CONTROL COMMITTEE, PACIFIC N.W. SECTION OF THE A.W.W.A., MAY, 1990, FIFTH EDITION MANUAL OR CURRENT EDITION.
2. BACKFLOW ASSEMBLIES MUST BE SELECTED FROM WASHINGTON STATE DEPARTMENT OF HEALTH LIST OF BACKFLOW ASSEMBLIES APPROVED FOR INSTALLATION IN WASHINGTON STATE, MARCH 15, 1991.
3. IMMEDIATELY UPON INSTALLATION OF AN APPROVED BACKFLOW ASSEMBLY, (AND YEARLY THEREAFTER), THE ASSEMBLY SHALL BE TESTED BY A WASHINGTON STATE CERTIFIED BACKFLOW ASSEMBLY TESTER, WHO SHALL PROMPTLY FORWARD THE TEST REPORT RESULTS TO: CITY OF MCCLEARY, WATER QUALITY OPERATIONS. 100 S. 3RD ST. MCCLEARY WA. 98557. PRIOR TO OCCUPANCY.
4. OS & Y GATE VALVES SHALL HAVE SUPERVISED TAMPER SWITCHES, LOCATED AS DIRECTED BY OWNER, AND APPROVED BY P.F.D.
5. ALL ELECTRICAL SHALL BE INSPECTED BY A WASHINGTON STATE ELECTRICAL INSPECTOR.
6. RPBP MUST BE PURCHASED AND INSTALLED AS A UNIT. NO MODIFICATIONS TO ANY PART OF THE ASSEMBLY ARE ALLOWED.
7. PIPE SUPPORTS SHALL BE RUST-PROTECTED WITH ALUMINUM PAINT.
8. PROVIDE FREEZE PROTECTION AS DIRECTED BY OWNER.

FILE: 317RPBA3+
JOB: 216-1669-025 (01/03)
DATE: 08-25-09

CITY OF McCLEARY
3" AND ABOVE REDUCED PRESSURE BACKFLOW ASSEMBLY
STANDARD DETAIL 317



NOTE:

1. 200 PSI PE (DRISCOPIPE) IN UNCONTAMINATED SOILS.
   COPPER PIPE IN SOILS THAT MAY CONTAIN HYDROCARBONS (OSMOSIS).
2. PIPE TO BE BEDDED WITH MATERIAL FREE OF ROCKS.

FILE: 318PRV
JOB: 216-1669-025 (01/03)
DATE: 08-25-09

CITY OF McCLEARY
PRIVATE WATER
SERVICE LINES
STANDARD DETAIL 318

B105.1 One- and two-family dwellings.
B105.2 Buildings other than one- and two-family dwellings.
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SECTION B105 FIRE-FLOW REQUIREMENTS FOR BUILDINGS

B105.1 One- and two-family dwellings.
The minimum fire-flow and flow duration requirements for one- and two-family *dwellings* having a fire-flow calculation area that does not exceed 3,600 square feet (344.5 m^2) shall be 1,000 gallons per minute (3785.4 L/min) for 1 hour. Fire-flow and flow duration for *dwellings* having a fire-flow calculation area in excess of 3,600 square feet (344.5m^2) shall not be less than that specified in Table B105.1.

Exception: A reduction in required fire-flow of 50 percent, as *approved,* is allowed when the building is equipped with an *approved automatic sprinkler system*.

TABLE B105.1 MINIMUM REQUIRED FIRE-FLOW AND FLOW DURATION FOR BUILDINGS

FIRE-FLOW CALCULATION AREA (square feet)					FIRE-FLOW (gallons per minute)[b]	FLOW DURATION (hours)
Type IA and IB[a]	Type IIA and IIIA[a]	Type IV and V-A[a]	Type IIB and IIIB[a]	Type V-B[a]		
0-22,700	0-12,700	0-8,200	0-5,900	0-3,600	1,500	2
22,701-30,200	12,701-17,000	8,201-10,900	5,901-7,900	3,601-4,800	1,750	
30,201-38,700	17,001-21,800	10,901-12,900	7,901-9,800	4,801-6,200	2,000	
38,701-48,300	21,801-24,200	12,901-17,400	9,801-12,600	6,201-7,700	2,250	
48,301-59,000	24,201-33,200	17,401-21,300	12,601-15,400	7,701-9,400	2,500	
	33,201-39,700		15,401-18,400	9,401-11,300	2,750	

59,001-70,900		21,301-25,500				
70,901-83,700	39,701-47,100	25,501-30,100	18,401-21,800	11,301-13,400	3,000	3
83,701-97,700	47,101-54,900	30,101-35,200	21,801-25,900	13,401-15,600	3,250	
97,701-112,700	54,901-63,400	35,201-40,600	25,901-29,300	15,601-18,000	3,500	
112,701-128,700	63,401-72,400	40,601-46,400	29,301-33,500	18,001-20,600	3,750	
128,701-145,900	72,401-82,100	46,401-52,500	33,501-37,900	20,601-23,300	4,000	4
145,901-164,200	82,101-92,400	52,501-59,100	37,901-42,700	23,301-26,300	4,250	
164,201-183,400	92,401-103,100	59,101-66,000	42,701-47,700	26,301-29,300	4,500	
183,401-203,700	103,101-114,600	66,001-73,300	47,701-53,000	29,301-32,600	4,750	
203,701-225,200	114,601-126,700	73,301-81,100	53,001-58,600	32,601-36,000	5,000	
225,201-247,700	126,701-139,400	81,101-89,200	58,601-65,400	36,001-39,600	5,250	
247,701-271,200	139,401-152,600	89,201-97,700	65,401-70,600	39,601-43,400	5,500	
271,201-295,900	152,601-166,500	97,701-106,500	70,601-77,000	43,401-47,400	5,750	
295,901-Greater	166,501-Greater	106,501-115,800	77,001-83,700	47,401-51,500	6,000	
—	—	115,801-125,500	83,701-90,600	51,501-55,700	6,250	
—	—	125,501-135,500	90,601-97,900	55,701-60,200	6,500	
—	—	135,501-145,800	97,901-106,800	60,201-64,800	6,750	
—	—	145,801-156,700	106,801-113,200	64,801-69,600	7,000	
—	—	156,701-167,900	113,201-121,300	69,601-74,600	7,250	
—	—	167,901-179,400	121,301-129,600	74,601-79,800	7,500	
—	—	179,401-191,400	129,601-138,300	79,801-85,100	7,750	
—	—				8,000	

		191,401-Greater	138,301-Greater	85,101-Greater		

For SI: 1 square foot = 0.0929 m^2, 1 gallon per minute = 3.785 L/m, 1 pound per square inch = 6.895 kPa.

a. Types of construction are based on the *International Building Code.*

b. Measured at 20 psi residual pressure.

B105.2 Buildings other than one- and two-family dwellings.
The minimum fire-flow and flow duration for buildings other than one- and two-family *dwellings* shall be as specified in Table B105.1.

Exception: A reduction in required fire-flow of up to 75 percent, as *approved,* is allowed when the building is provided with an *approved automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2. The resulting fire-flow shall not be less than 1,500 gallons per minute (5678 L/min) for the prescribed duration as specified in Table B105.1.

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City of McCleary
Home of the McCleary Bear Festival

October17, 2019

Mr. Todd Baun
Director of Public Works
City of McCleary
100 South 3rd Street
McCleary, Washington 98557

SUBJECT: MCCLEARY WATER SYSTEM PLAN, FIRE FLOW STANDARDS AND NESTING OF FIRE SUPPRESSION AND STANDBY STORAGE,

CITY OF MCCLEARY, GRAYS HARBOR COUNTY, WASHINGTON

Dear Mr. Baun:

In response to your request for documentation regarding the acceptance of the fire flow standards and "nesting" fire suppression storage and standby storage as discussed in the current draft of the City's Water System Plan Update, the following has been reviewed and considered acceptable by this department.

The City of McCleary has adopted the International Fire Code (IFC) fire flow standards. However, it is understood that the City has limited fire flow capabilities within portions of its water system, and that it is not reasonable to expect the City's water system to provide fire flow in accordance with the IFC for large commercial/industrial development, which can require fire flow of up to 8,000 gpm for 4 hours.

Accordingly, the fire flow standards for the City of McCleary Water System shall be as follows:

- Residential Areas: 1,000 gpm for 1 hour.
- Industrial and Commercial Areas: 1,500 gpm for 2 hours.

These standards shall apply to areas of both existing and new development. The City should plan to make any improvements to its water system which may be necessary to meet these standards.

All new development must fully comply with IFC fire flow standards as required by existing City Code. It is expected that any new development requiring fire flow in excess of these standards per the IFC will be required to construct additional water system facilities necessary to comply with the IFC.

Based on the reliability of both the City's wells and the City's power supply we do not believe it is necessary to maintain a separate water storage volume for both standby storage and fire suppression storage. It is acceptable to "nest" these volumes together and use the higher storage value of standby storage (200 gallons times the number of ERU's being served) to meet both the fire suppression storage (180,000 gallons) and standby storage requirements.

Sincerely,

City of McCleary

Paul Nott, Fire Chief

APPENDIX E

CROSS-CONNECTION CONTROL AND BACKFLOW PREVENTION MANUAL

CROSS-CONNECTION CONTROL DEVICE TESTING RESULTS

CITY OF MCCLEARY

CROSS CONNECTION CONTROL

AND

BACKFLOW PREVENTION MANUAL

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I. PURPOSE AND SCOPE

The purpose of this manual, in conjunction with the Uniform Plumbing Code Chapter 10, State of Washington cross connection regulations and the current edition of the *Cross Connection Controls Manual – Accepted Procedure and Practice*, published by the Pacific Northwest Section, American Water Works Association, is to protect the health of the water consumer and the potability of the water in the distribution system. Inspection and regulation of all actual or potential cross connections between potable and non-potable systems is required in order to minimize the danger of contamination or pollution of the public potable water supply. Controlling and preventing cross connections is accomplished by either removing the cross connection or installing an approved backflow prevention assembly to protect the public potable water supply.

The City of McCleary is required to eliminate or control all cross connections throughout it's service area. Therefore, anyone wanting or using water from the City of McCleary is required to comply with these regulations. The owner of the property in which a cross connection occurs is fully responsible for all damages incurred.

This manual establishes a minimum standards for the City to protect the public potable water supply from possible contamination of pollution due to backflow or back siphon from a customers private internal system into the public potable water system.

This manual establishes minimum cross connection control operating policies, provides guidelines and requirements for installation, testing, and maintenance of approved backflow devices and establishes permitting, and inspection requirements for existing and new backflow protection devices.

II. AUTHORITY

A. The Federal Safe Drinking Water Act of 1974 and the statutes of the State of Washington Title 43 RCW and Chapter 248-54 and 246-290-490 WAC require purveyors to "protect public water systems from contamination due to cross connections."

B. The City of McCleary Water System Plan adopted by Resolution No. _____ Cross Connection program requirements.

III. RESPONSIBILITY

The City Engineer will enforce the provisions of this ordinance. The City Engineer may delegate responsibilities to a Certified Cross Connection Control Specialist/Inspector. The provisions of this ordinance may supersede State regulations but in no case shall they be less stringent. All approved standards shall be approved by the City Engineer.

If the City Engineer determines a backflow device is required at any customer's premises, he or his delegated agent shall give notice to said customer to install an approved backflow prevention device at one or more locations to isolate the premises. Installation of requested backflow protection devices shall be a condition of continued water service from the City.

Upon installation the customer shall contact the City requesting inspection and testing of said device or devices. The customer shall be subject to all applicable inspection and testing fees as may be established.

IV. FAILURE TO COMPLY

Failure of the customer to cooperate in the installation, maintenance, repair, inspection or testing of backflow prevention assemblies required by this ordinance shall be grounds for termination of water service to the premise or the requirement for an Air Gap separation. Discontinuance of the City potable supply to the premise shall remain in effect until corrective action as required by the City Engineer is completed, tested and approved.

V. REQUIREMENTS

A. GENERAL

The City will operate a cross connection control program which fulfills the requirements of the State of Washington Cross Connection Regulations and is approved by the Department of Health.

The owner shall allow their property to be inspected for possible cross connection and shall follow the provisions of the City's program if a cross connection is permitted.

If the City requires that the public supply be protected by containment, the owner shall be responsible for water quality beyond the outlet end of the containment device and should utilize fixture outlet protection for that purpose. Fixture outlet devices shall be installed in accordance with the Uniform Plumbing Code. A plumbing permit and inspections may be required.

All backflow prevention assemblies required by this ordinance shall be a model approved by the Department of Health.

Approved backflow prevention assemblies required by this ordinance shall be installed under the direction of the City Engineer and/or under the supervision of the Cross Connection Specialist/Inspector per City standards.

B. CITY OF MCCLEARY

On new installations, the City will provide on-site evaluation and/or inspection of plans in order to determine the type of backflow preventer, if any, that will be required, will issue permits, and perform inspection and testing. In any case, a minimum of a meter setter check valve will be required on any new construction.

For premises existing prior to the start of this program, the City will perform evaluations and inspections of plans and/or premises and inform the owner by letter of any corrective action deemed necessary, the method of achieving the correction, and the time allowed for the correction to be made. Ordinarily, sixty days will be allowed; however, this time period may be shortened depending upon the degree of hazard involved and the history of the device(s) in question.

When an existing cross connection poses a potential health or system hazard, the City shall shut off water service to the premises until the cross connection has been eliminated or controlled by the installation of a proper backflow prevention assembly. The cross connection control program manager for the department shall be notified when a service has been shut off.

Premises will be inspected on or after the expiration date of required action to correct a cross connection. Premises that have failed to comply with the City's request shall receive written notice that water service to the premise will be terminated within a period not to exceed seven calendar days. In the event the owner informs the City Engineer in writing of extenuating circumstances as to why the correction has not been completed, the City Engineer may grant a time extension up to but not exceeding thirty days.

The City will not allow any cross connection to remain unless it is protected by an approved backflow preventer for which a permit has been issued and which will be regularly tested to insure satisfactory operation.

If the City determines at any time that a serious threat to the public health exists, the water service will be terminated immediately.

The City shall require inspection and testing for all backflow devices. All inspection shall be completed by and certified by individuals certified by the State of Washington as a cross connection control specialist. Testing and inspection shall include the initial installation, on-site reviews of existing installations, after any repairs or maintenance, after any relocation and the annual testing requirement. Inspections, tests, and repairs shall be made under the purveyor's supervision and records thereof kept as required by the purveyor.

When an initial installation or annual test identifies a backflow device is not properly functioning, the owner shall correct the malfunction as directed by the City. The owner shall contact the City after correcting the malfunction for inspection and re-testing of the device(s).

C. OWNER

The owner shall be responsible for the elimination or protection of all cross connection on their premises.

The owner after having been informed by a letter from the City shall at their expense, install any and all backflow preventers requested.

The owner shall correct any malfunction of the backflow preventer which is revealed by periodic testing.

The owner shall inform the City of any proposed or modified cross connections and also any existing cross connections of which the owner is aware but has not been found by the City.

The owner shall install only backflow preventers approved by the City.

Any owner having a private well or other private water source shall not cross connect to the City's system.

The owner shall provide access to premises to the City at the City's request. Failure to provide access to inspect facilities shall be grounds for termination of water service.

The owner shall be responsible for the payment of all fees for permits, annual or semi-annual device testing, re-testing in the case that the device fails to operate correctly, and any re-inspections for non-compliance with City requirements. Permits and fee schedules shall be as specified in the applicable sections of the City of McCleary Municipal Code.

VI. APPLICABILITY

The provisions of this manual are applicable to all connections to the City domestic water supply. The City recognizes there are varying degree of risks associated with different types of uses and will consider this when determining if a cross connection exists and applicable backflow prevention devices. Table 1 lists common backflow devices that may be required. NOTE: The following Tables 1, 2, 3, and 4 are derived from American Water Works Association Cross Connection Control Manual, May 1990.

TABLE 1: ABBREVIATIONS

Abbreviation	Description	Level of Protection
AG	Air Gap	1
RPBA	Reduced Pressure Backflow Assembly	2
RPDA	Reduced Pressure Detector Assembly	2
DCVA	Double Check Valve Assembly	3
DCDA	Double Check Detector Assembly	3
PVBA	Pressure Vacuum Breaker Assembly	4
AVB	Atmospheric Vacuum Breaker	5

NOTE: Lower numbers in the "Level of Protection" column indicate higher levels of protection.

There are premises which require mandatory premise isolation. These types of premises and minimum protection requirements are shown in Table 2. Table 2 is not considered to include all premises. The City may require backflow protection of any facility it deems appropriate and a risk to domestic system. Table 3 lists the types of facilities the City may require backflow protection devices.

TABLE 2: PREMISES REQUIRING MANDATORY SERVICE PROTECTION

Premises	Protection	Premises	Protection
Beverage bottling plants	RPBA	Mortuaries	RPBA
Car washes	RPBA	Nursing homes	RPBA
Chemical plants	RPBA	Petroleum processing or storage plants	RPBA
Fire sprinkler services	DCVA	Piers and docks	RPBA
Food processing plants	DCVA	Radioactive material processing or nuclear reactors	RPBA
Sewage lift stations	RPBA	Hospitals, medical centers and clinics	RPBA
Sewage pump stations	RPBA	Sewage treatment plants	RPBA
Laboratories	RPBA	Tall building (over 30', domestic wtr)	DCVA
Metal plating industries	RPBA	Unapproved auxiliary supply	RPBA

TABLE 3: FACILITIES REQUIRING BACKFLOW PROTECTION

Facilities	Protection	Facilities	Protection
Battery manufacturing or repair facilities	RPBA	Film processing facilities	RPBA
Boat marinas	RPBA	Ice manufacturing plants	RPBA
Canneries	DCVA	Mobile home parks	DCVA
Cold storage plants	RPBA	Packing houses (slaughter houses)	RPBA
Commercial laundries	RPBA	Paper product plants	RPBA
Concrete mixing plants	DCVA	Parks and playgrounds	DCVA
Dairies	DCVA	Plasma centers	RPBA
Dry cleaners	RPBA	Sand and gravel plants	DCVA
Dry docks	RPBA	Ship repair facilities	RPBA
Farms	DCVA	Shopping centers	DCVA

In addition to mandatory backflow protection for certain types of premises there are numerous fixtures, equipment areas, or other common use areas which could have cross connection and backflow potential. These fixtures, equipment areas and other areas must be inspected and analyzed to determine potential risk to the system. Table 4 lists typical fixtures, equipment areas and other areas that may or may not require backflow protection devices.

TABLE 4: FIXTURES, EQUIPMENT AND AREAS WITH BACKFLOW POTENTIAL

Fixtures, Equipment and Areas	Minimum Protection	Fixtures, Equipment and Areas	Minimum Protection
Air compressors	DCVA	Etching tanks	AG/RPBA
Air conditioning systems	RPBA	Fermenting tanks	AG/RPBA
Air washers	RPBA	Fertilizer injection equipment	RPBA
Aquarium make-up water	AG/RPBA	Film processors	RPBA
Aspirators, medical	AVB	Fire department connections	DCVA
Aspirators, weedicide, herbicide and pesticide	AVB	Fire sprinkler systems	DCVA
Autoclaves	RPBA	Floor drains	AG
Autopsy tables	RPBA	Flushing floor drains	AVB
Baptismal founts	AG/AVB	Foamite systems	AG/RPBA
Bathtub, below rim filler	Not Allowed	Fountains, ornamental	AG/RPBA
Bedpan washers	AVB	Fume hoods	AVB
Beverage dispensers using CO_2	RPBA	Garbage can washers	AVB/PVBA
Bidets	AG-Internal	Garbage disposals	AVB
Boat lifts	RPBA	Heat exchangers	RPVA
Boiler feed lines	AG/RPBA	Heat pumps	RPBA
Bottle washing equipment	RPBA	High pressure washers	DCVA
Box hydrants	PVBA/DCVA	Hose bibs	AVB
Brine tanks	AG/DCVA	Hoses, kitchen rinse	AVB
Can washing equipment	AVB/PVBA	Hot tubs	AG/RPBA
Chemical feeder tanks	AG/RPBA	Hot water heating systems	RPBA
Chilled water systems	RPBA	Hot water boilers	RPBA
Chlorinators	RPBA	Humidifier tanks and boxes	AG
Coffee urns	AG/AVB	Hydraulically operated equipment	DCVA
Computer cooling lines	AG/RPBA	Hydrotherapy baths	AVB
Condensate tanks	AG/RPBA	Ice makers	AG
Cooking kettles	AG/AVB	Industrial fluid systems	RPBA
Cooling towers	AG/RPBA	Intertied (looped) water systems	DCVA
Decorative ponds	AG/RPBA	Irrigation systems	AVB/PVBA
Degreasing equipment	RPBA	Janitor sinks	AVB
Demineralized water systems	RPBA	Kitchen equipment	AVB
Dental cuspidors	RPBA	Laboratory equipment	RPBA
Detergent dispensers (dishwasher)	AVB	Laundry machines, commercial	RPBA
Dialysis equipment	RPBA	Lavatories	AVB
Dishwashers	AVB	Livestock drinking tanks	AG/AVB

TABLE 4: FIXTURES, EQUIPMENT AND AREAS WITH BACKFLOW POTENTIAL – (continued)

Fixtures, Equipment and Areas	Minimum Protection	Fixtures, Equipment and Areas	Minimum Protection
Drinking fountains	AG	Make-up tanks	AG/RPBA
Dye vats and tanks	AG/RPBA	Mobile carpet cleaners	RPBA
Dynamometers	DCVA	Mop sinks	AVB
Emergency generators	RPBA	Outboard motor test tanks washers	AG/AVB
Perchlorethylene reclaim	RPBA	Steam cleaners	RPBA
Pesticide applicator trucks	AG/RPBA	Steam ejectors	RPBA
Photo developing tanks and sinks	RPBA	Steam generating facilities	RPBA
Photostat equipment	RPBA	Sterilizes	RPBA
Pipette washers	AVB	Stills	RPBA
Potato peelers	AVB	Sumps	AG
Poultry feeders	RPBA	Swimming pools	AG/RPBA
Private hydrants	DCVA	Toilets (internal)	AG
Processing tanks	AG/RPBA	Trap primers	AG
Pump seal water	AG	Ultrasonic baths	AG
Pumps, pneumatic ejector	RPBA	Urinals (internal)	AG
Pump prime lines	DCVA	Used water systems	RPBA
Pumps, water operated ejector	RPBA	Vats	AG/AVB
Radiator flushing equipment	RPBA	Washing pools wall hydrants	AG/RPBA
Recreational vehicle dump stations	RPBA	Wash basins	AVB
Aerated faucets	AVB	Wash-up sinks	AG/AVB
Service sinks	AVB	Wash tanks	AG/AVB
Sewer connected equipment	AG	Waste sewer lines	AG/AVB
Sewer flushing	AG	Water-air sprays	AG/DCVA
Shampoo basins/hose rinse	AVB	Water closets (internal)	AG/DCVA
Showers, telephone	AVB	Water cooled equipment	RPBA
Sitz baths	AVB	Water ejectors	DCVA
Soap mixing tanks	AG/AVB	Water recirculating systems	DCVA
Solar heating systems	RPVA	Water settling	AG/RPBA
Solution tanks	AG/RPBA	Water treatment tanks	DCVA
Spas	AG/RPBA	Water trucks	RPBA
Specimen tanks	AG/RPBA	Wet vacuum systems	AVB
Starch tanks	AG/DCVA	Whirlpool baths	RPBA
Stream-air sprays	RPBA	Windshield washer fluid aspirators	RPBA

VII. INSTALLATION AND TESTING

Installation and testing of all backflow protection devices shall be in accordance with cross Connection Control Manual Accepted Procedures and Practice produced by the American Water Works Association (AWWA). The latest edition shall be used. Copies can be purchased from the State Department of Health Drinking Water Section or the Pacific Northwest Section of AWWA. In addition, all backflow protection devices shall be installed at a location that is easily accessible for inspection and testing. Devices located in vaults shall have adequate clearances and depths to allow the City to inspect and test. Devices that cannot be easily and readily inspected shall be required to be relocated and re-plumbed as required by the City. The owner shall contact the City for applicable installation requirements and standards.

All RPBAs, RPDAs, DCVAs, DCDAs, and PVBAs are required to be tested at least annually and all Air Gaps installed in lieu of an approved backflow prevention assemble shall be inspected at least annually. Completed Test Reports shall be returned to the City of McCleary within 30 days after receipt of the yearly test notification. Tests and inspections may be required on a more frequent basis at the discretion of the City Engineer.

VIII. EXISTING BACKFLOW PROTECTION DEVICES

Any existing backflow protection device in use can continue to be used providing:

1. The devices are functioning properly based on inspection and test by the City.

2. The degree of protection is satisfactory for protection of the City's domestic system as determined by the City's General Manager.

Backflow devices that do not meet the above conditions shall be removed and installed with new approved devices.

IX. DEFINITIONS

1. AIR GAP (AG)

   The vertical physical separation between the free flowing discharge end of the potable supply line and the overflow rim of the receiving vessel. This separation must be at least twice the inside diameter of the supply line, but never less than one-inch. When located near walls, the air gap separation must be increased.

2. APPROVAL/APPROVED

Approved in writing by the health authority or other agency having jurisdiction as meeting the specifications stated or implied in this manual.

3. ATMOSPHERIC VACUUM BREAKER (AVB)

A device which contains a float check (poppet), a check seat and an air inlet vent. When water pressure is reduced to a gauge pressure of zero or below, air enters the device, preventing backsiphonage. It is designed to protect against backsiphonage only.

4. AUXILIARY WATER SUPPLY

Any water supply on, or available to, a premise other than the City's approved public potable water supply.

5. AUXILIARY WATER SUPPLY - APPROVED

An auxiliary water supply which has been investigated and approved by the health authority, meets water quality regulations, and is accepted by the water purveyor.

6. AUXILIARY WATER SUPPLY - UNAPPROVED

An auxiliary water supply which is not approved by the health authority.

7. BACKFLOW

The flow of water or other liquids, gases or solids from any source back into the distribution piping of the public potable supply system.

8. BACKFLOW PREVENTION ASSEMBLY

An assembly which prevents the backflow of water or other liquids, gases or solids into the purveyor's potable water supply and appears on the health authority "Approved" list.

9. BACKFLOW PREVENTION DEVICE

A device which prevents the backflow of water or other liquids, gases or solids into the purveyor's potable water supply and does not appear on the health authority "Approved" list.

10. BACKPRESSURE

Water pressure which exceeds the operating pressure of the public potable water supply.

11. BACKSIPHONAGE

Backflow due to a negative or reduced pressure within the public potable water supply.

12. BAROMETRIC LOOP (BL)

A loop of pipe rising at least 35 feet at it's uppermost point, above the highest point on the downstream piping.

13. CERTIFIED BACKFLOW ASSEMBLY TESTER

A person who is certified by the health authority, or other approval agency, to test backflow prevention assemblies.

14. CERTIFIED CROSS CONNECTION CONTROL SPECIALIST/INSPECTOR

A person who is certified by the health authority, or other approval agency, to administer a cross connection control program and to conduct cross connection surveys.

15. CITY

The City of McCleary or their authorized representative.

16. CONFINED SPACE

Any space having a limited means of egress which is subject to the accumulation of toxic or flammable contaminants or an oxygen deficient atmosphere.

17. CONTAMINATION

An impairment of the quality of the potable water which creates an actual hazard to the public health through poisoning or through the spread of diseases by sewage, industrial fluids or waste. Also defined as high hazard.

18. CRITICAL LEVEL

The point on a vacuum breaker which determines the minimum elevation above the flood level rim of the fixture or receptacle served at which the vacuum breaker may be installed.

19. CROSS CONNECTION

A point in the plumbing system where the public potable water supply is connected directly, or has the potential of being connected, to a source of non-potable substance that is not a part of the public potable water supply.

20. DOUBLE CHECK DETECTOR ASSEMBLY (DCDA)

An approved assembly consisting of two approved double check valve assemblies, set in parallel, equipped with a meter on the bypass line to detect small amounts of water leakage or use. This unit must be purchased as a complete assembly. The assembly may be allowed on fire line water services in place of an approved double check valve assembly upon approval by the local water authority.

21. DOUBLE CHECK VALVE ASSEMBLY (DCVA)

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.

22. FLOOD LEVEL

The highest level to which water, or other liquid, will rise within a tank or fixture (i.e. the overflow rim of the receiving vessel).

23. HEALTH AUTHORITY

The appropriate state or provincial departments or districts of public health or, in some cases, a local agency having jurisdiction.

24. HIGH HAZARD

A physical or toxic hazard which could be detrimental to ones health.

25. IN-PLANT PROTECTION

The practice of installing backflow prevention assemblies at the point of hazard to protect one or more actual or potential cross connections within a premise.

26. INTERNALLY-LOADED CHECK VALVE

A check valve which is internally loaded, either by springs or weights, the extent it will be drip tight with a 1 psi differential in the direction of flow.

27. LOCAL ENFORCEMENT AUTHORITY

Authorized agent of the regulatory authority and/or the water purveyor.

28. LOW HAZARD

A hazard which could cause aesthetic problems or have a detrimental effect on the quality of the public potable water supply.

29. NON-POTABLE FLUID

Any water, other liquid, gas, or other substance which is not safe for human consumption, or is not a part of the public potable water supply as described by the health authority.

30. OWNER

Any person who has legal title to, or license to operate or occupy, a property upon which a cross connection inspection will be made or upon which a cross connection is present.

31. PERMIT

A document issued by the City which allows the use of a backflow preventer.

32. POLLUTION

An impairment of the quality of the public potable water supply which does not create a hazard to the public health but which does adversely affect the aesthetic qualities of such potable waters for domestic use. Also defined as low hazard.

33. POTABLE WATER

Water which is safe for human consumption, free from harmful or objectionable materials, as described by the health authority.

34. PREMISE ISOLATION

The practice of protecting the public potable water supply by installing backflow prevention assemblies at or near the point where water enters the premise. This type of protection does not provide protection to personnel on the premise. Also called containment.

35. PRESSURE VACUUM BREAKER ASSEMBLY (PVBA)

An approve 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 and between two resilient seated shutoff valves and with suitable connections for testing. It is designed to protect against backsiphonage only.

36. PRIVAT HYDRANT

Any hydrant which is not owned, operated or maintained by the City of McCleary.

37. PROCESS WATER

Water that is directly connected to, or could come in contact with, an extreme high hazard situation, and must never be consumed by humans.

38. REDUCED PRESSURE BACKFLOW ASSEMBLY (RPBA)

An approved assembly consisting of two independently operating check valves, spring loaded to the closed position, separated by a spring loaded differential pressure relief valve loaded to the open position, and installed as a unit with and between two resilient seated shutoff valves and having suitable connections for testing.

39. REDUCED PRESSURE DETECTOR ASSEMBLY (RPDA)

An approved assembly consisting of two approved reduced pressure backflow assemblies, set in parallel, equipped with a meter on the bypass line to detect small amounts of water leakage or use. This unit must be purchased as a complete assembly. The assembly may be allowed on fire line water services in place of an approved reduced pressure backflow assembly upon approval by the local water purveyor.

40. USED WATER

Any potable water which is no longer in the City's distribution system. In most cases, the potable water has moved past (downstream of) the water meter and/or the property line.

41. WATER PURVEYOR

Any agency, subdivision of the state, municipal corporation, firm, company, mutual or cooperative association, institution, partnership, person or other entity that owns or operates a public potable water system. It also means the authorized agents of such entities as listed above.

42. WATER SERVICE ENTRANCE

That point in the owners water system beyond the sanitary control of the City; generally considered to be the outlet end of the water meter and always before any unprotected branch.

BACKFLO PRO'S, INC.
855 Trosper Rd SW Suite 108-230
Tumwater, WA 98512
Phone: 360-951-6130 Fax: 360-352-1990

Backflow Prevention Assembly Test Report

Mailing Address

LYLE WIESE
SIMPSON DOOR CO.
400 SIMPSON AVENUE
McLEARY, WA 98557

Device: WATTS 009M2QT RP
Size: 1.500
Test Due: 07/01/14

Accountnum: 1731
Serial #: 98783
Meter #:

Service Address
Address: 400 SIMPSON AVENUE
Company: SIMPSON DOOR CO.
Contact: LINN BOLEY
Hazard: Premesis Isolation
Location: WEST SIDE OF PLANT

Reduced Pressure Principle Assembly

RP [X] DCDA [ ]
DC [ ] RPDA [ ]
PVB [ ] Air Gap [ ]
SVB [ ] AVB [ ]

Double Check Valve Assembly

	Check Valve #1	Check Valve #2	Relief Valve	PVB/SVB
Initial Test	Leaked [ ] Held at 7.2 PSID	Leaked [ ] Closed Tight [X] Held at _____ PSID	Did not Open [ ] Opened at 3.1 PSID	AIR INLET Did not Open [ ] Opened at _____ PSID
			Buffer 4.1 PSID	CHECK VALVE Leaked [ ] Held at _____ PSID
Repairs	Repaired [ ]			Repaired [ ]
Final Test	Held at _____ PSID	Closed Tight [ ] Held at _____ PSID	Opened at _____ PSID	AIR INLET Opened at _____ PSID
			Buffer _____ PSID	CHECK VALVE Held at _____ PSID

Comments
RELIEF VALVE WAS VENTING ON ARRIVAL. REPLACED BROKEN STEM. TESTED GOOD, PROPERLY INSTALLED.

Line Pressure 100
Held Backpressure [X]
#2 Shutoff [X]
Relief Valve Exercised [ ]

The above report is certified to be true.

	Date	Tester	Signature	Tester #	Test Kit	Passed	Failed
Initial Test	01/29/16	MARCUS TEETERS	Marcus Teeters	B5847	05071592	[X]	[ ]
Repairs							
Final Test						[ ]	[ ]

BACKFLO PRO'S, INC.
855 Trosper Rd SW Suite 108-230
Tumwater, WA 98512
Phone: 360-951-6130 Fax: 360-352-1990

Backflow Prevention Assembly Test Report

Mailing Address

LYLE WIESE
SIMPSON DOOR CO.
400 SIMPSON AVENUE
McLEARY, WA 98557

Device: WATTS 009M2QT RP
Size: 2.000
Test Due: 07/01/16

Accountnum: 1731
Serial #: 180454
Meter #:

Service Address
Address: 400 SIMPSON AVENUE
Company: SIMPSON DOOR CO.
Contact: LYLE WIESE
Hazard: Premesis Isolation
Location: EAST SIDE OF PLANT

Reduced Pressure Principle Assembly

Double Check Valve Assembly

RP ☒ DCDA ☐
DC ☐ RPDA ☐
PVB ☐ Air Gap ☐
SVB ☐ AVB ☐

	Check Valve #1	Check Valve #2	Relief Valve	PVB/SVB
Initial Test	Leaked ☐ Held at_____PSID	Leaked ☐ Closed Tight ☐ Held at_____PSID	Did not Open ☐ Opened at 1.3 PSID	**AIR INLET** Did not Open ☐ Opened at_____PSID
			Buffer -1.3 PSID	**CHECK VALVE** Leaked ☐ Held at_____PSID
Repairs	Repaired ☒			Repaired ☐
Final Test	Held at 7.6 PSID	Closed Tight ☒ Held at_____PSID	Opened at 3.0 PSID	**AIR INLET** Opened at_____PSID
			Buffer 4.6 PSID	**CHECK VALVE** Held at_____PSID

Comments
RELIEF VAVLE DID NOT OPEN IN TIME. EXERCISED THE RELIEF VALVE. RE-TESTED GOOD.

Line Pressure 100
Held Backpressure ☒
#2 Shutoff ☒
Relief Valve Exercised ☒

The above report is certified to be true.

	Date	Tester	Signature	Tester #	Test Kit	Passed	Failed
Initial Test	01/29/16	MARCUS TEETERS	Marcus Teeters	B5847	05071592	☐	☒
Repairs	01/29/16	MARCUS TEETERS	Marcus Teeters	B5847			
Final Test	01/29/16	MARCUS TEETERS	Marcus Teeters	B5847	05071592	☒	☐

BACKFLO PRO'S, INC.
855 Trosper Rd SW Suite 108-230
Tumwater, WA 98512
Phone: 360-951-6130 Fax: 360-352-1990

Backflow Prevention Assembly Test Report

Mailing Address

JON EHRESMAN
CITY OF MCCLEARY
1001 N SUMMIT
McCLEARY, WA 98557

Device: WATTS 009M2QT RP
Size: 1.000
Test Due: 06/01/17

Accountnum: 9664
Serial #: 388888
Meter #:

Service Address
Address: 1001 N SUMMIT
Company: CITY OF MCCLEARY
Contact: JON EHRESMAN
Hazard: CHLORINATOR
Location: CITY WELL #2 WATER TREATMENT PLANT ON CHLORINE MIXER

Reduced Pressure Principle Assembly

RP [X] DCDA [ ]
DC [ ] RPDA [ ]
PVB [ ] Air Gap [ ]
SVB [ ] AVB [ ]

Double Check Valve Assembly

	Check Valve #1	Check Valve #2	Relief Valve	PVB/SVB
Initial Test	Leaked [ ] Held at 8.2 PSID	Leaked [ ] Closed Tight [X] Held at ____ PSID	Did not Open [ ] Opened at 2.3 PSID	**AIR INLET** Did not Open [ ] Opened at ____ PSID
			Buffer 5.9 PSID	**CHECK VALVE** Leaked [ ] Held at ____ PSID
Repairs	Repaired [ ]			Repaired [ ]
Final Test	Held at ____ PSID	Closed Tight [ ] Held at ____ PSID	Opened at ____ PSID	**AIR INLET** Opened at ____ PSID
			Buffer ____ PSID	**CHECK VALVE** Held at ____ PSID

Comments
TESTED GOOD, PROPERLY INSTALLED.

Line Pressure 90
Held Backpressure [X]
#2 Shutoff [X]
Relief Valve Exercised [ ]

The above report is certified to be true.

	Date	Tester	Signature	Tester #	Test Kit	Passed	Failed
Initial Test	**06/28/16**	**MARCUS TEETERS**	Marcus Teeters	**B5847**	**03160034**	[X]	[ ]
Repairs							
Final Test						[ ]	[ ]

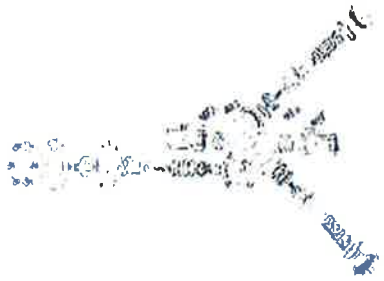
BACKFLO PRO'S, INC.
855 Trosper Rd SW Suite 108-230
Tumwater, WA 98512
Phone: 360-951-6130 Fax: 360-352-1990

Backflow Prevention Assembly Test Report

Mailing Address

JON EHRESMAN
CITY OF MCCLEARY
1001 N SUMMIT
McCLEARY, WA 98557

Device: WILKINS 975XL RP
Size: 2.000
Test Due: 06/01/17



Accountnum: 9664
Serial #: 3982128
Meter #:

Service Address
Address: 1001 N SUMMIT
Company: CITY OF MCCLEARY
Contact: JON EHRESMAN
Hazard: Construction Meter
Location: PORTABLE VALVE

Reduced Pressure Principle Assembly

RP [X] DCDA [ ]
DC [ ] RPDA [ ]
PVB [ ] Air Gap [ ]
SVB [ ] AVB [ ]

Double Check Valve Assembly

	Check Valve #1	Check Valve #2	Relief Valve	PVB/SVB
Initial Test	Leaked [ ] Held at 7.0 PSID	Leaked [ ] Closed Tight [X] Held at _____ PSID	Did not Open [ ] Opened at 2.4 PSID	**AIR INLET** Did not Open [ ] Opened at _____ PSID
			Buffer 4.6 PSID	**CHECK VALVE** Leaked [ ] Held at _____ PSID
Repairs	Repaired [ ]			Repaired [ ]
Final Test	Held at _____ PSID	Closed Tight [ ] Held at _____ PSID	Opened at _____ PSID	**AIR INLET** Opened at _____ PSID
			Buffer _____ PSID	**CHECK VALVE** Held at _____ PSID

Comments
TESTED GOOD, PROPERLY INSTALLED.

Line Pressure 100
Held Backpressure [X]
#2 Shutoff [X]
Relief Valve Exercised [ ]

The above report is certified to be true.

	Date	Tester	Signature	Tester #	Test Kit	Passed	Failed
Initial Test	06/28/16	MARCUS TEETERS	Marcus Teeters	B5847	03160034	[X]	[ ]
Repairs							
Final Test						[ ]	[ ]

KNIGHT FIRE PROTECTION, INC.
9702 LATHROP INDUSTRIAL DRIVE SW
OLYMPIA, WA 98512
(360) 786-8606
FAX 786-8722
service@knightfire.net

LICENSE NO. KNIGHTFP044LK

Backflow Prevention Assembly Test Report

Water Purveyor: McCleary
TESTED GOOD: [X] YES [ ] NO

Name of Premises: Beehive Retirement Community
Contact Name: Gary Duval — Phone: 360-495-3555
Service Address: 401 West Maple Street McCleary, WA
Location of Assembly: North side of building in wooden box

Assembly	Watts	009M2QT	2"	331295
	Manufacturer	Model	Size	Serial Number

Type of Assembly: [ ] DCVA [ ] DCDA [X] RPBA [ ] RPDA [ ] PVBA [ ] SVBA [ ] AIR GAP
Type of Installation: [X] Horizontal [ ] Vertical Line Pressure at time of Test: psi

	Reduced Pressure Assemblies			Pressure Vacuum Breakers	
	Double Check Valve Assemblies		Relief Valve	Air Inlet	Check Valve
	1st Check	2nd Check			
Initial Test	DC - psid	DC - psid		Open at psid	psid
	RP - 8.2 psid	RP - Closed tight [X] Leaked [ ]	Open at 2.9 psid	[ ] Did not Open	
Repairs & Materials					
Test After Repair	DC - psid	DC - psid		Open at psid	psid
	RP - psid	RP - Closed tight [ ] Leaked [ ]	Open at psid		

Air Gap Inspection: Required minimum air gap separation provided? [X] Yes [ ] No
Water Service Restored: [X] Yes [ ] No Proper Installation: [X] Yes [ ] No

Remarks: Tested goodNew test kit info: Barton, Model 246C, S.N.098703, Calibration date 12/21/15

Type of Equipment Used: Barton Diff. Press. Gauge (Make) 246C (Model) 098703 (Serial #) Calibration Date

Type of Hazard: [X]Domestic Water [ ]Fire Sprinkler [ ]Irrigation [ ]Meter Bypass [ ]Other:

The above report is certified to be true:

Initial Test By: _____ Cert. No.: B2869 Date/Time: 08/01/16

Repair By: _____ Cert. No.: Date/Time:

Final Test By: _____ Cert. No.: Date/Time:

_____ 8/1/2016
Customer Name/Signature Date

Confined space: [ ] Yes [ ] No Oxygen % H2S ppm CO ppm Flammable Vapour % LEL

KNIGHT FIRE PROTECTION, INC.
9702 LATHROP INDUSTRIAL DRIVE SW
OLYMPIA, WA 98512
(360) 786-8606
FAX 786-8722
service@knightfire.net

LICENSE NO. KNIGHTFP044LK

Backflow Prevention Assembly Test Report

Water Purveyor: McCleary
TESTED GOOD: [X] YES [ ] NO

Name of Premises: Beehive Retirement Community
Contact Name: Gary Duval Phone: 360-495-3555
Service Address: 401 West Maple Street McCleary, WA
Location of Assembly: Riser dog house on N. side of memory care bldg

Assembly	Wilkins	350D	3/4"	W236561
	Manufacturer	Model	Size	Serial Number

Type of Assembly: [X] DCVA [ ] DCDA [ ] RPBA [ ] RPDA [ ] PVBA [ ] SVBA [ ] AIR GAP
Type of Installation: [ ] Horizontal [X] Vertical Line Pressure at time of Test: psi

	Reduced Pressure Assemblies			Pressure Vacuum Breakers	
	Double Check Valve Assemblies		Relief Valve		
	1st Check	2nd Check		Air Inlet	Check Valve
Initial Test	DC - 2.2 psid	DC - 1.9 psid		Open at psid	psid
	RP - psid	RP - Closed tight [ ] Leaked [ ]	Open at psid	[ ] Did not Open	
Repairs & Materials					
Test After Repair	DC - psid	DC - psid		Open at psid	psid
	RP - psid	RP - Closed tight [ ] Leaked [ ]	Open at psid		

Air Gap Inspection: Required minimum air gap separation provided? [ ] Yes [ ] No
Water Service Restored: [X] Yes [ ] No Proper Installation: [X] Yes [ ] No

Remarks: Tested goodNew test kit info: Barton, Model 246C, S.N.098703, Calibration date 12/21/15

Type of Equipment Used: Barton Diff. Press. Gauge (Make) 246C (Model) 098703 (Serial #) Calibration Date

Type of Hazard: [ ]Domestic Water [ ]Fire Sprinkler [ ]Irrigation [X]Meter Bypass [ ]Other:

The above report is certified to be true:

Initial Test By: _____ Cert. No.: B2869 Date/Time: 08/01/16

Repair By: _____ Cert. No.: Date/Time:

Final Test By: _____ Cert. No.: Date/Time:

_____ 8/1/2016
Customer Name/Signature Date

Confined space: [ ] Yes [ ] No	Oxygen %	H2S ppm	CO ppm	Flammable Vapour % LEL

KNIGHT FIRE PROTECTION, INC.
9702 LATHROP INDUSTRIAL DRIVE SW
OLYMPIA, WA 98512
(360) 786-8606
FAX 786-8722
service@knightfire.net

LICENSE NO. KNIGHTFP044LK

Backflow Prevention Assembly Test Report

Water Purveyor: McCleary
TESTED GOOD: [X] YES [ ] NO

Name of Premises: Beehive Retirement Community
Contact Name: Gary Duval — Phone: 360-495-3555
Service Address: 401 West Maple Street McCleary, WA
Location of Assembly: Riser dog house N side of memory care bldg

Assembly	Wilkins	950XLTDABF	2"	C01499
	Manufacturer	Model	Size	Serial Number

Type of Assembly: [ ] DCVA [X] DCDA [ ] RPBA [ ] RPDA [ ] PVBA [ ] SVBA [ ] AIR GAP
Type of Installation: [ ] Horizontal [X] Vertical Line Pressure at time of Test: psi

	Reduced Pressure Assemblies			Pressure Vacuum Breakers	
	Double Check Valve Assemblies		Relief Valve		
	1st Check	2nd Check		Air Inlet	Check Valve
Initial Test	DC - 2.8 psid	DC - 2.7 psid		Open at psid	psid
	RP - psid	RP - Closed tight [ ] Leaked [ ]	Open at psid	[ ] Did not Open	
Repairs & Materials					
Test After Repair	DC - psid	DC - psid		Open at psid	psid
	RP - psid	RP - Closed tight [ ] Leaked [ ]	Open at psid		

Air Gap Inspection: Required minimum air gap separation provided? [ ] Yes [ ] No
Water Service Restored: [X] Yes [ ] No Proper Installation: [X] Yes [ ] No

Remarks: Tested goodNew test kit info: Barton, Model 246C, S.N.098703, Calibration date 12/21/15

Type of Equipment Used: Barton Diff. Press. Gauge (Make) 246C (Model) 098703 (Serial #) Calibration Date

Type of Hazard: [ ]Domestic Water [X]Fire Sprinkler [ ]Irrigation [ ]Meter Bypass [ ]Other:

The above report is certified to be true:

Initial Test By: _____ Cert. No.: B2869 Date/Time: 08/01/16

Repair By: _____ Cert. No.: Date/Time:

Final Test By: _____ Cert. No.: Date/Time:

_____ 8/1/2016
Customer Name/Signature Date

Confined space: [ ] Yes [ ] No Oxygen % H2S ppm CO ppm Flammable Vapour % LEL

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LICENSE NO. KNIGHTFP044LK

Backflow Prevention Assembly Test Report

Water Purveyor: McCleary
TESTED GOOD: [ ] YES [X] NO

Name of Premises: Beehive Retirement Community
Contact Name: Gary Duvall — Phone: 360-495-3555
Service Address: 401 West Maple Street McCleary, WA
Location of Assembly: East side of bldg in wooden enclosure

Assembly	Wilkins	375	3"	L45574-2016
	Manufacturer	Model	Size	Serial Number

Type of Assembly: [ ] DCVA [ ] DCDA [X] RPBA [ ] RPDA [ ] PVBA [ ] SVBA [ ] AIR GAP
Type of Installation: [X] Horizontal [ ] Vertical Line Pressure at time of Test: psi

	Reduced Pressure Assemblies			Pressure Vacuum Breakers	
	Double Check Valve Assemblies		Relief Valve	Air Inlet	Check Valve
	1st Check	2nd Check			
Initial Test	DC - psid	DC - psid		Open at psid	psid
	RP - psid	RP - Closed tight [ ] Leaked [ ]	Open at 0.3 psid	[ ] Did not Open	
Repairs & Materials			As soon as #2 SOV is shut, gauge drops below 5.0 / RV opens @ 0.3 psid		
Test After Repair	DC - psid	DC - psid		Open at psid	psid
	RP - psid	RP - Closed tight [ ] Leaked [ ]	Open at psid		

Air Gap Inspection: Required minimum air gap separation provided? [ ] Yes [ ] No
Water Service Restored: [ ] Yes [ ] No Proper Installation: [ ] Yes [ ] No

Remarks: Needs repairedNew test kit info: Barton, Model 246C, S.N.098703, Calibration date 12/21/15

Type of Equipment Used: Barton Diff. Press. Gauge (Make) 246C (Model) 098703 (Serial #) Calibration Date

Type of Hazard: [X]Domestic Water [ ]Fire Sprinkler [ ]Irrigation [ ]Meter Bypass [ ]Other:

The above report is certified to be true:

Initial Test By: _____ Cert. No.: B2869 Date/Time: 08/01/16
Repair By: _____ Cert. No.: Date/Time:
Final Test By: _____ Cert. No.: Date/Time:

_____ 8/1/2016
Customer Name/Signature Date

Confined space: [ ] Yes [ ] No Oxygen % H2S ppm CO ppm Flammable Vapour % LEL

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service@knightfire.net

LICENSE NO. KNIGHTFP044LK

Backflow Prevention Assembly Test Report

Water Purveyor: McCleary
TESTED GOOD: [X] YES [ ] NO

Name of Premises: Beehive Retirement Community
Contact Name: Gary Duval Phone: 360-495-3555
Service Address: 401 West Maple Street McCleary, WA
Location of Assembly: West side of bldg in Hot Box

Assembly	Watts	007M1QT	1"	400991
	Manufacturer	Model	Size	Serial Number

Type of Assembly: [X] DCVA [ ] DCDA [ ] RPBA [ ] RPDA [ ] PVBA [ ] SVBA [ ] AIR GAP
Type of Installation: [X] Horizontal [ ] Vertical Line Pressure at time of Test: psi

	Reduced Pressure Assemblies			Pressure Vacuum Breakers	
	Double Check Valve Assemblies		Relief Valve		
	1st Check	2nd Check		Air Inlet	Check Valve
Initial Test	DC - 1.7 psid	DC - 1.7 psid		Open at psid	psid
	RP - psid	RP - Closed tight [ ] Leaked [ ]	Open at psid	[ ] Did not Open	
Repairs & Materials					
Test After Repair	DC - psid	DC - psid		Open at psid	psid
	RP - psid	RP - Closed tight [ ] Leaked [ ]	Open at psid		

Air Gap Inspection: Required minimum air gap separation provided? [ ] Yes [ ] No
Water Service Restored: [X] Yes [ ] No Proper Installation: [X] Yes [ ] No

Remarks: Tested goodNew test kit info: Barton, Model 246C, S.N.098703, Calibration date 12/21/15

Type of Equipment Used: Barton Diff. Press. Gauge (Make) 246C (Model) 098703 (Serial #) Calibration Date

Type of Hazard: [ ]Domestic Water [ ]Fire Sprinkler [X]Irrigation [ ]Meter Bypass [ ]Other:

The above report is certified to be true:

Initial Test By: _____ Cert. No.: B2869 Date/Time: 08/01/16
Signature valid only in mobile-eyes documents

Repair By: _____ Cert. No.: Date/Time:

Final Test By: _____ Cert. No.: Date/Time:

_____ 8/1/2016
Customer Name/Signature Date

Confined space: [ ] Yes [ ] No	Oxygen %	H2S ppm	CO ppm	Flammable Vapour % LEL

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service@knightfire.net

LICENSE NO. KNIGHTFP044LK

Backflow Prevention Assembly Test Report

Water Purveyor: McCleary
TESTED GOOD: [X] YES [ ] NO

Name of Premises: Beehive Retirement Community
Contact Name: Gary Duval Phone: 360-495-3555
Service Address: 401 West Maple Street McCleary, WA
Location of Assembly: In riser / laundry room

Assembly	Conbraco	4010802	2"	L9051
	Manufacturer	Model	Size	Serial Number

Type of Assembly: [X] DCVA [ ] DCDA [ ] RPBA [ ] RPDA [ ] PVBA [ ] SVBA [ ] AIR GAP
Type of Installation: [X] Horizontal [ ] Vertical Line Pressure at time of Test: psi

	Reduced Pressure Assemblies			Pressure Vacuum Breakers	
	Double Check Valve Assemblies		Relief Valve		
	1st Check	2nd Check		Air Inlet	Check Valve
Initial Test	DC - 1.8 psid	DC - 1.9 psid		Open at psid [ ] Did not Open	psid
	RP - psid	RP - Closed tight [ ] Leaked [ ]	Open at psid		
Repairs & Materials					
Test After Repair	DC - psid	DC - psid		Open at psid	psid
	RP - psid	RP - Closed tight [ ] Leaked [ ]	Open at psid		

Air Gap Inspection: Required minimum air gap separation provided? [ ] Yes [ ] No
Water Service Restored: [X] Yes [ ] No Proper Installation: [X] Yes [ ] No

Remarks: Tested goodNew test kit info: Barton, Model 246C, S.N.098703, Calibration date 12/21/15

Type of Equipment Used: Barton Diff. Press. Gauge (Make) 246C (Model) 098703 (Serial #) Calibration Date

Type of Hazard: [ ]Domestic Water [X]Fire Sprinkler [ ]Irrigation [ ]Meter Bypass [ ]Other:

The above report is certified to be true:

Initial Test By:  Cert. No.: B2869 Date/Time: 08/01/16
Signature valid only in mobile eyes documents

Repair By: _____ Cert. No.: Date/Time:

Final Test By: _____ Cert. No.: Date/Time:

_____ 8/1/2016
Customer Name/Signature Date

Confined space: [ ] Yes [ ] No	Oxygen %	H2S ppm	CO ppm	Flammable Vapour % LEL

BACKFLO PRO'S, INC.
855 Trosper Rd SW Suite 108-230
Tumwater, WA 98512
Phone: 360-951-6130 Fax: 360-352-1990

Backflow Prevention Assembly Test Report

Mailing Address

JON EHRESMAN
CITY OF MCCLEARY
100 S 3RD ST
McLEARY, WA 98557

Device: WILKINS 375 RP
Size: 4.000
Test Due: 07/01/17

Accountnum: 1198
Serial #: X00688
Meter #:

Service Address
Address: 700 WEST MAPLE STREET
Company: CITY OF MCCLEARY
Contact: JON EHRESMAN
Hazard: SEWER/SANITARY & STORM
Location: WASTEWATER TREATMENT PLANT IN HOT BOX ON SIDE OF OFFICE

RP [X] DCDA [ ]
DC [ ] RPDA [ ]
PVB [ ] Air Gap [ ]
SVB [ ] AVB [ ]

Reduced Pressure Principle Assembly

Double Check Valve Assembly

	Check Valve #1	Check Valve #2	Relief Valve	PVB/SVB
Initial Test	Leaked [X] Held at_____PSID	Leaked [ ] Closed Tight [ ] Held at_____PSID	Did not Open [ ] Opened at_____PSID	**AIR INLET** Did not Open [ ] Opened at_____PSID
			Buffer _____PSID	**CHECK VALVE** Leaked [ ] Held at_____PSID
Repairs	Repaired [X]			Repaired [ ]
Final Test	Held at 9.5 PSID	Closed Tight [X] Held at_____PSID	Opened at 2.8 PSID	**AIR INLET** Opened at_____PSID
			Buffer 6.7 PSID	**CHECK VALVE** Held at_____PSID

Comments
CHECK VALVE #1 LEAKING ON ARRIVAL. REPLACED THE CHECK MODULE IN CHECK VALVE #1. RE-TESTED GOOD, PROPERLY INSTALLED.

Line Pressure 80
Held Backpressure [X]
#2 Shutoff [X]
Relief Valve Exercised [ ]

The above report is certified to be true.

	Date	Tester	Signature	Tester #	Test Kit	Passed	Failed
Initial Test	10/25/16	DAURLYN HANSEN		B6205	05071592	[ ]	[X]
Repairs	10/25/16	DAURLYN HANSEN		B6205			
Final Test	10/25/16	DAURLYN HANSEN		B6205	05071592	[X]	[ ]

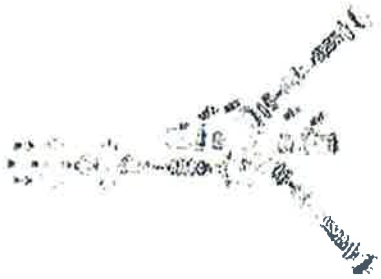
BACKFLO PRO'S, INC.
855 Trosper Rd SW Suite 108-230
Tumwater, WA 98512
Phone: 360-951-6130 Fax: 360-352-1990

Backflow Prevention Assembly Test Report

Mailing Address

JON EHRESMAN
McLEARY WASTE WATER TREATMENT
700 WEST MAPLE STREET
McLEARY, WA 98557

Device: WILKINS 375 RP
Size: 4.000
Test Due: 07/01/17



Accountnum: 1198
Serial #: X00688
Meter #:

Service Address
Address: 700 WEST MAPLE STREET
Company: McLEARY WASTE WATER TREATMENT PLANT
Contact: JON EHRESMAN
Hazard: SEWER/SANITARY & STORM
Location: IN HOT BOX ON SIDE OF OFFICE

Reduced Pressure Principle Assembly

RP [X] DCDA [ ]
DC [ ] RPDA [ ]
PVB [ ] Air Gap [ ]
SVB [ ] AVB [ ]

Double Check Valve Assembly

	Check Valve #1	Check Valve #2	Relief Valve	PVB/SVB
Initial Test	Leaked [ ] Held at 7.9 PSID	Leaked [ ] Closed Tight [X] Held at _____ PSID	Did not Open [ ] Opened at 3.8 PSID	**AIR INLET** Did not Open [ ] Opened at _____ PSID
			Buffer 4.1 PSID	**CHECK VALVE** Leaked [ ] Held at _____ PSID
Repairs	Repaired [ ]			Repaired [ ]
Final Test	Held at _____ PSID	Closed Tight [ ] Held at _____ PSID	Opened at _____ PSID	**AIR INLET** Opened at _____ PSID
			Buffer _____ PSID	**CHECK VALVE** Held at _____ PSID

Comments
TESTED GOOD, PROPERLY INSTALLED.

Line Pressure 90
Held Backpressure [X]
#2 Shutoff [X]
Relief Valve Exercised [ ]

The above report is certified to be true.

	Date	Tester	Signature	Tester #	Test Kit	Passed	Failed
Initial Test	06/28/16	MARCUS TEETERS	MARCUS TEETERS	B5847	03160034	[X]	[ ]
Repairs							
Final Test						[ ]	[ ]

BACKFLO PRO'S, INC.
855 Trosper Rd SW Suite 108-230
Tumwater, WA 98512
Phone: 360-951-6130 Fax: 360-352-1990

Backflow Prevention Assembly Test Report

Mailing Address

JON EHRESMAN
McLEARY WASTE WATER TREATMENT
700 WEST MAPLE STREET
McLEARY, WA 98557

Device: WILKINS 375 RP
Size: 4.000
Test Due: 07/01/17

Accountnum: 1198
Serial #: X00690
Meter #:

Service Address
Address: 700 WEST MAPLE STREET
Company: McLEARY WASTE WATER TREATMENT PLANT
Contact: JON EHRESMAN
Hazard: SEWER/SANITARY & STORM
Location: TREATMENT PLANT IN FRONT OF OFFICE IN VAULT

Reduced Pressure Principle Assembly

RP [X] DCDA [ ]
DC [ ] RPDA [ ]
PVB [ ] Air Gap [ ]
SVB [ ] AVB [ ]

Double Check Valve Assembly

	Check Valve #1	Check Valve #2	Relief Valve	PVB/SVB
Initial Test	Leaked [ ] Held at 10.2 PSID	Leaked [ ] Closed Tight [X] Held at _____ PSID	Did not Open [ ] Opened at 2.4 PSID	**AIR INLET** Did not Open [ ] Opened at _____ PSID
			Buffer 7.8 PSID	**CHECK VALVE** Leaked [ ] Held at _____ PSID
Repairs	Repaired [ ]			Repaired [ ]
Final Test	Held at _____ PSID	Closed Tight [ ] Held at _____ PSID	Opened at _____ PSID	**AIR INLET** Opened at _____ PSID
			Buffer _____ PSID	**CHECK VALVE** Held at _____ PSID

Comments
TESTED GOOD, PROPERLY INSTALLED.

Line Pressure 95
Held Backpressure [X]
#2 Shutoff [X]
Relief Valve Exercised [ ]

The above report is certified to be true.

	Date	Tester	Signature	Tester #	Test Kit	Passed	Failed
Initial Test	06/28/16	MARCUS TEETERS	MARCUS TEETERS	B5847	03160034	[X]	[ ]
Repairs							
Final Test						[ ]	[ ]

BACKFLO PRO'S, INC.
855 Trosper Rd SW Suite 108-230
Tumwater, WA 98512
Phone: 360-951-6130 Fax: 360-352-1990

Backflow Prevention Assembly Test Report

Mailing Address

JON EHRESMAN
MC CLEARY CITY PARK
100 SOUTH 3RD STREET
MCCLEARY, WA 98557

Device: WILKINS 950XLT DC
Size: 2.000
Test Due: 07/01/17

Accountnum: 8167
Serial #: 3160400
Meter #:

Service Address
Address: 100 SOUTH 3RD STREET
Company: MCCLEARY CITY PARK
Contact: JON EHRESMAN
Hazard: IRRIGATION - COMMERCIAL
Location: NEXT TO METER BY PARK KITCHEN BLDG B

Reduced Pressure Principle Assembly

Double Check Valve Assembly

RP ☐ DCDA ☐
DC ☒ RPDA ☐
PVB ☐ Air Gap ☐
SVB ☐ AVB ☐

	Check Valve #1	Check Valve #2	Relief Valve	PVB/SVB
Initial Test	Leaked ☐ Held at 2.6 PSID	Leaked ☐ Closed Tight ☒ Held at 1.8 PSID	Did not Open ☐ Opened at _____ PSID	AIR INLET Did not Open ☐ Opened at _____ PSID
			Buffer _____ PSID	CHECK VALVE Leaked ☐ Held at _____ PSID
Repairs	Repaired ☐			Repaired ☐
Final Test	Held at _____ PSID	Closed Tight ☐ Held at _____ PSID	Opened at _____ PSID	AIR INLET Opened at _____ PSID
			Buffer _____ PSID	CHECK VALVE Held at _____ PSID

Comments
TESTED GOOD, PROPERLY INSTALLED.

Line Pressure 95
Held Backpressure ☒
#2 Shutoff ☒
Relief Valve Exercised ☐

The above report is certified to be true.

	Date	Tester	Signature	Tester #	Test Kit	Passed	Failed
Initial Test	06/28/16	E. ROBERT SPINKS		B6268	10100327	☒	☐
Repairs							
Final Test						☐	☐

APPENDIX F

DUTY TO SERVICE REQUIREMENT

SAMPLE COMPLAINT FORM

Fact Sheet

Municipal Water Law

Duty to provide service requirement

Jan. 2017
DOH 331-366

Municipal water suppliers have a duty to provide service to all new connections within their retail service area when the circumstances meet the following four threshold factors:*

1. The municipal water supplier has sufficient **capacity** to serve water in a safe and reliable manner.
2. The service request is **consistent** with adopted local plans and development regulations.
3. The municipal water supplier has sufficient **water rights** to provide service.
4. The municipal water supplier can provide service in a **timely and reasonable** manner.

* RCW 43.20.260 *Review of water system plan, requirements – Municipal water suppliers, retail service*

Retail service area

A municipal water supplier determines its retail service area and identifies the area in its Water System Plan. The retail service area must include all areas where the municipal water supplier currently provides service, and may include areas where new service is proposed. A municipal water supplier may extend water service outside the retail service area to provide temporary service for a neighboring water system if there is a written agreement in place.

Threshold factors

A municipal water supplier must describe in its Water System Plan how it intends to meet the four threshold factors within its retail service area. A municipal water supplier must provide service for all requests within its retail service area, unless it describes how a situation does not meet one or more of the four threshold factors.

Water System Plans must address the four threshold factors as follows:

1. **Capacity:** Municipal water suppliers must include a capacity determination in their Water System Plan. Capacity determinations incorporate a water system's physical capacity (source and storage) and water right limitations.

2. **Consistency:** Consistency applies to locally adopted comprehensive plans, land use plans, development regulations, and utility service extension ordinances. Consistency determinations must evaluate land use, 6-year growth projections, service extension

ordinances, new water service provisions, and other elements we determine are related to water supply planning.[1] Municipal water suppliers must ask their local government(s) to determine consistency. If a local government does not complete the determination, the municipal water supplier must document its efforts to obtain local review and then determine consistency itself.

3. **Water Rights:** Department of Ecology is responsible for water right sufficiency determinations. Municipal water suppliers must include a water right self-assessment in their Water System Plan or Small Water System Management Program. We will forward a copy of the planning document and water right self-assessment to the Department of Ecology for review. We will incorporate water right limitations into service capacity approvals.

4. **Timely and Reasonable:** Municipal water suppliers must include their service policies in their Water System Plan. They must describe how they will provide new service. For more information on the timely and reasonable concept under the Municipal Water Law, see our fact sheet Timely and Reasonable Water Service (331-444).

For more information:

If you have technical questions or concerns, contact:

Linda Kildahl, Planning and Policy Section
Phone: 360-236-3186
Email: linda.kildahl@doh.wa.gov

View additional fact sheets on Municipal Water Law:
http://www.doh.wa.gov/ehp/dw/municipal_water/plan_eng.htm

Our publications are available at https://fortress.wa.gov/doh/eh/dw/publications/publications.cfm

Washington State Department of Health
Environmental Public Health Division
Office of Drinking Water

PUBLIC HEALTH
ALWAYS WORKING FOR A SAFER AND HEALTHIER WASHINGTON

[1] See Department of Health Office of Drinking Water Policy B.07, Local Government Consistency – Other Relevant Elements: http://www.doh.wa.gov/ehp/dw/Policies/P-B07.pdf

Jan. 2017
DOH 331-432
Revised

Fact Sheet

Municipal Water Suppliers

Service areas in planning documents

The 2003 Municipal Water Law allows municipal water suppliers to expand their water right place-of-use to the service area identified in an approved Water System Plan (WSP) or Small Water System Management Program (SWSMP). Municipal suppliers should understand service area definitions and requirements before they develop their planning documents.

Service Area Definitions and Requirements

Retail Service Area is the specific area, defined by the municipal supplier, where the supplier has a duty to provide service to new service connections as set forth in RCW 43.20.260. For details, see the Municipal Water Law: Duty to Provide Service Requirement fact sheet, DOH 331-366.

Municipal suppliers must include a map of their retail service area in their WSP. The map must show where service is currently provided and may include areas where new service is planned. The distribution system may extend beyond the approved retail service area as long as it does not go outside the overall service area.

Future Service Area is the specific area to which a water system in a Critical Water Supply Service Area is to provide water service as provided in a written agreement between purveyors under chapter 70.116 RCW and chapter 246-293 WAC.

All water systems in a Critical Water Supply Service Area must identify their future service area on map. These systems have the exclusive opportunity to provide water service in their respective future service areas. This is known as the "right of first refusal." A system may choose to decline the request if it cannot or will not provide the new service in a timely and reasonable manner as defined in the local Coordinated Water System Plan. A municipal supplier may have their future service be the same as their retail service area, but it is not required. The future service area must be fully contained within the service area.

All water systems planning under the Public Water System Coordination Act determine their future service area by written agreement. Modifications to the future service area must be consistent with the local Coordinated Water System Plan. For more information on service requests in the future service area, see DOH Pub. 331-444.

Service Area is the most expansive of all the service area types. It is the specific area a water system currently serves and areas where future water service is planned. This may include areas where wholesale water is provided to other public water systems.

All water systems must identify their service area in their WSP or SWSMP. For municipal water suppliers, the service area includes areas where it provides direct and remote service, and the area it plans to serve in the future. Unless the WSP is amended, water service may not be provided outside the service area. If wholesale water is supplied to other public water systems through an intertie, those areas must be included in the service area. The service area may represent a water right's expanded place of use if the requirements of WAC 246-290-107 are met.

Retail Service Area: Duty to serve conditions

A municipal supplier must serve an applicant for new service within its retail service area if all of the following conditions are met. These conditions apply only to the retail service area:

1. The water system has sufficient capacity to serve water in a safe and reliable manner.
2. The service request is consistent with adopted local plans and development regulations.
3. The water system has sufficient water rights to provide service.
4. The water system can provide service in a timely and reasonable manner.

The Department of Health oversees physical capacity determinations and ensures consistency with adopted local plans and development regulations (conditions 1 and 2). We consider these factors during WSP review. The Department of Ecology oversees water right determinations (condition 3). WSPs must contain a water right self-assessment. We will send a copy of the WSP to Ecology for review and incorporate water rights into service capacity determinations.

Whether a municipal supplier can provide new service in a timely and reasonable manner (condition 4) is specific to each system and application for service. It is a civil matter between the parties. The Department of Health ensures that a WSP includes service area policies and conditions of service that articulate how the system will provide new service.

Retail Service Area Boundary: Factors to consider

Because the retail service area carries a duty to serve obligation (WAC 246-290-106), a municipal supplier should consider the following before delineating its retail service area:

- Size, location, and physical features of its existing and future service areas and those of adjacent utilities.
- Population projections and land-use designations.
- How the service will be provided to the retail service area.
- System capacity and the number of connections approved by the Department of Health.
- Resources available to construct facilities needed to meet growth demands.
- Commitments, pending requests, and potential requests for water service.
- Water right limitations.
- Utility service extension ordinances for cities and towns.

For more information:

Call your ODW regional office:

Eastern Region: Spokane Valley 509-329-2100
Northwest Region: Kent 253-395-6750
Southwest Region: Tumwater 360-236-3030

Our publications are online at https://fortress.wa.gov/doh/eh/dw/publications/publications.cfm

Fact Sheet

Service Area Policies

Jan. 2017
DOH 331-438

A water system's service area is the specific area or areas the system serves or plans to serve. This may include the:

- Retail service area (applies to municipal water suppliers only)
- Future service area
- Areas where the system provides water to other public water systems

Water systems should document how they will serve these areas in their service area policies and include the policies in their water system plan.

Service area policies

Service area policies should define provisions for new service and include associated timeframes so applicants know what to expect. Having clear and complete service area policies documented in the system's water system plan will help avoid potential disputes about new service. For example, explain how new requests for service will be processed and identify potential costs applicants may incur. Outline your appeal process upfront for any service conditions you impose or for denials of service, and explain whether you offer direct service only or if you will consider remote service.

Consider the following when developing your service area policies:

- General facility charges
- Possibility for cost recovery through late-comer agreements
- Surcharges for areas outside a corporate boundary
- Cost for up-sizing facilities
- Meter specifications and material charges
- Applicable design and performance standards
- Differences between service inside or outside a corporate boundary or urban growth area
- Developer extension and main extension requirements
- Wholesaling water
- Wheeling water
- Cross-connection control devices and requirements for inspecting and testing
- Procedures for granting or requesting project time extensions
- Guiding principles such as "first-come, first served"
- Annexation

Washington State Department of Health
Environmental Public Health Division
Office of Drinking Water

HELPING TO ENSURE SAFE AND RELIABLE DRINKING WATER

Conditions of service

Conditions of service are specific requirements that help you implement your service area policies.

Consider the following when developing your conditions of service:

- System and applicant responsibilities for new service requests.
- Customer consent for inspection, maintenance, and standard repair activities that may disrupt water service.
- Whether professional engineer review is required for new system facilities to accommodate new development.

Other considerations

- Water systems located in a critical water supply service area should refer to the "timely and reasonable" framework outlined in their local Coordinated Water System Plan.
- Municipal water suppliers should provide a narrative about the "duty to serve" and summarize how they will evaluate whether they can provide service for new requests. The evaluation should discuss the system's capacity, including any non-technical conditions that may affect its ability to provide new water service (such as annexation procedures, water right limitations, or applicable local ordinances).

For more information

Call the nearest Office of Drinking Water Regional Offices:

Eastern Region: Spokane Valley 509-329-2100

Northwest Region: Kent 253-395-6750

Southwest Region: Tumwater 360-236-3030

View our fact sheets on other planning-related topics at:
https://fortress.wa.gov/doh/eh/dw/publications/publications.cfm?action=pubindex&id=14&type=subject&CFID=1135560&CFToken=78228055

Washington State Department of Health
Environmental Public Health Division
Office of Drinking Water

PUBLIC HEALTH
ALWAYS WORKING FOR A SAFER AND HEALTHIER WASHINGTON

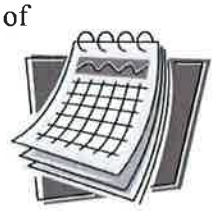
January 2017
DOH 331-444
Updated

Timely and Reasonable Water Service

Potential customers often ask water systems to extend service to new areas. These systems must consider many factors when they develop policies to govern how they will handle new requests.

Requests for new service can range from a landowner wanting to build a new home to a developer wanting to build a new subdivision. One factor that many systems must consider is how to provide new service in a timely and reasonable manner.

Two Washington State laws that govern new water service include the concept of "timely and reasonable." Created 26 years apart, the laws have different focuses, and they don't share a consistent use of the term. This document reviews and compares the two laws:



- 1977 Public Water System Coordination Act
- 2003 Municipal Water Law

Public Water System Coordination Act

Local governments administer the Coordination Act through permitting processes and Coordinated Water System Plans (CWSPs) under RCW 70.116.

CWSPs provide a local foundation to define timely and reasonable service and to administer the provision of timely and reasonable service within a critical water supply service area (CWSSA). The Coordination Act applies only to areas where a local government has declared a CWSSA. A map of CWSSAs is at Coordinated Water System Plans of Washington State.

Water systems in a CWSSA identify their future service area in the local CWSP. Applicants for new service within an existing water system's future service area must request service from that system. The system has the "right of first refusal" to provide the service. If the existing system cannot provide the new service in a timely and reasonable manner, the applicant may:

- Seek service from another water system.
- Develop a new public water system if an existing system isn't willing or able to provide the service. Local governments are responsible for ensuring an adequate potable water supply before issuing a building permit. Before developing a new water system using a permit-exempt well, applicants must check with local authorities on their criteria for establishing an adequate potable water supply. A determination of adequacy may include demonstrating that the water is potable and is both physically and legally available.

We don't determine whether new service is timely and reasonable. To resolve disputes, each CWSP contains an appeal process known as Utility Review Service Procedures.

Timely Service:
The Coordination Act defines "timely" as 120 days. It doesn't specify when the 120-day period begins and ends. Individual CWSPs can specify actions for completion in this timeframe. If they don't, water systems should incorporate the 120-day timeframe into their procedures and include them in their service area policies and conditions of service.

We suggest beginning the 120-day "timely" clock on the date the applicant and water system complete a formal agreement (unless otherwise specified).

Reasonable Service:
Although the Coordination Act doesn't define "reasonable," we suggest new water service is reasonable if conditions of service and associated costs are:

- Consistent with local land-use plans and development regulations.
- Consistent with those documented in the system's approved water system plan.
- Consistent with the system's acknowledged standard practice experienced by other applicants requesting similar water services.

Municipal Water Law

We administer the section of the Municipal Water Law that uses the term "timely and reasonable" under RCW 43.20.260. The law says municipal water suppliers have a "duty to serve" all new service connections within their **retail service area** if four conditions are met.

One of the four conditions is the ability to provide service in a timely and reasonable manner. However, the law doesn't define what constitutes timely and reasonable service. For more information a water system's duty to serve, see PUB 331-366 Duty to Provide Service Requirement.

We don't determine whether new service is timely and reasonable. Municipal water suppliers must identify a retail service area in their water system plan and discuss in their service area policies how they will provide new service in that area.

Timely and Reasonable Service:
We didn't define the term "timely and reasonable" because each water system and each service application is unique.

Applicants for new service should look to the approved water system plan to understand what is required to connect and how long it may take to obtain service. Municipal suppliers should include in their service area policies on how they respond to requests for new service, including a timeframe, how they evaluate existing system capacity, and who pays for necessary facility upgrades. For more information, see PUB 331-438 Service Area Policies.

Municipal water suppliers in a CWSSA should be aware of the differences in the two laws, including the benefits gained, obligations created, and remedies for disputes.

Key Differences

Coordination Act	Municipal Water Law
Who provides service	
Each expanding public water system in a CWSSA must identify their future service area in their individual water system plan and through service area agreements.	Municipal water suppliers must identify their retail service area in their individual water system plan.
Applicants for service	
Applicants proposing to develop a new potential public water system (serving two or more connections) must request service from the existing system.	Municipal water suppliers must provide new service to any applicant down to a single connection.
Requirement to provide service	
Applicants in an existing system's designated service area must request service from the existing system, allowing the existing system the exclusive opportunity to provide the service. This is the "right of first refusal." An existing system may decline the request if it cannot or will not provide the new service in a timely and reasonable manner (as outlined in the applicable CWSP).	Municipal water suppliers must provide service to all new connections in their retail service area if they meet four conditions. This is the "duty to serve." Municipal water suppliers (including those within a CWSSA that have the "right of first refusal") may not decline a request for new service if an applicant meets all "duty to serve" conditions at the time of the request.
Applicable service areas	
The "right of first refusal" provisions apply to the area currently served by a water system and to the future service area for all existing water systems within a CWSSA.	The "duty to serve" provisions apply to the retail service area for all municipal water suppliers. Municipal suppliers may have their retail service area equal their future service area (identified in a CWSP), but this is not required.

Coordination Act	Municipal Water Law
Timely and reasonable disputes Applicants usually realize that if they want an amount of water that precludes an exempt well, they must work out the details for new service with the water system existing in the service area for their development location.	
An applicant dissatisfied with an existing system's conditions for new service may initiate a timely and reasonable appeal. Resolution occurs through a specific process outlined in the applicable CWSP. This process can cost the applicant, water system, and local government significant amounts of time and resources. If either party is dissatisfied with the outcome of the appeal process, they may seek resolution through a civil judicial proceeding.	An applicant dissatisfied with the conditions for new service in a municipal water supplier's retail service area may appeal to the water system. If applicants are not successful, they may make their dispute a civil matter.

For more information:

Visit us at http://www.doh.wa.gov/CommunityandEnvironment/DrinkingWater.aspx

Call your Office of Drinking Water regional office:

Eastern Region: Spokane 509-329-2100

Northwest Region: Kent 253-395-6750

Southwest Region: Tumwater 360-236-3030

Our publications are online at https://fortress.wa.gov/doh/eh/dw/publications/publications.cfm

PUBLIC HEALTH
ALWAYS WORKING FOR A SAFER AND HEALTHIER WASHINGTON

For people with disabilities, this document is available on request in other formats. To submit a request, please call 1-800-525-0127 (TDD/TTY call 711).

Citizen Action Request

CAR # _____

City of McCleary
100 S. 3rd Street
McCleary, WA 98557
(360) 495-3667

Citizen Requesting Action: _____

Home Address: _____ **Do you want staff to call you?** ☐ Yes ☐ No

Daytime Phone: _____ **Home Phone:** _____

Location of Requested Action: _____

Detailed description of request or comment (be as specific as possible): _____

Signature of Requestor: _____

FOR CITY USE ONLY BELOW THIS POINT

Date received: _____ **Time:** _____ **Received by:** _____

Given to: _____ **for response and action** **Date:** _____

DEPARTMENT FOLLOW-UP

☐ P/W ☐ L&P ☐ W/S Quality ☐ Building ☐ Police ☐ Other

Date Department Received: _____ **Time:** _____

Received By: _____ **Citizen was notified on** _____ **by** _____

Response/Solution: _____

APPENDIX G

CONSUMER CONFIDENCE REPORT 2019

Inorganic Chemicals	Year Tested	Units	MCL	MCLG	Your Water	Violation?	Major Sources in Drinking Water
Nitrate	2017	ppm	10	10	<0.2	NO	Runoff from fertilizer use; leaching from septic tanks; sewage; erosion or natural deposits

Lead & Copper samples are collected at customer faucets. The number of homes sampled is based on population served by the system. Specific EPA mandated criteria are used to select the homes. This testing is done every three years.

Primary Contaminants	Year Tested	Units	AL	90th Percentile	Samples > AL	Violation?	Major Sources in Drinking Water
*Copper	2016	ppm	1.3	0.16	0 of 10	NO	Corrosion of household systems erosions of natural deposits
*Lead	2016	ppm	0.015	0.001	0 of 10	NO	Corrision of household systems erosions of natural deposits

Disinfectant (an additive)	Year Tested	Units	MCL	MRDLG	Running Average	Range	Violation?	In Drinking Water
Free Chlorine Residual	2017	ppm	4	4	0.28	.02 - .80	NO	Water additive used for filter treatment and microbe control

Disinfection Byproducts	Year Tested	Units	SRL	MCL	Your Water	Violation?	Major Sources in Drinking Water
HAA5	2017	ug/L	15	60	N/D	NO	Organic matter and disinfection products
Total Trihalomethanes	2017	ug/L	0.5	80	6.5	NO	Organic matter and disinfection products

Tables ...

The Table briefly identifies the results of the required testing that the Department of Health requires of the City of McCleary.

Also ...

Besides the testing on the preceding table we are also required to test for :

Test	*Next Sample Due*
Asbestos	Oct 2019
Complete Inorganics (IOC)	Dec 2022
Volatile Organics (VOC)	Oct 2019
Herbicides	Oct 2018
Pesticides	Dec 2019
Soil Fumigants	Dec 2019
Gross Alpha	Sep 2022
Radium 228	Sep 2022

Because of our excellent test results we have had waivers on our IOC's, VOC's ranging from 6 to 9 years. The Department of Health requires testing t for more than 45 Herbicides, Pesticides and Soil Fumigants. Fall of 2018 we will be testing for Herbicides in the drinking water. McCleary's water has had no evidence of these chemicals in the drinking water, therefore we have been granted waivers ranging from 3 to 9 years between tests.

*Copper not to be retested until Aug 2019

*Lead not to be retested until Aug 2019

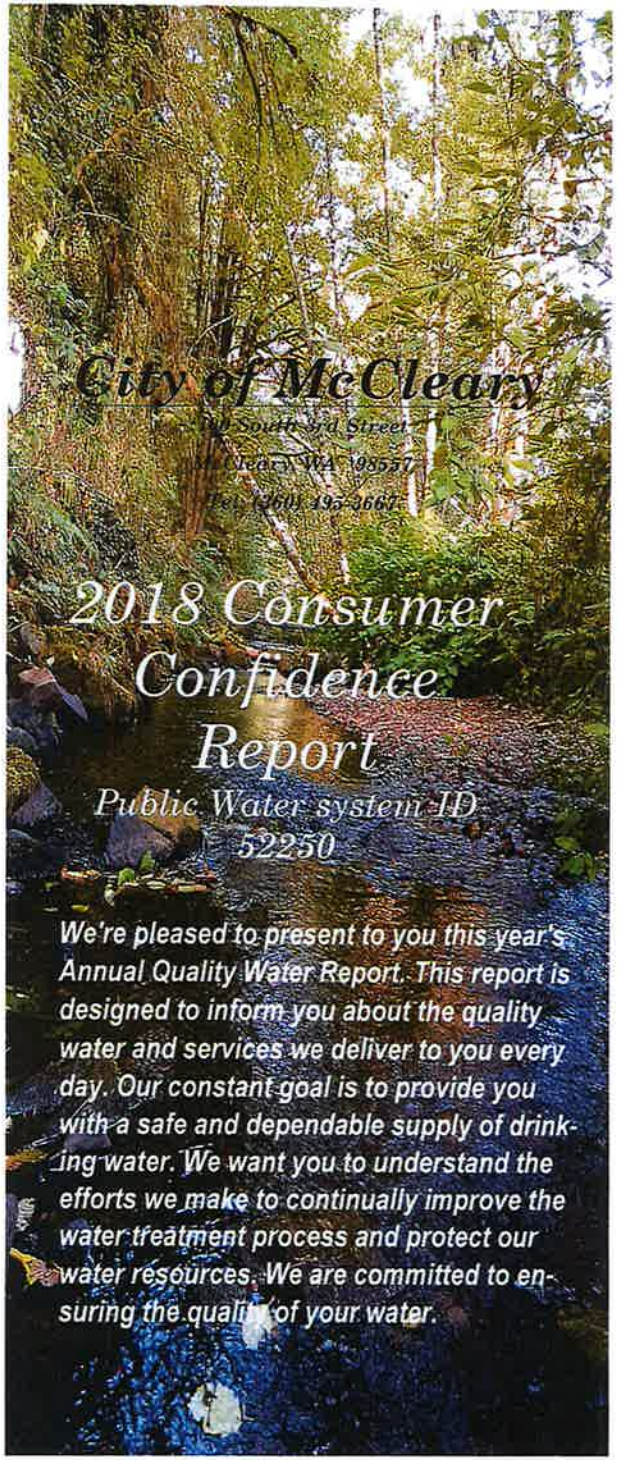
We at The City of McCleary...

work tirelessly to provide top quality water to every tap.

We ask that all our customers help us protect our water sources, which are the heart of our community, our way of life and our children's future.

Water Plant Manager: Kevin Trewhella

Phone: 360-495-3217



2018 Annual Drinking Water Quality Report

The source of our water comes from two 90 foot deep wells, located on city property, just west of the SR108 turnoff, in the northern part of town. From the source, a disinfectant is injected into the system to protect us from microbial contaminants. From there the water is filtered to remove Iron & Manganese It is then conveyed through the distribution system to 2 storage tanks located to the east of the city, high on a hill. I am pleased to report that McCleary's tap water' continues to meet state drinking water and Environmental Protection Agency (EPA) health standards for 2018.

Continued water quality testing results report that our system has not violated a primary maximum contaminate level (MCL) or primary water quality standard.

Additional Health Information:

Lead - Elevated levels of lead, if present, can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing.

The City of McCleary is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components.

When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking.

If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the...

Safe Drinking Water Hotline or at *http://www.epa.gov/safewater/lead.*

WATER...

Drinking water, including bottled water, can contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained from the EPA's Safe Drinking Water Hotline.

The sources of contaminants can be naturally occurring minerals and from the presence of animals or from human activity. Some people may be more vulnerable to contaminants in drinking water than the general population. Persons with immune system deficiencies, such as those with cancer under going chemotherapy, or who have undergone organ transplants, or people with HIV/AIDS or other immune system disorders, and some elderly, and infants can be particularly at risk from infections. Persons with such conditions should seek advice about drinking water from their health care providers. EPA/Centers for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection from microbial contaminants are available from the Safe Drinking Water Hotline.

More information is contained in the city's Water System Plan. You can review this plan, as well as recent water testing results, by contacting McCleary City Hall.

Water Use Efficiency Report

Every year the Department of Health ask us to record how much water we Produce, Sell and Lose. Losses are generally caused by leaks. The following is a summary of what we produce, sell and lose.

Distribution System Leakage Summary:	
Total Water Produced -Annual Volume	68,267,136
Water Sold – Annual Volume	*64,988,337*
Distribution System Leakage – Annual Volume	*3,278,799*
Distribution System Leakage - Percent	*4.8 %*
3-year annual average	*6.4 %*

Key Definitions...

Action Level (AL): The concentration of a contaminant which, when exceeded, triggers treatment or other requirements which a water system must follow.

Lead and Copper 90th Percentile Value: Out of every 10homes sampled, 9 were at or below this level. This must be less than or equal to the AL or additional steps must be taken.

Maximum Contaminant Level (MCL): The highest level of a contaminant allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.

Maximum Contaminant Level Goal (MCLG): The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

Maximum Residual Disinfectant Level (MRDL): The highest level of a disinfectan: allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants

Maximum Residual Disinfectant Level Goal (MRDLG): 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.

N/A: Not applicable

N/D: Not detectible

ppb: Parts per billion (µg/L, micrograms per liter)

ppm: Parts per million (mg/L, milligrams per liter)

Secondary Maximum Contaminant Level (SMCL): These standards are developed as guidelines to protect the aesthetic qualities of drinking water and are not health based.

EPA Safe Drinking Water Hotline
(800) 462-4791

APPENDIX H

SUMMARY OF WATER QUALITY REGULATIONS

VOC/SOC/IOC/ASBESTOS/BACTERIOLOGICAL/DBP EXCEEDANCES

WATER QUALITY MONITORING SCHEDULE

WATER QUALITY REGULATIONS

BACKGROUND

The Safe Drinking Water Act (SDWA) of 1974, amended in 1986 and 1996, established specific roles for the federal government, state government, and water system purveyors, with respect to water quality monitoring. The US Environmental Protection Agency (EPA) is authorized to develop national drinking water regulations and oversee the implementation of the act. Once the federal regulations become effective (i.e. promulgated), the States may adopt the federal law and accept the primary responsibility for implementation and enforcement of the law.

In Washington State, State Drinking Water Regulations are published in Washington Administrative Code (WAC) 246-290. These regulations establish monitoring requirements, maximum contaminant levels, and requirements for follow-up actions. The latest version of the WAC is July 1994, which incorporates the SDWA regulations.

On August 6, 1996, additional amendments to the Safe Drinking Water Act were enacted as public law (PL) 104-182. The 1996 amendments updated the regulations concerning arsenic, radon, groundwater disinfection and filtration, as well as authorized more than $12 billion in federal funds for various drinking water programs through the year 2003. These new regulations have not yet been incorporated into Washington State law.

Minimum standards for water quality are specified in terms of Maximum Contaminant Levels (MCLs). Primary MCLs are based on chronic and/or acute human health effects. Secondary MCLs are based on factors other than health effects, including aesthetics.

Public water suppliers have the responsibility of meeting the requirements of the regulations on a day-to-day basis. Monitoring requirements are often established for regulated contaminants to ensure that water systems demonstrate compliance with MCLs or treatment technique requirements. Public water suppliers are also required to retain certain records and submit reports to the Washington State Department of Health (DOH).

EXISTING DRINKING WATER REGULATIONS

Bacteriological

Coliform bacteria describes 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 water borne diseases, so these tests are strictly monitored and regulated by the DOH.

The Coliform Monitoring Rule specifies two types of violations, "nonacute MCL" and "acute MCL". A purveyor is required to notify both the DOH and system consumers if either MCL violation occurs. A violation of bacteriological MCLs occurs during routine sampling when:

- Coliform is detected in more than one sample in a single month (nonacute MCL);
- Coliform is present in a set of repeat samples collected as a follow-up to a sample with fecal coliform or E. coli presence (acute MCL);
- Fecal coliform or E. coli is present in a repeat sample after coliform was detected in the routine sample (acute MCL).

Systems must monitor for coliform in accordance with their Coliform Monitoring Plan.

Residual Disinfectant

WAC 246-290-300, -440, and –664 require residual disinfectant concentration monitoring on a daily basis. For filtered systems serving more than 3,300 people each month, WAC 246-290-664 requires continuous monitoring of the residual disinfectant concentration of water entering the distribution system, with the lowest value reported each day. For distribution systems, residual disinfectant concentration at representative points is required to be measured on a daily basis, or as otherwise approved by the DOH. At a minimum, residual disinfectant concentration within the distribution system must also be measured at the same time and location that routine coliform samples are collected. Water in the distribution system must contain a residual disinfectant concentration throughout the distribution system.

Lead and Copper

In 1991, the EPA promulgated the Federal Lead and Copper Rule (LCR). The State of Washington adopted this rule in 1995, with minimal changes. The LCR is intended to reduce the tap water concentrations of lead and copper that can occur when corrosive source water causes lead and copper to leach from water meters and other plumbing fixtures.

The LCR requires an initial monitoring phase, in which tow rounds of water sampling are conducted for lead and copper. If the Action Levels of 0.015 mg/L for lead and 1.3 mg/L for copper are exceeded in more than 10 percent of the samples, the water system is required to take additional action to reduce lead and copper concentrations.

Consumer Confidence Report (CCR)

This rule was finalized on August 19, 1998. The Consumer Confidence Report Rule requires community water system purveyors to prepare and distribute an annual report of water quality analyses to their customers. Purveyors are required to submit the Consumer Confidence Report (CCR) to their customers before the 1st of July each year.

Stage 1 Disinfectants/Disinfection Byproducts Rule (DBPR)

Trihalomethanes (THMs) are a group of organic compounds that can be formed as a result of drinking water disinfection by chlorine, and are often referred to as disinfection byproducts. TTHMs include the sum of the concentrations of four disinfection byproducts, including trichloromethane, bromodichloromethane, dibromochloromethane, and tribromomethane. Under Stage 1 of the DBPR, the MCL for TTHMs is 0.08 mg/L (80 µg/L) and is based on the running annual average of four samples, one per quarter. The MCL for HAA5 is 0.06 mg/L (60 µg/L) and is based on the running annual average of four quarterly samples.

The Stage 1 D/DBP Rule became effective in February 1999. Small systems will have to be in compliance by January 2004. This rule is aimed at water systems that introduce a disinfectant during any part of the treatment process.

Systems are also required to have a percent reduction in Total Organic Carbon (TOC) found in the source water. The reduction in TOC required is dependent upon treatment techniques.

IOCs, VOCs and SOCs

The State of Washington has adopted Federal MCLs and monitoring regulations for inorganic chemicals and physical parameters (IOCs), volatile organic compounds (VOCs), and synthetic organic compounds (SOCs). The Federal standards were originally promulgated in the Phase I Rule and updated in the Phase II and Phase V Rules. Lists of current state MCLs for IOCs, VOCs, and SOCs is provided below.

TABLE 1

Primary Water Quality Standards Inorganic Chemical Characteristics[1]

Chemical	Primary MCL (mg/L)
Antimony (Sb)	0.006
Arsenic (As)	0.01
Asbestos	7 million fibers/liter (length > 10 microns)
Barium (Ba)	2.0
Beryllium (Be)	0.004
Cadmium (Cd)	0.005
Chromium (Cr)	0.1
Copper (Cu)	[2]
Cyanide (HCN)	0.2
Fluoride (F)	4.0
Lead (Pb)	[2]
Mercury (Hg)	0.002
Nickel (Ni)	0.1
Nitrate (as N)	10.0
Nitrite (as N)	1.0
Selenium (Se)	0.05
Sodium (Na)	[2]
Thallium (Tl)	0.002

(1) Source: DOH Drinking Water Regulations, effective April 1999.

(2) Although the state Board of Health has not established MCLs for copper, lead, and sodium, there is sufficient public health significance connected with copper, lead, and sodium levels to require inclusion in inorganic chemical and physical source monitoring. For lead and copper, the EPA has established distribution system related levels at which a system is required to consider corrosion control. These levels, called "action levels", are 0.015 mg/L for lead and 1.3 mg/L for copper and are applied to the highest concentration in ten percent of all samples collected from the distribution system. The EPA has also established a recommended level of 20 mg/L for sodium as a level of concern for those consumers that may be restricted for daily sodium intake into their diets.

TABLE 2

Secondary Water Quality Standards Inorganic Chemical and Physical Characteristics[1]

Chemical/Characteristic	Secondary MCL (mg/L)
Chloride (Cl)	250.0
Fluoride (F)	2.0
Iron (Fe)	0.3
Manganese (Mn)	0.05
Silver (Ag)	0.1
Sulfate (SO4)	250.0
Zinc (Zn)	5.0
Color	15 Color Units
Hardness	None Established
Specific Conductivity	700 umhos/cm
Total Dissolved Solids (TDS)	500

Source: State DOH Drinking Water Regulations, effective April 1999.

TABLE 3

Regulated VOCs and SOCs

Organic Chemical	Federal Regulation	Primary MCL (mg/L)[1]	Organic Chemical	Federal Regulation	Primary MCL (mg/L)[1]
Volatile Organic Chemicals (VOCs)					
Vinyl Chloride	Phase I	0.002	Monochlorobenzene	Phase II	0.1
Benzene	Phase I	0.005	Ortho-Dichlorobenzene	Phase II	0.6
Carbon Tetrachloride	Phase I	0.005	Styrene	Phase II	0.1
1,2-Dichloroethane	Phase I	0.005	Tetrachloroethylene	Phase II	0.005
Trichloroethylene	Phase I	0.005	Toluene	Phase II	1
para-Dichlorobenzene	Phase I	0.075	Trans-1,2-Dichloroethylene	Phase II	0.1
1,1-dichloroethylene	Phase I	0.007	Xylenes (total)	Phase II	10
1,1,1-Trichloroethane	Phase I	0.2	Dichloromethane	Phase V	0.005
cis-1,2-Dichloroethylene	Phase II	0.07	1,2,4-Trichloro-benzene	Phase V	0.07
1,2-Dichloropropane	Phase II	0.005	1,1,2-Thrichloro-ethane	Phase V	0.005
Ethylbenzene	Phase II	0.7			
Synthetic Organic Chemicals (SOCs)					
Arochlor	Phase II	0.002	2,4,5-TP	Phase II	0.05
Aldicarb	Phase II[2]	0.003	Benzo(a)pyrene	Phase V	0.0002
Aldicarb sulfone	Phase II[2]	0.003	Dalapon	Phase V	0.2
Aldicarb sulfoxide	Phase II[2]	0.004	Di(2-ethylhexyl) adipate	Phase V	0.4
Atrazine	Phase II	0.003	Di(2-ethylhexyl) phthalate	Phase V	0.006
Carbofuran	Phase II	0.04	Dinoseb	Phase V	0.007
Chlordane	Phase II	0.002	Diquat	Phase V	0.02
Dibromochloro-propane	Phase II	0.0002	Endothall	Phase V	0.1

TABLE 3 – (continued)

Regulated VOCs and SOCs

Organic Chemical	Federal Regulation	Primary MCL (mg/L)[1]	Organic Chemical	Federal Regulation	Primary MCL (mg/L)[1]
2,4-D	Phase II	0.07	Endrin	Phase V	0.002
Ethylene dibromide	Phase II	0.00005	Glyphosate	Phase V	0.7
Heptachlor	Phase II	0.0004	Hexachlorobenzene	Phase V	0.001
Heptachlor epoxide	Phase II	0.0002	Hexachloro Cyclopentadiene	Phase V	0.05
Lindane	Phase II	0.0002	Oxamyl (vydate)	Phase V	0.2
Methoxychlor	Phase II	0.04	Picloram	Phase V	0.5
Polychlorinated biphenyls (PCBs)	Phase II	0.0005	Simazine	Phase V	0.004
Pentachlorophenol	Phase II	0.001	2,3,7,8-TCDD (dioxin)	Phase V	$3x10^{-8}$
Toxaphene	Phase II	0.003			

(1) 40 CFR 141.61(a) & (c); adopted by State Board of Health, effective April 1999
(2) Delayed; re-proposal of MCLs for aldicarb compounds expected in the future.

Information Collection Rule (ICR)

The Information Collection Rule (ICR) generates large volumes of data on the occurrence of microbiological agents, disinfection by-products, and treatment for a variety of surface waters across the country. The ICR specifies which systems are required to comply based on service area population. Systems serving 100,000 people or more are required to conduct monitoring under the ICR.

Radionuclides Rule

Existing state law requires monitoring of existing drinking water sources for radionuclides. Radionuclides include radioactive substances occurring naturally in surface waters. Regulated substances include radium-226, radium-228, uranium, and gross alpha and beta particles.

Table 4 summarizes radionuclide MCLs as defined by EPA's Radionuclide Rule and Washington State Department of Health's WAC 246-290.

TABLE 4

Radionuclide MCLs

Radionuclide	MCL
Radium – 226	3 pCi/L
Radium – 228	20 pCi/L
Combined Radium - 226 and 228	5 Ci/L
Uranium	20 µg/L
Gross Alpha (excluding Uranium)	15 pCi/L
Gross Beta	4 millirem

WAC 246-290 requires radionuclide samples once every four years.

Interim Enhanced Surface Water Treatment Rule (IESWTR)

The purpose of the IESWTR is to improve control of microbial pathogens, specifically the protozoan Cryptosporidium, in drinking water and address risk trade-offs with disinfection byproducts. The rule requires systems to meet strengthened filtration requirements as well as to calculate levels of microbial inactivation to ensure that microbial protection is not jeopardized if systems make changes to comply with disinfection requirements of the Stage 1 Disinfection and Disinfection Byproducts Rule (DBPR). The IESWTR applies to public water systems that use surface water or ground water under the direct influence of surface water and serve more than 10,000 people.

Long Term 1 Enhanced Surface Water Treatment Rule (LT1ESWTR)

The LT1ESWTR applies to public water systems that use surface water or groundwater under the direct influence of surface water and serve fewer than 10,000 persons. The LT1ESWTR builds upon the framework established for systems serving a population of 10,000 or more in the IESWTR.

Filter Backwash Recycling Rule

The Filter Backwash Recycling Rule relates to those systems that recycle filter backwash water. The rule is intended to ensure that the 2-log Cryptosporidium removal requirement established in the IESWTR and proposed in the LT1ESWTR is not jeopardized by recycle practices.

Unregulated Contaminant Monitoring Rule (UCMR)

The 1996 amendments to the SDWA require EPA to publish a list of non-regulated contaminants every five years, which may warrant regulation due to their health effects and their potential for occurrence in public water systems. The rule was published on September 17, 1999 and supplemented on March 2, 2000 and January 11, 2001. The data generated by the UCMR will be used to evaluate and prioritize contaminants on the Drinking Water Contaminant Candidate List.

Three different lists of contaminants based on the availability of established analytical methods are included in the Rule. These lists are included as Table 5. List 1 includes 12 chemical contaminants for which analytical methods exist. Monitoring of List 1 contaminants is to occur at approximately 2,800 large water systems and a representative sample of 800 small water systems. The monitoring results from these systems will be used to estimate national occurrence of the 12 contaminants on List 1. Surface water systems will monitor quarterly during a 1-year period and groundwater systems will monitor twice in a 1-year period. Assessment monitoring was to be done within the three years of 2001 to 2003, which allowed coordination with the 3-year compliance (for regulated contaminants) monitoring cycle. One of these quarterly or semi annual sampling events was to occur in the most vulnerable period of May through July, or an alternate vulnerable period designated by the State.

List 2 contaminants are those for which analytical methods have just been developed and for which EPA has less occurrence data than the contaminants on List 1. Monitoring for List 2 contaminants occurred in 2001 through 2003 for a randomly selected set of 300 large and small systems. List 3 contaminants have in recent years emerged as drinking water concerns and, in most cases, only have methods in an early stage of development. Monitoring of List 3 contaminants will be performed only after future rulemaking specifies methods.

TABLE 5

UCMR Monitoring List

List 1: Assessment Monitoring of Contaminants with Available Methods	List 2: Screening Surveys of Contaminants with Methods Just Developed	List 3: Pre-Screen Testing of Contaminants Needing Research on Methods
2,4-dinitrotoluene	1,2-diphenylhydrazine	Lead-210
2,6-dinitrotoluene	2-methyl-phenol	Polonium-210
Acetochlor	2,4-dichlorophenol	Cyanobacteria
DCPA mono-acid degradate	2-4-dinitropehnol	Echoiruses
DCPA di-acid degradate	2, 4, 6-trichlorophenol	Coxsackieviruses
4, 4'-DDE	Diazinon	Helicobacter pylori
EPTC	Disulfoton	Microsporidia
Molinate	Diuron	Caliciviruses
MTBE	Fonofos	Adenoviruses
Nitorbenzene	Linuron	
Perchlorate	Nitrobenzene	
Terbacil	Prometon	
	Terbufos	
	Aeromonas(1)	
	Alachlor ESA(2)	
	RDX(2)	

(1) The Screening Survey for Aeromonas occurred in 2003. Applicable public water systems were notified.

(2) The monitoring period for Alachlor ESA, RDX and all List 3 contaminants will be performed only after future rulemaking specifies methods.

Arsenic Rule

The Arsenic Rule establishes a non-enforceable Maximum Contaminant Level Goal (MCLG) for arsenic of zero and an enforceable Maximum Contaminant Level (MCL) for arsenic of 0.01 mg/L (10 µg/L). This regulation applies to non-transient non-community water systems, which are not presently subject to standards on arsenic in drinking water, and to community water systems.

ANTICIPATED FUTURE DRINKING WATER REGULATIONS

Groundwater Rule

The Groundwater Rule establishes a method for determining if disinfection of a groundwater source is required. It also establishes disinfection standards for those

sources where disinfection is required. Disinfection standards are established in terms of a residual disinfectant concentration and a disinfection contact time requirement. These standards depend in part on characteristics of the water, such as pH and temperature. In general, disinfection is more effective at lower pH values and higher temperatures.

Sulfate Rule

The EPA is expected to publish the final version of the Sulfate Rule in 2005, which will establish a primary sulfate MCL. The primary sulfate MCL in the proposed rule of 500 mg/L is based on taste and odor effects. If the final rule publication date is met, the effective date for the rule is expected to be 2008.

Aldicarb Rule

Final MCLs for the pesticides aldicarb, aldicarb sulfone, and aldicarb sulfoxide have been established under the Phase II Rule for SOCs and IOCs. However, the effective date for these MCLs was postponed when the EPA agreed to reexamine the health effects data for aldicarb compounds. The EPA is expected to propose MCLs of 7 µg/L for each pesticide with a 9 µg/L composite total.

Radon

Though a radon MCL was included in the originally proposed Radionuclide Rule, it was determined that a radon MCL will now be issued as a separate rule. In November of 1999, EPA proposed a preliminary radon MCL of 300 pCi/L. EPA is considering an alternative MCL of 4,000 pCi/L if states or water purveyors implement a multimedia mitigation program aimed at reducing household indoor-air health risks from radon gas from soil as well as tap water. The final Radon Rule is expected in 2005.

Stage 2 Disinfectants/Disinfection By-Products Rule

The Stage 2 DBPR applies to public water systems (PWSs) that are community water systems (CWSs) or nontransient noncommunity water systems (NTNCWs) that add a primary or residual disinfectant other than ultraviolet light or deliver water that has been treated with a primary or residual disinfectant other than ultraviolet light. The key provision in this rule is the change in calculating the maximum contaminant level (MCL). Up to now, compliance with the MCL was calculated using a running annual average (RAA) to average compliance samples across the distribution system sampling locations. Under Stage 2 DBPR, the MCL will be calculated using locational running annual averages (LRAAs). PWSs must maintain the locational rolling annual average (LRAA) for each compliance sampling location at or below 0.080 mg/L total trihalomethane (TTHM) and 0.060 mg/L haloacetic acids (HAA5). All systems, including consecutive systems, must comply with the MCLs for TTHM and HAA5 LRAA using compliance sampling locations identified under the Initial Distribution System Evaluation (IDSE) or in specific instances, using existing Stage 1 DBPR compliance monitoring locations.

In addition to setting the new requirement for LRAA, the Stage 2 DBPR sets rules for determining the required locations of the LRAA sampling sites through an initial distribution system evaluation (IDSE), including a standard monitoring option based on Stage 1 monitoring results, and an alternative option based on modeling and sampling, sets standards for reduced monitoring and monitoring waivers, sets compliance dates for submittal of IDSE reports based on population served, sets long term monitoring requirements to apply after approval of the IDSE report, sets response requirements for exceedance of the LRAA MCL, and sets minimum reporting requirements.

This summary of the Stage 2 D/DBP rule was taken from, and more details are available at, the following web site:

http://www.awwa.org/Advocacy/govtaff/issues/Issue02_Disinfectants_By-Products.cfm

Washington State Department of Health

Division of Environmental Health
Office of Drinking Water

Help

Individual System View

Compliance Actions | Operating Permits | Operators | Reports | Water Use Efficiency

General Information | Source Information | Samples | Exceedances | Water Quality Monitoring Schedule

Type	Source	DOE Source	Collect Date	Analyte	Result Quantity	Units	Test Panel	Analyte Group	Sample Number	Lab Number
MCL2	01	22G037	11/13/1986	IRON	0.360	mg/L	ICHEM	IOC	09337	051
MCL2	01	22G037	11/13/1986	MANGANESE	0.133	mg/L	ICHEM	IOC	09337	051
MCL2	01	22G037	2/14/1984	MANGANESE	0.051	mg/L	ICHEM	IOC	06954	051
MCL2	01	22G037	4/29/1981	MANGANESE	0.100	mg/L	ICHEM	IOC	04536	051
MCL2	01	22G037	11/6/1975	IRON	0.840	mg/L	ICHEM	IOC	02035	051
MCL2	01	22G037	11/6/1975	MANGANESE	0.060	mg/L	ICHEM	IOC	02034	051
MCL2	01	22G037	11/6/1975	MANGANESE	0.100	mg/L	ICHEM	IOC	02032	051
MCL2	02	22G019	7/6/2004	MANGANESE	0.080	mg/L	IOC	IOC	68627	089
MCL2	02	22G019	3/4/1993	MANGANESE	0.084	mg/L	ICHEM	IOC	14392	051
MCL2	02	22G019	8/31/1989	MANGANESE	0.104	mg/L	ICHEM	IOC	11912	051
MCL2	03	22G020	10/5/2004	MANGANESE	0.100	mg/L	IOC	IOC	00384	089
MCL2	03	22G020	3/4/1993	IRON	0.310	mg/L	ICHEM	IOC	14393	051
MCL2	03	22G020	3/4/1993	MANGANESE	0.106	mg/L	ICHEM	IOC	14393	051
MCL2	03	22G020	8/31/1989	MANGANESE	0.131	mg/L	ICHEM	IOC	11913	051
P	Distribution		3/4/2008	E. COLI	Present	/100ml	COLI_AP	MICRO	61790	089
P	Distribution		3/4/2008	TOTAL COLIFORM	Present	/100ml	COLI_AP	MICRO	61790	089
P	Distribution		10/15/2002	TOTAL COLIFORM	Present	/100ml	COLI_AP	MICRO	21835	070
P	Distribution		10/15/2002	TOTAL COLIFORM	Present	/100ml	COLI_AP	MICRO	21834	070
P	Distribution		8/7/2000	TOTAL COLIFORM	Present	/100ml	COLI_AP	MICRO	01660	070
P	Distribution		6/3/1997	TOTAL COLIFORM	Present	/100ml	COLI_AP	MICRO	71186	070

Records 1 - 20 of 20

Export CSV

Links to external resources are provided as a public service and do not imply endorsement by the Washington State Department of Health

Department of Health, Office of Drinking Water

Street Address:
243 Israel Road S.E. 2nd floor
Tumwater, WA 98501

Mail:
PO BOX 47822
Olympia, WA 98504-7822

Phone: (360) 236-3100

Send inquiries about DOH and its programs to the Health Consumer Assistance Office
Comments or questions regarding this Web site? Send email to Environmental Health Application Testing and Support or call 360-236-3113.

Washington State Department of Health
Environmental Public Health
Office of Drinking Water

Water Quality Monitoring Schedule

System: MCCLEARY, CITY OF
Contact: Todd A Baun

PWS ID: 52250 U
Group: A - Comm

Region: SOUTHWEST
County: GRAYS HARBOR

NOTE: To receive credit for compliance samples, you must fill out laboratory and sample paperwork completely, send your samples to a laboratory accredited by Washington State to conduct the analyses, AND ensure the results are submitted to DOH Office of Drinking Water. There is often a lag time between when you collect your sample, when we credit your system with meeting the monitoring requirement, and when we generate the new monitoring requirement.

Coliform Monitoring Requirements

	Jul 2018	Aug 2018	Sep 2018	Oct 2018	Nov 2018	Dec 2018	Jan 2019	Feb 2019	Mar 2019	Apr 2019	May 2019	Jun 2019
Coliform Monitoring Population	2370	2370	2753	2753	2753	2753	2753	2753	2753	2753	2753	2753
Number of Routine Samples Required	2	2	3	3	3	3	3	3	3	3	3	3

- Collect samples from representative points throughout the distribution system.
- Collect required repeat samples following an unsatisfactory sample. In addition, collect a sample from each operating groundwater source.
- For systems that chlorinate, record chlorine residual (measured when the coliform sample is collected) on the coliform lab slip.

Chemical Monitoring Requirements

Distribution Monitoring

Test Panel/Analyte	*# Samples Required*	*Compliance Period*	*Frequency*	*Last Sample Date*	*Next Sample Due*
Lead and Copper	10	Jan 2017 - Dec 2019	standard - 3 year	09/13/2016	Aug 2019
Asbestos	1	Jan 2011 - Dec 2019	standard - 9 year	12/03/2010	Oct 2019
Total Trihalomethane (THM)	1	Jan 2018 - Dec 2018	reduced - 1 year	09/26/2017	***Sep 2018***
Halo-Acetic Acids (HAA5)	1	Jan 2018 - Dec 2018	reduced - 1 year	09/26/2017	***Sep 2018***

Water Quality Monitoring Schedule

Notes on Distribution System Chemical Monitoring

For *Lead and Copper*:
- Collect samples from the COLD WATER side of a KITCHEN or BATHROOM faucet that is used daily.
- Before sampling, make sure the water has sat unused in the pipes for at least 6 hours, but no more than 12 hours (e.g. overnight).
- If you are sampling from a faucet that has hot water, make sure cold water is the last water to run through the faucet before it sits overnight.
- If your sampling frequency is annual or every 3 years, collect samples between June 1 and September 30.

For *Asbestos:* Collect the sample from one of your routine coliform sampling sites in an area of your distribution system that has asbestos concrete pipe.

For *Disinfection Byproducts (HAA5 and THM):* Collect the samples at the locations identified in your Disinfection Byproducts (DBP) monitoring plan.

Source Monitoring

- Collect 'source' chemical monitoring samples from a tap after all treatment (if any), but before entering the distribution system.
- Washington State grants monitoring waivers for various test panels /analytes. Please note that we may require some monitoring as a condition of some waivers. We have granted complete waivers for dioxin, endothal, glyphosate, diquat, and insecticides.
- Nitrate, arsenic, iron, and other individual inorganics are included as part of a Complete Inorganic (IOC) analysis when it is collected.

Source S01 *WF (S02 & S03)* *Well Field* *Use - Permanent* *Susceptility - Moderate*

Test Panel/Analyte	*# Samples Required*	*Compliance Period*	*Frequency*	*Last Sample Date*	*Next Sample Due*
Nitrate	1	Jan 2018 - Dec 2018	standard - 1 year	10/10/2017	***Oct 2018***
Complete Inorganic (IOC)	1	Jan 2011 - Dec 2019	waiver - 9 year	12/09/2013	
Iron	1	Jan 2017 - Dec 2019	standard - 3 year	09/10/2013	May 2019
Manganese	1	Jan 2017 - Dec 2019	standard - 3 year	09/10/2013	Jun 2019
Volatile Organics (VOC)	1	Jan 2014 - Dec 2019	waiver - 6 year	12/17/2013	Oct 2019
Herbicides	1	Jan 2014 - Dec 2022	waiver - 9 year	10/26/2009	***Oct 2018***
Pesticides	0	Jan 2017 - Dec 2019	waiver - 3 year	10/26/2009	
Soil Fumigants	0	Jan 2017 - Dec 2019	waiver - 3 year		
Gross Alpha	1	Jan 2014 - Dec 2019	standard - 6 year	07/20/2010	
Radium 228	1	Jan 2014 - Dec 2019	standard - 6 year	07/20/2010	

Water Quality Monitoring Schedule

Other Information

Other Reporting Schedules	*Due Date*
Measure chlorine residuals and submit monthly reports if your system uses continuous chlorination:	monthly
Submit Consumer Confidence Report (CCR) to customers and ODW (Community systems only):	07/01/2018
Submit CCR certification form to ODW (Community systems only):	10/01/2018
Submit Water Use Efficiency report online to ODW and to customers (Community and other municipal water systems only):	07/01/2018
Send notices of lead and copper sample results to the customers sampled:	30 days after you receive the laboratory results
Submit Certification of customer notification of lead and copper results to ODW:	90 days after you notify customers

Special Notes

None

Southwest Regional Water Quality Monitoring Contacts

For questions regarding chemical monitoring:	Sophia Petro: (360) 236-3046 or sophia.petro@doh.wa.gov
For questions regarding DBPs:	Sophia Petro: (360) 236-3046 or sophia.petro@doh.wa.gov
For questions regarding coliform bacteria and microbial issues:	Southwest Office: (360) 236-3030 or SWRO.Coli@doh.wa.gov

Additional Notes

The information on this monitoring schedule is valid as of the date in the upper left corner on the first page. However, the information may change with subsequent updates in our water quality monitoring database as we receive new data or revise monitoring schedules. There is often a lag time between when you collect your sample and when we credit your system with meeting the monitoring requirement.

We have not designed this monitoring schedule to display all compliance requirements. The purpose of this schedule is to assist water systems with planning for most water quality monitoring, and to allow systems to compare their records with DOH ODW records. Please be aware that this monitoring schedule does not include constituents that require a special monitoring frequency, such as monitoring affiliated with treatment.

Any inaccuracies on this schedule will not relieve the water system owner and operator of the requirement to comply with applicable regulations.

If you have any questions about your monitoring requirements, please contact the regional office staff listed above.

APPENDIX I

DISINFECTION BYPRODUCTS MONITORING PLAN (DBP)

COLIFORM MONITORING PLAN

Coliform Monitoring Plan for: City of McCleary

A. System Information

Plan Date: January 2020

Water System Name City of McCleary	**County** Grays Harbor	**System I.D. Number** 52250 U
Name of Plan Preparer Eric Noah	**Position** Consultant	**Daytime Phone** **360-292-7481**
Sources: DOH Source Number, Source Name, Well Depth, Pumping Capacity	S02 – Well No. 2 S03 – Well No. 3	
Storage: List and Describe	500,000 gallon –steel, 150,000 gallon - steel	
Treatment: Source Number & Process	All sources – sodium hypochlorite, pyrolusite catalytic oxidation and filtration	
Pressure Zones: Number and name	Single pressure zone	
Population by Pressure Zone	1,684 persons	
Number of Routine Samples Required Monthly by Regulation:		2 (July and August) 3 (Sept. through June)
Number of Sample Sites Needed to Represent the Distribution System:		3
***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 Water Management Laboratories	**Office Phone 253-531-3121** **After Hours Phone 253-531-3121**
Address 1515 80th Street East Tacoma, Washington 98404	**Cell Phone - -** **Email** _____
Hours of Operation Mon-Fri: 8:00 AM to 5:00 PM, Saturday: 9:00 AM to 12:00 PM, Sunday: Closed	
Contact Name Diane DuMond	
Emergency Laboratory Name _____	**Office Phone - -** **After Hours Phone - -**
Address _____	**Cell Phone - -** **Email** _____
Hours of Operation _____	

Contact Name
_____

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: Contact Name: Telephone Numbers Office - - After Hours - -		
If yes, Water System Name: Contact Name: Telephone Numbers Office - - After Hours - -		
If yes, Water System Name: Contact Name: Telephone Numbers Office - - After Hours - -		
If yes, Water System Name: Contact Name: Telephone Numbers Office - - After Hours - -		

D. Routine, Repeat, and Triggered Source Sample Locations*

Location/Address for **Routine Sample Sites**	Location/Address for **Repeat Sample Sites**	Groundwater Sources for **Triggered Sample Sites****
X1. 700 W. Maple	**1-1. 700 W. Maple**	**S01___**
	1-2. City Wells	**S___**
	1-3. 100 S. 3rd Street	**S___**
		S___
		S___
X2. 10 McCleary Rd	**2-1. 10 McCleary Road**	**S01___**
	2-2. 700 W. Maple	**S___**
	2-3. City Wells	**S___**
		S___
		S___
X3. 100 S. 3rd St.	**3-1. 100 S. 3rd Street**	**S01___**
	3-2. 10 McCleary Road	**S___**
	3-3. City Wells	**S___**
		S___
		S___
X4. City Wells	**4-1. City Wells**	**S01___**
	4-2. 100 S. 3rd Street	**S___**
	4-3. 10 McCleary Road	**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:

1. **Routine Sample Sites are collected the first 3 Tuesdays of each month.**

2. **Check the sample tap before filling the bottle to make sure there is no reason to invalidate the sample result.**

E. Reduced Triggered Source Monitoring Justification (add sheets as needed):

F. Routine Sample Rotation Schedule

Month	Routine Site(s)	Month	Routine Site(s)
January	X1, X3, X4	July	X1, X2, X3
February	X1, X2, X4	August	X2, X3, X4
March	X1, X2, X3	September	X1, X3, X4
April	X2, X3, X4	October	X1, X2, X4
May	X1, X3, X4	November	X1, X2, X3
June	X1, X2 X4	December	X2, X3, X4

G. Level 1 and Level 2 Assessment Contact Information

Name **Kevin Trewhella, Water Manager**	**Office Phone 360-495-3217** **After Hours Phone 360-521-2058**
Address **100 S. Third St.** **McCleary, WA 98557**	**Email: kevint@cityofmccleary.com**
Name **Todd Baun, Public Works Director**	**Office Phone 360-495-3667** **After Hours Phone 360-470-1422**
Address **100 S. Third St.** **McCleary, WA 98557**	**Email: toddb@cityofmccleary.com**

H. *E. coli*-Present Sample Response

Distribution System *E. coli* 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 *E. coli*-present sample results with our policy makers.	☒	☐	☐	☐
If we find *E. coli* 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 *E. coli* 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 *E. coli* Response Plan

If we have *E. coli* 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 for proper operation.
4. Review any new construction activities, water main breaks, and power outages that have occurred during the previous month.
5. Review Cross-Connection Control Program status.
6. Discuss with DOH whether to issue a Health Advisory based on the findings of steps 3-5.

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 *E. coli*-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 *E. coli*-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.	☒	☐	☐	☐

E. coli-Present Triggered Source Sample Response Checklist – Source S01_*				
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? _____ 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.

E. coli-Present Triggered Source Sample Response Plan – Source S01___

If we have *E. coli* in Source S01 water we will immediately:

1. Call DOH.
2. Distribute required notice. Advise customers to boil their water prior to consumption until advised water source is safe to drink.
3. Locate a source of bottled water to supply nonresidential customers with a long-term supply of bottled water for individuals who cannot boil their water
4. Working with DOH, begin work on corrective action plan to provide 4-log virus treatment of the source.

I. System Map

N

0 1,600 3,200
Feet

X4, 1-2, 2-3, 3-3, 4-1

WELL NO. 2

108

WELL NO. 3

X3, 1-3, 3-1, 4-2

X1, 1-1, 2-2

RESERVOIR SITE

X2, 2-1, 3-2, 4-3

8

Legend:

- EXISTING WELL
- EXISTING RESERVOIR
- 3/4" WATER LINE
- 1" WATER LINE
- 1 1/4" WATER LINE
- 1 1/2" WATER LINE
- 2" WATER LINE
- 3" WATER LINE
- 4" WATER LINE
- 6" WATER LINE
- 8" WATER LINE
- 10" WATER LINE
- EXISTING WATER SERVICE AREA
- FUTURE WATER SERVICE AREA AND RETAIL WATER SERVICE AREA
- CITY LIMITS

CITY OF McCLEARY

COLIFORM MONITORING PLAN

Gray & Osborne, Inc.
CONSULTING ENGINEERS

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APPENDIX J

HYDRAULIC MODELING RESULTS

City of McCleary
Hydraulic Modeling Results
April 22, 2015

Scenario: 2015 Available Residential Fire Flow
Sorted from lowest to highest fire flow

ID	Static Demand (gpm)	Static Pressure (psi)	Fire-Flow Demand (gpm)	Design Flow (gpm)
H-85	0.00	67.56	1,000	448
H-66	0.00	66.59	1,000	533
H-65	0.00	64.43	1,000	571
H-86	0.00	73.20	1,000	589
H-33	0.00	91.93	1,000	693
H-44	0.00	83.07	1,000	776
H-97	0.00	60.23	1,000	817
H-94	0.00	61.10	1,000	831
H-96	0.00	60.23	1,000	832
H-14	0.00	69.83	1,000	841
H-95	0.00	62.40	1,000	852
H-23	0.00	90.64	1,000	856
H-93	0.00	63.27	1,000	861
H-91	0.00	63.27	1,000	873
H-8	0.00	69.83	1,000	875
H-92	0.00	61.97	1,000	881
H-90	0.00	61.97	1,000	894
H-17	0.00	70.37	1,000	898
H-6	0.00	61.11	1,000	908
H-7	0.00	61.98	1,000	923
H-5	0.00	63.28	1,000	938
H-4	0.00	63.27	1,000	947
H-3	0.00	65.01	1,000	988
H-30	1.55	91.93	1,000	1,007
H-29	1.55	91.93	1,000	1,054
H-16	0	81.2	1,000	1,086
H-2	0.00	67.63	1,000	1,096
H-28	1.55	94.97	1,000	1,107
H-100	0.00	67.20	1,000	1,120
H-98	0.00	67.20	1,000	1,120
H-99	0.00	67.20	1,000	1,120
H-27	1.55	93.23	1,000	1,142
H-26	1.55	93.23	1,000	1,154
H-1	0.00	68.95	1,000	1,197
H-25	0.00	90.63	1,000	1,243
H-9	0.00	70.71	1,000	1,247
H-10	0.00	72.89	1,000	1,285
H-12	0.00	73.38	1,000	1,288
H-31	0.00	90.20	1,000	1,299
H-22	0.00	64.02	1,000	1,309
H-11	0.00	74.66	1,000	1,367
H-32	0.00	88.91	1,000	1,375
H-64	0.00	76.15	1,000	1,401
H-15	0.00	78.60	1,000	1,502
H-24	0.00	86.74	1,000	1,542
H-37	0.00	87.66	1,000	1,563
H-36	0.00	89.78	1,000	1,590
H-50	0.00	80.48	1,000	1,607
H-81	0.00	50.88	1,000	1,623
H-34	0.00	91.55	1,000	1,651

Reservoir	Level
150K Reservoir	22.5
500K Reservoir	27.5

Source	Capacity (gpm)	Status
Well No. 2	400	ON
Well No. 3	500	OFF

System Improvements

City of McCleary
Hydraulic Modeling Results
April 22, 2015

Scenario: 2015 Available Residential Fire Flow
Sorted from lowest to highest fire flow

ID	Static Demand (gpm)	Static Pressure (psi)	Fire-Flow Demand (gpm)	Design Flow (gpm)
H-35	0.00	91.98	1,000	1,654
H-39	0.00	89.84	1,000	1,687
H-62	0.00	30.22	1,000	1,724
H-87	0.00	41.87	1,000	1,755
H-78	0.00	47.07	1,000	1,760
H-88	0.00	46.19	1,000	1,766
H-89	0.00	54.82	1,000	1,793
H-82	0.00	62.58	1,000	1,801
H-19	0.00	86.49	1,000	1,804
H-18	0.00	85.19	1,000	1,804
H-20	0.00	86.49	1,000	1,804
H-71	1.55	60.00	1,000	1,806
H-72	1.55	71.26	1,000	1,806
H-73	1.55	62.16	1,000	1,806
H-74	1.55	60.86	1,000	1,806
H-75	1.55	64.33	1,000	1,806
H-70	1.55	65.63	1,000	1,806
H-63	0.00	57.79	1,000	1,835
H-76	0.00	52.58	1,000	1,846
H-68	0.00	55.58	1,000	1,864
H-38	0.00	88.98	1,000	1,872
H-67	0.00	56.86	1,000	1,877
H-53	0.00	65.48	1,000	1,911
H-52	0.00	67.94	1,000	1,923
H-51	0.00	74.42	1,000	1,924
H-43	0.00	77.04	1,000	1,924
H-42	0.00	81.35	1,000	1,925
H-49	0.00	85.26	1,000	1,926
H-41	0.00	86.53	1,000	1,927
H-45	0.00	86.56	1,000	1,927
H-40	0.00	88.24	1,000	1,928
H-46	0.00	87.84	1,000	1,932
H-21	0.00	86.55	1,000	1,941
H-54	0.00	82.79	1,000	1,942
H-48	0.00	86.59	1,000	1,944
H-55	0.00	83.66	1,000	1,966
H-57	0.00	64.67	1,000	1,977
H-47	0.00	83.70	1,000	1,992
H-58	0.00	73.77	1,000	2,000
H-61	0.00	60.34	1,000	2,006
H-59	0.00	78.96	1,000	2,017
H-60	0.00	73.77	1,000	2,026
H-84	0.00	63.12	1,000	2,280
H-80	0.00	66.65	1,000	2,595
H-79	0	78.82	1,000	2,772

City of McCleary
Hydraulic Modeling Results
April 22, 2015

Scenario: 2015 Available Commercial Fire Flow
Sorted from lowest to highest fire flow

ID	Static Demand (gpm)	Static Pressure (psi)	Fire-Flow Demand (gpm)	Design Flow (gpm)
H-33	0.00	91.93	1,500	693
H-30	1.55	91.93	1,500	1,007
H-29	1.55	91.93	1,500	1,054
H-28	1.55	94.97	1,500	1,107
H-27	1.55	93.23	1,500	1,142
H-26	1.55	93.23	1,500	1,154
H-15	0.00	78.60	1,500	1,502
H-18	0.00	85.19	1,500	1,804
H-70	1.55	65.63	1,500	1,806
H-63	0.00	57.79	1,500	1,835
H-38	0.00	88.98	1,500	1,872
H-46	0.00	87.84	1,500	1,932
H-21	0.00	86.55	1,500	1,941
H-54	0.00	82.79	1,500	1,942
H-48	0.00	86.59	1,500	1,944

Reservoir	Level
150K Reservoir	16.5
500K Reservoir	21.5

Source	Capacity (gpm)	Status
Well No. 2	400	ON
Well No. 3	500	OFF

System Improvements

City of McCleary
Hydraulic Modeling Results
April 22, 2015

Scenario: 2015 Available Commercial Fire Flow
Sorted from lowest to highest fire flow

ID	Static Demand (gpm)	Static Pressure (psi)	Fire-Flow Demand (gpm)	Design Flow (gpm)

City of McCleary
Hydraulic Modeling Results
April 22, 2015

Scenario: 2021 Available Residential Fire Flow
Sorted from lowest to highest fire flow

ID	Static Demand (gpm)	Static Pressure (psi)	Fire-Flow Demand (gpm)	Design Flow (gpm)
H-14	0.00	72.93	1,000	1,030
H-97	0.00	63.93	1,000	1,039
H-17	0.00	73.20	1,000	1,041
H-94	0.00	64.79	1,000	1,044
H-96	0.00	63.93	1,000	1,051
H-93	0.00	66.96	1,000	1,076
H-95	0.00	66.09	1,000	1,085
H-8	0.00	72.93	1,000	1,092
H-91	0.00	66.96	1,000	1,129
H-92	0.00	65.66	1,000	1,138
H-7	0.00	65.67	1,000	1,174
H-6	0.00	64.81	1,000	1,187
H-90	0.00	65.66	1,000	1,193
H-5	0.00	66.97	1,000	1,268
H-4	0.00	66.97	1,000	1,295
H-16	0.00	84.03	1,000	1,306
H-3	0.00	68.71	1,000	1,370
H-35	0.00	94.71	1,000	1,515
H-12	0.00	76.27	1,000	1,527
H-2	0.00	71.33	1,000	1,617
H-31	0.00	93.17	1,000	1,640
H-99	0	70.9	1,000	1,648
H-32	0.00	91.86	1,000	1,655
H-23	0.00	93.59	1,000	1,659
H-100	0.00	70.90	1,000	1,676
H-98	0.00	70.90	1,000	1,676
H-66	0.00	68.77	1,000	1,697
H-80	0.00	68.26	1,000	1,736
H-81	0.00	52.67	1,000	1,785
H-37	0.00	90.33	1,000	1,838
H-30	1.68	95.30	1,000	1,844
H-33	0.00	94.90	1,000	1,846
H-29	1.68	95.23	1,000	1,851
H-79	0.00	80.39	1,000	1,852
H-24	0.00	89.71	1,000	1,865
H-25	0.00	93.72	1,000	1,866
H-1	0.00	72.65	1,000	1,876
H-27	1.68	96.42	1,000	1,902
H-26	1.68	96.41	1,000	1,907
H-28	1.68	98.19	1,000	1,909
H-34	0.00	94.28	1,000	1,958
H-9	0.00	74.24	1,000	1,981
H-39	0.00	92.48	1,000	1,985
H-65	0.00	66.60	1,000	1,985
H-85	0.00	69.12	1,000	1,989
H-82	0.00	64.37	1,000	1,997
H-10	0.00	76.28	1,000	2,001
H-15	0.00	81.43	1,000	2,023
H-75	1.68	66.10	1,000	2,024
H-11	0.00	77.80	1,000	2,049

Reservoir	Level
150K Reservoir	22.5
500K Reservoir	27.5

Source	Capacity (gpm)	Status
Well No. 2	400	ON
Well No. 3	500	OFF

System Improvements

Replaced ~250 feet of 4-inch along Ash St. west of 9th St. with 8-inch pipe.

Replaced ~500 feet of 4-inch along 9th St. from Simpson Ave. to WWTP with 8-inch pipe.

Replaced ~360 feet of 4-inch along Pine St. from 5th St. to 6th St. with 8-inch pipe.

Replaced ~800 feet of 4-inch along 4th St. from Oak St. to Spruce St. with 8-inch pipe.

Replaced approximately 850 feet of 4-inch along Mommsen Rd. from Birch St. to the east with 8-inch pipe.

Constructed approximately 6,250 foot long 8-inch waterline from Wellfield to the west end of Simpson Ave.

City of McCleary
Hydraulic Modeling Results
April 22, 2015

Scenario: 2021 Available Residential Fire Flow
Sorted from lowest to highest fire flow

ID	Static Demand (gpm)	Static Pressure (psi)	Fire-Flow Demand (gpm)	Design Flow (gpm)
H-36	0.00	92.69	1,000	2,071
H-62	0.00	31.86	1,000	2,088
H-74	1.68	62.64	1,000	2,102
H-50	0.00	82.63	1,000	2,103
H-22	0.00	66.17	1,000	2,112
H-20	0.00	88.97	1,000	2,136
H-64	0.00	78.30	1,000	2,156
H-78	0.00	48.77	1,000	2,172
H-19	0.00	88.97	1,000	2,181
H-44	0.00	85.25	1,000	2,224
H-87	0.00	43.57	1,000	2,234
H-38	0.00	91.62	1,000	2,254
H-76	0.00	54.41	1,000	2,292
H-73	1.68	63.94	1,000	2,297
H-51	0.00	76.57	1,000	2,332
H-88	0.00	47.90	1,000	2,334
H-42	0.00	83.52	1,000	2,348
H-89	0.00	56.57	1,000	2,355
H-41	0.00	88.75	1,000	2,357
H-70	1.68	67.40	1,000	2,371
H-71	1.68	61.77	1,000	2,371
H-72	1.68	73.04	1,000	2,371
H-84	0.00	64.80	1,000	2,378
H-86	0.00	74.75	1,000	2,386
H-52	0	70.07	1,000	2,397
H-63	0.00	59.61	1,000	2,411
H-40	0.00	90.53	1,000	2,423
H-18	0.00	87.67	1,000	2,451
H-68	0.00	57.46	1,000	2,461
H-67	0.00	58.76	1,000	2,480
H-53	0.00	67.44	1,000	2,536
H-61	0.00	62.22	1,000	2,567
H-43	0.00	79.18	1,000	2,583
H-49	0.00	87.43	1,000	2,587
H-54	0.00	84.79	1,000	2,590
H-45	0.00	88.74	1,000	2,591
H-46	0.00	90.11	1,000	2,608
H-48	0.00	88.78	1,000	2,620
H-21	0.00	88.83	1,000	2,626
H-57	0.00	66.55	1,000	2,626
H-55	0.00	85.66	1,000	2,627
H-47	0.00	85.64	1,000	2,664
H-58	0.00	75.65	1,000	2,667
H-59	0.00	80.86	1,000	2,700
H-60	0.00	75.65	1,000	2,708

City of McCleary
Hydraulic Modeling Results
April 22, 2015

Scenario: 2021 Available Commercial Fire Flow
Sorted from lowest to highest fire flow

ID	Static Demand (gpm)	Static Pressure (psi)	Fire-Flow Demand (gpm)	Design Flow (gpm)
H-30	1.68	95.30	1,500	1,844
H-33	0.00	94.90	1,500	1,846
H-29	1.68	95.23	1,500	1,851
H-27	1.68	96.42	1,500	1,902
H-26	1.68	96.41	1,500	1,907
H-28	1.68	98.19	1,500	1,909
H-15	0.00	81.43	1,500	2,023
H-38	0.00	91.62	1,500	2,254
H-70	1.68	67.4	1,500	2,371
H-63	0.00	59.61	1,500	2,411
H-18	0.00	87.67	1,500	2,451
H-54	0.00	84.79	1,500	2,590
H-46	0.00	90.11	1,500	2,608
H-48	0.00	88.78	1,500	2,620
H-21	0.00	88.83	1,500	2,626

Reservoir	Level
150K Reservoir	16.5
500K Reservoir	21.5

Source	Capacity (gpm)	Status
Well No. 2	400	ON
Well No. 3	500	OFF

System Improvements

Replaced ~250 feet of 4-inch along Ash St. west of 9th St. with 8-inch pipe.

Replaced ~500 feet of 4-inch along 9th St. from Simpson Ave. to WWTP with 8-inch

Replaced ~360 feet of 4-inch along Pine St. from 5th St. to 6th St. with 8-inch pipe.

Replaced ~800 feet of 4-inch along 4th St. from Oak St. to Spruce St. with 8-inch pipe.

Replaced approximately 850 feet of 4-inch along Mommsen Rd. from Birch St. to the east with 8-inch pipe.

Constructed approximately 6,250 foot long 8-inch waterline from Wellfield to the west end of Simpson Ave.

City of McCleary
Hydraulic Modeling Results
April 22, 2015

Scenario: 2021 Available Commercial Fire Flow
Sorted from lowest to highest fire flow

ID	Static Demand (gpm)	Static Pressure (psi)	Fire-Flow Demand (gpm)	Design Flow (gpm)

City of McCleary
Hydraulic Modeling Results
April 22, 2015

Scenario: 2035 Available Residential Fire Flow
Sorted from lowest to highest fire flow

ID	Static Demand (gpm)	Static Pressure (psi)	Fire-Flow Demand (gpm)	Design Flow (gpm)
H-14	0.00	72.90	1,000	1,028
H-97	0.00	63.90	1,000	1,038
H-17	0.00	73.18	1,000	1,040
H-94	0.00	64.76	1,000	1,042
H-96	0.00	63.90	1,000	1,049
H-93	0.00	66.93	1,000	1,074
H-95	0.00	66.06	1,000	1,084
H-8	0.00	72.91	1,000	1,091
H-91	0.00	66.93	1,000	1,127
H-92	0.00	65.63	1,000	1,136
H-7	0.00	65.64	1,000	1,173
H-6	0.00	64.78	1,000	1,185
H-90	0.00	65.63	1,000	1,191
H-5	0.00	66.94	1,000	1,266
H-4	0.00	66.94	1,000	1,293
H-16	0.00	84.01	1,000	1,304
H-3	0.00	68.68	1,000	1,368
H-35	0.00	94.69	1,000	1,514
H-12	0.00	76.25	1,000	1,525
H-2	0.00	71.30	1,000	1,614
H-31	0.00	93.15	1,000	1,638
H-99	0.00	70.87	1,000	1,645
H-32	0.00	91.83	1,000	1,653
H-23	0.00	93.57	1,000	1,658
H-100	0.00	70.87	1,000	1,672
H-98	0.00	70.87	1,000	1,672
H-66	0.00	68.76	1,000	1,695
H-80	0.00	68.26	1,000	1,736
H-81	0.00	52.67	1,000	1,784
H-37	0.00	90.31	1,000	1,836
H-30	1.71	95.27	1,000	1,841
H-33	0.00	94.88	1,000	1,844
H-29	1.71	95.20	1,000	1,849
H-79	0.00	80.39	1,000	1,851
H-24	0.00	89.69	1,000	1,863
H-25	0.00	93.70	1,000	1,864
H-1	0.00	72.63	1,000	1,873
H-27	1.71	96.40	1,000	1,899
H-26	1.71	96.38	1,000	1,905
H-28	1.71	98.17	1,000	1,907
H-34	0.00	94.26	1,000	1,956
H-9	0.00	74.21	1,000	1,978
H-39	0.00	92.46	1,000	1,982
H-65	0.00	66.59	1,000	1,983
H-85	0.00	69.12	1,000	1,989
H-82	0.00	64.37	1,000	1,995
H-10	0	76.26	1,000	1,998
H-15	0.00	81.41	1,000	2,020
H-75	1.71	66.10	1,000	2,022
H-11	0.00	77.78	1,000	2,046

Reservoir	Level
150K Reservoir	22.5
500K Reservoir	27.5

Source	Capacity (gpm)	Status
Well No. 2	400	ON
Well No. 3	500	OFF

System Improvements

Replaced ~250 feet of 4-inch along Ash St. west of 9th St. with 8-inch pipe.

Replaced ~500 feet of 4-inch along 9th St. from Simpson Ave. to WWTP with 8-inch

Replaced ~360 feet of 4-inch along Pine St. from 5th St. to 6th St. with 8-inch pipe.

Replaced ~800 feet of 4-inch along 4th St. from Oak St. to Spruce St. with 8-inch pipe.

Replaced approximately 850 feet of 4-inch along Mommsen Rd. from Birch St. to the east with 8-inch pipe.

Constructed approximately 6,250 foot long 8-inch waterline from Wellfield to the west end of Simpson Ave.

City of McCleary
Hydraulic Modeling Results
April 22, 2015

Scenario: 2035 Available Residential Fire Flow
Sorted from lowest to highest fire flow

ID	Static Demand (gpm)	Static Pressure (psi)	Fire-Flow Demand (gpm)	Design Flow (gpm)
H-36	0.00	92.67	1,000	2,069
H-62	0.00	31.86	1,000	2,083
H-74	1.71	62.63	1,000	2,100
H-50	0.00	82.62	1,000	2,101
H-22	0.00	66.16	1,000	2,109
H-20	0.00	88.95	1,000	2,134
H-64	0.00	78.29	1,000	2,154
H-78	0.00	48.76	1,000	2,170
H-19	0.00	88.95	1,000	2,179
H-44	0.00	85.24	1,000	2,222
H-87	0.00	43.56	1,000	2,231
H-38	0.00	91.60	1,000	2,251
H-76	0.00	54.41	1,000	2,289
H-73	1.71	63.93	1,000	2,295
H-88	0.00	47.90	1,000	2,328
H-51	0.00	76.56	1,000	2,329
H-42	0.00	83.51	1,000	2,346
H-89	0.00	56.57	1,000	2,349
H-41	0.00	88.74	1,000	2,355
H-70	1.71	67.40	1,000	2,365
H-71	1.71	61.77	1,000	2,365
H-72	1.71	73.03	1,000	2,365
H-84	0.00	64.79	1,000	2,377
H-86	0.00	74.75	1,000	2,385
H-52	0.00	70.06	1,000	2,394
H-63	0.00	59.61	1,000	2,405
H-40	0.00	90.52	1,000	2,421
H-18	0.00	87.65	1,000	2,448
H-68	0.00	57.45	1,000	2,454
H-67	0.00	58.76	1,000	2,474
H-53	0.00	67.43	1,000	2,530
H-61	0.00	62.21	1,000	2,564
H-43	0.00	79.17	1,000	2,576
H-49	0.00	87.42	1,000	2,581
H-54	0.00	84.79	1,000	2,584
H-45	0.00	88.73	1,000	2,585
H-46	0.00	90.10	1,000	2,602
H-48	0.00	88.77	1,000	2,613
H-21	0.00	88.82	1,000	2,619
H-57	0.00	66.55	1,000	2,619
H-55	0.00	85.65	1,000	2,620
H-47	0.00	85.63	1,000	2,657
H-58	0.00	75.65	1,000	2,660
H-59	0.00	80.86	1,000	2,693
H-60	0	75.64	1,000	2,700

City of McCleary
Hydraulic Modeling Results
April 22, 2015

Scenario: 2035 Available Commercial Fire Flow
Sorted from lowest to highest fire flow

ID	Static Demand (gpm)	Static Pressure (psi)	Fire-Flow Demand (gpm)	Design Flow (gpm)
H-30	1.71	95.27	1,500	1,842
H-33	0.00	94.88	1,500	1,844
H-29	1.71	95.20	1,500	1,849
H-27	1.71	96.40	1,500	1,900
H-26	1.71	96.38	1,500	1,905
H-28	1.71	98.17	1,500	1,907
H-15	0.00	81.41	1,500	2,020
H-38	0.00	91.60	1,500	2,251
H-70	1.71	67.40	1,500	2,365
H-63	0.00	59.61	1,500	2,405
H-18	0	87.65	1,500	2,448
H-54	0.00	84.79	1,500	2,584
H-46	0.00	90.10	1,500	2,602
H-48	0.00	88.77	1,500	2,613
H-21	0.00	88.82	1,500	2,619

Reservoir	Level
150K Reservoir	16.5
500K Reservoir	21.5

Source	Capacity (gpm)	Status
Well No. 2	400	ON
Well No. 3	500	OFF

System Improvements

Replaced ~250 feet of 4-inch along Ash St. west of 9th St. with 8-inch pipe.

Replaced ~500 feet of 4-inch along 9th St. from Simpson Ave. to WWTP with 8-inch

Replaced ~360 feet of 4-inch along Pine St. from 5th St. to 6th St. with 8-inch pipe.

Replaced ~800 feet of 4-inch along 4th St. from Oak St. to Spruce St. with 8-inch pipe.

Replaced approximately 850 feet of 4-inch along Mommsen Rd. from Birch St. to the east with 8-inch pipe.

Constructed approximately 6,250 foot long 8-inch waterline from Wellfield to the west end of Simpson Ave.

City of McCleary
Hydraulic Modeling Results
April 22, 2015

Scenario: 2035 Available Commercial Fire Flow
Sorted from lowest to highest fire flow

ID	Static Demand (gpm)	Static Pressure (psi)	Fire-Flow Demand (gpm)	Design Flow (gpm)

City of McCleary
Hydraulic Modeling Results
April 22, 2015

Scenario: 2015 Peak Hour Demand
Sorted from lowest to highest pressure

ID	Static Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J139	2.85	394	465	30.84
J133	2.85	367	465	42.40
J447	2.85	365	465	43.37
J329	2.85	364	465	43.68
J327	2.85	364	465	43.69
J129	2.85	357	465	46.67
J391	2.85	355	465	47.58
J331	2.85	346	464	51.22
J131	2.85	346	465	51.41
J143	2.85	343	465	52.82
J359	2.85	342	464	52.84
J363	2.85	342	464	52.85
J361	2.85	342	464	52.88
J189	2.85	341	464	53.30
J401	2.85	337	464	55.22
J371	2.85	335	464	55.78
J369	2.85	332	464	57.01
J125	2.85	330	464	58.08
J123	2.85	330	464	58.09
J265	2.85	325	460	58.41
J251	2.85	324	460	58.88
J273	2.85	323	460	59.27
J271	2.85	323	460	59.27
J267	2.85	323	460	59.27
J263	2.85	323	460	59.27
J261	2.85	322	460	59.71
J279	2.85	321	460	60.14
J269	2.85	321	460	60.14
J255	2.85	321	460	60.18
J245	2.85	321	460	60.18
H-71	2.85	325	464	60.36
J147	2.85	324	464	60.52
J403	2.85	324	464	60.52
J149	2.85	324	464	60.52
J289	2.85	319	460	61.01
J287	2.85	319	460	61.01
J259	2.85	319	460	61.02
J257	2.85	319	460	61.02
J247	2.85	319	460	61.05
H-74	2.85	323	464	61.23
J445	2.85	322	464	61.39
J181	2.85	322	464	61.39
J275	2.85	318	460	61.44
J277	2.85	318	460	61.44
J249	2.85	318	460	61.48
J235	2.85	305	447	61.49
J285	2.85	317	460	61.88
J281	2.85	316	460	62.31
J283	2.85	316	460	62.31
J293	2.85	316	460	62.31

Reservoir	Level
150K Reservoir	25.5
500K Reservoir	30.5

Source	Capacity (gpm)	Status
Well No. 2	400	OFF
Well No. 3	500	OFF

System Improvements

City of McCleary **Scenario: 2015 Peak Hour Demand**
Hydraulic Modeling Results **Sorted from lowest to highest pressure**
April 22, 2015

ID	Static Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J291	2.85	316	460	62.31
J253	2.85	316	460	62.34
J243	2.85	316	460	62.35
J241	2.85	316	460	62.35
H-73	2.85	320	464	62.53
J407	2.85	319	464	62.92
J333	2.85	319	464	62.92
J105	2.85	315	462	63.73
J103	2.85	315	462	63.73
J185	2.85	316	464	63.95
J239	2.85	312	460	64.08
J237	2.85	312	460	64.09
J117	2.85	314	462	64.09
J113	2.85	314	462	64.09
J389	2.85	314	462	64.09
J191	2.85	312	461	64.52
H-75	2.85	315	464	64.69
J393	2.85	314	464	64.85
J145	2.85	314	464	64.85
J351	2.85	315	466	65.34
J101	2.85	312	463	65.54
J387	2.85	312	463	65.54
H-70	2.85	312	464	65.99
J233	2.85	307	460	66.29
J441	2.85	307	460	66.32
J439	2.85	307	460	66.32
J127	2.85	311	464	66.43
J231	2.85	306	460	66.74
J229	2.85	306	460	66.74
J227	2.85	306	460	66.76
J225	2.85	305	460	67.19
J449	2.85	306	461	67.21
J187	2.85	308	463	67.27
J119	2.85	305	460	67.32
J399	2.85	310	465	67.33
J339	2.85	310	466	67.51
J341	2.85	310	466	67.53
J325	2.85	306	462	67.71
J97	2.85	306	462	67.71
J99	2.85	306	462	67.73
J223	2.85	303	460	68.06
J221	2.85	303	460	68.07
J295	2.85	303	460	68.11
J299	2.85	303	460	68.11
J421	2.85	303	460	68.11
J343	2.85	308	466	68.35
J215	2.85	302	460	68.57
J213	2.85	302	460	68.57
J153	2.85	305	464	68.72
J219	2.85	301	460	68.98

City of McCleary **Scenario: 2015 Peak Hour Demand**
Hydraulic Modeling Results **Sorted from lowest to highest pressure**
April 22, 2015

ID	Static Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J427	2.85	301	460	69.00
J425	2.85	301	460	69.00
J419	2.85	301	460	69.00
J121	2.85	302	462	69.29
J217	2.85	300	460	69.40
J115	2.85	299	459	69.54
J417	2.85	300	461	69.77
J211	2.85	299	460	69.85
J209	2.85	299	460	69.87
J205	2.85	299	460	69.89
J203	2.85	299	460	69.91
J423	2.85	298	460	70.28
J297	2.85	298	460	70.29
J207	2.85	298	460	70.30
H-72	2.85	299	464	71.63
J301	2.85	294	460	72.01
J201	2.85	294	460	72.13
J197	2.85	293	461	72.73
J183	2.85	294	464	73.46
J395	2.85	293	464	73.93
J179	2.85	293	464	73.95
J151	2.85	293	464	73.96
J199	2.85	290	461	73.97
J345	2.85	295	466	73.98
J321	2.85	291	462	74.14
J323	2.85	291	462	74.14
J107	2.85	289	462	74.99
J397	2.85	289	464	75.66
J111	2.85	287	462	75.86
J109	2.85	287	462	75.86
J385	2.85	285	462	76.79
J95	2.85	285	462	76.79
J161	2.85	283	463	77.99
J413	2.85	281	461	78.01
J193	2.85	281	461	78.01
J195	2.85	281	461	78.02
J163	2.85	283	464	78.21
J365	2.85	282	464	78.69
J367	2.85	282	464	78.69
J177	2.85	281	464	79.10
J349	2.85	282	466	79.57
J347	2.85	282	466	79.62
J303	2.85	278	462	79.82
J317	2.85	277	462	80.19
J315	2.85	277	462	80.19
J313	2.85	277	462	80.20
J319	2.85	276	462	80.59
J415	2.85	275	461	80.61
J305	2.85	275	462	81.04
J383	2.85	275	462	81.05

City of McCleary **Scenario: 2015 Peak Hour Demand**
Hydraulic Modeling Results **Sorted from lowest to highest pressure**
April 22, 2015

ID	Static Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J311	2.85	271	462	82.74
J309	2.85	271	462	82.76
J307	2.85	271	462	82.77
J87	2.85	272	463	82.79
J157	2.85	271	463	83.41
J91	2.85	270	463	83.67
J93	2.85	270	463	83.68
J155	2.85	270	463	83.79
J405	2.85	270	463	83.80
J159	2.85	266	462	84.76
J409	2.85	266	462	84.79
J69	2.85	266	462	84.89
J85	2.85	266	462	85.01
J169	2.85	265	462	85.22
J89	2.85	266	463	85.36
J431	2.85	262	459	85.52
J443	2.85	263	461	85.69
J357	2.85	262	460	85.95
J355	2.85	262	460	85.95
J429	2.85	262	460	85.96
J353	2.85	262	460	85.96
J165	2.85	263	462	86.08
J411	2.85	263	462	86.09
J167	2.85	263	462	86.12
J79	2.85	264	463	86.14
J71	2.85	263	462	86.19
J67	2.85	263	462	86.23
J173	2.85	263	462	86.25
J171	2.85	263	462	86.25
J175	2.85	263	462	86.28
J81	2.85	263	462	86.29
J83	2.85	263	462	86.29
J77	2.85	263	462	86.35
J75	2.85	263	462	86.38
J73	2.85	263	462	86.39
J65	2.85	262	462	86.58
J53	2.85	260	461	86.99
J55	2.85	260	461	86.99
J63	2.85	260	462	87.44
J381	2.85	260	462	87.54
J379	2.85	259	462	87.87
J21	2.85	257	460	88.06
J375	2.85	257	460	88.11
J5	2.85	257	460	88.11
J61	2.85	258	462	88.27
J57	2.85	257	461	88.32
J377	2.85	257	461	88.35
J45	2.85	257	461	88.37
J41	2.85	256	461	88.67
J43	2.85	256	461	88.67

City of McCleary **Scenario: 2015 Peak Hour Demand**
Hydraulic Modeling Results **Sorted from lowest to highest pressure**
April 22, 2015

ID	Static Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J51	2.85	256	461	88.70
J37	2.85	255	460	89.00
J39	2.85	255	460	89.01
J59	2.85	255	461	89.20
J9	2.85	254	460	89.38
J7	2.85	254	460	89.40
J11	2.85	254	460	89.40
J13	2.85	254	460	89.41
J15	2.85	254	460	89.41
J19	2.85	253	460	89.83
J373	2.85	253	460	89.83
J17	2.85	253	460	89.83
J3	2.85	253	460	89.84
J31	2.85	253	460	89.87
J35	2.85	253	461	89.97
J23	2.85	252	460	90.27
J1	2.85	251	460	90.67
J47	2.85	251	461	90.85
J49	2.85	251	461	90.85
J25	2.85	250	460	91.09
H-30	2.85	250	460	91.12
H-29	2.85	250	460	91.13
J29	2.85	250	460	91.13
J27	2.85	250	460	91.13
J33	2.85	250	460	91.17
H-27	2.85	247	460	92.43
H-26	2.85	247	460	92.43
H-28	2.85	243	460	94.16

City of McCleary
Hydraulic Modeling Results
April 22, 2015

Scenario: 2021 Peak Hour Demand
Sorted from lowest to highest pressure

ID	Static Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J139	2.92	394	465	30.79
J133	2.92	367	465	42.34
J447	2.92	365	465	43.32
J327	2.92	364	465	43.63
J329	2.92	364	465	43.63
J129	2.92	357	465	46.61
J391	2.92	355	465	47.53
J331	2.92	346	464	51.15
J131	2.92	346	465	51.35
J143	2.92	343	465	52.76
J359	2.92	342	464	52.77
J363	2.92	342	464	52.78
J361	2.92	342	464	52.81
J189	2.92	341	464	53.23
J401	2.92	337	464	55.16
J371	2.92	335	464	55.70
J369	2.92	332	463	56.93
J125	2.92	330	464	58.01
J123	2.92	330	464	58.02
J265	2.92	325	459	58.28
J251	2.92	324	460	58.75
J263	2.92	323	459	59.14
J267	2.92	323	459	59.14
J271	2.92	323	459	59.14
J273	2.92	323	459	59.14
J261	2.92	322	460	59.58
J269	2.92	321	459	60.01
J279	2.92	321	459	60.01
J245	2.92	321	460	60.05
J255	2.92	321	460	60.05
H-71	2.92	325	464	60.30
J147	2.92	324	464	60.44
J149	2.92	324	464	60.45
J403	2.92	324	464	60.45
J287	2.92	319	460	60.88
J289	2.92	319	460	60.88
J257	2.92	319	460	60.89
J259	2.92	319	460	60.89
J247	2.92	319	460	60.92
J235	2.92	305	446	61.10
H-74	2.92	323	464	61.16
J181	2.92	322	464	61.31
J275	2.92	318	459	61.31
J277	2.92	318	459	61.31
J445	2.92	322	464	61.31
J249	2.92	318	460	61.35
J285	2.92	317	460	61.74
J281	2.92	316	460	62.18
J283	2.92	316	460	62.18
J291	2.92	316	460	62.18

Reservoir	Level
150K Reservoir	25.5
500K Reservoir	30.5

Source	Capacity (gpm)	Status
Well No. 2	400	OFF
Well No. 3	500	OFF

System Improvements

Replaced ~250 feet of 4-inch along Ash St. west of 9th St. with 8-inch pipe.

Replaced ~500 feet of 4-inch along 9th St. from Simpson Ave. to WWTP with 8-inch

Replaced ~360 feet of 4-inch along Pine St. from 5th St. to 6th St. with 8-inch pipe.

Replaced ~800 feet of 4-inch along 4th St. from Oak St. to Spruce St. with 8-inch pipe.

Replaced approximately 850 feet of 4-inch along Mommsen Rd. from Birch St. to the east with 8-inch pipe.

Constructed approximately 6,250 foot long 8-inch waterline from Wellfield to the west end of Simpson Ave.

City of McCleary **Scenario: 2021 Peak Hour Demand**
Hydraulic Modeling Results **Sorted from lowest to highest pressure**
April 22, 2015

ID	Static Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J293	2.92	316	460	62.18
J253	2.92	316	460	62.21
J241	2.92	316	460	62.22
J243	2.92	316	460	62.22
H-73	2.92	320	464	62.46
J333	2.92	319	464	62.85
J407	2.92	319	464	62.85
J103	2.92	315	462	63.69
J105	2.92	315	462	63.69
J185	2.92	316	463	63.87
J237	2.92	312	460	63.96
J239	2.92	312	460	63.96
J113	2.92	314	462	64.12
J117	2.92	314	462	64.12
J389	2.92	314	462	64.12
J191	2.92	312	461	64.41
H-75	2.92	315	464	64.63
J145	2.92	314	464	64.78
J393	2.92	314	463	64.78
J351	2.92	315	466	65.31
J101	2.92	312	463	65.45
J387	2.92	312	463	65.45
H-70	2.92	312	464	65.93
J233	2.92	307	460	66.16
J439	2.92	307	460	66.20
J441	2.92	307	460	66.20
J127	2.92	311	464	66.36
J229	2.92	306	460	66.62
J231	2.92	306	460	66.62
J227	2.92	306	460	66.63
J225	2.92	305	460	67.06
J187	2.92	308	463	67.19
J449	2.92	306	461	67.22
J399	2.92	310	465	67.29
J119	2.92	305	460	67.31
J339	2.92	310	466	67.48
J341	2.92	310	466	67.49
J97	2.92	306	462	67.60
J325	2.92	306	462	67.60
J99	2.92	306	462	67.62
J223	2.92	303	460	67.93
J221	2.92	303	460	67.95
J295	2.92	303	460	67.98
J299	2.92	303	460	67.99
J421	2.92	303	460	67.99
J343	2.92	308	466	68.32
J213	2.92	302	460	68.45
J215	2.92	302	460	68.45
J153	2.92	305	463	68.64
J219	2.92	301	460	68.86

City of McCleary **Scenario: 2021 Peak Hour Demand**
Hydraulic Modeling Results **Sorted from lowest to highest pressure**
April 22, 2015

ID	Static Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J419	2.92	301	460	68.89
J425	2.92	301	460	68.89
J427	2.92	301	460	68.89
J217	2.92	300	460	69.29
J121	2.92	302	462	69.32
J115	2.92	299	459	69.52
J417	2.92	300	461	69.66
J211	2.92	299	460	69.73
J209	2.92	299	460	69.75
J205	2.92	299	460	69.76
J203	2.92	299	460	69.79
J423	2.92	298	460	70.16
J297	2.92	298	460	70.18
J207	2.92	298	460	70.19
H-72	2.92	299	464	71.56
J301	2.92	294	460	71.89
J201	2.92	294	460	72.01
J197	2.92	293	461	72.61
J183	2.92	294	463	73.38
J199	2.92	290	460	73.85
J395	2.92	293	463	73.86
J151	2.92	293	464	73.88
J179	2.92	293	464	73.88
J345	2.92	295	466	73.95
J321	2.92	291	462	74.07
J323	2.92	291	462	74.07
J107	2.92	289	462	74.95
J397	2.92	289	463	75.59
J109	2.92	287	462	75.81
J111	2.92	287	462	75.81
J95	2.92	285	462	76.69
J385	2.92	285	462	76.69
J193	2.92	281	461	77.89
J413	2.92	281	461	77.89
J195	2.92	281	461	77.90
J161	2.92	283	463	77.91
J163	2.92	283	463	78.13
J365	2.92	282	463	78.61
J367	2.92	282	463	78.61
J177	2.92	281	463	79.02
J349	2.92	282	466	79.54
J347	2.92	282	466	79.59
J303	2.92	278	462	79.72
J313	2.92	277	462	80.13
J315	2.92	277	462	80.13
J317	2.92	277	462	80.13
J415	2.92	275	461	80.49
J319	2.92	276	462	80.53
J305	2.92	275	462	80.96
J383	2.92	275	462	80.96

City of McCleary **Scenario: 2021 Peak Hour Demand**
Hydraulic Modeling Results **Sorted from lowest to highest pressure**
April 22, 2015

ID	Static Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J311	2.92	271	462	82.67
J307	2.92	271	462	82.69
J309	2.92	271	462	82.69
J87	2.92	272	463	82.71
J157	2.92	271	463	83.33
J91	2.92	270	463	83.58
J93	2.92	270	463	83.60
J155	2.92	270	463	83.71
J405	2.92	270	463	83.72
J159	2.92	266	461	84.65
J409	2.92	266	461	84.68
J69	2.92	266	462	84.78
J85	2.92	266	462	84.90
J169	2.92	265	461	85.11
J89	2.92	266	463	85.28
J431	2.92	262	459	85.35
J443	2.92	263	460	85.56
J353	2.92	262	460	85.81
J355	2.92	262	460	85.81
J357	2.92	262	460	85.81
J429	2.92	262	460	85.81
J165	2.92	263	461	85.97
J411	2.92	263	461	85.98
J167	2.92	263	461	86.01
J79	2.92	264	463	86.05
J71	2.92	263	462	86.10
J67	2.92	263	462	86.13
J171	2.92	263	462	86.14
J173	2.92	263	462	86.14
J175	2.92	263	462	86.18
J81	2.92	263	462	86.19
J83	2.92	263	462	86.19
J77	2.92	263	462	86.25
J75	2.92	263	462	86.28
J73	2.92	263	462	86.29
J65	2.92	262	462	86.48
J53	2.92	260	460	86.85
J55	2.92	260	460	86.86
J63	2.92	260	462	87.34
J381	2.92	260	462	87.44
J379	2.92	259	462	87.76
J21	2.92	257	460	87.90
J375	2.92	257	460	87.96
J5	2.92	257	460	87.97
J61	2.92	258	461	88.16
J57	2.92	257	461	88.18
J377	2.92	257	461	88.22
J45	2.92	257	461	88.24
J41	2.92	256	460	88.52
J43	2.92	256	460	88.53

City of McCleary **Scenario: 2021 Peak Hour Demand**
Hydraulic Modeling Results **Sorted from lowest to highest pressure**
April 22, 2015

ID	Static Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J51	2.92	256	460	88.56
J37	2.92	255	460	88.85
J39	2.92	255	460	88.86
J59	2.92	255	461	89.06
J9	2.92	254	460	89.22
J7	2.92	254	460	89.25
J11	2.92	254	460	89.25
J13	2.92	254	460	89.25
J15	2.92	254	460	89.25
J17	2.92	253	460	89.67
J19	2.92	253	460	89.67
J373	2.92	253	460	89.67
J3	2.92	253	460	89.70
J31	2.92	253	460	89.73
J35	2.92	253	460	89.83
J23	2.92	252	460	90.12
J1	2.92	251	460	90.53
J47	2.92	251	460	90.71
J49	2.92	251	460	90.71
J25	2.92	250	460	90.94
H-30	2.92	250	460	90.96
H-29	2.92	250	460	90.96
J27	2.92	250	460	90.98
J29	2.92	250	460	90.98
J33	2.92	250	460	91.02
H-27	2.92	247	460	92.26
H-26	2.92	247	460	92.26
H-28	2.92	243	460	93.99

City of McCleary
Hydraulic Modeling Results
April 22, 2015

Scenario: 2035 Peak Hour Demand
Sorted from lowest to highest pressure

ID	Static Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J139	3.11	394	465	30.66
J133	3.11	367	464	42.19
J447	3.11	365	465	43.19
J329	3.11	364	464	43.48
J327	3.11	364	464	43.48
J129	3.11	357	464	46.46
J391	3.11	355	464	47.38
J331	3.11	346	464	50.97
J131	3.11	346	464	51.19
J359	3.11	342	463	52.57
J363	3.11	342	463	52.58
J361	3.11	342	463	52.61
J143	3.11	343	464	52.62
J189	3.11	341	463	53.03
J401	3.11	337	464	54.98
J371	3.11	335	463	55.49
J369	3.11	332	463	56.71
J125	3.11	330	463	57.82
J123	3.11	330	463	57.82
J265	3.11	325	459	57.85
J251	3.11	324	459	58.33
J271	3.11	323	459	58.71
J273	3.11	323	459	58.71
J267	3.11	323	459	58.71
J263	3.11	323	459	58.71
J261	3.11	322	459	59.15
J279	3.11	321	459	59.58
J269	3.11	321	459	59.58
J255	3.11	321	459	59.63
J245	3.11	321	459	59.63
J235	3.11	305	443	59.95
H-71	3.11	325	464	60.12
J147	3.11	324	463	60.23
J403	3.11	324	463	60.23
J149	3.11	324	463	60.23
J289	3.11	319	459	60.45
J287	3.11	319	459	60.45
J259	3.11	319	459	60.46
J257	3.11	319	459	60.46
J247	3.11	319	459	60.49
J275	3.11	318	459	60.88
J277	3.11	318	459	60.88
J249	3.11	318	459	60.93
H-74	3.11	323	464	60.98
J445	3.11	322	463	61.10
J181	3.11	322	463	61.10
J285	3.11	317	459	61.31
J281	3.11	316	459	61.75
J283	3.11	316	459	61.75
J293	3.11	316	459	61.75

Reservoir	Level
150K Reservoir	25.5
500K Reservoir	30.5

Source	Capacity (gpm)	Status
Well No. 2	400	OFF
Well No. 3	500	OFF

System Improvements

Replaced ~250 feet of 4-inch along Ash St. west of 9th St. with 8-inch pipe.

Replaced ~500 feet of 4-inch along 9th St. from Simpson Ave. to WWTP with 8-inch

Replaced ~360 feet of 4-inch along Pine St. from 5th St. to 6th St. with 8-inch pipe.

Replaced ~800 feet of 4-inch along 4th St. from Oak St. to Spruce St. with 8-inch pipe.

Replaced approximately 850 feet of 4-inch along Mommsen Rd. from Birch St. to the east with 8-inch pipe.

Constructed approximately 6,250 foot long 8-inch waterline from Wellfield to the west end of Simpson Ave.

City of McCleary
Hydraulic Modeling Results
April 22, 2015

Scenario: 2035 Peak Hour Demand
Sorted from lowest to highest pressure

ID	Static Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J291	3.11	316	459	61.75
J253	3.11	316	459	61.78
J243	3.11	316	459	61.80
J241	3.11	316	459	61.80
H-73	3.11	320	464	62.28
J407	3.11	319	464	62.67
J333	3.11	319	464	62.67
J105	3.11	315	461	63.39
J103	3.11	315	461	63.39
J239	3.11	312	459	63.53
J237	3.11	312	459	63.53
J185	3.11	316	463	63.65
J117	3.11	314	461	63.82
J113	3.11	314	461	63.82
J389	3.11	314	461	63.82
J191	3.11	312	460	64.04
H-75	3.11	315	464	64.45
J393	3.11	314	463	64.56
J145	3.11	314	463	64.56
J351	3.11	315	466	65.21
J101	3.11	312	463	65.21
J387	3.11	312	463	65.21
J233	3.11	307	459	65.75
H-70	3.11	312	464	65.75
J441	3.11	307	459	65.78
J439	3.11	307	459	65.78
J127	3.11	311	464	66.18
J231	3.11	306	459	66.20
J229	3.11	306	459	66.20
J227	3.11	306	459	66.22
J225	3.11	305	459	66.65
J449	3.11	306	460	66.88
J119	3.11	305	459	66.93
J187	3.11	308	463	66.95
J399	3.11	310	465	67.17
J325	3.11	306	461	67.31
J97	3.11	306	461	67.31
J99	3.11	306	461	67.33
J339	3.11	310	466	67.39
J341	3.11	310	466	67.40
J223	3.11	303	459	67.52
J221	3.11	303	459	67.54
J295	3.11	303	459	67.57
J299	3.11	303	459	67.58
J421	3.11	303	459	67.58
J215	3.11	302	459	68.05
J213	3.11	302	459	68.05
J343	3.11	308	465	68.22
J153	3.11	305	463	68.42
J219	3.11	301	459	68.46

City of McCleary **Scenario: 2035 Peak Hour Demand**
Hydraulic Modeling Results **Sorted from lowest to highest pressure**
April 22, 2015

ID	Static Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J427	3.11	301	459	68.48
J425	3.11	301	459	68.49
J419	3.11	301	459	68.49
J217	3.11	300	459	68.88
J121	3.11	302	461	69.02
J115	3.11	299	458	69.08
J417	3.11	300	460	69.30
J211	3.11	299	459	69.33
J209	3.11	299	459	69.35
J205	3.11	299	459	69.36
J203	3.11	299	459	69.39
J423	3.11	298	459	69.75
J297	3.11	298	459	69.77
J207	3.11	298	459	69.78
H-72	3.11	299	464	71.38
J301	3.11	294	459	71.48
J201	3.11	294	459	71.62
J197	3.11	293	460	72.24
J183	3.11	294	463	73.16
J199	3.11	290	460	73.47
J395	3.11	293	463	73.64
J179	3.11	293	463	73.66
J151	3.11	293	463	73.67
J323	3.11	291	461	73.77
J321	3.11	291	461	73.77
J345	3.11	295	465	73.86
J107	3.11	289	461	74.65
J397	3.11	289	463	75.37
J109	3.11	287	461	75.51
J111	3.11	287	461	75.51
J385	3.11	285	461	76.39
J95	3.11	285	461	76.39
J413	3.11	281	460	77.53
J193	3.11	281	460	77.53
J195	3.11	281	460	77.54
J161	3.11	283	462	77.65
J163	3.11	283	463	77.90
J365	3.11	282	463	78.39
J367	3.11	282	463	78.39
J177	3.11	281	463	78.80
J303	3.11	278	461	79.42
J349	3.11	282	465	79.43
J347	3.11	282	465	79.49
J317	3.11	277	461	79.83
J315	3.11	277	461	79.83
J313	3.11	277	461	79.83
J415	3.11	275	460	80.13
J319	3.11	276	461	80.23
J305	3.11	275	461	80.65
J383	3.11	275	461	80.66

City of McCleary **Scenario: 2035 Peak Hour Demand**
Hydraulic Modeling Results **Sorted from lowest to highest pressure**
April 22, 2015

ID	Static Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J311	3.11	271	461	82.36
J309	3.11	271	461	82.38
J307	3.11	271	461	82.39
J87	3.11	272	462	82.46
J157	3.11	271	463	83.10
J91	3.11	270	462	83.33
J93	3.11	270	462	83.35
J155	3.11	270	463	83.48
J405	3.11	270	463	83.49
J159	3.11	266	461	84.32
J409	3.11	266	461	84.35
J69	3.11	266	461	84.47
J85	3.11	266	461	84.60
J169	3.11	265	461	84.79
J431	3.11	262	458	84.90
J89	3.11	266	462	85.02
J443	3.11	263	460	85.18
J357	3.11	262	459	85.41
J355	3.11	262	459	85.41
J429	3.11	262	459	85.41
J353	3.11	262	459	85.41
J165	3.11	263	461	85.64
J411	3.11	263	461	85.65
J167	3.11	263	461	85.68
J79	3.11	264	462	85.78
J71	3.11	263	461	85.79
J67	3.11	263	461	85.82
J173	3.11	263	461	85.84
J171	3.11	263	461	85.84
J175	3.11	263	461	85.88
J81	3.11	263	461	85.89
J83	3.11	263	461	85.89
J77	3.11	263	461	85.96
J75	3.11	263	461	85.99
J73	3.11	263	461	86.00
J65	3.11	262	461	86.16
J53	3.11	260	460	86.48
J55	3.11	260	460	86.48
J63	3.11	260	461	87.02
J381	3.11	260	461	87.13
J379	3.11	259	461	87.44
J21	3.11	257	459	87.49
J375	3.11	257	459	87.56
J5	3.11	257	459	87.56
J57	3.11	257	460	87.81
J61	3.11	258	461	87.84
J377	3.11	257	460	87.85
J45	3.11	257	460	87.87
J41	3.11	256	459	88.14
J43	3.11	256	459	88.14

City of McCleary **Scenario: 2035 Peak Hour Demand**
Hydraulic Modeling Results **Sorted from lowest to highest pressure**
April 22, 2015

ID	Static Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
J51	3.11	256	460	88.18
J37	3.11	255	459	88.45
J39	3.11	255	459	88.46
J59	3.11	255	460	88.69
J9	3.11	254	459	88.82
J7	3.11	254	459	88.85
J13	3.11	254	459	88.85
J11	3.11	254	459	88.85
J15	3.11	254	459	88.85
J19	3.11	253	459	89.26
J373	3.11	253	459	89.26
J17	3.11	253	459	89.26
J3	3.11	253	459	89.30
J31	3.11	253	459	89.33
J35	3.11	253	459	89.44
J23	3.11	252	459	89.71
J1	3.11	251	459	90.12
J47	3.11	251	459	90.32
J49	3.11	251	459	90.32
J25	3.11	250	459	90.53
H-30	3.11	250	459	90.55
H-29	3.11	250	459	90.55
J29	3.11	250	459	90.58
J27	3.11	250	459	90.58
J33	3.11	250	459	90.63
H-27	3.11	247	459	91.86
H-26	3.11	247	459	91.86
H-28	3.11	243	459	93.59

APPENDIX K

ACCOUNTED FOR WATER TABULATION

Year 2013	Well Production gallons	Consumption gallons	Un-metered consumption gallons	Well Production + Consumption	Difference gallons	Percent Difference		Totals from unmetered Consumption list Page 2		
** averaged line 17 from march & may										
	Meter reading								cu ft to find	
January	4,975,696	3,206,938	765,867	3,972,805	1,002,891	0.20		765,867	0	428,735
Febraury	4,826,829	3,087,183	701,000	3,788,183	1,038,646	0.22		701,000	0	412,725
March	5,244,154	2,719,937	727,848	3,447,785	1,796,369	0.34		727,848	0	363,628
April	4,938,670	3,102,233	872,892	3,975,125	963,545	0.20		872,892	0	414,737
May	5,288,076	3,250,569	2,030,880	5,281,449	6,627	0.00		2,030,880	0	434,568
June	5,388,100	3,212,929	1,941,320	5,154,249	233,851	0.04		1,941,320	0	429,536
July	7,752,484	5,018,392	2,709,423	7,727,815	24,669	0.00		2,709,423	0	670,908
August	5,821,603	5,632,754	182,600	5,815,354	6,249	0.00		182,600	0	753,042
September	4,795,429	4,635,378	148,300	4,783,678	11,751	0.00		148,300	0	619,703
October	4,975,497	3,651,257	1,045,450	4,696,707	278,790	0.06		1,045,450	0	488,136
November	5,514,223	3,718,884	1,468,370	5,187,254	326,969	0.06		1,468,370	0	497,177
December	5,095,912	3,613,797	1,189,688	4,803,485	292,427	0.06		1,189,688	0	483,128
	64,616,673	44,850,252	13,783,638	58,633,890	5,982,783	0.10				

Unmetered consumption list Page 2

	Event	Usage gallons
January	Break-Simpson	90000
	equipment cleanup	4500
	Hydrant Flushing	625,367
	FD Training	46,000
		765,867
February		
	Hydrant Flushing	651,000
	FD Training	50,000
		701,000
March		
	Hydrant Flushing	676,848
	equipment cleanup	3,000
	FD Training	48,000
		727,848
April		
	Hydrant Flushing	688,012
	Break-Simpson	140,000
	FD Training	44,880
		872,892
May		
	Testing-Well #2	1,000,000
	Res Drain	750,000
	Pump to waste	54,000
	Break-Simpson	182,000
	FD Training	44,880
		2,030,880
June		
	Testing-Well #2	700,000
	Structure Fire	130,000
	Hydrant Flushing	800,000
	Pump to waste	54,000
	FD Training	44,880
	Break-Beck St.	50,000
	Mud Run	46,800
	Break-Momson	30,240
	Backwash	85,400
		1,941,320
July		
	Hydrant Flushing	843,643
	Pump to waste	54,000
	FD Training	44,880
	Break-Simpson	140,000
	Well Testing #3	1,000,000
	reservoir overflow Potelco line cut	475,000
	Backwash	151,900
		2,709,423
August		
	Pump to waste	54,000
	Backwash	128,600
		182,600
September		
	Pump to waste	54,000
	Backwash	94,300
		148,300
October		
	FD Training	44,880
	Pump to waste	54,000
	Hydrant flushing	569,670
	Break-8th st	275,000
	Backwash	101,900
		1,045,450
November		
18-22	RP leak @WWTP	180,000

Leaks	1,433,150	EN
Accounted for	12,350,502	EN

13,055,790

Expert pipe	5,000
Pump to waste	54,000
Hydrant Flushing	584,690
Reservoir draining for testing	77000
Overflow-Reservoir	420,000
Backwash	102,800
FD Training	44,880
	1,468,370

December

FD Training	44,880
Pump to waste	54,000
Break-Simpson	91,000
Hydrant Flushing	636,012
Backwash	108,900
Break-City Hall	254,896
	1,189,688

BACKWASH TOTALS

Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
					13,900	23,100	5,600	6,700	6,800	6,900	6,800
					13,600	7,800	6,800	6,700	6,800	6,700	6,800
					6,900	5,800	6,900	6,800	6,800	6,800	6,900
					14,100	6,000	6,900	6,700	6,800	6,800	6,800
					6,900	5,400	6,900	6,800	6,800	6,800	6,700
					2,400	5,300	6,900	6,600	6,800	6,800	6,800
					12,600	16,500	6,900	6,800	6,800	6,800	6,800
					7,500	5,300	6,900	6,700	6,800	6,900	6,900
					7,500	5,400	6,900	6,800	6,700	6,700	6,800
					85,400	5,300	6,900	6,700	6,900	6,800	6,800
						5,500	6,900	6,700	6,700	6,900	6,900
						5,300	7,000	6,800	6,800	6,800	6,700
						5,400	7,000	6,700	6,800	7,100	6,800
						5,400	6,800	6,800	6,800	7,100	6,800
						5,300	6,600	94,300	6,800	6,900	6,800
						5,200	6,500		101,900	102,800	6,800
						5,500	6,700				108,900
						5,200	6,800				
						5,500	6,700				
						5,300	128,600				
						6,900					
						5,500					
						151,900					

Year 2014	Well Production gallons	Consumption gallons	Un-metered consumption gallons	consumption + Un-metered Consumption	Difference gallons	Percent Difference		Totals from unmetered Consumption list Page 2		
	Meter reading								cu ft to find	
January	5,330,026	3,677,779	935,316	4,613,095	716,931	13.45		935,316	0	464,435
Febraury	4,956,707	3,969,969	272,290	4,242,259	714,448	14.41		272,290	0	483,128
March	5,212,491	3,285,032	834,605	4,119,637	1,092,854	20.97		834,605	0	530,403
April	5,047,326	4,126,767	727,331	4,854,098	193,228	3.83		727,331	0	438,646
May	5,227,707	3,855,225	586,445	4,441,670	786,037	15.04		586,445	0	551,170
June	5,629,902	4,670,338	928,780	5,599,118	30,784	0.55		928,780	0	514,891
July	7,068,846	5,106,945	1,657,478	6,764,423	304,423	4.31		1,657,478	0	623,675
August	7,019,566	5,882,441	1,113,515	6,995,956	23,610	0.34		1,113,515	0	675,000
September	5,270,751	5,124,180	145,410	5,269,590	1,161	0.02		145,410	0	612,000
October	5,133,479	4,057,827	1,043,951	5,101,778	31,701	0.62		1,043,951	0	488,136
November	4,762,678	3,806,034	345,740	4,151,774	610,904	12.83		345,740	0	497,177
December	4,780,111	3,826,081	252,538	4,078,619	701,492	14.68		252,538	0	483,128
	65,439,590	51,388,618		60,232,017	5,207,573	7.96				

Unmetered consumption list Page 2

	Event	Usage gallons			
January					meter @ school park On 8/1/2014 = 51,480
	Backwash	123,700			
	equipment cleanup	11,500			
	Frozen water pipe and leaks	230,400			
	Cl2 analyzer	6,975			
	Hydrant Flushing	515,741			
	FD Training	47,000			
		935,316			
February			8,008,794		
	Hydrant Flushing	133,890			
	Cl2 analyzer	6,300			
	equipment cleanup	10,000			
	Backwash	77,100			
	FD Training	45,000			
		272,290			
March					
	Break simpson	78,960			
	2" Line Break	48,600			
	Res overflow	380,000			
	Cl2 analyzer	6,975			
	equipment cleanup	10,500			
	Backwash	74,600			
	Hydrant Flushing	183,970			
	FD Training	51,000			
		834,605			
April					
	Hydrant Flushing	556,581			
	Cl2 analyzer	6,750			
	equipment cleanup	11,000			
	Backwash	77,900			
	Break-Simpson	12,600			
	FD Training	62,500			
		727,331			
May					
	Pump to waste	54,000			
	Cl2 analyzer	6,975			
	equipment cleanup	12,000			
	Hydrant Flushing	133,890			
	Bear festival rod cleanup	250,000			
	School Triangle	51,480			
	Backwash	78,100			
		586,445			
June					
	Beehive water leak	46,200			
	Cl2 analyzer	6,750			
	Hydrant Flushing	133,890			
	Pump to waste	54,000			
	unmetered watering	525,860			
	leak on Fir	8,400			
	Mud Run	30,500			
	School Triangle	51,480			
	Backwash	71,700			
		928,780			
July					
	Leak 610 Simpson	216,000			
	Cl2 analyzer	6,975			
	Hydrant Flushing	497,673			
	Pump to waste	54,000			
	watering/unmetered	687,730		31,500	
	FD Training	56,000	60,750	3,500	
	School Triangle	51,000		15,750	
	Backwash	88,100			
		1,657,478		57,750	
				26,250	
August	Pump to waste	54,000		21,000	
	Cl2 analyzer	6,975		73,500	
	Hydrant Flushing	133,890			
	3/4 water line break	100,800		47,250	
	Fire	12,000		31,500	
	Cleaning curbs & Hydrants	11,100		308,000	
	Mill line break	15,240			
	watering/unmetered	634,610			
	School Triangle	51,000			
	Backwash	93,900			
		1,113,515			
September	Pump to waste	46,000			
	Cl2 analyzer	6,750			
	Hydrant flushing	47,560			

Jan. 2014	Zone 1 Total	381851	515,741
April	Zone 2 Total	422691	556,581
July	Zone 1 Total	363783	497,673
Oct	Zone 2 Total	382506	516,396
	Total (GAL)	1550831	

	oz/day	gal/day		
cl2 analyzer	28,800	225	6,975	jan
			6,300	feb
			6,975	mar
			6,750	apr
			6,975	may
			6,750	june
			6,975	july
			6,975	aug
			6,750	sep
			6,975	oct
			6,750	nov
			6,975	dec

0

6,750

	Backwash	45,100
		145,410
October	FD Training	44,880
	Cl2 analyzer	6,975
	Pump to waste	55,800
	Hydrant flushing	516,396
	Water Jetting	339,500
	Backwash	80,400
		1,043,951
November	Pump to waste	54,000
	Cl2 analyzer	6,750
	Hydrant Flushing	120,900
	water Jetting	25,110
	Backwash	94,100
	FD Training	44,880
		345,740
December	FD Training	54,000
	Cl2 analyzer	6,975
	Pump to waste	55,800
	Water Jetting	20,643
	Hydrant Flushing	47,520
	Backwash	67,600
		252,538

BACKWASH TOTALS

Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
6,900	6,900	6,800	6,500	6,500	6,500	1,200	6,800	6,800	5,600	6,700	6,800
6,800	6,800	6,800	6,500	6,500	6,600	5,300	6,700	6,800	1,200	6,700	6,700
6,800	4,500	6,900	6,500	6,600	6,500	6,400	6,600	6,700	6,800	6,800	6,800
6,800	4,600	6,900	6,500	6,400	6,500	6,400	6,700	6,800	6,700	6,800	6,800
6,900	6,600	5,100	6,500	6,500	2,700	6,500	6,700	6,700	6,800	6,800	6,700
6,800	100	5,100	6,500	6,500	3,800	6,400	6,600	6,700	6,700	6,700	6,800
6,800	6,700	5,800	6,500	6,600	6,500	6,400	6,700	6,700	6,700	6,700	6,700
6,900	6,700	6,200	6,300	6,500	6,600	6,500	6,700	6,700	6,700	6,800	6,800
6,800	6,800	6,100	6,500	6,500	6,500	4,500	6,700	6,700	6,600	6,700	6,700
6,900	6,900	6,200	6,600	6,400	6,600	4,600	6,800	6,800	6,600	6,700	6,800
6,900	6,800	6,200	6,500	6,600	6,400	4,400	6,700	6,700	6,400	6,800	6,800
7,100	6,900	6,500	77,900	78,100	71,700	9,100	6,800	74,100	6,700	6,700	6,700
6,900	6,800	74,600				7,100	6,700		6,800	6,800	6,800
6,900	6,900					6,700	6,700		6,500	6,800	6,700
6,800	6,900					6,600	6,600		80,400	6,800	6,800
6,900	6,900					88,100	93,900			94,100	6,800
6,900	6,800										67,600
123,700	77,100										

Year 2015	Well Production gallons	Consumption gallons	Un-metered consumption gallons	consumption + Un-metered Consumption	Difference gallons	Percent Difference	Totals from unmetered Consumption list		
	Meter reading							cu ft to find	
January	5,566,700	4,250,185	925,990	5,176,175	390,525	7.02	925,990	0	464,435
Febraury	5,020,882	3,675,165	735,043	4,410,208	610,674	12.16	735,043	0	483,128
March	5,360,030	3,661,647	1,082,587	4,744,234	615,796	11.49	1,082,587	0	530,403
April	5,608,392	4,421,681	797,681	5,219,362	389,030	6.94	797,681	0	438,646
May	5,662,969	4,144,452	960,249	5,104,701	558,268	9.86	960,249	0	551,170
june	7,744,978	5,300,862	1,451,812	6,752,674	992,304	12.81	1,451,812	0	514,891
July	9,067,522	7,217,239	1,092,759	8,309,998	757,524	8.35	1,092,759	0	623,675
August	7,437,499	6,632,197	786,520	7,418,717	18,782	0.25	786,520	0	675,000
September	4,784,500	4,614,500	166,914	4,781,414	3,086	0.06	166,914	0	612,000
October	4,693,380	3,857,552	722,951	4,580,503	112,877	2.41	722,951	0	488,136
November	4,875,496	4,154,946	418,150	4,573,096	302,400	6.20	418,150	0	497,177
December	4,780,111	3,777,627	453,144	4,230,771	549,340	11.49	453,144	0	483,128
	70,602,459	55,708,053		65,301,853	5,300,606	7.51			

Unmetered consumption list

	Event	Usage gallons								Cubic feet	Jetting gallons
January					30 min wash down@	gpm		day			
	Pump start-up	86,400			june		81	22	53,460	10.00	74.8
	Maple St leak	11,160			feb		81	19	46,170	60.00	448.8
	Backwash	87,900								670.00	5011.6
	equipment cleanup	51,030								480.00	3590.4
	Frozen water pipe and leaks	5,880								3190.00	23861.2
	Cl2 analyzer	6,975								2790.00	20869.2
	Line Jetting	133,294								870.00	6507.6
	Hydrant Flushing	496,351								1220.00	9125.6
	FD Training	47,000								2800.00	20944
		925,990								3270.00	24459.6
February			8,511,213							2460.00	18400.8
	Hydrant Flushing	372,800									133,294
	Cl2 analyzer	6,300									
	equipment cleanup	46,170									
	Backwash	74,500									
	FD Training	45,000									
	Maple St leak	10,080									
	Line Jetting	180,193									
		735,043									
March											
	Break Cedar	221,760									
	Maple St leak	11,160									
	Cedar Heights Lift Staion	12,000									
	Wildcat Cleanup	10,000									
	Line Jetting	162,982									
	State Sign Cleaning	5,000									
	Cl2 analyzer	6,975									
	equipment cleanup	53,460									
	Backwash	84,400			cl2 analyzer	28,800		225	6,975	jan	
	Hydrant Flushing	463,850							6,300	feb	
	FD Training	51,000							6,975	mar	
		1,082,587							6,750	apr	
April									6,975	may	
	Hydrant Flushing	556,581							6,750	june	
	Cl2 analyzer	6,750							6,975	july	
	equipment cleanup	11,000							6,975	aug	
	Road spraying	1,000							6,750	sep	
	treatment plant leak	500							6,975	oct	
	car fire	250							6,750	nov	
	Backwash	121,300							6,975	dec	
	Maple St leak	10,800									
	6th & Pine leak	14,400									
	Break-Simpson	12,600									0
	FD Training	62,500									
		797,681									
May											
	Pump to waste	54,000									
	Maple St leak	11,160									
	Cl2 analyzer	6,975									
	equipment cleanup	12,000									
	Hydrant Flushing	433,890									
	Line flushing	11,444									
	Bear festival road cleanup	250,000									
	School Triangle	51,480									6,750
	Backwash	129,300									
		960,249									
June											
	Maple St leak	10,800									
	equipment cleanup	53,460									
	Hydrant Flushing	49,500									
	Cl2 analyzer	6,750									
	Pump to waste	54,000									
	unmetered watering	525,860									
	Mud Run	41,962									
	Line break Beck st	475,200									
	School Triangle	51,480									
	Backwash	182,800									
		1,451,812									
July											
	Dust control	17,354									
	Cl2 analyzer	6,975									
	Hydrant Flushing	9,500									
	Pump to waste	54,000									
	watering/unmetered	687,730		31,500							

	Fire control	56,000	60,750	3,500
	School Triangle	51,000		15,750
	Backwash	210,200		
		[illegible]		57,750
				26,250
August	Pump to waste	54,000		21,000
	Cl2 analyzer	6,975		73,500
	Hydrant Flushing	133,890		
	3/4 water line break	33,000		47,250
	Cleaning curbs & Hydrants	11,100		276,500
	watering/unmetered	75,000		
	Jetting	17,255		
	Main Break	19,800		
	Reservoir Overflow	300,000		
	Backwash	135,500		
		786,520		
September	Pump to waste	46,000		
	Cl2 analyzer	6,750		
	Water Leaks	12,500		
	Jetting Lines	6,964		
	Backwash	94,700		
		166,914		
October	FD Training	44,880		
	Cl2 analyzer	6,975		
	Water Leaks	3,600		
	Pump to waste	55,800		
	Hydrant flushing	516,396		
	Backwash	95,300		
		722,951		
November	Pump to waste	54,000		
	Cl2 analyzer	6,750		
	Hydrant Flushing	120,900		
	water Jetting	25,110		
	Backwash	81,700		
	10" water main Break	84,810		
	FD Training	44,880		
		418,150		
December	FD Training	54,000		
	Cl2 analyzer	6,975		
	Pump to waste	55,800		
	house Fire	160,000		
	Water Jetting	4,144		
	Hydrant Flushing	83,325		
	Backwash	88,900		
		453,144		

BACKWASH TOTALS

Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
6,800	6,800	6,700	6,800	6,800	6,800	6,700	6,800	6,900	6,800	6,800	6,800
6,800	6,700	6,800	6,700	6,800	6,800	6,800	6,800	6,600	6,800	6,700	6,900
6,800	6,800	6,800	6,800	6,700	6,900	6,700	6,800	6,800	6,800	6,900	6,800
6,700	6,700	6,700	6,800	6,800	6,800	13,600	6,800	6,600	6,800	6,800	6,800
6,700	6,800	6,900	6,800	6,800	6,700	6,800	6,800	6,700	6,900	6,800	6,900
6,800	6,800	6,700	6,800	6,700	6,800	6,600	6,700	6,700	6,800	6,800	6,800
6,700	6,800	6,800	6,800	6,800	6,800	6,800	6,800	6,800	6,800	6,800	6,800
6,700	6,800	6,800	6,800	6,800	6,700	6,800	6,800	6,800	6,800	6,800	6,900
6,800	6,800	6,800	6,700	6,900	6,800	6,900	6,800	6,800	6,800	6,900	6,800
6,800	6,800	6,800	6,700	6,900	6,800	6,900	6,700	6,800	6,800	6,800	6,800
6,800	6,700	6,800	6,700	6,800	6,700	13,500	6,800	6,800	6,800	6,800	6,900
6,700	0	6,800	6,700	6,800	6,800	6,800	6,800	6,800	6,800	6,800	6,900
6,800	0	81,400	6,800	6,800	6,700	6,800	6,500	6,700	6,800		6,800
87,900	74,500		6,700	6,800	6,700	6,800	6,900	6,900	6,800		
			6,800	6,800	6,700	6,800	6,800	94,700	95,300	81,700	88,900
			6,800	6,900	6,800	6,800	6,700				
			6,800	6,800	6,800	5,700	6,800				
			6,800	6,800	13,700	6,700	6,700				
			121,800	6,800	6,800	6,700	6,700				
				129,300	6,800	6,700	7,000				
					13,500	6,800	135,500				
					6,700	6,800					
					6,700	6,700					
					6,700	6,900					
					6,800	6,900					
					182,800	6,800					
						6,800					
						1,100					
						6,800					
						6,700					
						210,200					

Year 2016	Well Production gallons	Consumption gallons	Un-metered consumption gallons	consumption + Un-metered Consumption	Difference gallons	Percent Difference
	Meter reading					
January	5,033,461	4,086,204	513,685	4,599,889	433,572	8.61
Febraury	4,796,543	4,180,535	507,170	4,687,705	108,838	2.27
March	5,209,125	3,979,143	1,205,085	5,184,228	24,897	0.48
April	4,824,257	4,153,195	492,250	4,645,445	178,812	3.71
May	6,170,222	4,772,898	757,345	5,530,243	639,979	10.37
June	6,656,074	5,107,711	1,379,812	6,487,523	168,551	2.53
July	7,153,566	5,096,371	1,108,063	6,204,434	949,132	13.27
August	8,662,162	7,426,734	486,708	7,913,442	748,720	8.64
September	5,771,787	5,428,245	176,214	5,604,459	167,328	2.90
October	5,190,005	3,976,532	711,351	4,687,883	502,122	9.67
November	4,942,416	4,157,289	413,250	4,570,539	371,877	7.52
December	5,159,006	4,159,950	542,124	4,702,074	456,932	8.86
	69,568,624	56,524,807		64,817,864	4,750,760	6.83

Totals from unmetered Consumption list
513,685
507,170
1,205,085
492,250
757,345
1,379,812
1,108,063
486,708
176,214
711,351
413,250
542,124

cu ft to find
0
0
0
0
0
0
0
0
0
0
0
0

	cu/ft	gal	
464,435	546,269.00	4,088,823	
483,128	558,888.00	4,183,277	
530,403	531,970.00	3,981,795	
438,646	554,752.00	4,152,319	
551,170	637,348.00	4,770,550	
514,891		0	
623,675		0	
675,000		0	
612,000		0	
488,136		0	
497,177		0	
483,128		0	

Unmetered consumption list

	Event	Usage gallons	
January			
	Pump to waste	42,000	
	Backwash	81,800	
	equipment cleanup	51,030	
	Frozen water pipe and leaks	5,880	
	Cl2 analyzer	6,975	
	Hydrant Flushing	279,000	
	FD Training	47,000	
		513,685	
February			7,087,972
	Hydrant Flushing	338,000	
	Cl2 analyzer	6,300	
	equipment cleanup	46,170	
	Backwash	68,300	
	FD Training	10,000	
	Pump to waste	38,400	
		507,170	
March			
	Summit Break	342,000	
	Cl2 analyzer	6,975	
	Pump to waste	48,000	
	equipment cleanup	53,460	
	Backwash	107,300	
	Hydrant Flushing	616,350	
	FD Training	31,000	
		1,205,085	
April			
	Hydrant Flushing	247,500	
	Pump to waste	43,200	
	Cl2 analyzer	6,750	
	equipment cleanup	11,000	
	Backwash	121,300	
	FD Training	62,500	
		492,250	
May			
	Pump to waste	54,000	
	Cl2 analyzer	6,975	
	WA DOT	4,000	
	equipment cleanup	12,000	
	Hydrant Flushing	433,890	
	Bear festival road cleanup	100,000	
	School Triangle	51,480	
	Backwash	95,000	
		757,345	
June			
	Maple St leak	30,800	
	equipment cleanup	53,460	
	Hydrant Flushing	49,500	
	Cl2 analyzer	6,750	
	Pump to waste	54,000	
	unmetered watering	525,860	
	Mud Run	41,962	
	Line break Beck st	475,200	
	School Triangle	51,480	
	Backwash	110,800	
		1,379,812	
July			
	Dust control	6,508	
	Cl2 analyzer	6,975	
	Hydrant Flushing	9,500	
	Pump to waste	54,000	
	Line Jetting	72,450	
	watering/unmetered	687,730	
	Fire control	56,000	
	2" line Break/school	45,900	
	School Triangle	51,000	
	Backwash	118,000	
		1,108,063	
August	Pump to waste	54,000	
	Cl2 analyzer	6,975	
	Hydrant Flushing	133,890	
	3/4 water line break	33,000	
	Dust control	4,638	
	watering/unmetered	75,000	
8/8/2016	Water Truck, GH	3,750	
	Jetting	17,255	
	Main Break	19,800	
	Backwash	138,400	
		486,708	
September	Pump to waste	46,000	
	Cl2 analyzer	6,750	
	Water Leaks	12,500	
	Jetting Lines	6,964	
	Backwash	104,000	
		176,214	
October	FD Training	44,880	

30 min wash down@	gpm	day		
june	81	22	53,460	
feb	81	19	46,170	

Cubic feet	Jetting gallons
10.00	74.8
60.00	448.8
670.00	5011.6
480.00	3590.4
3190.00	23861.2
2790.00	20869.2
870.00	6507.6
1220.00	9125.6
2800.00	20944
2460.00	18400.8
	108,834

cl2 analyzer	28,800	225	6,975	jan
			6,300	feb
			6,975	mar
			6,750	apr
			6,975	may
			6,750	june
			6,975	july
			6,975	aug
			6,750	sep
			6,975	oct
			6,750	nov
			6,975	dec

	6,750

	Cl2 analyzer	6,975
	Water Leaks	3,600
	Pump to waste	55,800
	Hydrant flushing	516,396
	Backwash	83,700
		711,351
November	Pump to waste	54,000
	Cl2 analyzer	6,750
	Hydrant Flushing	120,900
	water Jetting	25,110
	Backwash	76,800
	10" water main Break	84,810
	FD Training	44,880
		413,250
December	FD Training	54,000
	Cl2 analyzer	6,975
	New 6" water line flushing	82,500
	8th & Frontage Rd leak	11,280
	Pump to waste	55,800
	house Fire	160,000
	Water Jetting	4,144
	Hydrant Flushing	83,325
	Backwash	84,100
		512,121

[redacted]

Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
6,800	6,800	6,800	6,800	7,200	7,000	6,900	6,900	6,500	6,900	6,900	7,100
6,800	6,900	6,800	7,100	7,100	6,900	7,000	6,900	6,900	7,000	6,900	6,900
6,700	6,900	6,700	7,100	7,300	6,900	7,000	7,000	6,900	7,000	7,000	7,000
6,800	6,800	6,900	7,200	7,300	6,900	6,900	6,900	7,000	6,900	7,000	7,100
6,800	6,800	6,800	6,800	7,300	6,900	6,900	6,900	6,900	6,900	7,100	7,000
6,900	6,800	6,800	6,800	7,200	6,900	6,900	7,000	6,900	3,500	6,900	7,000
6,800	6,800	6,800	7,300	6,000	6,900	7,000	6,900	7,000	3,500	7,000	7,000
6,800	6,900	6,800	7,200	6,100	6,900	7,000	6,900	7,000	7,000	7,000	7,000
6,900	6,800	6,800	7,200	6,000	7,000	7,000	6,800	6,900	7,000	7,000	7,000
6,900	6,800	6,800	7,200	6,000	6,900	7,000	6,900	7,000	7,000	7,000	7,000
6,800	0	18,600	7,300	5,900	6,900	6,900	7,000	7,000	7,000	7,000	7,000
6,800	0	6,800	0	7,800	6,900	6,900	6,900	7,000	7,000	0	7,000
0	0	6,800	0	7,000	6,900	6,900	6,900	7,000	7,000	0	0
81,800	68,300	7,100	0	6,800	6,900	6,900	13,800	7,000	0	0	0
		107,300	78,000	0	7,000	6,900	7,000	7,000	83,700	76,800	84,100
				0	7,000	7,000	6,900	104,000			
				0	0	6,900	6,900				
				0	0	0	6,900				
				0	0	0	7,000				
				95,000	0	0	0				
					0	0	138,400				
					0	0					
					0	0					
					0	0					
					0	0					
					110,800	118,000					

Year 2017	Well Production gallons	Consumption gallons	Un-metered consumption gallons	consumption + Un-metered Consumption	Difference gallons	Percent Difference	Totals from unmetered Consumption list
	Meter reading						
January	4,749,461	3,960,553	389,105	4,349,658	399,803	8.42	389,105
Febraury	4,389,780	4,266,704	121,270	4,387,974	1,806	0.04	121,270
March	4,456,111	3,600,554	771,665	4,372,219	83,892	1.88	771,665
April	4,501,800	3,777,522	452,550	4,230,072	271,728	6.04	452,550
May	5,383,130	4,110,912	1,075,384	5,186,296	196,834	3.66	1,075,384
june	5,958,943	4,989,059	836,150	5,825,209	133,734	2.24	836,150
July	8,635,645	6,019,446	1,795,453	7,814,899	820,746	9.50	1,795,453
August	8,615,970	7,833,831	666,508	8,500,339	115,631	1.34	666,508
September	6,669,745	6,523,185	145,830	6,669,015	730	0.01	145,830
October	5,273,552	4,699,495	375,275	5,074,770	198,782	3.77	375,275
November	4,835,311	3,893,158	535,450	4,428,608	406,703	8.41	535,450
December	4,797,688	3,699,514	449,764	4,149,278	648,410	13.52	449,764
	68,267,136	57,373,933		64,988,337	3,278,799	4.80	

cu ft to find				
0	464,435	529,132.00	cu/ft	gal
0	483,128	570,034.00		3,960,553
0	481,036	481,036.00		4,266,704
0	438,646	504,679.00		3,600,554
0	551,170	549,220.00		3,777,522
0	514,891	666,541.00		4,110,912
0	623,675	750,761.00		4,989,059
0	675,000	1,046,604.00		5,619,446
0	612,000	871,501.00		7,833,831
0	488,136	627,855.00		6,523,185
0	497,177	520,128.00		4,699,495
0	483,128	494,257.00		3,893,158
				3,699,514

Unmetered consumption list

	Event	Usage gallons		
January				
	Pump to waste	42,000		
	Backwash	110,600		
	equipment cleanup	51,030		
	House Fire: Ray Boling	1,500		
	Cl2 analyzer	6,975		
	Hydrant Flushing	175,000		
	Grays Harbors County	2,000		
		389,105		
February			6,842,739	
	Hydrant Flushing	0		
	Cl2 analyzer	6,300		
	equipment cleanup	26,170		
	Backwash	50,400		
	Pump to waste	38,400		
		121,270		
March				
	Summit Break	342,000		
	Cl2 analyzer	6,975		
	Hydrant Valve Repair	85,000		
	Summit line break	19,320		
	Pump to waste	48,000		
	equipment cleanup	29,000		
	Backwash	56,000		
	Hydrant Flushing	185,370		
		771,665		
April				
	Hydrant Flushing	247,500		
	Pump to waste	43,200		
	Cl2 analyzer	6,750		
	equipment cleanup	31,000		
	Backwash	61,600		
	FD Training	62,500		
		452,550		
May				
	Pump to waste	54,000		
	Cl2 analyzer	6,975		
	Freeway Project	459		
	57th street leak	53,280		
	Maple st leak	33,840		
	equipment cleanup	28,500		
	Hydrant Flushing	233,890		
	Bear festival road cleanup	100,000		
	School Triangle	51,480		
		473,760		
	Backwash	39,200		
		1,075,384		
June				
	Maple St leak	10,800		
	equipment cleanup	53,460		
	Hydrant Flushing	49,500		
	Cl2 analyzer	6,750		
	Pump to waste	54,000		
	unmetered watering	425,860		
	8 in leaky packing	100,000		
	School Triangle	51,480		
	Backwash	84,300		
		836,150		
July				
	Reservoir Overflow	475,000		
	Dust control	126,508		
	Leaky valve	50,000		
	Frontage Rd leak	15,840		
	Cl2 analyzer	6,975		
	Hydrant Flushing	125,000		
	Pump to waste	54,000		
	watering/unmetered	687,730		
	Fire control	56,000		
	School Triangle	75,000		
	Backwash	123,400		
		1,795,453		
August	Pump to waste	54,000		
	Cl2 analyzer	6,975		
	Hydrant Flushing	133,890		
	3/4 water line break	33,000		
	Dust control	4,638		
	watering/unmetered	275,000		
	Water Truck, GH	3,750		
	Jetting	17,255		
	Main Break	19,800		
	Backwash	118,200		
		666,508		

30 min wash down@	gpm		day		Cubic feet	Jetting gallons
june		81	22	53,460	10.00	74.8
feb		81	19	46,170	60.00	448.8
					670.00	5011.6
					480.00	3590.4
					3190.00	23861.2
					2790.00	20869.2
					870.00	6507.6
					1220.00	9125.6
					2800.00	20944
					2460.00	18400.8

cl2 analyzer	28,800	225	6,975	
			6,975	
			6,750	
			6,975	
			6,750	
			6,975	
			6,975	
			6,750	
			6,975	
			6,750	
			6,975	
				6,750

September	Pump to waste	46,000
	Cl2 analyzer	6,750
	Asphalt cooling	1,980
	Fire Truck	1,000
	Backwash	90,100
		145,830
October		
	Cl2 analyzer	6,975
	Water Leaks	3,600
	Pump to waste	55,800
	Car fire	2,500
	Hydrant flushing	216,000
	Backwash	90,400
		375,275
November	Pump to waste	54,000
	Cl2 analyzer	6,750
	Hydrant Flushing	120,900
	water Jetting	25,110
	Backwash	99,000
	10" water main Break	184,810
	FD Training	44,880
		535,450
December	FD Training	54,000
	Cl2 analyzer	6,975
	Beck 2" water line break	45,900
	Pump to waste	55,800
	5th st 3/4" break	2,820
	Water Jetting	4,144
	Hydrant Flushing	183,825
	Backwash	96,300
		449,764

[redacted]

Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
7,000	5,600	5,600	5,700	5,500	5,600	5,600	5,600	5,600	5,600	5,700	5,600
7,000	5,600	5,600	5,500	5,600	5,600	5,600	5,600	5,600	5,700	5,600	5,700
13,100	5,600	3,000	5,600	5,600	5,600	5,600	5,700	5,700	5,600	5,700	5,700
27,900	5,600	2,600	5,600	5,600	5,700	5,600	5,700	5,600	5,600	5,600	5,700
20,900	5,700	5,600	5,600	5,600	5,600	5,600	5,600	5,600	5,600	5,600	5,600
1,100	5,600	5,600	5,600	5,600	5,600	5,600	5,600	5,600	5,600	11,500	5,700
5,600	5,500	5,600	5,600	5,700	5,600	5,600	5,600	5,600	5,700	5,700	5,700
5,600	5,700	5,600	5,600	0	5,600	5,700	5,600	5,700	5,600	2,600	5,600
5,600	5,500	5,600	5,600	0	5,600	5,600	5,700	5,600	5,600	5,600	5,700
5,600	0	5,600	5,500	0	5,700	5,800	5,600	5,700	5,700	5,700	5,600
5,600	0	5,600	5,700	0	5,600	5,400	5,600	5,600	5,600	5,700	5,700
5,600	0	0	0	0	5,600	5,600	5,700	5,600	5,700	5,600	5,700
0	0	0	0	0	5,600	5,600	5,600	5,600	5,800	5,700	5,700
110,600	50,400	0	0		5,700	5,600	5,600	5,700	5,700	5,700	5,600
		56,000	61,600	39,200	5,600	5,700	5,700	5,600	5,700	5,600	5,700
					0	5,600	5,600	5,700	5,600	5,700	5,700
					0	5,600	5,600	0	0	5,700	5,600
					0	5,600	5,600	90,100	90,400	99,000	96,300
					0	5,600	5,700				
					0	5,600	5,600				
					0	5,600	5,600				
					0	5,600	118,200				
					84,300	123,400					

APPENDIX L

CITY OF MCCLEARY WELLHEAD PROTECTION DOCUMENTATION

WELLHEAD/AQUIFER PROTECTION LETTER/MAP TO PROPERTY OWNERS

INTERLOCAL AGREEMENT
BETWEEN
GRAYS HARBOR COUNTY AND THE CITY OF MCCLEARY
TO
PROTECT AND MANAGE THE WILDCAT CREEK AQUIFER
BY
COORDINATING LAND USE DEVELOPMENT
AND
ESTABLISHING THE WILDCAT CREEK AQUIFER
JOINT MANAGEMENT PROGRAM

THIS AGREEMENT is made and entered into this date by Grays Harbor County, a political subdivision of the State of Washington (hereinafter referred to as the "County,") and the City of McCleary, a code city, incorporated under the laws of the State of Washington (hereinafter referred to as the "City.")

WHEREAS, because of concerns about potential detrimental effects of land use development on the Wildcat Creek Aquifer, the County Board of Commissioners declared a six-month emergency moratorium on development on land above the Aquifer by adopting Ordinance 357 on February 12, 2007; and,

WHEREAS, the County subsequently extended the moratorium three times by adopting Ordinances 366, 369, and 375; and

WHEREAS, during the moratorium the County, the City, and the Washington State Department of Health and the Department of Community, Trade and Economic Development financed studies of the Wildcat Creek Aquifer area's hydrogeology and of regulatory alternatives; and

WHEREAS, key findings of these hydrogeologic studies are that: (1) Wildcat Creek Aquifer is the only practical water supply for several hundred individual domestic wells and six public water systems, including the City's; (2) the Aquifer serves as a naturally replenishing reservoir; (3) local soils and geologic deposits are relatively permeable, enabling potential transmission of contaminants to the Aquifer; (4) Aquifer management will always be characterized by uncertainty and, therefore, should allow for a margin of safety; and (5) management is further complicated by fragmented land ownership and the several governmental jurisdictions, unlike a municipal watershed under single ownership and management; and

WHEREAS, based on these hydrogeologic studies, the County established critical aquifer recharge areas around each public water system well in the Wildcat Creek Aquifer by amending Grays Harbor County Code 17.56.180 and affirmed the appropriateness of the existing Grays Harbor County Comprehensive Plan Rural Lands Element policies and zoning designations for low-density land use above the Aquifer, Ordinance 377 adopted October 6, 2008; and,

WHEREAS, the County found that these two actions plus ongoing collaboration with the City on a joint management program for the Aquifer constituted a three-part strategy that eliminated the emergency condition on which the development moratorium was based; and,

WHEREAS, based on this three-part strategy the County canceled the moratorium under Ordinance 378 on October 6, 2008; and

WHEREAS, the County Comprehensive Plan's Community Plan Coordination Element encourages city comprehensive plans to designate Urban Services Areas and also encourages the coordination and integration of county and city development plans, programs, and policies; and

WHEREAS, the County and City wish to enter into an Interlocal Agreement for coordinating land use development and joint management of the aquifer;

NOW, THEREFORE, in consideration of the terms and conditions contained herein, the City and County agree as follows:

SECTION A. LAND USE COORDINATION

Section A1. The Wildcat Creek Aquifer – An Area of High Natural Resource Value. The Rural Lands Element of the County's Comprehensive Plan sets forth objectives and policies for a low-density mix of forestry, agriculture, and lot sizes of five acres or more. Under certain conditions lot sizes smaller than five acres may also be created. However, the County Plan states that such smaller lot sizes are to be avoided in "areas of high natural resource values." (Grays Harbor County, *Rural Lands Study, Part Two: Recommendations*, July 1982. Policies for the Rural Residential Area, 2.1, policy (f) under "Areas to be avoided by this designation, page 5; and policy (e) under R-1 and R-2 Zones, page 14.)

The County and City recognize that the Wildcat Creek Aquifer is an "area of high natural resource value," as stated in the County Comprehensive Plan. Therefore, rezones that would allow the subdivision of land into lots smaller than five acres should be avoided on land located on top of the Aquifer. The County and City recognize that additional lots smaller than five acres may be subdivided within areas under County jurisdiction that are already zoned RR and R2, if developed in accordance with County Code. The City and County also recognize that property within the City that overlies the Aquifer may also be developed in accordance with existing zoning, provided that such development is served by City water and sewer.

Section A2. Transition and Coordination Policy.

a. The purposes of this policy are:

1. to improve County-City Coordination for land use under County jurisdiction within the Aquifer boundaries in accordance with the Grays Harbor County Comprehensive Plan Rural Lands Community Plan Coordination Element; and

2. to provide guidance for development, comprehensive plan changes, and rezones of land within the Aquifer boundaries and under County jurisdiction that, as growth occurs, is anticipated to become part of the City.

b. In addition to improved coordination, the intent of this policy is that development or rezones that occur on land presently under County jurisdiction, which will need City services, be located, designed, and developed so that the City can provide such services economically. While it is City policy to provide services, including water and sewer, within City boundaries, such services can be extended outside of City boundaries based on conditions expressly stating that the area will be annexed in the future (e.g. signed annexation covenants) and the cost of services are economically feasible for the City.

c. Following adoption of this Interlocal agreement, the City will identify its Urban Services Area. The term "urban services area" is from Grays Harbor County, *Rural Lands Study, Part Two: Recommendations,* Policy 9 of the Community Plan Coordination Element, page 31. The term is also commonly known as "urban growth area." An urban services area – or urban growth area – is land that the City recognizes may, at some stage, be subject to consideration for annexation and/or provision of City utility services, whether within the City or while in the County.

d. For purposes of this policy, land within Aquifer boundaries that is under County jurisdiction is understood to be of three types of areas:

1. Type A refers to the City's wellhead protection area, which is also designated as a Critical Aquifer Recharge Area under the County's Critical Areas Ordinance.

2. Type B refers to areas that the City has designated as its Urban Services Area.

3. Type C refers to all other areas within Aquifer boundaries that are under County jurisdiction.

e. The City Planning Commission shall review, and report to the City Council, all policy change proposals for County Comprehensive Plan and rezones that are proposed for Type A and Type B areas. The City Council shall review the Planning Commission recommendations and submit City recommendations to the County.

f. City staff shall review all County Comprehensive Plan changes and rezone applications that are proposed for Type C areas. City staff shall also review all subdivision, conditional shoreline substantial development, recreational vehicle park, mobile home park conditional land use and surface excavation development applications proposed for all Type A, Type B, and Type C areas.

g. If, during the interim period between adoption of this Interlocal Agreement and the City's designation of its Urban Services Area, the County receives either a pre-application or an application for a Comprehensive Plan change, rezone, or development for land within the Aquifer, the County and the City will seek to agree on guidance concerning the proposal that is consistent with the intent of this section. Such guidance shall be for use by the County during its review process. The County retains all decision-making authority over applications for Comprehensive Plan changes, rezones, and land development within County jurisdiction.

h. Any agreement reached by the City and the County under this section shall include appropriate provision for filing notice of a proposed action in compliance with Chapter 36.93 RCW, if applicable, with the Grays Harbor County Boundary Review Board.

Section A3. Extension of City water and sewer to existing R-2 Zones.
Several areas adjacent to the City and above the Aquifer are zoned R2. They are located south and west of Highway 108 on the west end of the City and in the vicinity of Lynch and Larson Roads, immediately north of the City. Although the County's R2 zone allows lots small enough to make municipal water and sewer more economical to provide than would the RR zone, most lots in the two existing R2 areas have already been platted at lot sizes that are not efficient for provision of City services. (See map.)

The City and County will seek means for providing existing R-2 zones with City services, including joint applications for grants. Any such provision of City services would be conditioned by an annexation covenant.

SECTION B. WILDCAT CREEK AQUIFER JOINT MANAGEMENT PROGRAM

Section B1. Establishing the Wildcat Creek Aquifer Joint Management Program.
The County and City hereby establish the Wildcat Creek Aquifer Joint Management Program.

Section B2. Maximizing the quantity of groundwater.
The County and City agree:

a. To encourage water conservation.
b. Where appropriate, to use low impact development techniques that increase infiltration of precipitation to groundwater.

c. To manage City and County surface runoff to return precipitation to the aquifer rather than send it downstream.

Section B3. Minimize the transmission of contaminants to the aquifer.
The County and City agree:

a. To educate residents about the responsibilities of living above the water supply.

b. To update the list of potential contamination sites for chemicals.

c. To review and, where necessary, update spill response plans.

d. To examine their respective zoning ordinances to determine whether such ordinances allow or condition uses that are too risky to locate on top of a water supply reservoir. The intent here is strike the right balance between allowing uses whose risks can be eliminated through cost-effective regulation and prohibiting those uses that cannot. After completing these reviews the County and City will specify which uses shall require a hydrogeologic assessment by a licensed hydrogeologist. The County and City shall each make its own determination, and neither shall require joint concurrence.

Section B4. Learn more about the Aquifer.
Much can be learned at a fairly reasonable cost about the Aquifer, even though the impossibility of ever obtaining a complete and detailed picture of the Aquifer's below-ground variations means that land use decisions will always entail uncertainty. Monitoring streamflows can refine estimates of safe yield. Monitoring a sample of wells over time can build a database and can alert residents and the two governments to problems with groundwater quality. The County monitored a sample of private wells in 2008 and did not detect evidence of contamination. The databases established through both monitoring programs can aid future decision making. Therefore, the County and City agree:

a. Additional monitoring of private wells: If the County and City decide that additional monitoring of private wells is necessary, they shall agree on a monitoring program and designate funds for its operation.

b. To monitor the level of Wildcat Creek downstream of the point where its three branches converge.

c. To build an ongoing record of monitoring results to aid future decision making.

Section B5. Responsibility
The McCleary City Council and the Grays Harbor County Board of Commissioners shall be responsible for the Wildcat Creek Aquifer Joint Management Program. No new or separate legal or administrative entity is created to administer the provisions of this

agreement. The Lead Staff specified in Section B6 shall jointly administer the undertakings of the parties under this agreement.

Section B6. Lead Staff
Each government shall designate a lead staff person for the Joint Management Program. For Grays Harbor County the lead shall be the Deputy Director of the Community Development Department. For the City of McCleary the lead shall be the City Administrator. The designations are the presumptive designations unless the County Board of Commissioners changes the County's designation, or the City Mayor and Council change the City's designation.

Section B7. Work Plan
The lead staff persons shall be responsible for preparing an annual work plan. The first work plan shall be prepared within 30 days after this interlocal agreement takes effect. Subsequent work plans shall be prepared by July 1 of each year. The County Board of Commissioners and the City Council shall approve work plans.

Section B8. Record Keeping and Reporting
The two governments will keep records of progress on the work plan in at least one location and post updates on the County's website. At least once per year the lead staff members for the County and City will jointly update the Board of Commissioners and the City Council at their regularly scheduled public meetings.

Section B9. Funding
The two governments may apply jointly for funding to carry out the aquifer management program. If expected or actual funding is withdrawn, reduced or limited in any way for work planned under this agreement or in any amendment hereto, the parties are not obligated to perform the unfunded task until funds become available.

Section B10. Duration of Agreement and Termination
This agreement shall be deemed to have commenced and become effective on such date as both the County and the City have executed it, and it shall continue in effect indefinitely until terminated by agreement of both parties, or by written notice given by one party to the other at least one year prior to the date of such termination.

Section B11. Amendments
Any amendment to this agreement shall only be as specifically authorized by the Board of County Commissioners and the City Council of the City of McCleary, and shall be in writing.

NOW THEREFORE BE IT JOINTLY RESOLVED BY THE CITY OF MCCLEARY AND THE BOARD OF COUNTY COMMISSIONERS FOR GRAYS HARBOR COUNTY that the Interlocal Agreement to Protect and Manage the Wildcat Creek Aquifer and establish a joint management program is hereby accepted and adopted this 6th day of October, 2009.

City of McCleary

Wally Bentley, Mayor

Board of County Commissioners
Grays Harbor County Washington

Mike Wilson, Chair

Albert A. Carter, District 3

Terry L. Willis, District 1

Attest:

Wendy Collins, Clerk-Treasurer

Attest:

Donna Caton, Clerk of the Board

OFFICE OF
COUNTY COMMISSIONERS
BOB BEERBOWER
FIRST DISTRICT
MIKE WILSON
SECOND DISTRICT
ALBERT A. CARTER
THIRD DISTRICT
DONNA CATON
ADMINISTRATIVE ASSISTANT
CLERK OF THE BOARD

GRAYS HARBOR COUNTY
1854
STATE OF WASHINGTON

100 West Broadway, Suite #1
MONTESANO, WASHINGTON 98563
PHONE (360) 249-3731
FAX (360) 249-3783

June 16, 2008

Growth Management Services
Department of Community, Trade and Economic Development
PO Box 42525
906 Columbia St. SW
Olympia, WA 98504-8350

RE: Wildcat Creek Aquifer

Attn: Review Team:

In accordance with the RCW 36.70A.106, the Grays Harbor County Board of Commissioners notifies the Department of Community, Trade and Economic Development of its intent to amend the County Code to designate the Wildcat Creek Aquifer as a Critical Aquifer Recharge Area.

This proposed amendment is one component of the County's efforts to manage the aquifer in a manner that protects the functions and values of this important natural system so that it continues to provide the public with clean, safe, and available drinking water. Other components will include an aquifer management program with the City of McCleary; monitoring ground water and stream flows to learn more about water quality and the safe yield of the aquifer; public education; integrated pest management programs; and low impact development practices for site development and surface water management.

Grays Harbor County shares jurisdiction over the Wildcat Creek Aquifer with the City of McCleary and has been working in partnership with the City to develop management practices and regulations to ensure that aquifer management is comprehensive and compatible.

Our understanding is that the 60-day state review period is a time when state agencies, local officials, and concerned citizens may comment on proposed amendments to the Grays Harbor County Critical Areas Ordinance.

The attached electronic copy contains two parts: The proposed amendments to the Critical Areas Ordinance; and the report funded by an Emerging Issues Grant and by matching funds from Grays Harbor County and the City of McCleary. This report provided the basis for the proposed County CAO amendments.

The County Planning Commission will hold a public hearing on the proposed amendments to

receive official public testimony. The Board of County Commissioners will then schedule an official, 14-day public comment period, during which it will hold a public hearing on the proposed final draft amendment for the purpose of receiving public testimony.

We are providing you an electronic copy of the proposed amendment to the Grays Harbor County Code. If you have any questions concerning these amendments, please call Lee Napier at 360.249.4222.

Respectfully yours,

BOARD OF COMMISSIONERS GRAYS HARBOR COUNTY

Albert A. Carter, Chairman

Bob Beerbower, District 1

Mike Wilson, District 2

17.56.180 Critical area overlay.

Critical areas designated under authority of RCW 36.70A.060(2) shall comply with the following additional regulations:

(A) ~~Land-filling~~ Fill and grade activities within frequently flooded areas shall be a conditional use in all zones, and the minimum mitigation shall include replacement of flood storage capacity.

(B) Except for activities allowed by a Washington State Department of Natural Resources Class III Forest Practices Permits, earth changing on and/or within forty (40) feet of landslide hazard areas shall follow the requirements for engineered grading requirements in the current edition of the International Building Code regardless of grading volume.

(C) Subdivision for residential construction ~~is prohibited~~ within critical aquifer recharge areas shall be subject to the requirements set forth in Section 17.56.180(D)(5).

(D) The following requirements set forth in this sub-section shall apply to development activities located within the Wildcat Creek Aquifer.

(1) "Wildcat Creek Aquifer" means that area of unincorporated Grays Harbor County depicted on the Grays Harbor County Map identified as the 'Wildcat Creek Aquifer' dated June 2008

(2) All rezones and subdivisions within the Wildcat Creek Aquifer shall be required to prepare and implement a Plan that contains (a) hazardous material best management practices, (b) integrated pest best management practices, and (c) landscape maintenance best management practices.

The Plan shall be included in the conditions of any rezone and in any subsequent resulting conditions, covenants and restrictions of a recorded subdivision and carried forth to all deeds for the individual lots resulting from the subdivision. Educational materials pertaining to the Plan shall be provided to each initial homeowner in the subdivision.

The Plan shall be reviewed by the Environmental Health Division prior to any County decision on the proposal.

(3) Any surface water management plan prepared for a subdivision or rezone or other development within the Wildcat Creek Aquifer shall include low impact development techniques consistent with those contained in the January 2005 Puget Sound Action Team and Washington State University Pierce County Extension document entitled "Low Impact Development: Technical Guidance Manual for Puget Sound".

The Plan shall be reviewed and approved by the Public Works Division prior to any County decision on the proposal.

(4) The installation and use of underground and above-ground automotive motor fuel and liquefied natural gas fuel-dispensing and storage facilities within the Wildcat Creek Aquifer shall comply with the requirements set forth in the current edition of the International Fire Code (IFC), the underground storage tank regulations set forth in Washington Administrative Code 173-360, and the tank system requirements set forth in Washington Administrative Code 173-303-640.

(5) The 100-foot protective radius for Group A and Group B Public Water System wells or their Washington State Department of Health recognized Wellhead Protection Area Zones depicted on the Grays Harbor County Map identified as the 'Wildcat Creek Aquifer' dated June 2008 are hereby designated as critical aquifer recharge areas.

(a) All proposed rezones and subdivisions within the critical aquifer recharge areas identified in Section 17.56.180(D)(5) shall be required to prepare a Wellhead and Wellhead Time-of-Travel Protection Plan (WPP).

For Group A and Group B Public Water System Wells, the Plan shall be reviewed by the Group A Public Water System purveyor or Group B Public Water System purveyor and the Grays Harbor County Environmental Health Division prior to any County decision on the proposal. In the event that the Division finds that the proposal does not provide a reasonable margin of safety for the critical aquifer recharge area, the proposal shall be (a) required to be revised to increase the margin of safety, including a reduction in lot density, or (b) shall be denied based upon evidence that the proposal represents a probable significant adverse impact to the critical aquifer recharge area.

For the City of McCleary wellhead capture zone, the Plan shall be reviewed by the City of McCleary and the Grays Harbor County Environmental Health Division prior to any County decision on the proposal. In the event that the Division finds that the proposal does not provide a reasonable margin of safety for the critical aquifer recharge area, the proposal shall be (a) required to be revised to increase the margin of safety, including a reduction in lot density, or (b) shall be denied based upon evidence that the proposal represents a probable significant adverse impact to the critical aquifer recharge area.

(b) Grays Harbor County shall prepare and record a notice with the Grays Harbor County Auditor for any site within the critical aquifer recharge areas identified in Section 17.56.180(D)(5) on which a development proposal is submitted.

The notice shall indicate in the public record the presence of the critical aquifer recharge area, the application of this code to the site, and that limitations on development activities may exist. Only

one such notice is required to be recorded on any individual property or lot.

The notice shall be as set forth:

"Notice: This site lies within a critical aquifer recharge area as identified in Grays Harbor County Code 17.56.180(D)(5). The site was the subject of a development proposal for [application number] filed on [date]. Restrictions on use or alteration of the site may exist due to natural conditions of the site and resulting regulation. Review of such application provides information on the location of the critical aquifer recharge area and the restrictions on the site. A copy of the plan showing the critical aquifer recharge area is attached hereto".

(c) For all proposed subdivision proposals within critical aquifer recharge areas identified in Section 17.56.180(D)(5), the applicant shall include a note on the face of the plat.

The note shall be as set forth below:

"Notice: This site lies within a critical aquifer recharge area as identified in Grays Harbor County Code 17.56.180(D)(5). Grays Harbor County shall prepare and record a notice with the Grays Harbor County Auditor for any site within the critical aquifer recharge areas identified in Section 17.56.180(D)(5) on which a development proposal is submitted.

The site was the subject of a development proposal for [application number], filed on [date]. Restrictions on use or alteration of the site may exist due to natural conditions of the site and resulting regulation".

The note shall be recorded as part of final plat approval for any subdivision.

(E) Wetlands in all districts are declared critical areas for purposes of State Environmental Policy Act Review. The words used in this section shall carry the meaning given by RCW 36.70A and Grays Harbor County Resolution 192-39 as amended.

WILDCAT CREEK AQUIFER
HYDROLOGY, REGULATORY ALTERNATIVE, AND RECOMMENDATIONS - FINAL REPORT

Prepared for:

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and
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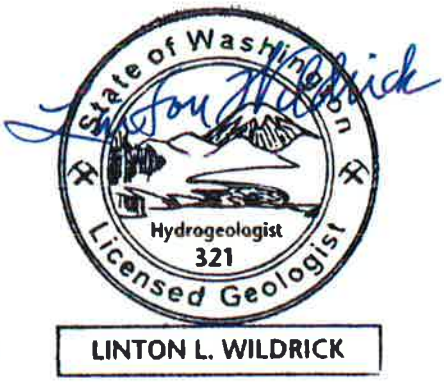
June 13, 2008

SIGNATURE

This report was reviewed by the undersigned and approved for release.

Jim Arthur
Consultant



Linton Wildrick
Associate Hydrogeologist
Pacific Groundwater Group

Contents

Part 1 – Hydrogeology and Existing Development

Introduction

The Wildcat Creek Aquifer is a naturally occurring, cost-free reservoir that provides clean, safe drinking water to several hundred individual domestic wells, three Group B public water system wells, and three Group A public water system wells, one of which is the City of McCleary's water system. As the only practical, abundant source of water in the vicinity, the Wildcat Creek Aquifer is a significant natural resource supporting the economy, health, and safety of residents of the City of McCleary and the surrounding unincorporated land under Grays Harbor County jurisdiction.

Because of uncertainty about how future development could affect this indispensable water supply, on February 12, 2007, the Grays Harbor County Board of County Commissioners declared a moratorium on development of land above the Wildcat Creek Aquifer and extended it twice. The current extension expires on August 12, 2008.

While the moratorium has been in effect, County and City officials have been working together to learn more about the aquifer and how to protect it. In 2007 they were assisted by Dan Cappellini of Evergreen Rural Water, which is headquartered in Shelton, and Scott Horsley and his associates at the Horsley Witten Group, a ground water and planning consulting firm from Massachusetts. The Washington State Department of Health paid for Horsley Witten's assistance through a contract with Evergreen Rural Water.

The County and City hired consultant Jim Arthur from Olympia to coordinate their partnership and to prepare this report. The report describes what is now known about the Wildcat Creek Aquifer and recommends actions for its protection and management. The Washington State Department of Community, Trade, and Economic Development funded the report through an Emerging Issues Grant, with matching funds from the County and City. Linton Wildrick, a licensed hydrogeologist with Pacific Groundwater Group, Tumwater, assisted Mr. Arthur in the preparation of this report.

Hydrogeology of the Wildcat Creek Aquifer

How the Aquifer Was Formed

Wildcat Creek Aquifer is a semi-confined aquifer located within sedimentary deposits that partly fill a northeast-to-southwest oriented valley. The nearby hills are composed of basaltic and sedimentary bedrock. The aquifer material consists mostly of sand and gravel that are fragments of rocks from the southeastern Olympic Mountains and the northern Cascades.

The aquifer-containing sediments were carried to the Wildcat Creek Valley by an advancing glacier of the Double Bluff glaciation period. As the glacier moved toward the valley, streams flowing out of the glacier's melting end deposited these "advance outwash" sediments at least 100,000 years ago. As the glacier then advanced into the valley, it over-rode the advance outwash materials and deposited glacial till beneath the ice. Commonly called hardpan, till is a mixture of clay, silt, and gravel, with some sand. Though saturated with water like the outwash below, till is far less permeable and usually does not yield water readily to wells.

The Double Bluff glacier stopped at the southwestern end of the valley, pushing up a terminal moraine of sand and gravel. That is partly why the three branches of Wildcat Creek converge where they do. More than 100,000 years later, the final Ice Age glaciation, called the Vashon stade of the Frasier glaciation, advanced again toward the southwest. It stopped in the upper reaches of the Skookum Creek watershed and deposited only a thin veneer of advance and recessional outwash over the old till in the Wildcat Creek Valley. Since then, modern streams have eroded channels through the glacial materials and deposited minor pockets of sediments along the channels. So, looking at the valley in cross-section:

- At the bottom is bedrock – basalt to the east and south, sandstone to the west and north.
- Above that is the advance outwash, up to 75 feet thick – the aquifer layer that contains the productive water supplies.
- Above that is the till, an aquitard, which varies from as little as 10 feet to as much as 40 feet.
- Above the till is a thin (5 feet or less) discontinuous veneer of Vashon outwash.
- On top are recent alluvial sediments, deposited by running water along Wildcat Creek and its tributaries during the 13,000 years since the last Ice Age.

Only One Aquifer

Previous reports written about Wildcat Creek Aquifer are correct in assuming the presence of a confining layer in the northeast portion of the aquifer. Pacific Groundwater Group's analysis has concluded that the confining layer is till and that it extends throughout the aquifer. The only significant aquifer resides within advance outwash material beneath the till, not in thin or absent outwash material at the surface or deeper in the main aquifer.

- There is only one aquifer.
- Both shallow domestic wells and slightly deeper City wells are drilled through the overlying till into this aquifer.
- The semi-confining effect of the till accounts for the upward pressure in the City wells.
- While some recharge comes from the surrounding hillsides, most recharge percolates down from precipitation falling directly on the land surface overlying the aquifer. There is little contribution via fractures in basalt.

- Because of its silty or clayey matrix, the till delays the percolation of rainwater down to the aquifer. That delay provides some protection against aquifer contamination but also lowers the recharge rate.

To develop this understanding of the aquifer as a whole, Mr. Wildrick examined all 200-plus well logs for the area. By contrast, Hart Crowser interpreted 67 logs, most of them located in the northeastern part of the valley, the more relevant area to analyze for a study that focused on the City's wellfield. Mr. Wildrick also spoke with Robert L. Logan, the geologist who most recently mapped the local geology for the Department of Natural Resources (Logan, R. L. 1987.)

In analyzing these well logs, what puzzled Mr. Wildrick was that the drillers all noted the presence of yellow clay, gravel, and "hardpan," the driller's term that usually means glacial till. Till is formed by the weight of ice, and the yellowish color, a sign of iron oxide, means that a deposit has weathered for a long time. Mr. Logan explained that the outwash that makes up the aquifer came not from last Ice Age advance, as had been assumed, but from the next-to-last advance. Because it has been more than 100,000 years since the Double Bluff advance deposited the till, ample time has passed for deep weathering to have occurred in the area's wet, maritime climate.

Though precipitation percolates through the till to recharge the aquifer in the advance outwash layer, the till does act as a semi-confining layer. Mr. Wildrick determined that the confined water level (the piezometric head) usually occurs above the top of the confined aquifer and about 5 to 20 feet below land surface, but never above land surface, which would make it artesian. He also noted that a water table occurs within the surficial Vashon outwash or Double Bluff till at a slightly higher level than in the Wildcat aquifer and may reach the surface during winter, forming seasonal wetlands.

The water table and piezometric water levels can be readily explained by the hydrodynamic balance of local recharge from precipitation as it percolates downward through the less permeable till into the much more permeable outwash, where it then flows down the valley or toward the creeks. Additional recharge by surface water from the surrounding hills is not required to explain the head distribution. The computer model used by Hart Crowser confirmed this conceptual interpretation by reproducing the head distribution and flow pattern in the northeastern part of the valley.

Finally, the very thin outwash and uppermost weathered till do not constitute an aquifer; no known wells tap these deposits. A few wells appear to tap thin, discontinuous, permeable lenses of sand and gravel within the till. These lenses could be called aquifers in the strict sense of the scientific term, but are insignificant in volume compared to the Wildcat Creek Aquifer and so do not constitute a second, independent aquifer of importance to our considerations.

Learning More about the Aquifer and Safe Yield

Fieldwork by the Horsley Witten Group in 2007 indicated that groundwater from the Wildcat Creek aquifer is discharging to the branches of Wildcat Creek. Groundwater

discharge to streams, called baseflow, is the natural source of streamflow during the dry months in western Washington. Monitoring streamflow below the confluence of the three branches would make it possible to estimate the average annual recharge of the aquifer. In other words, each year there is an approximate balance between the amount of water that is recharged and the amount that drains away to the streams; otherwise the groundwater level would rise or fall in the long-term.

Streamflow monitoring could be accomplished with a simple staff gauge that would be observed weekly or even monthly, coupled with several flow measurements each year, using a current meter on a wading staff. Monitoring need only be done during the dry season (June through October), since most water in the creeks would then be baseflow from groundwater. Several years of streamflow monitoring would improve the estimate of groundwater recharge, because recharge varies with the weather.

It would also be useful to monitor water elevations in various locations in the aquifer. Monitoring levels in two or three wells would be sufficient. For example, one of the un-pumped City could be monitored along with one or two newer, private wells. One should only monitor wells for which a driller's construction log is available, because the depth and geology must be known for the results to be meaningful. Depth-to-water measurements in wells usually are done with an "electrical tape" (e-tape), consisting of a coaxial cable on a reel, with depth markings on the cable and an indicator needle. Initially monitoring should be done monthly, but once the typical seasonal pattern is known, the monitoring can be cut back to quarterly or half-yearly.

In especially dry years, well owners may be concerned about whether their water supply will be depleted. Historic data on water levels compared to annual rainfall could then help water managers and governments compare current conditions to the past.

Another long-term benefit of combined streamflow and groundwater level monitoring would be improved understanding of the specific dependency of Wildcat Creek on baseflow from the aquifer. Pumping groundwater always reduces baseflow to some extent. The tough questions one must answer to define "safe yield" for an aquifer are how much effect on streamflow and other wells is acceptable to the community and to regulatory agencies. Also, if the City needs additional water rights, the monitoring results would permit more accurate estimates of the effects of new pumping, as is routinely required by Department of Ecology.

Development in the Valley

Unincorporated Area

Approximately 250 parcels in the unincorporated part of the valley have houses on them. Forty-five houses do not have on-site sewage disposal permits but are assumed to have on-site sewage systems. The County issued 171 permits for on-site systems before 1995, and has issued 74 permits since then. The new standards that took effect in 1995 have resulted in the construction of a greater number of pressure distribution systems, and there are now about 50 such systems in the valley. County records show that 13 on-site

systems have been repaired in the valley, a number that may be low since repairs before 1980 may not have been recorded.

There are fewer individual wells than on-site sewage systems because of homes served by the six public water system wells: Two Group B wells (Olin 330 & Sky Acres) and one Group A well (Pit Co 328) in the northeastern portion of the valley; one Group B well (Wintercreek MHP) and one Group A well (Forrestview Senior 55+ community) in the southwestern portion of the valley; and the City of McCleary's water utility, which serves four homes located outside City boundaries on Larson Road.

Approximately two-thirds of the unincorporated area is presently zoned for 5 acre or larger lot sizes. The remaining one-third is R2 – General Residential and RR – Rural Residential.

The minimum lot size in the RR zone is one acre, provided that various conditions are met. As a practical matter, however, County requirements for distances between on-site sewage systems and wells suggest that the actual minimum lot size would be between one and two acres. (The County requires a setback of 100 feet from the edge of an on-site system's soil dispersal component and a set-aside area for a reserve drainfield. Also, wells must be 50 feet from any sewage tank and distribution box, sewer line, and non-perforated distribution pipe.)

In the R2 zone, the minimum lot size is 10,000 square feet for a single family home, or 11,500 square feet for a duplex, provided that (1) the area is within the designated urban service area of a city, town, water, or sewer district or (2) the area is adjacent to a city or developed area and has an adequate public water system and either an adequate public sewer system or is suitable for the long-term use of on-site septic systems at the permitted density.

Under current zoning, the build-out potential above the aquifer and within County jurisdiction is an additional 400 to 500 homes on individual, on-site sewage systems, for a total of approximately 650 to 750 residences.

City of McCleary

Approximately one-third of the aquifer lies within the City of McCleary, including the downtown commercial district and the Simpson mill. The land in the very center of the aquifer is zoned industrial but, except for the 14-acre site of a former pole yard, is undeveloped. Port Blakely operated the pole yard for several years but only to peel poles, which were then shipped to another company for treatment.

In recent years the City has annexed northward along Summit Road and approved subdivisions for the construction of approximately 125 homes, all of which will be located within this report's recommended City wellhead protection area. The 2007 estimated City population is 1,550.

Risks to Wells

On-Site Sewage Disposal

The primary source of potential contamination in the Wildcat Creek Aquifer is on-site sewage systems. In much of the portion of the aquifer under County jurisdiction, the risk to wells is low because of the current low density of development. The more significant risks to manage for are those associated with wells of the group public water systems, including the City of McCleary, and individual wells in the R2 and RR zones that may be located too close to improperly functioning, on-site sewage systems.

Hazardous Chemicals

The Hart Crowser report listed potential contamination sites for hazardous materials upgradient to the City wells. That list was updated in the City of McCleary's *Wellhead Protection Plan* (Cleveland, 1999.)

Monitoring Private Wells

One unknown about the aquifer is the quality of water in the several hundred private wells. The risk presumably would be for wells receiving water from failed on-site sewage systems. A program to check the quality of private well water should test for nitrate, at a minimum. Caffeine and methylene blue substances (used in detergents) also are relatively inexpensive to detect and their presence can indicate an impending problem.

An initial round of tests would establish the background concentration of these substances. There is always some nitrate from natural sources, but caffeine and methylene blue substances should not be detectable. Subsequent testing could then focus on areas downgradient from and close to housing developments having a relatively dense concentration of septic systems. Retesting once every few years likely would be adequate.

Previous reports (Hart Crowser and Horsley Witten) have recommended extending public water and sewer to houses on Lynch and Larson Roads, immediately north of the City wells. Monitoring private wells in this area could reveal whether, in fact, on-site sewage systems there are causing a problem.

Wellhead Protection Areas

The City of McCleary's Time-Related Capture Zone

Hart Crowser conducted a capture zone analysis to determine areas where the McCleary wellfield is most vulnerable to land use impacts. The analysis used a numerical modeling method, with input from the aquifer pumping test that the firm conducted on a City well from July 27 to July 30, 1993. (For more about the Hart Crowser analysis, please see pages 5, 8-10, and Appendices A and B in the Hart Crowser report, 1994.)

Hart Crowser's method and test procedures were state-of-the-art and equivalent to those currently recommended by EPA and the Department of Ecology. As noted in their report, however,

> It is important to recognize that these modeled capture zones are subject to uncertainty.... The uncertainty is unavoidable because it is not possible to have perfect knowledge of the aquifer and its hydraulic properties. [p. 10]

Because of this uncertainty and to provide a margin of safety, Pacific Groundwater Group has recommended that Hart Crowser's original 10-year time-of-travel capture zone be enlarged (see Wildcat Creek Aquifer Map). This enlargement increases the width by about 50 percent to the west; to the east it extends the zone to the railroad and highway to draw attention to the potential for spills from road vehicles or trains.

While this larger capture zone does not cover the entire area from which water may be influencing City wells, the so-called "beneficial recharge area," it is believed to sufficiently encompass the area that could contribute contaminants to the wells for the foreseeable future. The distinction between "capture zone" and "beneficial recharge area" refers to the way that water in an area beyond a capture zone can reduce drawdown around a well without actually getting pumped up a well. Beneficial recharge helps to maintain the groundwater level at a well (by causing less drawdown) even though most if not all of the water in the "beneficial recharge area" never shows up at the well and, in fact, bypasses the well field.

In addition to the added protection of the expanded capture zone, we now recognize that older glacier till covers the entire Wildcat Creek aquifer. This layer provides additional filtration for septic effluent and delays the vertical movement of contaminants down to the aquifer, thereby allowing more time for cleanup of accidental spills.

Wellhead Protection Areas for Other Group Water Systems

At present the wellhead protection areas for other group public water system wells using the Wildcat Creek Aquifer are defined by the simple "fixed-radius" method, which does not incorporate the effect of recharge. Time-related capture zones for these wellhead protection areas could be estimated reliably by EPA's "WhAEM 2000" model (Kraemer and others, 2007), which would use the same hydraulic inputs as Hart Crowser's model but is much simpler to construct and execute.

Part 2 – Regulatory Alternatives

Introduction

Several state and federal statutes address the protection and management of groundwater resources, especially for communities without a practical alternative drinking water source. All such programs require detailed applications, considerable funding, and appear to be more complicated than needed for present management of the Wildcat Creek Aquifer.

Sole Source Aquifer Protection Program

The federal Safe Drinking Water Act authorizes the U. S. Environmental Protection Agency to designate aquifers that are the sole or principal source of drinking water for an area. To meet the criteria for designation, a sole source aquifer must supply at least 50 percent of the drinking water to persons living over the aquifer, and there can be no feasible alternate source of drinking water. Once designated, EPA can review proposed projects that are to receive federal funds and that could contaminate the aquifer. The EPA Sole Source designation is also referred to in several state statures as justification for applying a state program.

Washington State Statutes and Programs

The Water Resources Act of 1971

Chapter 90.54.140 of the Revised Code of Washington singles out sole sources and is referenced in several Department of Ecology groundwater programs:

> The legislature hereby declares that the protection of groundwater aquifers which are the sole drinking water source for a given jurisdiction shall be of the uppermost priority of the state department of ecology, department of social and health services, and all local government agencies with jurisdiction over such areas. In administration of programs related to the disposal of wastes and other practices which may impact such water quality, the department of ecology, department of social and health services, and such affected local agencies shall explore all possible measures for the protection of the aquifer, including any appropriate incentives, penalties, or other measures designed to bring about practices which provide for the least impact on the quality of the groundwater.

Regulation of Public Groundwaters Act, Chapter 90.44 RCW

Excerpts from RCW 90.44.400, Groundwater Management Areas:

> (1) This legislation is enacted for the purpose of identifying groundwater management procedures that are consistent with both local needs and state water resource policies and management objectives; including the protection of water quality, assurance of quantity, and efficient management of water resources to meet future needs. In recognition of existing water rights and the need to manage groundwater aquifers for future use, the department of ecology shall, by rule, establish standards, criteria, and a process for the designation of

specific groundwater areas or sub-areas, or separate depth zones within such area or sub-area, and provide for either the department of ecology, local governments, or groundwater users of the area to initiate development of a groundwater management program for each area or sub-area, consistent with state and local government objectives, policies, and authorities. The department shall develop and adopt these rules by January 1, 1986.

(2) The department of ecology, in cooperation with other state agencies, local government, and user groups, shall identify probable groundwater management areas or sub-areas. The department shall also prepare a general schedule for the development of groundwater management programs that recognizes the available local or state agency staff and financial resources to carry out the intent of RCW 90.44.400 through 90.44.420. The department shall also provide the option for locally initiated studies and for local government to assume the lead agency role in developing the groundwater management program and in implementing the provisions of RCW 90.44.400 through 90.44.420. The criteria to guide identification of the groundwater areas or sub-areas shall include but not be limited to, the following:

(a) Aquifer systems that are declining due to restricted recharge or over-utilization;

(b) Aquifer systems in which over-appropriation may have occurred and adjudication of water rights has not yet been completed;

(c) Aquifer systems currently being considered for water supply reservation under chapter 90.54 RCW for future beneficial uses;

(d) Aquifers identified as the primary source of supply for public water supply systems;

(e) Aquifers designated as a sole source aquifer by the federal environmental protection agency; and

(f) Geographical areas where land use may result in contamination or degradation of the groundwater quality.

(3) In developing the groundwater management programs, priority shall be given to areas or sub-areas where water quality is imminently threatened.

Special Protection Area – Department of Ecology

Excerpt from WAC 173-200-090:

(1) The purpose of a special protection area is to identify and designate ground waters that require special consideration or increased protection because of one or more unique characteristics.

(2) The unique characteristics of a special protection area shall be considered by the department when regulating activities, developing regulations, guidelines, and policies, and when prioritizing department resources for ground water quality protection programs.

(3) The characteristics to guide designation of a special protection area shall include, but not be limited to, the following:

(a) Ground waters that support a beneficial use or an ecological system requiring more stringent criteria than drinking water standards;

(b) Ground waters, including, but not limited to, recharge areas and wellhead protection areas, that are vulnerable to pollution because of hydrogeologic characteristics; and

(c) Sole source aquifer status by federal designation.

(4) Special protection areas may be proposed for designation at any time by the department upon its own initiative or at the request of a federal agency, another state agency, an Indian tribe, or local government.

Statutes for Counties and Cities

Aquifer Protection Areas Act (RCW 36.36.010)

The purpose of this statute is to allow counties to create

...aquifer protection areas to finance the protection, preservation, and rehabilitation of subterranean water.... When a county legislative authority proposes to create an aquifer protection area it shall conduct a public hearing on the proposal.... After the public hearing, the county legislative authority may adopt a resolution causing a ballot proposition to be submitted to the registered voters residing within the proposed aquifer protection area to authorize the creation of the aquifer protection area, if the county legislative authority finds that the creation of the aquifer protection area would be in the public interest.... An aquifer protection area shall be created by ordinances of the county if the voters residing in the proposed aquifer protection area approve the ballot proposition by a simple majority vote. The ballot proposition shall be in substantially the following form:

Aquifer protection areas are authorized to impose fees on the withdrawal of subterranean water and on on-site sewage disposal...to fund:□□

(1) The preparation of a comprehensive plan to protect, preserve, and rehabilitate subterranean water, including groundwater management programs adopted under chapter 90.44 RCW. This plan may be prepared as a portion of a county sewerage and/or water general plan pursuant to RCW 36.94.030;□□

(2) The construction of facilities for:

(a) The removal of water-borne pollution;
(b) water quality improvement;
(c) sanitary sewage collection, disposal, and treatment;
(d) storm water or surface water drainage collection, disposal, and treatment; and
(e) the construction of public water systems;

□□

(3) The proportionate reduction of special assessments imposed by a county, city, town, or special district in the aquifer protection area for any of the facilities described in subsection (2) of this section;

□□

(4) The costs of monitoring and inspecting on-site sewage disposal systems or community sewage disposal systems for compliance with applicable standards and rules, and for enforcing compliance with these applicable standards and rules in aquifer protection areas created after June 9, 1988; and

□□

(5) The costs of:

(a) Monitoring the quality and quantity of subterranean water and analyzing data that is collected;

(b) ongoing implementation of the comprehensive plan developed under subsection (1) of this section;

(c) enforcing compliance with standards and rules relating to the quality and quantity of subterranean waters; and

(d) public education relating to protecting, preserving, and enhancing subterranean waters.

Critical Aquifer Recharge Areas – The Growth Management Act (Chapter 36.70A RCW)

The GMA requires all counties and cities, even those not planning under the Act, to designate and protect critical areas, among which are critical aquifer recharge areas. Critical aquifer recharge areas are defined as "areas with a critical recharging effect on aquifers used for potable water." As examples of critical aquifer recharge areas, the Washington Administrative Code, Chapter 365-190-080, lists:

(i) Sole source aquifer recharge areas designated pursuant to the Federal Safe Drinking Water Act.

(ii) Areas established for special protection pursuant to a ground water management program, chapters 90.44, 90.48, and 90.54 RCW, and chapters 173-100 and 173-200 WAC.

(iii) Areas designated for wellhead protection pursuant to the Federal Safe Drinking Water Act.

(iv) Other areas meeting the definition of "areas with a critical recharging effect on aquifers used for potable water" in these guidelines.

Chapters 36.70 and 35.63 RCW for Non-GMA Counties and Cities

Counties and cities not planning under the Growth Management Act, such as Grays Harbor County and the City of McCleary, must include two elements in their comprehensive plans – a land use element, which designates the proposed general distribution, location, and extent of land uses, and a circulation element, consisting of the general location, alignment, and extent of major thoroughfares, transportation routes, terminals, and trunk utility lines. The statutory language for the required lnd use element includes the following wording: "The land use element shall also provide for protection of the quality and quantity of groundwater used for public water supplies…." [RCW 36.70.330 and RCW 35A.63.061]

Consistency of Development Regulations with Comprehensive Plan

Beginning July 1, 1992, the development regulations of each city and county that does not plan under RCW 36.70A.040 [The Growth Management Act] shall not be inconsistent with the city's or county's comprehensive plan. For the purposes of this section, "development regulations" has the same meaning as set forth in RCW 36.70A.030. (RCW 36.70.545 and RCW 35.63.125)

Grays Harbor County Comprehensive Plan

As a result of the Rural Lands Study, 1982, two elements were added to the Grays Harbor County Comprehensive Plan: The Rural Lands Element and the Community Plan Coordination Element.

The Rural Lands Element

The Rural Lands Element established the policy basis for deciding how 29,000 acres of marginally productive agricultural land in the eastern part of the county were to be zoned. As stated in its introduction, "One of the key purposes of a comprehensive plan is [to] guide decisions and the Rural Lands Element's goals, objectives, and policies are intended to guide the manner in which the rural areas of Eastern Grays Harbor County are zoned." [p. vi]

For purposes of managing and protecting the Wildcat Creek Aquifer, the important policies in the Rural Lands Element are those that guide the designation of land use densities of less than one unit per five acres. Reprinted below are the Rural Lands Element's two goals and the relevant objectives, followed by the policies for the RR – Rural Residential Zone and the R2 – General Residential Zone.

Goals

1. To provide opportunities for rural development at appropriate intensities while protecting the natural resources and character of the rural lands.
2. To develop a land use pattern which minimizes development, service, and maintenance costs for residents, property owners, builders, and public agencies. [p. 2]

Objectives

5. To protect and maintain the high quality of the air, water, and groundwater resources of the rural lands.
11. To ensure that County, Regional, City, and Town development plans, programs, and policies are well coordinated and integrated.
13. To ensure County policies, programs, and ordinances, especially zoning and capital improvement programs, will be coordinated with and support the goals, objectives, and policies of this plan. [p. 2]

Policies for Rural Residential

Reprinted below are the relevant sections from the Plan:

Purpose: The purpose of the Rural Residential designation is to provide areas for small acreage rural residential development where compatible with the area's natural resources, natural limitations, public facilities, and public services. [p. 3]

Description: These areas would be primarily composed of rural residential uses with a maximum density of not more than one (1) unit per acre. The permitted density may vary depending on the suitability of the site for development. During the platting process a determination shall be made as to whether conditions are present which limit the site's development potential. These conditions include:

(a) Areas within the one hundred year flood plain.
(b) Areas subject to riverbank erosion.
(c) Areas of very steep slopes.
(d) Areas of low suitability for on site waste disposal systems.
(e) Areas of high groundwater tables or ponding.
(f) Other conditions or hazards which limit development.

If any of these conditions are present, measures may be required as necessary to overcome the limitations including, but not limited to: special site designs, the clustering of structures, special construction requirements, engineered drainage and/or waste disposal systems, and reductions in the maximum permitted density. While the primary character of these areas will be rural residential, a mix of compatible forestry and agricultural uses will be permitted and encouraged.

...

Criteria for Designation: [p. 4]
Areas suitable for this designation shall meet the following criteria:

(a) The areas shall have an adequate supply of ground water given the one acre density or access to a community water system.
(b) The areas shall be located to minimize the travel distances of residents, school buses, and emergency equipment over substandard roads.
(c) The areas shall be located to minimize their impact on those fire and school systems least able to accommodate growth.
(d) In addition, designated urbanizing areas may be designated Rural Residential until they are served by adequate public facilities, including streets, water, and sewer systems.

Areas to be avoided by this designation: [p. 4]

(a) Areas which would require major public expenditures to adequately accommodate the permitted growth.
(b) Areas substantially or wholly within the one hundred year flood plain.
(c) Areas subject to major riverbank erosion.
(d) Extensive areas of soils with a poor suitability for on site waste disposal systems.
(e) Areas where septic systems may contaminate groundwater resources.

Policies for R-1 and R-2 Zones

Reprinted below are the relevant sections from the Plan:

Purpose: The purpose of the Residential designation is to provide for low and moderate density residential communities adjacent to developed areas where adequate facilities and services are available or can be economically provided. [p. 13]

...

Criteria for Designation: Areas suitable for this designation include either:

(a) The designated urban service areas of a city, town, water or sewer district. Or;
(b) Areas which have all of the following characteristics:

(i) The area is adjacent to either the corporate limits of a city or town or the built-up portions of a developed area. Areas designated Residential shall not be more than a half mile from the corporated limits or built-up area. (See definition of developed area.) [DEVELOPED AREA: An area of compact, continuous development containing residences, businesses, and other land uses served by a water system(s), a road system and other public facilities. The built-up portion of the developed area is the area of contiguous development. p.33]

(ii) An adequate public water system shall be available to serve the area or expansion of a public water system into the area must be planned.

(iii) An adequate sewer system shall be available to service the area or the area shall be suitable for the long term use of on-site septic systems at the permitted density.

(iv) The area should be located to minimize the impact of new residences on those fire and school systems least able to accommodate growth.

Areas to be avoided by this designation:

(a) Areas within the one hundred year flood plain.
(b) Areas subject to riverbank erosion.
(c) Areas where the available public facilities and services are not adequate to serve the development.
(d) Areas adjacent to planned agricultural lands.
(e) Areas of high resource value.

Community Plan Coordination Element

Reprinted below are the Goal, Objectives, and Relevant Policies of the Community Plan Coordination Element:

Goal

To ensure the continued development of a balanced land use pattern with adequate areas for housing, commerce, industry, agriculture, forestry, recreation, and other uses through the development of a coordinated land use plan. [p. 29]

Objectives

1. To encourage the development of urban land uses within areas designated to be served by urban facilities and services.
2. To promote appropriate land uses within suitable areas.
3. To ensure the coordination of the region's land use pattern by considering the plans and concerns of cities, towns, and other affected agencies during the development and administration of county plans and implementing ordinances.
4. To encourage cities, towns, and other agencies to consider county plans and concerns during the development and administration of their plans and implementing ordinances thereby ensuring the continuity of land uses throughout the region.
5. To ensure that county, regional, city, and town development plans, programs, and policies are well coordinated and integrated.
6. To ensure that jointly adopted plans, programs, and policies are incorporated into land use, public facilities, and public services decisions.
7. To coordinate amendments and updates to jointly adopted plans with all affected jurisdictions.
8. To encourage the joint review of development proposals which because of size, location, or public services needs affect more than one jurisdiction.

Policies

1. [Adoption of city and town plans by reference.]
2. Residential and commercial growth should be encouraged in areas designated for urban services including water, sewer, and other public services.
3. [Procedure for joint adoption of plans.]
4. The jointly adopted plans should guide county decisions on rezones, conditional uses, site plans, subdivisions, the provision and extension of public facilities and services, appropriate densities, land use plan revisions, and other land use matters within the areas to which they apply.
5. [Evaluating development proposals and joint review.]
6. [Procedure for county to inform other jurisdictions.]
7. [Joint review is advisory.]
8. [Providing public services to a development.]
9. The County should encourage community comprehensive plans to designate urban services areas. Urban services areas are those lands that cities, towns, and special districts intend to incorporate into their communities and provide with urban services, such as water and sewer.

10 – 12. [More about providing urban services.]

13. [Special district plans.]

City of McCleary Comprehensive Plan

Introduction

Three subjects in the City of McCleary's Comprehensive Plan bear on aquifer protection and management: (1) development in the wellhead protection area; (2) industrial zoning; and (3) stormwater management.

1. Development in the Wellhead Protection Area

The City's Comprehensive Plan, adopted in 2002, has two objectives that are relevant for managing and protecting the aquifer:

LU 2.1 Protect critical areas within the city: [including]...areas with critical recharging effect on aquifers.

LU 2.3 Manage development so growth does not negatively affect the quality and quantity of groundwater and surface water.

These objectives are followed by Implementation Steps:

- Manage areas with development constraints by:
  - Enforcing the city's critical areas ordinance.
  - Protecting Wildcat Creek as a Critical Area.
- Maintain water quality and quantity by:
  - Keeping the city's wellhead protection program current to protect the public water supply;
  - Developing and enforcing [words appear to missing here in the City text] that protect the city's aquifer recharge areas;
  - Requiring new development in all zoning districts to be on the city sewer system to protect ground water quality;
  - Requiring new development to provide adequate stormwater management as specified and adopted by the City.
  - Adopting requirements for minimum removal of vegetative cover for reducing storm water runoff.

With the City's approval of 125 new homes in the City's recharge area not long after the Comprehensive Plan was adopted, the City's emphasis for aquifer management and protection is now focusing on the second set of implementation steps, those for maintaining water quality and quantity. Because the new homes are served by City water and sewer, the approach now is on maximizing recharge given the additional impervious surfaces and educating residents about proper use of pesticides and fertilizers.

Although the 2002 Comprehensive Plan did not anticipate the new growth along Summit Road, it did project that the City would encompass the developed area along Lynch and Larson Roads, presently zoned R2 – General Residential by the County. Both the Hart Crowser and Horsley Witten reports cite this area as one of concern because of the proximity of private on-site sewage systems to City wells, some of which are within the wells' one-year travel time capture zone.

2. Industrial Zoning

Goal 5, on Industrial Development, calls for increasing "... McCleary's economic diversity by encouraging new industrial land uses in suitable locations." The associated objective, LU 5.1, calls for maintaining "... a supply of industrially zoned land for new industry that will provide minimal disruption to existing citywide land use patterns." The associated implementation step calls for pursuing "... the potential for industrial expansion in northern areas of McCleary."

Land to the north of the City is zoned industrial, but its development for industrial use would need to overcome several constraints: a high water table making it unsuitable for the construction of heavy buildings; delineated wetlands between the zone and Simpson

Road to the south complicating access to the freeway; and the only other access being Larson Road, a residential neighborhood. In addition, the land lies at the center of the aquifer, between the Middle Fork and East Fork of Wildcat Creek. As such, its undeveloped condition may prove to be useful to the City as an area worth investigating for a back-up wellfield – and associated recharge area.

3. Stormwater Management

The purpose of "low impact development" is to maximize recharge to groundwater and reduce stormwater runoff. A technical manual published by the Puget Sound Action Team and the Washington State Extension Service uses the following definition:

> Low impact development is a stormwater management and land development strategy applied at the parcel and subdivision scale that emphasizes conservation and use of on-site natural features integrated with engineered, small-scale hydrologic controls to more closely mimic pre-development hydrologic functions. (Hinman, 2005)

The City of McCleary can employ low impact development in two ways – by requiring this approach in new development and by using it to the extent feasible when upgrading existing neighborhoods and managing stormwater.

Part 3 -- Recommendations

A. Joint County – City Recommendations

1. Establish the Wildcat Creek Aquifer Management Area by inter-local agreement.

a. Purpose: To coordinate risk management and other actions to ensure the long-term benefits to the economy and to public health and safety provided by the Wildcat Creek Aquifer.

b. Management Principles: To ensure a margin of safety, manage the aquifer in accordance with the following principles:

i. Maximize recharge to the aquifer.
ii. Minimize the transmission of contaminants to the aquifer.
iii. Monitor well water and measure streamflows to learn more about the aquifer's hydrogeology, groundwater conditions, and safe yield.
iv. Regulate land use in a manner that is clear, fair, and assures that groundwater will be protected.
v. Manage the aquifer comprehensively through compatible city and county policies, actions, and ordinances.

c. Responsibility:

i. Designate staff with responsibility for each action listed under (e) below.
ii. Designate lead officials from each jurisdiction to oversee staff.
iii. Publish an annual report on aquifer management.

d. Funding: Where appropriate, apply jointly for funding to carry out the management purposes of the Management Area.

e. Actions:

i. Update the list of potential point-source contamination sites within aquifer boundaries. Include sites on surrounding hillsides from which surface runoff could carry hazardous contaminates to the aquifer.
ii. Monitor individual wells in the RR and R2 zones for quality. If water quality tests show a problem with a well, work with the landowner to correct the problem; the emphasis should be on assistance, not penalty.
iii. Measure streamflow below the confluence of the three branches of Wildcat Creek and measure water levels in several wells to learn more about groundwater movement and quantity.
iv. Review and coordinate spill-response plans(s) for accidental spills along transportation corridors within the Wildcat Creek Aquifer Management Area. Include Fire District 12 in this action.

v. Educate the public about the do's and don'ts of living above their water supply.
vi. Adopt by reference the Low Impact Development Technical Guidance Manual for on-site development and surface water management.
vii. Review and, where appropriate, revise the zoning ordinances of both jurisdictions to prevent the location above the aquifer of land uses and activities that would introduce risks that could not be eliminated by development conditions and operating practices. This would include a review of a zoning district reclassification of general development five–acre (G-5) for any property currently zoned industrial (I-1 or I-2).

2. Under the Community Plan Coordination Element of the Grays Harbor County Comprehensive Plan, review and, if necessary, revise the City and County plans for the area. In accordance with Policy (9), designate an urban services area for the City of McCleary.

B. Recommendations for Grays Harbor County

1. Adopt an ordinance that (1) affirms the Grays Harbor County Comprehensive Plan's policy basis for zoning in the Wildcat Creek Valley and (2) cancels the development moratorium upon the completion of the adoption process for amending Grays Harbor County Code 17.56.180 governing critical areas.

2. Designate the City of McCleary's wellhead 1-year capture zone, the 5-year capture zone, and the 10-year capture zone, as delineated by Pacific Groundwater Group in this report, as a critical aquifer recharge area.

3. Amend the Grays Harbor County Code for critical areas, Title 17, to define the Wildcat Creek Aquifer as a specific area.

4. Set forth requirements and review responsibilities for development activities, including rezones and subdivisions, located within the Wildcat Creek Aquifer.

5. Set forth requirements for development activities, including rezones and subdivisions, located within a Wildcat Creek critical aquifer recharge area, including a wellhead and wellhead time-of-travel protection plan. Specify that purveyors shall review the proposals and that the Grays Harbor County Environmental Health Division shall determine whether the proposal would provide a reasonable margin of safety for the critical aquifer recharge area; and further, that the if proposal does not, the proposal shall be (a) required to be revised to increase the margin of safety, including a reduction in lot density, or (b) shall be denied based upon evidence that the proposal represents a probable significant adverse impact to the critical aquifer recharge area.

C. Recommendations for the City of McCleary

1. Investigate the feasibility of establishing a back-up wellfield.

2. Designate the City portion of the wellhead protection area for the City wells as a critical aquifer recharge area.

3. Revise the City's wellhead protection area to conform to the ten-year time-travel capture zone, based on the delineation by Pacific Groundwater Group.

4. Revise the City's Integrated Pest Management program to make it more workable.

5. Develop a monitoring program to determine whether on-site sewage systems located in the wellhead protection area on Lynch and Larson Roads are contributing contaminants to City wells.

6. Reconsider the existing industrial zoning above the aquifer.

7. Continue efforts to reduce per capita water consumption.

Bibliography

Cleveland, Jonathan. *City of McCleary Water System Wellhead Protection Plan.* Evergreen Rural Water. 1999.

Eddy, P.A. *Preliminary Investigation of the Geology and Ground-Water Resources of the Lower Chehalis River Valley and Adjacent Areas. Water Supply Bulletin No. 30.* Washington State Department of Conservation. Olympia, Washington. 1966.

Hart Crowser. *Hydrogeologic Characterization for Protection of the Wildcat Creek Aquifer, Grays Harbor County, Washington.* Prepared for the City of McCleary. April 12, 1994, Report J-3500-01.

Hinman, Chris. *Low Impact Development: Technical Guidance Manual for Puget Sound.* Puget Sound Action Team and Washington State University, Pierce County Extension. January 2005.

Horsley Witten Group, Inc. *Case Study: City of McCleary Public Water Supply Wells.* Prepared for the Washington State Department of Health. January 28, 2008.

Insight Geologic. *Hydrogeologic Assessment, Proposed Residential Development, McCleary, Washington.* Prepared for Capital Contracting. January 9, 2007.

Kraemer, S. R., Haitjema, H. M., and Kelson, V. A. *Working with WhAEM2000, Capture Zone Delineation for a City Wellfield in a Valley Fill Glacial Outwash Aquifer Supporting Wellhead Protection.* U. S. E. P. A., Office of Research and Development, Washington, DC, revised 2007.

Logan, R. L., 1987. *Geologic Map of the South Half of the Shelton and the South Half of the Copalis Beach Quadrangles, Washington. Department of Natural Resources, Geology and Earth Resources Division, Open-File Report 87-9.*

Molenaar, Dee and J.B. Noble. *Geology and Related Groundwater Occurrence, Southeastern Mason County, Washington. Washington Department of Water Resources Supply Bulletin 29.* 1970.

Pringle, R.F. *Soil Survey of Grays Harbor County Area, Pacific County, and Wahkiakum County, Washington.* U.S.D.A. Soil Conservation Service. 1986.

Washington State Department of Ecology. *Critical Aquifer Recharge Areas Guidance Document.* Washington State Department of Ecology. 2005

Washington State Department of Health. *Wellhead Protection Program Guidance Document.* Washington State Department of Health. 1995

GRAYS HARBOR COUNTY & CITY OF MCCLEARY

WILDCAT CREEK AQUIFER

Aquifer Boundary and Group "A" & "B" Wellhead Protection Areas

City of McCleary WHPA Modified From Hart Crowser, 1994

June 2008

LEGEND

- Wildcat Creek Aquifer
- Wellhead Protection Area
- City of McCleary
- Group "A" Wellheads
- Group "B" Wellheads

Mason County

R 5 W

T 18 N

10-Year

10-Year

OLIN 330

SKY ACRES

PIT WATER CO 328

5-Year

1-Year

MCCLEARY, CITY OF

MCCLEARY, CITY OF

McCleary

WINTERCREEK MHP

FORESTVIEW SENIOR 55+ COMMUNITY

FORESTVIEW SENIOR 55+ COMMUNITY

10-Year

Mark Reed Hospital

108

8

8

Pacific Groundwater Group

Grays Harbor County

1854

City of McCleary

N

1" = 500'

1000 0 1000 Feet

State of Washington
Source Water Protection

Case Study: City of McCleary Public Water Supply Wells

1.0 BACKGROUND

The purpose of this study is to assess the current conditions of the City of McCleary's public water supply with respect to water quantity and water quality, and provide recommendations for protection and management strategies for future growth to both county and city officials. The study is also designed to provide guidance to Grays Harbor County residents who rely upon private domestic wells for water supply. This study is a case study for a larger effort being conducted at the State level to provide guidance to local governments in the form of training workshops and materials to include both technical (hydrogeologic) and planning (land use) concepts.

The City of McCleary draws water from the Wildcat Creek Aquifer in Grays Harbor County. A development moratorium has been imposed within the Wildcat Creek Aquifer by the county commissioners during which some of the issues raised at public meetings can be investigated and a sustainable level of development within the area can be determined. According to local sources, there are at least two subdivisions that are on hold as a result of the moratorium (The Vidette, 2007).

In order to assess the amount of groundwater available for McCleary's public drinking water supply wells, a hydrologic budget and safe yield analysis were conducted. In order to further characterize the hydrogeology within the aquifer, and how it impacts the water table, private and public well installation logs were examined and hydrogeologic studies conducted by the United States Geological Survey (USGS) among others were reviewed.

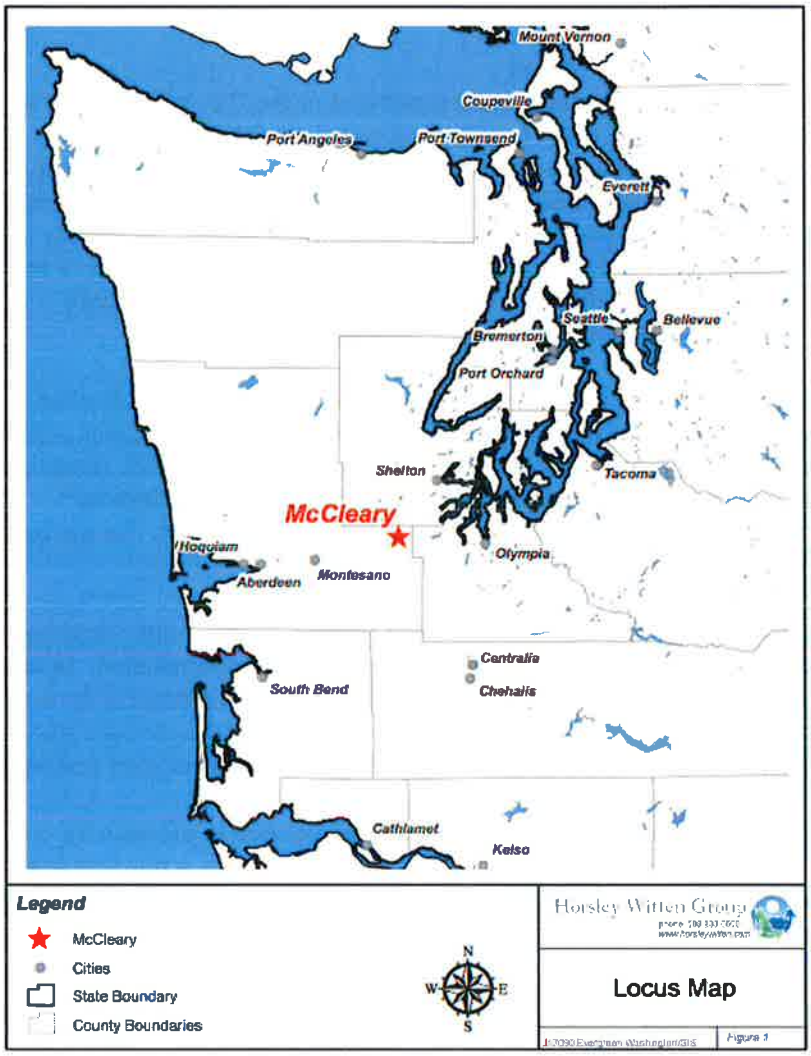
There are several types of assessment techniques which can be used to evaluate the water quality of a water resource (EPA, 2004). For the purpose of this study, a nitrogen loading analysis was conducted, since the potential threat to the regional drinking water supply is increased development in the area. Elevated nitrogen levels found in groundwater and surface waters are often directly related to increased development in their respective contributing areas, due to infiltration of nitrogen contained in wastewater effluent, fertilizers and stormwater runoff. A nitrogen loading analysis was conducted for the current conditions of the recharge area as well as the buildout conditions.

Site Description

Founded as a logging camp in 1898 (McCleary, 2007), the City of McCleary is set within the northeast corner of Grays Harbor County in the State of Washington (Figure 1). The City is experiencing growth over the last several years, partly due to its convenient location, approximately 30 miles from Interstate 5 at Olympia, and also within an easy commute to expanding job opportunities in the Thurston County area (McCleary, 2007).

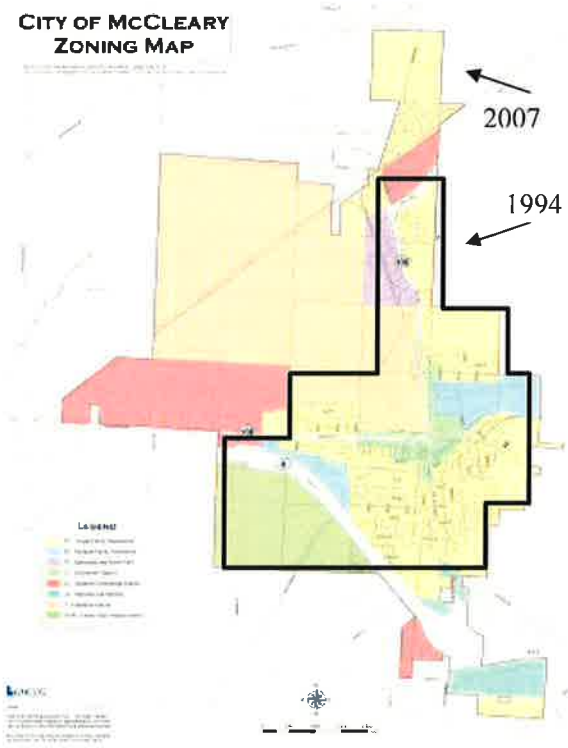
The City has also expanded geographically as a result of annexations of adjacent County lands (Figure 2).

Figure 1. Locus Map of McCleary



The County area outside of McCleary within the recharge area to the McCleary Public Wells is very rural, and is primarily composed of single family residences, agricultural land, and forested area. A small airport is also located within the northern portion of the County in the recharge area.

Figure 2. Comparison of McCleary City Boundaries.



Hydrogeologic Conditions

The Wildcat Creek aquifer system sits within a valley composed of a sequence of recent alluvial and glacial sediments overlying bedrock to depths of approximately 100 feet. The boundaries of the aquifer were more or less defined by the bedrock topography (Hart Crowser, 1994). The aquifer system is composed of two groundwater systems: a shallow unconfined glacial aquifer and a deeper partially-confined glacial aquifer system. The deeper aquifer is a "leaky confined aquifer", meaning that it has an overlying layer that is partially confining and allows some water to drain from or into the lower aquifer (Hart Crowser, 1994).

Although the relationship and interaction between the two aquifers throughout the valley is not clearly defined, local experts believe that in the area surrounding the McCleary public water supply wells, groundwater within the deeper aquifer is confined and is under pressure with an upward hydraulic gradient (Cappellini, 2007). There is also some indication that the public supply wells may be partially screened in both the upper and lower aquifers. This is important to note, since the shallow unconfined aquifer is highly susceptible to contamination.

Safe Yield

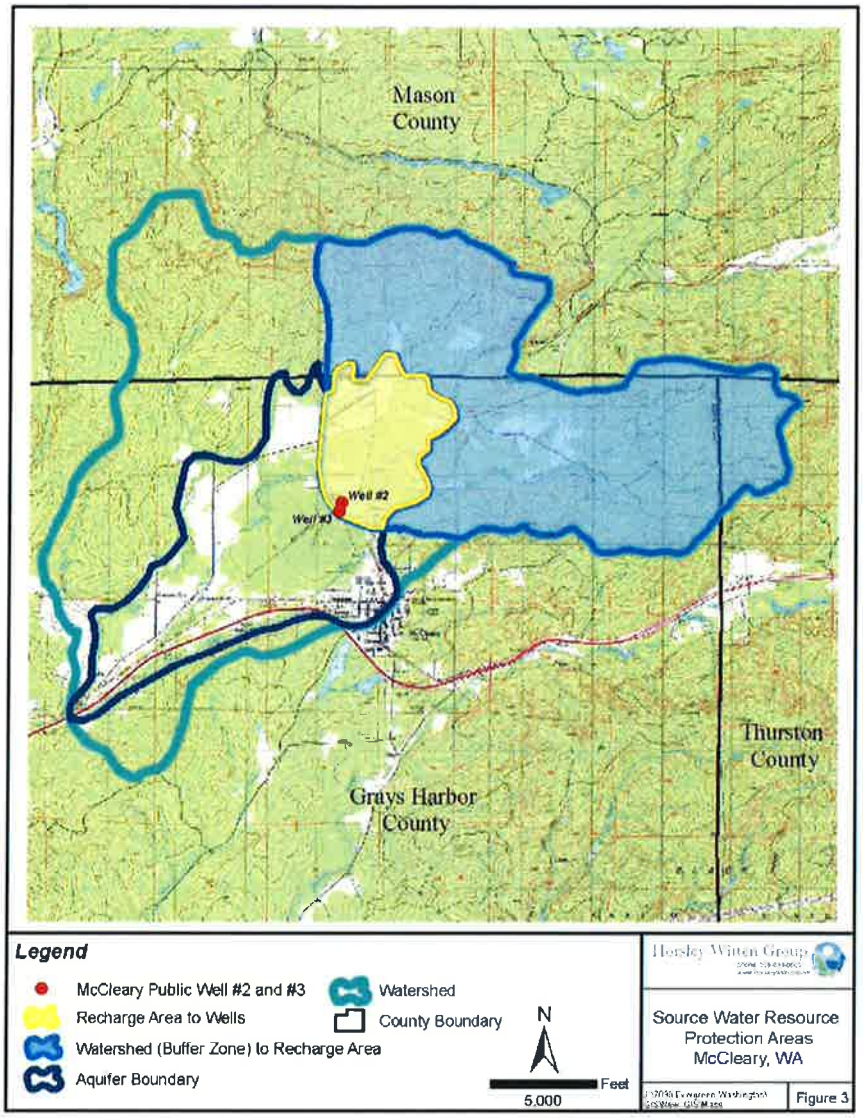
The concept of safe yield is used to determine how much water can be safely withdrawn from an aquifer. Theoretically, one can withdraw the same amount of water that is recharged. Practically, rarely can this occur without significant impacts. In the case of an unconfined, shallow aquifer groundwater withdrawals result in lowering the water table to a new equilibrium point, resulting in reduced flows to wetlands and streams with corresponding ecological impacts.

In the case of a confined aquifer (such as the one that the McCleary wells withdraw from), withdrawals will change the hydraulic gradient (or pressure difference) between the overlying aquifer and the confined unit. If sufficient withdrawals occur the hydraulic gradient (and flow direction) can be reversed. We recommend that the safe yield of the lower semi-confined aquifer that the McCleary wells draw from be established in this manner, so as to prevent the downward flow of groundwater from the upper aquifer that is more vulnerable to contamination.

Recharge Areas

The primary recharge area to the City of McCleary public drinking water wells was delineated by Hart Crowser, Inc. in 1994, based on the aquifer boundary, the direction of groundwater flow, and the Wildcat Creek watershed area. This is where infiltration of precipitation to the aquifer that is pumped by the McCleary well most likely occurs (Hart Crowser, 1994). However, the aquifer is also likely to receive runoff and recharge from the upstream portions of the watershed area of the Wildcat Creek drainage. Using USGS topographic maps, Horsley Witten Group, Inc. (HW) delineated this upper watershed area as a "buffer zone".

Figure 3. Source Water Protection Areas



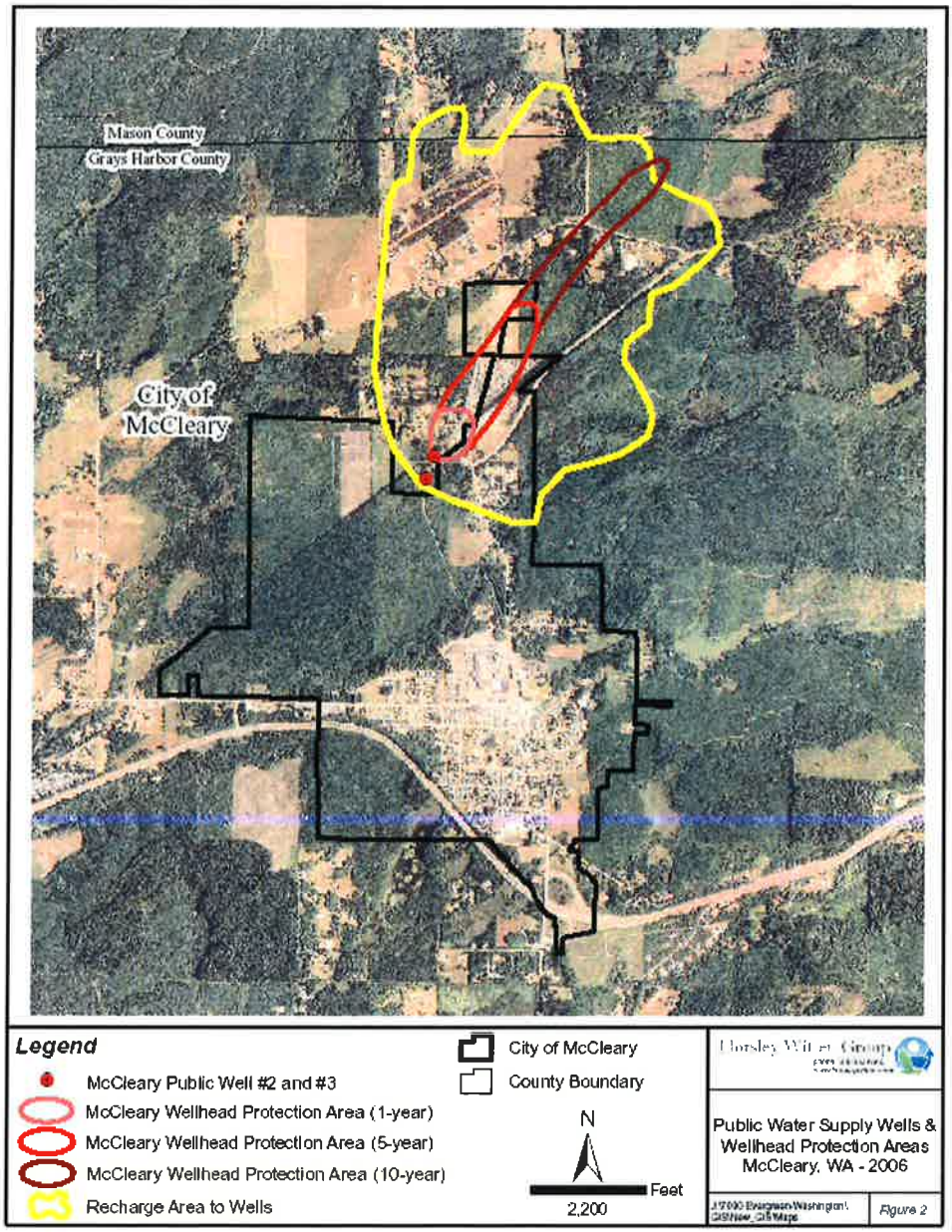
This upper watershed is characterized by fractured basalt. During our field trip in October 2007 we visited two quarries that exhibited groundwater seeps from the fractures indicating that significant groundwater recharge exists in this area and that it can be transported to the deeper aquifer via the fractures.

Basalt quarries in the upper watershed showing fractures

Groundwater seeps from fractures in basalt bedrock in upper watershed.

McCleary Wellhead Protection Areas (WPAs) were also delineated by Hart Crowser in 1994 (Figure 4). "Zone 1" is the one year horizontal time of travel boundary for groundwater, and is managed to protect the drinking water supply from viral, microbial and direct chemical contaminants. "Zone 2" is the five year time of travel boundary and should be managed to control potential chemical contaminants. "Zone 3" is the ten year time of travel boundary.

Figure 4. Public Water Supply Wellhead Protection Areas



2.0 WATER QUANTITY AND QUALITY

Hydrologic Budget

A hydrologic budget was calculated to analyze water inputs to and withdrawals from the confined aquifer. The following components were analyzed in the hydrologic budget:

- Natural recharge from precipitation;
- Wastewater discharges from septic systems;
- Stormwater runoff from impervious surfaces;
- Private well withdrawals; and
- Public well withdrawals.

However, because of the confining nature of the aquifer, the final hydrologic budget focused on the effects of natural recharge and public well withdrawals.

Natural Recharge

The study area receives approximately 59 inches/year of precipitation (Hart Crowser). Accounting for losses to evaporation and transpiration (evapotranspiration) and some surface runoff, Hart Crowser estimated a recharge rate to groundwater of 24 inches/year. This recharge rate was applied to the total pervious area within the aquifer and primary recharge area. Based upon our field observations at several excavation pits that showed fractured basalt, the recharge rate was also applied to the upper watershed (buffer) zone.

A portion of this recharge makes its way to the lower confined aquifer. It is very difficult to accurately determine how much of this occurs without extensive hydrogeologic field studies. For the purposes of this assessment we assumed that 10% of the surficial recharge enters the lower confined aquifer and 90% flows laterally through the upper aquifer.

This is generally supported by stream flow measurements that were made during our field trip on October 30, 2007 that demonstrated gaining stream conditions (meaning that a significant amount of the groundwater in the upper unconfined aquifer is flowing laterally and discharging into the stream). Specifically, measurements were made at two locations approximately one mile apart: 1) at the Elma Hicklin road crossing and 2) at a new bridge constructed by Larry Birindelli on his property. The measured flow at these two locations was 0.24 cubic feet per second (cfs) and 1.4 cfs respectively. While these are likely to be low flows representative of the dry season, they equate to 57 and 331 million gallons/year.

Measuring stream flow at the Elma Hicklin Road Crossing

Wastewater Discharges

On-site septic system discharge volumes were calculated for all residential, commercial, industrial, and other land uses based on Grays Harbor County GIS parcel data, and wastewater flows specified in *On-site Sewage Systems Chapter 246-272A WAC* and *On-site Wastewater Treatment Systems Manual*, USEPA, EPA-625/R-00/008, February 2002. GIS parcel data were used to determine land use coverage within the primary recharge area. The residential wastewater flows were then applied to the residential areas using wastewater flow estimates defined in WAC Chapter 246-272A-0230 (2)(d)(i). The US Census 2000 average household size within Grays Harbor County (2.48) was used in the calculation. WAC Chapter 246-272A-0230 (2)(d)(ii) requires that all facility design flows other than residential be calculated according to the "On-site Wastewater Treatment Systems Manual," USEPA, EPA-625/R-00/008, February 2002. EPA's manual sets standards for most of the design flows for facilities other than residential uses, based on number of employees. In order to derive number of employees from land use acreage, conversion factors relating employee to square footage of land use area that were calculated in a local study conducted by the University of Washington were used (UW, 1998). Public wastewater discharge volumes were not calculated, since there are no permitted sewage treatment plant groundwater discharges within the Wildcat Creek aquifer.

Stormwater Runoff

Precipitation that falls on impervious surfaces moves as surface runoff into open ditches along the sides of streets. Based upon observed high-permeability soils at the surface and observations by local residents that the majority of stormwater infiltrates within the basins during most storm events, we assumed that stormwater runoff that is collected in these ditches is recharged to the shallow groundwater system. Based upon an average annual rainfall of 59 inches per year, an assumption that approximately 10% of the

rainfall is lost to evaporation, and an assumed 50% recharge rate (with the remainder being evapotranspired within the vegetated drainage ditches), the net recharge rate was calculated to be 26.5 inches/year.

Public and Private Well Withdrawals

Private well data was obtained from the State of Washington's Department of Ecology's online well database. Since well locations are provided in township/range/section format, it was difficult in some areas to determine which wells were within the aquifer boundary as mapped by Hart-Crowser. It is believed that these wells draw from the upper unconfined aquifer and therefore do not directly affect the hydrologic budget for the confined aquifer. The total number of private wells within the aquifer was estimated based on the percentage of each township/range/section that fell within the aquifer or recharge area. An average household water use of 257 gpd for winter use and 600 gpd in summer is reported and the US Census 2000 Grays Harbor County average household size (2.48). Since public wells are included in this database, the total number of public wells within the primary recharge area was subtracted from the estimated number of wells in the database. The quantity of public wells and withdrawal volume capacity for each public well within the primary recharge area were determined using WA State Department of Health public well data.

Results of Water Budget Analysis

The results of the water budget assessment are presented in Table 1. This represents inputs to and withdrawals from the lower confined aquifer. As can be seen from the budget, the City of McCleary wells are withdrawing an average of 105 million gallons/year from the confined aquifer. This is approximately 14% of the estimated 773 million gallons/year that is estimated to recharge this aquifer. This does not mean that there is a surplus of water that can be withdrawn. The maximum withdrawal rate should be established through a safe yield analysis that incorporates vertical hydraulic gradient considerations (See report section, "Safe Yield").

Table 1 Hydrologic Budget for Lower Confined Aquifer

	Area (acres)	Recharge (inches/year)	Flow (Q) (M gallons/year)
Recharge			
Primary Recharge Area	819	2.4	54
Buffer Zone (Secondary Recharge Area)*	11,000	2.4	719
Total	11,819		773
Withdrawals			
Total withdrawal volume from public wells			105
Total			105

*The buffer zone is defined by the Washington Wellhead Protection Program as an area up-gradient from Zone 3, potentially extending to include the entire zone of contribution. The buffer zone may also identify additional non-contiguous critical aquifer recharge areas (as defined under Section 36.70A.170 of the Growth Management Act) requiring protection from contamination.

Nitrogen Loading Analysis

Nitrate-nitrogen is a primary drinking water criterion with a maximum contaminant level of 10 mg/liter. It is considered a public health hazard causing methemoglobinemia (blue baby syndrome) in infants and is considered a precursor to carcinogenic compounds such as nitrosamines. Nitrates are also an indicator of other contaminants including agricultural chemicals, pharmaceuticals and pathogens such as E. Coli bacteria, viruses and other microorganisms.

A nitrogen loading analysis was conducted for the upper unconfined aquifer to determine the total annual nitrogen load (in pounds) to the recharge area from existing land uses within the area. The expected nitrogen concentration in groundwater was then calculated based on the total recharge to the recharge area. First, a land use survey was conducted to determine land use areas within the recharge area. Then, nitrogen loading rates specified for the different land uses were applied to the respective areas.

The 819-acre recharge area is composed of land within both the City of McCleary, and Grays Harbor County. In addition, a small portion of the upper recharge area lies within the adjacent Mason County. Land uses within the recharge area are dominated by residential and forested areas (indicated as "Resource Production & Extraction"; Figure 5). There are also a limited number of manufacturing, governmental uses, and other uses, including churches within the recharge area. County of Grays Harbor zoning within the recharge area includes "General Development," "Residential", "Agricultural", and a small portion of the "Industrial" zone (Figure 6). City of McCleary zoning includes mostly "Residential" and some "Commercial".

Grays Harbor County within the Primary Recharge Area

There are a significant number of livestock (horses, cattle and elk) in the primary recharge are. A site inventory concluded a total of 9 cows, 11 horses, and 25 elk within the primary recharge area at the time of the study.

Results of Nitrogen Loading Analysis

The Nitrogen Loading analysis results are shown in Table 2.

Table 2. Nitrogen Loading Results

NITROGEN LOADING: EXISTING CONDITIONS	Acres
Total Area	819
Nitrogen Inputs	**Lbs/yr.**
Residential septic systems (129)	1,600
Commercial septic systems	180
Livestock (47)	2,450
Stormwater	1,029
Lawn fertilizers	2,016
TOTAL LOADING	7,275
Estimated nitrate-nitrogen concentration (mg/liter)	1.6

NITROGEN LOADING: BUILDOUT CONDITIONS	Acres
Total Area	819
Nitrogen Inputs	**Lbs/yr.**
Residential septic systems (514)	6,374
Commercial septic systems	161
Livestock (47)	2,450
Stormwater	2,145
Lawn fertilizers	6,818
TOTAL LOADING	17,947
Estimated nitrate-nitrogen concentration (mg/liter)	3.7

Figure 5. Land Uses within the Primary Recharge Area

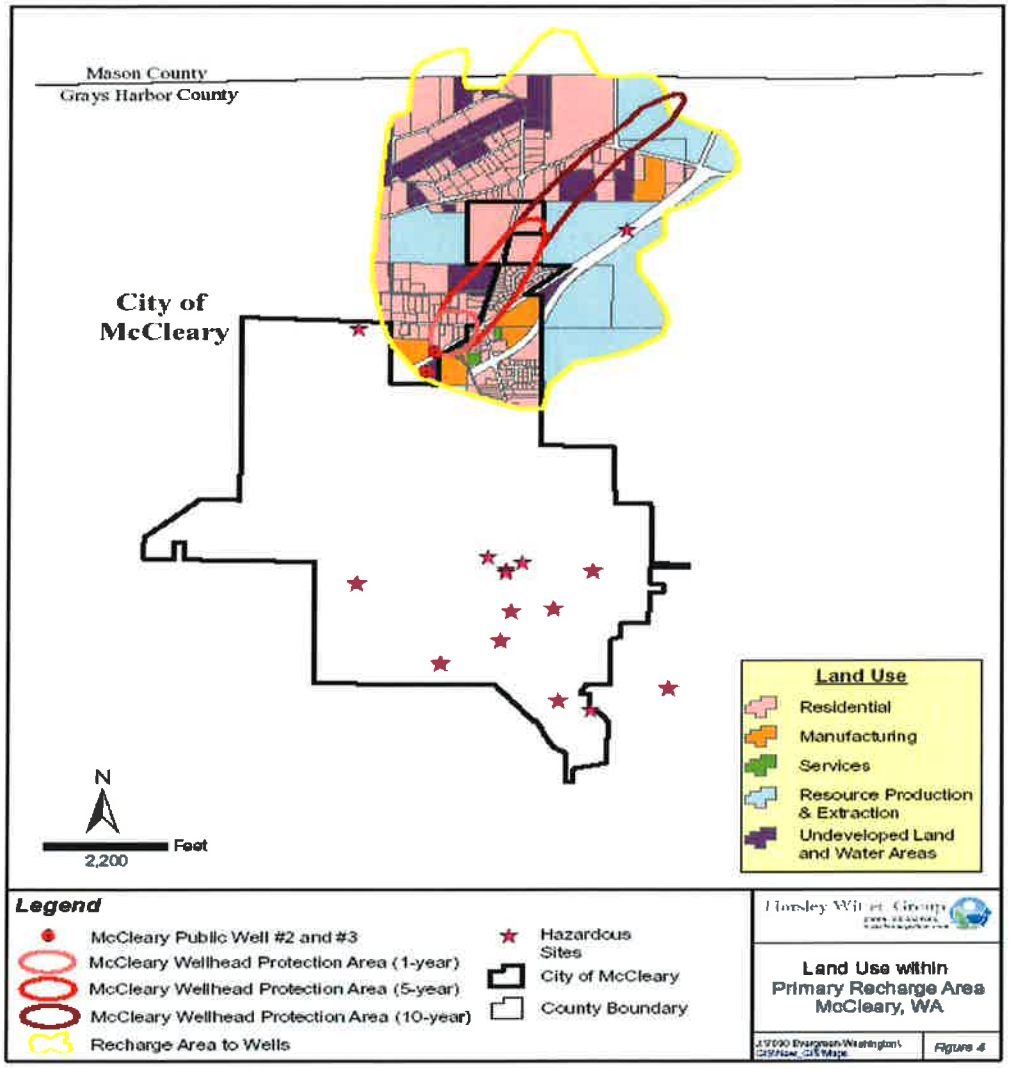
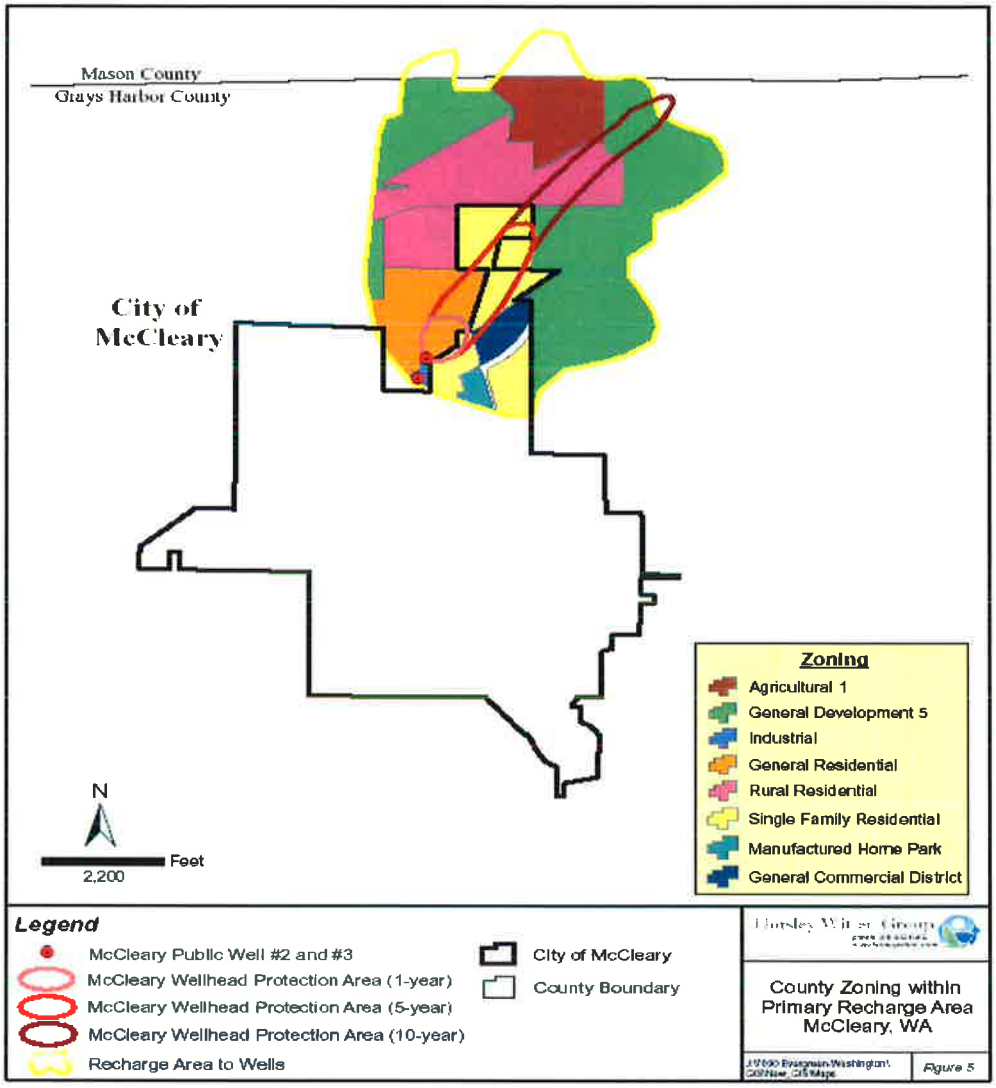


Figure 6. Zoning within the Primary Recharge Area



Discussion

The results of the hydrologic budget analysis indicate that approximately 14% of the water that is recharged into the lower confined aquifer is being extracted via the public supply wells. While this seems like a relatively small percentage, future increases in the withdrawal rate are likely to change the equilibrium balance between the upper and lower aquifers, possibly causing a reversal of vertical hydraulic gradient. Currently, it is presumed that the lower aquifer is under higher pressure than the overlying surficial aquifer resulting in an upward flow. Increased withdrawals will reduce and possibly reverse this pressure gradient, potentially resulting in a downward gradient with water (and pollutants) from the upper aquifer flowing downward into the confined aquifer.

Baseline, natural concentrations of nitrate-nitrogen in groundwater are less than 0.1 mg/L. Based upon the predicted high existing nitrogen loading to the upper aquifer (1.6 mg/liter) and the low measured baseline concentrations in the public supply wells (0.2 mg/liter), it appears that the confining layer is providing a significant level of protection to the lower aquifer.

Future growth in the primary recharge area will threaten water quality if it is not guided. The buildout analysis suggests that zoning in the County lands within the recharge area will allow another 385 homes on septic systems to be built. Along with these homes will come additional nitrogen loading that could raise nitrogen concentrations to 3.7 mg/liter. Although this concentration is below the drinking water standard, it should be recognized that nitrate-nitrogen is an indicator of other potential contaminants such as agricultural chemicals (applied at residential rates), pharmaceuticals and pathogens such as E. Coli bacteria, viruses and other microorganisms. Increases in nitrogen loading should be minimized. Some viruses remain viable in groundwater for time periods of up to two years. Pharmaceuticals can remain in the groundwater for longer periods of time.

3.0 WELLHEAD PROTECTION AREA MANAGEMENT STRATEGIES AND IMPLEMENTATION

Approach and Strategy

The issues regarding the City of McCleary's public water supply include both concerns of water quantity (safe yield) and water quality. At the source of both of these concerns is increased development which conventionally necessitates larger withdrawal volumes and emits more pollution. Therefore, carefully planning development that provides low impacts to the public water supply wells, as well as decreasing development pressure altogether within the recharge areas, is integral to the protection of the water supply wells. These goals can still be achieved while increasing growth, vitality, and economic development within the City of McCleary through the use of smart growth techniques.

Smart growth is a principle of land development that emphasizes mixed land uses; increases the availability of a range of housing types in neighborhoods; takes advantage of compact design; fosters distinctive and attractive communities; preserves open space, farmland, natural beauty and critical environmental areas; strengthens existing communities; provides a variety of transportation choices; makes development decisions predictable, fair and cost effective; and, encourages community and stakeholder collaboration in development decisions. It also reduces water demands, provides enhanced treatment of stormwater pollutants and encourages re-use of wastewater and stormwater.

Protecting the rural character of the community is especially significant in the State of Washington. In fact, the purpose of the State of Washington Growth Management Act (GMA) is to "recognize the importance of rural lands and rural character to Washington's economy, its people, and its environment, while respecting regional differences. Rural lands and rural-based economies enhance the economic desirability of the state, help to

preserve traditional economic activities, and contribute to the state's overall quality of life."

HW recommends two strategies to better assess existing conditions: water level monitoring and water quality testing. A public education program is also recommended. Two regulatory/smart growth techniques that would be particularly useful to the City of McCleary to maintain growth while providing protection of the public water supply wells include Transfer of Development Rights (TDR) and Low Impact Development (LID).

1. Water Level Monitoring

   HW recommends that the City develop a water level monitoring protocol to further clarify the vertical hydraulic gradient between the upper and lower (confined) aquifer units. This is best established with the installation of three multi-level well clusters (each with a shallow well in the upper aquifer and a deeper well in the deeper confined aquifer). The well clusters should be installed at distances of approximately 20 feet, 100 feet and 400 feet from the pumping wells along a transect.

   Water levels should be measured in each of the six wells using a continuous-recording pressure transducer (approximate cost is $600/transducer). This data should be plotted and analyzed in relation to pumping records at the two pumping wells.

   Changes in the hydraulic gradient between the shallow and confined aquifers can then be assessed under a range of pumping conditions. These data can then be used to refine a safe yield estimate, defined as that quantity of water that can be safely withdrawn from the lower aquifer without reversal of the hydraulic gradient and subsequent water quality threats from contaminated water in the shallow aquifer.

2. Water Quality Testing (Private Wells)

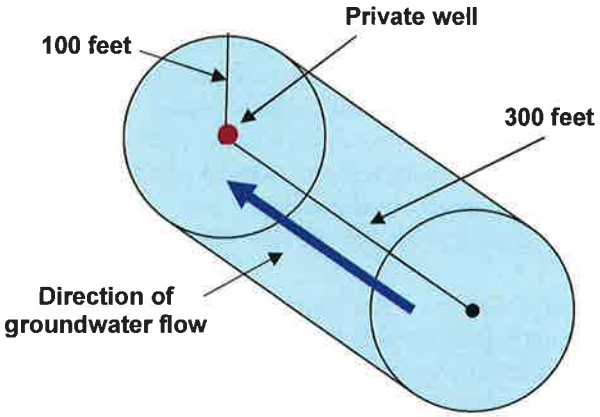
   To confirm the nitrogen loading results HW recommends that private wells located up-gradient of the public supply wells that draw from the upper (unconfined) aquifer be tested for nitrate-nitrogen. Approximately 30 wells should be sampled and tested. The locations should be plotted. Only wells that have drilling logs that suggest they are shallow and screened in the unconfined aquifer (less than 30 feet) should be selected.

3. Private Well Protection

   Much of Grays Harbor County will continue to rely upon private domestic wells as their source of drinking water. The majority of the wells are shallow and draw from the unconfined aquifer. This aquifer is vulnerable to pollution from nearby land uses including septic systems, fertilizers, and livestock. To provide safe drinking water, the County could consider developing private well protection zones and locating significant pollution sources such as septic systems and livestock away from wells.

Private well protection zones can include a fixed radius (such as 100 feet) and an extended area up-gradient to take into account groundwater flow direction. As an example, the Town of Nantucket, Massachusetts has adopted a local health regulation that prohibits septic systems within a 100-foot radius and a 300-foot up-gradient area based upon potential virus transport distance.

Figure 7. Example Private Well Protection Area



4. Public Education

A critical part of any drinking water protection program is public education. Homeowners and business operators must be aware of the sensitivity of the groundwater system and the potential impacts that their individual activities may have. Homeowner practices such as lawn fertilization, application of pesticides, pet and livestock waste management and failing on-site systems all can have direct water quality impacts. Cumulatively, these impacts can add up and may cause significant degradation to the community drinking water supply.

The State of Washington has been a national leader in the development of public education campaigns directed at environmental protection. Posters, newspaper advertisements, training workshops and cable television are all effective means to get the message out.

5. Transfer of Development Rights

Transfer of Development Rights (TDR) is a regulatory strategy that harnesses private market forces to accomplish two smart growth objectives. First, open space is permanently protected for water supply, agricultural, habitat, recreational, or other purposes via the transfer of some or all of the development that would otherwise have occurred in these sensitive places to more suitable locations. Second, other locations, such as city and town centers or vacant and underutilized properties, become more vibrant and successful as the development potential from the protected resource areas

is transferred to them. In essence, development rights are "transferred" from one district (the "sending district") to another (the "receiving district"). Communities using TDR are generally shifting development densities within the community to achieve both open space and economic goals without changing their overall development potential. Implementing a TDR program would provide protection of McCleary's public water supply and would also benefit the city by refocusing development attention and growth to the city. Prior to implementing a TDR program, however, the community should attain the following characteristics:

- Clearly Identified Resource Areas for Protection. The foundation of any TDR program is a resource area that requires protection. Sending area communities should clearly identify the resources they would like to protect as these choices will shape many of the TDR program elements such as the method of calculating development rights, the types of incentives that will be offered to developers, and the type of restriction recorded. In this case we are recommending the primary recharge area identified in the Hart Crowser study.

- Consensus Regarding the Location and Extent of Receiving Areas. Communities must develop consensus regarding which areas will receive higher densities than what is allowed under existing zoning. Higher density development is a politically charged topic in communities and often requires a significant outreach effort to gain acceptance. Detailed discussion regarding the intensity and types of use should be a part of the TDR planning process. The City of McCleary downtown area appears to be appropriate for re-development within the existing City urban growth boundaries. During our site visit on October 31, 2007 we toured the downtown area and spoke to City officials. There are many properties and sections of town that could be re-developed at greater densities than currently exist in a sustainable manner. This would provide economic incentive, would limit the urban sprawl into the wellhead protection areas and could serve to conserve water demands.

- Infrastructure that can Support Increases in Density. Another critical element to TDR program is the district(s) to which increased growth will be directed. Communities should be able to identify areas where existing infrastructure can accommodate higher densities. Infrastructure concerns include wastewater, water supply, traffic, and other utilities. Market considerations should also be evaluated when residential and/or commercial development rights may be transferred as the market in receiving areas must be able to support increased densities. McCleary has an existing sewer system. We have not evaluated the capacity or expansion issues associated with this facility.

- A Clearly Written Ordinance. TDR legislation can become very complex as municipalities attempt to create guidelines for market transactions with various incentives to the development community. The goal of a community should be to develop a concise permitting process that does not add unnecessary layers of review for the development community. Ordinances

should include an attractive incentive for TDR transactions in the form of density above that otherwise possible in the receiving zone.

- Strong Market Conditions. The goal of increased density in receiving areas must be supported by a strong market demand for either residential or commercial development. Communities should consider enlisting the help of a qualified real estate or economic development professional to assess whether the market in receiving areas is strong enough to support increases in growth.

- TDR Credit Bank. Due to the complexity of TDR transactions, the timing involved with buying, selling, and developing properties may not always be seamless. In the event that specific elements of a transaction are delayed, it may be beneficial for a community to establish a TDR Credit Bank where development rights can be temporarily stored before being purchased by a developer. Communities can also use these banks to store credits that are purchased by the Town for parcels of high conservation priority.

- A Sophisticated Reviewing/Permitting Authority. The permitting authority for a TDR transaction should have a clear understanding of the program guidelines to ensure that development rights and density increases are correctly calculated in permit applications. Reviewing agencies should also be able to prioritize those design elements that are most important to the final project and identify alternative approaches that may simplify the application process.

- Open Communication between Local Agencies. The permitting authority for TDR transactions should have access to other agencies that may help to clarify opportunities or constraints associated with either the sending or receiving districts. Inter-agency cooperation can be formally integrated into the review process using the provisions of the TDR ordinance where commentary may be required from other agencies such as the Board of Health or the City Engineer. Other agencies or groups that could be involved in the review process, formally or informally, include local watershed groups, the local Open Space Committee, or the Agricultural Commission.

Local Model

An example community in the area that has implemented a TDR program is Thurston County, WA, which created a TDR ordinance in 1995 for the purpose of protecting agricultural lands (Chapter 20.62 Transfer of Development Rights). The sending area for the TDR program consists of any land zoned as "long-term agricultural," a zoning classification required by the state's Growth Management Act. All of this land is within the unincorporated area of the county and is zoned for one dwelling unit per 20 acres. Landowners in the sending area are entitled to one development right for every five acres of land they own, regardless of whether the land is suitable for development. They are required to reserve one development right for each unit they

want to build. The county maintains a list of interested sellers, and development rights are traded on the open market. The receiving areas are located throughout the unincorporated area of the county and within each of the three largest cities. Four ordinances, one for the county and one for each of the three largest cities (Lacey, Tumwater and Olympia), were adopted in 1995 (AFT, 2001).

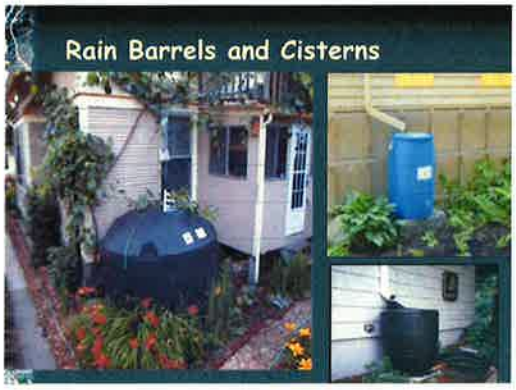
5. Low-Impact Development

Decreasing water consumption rates within the city, whether through regulations or incentive programs, is an important consideration to protect the water supply. Not only is water quantity threatened by increased withdrawal and consumption, but in the case of the Wildcat Creek aquifer, water quality is also at risk. It is believed that groundwater within the deeper aquifer is under pressure and currently has an upward flow potential. However, the upward flow potential is dependent upon maintaining an upward gradient and increasing withdrawals may cause the water to flow downward, threatening the drinking water supply with contaminated groundwater from the overlying shallow unconfined aquifer.

One strategy that could successfully reduce water demand on public drinking water supply wells would be to implement a Low Impact Development (LID) ordinance. The ordinance may require changes to both the City of McCleary's and Grays Harbor County's Comprehensive Plans, zoning codes, design standards, and other applicable regulations. Some of the Comprehensive Plan's primary planning goals include:

- Urban growth;
- Reduction of sprawl;
- Efficient multi-modal transportation;
- Diverse and equitable housing;
- Economic development;
- Encouragement of natural resource industries;
- Open space and recreation; and
- Environmental protection.

LID is a more sustainable land development pattern that results from a site planning process that first identifies critical natural resources, and then determines appropriate building envelopes. LID also incorporates a range of best management practices (BMPs) that preserve the natural hydrology of the land. Best management practices can include bioretention systems, infiltration systems, green roofs and cisterns to treat, store and re-use stormwater runoff as an irrigation source. The principles of LID are also in direct alignment with the Comprehensive Plan goals.



Examples of Rain Gardens and Bioretention Areas

The LID ordinance could require water conservation devices for public buildings and provide incentives for their implementation in private business and residences. The ordinance should also include design criteria that require the collection and re-use of stormwater as an irrigation source (using rain barrels, cisterns or recharge to the local groundwater system). This would significantly reduce water demands on the public drinking water system during the growing season and provide water allocation to future growth within the city limits. According to local sources, the winter water demand averages 257 gallons/day per residence. This demand increases to 600 gallons/day per residence during the summer growing season. A significant portion of this increase is believed to be irrigation.

Infiltration and recharge of roof runoff into stone infiltration chambers via "rain chains"

In addition to reducing non-point source pollution to drinking water supplies and surface waters, LID provides other important benefits to the municipality, the developer, and the general public. More concentrated (cluster) design, with less impervious area and smaller infrastructure (stormwater drainage and other utilities), means significant cost savings to developers. Less impervious surface creates less surface runoff, which will decrease the burden to municipal drainage infrastructure.

Local Model

Thurston County and the City of Olympia have adopted LID principles into their Comprehensive Plans, zoning and tree protection ordinances; street, sidewalk, and parking standards; and drainage design and erosion control standards. The Comprehensive Plan amendment process began earlier and took a year, from September 2000 to September 2001. The Olympia Planning Commission reviewed the entire package – the first time it had considered anything other than Comprehensive Plan revisions. During review of the Comprehensive Plan amendments, the chart comparing impacts with conventional and low-impact design helped convince both City and County Planning Commissions that the approach was viable (Olympia, 2002).

By adoption of Ordinance 6140 (Olympia's LID ordinance), the City supplemented the Comprehensive Plan's Chapter 1 (Land Use and Urban Design), Chapter 2 (Environment), Chapter 5 (Utilities and Public Facilities), and Chapter 6 (Transportation) with goals and policies that establish Green Cove basin as a unique

area, subject to enhanced environmental regulations. Primary goals and policy changes for Green Cove basin included the following (Olympia, 2002):

- Designate Green Cove Creek as a sensitive drainage basin.
- Avoid high-density development where new development would have a significant adverse impact upon the habitat within designated sensitive drainage basins.
- Administer development regulations that protect critical areas and designated sensitive drainage basins.
- Adopt low-impact development regulations within designated sensitive drainage basins that may include stormwater standards, critical area regulations, zoning designations, and other development standards.
- Establish street designs that minimize impacts to the natural environment especially within a designated sensitive drainage basin.

The City of Olympia also used Ordinance 6140 to amend the municipal code with requirements for designated sensitive drainage basins, Green Cove basin in particular. The ordinance created a new zoning district and increased tree protection and replacement requirements. The new zoning district, Residential Low Impact (RLI), applied to Green Cove basin within Olympia's city limits. Parcels along the basin boundary that have at least 50% of their surface area within the basin were included in the district. Traits of the district included:

- Residential densities of two to four units per acre. Duplex, townhouse, and multifamily uses are allowed.
- Lot widths and rear setbacks are reduced and maximum building heights are increased, compared to the other residential districts.
- Maximum impervious surface coverage per lot is limited to 2,500 square feet.
- Several land uses, including duplexes and parking lots, not typically permitted in single-family residential developments, are allowed in the Green Cove basin.

Olympia also enacted a new Chapter 16.54 Tree Protection and Replacement for Green Cove Basin, which requires a minimum tree density of 220 tree units per acre. The requirement will result in approximately 55% tree cover in any given development.

Thurston County amended their Olympia Urban Growth Area Zoning Code (TCC 20.23), to be generally consistent with City of Olympia zoning. The urban growth area within Green Cove Creek Drainage Basin was rezoned from predominately 4-8 units per acre to 2-4 units per acre. The exception was a forested area along the creek where density was limited to one unit per five acres, to reduce the overall impervious surface in the basin to levels likely to enable preservation of anadromous fish and to buffer the creek from the impacts of urban density development up slope. The zoning amendments also required that, within the urban growth area, 60% of each site be retained in open space and that existing vegetation in these areas be preserved.

6. New Well Construction

A recent communication from City of McCleary officials suggests that the public supply well may actually be screened partially in the upper aquifer. In the event that the water quality testing confirms the nitrogen loading estimates, HW recommends that the City includes the possibility of eliminating the shallow screens using "packers" that cold seal off these intake areas and limit the wells intakes to the lower confined aquifer. If this is not feasible another option would be to drill a new well in the confined aquifer.

REFERENCES

American Farmland Trust. (May, 2001). Purchase of Development Rights and Transfer of Development Rights Case Studies. Prepared for the Boone County Planning Commission. pp. 11-15.

Cappellini, Dan. (2007). Personal communication.

Cappiella, K. and Brown, K. January, 2001. Impervious Cover and Land Use in the Chesapeake Bay Watershed. Center for Watershed Protection. Ellicott City, MD. 51 pp.

City of McCleary website. Retrieved October 17, 2007. http://www.cityofmccleary.com/.

City of Olympia, Water Resources Program. (October 2002). Low-Impact Development Strategy for Green Cove Basin: A Case Study in Regulatory Protection of Aquatic Habitat in Urbanizing Watersheds. Olympia, WA. pp. 1-13.

Frimpter, M.H., J.J. Donohue, and M.V. Rapacz. (1990). A Mass-Balance Nitrate Model for Predicting the Effects of Land Use on Ground Water Quality. U.S. Geological Survey, Open File Report 88-493

Hart Crowser. (April, 1994). Hydrogeologic Characterization for Protection of the Wildcat Creek Aquifer. City of McCleary, WA. pp. 1-19

Lane, R.C. (2004). Estimated Domestic, Irrigation, and Industrial Water Use in Washington, 2000. U.S. Geological Survey Science Investigations Report 2004-5015.

Massachusetts Executive Office of Energy and Environmental Affairs. (September, 2005) Smart Growth Toolkit. http://www.mass.gov/envir/smart_growth_toolkit

The Environmental Protection Agency. (2004). Tools for Watershed Protection: A Workshop for Local Governments. Washington, DC.

The Vidette. (July 30, 2007) Re: "Well of a Problem" article. Email correspondence.

University of Washington Center for Community Development and Real Estate. (1998). Industrial Land Supply and Demand in the Central Puget Sound Region. *Puget Sound Trends*. No. E1, Chapter 4. pp. 37-48.

STATE OF WASHINGTON
DEPARTMENT OF CONSERVATION AND DEVELOPMENT

No. Appl. 2136
Cert. 936-A

WELL LOG

Date February 18, 19 51
Record by O. E. Erdman
Source Driller's Record

Location: State of WASHINGTON
County Grays Harbor
Area
Map

DIAGRAM OF SECTION

NE¼ NE¼ sec. 11 T. 18 N., R. 5 W.
Drilling Co. Erdman Drilling Co. Inc.
Address Box 612; Elma
Method of Drilling Date Feb. 17 19 51
Owner City of McCleary
Address McCleary, Wash.
Land surface, datum ft. above below

CORRELATION	MATERIAL (Transcribe driller's terminology literally but paraphrase as necessary, in parentheses. If material water-bearing, so state and record static level if reported. Give depths in feet below land-surface datum unless otherwise indicated. Correlate with stratigraphic column, if feasible. Follow-ing log of materials, list all casings, perforations, screens, etc.)	THICKNESS (feet)	DEPTH (feet)
	Soil	2	2
	Clay & gravel hard pan	24	26
	Sand & gravel (water)	5	31
	Clay	2	33
	Sand & gravel	26	59
	Shale	16	75
	Pump Test:		
	Dim: 74' x 8" Drilled		
	SWL: 3'		
	DD: 29'		
	Yield: 200 g.p.m.		
	Casing: 8" dia. from 0 to 74'		
	Perforations:		
	Perf. in place from 33 to 58'		

Sheet of sheets

Turn up

STATE OF WASHINGTON
DEPARTMENT OF CONSERVATION
AND DEVELOPMENT

WELL LOG

No. Appl. #2598
Cert. #1326

Date May 8, 1952
Record by A. P. Graf
Source Driller's Record

Location: State of WASHINGTON
County Grays Harbor
Area
Map

DIAGRAM OF SECTION

N½ NE¼ sec. 11 T. 18 N., R. 5 W.

Drilling Co. A. P. Graf
Address 216 E. 68th St., Tacoma, Wash.
Method of Drilling Drilled Date May 8 1952
Owner Town of McCleary
Address McCleary, Washington
Land surface, datum ft. above / below

Correlation	Material	Thickness (feet)	Depth (feet)
	(Transcribe driller's terminology literally but paraphrase as necessary in parentheses. If material water-bearing, so state and record static level if reported. Give depths in feet below land-surface datum unless otherwise indicated. Correlate with stratigraphic column, if feasible. Following log of materials, list all casings, perforations, screens, etc.)		
	Well log:		
	Top soil	4	4
	Clay & rocks	20	24
	Gravel & boulders	8	32
	Gravel & sand	4	36
	Clay	3	39
	Water bearing gravel	28	67
	Clay	3	70
	Water bearing gravel	12	82
	Pump Test:		
	Dim.: 82' deep; 12" diam.		
	SWL: 8'		
	DD: 57'		
	Yield: 440 g.p.m.		
	Casing: 12" diam. from 0 to 82'		

Turn up (over)

Sheet of sheets

STATE OF WASHINGTON
DEPARTMENT OF CONSERVATION
AND DEVELOPMENT

No. A.6087:C.4371=A

WELL LOG

Date 1-11, 1963

Record by well driller

Source driller's record

Location: State of WASHINGTON

County Grays Harbor

Area

Map

¼ ¼ Sec. 11 T. 18 N., R. 5 W.

Diagram of Section

Drilling Co. Peter Sylte

Address Rt. 1, Box 1402, Spanaway, Wash.

Method of Drilling Date Aug. 8, 1962

Owner Town of McCleary, Wash.

Address

Land surface, datum ft. above / below

Geol. Log	Material	Thickness (feet)	Depth (feet)
	(Transcribe driller's terminology literally but paraphrase as necessary. In parentheses, if material water-bearing, so state and record static level if reported. Give depths in feet below land-surface datum unless otherwise indicated. Correlate with stratigraphic column, if feasible. Following log of materials, list all casings, perforations, screens, etc.)		
	Top soil & gravel	0	2
	Clay & gravel	28	30
	Sand gravel little water	12	42
	Blue clay & gravel	10	52
	Sand gravel some water	3	55
	Sand & gravel, tight, some water	12	67
	Hard packed sand	3	70
	Cemented gravel	5	75
	Sand & gravel good flow of water	18	93
	PUMP TEST.		
	Dim. 16"x93'		
	SWL. 18 ft. (8-8-62)		
	PD: 70 ft.		
	Yield: 500 g.p.m.		
	Water Temp. 50°		
	6 min. recovery		

Turn up (over)

Sheet ____ of ____ sheets

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.

490062

WATER WELL REPORT

Original & 1st copy – Ecology, 2nd copy – owner, 3rd copy – driller

DEPARTMENT OF ECOLOGY State of Washington

Construction/Decommission *("x" in circle)*

☐ Construction

☒ Decommission *ORIGINAL INSTALLATION*

Notice of Intent Number _____

PROPOSED USE: ☐ Domestic ☐ Industrial ☐ Municipal ☐ DeWater ☐ Irrigation ☐ Test Well ☐ Other _____

TYPE OF WORK: Owner's number of well (if more than one) _____

☐ New well ☐ Reconditioned *Method:* ☐ Dug ☐ Bored ☐ Driven ☐ Deepened ☐ Cable ☐ Rotary ☐ Jetted

DIMENSIONS: Diameter of well 8 inches, drilled 74 ft. Depth of completed well _____ ft.

CONSTRUCTION DETAILS

Casing Installed: ☒ Welded 8" Diam. from 0 ft. to 74 ft.
☐ Liner installed _____" Diam. from _____ ft. to _____ ft.
☐ Threaded _____" Diam. From _____ ft. to _____ ft.

Perforations: ☒ Yes ☐ No

Type of perforator used Mills Knife

SIZE of perfs 11/2 in. by 3 in. and no. of perfs 290 from 0 ft. to 74 ft.

Screens: ☐ Yes ☒ No ☐ K-Pac Location _____

Manufacturer's Name _____

Type _____ Model No. _____

Diam. _____ Slot size _____ from _____ ft. to _____ ft.

Diam. _____ Slot size _____ from _____ ft. to _____ ft.

Gravel/Filter packed: ☐ Yes ☒ No Size of gravel/sand _____

Materials placed from _____ ft. to _____ ft.

Surface Seal: ☐ Yes ☐ No To what depth? _____ ft.

Material used in seal _____

Did any strata contain unusable water? ☐ Yes ☐ No

Type of water? _____ Depth of strata _____

Method of sealing strata off _____

PUMP: Manufacturer's Name _____

Type _____ H.P. _____

WATER LEVELS: Land-surface elevation above mean sea level _____ ft

Static level 8 ft. below top of well Date May 30, 20

Artesian pressure _____ lbs. per square inch Date _____

Artesian water is controlled by _____ (cap, valve, etc.)

WELL TESTS: Drawdown is amount water level is lowered below static level

Was a pump test made? ☐ Yes ☐ No If yes, by whom? _____

Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.

Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.

Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test _____

Bailer test _____ gal./min. with _____ ft. drawdown after _____ hrs.

Airtest _____ gal./min. with stem set at _____ ft. for _____ hrs.

Artesian flow _____ g.p.m. Date _____

Temperature of water _____ Was a chemical analysis made? ☐ Yes ☐ No

CURRENT

Notice of Intent No. AE21919

Unique Ecology Well ID Tag No. NA

Water Right Permit No. NA

Property Owner Name CITY OF MC CLEARY

Well Street Address 1037 N. SUMMIT

City MC CLEARY County GRAYS HARBOR

Location NE 1/4-1/4 NE 1/4 Sec 11 Twn 18N R 5 EWM ☐ Or WWM ☒
(s, t, r Still REQUIRED)

Lat/Long Lat Deg ____ Lat Min/Sec ____
Long Deg ____ Long Min/Sec ____

Tax Parcel No. (Required) 618051111014

CONSTRUCTION OR DECOMMISSION PROCEDURE

Formation: Describe by color, character, size of material and structure, and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information. (USE ADDITIONAL SHEETS IF NECESSARY.)

MATERIAL	FROM	TO
DECOMMISSIONED 8" WELL X 74'		
DEEP PER WAC 173-160-381 (1)		
(a) (i) (ii) (iii).		
Perforated casing from bottom		
of well to within 2' of land		
surface with Mills Knife Per-		
forator, 4 slot per foot.		
Installed tremmie pipe to		
bottom of well. Pressure		
grouted with 30% hi-solids		
grout to land surface (250		
gallons).		
Cut off 8" casing 1' below		
ground surace. Welded on 8"		
steel cap.		

RECEIVED
JUN 03 2013
WA State Department of Ecology (SWRO)

Start Date May 29, 2013 Completed Date May 30, 2013

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

☒ Driller ☐ Engineer ☐ Trainee Name (Print) Bob Carper

Driller/Engineer/Trainee Signature

Driller or trainee License No. 1239

IF TRAINEE: Driller's License No:

Driller's Signature: Bob Carper

Drilling Company Hokkaido Drilling, Inc.

Address P.O. Box 100

City, State, Zip Graham , WA, 98338

Contractor's Registration No. HOKKADIO017M8 Date May 30, 2013

ECY 050-1-20 (Rev 02/10) *If you need this document in an alternate format, please call the Water Resources Program at 360-407-6872. Persons with hearing loss can call 711 for Washington Relay Service. Persons with a speech disability can call 877-833-6341.*

February 6, 2020

SUBJECT: NOTIFICATION TO PROPERTY OWNERS LOCATED WITHIN THE CITY OF MCCLEARY WELLHEAD PROTECTION AREA GRAYS HARBOR COUNTY, WASHINGTON

Dear Resident or Business:

To protect the drinking water supply for the customers of the City of McCleary Water System, we have developed a wellhead protection program as required by state law. As part of our wellhead protection program, we mapped the area overlying the short-term recharge zone of our drinking water supply wells. This is called our wellhead protection area.

Following the mapping of the wellhead protection area, we conducted an inventory of potential groundwater contamination sources within the area. The proximity of your property within our wellhead protection area means that your activities have the potential to affect our customer's drinking water supply.

We realize you are already careful to protect the environment. If you would like technical assistance to help manage your business or private septic system in a way that will best prevent groundwater contamination, please contact the City's water department. Properly installed/maintained and correctly functioning septic systems do not pose a risk of contamination to the City's wells. We hope that the knowledge that you are in our wellhead protection area will result in additional precautions to ensure that your activities will not affect our drinking water quality.

The enclosed map from the Water System Plan shows the 1-, 5-, and 10-year time-of-travel boundaries for our wellhead protection area. Any groundwater contamination that occurs within this wellhead protection area has a high potential to reach our well.

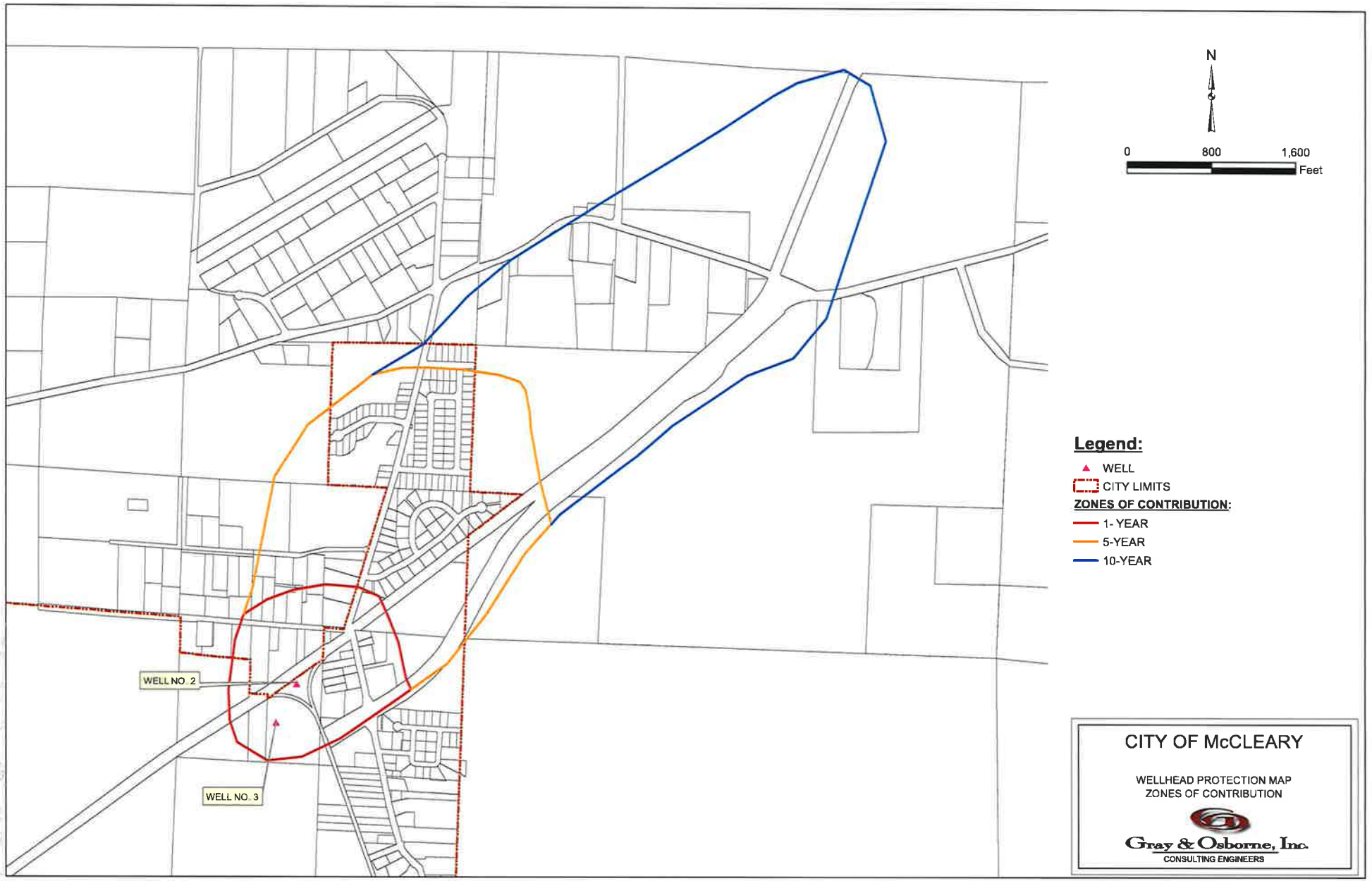
Thank you for your support in protecting our drinking water.

Sincerely,

CITY OF MCCLEARY

Todd Baun
Public Works Director

Encl.


N
0
800
1,600
Feet
Legend:
WELL
CITY LIMITS
ZONES OF CONTRIBUTION:
1- YEAR
5-YEAR
10-YEAR
WELL NO. 2
WELL NO. 3
CITY OF McCLEARY
WELLHEAD PROTECTION MAP
ZONES OF CONTRIBUTION
Gray & Osborne, Inc.
CONSULTING ENGINEERS

APPENDIX M

EXAMPLE MAINTENANCE AND MONITORING FORMS

ORCAA RULE 6.3.4 – DISPOSAL OF ASBESTOS CONTAINING WASTE MATERIAL

HYDRANTS MAINTENANCE / INSPECTION REPORT

Hydrant # _____, Valve Size _____, Section ____/____/4, Map # _____

Location:

Principle St: _____ _____ ft. _____ of center line

Intersecting St: _____ _____ ft. _____ of center line

Specific Location: Checked OK _____ or measured as follows:

_____ ft. _____ of _____

_____ ft. _____ of _____

_____ ft. _____ of _____

Caps Missing: _____, Replaced: _____, Greased: _____

Chains Missing: _____, Replaced: _____, Freed: _____

Paint: OK _____, Repaint: _____

Oper. Nut: OK _____, Greased: _____ Replaced: _____

Nozzles: OK _____, Caulked: _____ Replaced: _____

Valve & Seat: OK _____, Replaced: _____

Packing: OK _____, Tightened: _____ Replaced: _____

Drainage: OK _____, Corrected: _____

Flushed: _____ Minutes _____ Nozzle Open

Pressure: Static: _____ Residual: _____ Flow _____ gpm

Branch Valve: Condition: _____

Other Problems / Work Needed: _____

_____

_____

Work / Repairs Completed:

_____ By: _____ Date ___/___/___

_____ By: _____ Date ___/___/___

_____ By: _____ Date ___/___/___

Inspection/Maintenance Completed by: _____ Date ___/___/___

Remarks on back of page _____ Yes _____ No

VALVE REPAIR REPORT

Valve #_____ Valve Size _____ Section ____ ____/4 Map #_____

Connecting Pipe #_____ to Pipe/Node #_____, Installed ____/____

Type _____, Connecting ends _____ x _____, Make _____

Opens _____, # of turns _____, Depth to operate nut _____

Normally _____, Valve box cold-mixed? _____ needed? _____

General Location:

Principle St:_____ _____ ft. _____ of center line

Intersecting St:_____ _____ ft. _____ of center line

Specific Location:

_____ ft. _____ of _____

_____ ft. _____ of _____

_____ ft. _____ of _____

Valve/Site Map:

Last corrected ____/____/____ dBase enter ____/____/____ CAD Map ____/____/____

Remarks on back of page _____ Yes _____ No

VALVE MAINTENANCE / INSPECTION REPORT

Valve #_____, Valve Size _____, Section _____/_____/4, Map #_____

Location:

Principle St:_____ _____ ft. _____ of center line

Intersecting St:_____ _____ ft. _____ of center line

Specific Location: Checked OK _____ or measured as follows:

_____ ft. _____ of _____

_____ ft. _____ of _____

_____ ft. _____ of _____

Found: _____, # of turns: _____, Left: _____

Packing: OK _____, Leaking: _____

Stem: OK _____, Bent / Broken: _____

Nut: OK _____, Missing / Damaged: _____

Gears: OK _____, Faulty: _____

Lid: OK _____, Missing / Broken: _____, Replaced _____

Box: OK _____, Cold mixed *Yes / No* needed? *Yes / No*

Buried *Yes / No* _____, Protruding *Yes / No* _____"

Too Close to Operating Nut *Yes / No*

Other Problems / Work Needed: _____

_____

_____

Work / Repairs Completed:

_____ By: _____ Date ___/___/___

_____ By: _____ Date ___/___/___

_____ By: _____ Date ___/___/___

Inspection/Maintenance Completed by: _____ Date ___/___/___

Remarks on back of page _____ Yes _____ No

MAIN REPAIR REPORT

Main #_____ Main Size _____ Section _____ _____/4 Map #_____

Node #_____ (Valve/Main #_____) to Node #_____ (Valve/Main #_____)

Date Installed _____/_____ Type _____ Manufacturer _____

Length of Main _____ ft. Number of Connections on Main _____

Valves to Isolate _____, _____, _____, _____, _____, _____, _____

Location:

_____ side of _____

From _____ St. to _____

Other Location Information:

_____

_____

Specific Location:

_____ ft. _____ of _____

_____ ft. _____ of _____

Site Map:

Last corrected _____/_____/_____ dBase enter _____/_____/_____ Map _____/_____/_____

Remarks on back of page _____ Yes _____ No

STORAGE INSPECTION REPORT

Elevated Tank/Reservoir Name or Location _____

		YES	NO	N/A
1.	Capacity: _____ Gallons			
2.	Ventilation provided			
3.	Ventilation screen ok?			
4.	Tank outlet through bottom			
5.	Tank inlet and outlet insulated			
6.	Overflow pipe flushed			
7.	Angle flap valve screen on overflow pipe ok?			
8.	Tank drain operated and flushed			
9.	Tank drain separate from inlet and outlet piping			
10.	Screen at discharge end of drain pipe ok?			
11.	Manhole cover			
	a. Lockable			
	b. Watertight			
	c. Overhanging			
12.	Exterior ladder(s) usable and access controlled			
13.	Interior ladder			
	a. Provided			
	b. Usable			
14.	Roof watertight			
15.	Steel tanks			
	a. Interior paint adequate			
	b. Exterior paint adequate			
16.	Liquid level controls checked			
17.	Low and high level alarm checked			
18.	Recent trespass or vandalism observed			
19.	Does drain/overflow discharge to storm system?			
20.	Does drain/overflow discharge to sewer?			
21.	Does drain/overflow discharge adequately?			

Other possible source of contamination: _____

_____

Improvements needed: _____

_____

Remarks: _____

_____

(3) A description of the material, including the type and percentage of asbestos in the material, total amount of material involved, and the specific location(s) of the material on the site; and

(4) The reason why an alternative control measure is required and a description of the proposed alternative control measure to be employed, including the procedures that will be used to prevent the release of asbestos fibers into the ambient air.

Rule 6.3.4 Disposal of Asbestos Containing Waste Material

(a) Disposal Requirements. It shall be unlawful for any person to cause or allow work on an asbestos project unless the following procedures are employed during the collection, processing, packaging, transporting, or deposition of any asbestos containing material:

(1) Treat all asbestos containing waste material as follows:

(i) Adequately wet all asbestos containing waste material and mix asbestos waste from control devices, vacuum systems, or local ventilation and collection systems with water to form a slurry;

(ii) After wetting, seal all asbestos containing waste material in leak tight containers or wrapping to ensure that they remain adequately wet when deposited at a waste disposal site;

(iii) Permanently label wrapped materials and each container with an asbestos warning sign as specified by the Washington State Department of Labor and Industries or the Occupational Safety and Health Administration. Permanently mark the label with the date the material was collected for disposal, the name of the waste generator, the name and affiliation of the certified asbestos supervisor, and the location at which the waste was generated;

(iv) Ensure that the exterior of each container is free of all asbestos residue; and

(v) Exhibit no visible emissions during any of the operations required by this rule.

(2) All asbestos containing waste material shall be deposited within ten (10) calendar days after collection for disposal at a waste disposal site operated in accordance with the provisions of 40 CFR 61.154 or 40 CFR 61.155 and approved by the appropriate city or county department. The requirement is modified by Rule 6.3.2(c) for asbestos containing waste material from asbestos projects conducted under annual permit.

(3) All asbestos containing waste materials, handled as dangerous waste in accordance with chapter 173-303 WAC, shall be excluded from the requirements of Rule 6.3.4(a)(1) and 6.3.4(a)(2).

(b) Alternative Storage Method – Asbestos Storage Facility. The owner or operator of a licensed asbestos abatement company or disposal facility may apply to the Control Officer, or designee, to establish a facility for the purpose of collecting and temporarily storing asbestos containing waste material.

(1) It is unlawful to cause or allow the operation of a temporary asbestos storage facility without the prior written approval of the Control Officer, or designee.

(2) The owner or operator must request authorization for an asbestos storage facility. When approved, the Authorization will be returned and be available at the facility.

(3) An asbestos storage facility shall meet the following general conditions:

(i) Asbestos containing waste material must be stored in a container with a single piece liner at least 6 mil in thickness; and

(ii) Said container must be in a secured building or in a secured exterior enclosure; and

(iii) The container and enclosure must be locked except during transfer of asbestos containing waste material and have asbestos warning signs posted on the container;

(iv) Storage, transportation, disposal, and return of the waste shipment record to the waste generator will not exceed the 45 day requirement of 40 CFR Part 61.150; and

(v) A copy of all waste shipment records shall be retained for at least 2 years, including a copy of the waste shipment record signed by the owner or operator of the designated waste disposal site. A copy of the waste shipment records shall be provided to the Agency upon request.

(c) Alternative Disposal Method – Asbestos Cement Water Pipe. Asbestos cement water pipe used on public right of ways or public easements shall be excluded from the disposal requirements of Rule 6.3.4 (a)(2) if the following conditions are met:

(1) Asbestos cement pipe may be buried in place if the pipe is left intact (e.g., not moved, broken or disturbed) and covered with at least three (3) feet or more of non-asbestos fill material and the state, county or city authorities are notified in writing of buried asbestos cement pipe; and

(2) All asbestos containing waste material, including asbestos cement water pipe fragments that are one (1) linear foot or less, protective clothing, HEPA filters, or other asbestos contaminated material, debris, or containers, shall be subject to the requirements of Rule 6.3.

Rule 6.3.5 Controlled and Regulated Substances

(a) No person shall cause or allow visual asbestos emissions, including emissions from asbestos waste materials

(1) On public or private lands, on developed or undeveloped properties and on any open uncontrolled and non-designated disposal sites;

(2) During the collection, processing, handling, packaging, transporting, storage and disposal of any asbestos containing waste material; or

(3) From any fugitive source.

APPENDIX N

EMERGENCY RESPONSE CONTINGENCY PLAN

CONTINGENCY PLAN
BOMB THREAT/SABOTAGE

Scenario

The City receives a call or letter containing a threat of sabotage/bomb or injection of toxic materials into water well. Location of any devices is unknown.

System Components and Effects:

- Wells/Pumping Facilities – Possible target due to relative ease of access and isolated location.
  - Make provisions to take target source off line by closing isolation valves, etc.
  - Power down well (by bomb squad).
  - Open interties, if available.
  - Contamination: Restrict use of water, drain the system, and pump well to waste. Flush system from other sources.
- Storage Tanks – Likely target due to size and effect.
  - Make provisions to turn off valves to isolate tanks from system.
  - Contamination: Drain system and flush.
- Water Transmission Mains – Not likely target.
- Power Supply – Likely to be affected only as secondary target to other facilities.
  - Notify Light and Power.
- General Response Actions – Office will take call, Police and Fire Department will respond.
  - Attempt to get caller to reveal location of bomb or method of sabotage.
  - Immediately notify Police and Fire Departments of location of bomb/sabotage or, if unknown, likely targets.
  - Train all personnel how to handle a caller making a bomb threat.
  - Keep a copy of the following form near the switchboards at the City Hall, Fire, and Police Departments.

REPORTING BOMB THREATS

Person Receiving Call

- Attempt to retain the caller long enough to obtain all pertinent information, such as where the bomb/sabotage is located, type of bomb/sabotage, and when it is set to go off.
- Listen carefully to the exact words of the message so that you can repeat the information clearly and accurately.
- Listen for background noises, voice accent, word pronunciation, voice pitch (high or low), male or female voice, child, or adult.
- Try to signal another person near you to pick up the same telephone line and listen in.
- Prepare a list of the following information:
  - Date and time of call.
  - Type of bomb/sabotage.
  - Location of bomb/sabotage.
  - Description of bomb/sabotage.
  - What caller actually said.
  - Sex of caller.
  - Estimated age of caller.
  - Type of voice (soft, loud, whisper, normal, drunk).
  - Background noises heard, if any.
  - Your name and location.
- Report the threat to the Police Department and the Fire Department.

City Clerk, Water/Wastewater Manager or City Administrator

- Notify employees to search their areas.
- Notify local law enforcement agency having jurisdiction.
- If a suspicious object or package is discovered at any time, whether or not a bomb threat call has been received, proceed as follows:
  - Do not move, touch, or disturb the object or package in any way.
  - Immediately notify the Police and Fire Departments.
- Clear all persons from the immediate area and notify the Fire Department of location and description of the suspicious object or package.

REPORTING BOMB THREATS (Continued)

- Evaluate available information and make a decision on evacuation.
- Notify employees of evacuation decision or all-clear decision.
- When directed to evacuate, leave building.
- Take coats, jackets, purses, and briefcases when leaving the work area.
- Lock cash drawers and other valuable items.

Employees

- Search own work areas for suspicious objects or packages as follows:
  - Desks
  - Wastebaskets
  - File Cabinets
  - Supply Room
  - Closets
  - Ashtray Receptacles
  - Locked Doors
  - Underside of Horizontal Surfaces
- Turn off electrical machines or other noise-making equipment.
- Search non-work areas in assigned area including:
  - Restrooms
  - Conference Rooms
  - Kitchens
  - Store Rooms
  - Hallways, Stairways, and Lobbies
- Notify immediate supervisor of the results of the search.

CONTINGENCY PLAN
REGIONAL EARTHQUAKE

Scenario

7.5 Richter magnitude. Considerable damage to brick buildings. Foundations displaced. Ground cracks. Pipes broken.

- Wells/Pumping Facilities – Potential for damaged casing, shifted base, damage to chlorinators, and loss of power. Possible reduced yield.
  - Inspect well base.
  - If no power is available, call Light and Power (see Major Power Outage).
  - Turn on pump to aid in fire fighting if damage is not severe. Pump to waste if water is turbid.
  - If pump or feeder pipes are damaged, isolate from system and commence temporary repairs.
- Treatment Facilities/Equipment – Potential for damage to buildings, metering control, injector pumps, power failure.
  - Check for spillage of sodium hyporchlorite tanks.
  - If no power is available, call Light and Power (see Major Power Outage).
  - Check for damage to chlorinators, injectors, analyzers, and metering control. If all is okay and there are breaks in mains and widespread fires in the transmission system, increase chlorine residual to 3.0 mg/ℓ.
  - Maintain supply and manual metering pumps to feed sodium hypochlorite in case chlorinators are damaged.
- Storage Tanks – High potential for structural damage.
  - Close tank isolation valves.
  - Inspect tanks for structural damage. If imminent failure is suspected, drain tank; otherwise, open valves.
  - Monitor tank levels throughout emergency.
  - Implement Alternative Supply under the Wellhead Protection Plan at level appropriate to handle emergency. Keep Fire Department informed of available water so fire-fighting efforts may be prioritized.

CONTINGENCY PLAN – REGIONAL EARTHQUAKE (Continued)

- Water Transmission Mains – Potential for broken pipes. Fire fighting demands may be high.
  - ➢ Stockpile repair fittings at key locations. Know location of suppliers.
  - ➢ Keep detailed system maps of isolation valves and water mains with all personnel so crews can locate valves and isolate broken pipes. Have valve wrench in each vehicle.
  - ➢ Open available interties if water is needed for fighting fires. Call adjacent water utility first to assure water is available.
  - ➢ Provide an emergency source of water at a central location for those users who are without service.
  - ➢ Provide surface hose connection to connect City grid to tank complex if major leaks develop in the existing AC transmission pipe.
- Power Supply – Potential for wide-scale power outages.
  - ➢ Respond as for Major Power Outage.
- General Response Actions – Most taxing disaster on water system staff. Some may be injured in earthquake. Transportation impaired. Communications are down.
  - ➢ Train all personnel for earthquake response.
  - ➢ Keep Emergency Call-Up List with regular and a reserve force of emergency water system staff.
  - ➢ Call Department of Health for instruction.
  - ➢ Do not keep vehicles in damage prone locations.
  - ➢ Use mobile radios to coordinate activities.
  - ➢ Coordinate with Grays Harbor County Emergency Response Agencies (see Emergency Call-Up List).
  - ➢ Inform local radio and television stations of nature and extent of water system damage.

CONTINGENCY PLAN
MAJOR POWER OUTAGE

Scenario

Major regional power outage occurs due to earthquake, windstorm, or other disaster with loss of power to all Water System facilities for more than 12 hours.

- Wells – wells #2 and #3 out of service.
  - Call Light and Power. Alert Light and Power of emergency graveness.
- Treatment Facilities/Equipment – Injector pumps cease to operate.
  - Monitor chlorine residual in storage tanks.
  - All facilities should be checked after power is restored to assure return to normal operations.
- Storage Tanks – Water levels may drop if wells are down for extended period.
  - Monitor storage tank levels.
  - Adhere to Alternative Supply under the Wellhead Protection Plan.
- Water Transmission Mains – No effect.
- Power Supply – Interruption in power may create need to recalibrate meters and telemetry equipment.
- General Response Actions
  - City personnel should arrange for portable generator.
  - All personnel should obtain portable lights.
  - Check all facilities after power restoration to assure telemetry and metering controls are in operation.

CONTINGENCY PLAN
FLOODING/WASHOUTS

Scenario

100-year flood in the Chehalis River. Heavy rains cause washouts of roads and embankments.

- Wells – Wells #2 and #3 are above 100-Year flood plains.
- Storage Tanks – Above flood plains, no effect.
- Water Transmission Mains – May break due to road washouts. Some sections of the system may become contaminated.
  - Isolate breaks.
  - Eliminate cross connections by keeping buildings from flooding.
  - Sterilize all lines that are affected.
  - Provide a source of emergency water at a central point for all who are affected by the loss of service.
- Power Supply – Some localized outages could occur. See Major Power Outage if system is affected.
  - Keep all electrical equipment dry.
- General Response Actions
  - Use alternate routes in event of road washouts.
  - Keep Emergency Call-Up List with regular and a reserve force of emergency water system staff.

CONTINGENCY PLAN
HAZARDOUS SPILL

Scenario

A hazardous chemical spill occurs in the watershed, and one or both well sources become contaminated.

- Wells – Source of supply is contaminated.
  - ➢ Immediately isolate source from the system.
  - ➢ Call Department of Health emergency spill response number.
  - ➢ Increase chlorine residual in affected tank to 3.0 mg/l or greater to oxidize or disinfect the contaminants.
  - ➢ If health threat is immediate, notify users to stop using water.
  - ➢ Attempt to determine contaminating substance. Call professional services as required.
  - ➢ Coordinate with professionals to treat water to highest safe, feasible extent.
  - ➢ Keep chemical supplies of granular activated carbon and lime in stock for possible emergency treatment. Do not store in plain view or outside building.
- Treatment Facilities/Equipment – No effect.
- Storage Tanks – No effect likely.
  - ➢ Isolate tank until emergency treatment is complete. If treatment is not adequate, take out of service. Do not drain before treating if hazardous to aquatic life
- Water Transmission Mains – No effect.
  - ➢ Initiate Alternative Supply under the Wellhead Protection Plan if necessary.
- Power Supply – No effect.
- General Response Actions – Some may be sick from ingesting tainted water.
  - ➢ Train personnel in hazardous waste cleanup, emergency water treatment, and use of protective equipment.
  - ➢ Inform public of possible health effects of contaminant (see Public Notification).

CONTINGENCY PLAN
EXTENDED DROUGHT

Scenario

Extended drought conditions severely tax available water supply. Demand increases.

- Wells – Well drawdown may increase with less recharge, though this effect will be long-term and seasonal.
  - ➢ Monitor static and dynamic water levels in wells. Make records of any changes.
- Treatment Facilities/Equipment – No effect.
- Storage Tanks – No effects.
- Water Transmission Mains – No effects.
  - ➢ Open interties with utilities (if available).
- Power Supply – No effect.
- General Response Actions
  - ➢ Familiarize personnel with Alternative Supply under the Wellhead Protection Plan.
  - ➢ Initiate Alternative Supply under the Wellhead Protection Plan.

CONTINGENCY PLAN
WATER SYSTEM PERSONNEL INJURY

Emergency Scenario

Due to injury or sickness, most water system staff is unable to work.

- Wells – Need staff to turn on and off pump.
  - Assure telemetry is functioning between wells.
- Treatment Facilities/Equipment – Requires taking daily water samples and adjusting chlorine dose. Routine maintenance may be delayed.
  - Adjust chlorine dose to maintain desired residual.
- Storage Tanks – Not vulnerable to short-term work stoppages.
  - Check tank water levels during periods of high demand.
- Water Transmission Mains – Not vulnerable to short-term work stoppages.
- Power Supply – No effect.
- General Response Actions
  - Familiarize more than one operator with each part of the system.
  - In the event of serious accident, call an ambulance.
  - For accidents resulting from fire, gas, explosion, etc., call the Fire Department.
  - Never move a seriously injured person unless necessary to prevent further injury.
  - Train all personnel in first aid and CPR.
  - Maintain medical histories and information cards on all employees. Use this card when accidents, illness, or injuries occur.
  - All injuries, no matter how minor, should be reported immediately to the City Administrator or the Mayor.
  - Once proper medical treatment is received, complete an accident report form and submit it to the Administrator's office.
  - If work stoppage persists, consider obtaining help from local water district operators on a part-time basis.

CONTINGENCY PLAN
MECHANICAL FAILURE

Scenario

A major source is incapacitated by large mechanical failure. To fix equipment, manufacturer's technicians are needed.

- Wells – Pump out of service.
  - Prepare a list showing pump manufacturer's local supplier and service representatives.
  - If pump fails during peak demand period, implement Alternative Supply under the Wellhead Protection Plan.
  - Call manufacturer or service representative if problem cannot be repaired in-house.
- Treatment Facilities/Equipment – Injector pumps and regulators subject to failure.
  - Switch to backup injector, etc.
  - If both injectors are damaged, manually inject chlorine (sodium hypochlorite) with constant displacement feed pumps until repaired.
  - Call manufacturer or service representative if problem cannot be repaired in-house.
- Storage Tanks – No mechanical parts.
  - Monitor tank levels.
- Water Transmission Mains – No mechanical parts.
- Power Supply – No effect.
- General Response Actions
  - During repairs, some personnel may neglect routine duties.
  - Keep backup stocks of repair parts.

CONTINGENCY PLAN
SUB-ZERO WEATHER

Emergency Scenario

Extended freezing weather has promoted deep frost penetration in the soil. Local service connection lines are freezing. Conditions are similar throughout the county.

- Wells – Minor parts not well oiled are subject to freezing shut.
  - Exercise pumps daily.
  - Keep moving parts oiled and moisture-free.
  - Keep buildings warm with space heaters.
  - Keep space heaters in storage at Public Works building and in chlorination buildings. Rentals cannot be relied upon due to heavy demand in the region causing shortages.
- Treatment Facilities/Equipment
  - Keep buildings warm with space heaters.
- Storage Tanks – Broken lines and open faucets may result in increased water demand.
  - Monitor tank levels.
  - Implement Alternative Supply under the Wellhead Protection Plan if required.
- Water Transmission Mains – Effects are unlikely. Routine maintenance will be disrupted.
  - Fill meter boxes with insulating material to resist pipe freezing.
  - Areas of widespread problems should be documented and examined for preventive measures, such as deeper mains, insulted meter boxes, special customer notification, etc.
- Power Supply – Outage possible due to snow-weighted falling trees.
  - Inform power company of problem priority.
  - Check all electrical equipment throughout freezing weather to assure continued function.
  - See Major Power Outage.
- General Response Actions
  - Assure staff is wearing proper cold weather clothing to prevent hypothermia and frostbite.
  - Non-critical routine maintenance can be temporarily halted.
  - Prior to cold weather season, stock items for frozen line repair, fuels, and equipment for emergency power. Suppliers will most likely be out of stock during cold weather.

CONTINGENCY PLAN
WATERSHED FIRE

Scenario

A massive watershed fire threatens wells, treatment facilities, and storage tanks. Local efforts cannot stop blaze.

- Wells – Wood structures/building elements may burn.
  - Turn off supply that is immediately threatened.
  - Implement Alternative Supply under the Wellhead Protection Plan if required.
  - Turn on other well to aid in fire fighting.
  - Hose down building and surrounding area.
  - Create firebreaks around building.
- Treatment Facilities/Equipment – Metal buildings subject to intense heat.
  - Create firebreaks around building.
  - Hose down facilities.
  - Avoid spraying hazardous fire retardants in the watershed.
- Storage Tanks – Threatened by high heat. Heavy demand will cause levels to drop.
  - Create firebreaks around tanks.
  - Keep tanks as full as possible to provide insulating capacity.
  - Monitor tank levels.
- Water Transmission Mains – No effect expected.
- Power Supply
  - Monitor power to chlorination facilities.
- General Response Actions
  - Keep line of communication open with Fire Department.
  - Inform emergency response personnel that the area is a watershed and fire retardants that are toxic cannot be used.

CONTINGENCY PLAN
WINDSTORM

Scenario

High winds knock down trees and block access roads.

- Wells – Buildings subject to damage by falling trees.
  - Top large trees annually that have a potential to fall on facilities.
- Treatment Facilities/Equipment – Buildings subject to damage by falling trees.
  - Inspect all chlorination facilities for damage.
  - Top large trees that have a potential to fall on facilities.
- Storage Tanks – No severe damage expected, especially when full.
  - Check roofs to assure they are securely fastened.
- Water Transmission Mains – No damage expected.
- Power Supply – Power outages may occur.
  - See Major Power Outage.
- General Response Actions
  - Equip personnel with chainsaws to check watershed after storm.
  - Keep flashlights, chainsaws, crowbars, leather gloves, etc. in stock at a location not prone to damage.

CONTINGENCY PLAN
VANDALISM

Emergency Scenario

Vandalism causes damage to the water system.

- Wells – Unlikely target of vandalism. Fencing of well areas restricts entry.
  - Maintain active presence at wells #2 and #3 to check for signs of human passage.
  - Keep pump building door and gates locked at all times.
- Treatment Facilities/Equipment – Unlikely target of vandalism. Fencing of well areas restricts entry.
  - See "Wells" above.
- Storage Tanks – Target of graffiti.
  - If graffiti is observed, paint or clean immediately to discourage its spread.
  - Keep gates and fences around tanks locked at all times.
- Water Transmission Mains – No effects expected.
  - Fire hydrants may be subject to vandalism. Inspect all hydrants regularly according to a rotating schedule.
- Power Supply – Not likely target.

CONTINGENCY PLAN – VANDALISM (Continued)

- General Response Actions
  - Visit all facilities regularly and inspect for signs of vandalism.
  - Alert Police of all vandalism.
  - Look for patterns, such as times, days of the week, and seasons when vandalism is likely to occur.
  - If problems persist, consider staking out a high-risk facility to catch perpetrators.
  - Design underground facilities in preference to aboveground facilities.
  - Keep stockpiled materials out of sight.

Notification List

For City of McCleary WWTP

Employee

Title	Name	Day Phone	Other Phone	Email
Water / Wastewater Superintendent	Vern Merryman	(360) 495 3217	(360) 520 9494	vernm@cityofmccleary.com
Treatment Plant Operator	Jon Ehresmann	(360) 495 3217	(360) 495 3199	jone@cityofmccleary.com

Local

Title	Name	Day Phone	Other Phone	Email
Hospitals	Mark Reed Hospital (McCleary)	(360) 495 3244		
Hospitals	Grays Harbor Community Hospital (Aberdeen)	(360) 537 5000		
Neighboring Systems	City of Elma	(360) 482 3151		

Media

Title	Name	Day Phone	Other Phone	Email
System Spokesperson	Busse Nutley, Director of Public Works	(360) 495 3200		bussen@cityofmccleary.com

Notification

Title	Name	Day Phone	Other Phone	Email
Fire Department	City of McCleary Fire Department	(360) 495 3667		
Police Department	City of McCleary Police Department	(360) 495 3107		
Emergency Medical Service		911		
National Spill Response Center	Chemtrec 24-hour Hotline	(800) 424 9300		
State Spill Hotline	Department of Ecology Southwest Region	(360) 407 6300		
Wastewater System Operators	Vern Merryman Water/Wastewater Superintendent	(360) 495 3217		vernm@cityofmccleary.com
Wastewater System Operators	Jon Ehresmann Treatment Plant Operator	(360) 495 3217		jone@cityofmccleary.com

Service

Title	Name	Day Phone	Other Phone	Email
Electric Utility Company	City of McCleary Light and Power	(360) 495 3863	(360) 495 4533	
Gas Utility Company	Cascade Natural Gas	(888) 552 1130		
Telephone Utility Company	CenturyTel	(800) 201 4099		
"Dig Safe" or Local Equivalent	Utilities Underground Location Center	(800) 424 5555		

State

Notification List

For City of McCleary WWTP

Title	Name	Day Phone	Other Phone	Email
Wastewater Primary Agency	Department of Ecology Southwest Region	(360) 407 6300		
Drinking Water Primary Agency	Southwest Drinking Water Operations	(360) 664 0768		
Dept. of Env. Protection	Department of Ecology Southwest Region	(360) 407 6300		
Department of Health	Department of Health	(360) 664 0768		
Emergency Mgmt. Agency	Grays Harbor County Emergency Management	(360) 249 3911		

APPENDIX O

SUGGESTED BOIL WATER NOTICE

The Office of Drinking Water (ODW) website maintains a list of publications and recommended references related to all aspects of drinking water. These are free and can be downloaded. The ODW encourages water systems to photocopy, distribute, or link to their publications. Publications are updated as new or updated information becomes available. The following is a list of publications that has been included in this Water System Plan for quick reference. The ODW publication website is:

http://www.doh.wa.gov/CommunityandEnvironment/DrinkingWater/PublicationsandForms.aspx

Publication Title	Publication Number	Last Revised / Updated
Public Health Advisory Coliform	DOH 331-179	August 2017
Troubleshooting Checklist for Coliform Contamination	DOH 331-180	May 2016
Coliform Bacteria and Drinking Water	DOH 331-181	April 2016
Responding to a Threat Against a Water System	DOH 331-183	December 2012
Follow-up to an Unsatisfactory Routine Coliform Sample	DOH 331-187	April 2016
Routine Coliform Monitoring Requirements	DOH 331-205	May 2016
Types of Coliform Violations for Group A Public Water Systems	DOH 331-206	April 2016
Coliform Distribution System Sampling Procedure	DOH 331-225	December 2015
Public Notification Helps to Protect Water Systems	DOH 331-239	January 2011
Emergency Disinfection of Small Water Systems	DOH 331-242	February 2020
Coliform Public Health Advisory Packet	DOH 331-260-1	March 2011
News Release – Boil Water Advisory	DOH 331-260-2	June 2011
News Release – Boil Water Advisory Rescinded	DOH 331-260-3	March 2011

August 2017
DOH 331-179
Revised

Questions & Answers

Public Health Advisory

E. coli

Why must I boil my water?

Recent tests show that your water system is contaminated with organisms that can cause illness.

Who can be affected? Can I become ill?

Anyone who drinks contaminated water may become ill. Infants, young children, the elderly, and people with severely compromised immune systems are more at risk of illness.

Who are people with compromised immune systems?

People who are on chemotherapy, organ or bone marrow recipients, those with HIV or AIDS, malnourished children, infants, and some of the elderly have compromised or weakened immune systems. An infection from a disease-causing organism may lead to very serious health problems for these people.

Can these diseases be spread in ways other than drinking the water?

Yes. Many of these disease-causing organisms are shed in the feces of infected people. In fact, some infected people do not have any symptoms but still shed these organisms. Childcare workers, young children who attend childcare, and caregivers for people who are sick and shedding these organisms are at the greatest risk of becoming ill. Washing hands with soap and water after using the toilet and before preparing food prevents the spread of diseases to others.

What are the symptoms to watch for?
What should I do if I think I have a waterborne illness?

Disease-causing organisms in water can cause diarrhea, stomach cramps, bloating, gas, fatigue, weight loss, nausea, vomiting, and/or fever. Symptoms may appear as early as a few hours to several days after infection and may last more than two weeks. If you are ill with these symptoms, contact your health care provider.

How can I make the water safe?

Boiling is the best way to ensure water is free of illness-causing organisms. Bring the water to a rolling boil for one minute. When it cools, refrigerate the water in clean covered containers.

If you don't want to boil your water, you can disinfect the water using household bleach. Do not use bleach that contains perfume, dyes, or other additives. Use 1/4-teaspoon bleach per gallon of water, mix thoroughly, and then let stand for 60 minutes before using.

Washington State Department of Health
Environmental Public Health
Office of Drinking Water

HELPING TO ENSURE SAFE AND RELIABLE DRINKING WATER

Can I use bottled water?

You can use purchased bottled water. If you choose to use bottled water, Department of Health recommends water that is:

- Reverse-osmosis treated.
- Distilled.
- Filtered through an "absolute" one-micron or smaller filter.

Carbonated water in cans or bottles is usually filtered or heated to remove illness-causing organisms.

During a health advisory, can I use tap water for...?

Drinking	No	Coffee or tea	No
Ice cubes	No	Showers/Baths	Yes
Brushing teeth	No	Washing clothes	Yes
Baby's formula	No	Baby's bath	See below
Washing vegetables/fruits	No	Washing dishes	See below
Preparing food	No	Pet's water bowl	Contact Veterinarian

Can I bathe my baby or child using tap water?

Yes, as long as they do not drink any of the water. Don't let babies suck on a washcloth, as they will be ingesting some of the water.

Can I wash dishes?

You can use your dishwasher if you use the sanitizing/heat cycle and commercial dishwashing detergent. You can hand wash dishes, rinse them in a diluted bleach solution—one teaspoon household bleach to one gallon of water—and then let dishes air dry.

What must be done to fix the problem?

Fixing the problem could be different in each situation depending on whether the problem is at the water source or in the water lines. Usually, in every case the water lines will need to be flushed and the whole system will need to be disinfected using chlorine. The water will then be tested to make sure it is free of coliform bacteria.

How long will this health advisory be in effect?

This health advisory will remain in effect until the water is tested and results show that it meets public health drinking water standards. Your water system will notify you when that occurs.

For more information:

Personal medical questions: Contact your health care provider (physician, nurse consultant, etc.)

Call your local health jurisdiction with general questions about infectious disease, communicable disease transmission, symptoms, causes and prevention of waterborne disease.

PUBLIC HEALTH
ALWAYS WORKING FOR A SAFER AND HEALTHIER WASHINGTON

Drinking Water Fact Sheet

Troubleshooting Checklist for Coliform Contamination

331-180 • Updated May 2016

Coliform bacteria in a water system are generally either a result of a failure to maintain a "closed" water system or a treatment failure. Visually inspect the system for "openings" and/or treatment equipment failures. Look for areas of the system where soil, leaves, insects, birds, sewage, or animal wastes could possibly get into your water system.

Check the following:

Wells

- Well casing is above the floor or ground and the area around the well is clean.
- Well has a watertight seal and a U-shaped, inverted, screened (minimum 24-mesh) vent.
- There are no openings in the well cap or casing, including around the electrical wires.
- There is no standing water around the source.
- The well is at least 100 feet from sources of contamination, such as septic tanks, drain fields, sewers, manure, or garbage.
- The well has been effectively disinfected following any well or pump repairs.
- A dug well has a watertight lid with an overhanging edge and a neoprene-type seal between the lid and the well casing.

Springs

- The collection box and the hatch or lid are watertight. The hatch has an overhanging edge and a neoprene-type seal.
- Vents are covered with an insect-proof non-corroding screen (minimum 24-mesh).
- Overflow and drain lines are screened or protected with an angle-flap valve.
- Surface water is directed away from the spring collection area by a diversion ditch.
- The spring is at least 200 feet from sources of contamination, such as septic tanks, drain fields, sewers, manure, or garbage.

Treatment

- Chlorine residual is measured and levels are adequate.
- UV system is operating correctly.

Hydropneumatic and Bladder Tanks

- Tank(s) are not waterlogged.
- Sediment has not accumulated in the tank.
- Bladders are intact and functional.

Reservoirs and Storage Tanks

- There are no openings that allow entry of surface water, debris, insects, etc.
- The access hatch has an overlapping, watertight cover and a neoprene-type seal.
- Vents are clean, directed downward, and screened (minimum 24-mesh).
- Overflow and drain lines are protected with screens or angle-flap valves and discharge above ground. The drainpipe should not be submerged in nonpotable water.
- There are no signs of dirt, insects, growth, sediment, or debris inside the tank.
- There are no cracks, leaks, or vegetative growth on the outside of the tank.

Distribution System

- There are no obvious leaks or breaks.
- The system was effectively disinfected following any construction or repair work.
- There have been no low pressure or water outage incidents.
- Non-looped, dead-end sections are regularly flushed.
- System is free of possible cross connections.

After Inspecting System

- Make needed repairs and improvements.
- Disinfect and flush the system according to DOH guidelines.
- Install sample taps at source and storage facilities, if needed.
- Establish or improve the preventive maintenance program (routine sanitary control area inspection, storage tank inspection, and distribution system flushing).

For More Information

Our publications are online at http://www.doh.wa.gov/drinkingwater.

Contact our nearest regional office from 8 a.m. to 5 p.m. Monday through Friday. If you have an after-hours emergency, call (877) 481-4901.

Eastern Region, Spokane Valley (509) 329-2100 Adams, Asotin, Benton, Chelan, Columbia, Douglas, Ferry, Franklin, Garfield, Grant, Kittitas, Klickitat, Lincoln, Okanogan, Pend Oreille, Spokane, Stevens, Walla Walla, Whitman, and Yakima counties.

Northwest Region, Kent (253) 395-6750 Island, King, Pierce, San Juan, Skagit, Snohomish, and Whatcom counties.

Southwest Region, Tumwater (360) 236-3030 Clallam, Clark, Cowlitz, Grays Harbor, Jefferson, Kitsap, Lewis, Mason, Pacific, Skamania, Thurston, and Wahkiakum counties.

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on in an alternative format, call 800.525.0127 (TDD/TTY call 711). This and other
at www.doh.wa.gov/drinkingwater.

April 2016
DOH 331-181
Revised

Questions & Answers

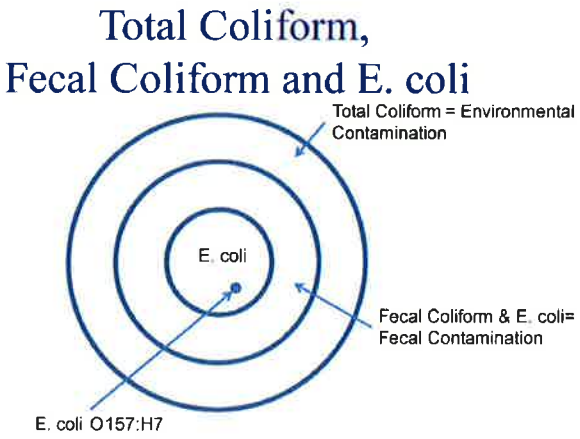
Coliform Bacteria and Drinking Water

Public water systems must deliver safe and reliable drinking water to their customers 24 hours a day, 365 days a year. If the water supply becomes contaminated, consumers can get seriously ill. Fortunately, public water systems take many steps to make sure drinking water is safe. One of the most important steps is regular testing for coliform bacteria.

What are coliform bacteria?

Coliform bacteria are present in the environment and feces of all warm-blooded animals and humans. Coliform bacteria are unlikely to cause illness. However, their presence in drinking water indicates that disease-causing organisms (pathogens) could be in the water system. Most pathogens that can contaminate water supplies come from the feces of humans or animals. Testing drinking water for all possible pathogens is complex, time-consuming, and expensive. It is easy and inexpensive to test for coliform bacteria. If testing detects coliform bacteria in a water sample, water systems search for the source of contamination and restore safe drinking water.

There are three groups of coliform bacteria. Each is an indicator of drinking water quality and each has a different level of risk. Total coliform is a large collection of different kinds of bacteria. Fecal coliform are types of total coliform that exist in feces. *E. coli* is a subgroup of fecal coliform. Labs test drinking water samples for total coliform. If total coliform is present, the lab also tests the sample for *E. coli*.



Total coliform bacteria are common in the environment (soil or vegetation) and are generally harmless. If a lab detects only total coliform bacteria in drinking water, the source is probably environmental and fecal contamination is unlikely. However, if environmental contamination can enter the system, pathogens could get in too. It is important to find and resolve the source of the contamination.

Fecal coliform bacteria are a subgroup of total coliform bacteria. They exist in the intestines and feces of people and animals.

Washington State Department of Health
Division of Environmental Health
Office of Drinking Water

HELPING TO ENSURE SAFE AND RELIABLE DRINKING WATER

E. coli is a subgroup of the fecal coliform group. Most *E. coli* bacteria are harmless and exist in the intestines of people and warm-blooded animals. However, some strains can cause illness. The presence of *E. coli* in a drinking water sample usually indicates recent fecal contamination. That means there is a greater risk that pathogens are present.

Note: *E. coli* outbreaks receive a lot of media coverage. A specific strain of *E. coli* bacteria known as ***E. coli O157:H7*** causes most of those outbreaks. When a drinking water sample is reported as "*E. coli* present," it does not mean that ***O157:H7*** is present. However, it does indicate recent fecal contamination. Boiling or disinfecting contaminated drinking water destroys all forms of *E. coli*, including *O157:H7.*

What if coliform bacteria are found in my water?

When coliform bacteria are found, water systems investigate to find out how the contamination got into the water. They collect additional water samples and often inspect the entire system. Collecting additional samples helps determine whether an actual problem exists. If the lab detects bacteria in any of the additional samples, the initial findings are "confirmed."

What if total coliform bacteria are confirmed in my water?

If a lab confirms total coliform bacteria in your drinking water, your water system must conduct an assessment to find out how the contamination got into the water. If the assessment identifies the cause of the contamination, the water system can usually correct the problem with repairs, treatment, or improved operation and maintenance practices. We help water systems resolve problems. When a lab confirms total coliform bacteria in drinking water, we recommend that the water system notify its customers as soon as possible. The notice will explain what the system is doing to correct the problem, when the problem will likely be resolved, and what customers may need to do until then.

What if *E. coli* are confirmed in my water?

Confirmation of *E. coli* in a water system indicates recent fecal contamination, which may pose an immediate health risk to anyone who consumes the water. The water system will issue a "health advisory" within 24 hours to alert all water users of a health risk associated with the water supply. The advisory usually recommends using boiled or bottled water for drinking, preparing food, and brushing teeth. It also outlines the steps underway to correct the problem and explains when the system expects to resolve the problem.

Responding to health emergencies is our highest priority. We will inspect the system as soon as possible to help the water system resolve the problem. More water samples will be collected to find and eliminate potential contamination sources, and a system not normally disinfected will most likely be chlorinated and flushed. The health advisory will remain in effect until the situation is resolved and the water is safe to drink.

For more information

Our publications are online at https://fortress.wa.gov/doh/odwpubs/

Call our nearest regional office

Northwest Region: Kent	Southwest Region: Tumwater	Eastern Region: Spokane Valley
253-395-6750	360-236-3030	509-329-2100

Fact Sheet

Responding to a threat against a water system

Guidance for Office of Drinking Water staff and water systems to use when responding to suspected vandalism or terrorism

Dec. 2012
DOH 331-183
Update

These guidelines appear in sequential order, but you can adjust the steps and actions to meet the needs of each situation. Office of Drinking Water staff and water system personnel must work closely and collaboratively when determining specific actions appropriate to any incident.

Identify the threat

- Take any suspicious activity or evidence of vandalism or sabotage seriously.
- Notify your chain of command immediately.
- Designate a response coordinator.
- Document what you see and take notes as you go.

Immediately notify officials

- Contact local law enforcement.
- Call our regional office (numbers listed on page 2). Use the after-hours number, (877) 481-4901, if necessary.
- Alert other officials needed to protect public health, such as the local health jurisdiction.

Assess and respond to the threat

- Inspect facilities, but do not disturb any evidence.
- Consult with local law enforcement to determine whether the threat is credible. If there is strong evidence of sabotage or terrorist activity, call the FBI at (206) 622-0460.
- Refer to your emergency response plan.
- Pull together a response team with expertise in the areas needed to resolve the situation.
- Determine whether there is biological or chemical contamination, or damage that disrupts supply.
- Consult with us to determine immediate actions needed to protect public health. Examples include notifying customers, isolating affected areas, shutting down critical facilities, and issuing "boil water" or "do not drink" advisories.
- See page 2 for a list of water tests to take if you suspect contamination.
- Collect samples and store them appropriately (for example, refrigerate).
- Conduct a full assessment of the situation, facilities and water quality.
- Develop a communication strategy and communicate with affected people regularly.
- If necessary, determine alternative sources of water supply for your customers.
- If appropriate, drain, clean, repair and disinfect the water system. Get professional help if necessary.

Communicate with others

- Designate one public spokesperson that is able to control his or her emotions, remain calm, stay in control, and be firm but polite.
- Identify key messages and keep them current.
- Anticipate possible questions and prepare answers ahead of time.
- Never assume what you say will be "off the record."
- Avoid assumption and blame.
- Keep your communications clear and to the point.

Consider additional water testing

Intentional contamination of drinking water falls into four categories: 1) Inorganic, such as metals or cyanide, 2) Organic, such as pesticides or volatile compounds, 3) Radionuclide, and 4) Pathogenic microbiological organisms.

Even if you suspect contamination, it is unlikely the evidence will point to a particular contaminant. Instead, you may have to decide what tests to run for contaminants. Below are possible tests and information they can give you about contaminants that may cause acute health effects.

Coliform Bacteria: This test indicates whether microbial contamination was introduced into the water system, especially from fecal origins.

Heterotrophic Plate Count (HPC): This test provides the number of bacteria that may have been introduced into the water. HPC counts greater than 500 signal the need to be wary. Very high levels (1,000 to 10,000 and greater) suggest a problem that requires immediate evaluation.

Chlorine Residual: In chlorinated water systems, this test indicates whether materials introduced into the water have created a demand for chlorine. Lower-than-normal or no residual signals the need for further evaluation.

Chlorine Demand: For water systems that do not routinely chlorinate, this test reveals unusual demands on the oxidizing capability of added chlorine. Unusual demand indicates the presence of a contaminant that warrants further investigation.

Nitrate or Nitrite: This easy test will tell you if either nitrate or nitrite is present at a level that could harm infants.

Total Organic Carbon (TOC): This test is relatively simple. Normal expected levels of TOC for surface water are 0.2 to 4 mg/L, and for groundwater 0.01 to 2.0 mg/L. Higher levels may indicate the presence of organic materials that pose a health concern.

Total Halogenated Organic Carbon (TOX): This simple test measures halogenated organic substances, including disinfection by-products such as trihalomethanes and haloacetic acids. High levels suggest contamination has occurred or that precursor organic materials have been added to enable formation of disinfection by-products.

Cyanide: Although this test is more complex, do it immediately if you suspect cyanide contamination. Cyanide is very toxic, causing rapid death upon ingestion.

Office of Drinking Water Regional Offices

Southwest Region 360-236-3030
Northwest Region 253-395-6750
Eastern Region 509-329-2100
After-hours 877-481-4901

Fact Sheet

Follow-up to an unsatisfactory routine coliform sample

April 2016
DOH 331-187
Revised

A drinking water sample is unsatisfactory whenever coliform bacteria are present. If your water system receives unsatisfactory sample results, you must collect a set of repeat samples. If your water system uses groundwater, you must also collect triggered source samples from every groundwater source that was in use when you collected the unsatisfactory routine sample. You must collect triggered source samples before treatment. If your water system has an approved triggered monitoring plan, follow your plan.

Repeat samples confirm the presence or absence of coliform bacteria in the system. If present, sample results can help you find the possible cause of contamination.

Triggered source samples indicate whether the groundwater source is contaminated with the fecal indicator *E. coli* bacteria.

You must collect repeat and triggered source samples within 24 hours after you learn about the unsatisfactory routine sample result. **Do not** shock-chlorinate the system or source before collecting any samples unless you have prior approval from us.

Review your sampling procedure

Review your sampling procedure to make sure you collect your samples correctly. For help, see *Coliform Sampling Procedure* (331-225).

Collect repeat samples

You *must* collect **THREE REPEAT** samples for every unsatisfactory ROUTINE sample. Three must come from the following locations:

1. The same tap as the original unsatisfactory routine sample.
2. An active service within 5 active connections upstream from the original unsatisfactory sample location.*
3. An active service within 5 active connections downstream from the original unsatisfactory sample location.*

You must also collect a raw water sample at each groundwater source that was in use when you collected the unsatisfactory routine sample and test it for *E. coli*.

* You may deviate from these locations if your state-approved Coliform Monitoring Plan includes one of the following:

- A standard operating procedure (SOP) for selecting alternate repeat sites.
- Defined alternate repeat site locations.

Thoroughly inspect your water system

Try to identify potential sources of contamination, such as "openings" in the system or treatment equipment failure. If you find obvious sources of contamination, call us (see below).

The month after an unsatisfactory sample

The month after an unsatisfactory routine sample, you must collect your usual number of ROUTINE samples from the distribution system.

Very small noncommunity groundwater systems not required to sample every month must collect ONE ROUTINE sample the month following an unsatisfactory sample even if they normally would not be required to collect a sample that month.

Call us if:

- You cannot sample as outlined above.
- You would like to discuss the triggered source sample requirement.
- Any repeat samples or triggered source samples are unsatisfactory.

Northwest Region: Kent	Southwest Region: Tumwater	Eastern Region: Spokane Valley
253-395-6750	360-236-3030	509-329-2100

Our publications are online at https://fortress.wa.gov/doh/eh/dw/publications/publications.cfm

PUBLIC HEALTH
ALWAYS WORKING FOR A SAFER AND HEALTHIER WASHINGTON

Fact Sheet

Routine Coliform Monitoring Requirements

May 2016
DOH 331-205
Updated

Group A public water systems must perform routine coliform monitoring. The minimum number of samples required each calendar month depends on the type of water system, the number of people served, and the sources of the water. A month's population is the total number of residential and nonresidential users. You can find the population, number of connections, and the assigned coliform monitoring schedule for your water system on your *Water Facilities Inventory* form.

A noncommunity water system serving fewer than 25 people per month that uses only protected groundwater sources may have a reduced monitoring schedule. A reduced monitoring schedule is not possible for a water system served by a surface water source or a groundwater source influenced by surface water.

This table lists the minimum number of routine samples required for community, nontransient noncommunity, and transient noncommunity water systems. If your water system serves more than 8,500 people, see the table in WAC 246-290-300.

Population Served During the Month	Routine Monthly Samples
0	0*
1 – 1,000	1
1,001 – 2,500	2
2,501 – 3,300	3
2,301 – 4,100	4
4,101 – 4,900	5
4,901 – 5,800	6
5,801 – 6,700	7
6,701 – 7,600	8
7,601 – 8,500	9

* *Monitoring is not required for a calendar month when a water system does not serve water to any consumers. If this is due to unusual circumstances, contact our regional office. If your water system remains open during a month it is normally closed, you must sample according to the above table.*

For more information:

Call your ODW regional office.

Eastern Region: Spokane 509-329-2100

Northwest Region: Kent 253-395-6750

Southwest Region: Tumwater 360-236-3030

Our publications are online at
https://fortress.wa.gov/doh/odwpubs

PUBLIC HEALTH
ALWAYS WORKING FOR A SAFER AND HEALTHIER WASHINGTON

For people with disabilities, this document is available on request in other formats. To submit a request, please call 1-800-525-0127 (TDD/TTY call 711).

Washington State Department of Health
Environmental Public Health
Office of Drinking Water

HELPING TO ENSURE SAFE AND RELIABLE DRINKING WATER

Fact Sheet

Revised Total Coliform Rule

Treatment technique triggers, violations, and public notification requirements

April 2016
DOH 331-206
Revised

The Revised Total Coliform Rule (RTCR) continues the basic monitoring requirements and objectives of the Total Coliform Rule; however, it offers greater public health protection by adding new requirements and updating others.

The Office of Drinking Water (ODW) always required water systems with microbial contamination to find and fix any maintenance or operational defect that could allow contamination to enter a water system. RTCR formalizes this process and requires water systems to submit a water system assessment report to us any time they have unsatisfactory sample results. It also assigns violations to water systems that fail to complete these tasks.

Treatment Technique Triggers

When a treatment trigger occurs, water systems must conduct an assessment to find and fix any sanitary defects. There are two assessment levels; both evaluate the entire system from the point of sample collection to the source of supply.

Don't wait for us to notify you about the treatment technique trigger. You must complete the assessment within 30 days after the trigger occurs, and submit an assessment report to us.

A Level 1 assessment is a basic system evaluation that an owner or other knowledgeable person can do. The RTCR requires a Level 1 assessment when one of these treatment technique triggers occurs:

- A system that collects fewer than 40 routine samples during the month has more than one coliform-present sample.
- A system that collects 40 or more routine samples during the month has coliform-present results in more than 5 percent of the routine and repeat samples.
- A water system fails to collect three repeat samples for every total coliform-present sample.

A Level 2 assessment is a more complex evaluation that only a state-qualified person can do. The RTCR requires a Level 2 assessment when one of these treatment technique triggers occurs:

- A water system has an *E. coli* MCL violation (see page 2).
- A water system incurs a second treatment technique trigger in a rolling 12-month period.

3 parts of a Level 1 or Level 2 assessment

- **Evaluation:** Identify any sanitary defect that allowed coliform to enter the distribution system or failure or imminent failure of an existing barrier.
- **Discussion:** Discuss what you identified during the assessment that might allow contamination to occur and the corrective action needed to fix it.
- **Corrective action:** Record the steps you took or will take to fix the sanitary defect that allowed the contamination to occur.

Violations

Violations under the RTCR usually indicate a failure to act. Water systems should prepare themselves to follow the rule requirements to protect the safety of their water supply.

Public Notification Requirements
Tier 1: Issued within 24 hours
Tier 2: Issued within 30 days
Tier 3: Issued within 1 year

Treatment Technique Violation

A treatment technique violation indicates the water system failed to act or respond as required. When a treatment technique violation occurs, a system must provide **Tier 2 public notification** to its customers. A coliform treatment technique violation occurs when one of the following occurs:

- A water system fails to conduct or fully complete a required Level 1 or Level 2 Assessment within 30 days of the treatment technique trigger.
- A system fails to correct any sanitary defect by taking required corrective action within the required timeframe.
- A seasonal system fails to complete an ODW-approved start-up procedure and submit a certificate of completion prior to serving water at the start of its season.

E. coli MCL Violation

If a system incurs an *E.coli* MCL violation, it must perform a **Level 2 assessment** and provide **Tier 1 public notification** to its customers. RTCR requires public notice within 24 hours after receiving confirmation of an *E. coli* MCL violation. There are four ways a system can have an *E. coli* MCL violation:

1. A total coliform-present repeat sample follows an *E. coli*-present routine sample.
2. An *E. coli*-present repeat sample follows a total coliform-present routine sample.
3. The lab fails to test a total coliform-present repeat sample for *E. coli.*
4. The system fails to take three repeat samples following an *E. coli*-present routine sample.

Monitoring Violation

A water system that incurs a monitoring violation must provide **Tier 3 public notification** to its customers. A monitoring violation occurs when:

- A system fails to collect all routine samples.
- A system fails to have each total coliform-present routine sample analyzed for *E.coli.*

Reporting Violation

A water system that incurs a reporting violation must provide **Tier 3 public notification** to its customers. A reporting violation occurs when:

- A system fails to submit a monitoring report or completed assessment form to ODW in a timely manner.
- A system fails to notify ODW of an *E. coli*-present sample in a timely manner.
- A seasonal system fails to submit to ODW a certificate of completion of an approved start-up procedure before serving water to consumers.

For more information:

Call our regional office.

Eastern Region: Spokane Valley (509) 329-2100
Northwest Region: Kent (253) 395-6750
Southwest Region: Tumwater (360) 236-3030

PUBLIC HEALTH
ALWAYS WORKING FOR A SAFER AND HEALTHIER WASHINGTON

Our publications are online at https://fortress.wa.gov/doh/eh/dw/publications/publications.cfm

Coliform Sampling Procedure

We recommend that you follow these steps when collecting your sample. If instructions from your lab are different, please call us for clarification.

Most sample kits contain a:

- Sample bottle
- Lab slip
- Rubber band

Protect the sample bottle from contamination before and after sampling. Don't rinse it and don't expose it to direct sunlight, heat, or unsanitary conditions.

A model sampling station in Kent.

For More Information

If you have questions about coliform sampling procedures, call our regional office:

Eastern Region
Spokane Valley
509-329-2100

Northwest Region
Kent
253-395-6750

Southwest Region
Tumwater
360-236-3030

Our publications are online at https://fortress.wa.gov/doh/eh/dw/publications/publications.cfm

Related Publications

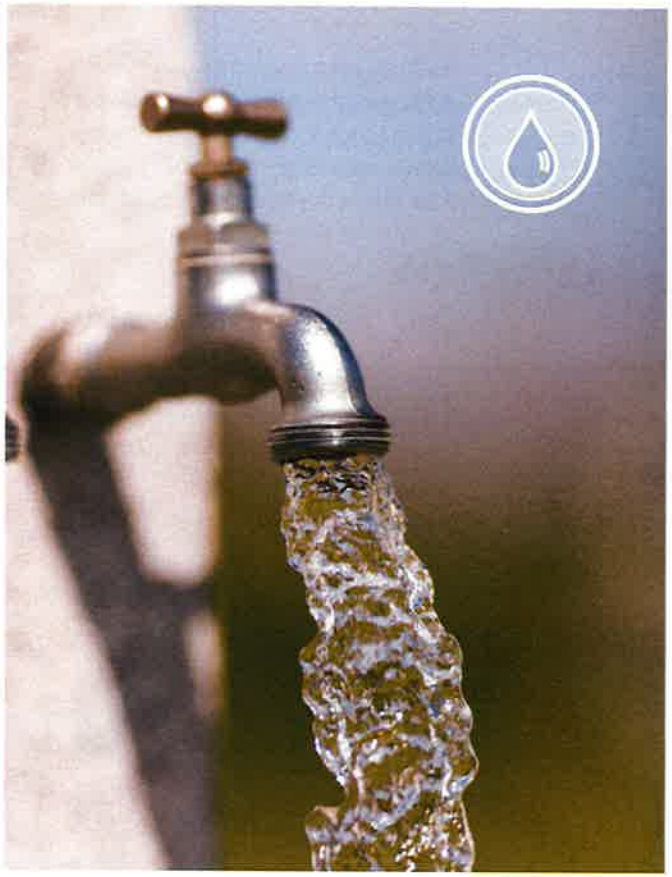
Revised Total Coliform Rule (331-556):
An explanation of the federal Revised Total Coliform Rule, including explanations of key terms, assessments, and violations of the rule.

General Sampling Procedure (331-219):
An overveiw of how to sample water in your system, including explanations of best practices and key terms.

Washington State Department of Health
Environmental Public Health
Office of Drinking Water

DOH PUB #331-225
December 2015

If you need this publication in an alternative format, call 800.525.0127 (TDD/TTY call 711). This and other publications are available at www.doh.gov/eph/dw.



Coliform Sampling Procedure

Step One

Follow your Coliform Monitoring Plan to collect routine, repeat, and raw source samples from sites throughout the distribution system. You must collect raw source samples from sites prior to all treatment and close to the source while the source pump is running.

Sample taps should represent the water in your distribution system. Avoid poor sample sites such as swivel faucets, hot and cold mixing faucets (with a single lever), leaky or spraying faucets, drinking fountains, janitorial sinks, frost-free hose bibs, and faucets below or near ground level.

Step Two

Remove any attachments from the faucet, including aerators, screens, washers, hoses, and water filters. If you choose to disinfect the sample site before collecting the sample, be sure to flush the site thoroughly to remove all disinfectant.

Step Three

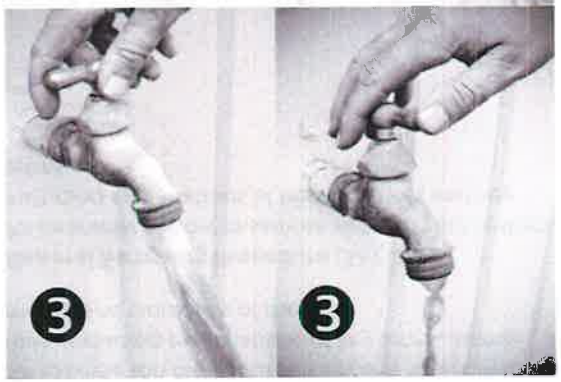
Turn on the cold water only and let it run with a steady stream for at least five minutes. Before collecting the sample, turn the water down to a thin stream (about the width of a pencil), then let the water run one minute. If you chlorinate your system, measure the free chlorine residual and note the measurement on the lab slip.

Step Four

There may be some liquid or powder in the sample bottle to neutralize chlorine. Do not rinse it out.

Step Five

To avoid contamination while taking the sample, hold the bottle near the bottom with one hand, hold the top of the cap with the other, and then unscrew the cap.



Do not set the cap down, touch any part of the cap that touches the bottle, or let anything touch the rim of the bottle or the inside of the cap.

Step Six

Hold the bottle under the stream of water. Be careful not to let the bottle touch the sample tap. Fully fill the bottle to the neck or indicated fill line. Don't allow it to overflow. Remove the bottle from the water flow and carefully screw the cap back on.

Step Seven

Complete the lab slip. If there was anything unusual about the sample collection, note it on the lab slip.

Lab forms vary. It is important to include at least the following information:

- Collection date and time
- System type (Group A or B)
- Water system ID number
- Water system name
- Contact information
- Sample location (street address or other location identifier)
- Type of sample (check ONLY ONE Type: Routine, Repeat, Raw, or For Information Only)
- Chlorine residual—even if it's zero.

Step Eight

Secure the lab slip to the bottle with the rubber band. Deliver the sample to a certified lab or a designated drop-off location for the lab as soon as possible. Lab analysis must begin within 30 hours after you collect your sample.

Fact Sheet

Public notification helps to protect public health

Jan. 2011
DOH 331-239 (Rev.)

Water systems must deliver safe and reliable drinking water to their customers 24 hours a day, 365 days a year. If the drinking water supply becomes contaminated, many people could get seriously ill or die. Therefore, state and federal laws require water systems to notify their customers any time a problem with drinking water poses a health risk.

Our highest priority is responding to drinking water emergencies. We work hand-in-hand with water systems to resolve problems. Notifying water system customers when their water may not be safe to drink, gives them time to protect themselves and their families.

Public notification rule

Public notification requirements help ensure customers know—as soon as possible—if a situation poses a public health risk. This rule applies to all Group A public water systems. Group A water systems serve 15 or more service connections or 25 or more people per day for 60 or more days per year.

Group A public water systems must notify their customers whenever they:

- Violate drinking water quality or monitoring requirements.
- Operate under a variance or exemption.
- Have any situation that poses a public health risk, such as a disruption in service.
- Receive an order from the Office of Drinking Water (ODW).
- Fail to comply with an ODW order.
- Receive a red operating permit.

Public notification requirements also give water systems an opportunity to educate their customers about drinking water quality and build trust by sharing information openly. Notices used in this positive way can help customers understand the basis for rate increases necessary for additional drinking water treatment and protection.

Public notification timing and distribution requirements

Notifying customers in a timely manner about actual or potential threats related to their drinking water allows them to make informed decisions affecting their health. Public notification timing and distribution requirements depend on the level of threat associated with the violation or event.

Tier 1: Acute health concerns require notification within 24 hours.

Tier 2: Chronic health concerns require notification within 30 days.

Tier 3: Reporting and monitoring violations require notification within 365 days.

You must send us a copy of all public notifications and the appropriate public notice certification.

Other aspects of the public notification rule

Water systems may combine notices for individual violations into their annual Consumer Confidence Reports, as long as they meet the public notification timing requirements.

This rule, including the following, is in the publication ***Group A Public Water Supplies: Chapter 246-290 WAC* (331-010)***. See Part 7, Reporting, Subpart A.

- A list of violations and situations that require 24-hour notification.
- Simplified health effects language.
- Standard language for monitoring violations.

Technical assistance

You can access public notification forms at
http://www.doh.wa.gov/ehp/dw/forms/forms.htm#Public_Notification

***Our publications are online at** https://fortress.wa.gov/doh/eh/dw/publications/publications.cfm

We also provide links to the following U.S. Environmental Protection Agency publications:

- ***Public Notification Handbook*** (816-R-09-013), March 2010.
- ***Public Notification Handbook for Transient Noncommunity Water Systems*** (816-R-09-009), March 2010.

You can call our regional offices for technical assistance.
We are open 8 a.m. to 5 p.m. Monday through Friday. If you have an after-hours emergency, call (877) 481-4901.

Eastern Region, Spokane Valley (509) 329-2100
Serving Adams, Asotin, Benton, Chelan, Columbia, Douglas, Ferry, Franklin, Garfield, Grant, Kittitas, Klickitat, Lincoln, Okanogan, Pend Oreille, Spokane, Stevens, Walla Walla, Whitman, and Yakima counties.

Northwest Region, Kent (253) 395-6750
Serving Island, King, Pierce, San Juan, Skagit, Snohomish, and Whatcom counties.

Southwest Region, Tumwater (360) 236-3030
Serving Clallam, Clark, Cowlitz, Grays Harbor, Jefferson, Kitsap, Lewis, Mason, Pacific, Skamania, Thurston, and Wahkiakum counties.

More detailed contact information is online at
http://www.doh.wa.gov/ehp/dw/Staff_Lists/dwnames.htm

Emergency Response and Drinking Water Safety

Emergency Disinfection of Small Water Systems

331-242 • Revised 2/17/2020

You should provide emergency disinfection when:

- Your water system loses pressure for any reason.
- You open up any part of your water system for maintenance or repairs.
- A cross-connection event occurs.
- Your water system is contaminated with coliform bacteria.

Before you disinfect, collect all required repeat and Groundwater Rule samples following an unsatisfactory routine result. If you're not sure how to proceed, contact our regional coliform staff.

Notify your customers first

If you usually don't disinfect your water, notify all your customers first. Water with high chlorine levels can harm people with unique medical needs, such as kidney dialysis patients. All water systems should keep a list of people with unique medical needs. People with aquariums or fishponds also need to know before you chlorinate the water.

Disinfecting a well

1. Use **Table 1** to calculate the volume of water in the well. You must know the total well depth and the static water level depth (water level when the pump is off). Subtract the static water depth from the total well depth to get the well's water depth.
2. Use **Table 2** (next page) to calculate how much chlorine to add to the well (see "Notes related to the tables" on page four).
3. Put the required amount of bleach into a five-gallon bucket of water. Pour the bucket of chlorine solution down the inside of the well.
4. Connect a garden hose **that has never been used** to the nearest outside faucet and circulate the water through the hose and back into the well. This will mix the chlorine with the water and the pump will draw the chlorine to the bottom of the well.
5. When you start to smell chlorine in the water coming out of the hose, use the hose to rinse the upper part of the well casing with disinfectant.

Table 1: Calculating Well Volume

Well Casing Diameter	Volume of Water per Vertical Foot
6 inches	1.5 gallons
8 inches	2.6 gallons
10 inches	4.1 gallons
12 inches	5.9 gallons
14 inches	8 gallons
16 inches	10 gallons
36 inches	53 gallons

Table 2: Chlorine bleach needed for well disinfection						
	Desired Dose Household-Strength 6% Bleach		Desired Dose Household-Strength 8.25% Bleach		Desired Dose Commercial-Strength 12% Bleach	
Well Volume	**5 mg/L**	**20 mg/L**	**5 mg/L**	**20 mg/L**	**5 mg/L**	**20 mg/L**
50 Gallons	1 Tbsp.	5 Tbsp.	1 Tbsp.	3 Tbsp.	½ Tbsp.	2 Tbsp.
100 Gallons	2 Tbsp.	9 Tbsp.	2 Tbsp.	6 Tbsp.	1 Tbsp.	4 Tbsp.
200 Gallons	4 Tbsp.	1 Cup	3 Tbsp.	¾ Cup	2 Tbsp.	9 Tbsp.
500 Gallons	11 Tbsp.	2 ¾ Cups	½ Cup	2 Cups	5 Tbsp.	1 ¼ Cups
1,000 Gallons	1 ¼ Cups	5 ¼ Cups	1 Cup	4 Cups	11 Tbsp.	2 ¾ Cups

Disinfecting water in pressure tanks

You must disinfect the water in your pressure tanks, especially if you are responding to a coliform incident or other known contamination event. Drain the water from each tank and refill it with chlorinated water from your well or storage tank, which depends on your water system's layout. The chlorinated water should remain in the tank at least six hours (24 hours preferred). Drain or flush the chlorinated water from the tank and refill it with untreated water. Draining can affect air pressure, so you may need to recharge the air in pressure tanks.

Disinfecting a storage tank and distribution system

If you must chlorinate your source and your storage tank, disinfect the source first.

1. If the contamination doesn't appear to be from the water source, you can add disinfectant just to the storage tank rather than the water source.
2. Use **Table 3** to determine the amount of chlorine needed to disinfect the storage tank. As a general rule:
   a. A chlorine dose of 1 to 2 mg/L is usually sufficient for a coliform incident or if you suspect contamination from pressure loss during a power outage.
   b. Larger chlorine doses may be required to address a bacteriological cross-connection event, flooding of water system facilities, or an *E. coli* MCL violation. Please consult with our regional office in these cases.

   See "Notes related to the tables" on page four. If you have an extensive distribution system, calculate the volume of water in the distribution piping and add it to the storage tank volume. Use that total volume in **Table 3** to determine how much chlorine to add to the storage tank.

   Table 4 shows common water distribution main sizes and volumes per foot of pipe. Estimate total length of water pipes in your water system and multiply the total by the appropriate value from the table. Use as-built drawings of the water system or a map to help estimate pipe diameters and lengths.
3. Draw down the water level in the storage tank, but keep enough for fire flow, if required.
4. As the tank refills, pour the chlorine in so it mixes.

Table 3: Chlorine Bleach Needed to Disinfect a Storage Tank									
	Desired Dose Household-Strength 6% Bleach			Desired Dose Household-Strength 8.25% Bleach			Desired Dose Commercial-Strength 12% Bleach		
Tank Volume (Gallons)	1 mg/L	5 mg/L	10 mg/L	1 mg/L	5 mg/L	10 mg/L	1 mg/L	5 mg/L	10 mg/L
5,000	1 ¼ Cups	6 ¾ Cups	13 ½ Cups	1 Cup	4 ¾ Cups	9 ¾ Cups	11 Tbsp.	3 ¼ Cups	6 ¾ Cups
10,000	2¾ Cups	13½ Cups	1 ¾ Gals.	2 Cups	9 ¾ Cups	1 ¼ Gal.	1 ¼ Cups	6 ¾ Cups	13 ½ Cups
20,000	5 ¼ Cups	1 ¾ Gals.	3 ½ Gals.	4 Cups	1 ¼ Gal.	2 ½ Gals.	2 ¾ Cups	13 ½ Cups	1 ½ Gals.
50,000	13 ½ Cups	4 ¼ Gals.	8 ¼ Gals.	9 ¾ Cups	3 Gals.	6 Gals.	6 ¾ Cups	2 Gals.	4 ¼ Gals.
100,000	1 ¾ Gals.	8 ¼ Gals.	16 ¾ Gals.	1 ¼ Gal.	6 Gals.	12 ¼ Gals.	13 ½ Cups	4 ¼ Gals.	8 ¼ Gals.

5. Use a blowoff, fire hydrant, or other outside faucet to draw chlorinated water from the tank into the distribution system. Then flush water from all faucets in the water system until you detect chlorinated water. You will probably smell the chlorine but, to be accurate, use a chlorine test kit to measure chlorine residual.
6. Allow the chlorine to remain in the water system at least six hours (24 hours preferred). It takes time for chlorine to disinfect effectively.
7. Replace the chlorinated water with chlorine-free water from your source by using outside faucets, blowoffs, or hydrants to draw water out of the water system. During this process, make sure you don't damage a pump by drawing water down below pump intake. Never discharge chlorinated water into any water body, wetland, or drainage ditch because it is extremely toxic to fish. You must dechlorinate the water prior to discharge. Depending on the chlorine levels in the water, you also may use normal water usage to replace the chlorinated water more slowly with chlorine-free water.
8. Wait at least seven days before collecting a coliform sample—or until you know there is no chlorine remaining in the water.* The coliform sample result will indicate whether disinfection was effective.

   If you are disinfecting in response to an *E. coli* MCL violation, work with staff from our regional office to determine when coliform sampling should occur relative to chlorination and flushing.

   When you collect a coliform sample, measure the chlorine residual and note the level on the lab slip. If you collect a coliform sample in follow-up to emergency disinfection, a measure of zero chlorine residual is worth noting on the lab slip.

**If you are using a chlorine residual test kit, and you can measure zero free chlorine residual throughout the water system sooner than seven days after the disinfection, you may collect coliform samples at that time.*

Disinfecting a distribution system that has no storage tank

Some water systems use a well pump and pressure tank to provide water and have no storage tanks. If the volume of water in the distribution system exceeds the volume of water in the well, only partially disinfected water may reach parts of the distribution system when you attempt to bring chlorinated water from the well into the system.

Use **Table 4** to estimate the volume of water in your distribution system. After disinfecting the well and pressure tanks, draw chlorinated water into the farthest part of the distribution system (Step 5). Then immediately re-disinfect the well and draw chlorinated water into the distribution system closest to the well. Measure the chlorine residual with a chlorine residual test kit to make sure you have enough chlorine everywhere in the water system. Now follow steps 6 through 8.

Table 4: Estimated Volume of Water in the Distribution System

Pipe Diameter	Volume Per Linear Foot of Pipe	Volume Per 100 Feet of Pipe
1 Inch	0.04 Gallon	4 Gallons
2 Inches	0.16 Gallon	16 Gallons
4 Inches	0.65 Gallon	65 Gallons
6 Inches	1.47 Gallons	147 Gallons

For more information

Contact our nearest regional office from 8 AM to 5 PM, Monday through Friday. If you have an after-hours emergency, call 877-481-4901.

Eastern Region, Spokane Valley 509-329-2100

Northwest Region, Kent 253-395-6750

Southwest Region, Tumwater 360-236-3030

Our publications are online at doh.wa.gov/drinkingwater.

American Water Works Association (AWWA) references to help you disinfect water system facilities.

- AWWA Standard C654-13, "Disinfection of Wells"
- AWWA Standard C651-14, "Disinfecting Water Mains"
- AWWA Standard C652-11, "Disinfection of Water-Storage Facilities"

These AWWA standards assume the well, storage tank, or other component is isolated from the rest of the water system during disinfection. For that reason, AWWA cites much higher chlorine doses than those listed in this publication. Do not use high doses if there is a chance that any water system user could consume, or otherwise use, the water.

Notes related to the tables

Volumes calculated for Tables 2 and 3 have been rounded for your ease of use in the field. Use the equations below if a higher degree of accuracy is desired. Contact the Office of Drinking Water if in need of assistance.

Volume of bleach needed, $V_1 = (C_2 \times V_2) / C_1$, in gallons, where:

C_2 = desired chlorine dose, ppm

V_2 = the volume water to be treated, gallons
C_1 = the concentration of the bleach solution, ppm

To calculate the bleach required for volumes not in the tables
Add the volumes together (for 150 gallons, add the required bleach for 100 gallons to that needed for 50 gallons); or extrapolate between values on the table.

Well volume = 7.48 x H x 3.14 x $(D/12)^2$ / 4, in gallons, where:
H = the height of water standing in the well, in feet
D = the well casing diameter, in inches

6 percent bleach = 60,000 parts per million (ppm) hypochlorite
8.25 percent household bleach = 82,500 ppm hypochlorite
12 percent bleach = 120,000 ppm hypochlorite
1 cubic foot of water = 7.48 gallons
1 gallon = 16 cups
1 cup = 16 tablespoons or 8 fluid ounces
1 Tablespoon (Tbsp.) = ½ fluid ounce (14.8 mL)

March 2011

DOH 331-260-1

Coliform
Public Health Advisory Packet

We developed this packet to provide the tools you will use to manage fecal contamination in your water supply. We will work closely with you to help you identify the source of contamination, eliminate it, and determine if you need to issue a public health advisory.

You can get an electronic version of this packet—including all the templates and forms listed below —at http://www.doh.wa.gov/ehp/dw/Coliform/coliform.htm

Publications	Pub #
Public Health Advisory: Coliform Questions & Answers	331-179 *
Coliform Bacteria and Drinking Water Fact Sheet	331-181
Troubleshooting Checklist for Coliform Contamination Fact Sheet	331-180
Emergency Disinfection of Small Systems	331-242

Publications	Pub #
Emergency Water Supply Guidelines for Food Services Establishments Fact Sheet	331-182 *
Drinking Water After-Hours Emergency Hotline Brochure	331-133
Treatment of Drinking Water For Emergency Use Brochure	331-115
Office of Drinking Water authority over operators and water systems Fact Sheet	331-449

* Publication also available in Spanish.

Templates and Forms	Pub #
Boil Water Door Hanger (English and Spanish)	None
Coliform Public Notice Certification Form	331-264
Drinking Water Warning for community water systems	None

Templates and Forms	Pub #
News Release Template: Boil Water Advisory	331-260-2
News Release Template: Rescinding Boil Water Advisory	331-260-3
Drinking Water Warning for noncommunity water systems	None

Public Notification Templates and Forms

Page 2 has information and instructions on using the coliform public notification templates and forms.

Washington State Department of Health

Division of Environmental Health
Office of Drinking Water

HELPING TO ENSURE SAFE AND RELIABLE DRINKING WATER

Public notification templates and forms

You can choose from the *Drinking Water Warning* template or the *Door Hanger* template to provide public notice to your customers in an emergency. You must distribute one or both of these templates to all of your customers within 24 hours in the event of an acute maximum contaminant level (MCL) violation or other emergency that requires a health advisory.

1. ***Drinking Water Warning:*** This public notice template provides detailed information about health effects and instructions for your customers. You can download templates for community and noncommunity water systems in Microsoft Word or PDF from our website.*

   You can use the Drinking Water Warning template to notify your customers in response to an *E. coli* or fecal coliform positive sample result. You may reformat this template, but the content must remain the same. Type or write all the information required to complete the template. Next, copy it on brightly colored paper and distribute it to all of your customers.

2. ***Door hanger:*** Use this template to inform your customers of contamination in the system and precautions they can take. Door hangers include information in English and Spanish. You can get door hangers from our regional offices, your local health office, or our website.*

   Ways to use door hangers to inform customers quickly during a public health advisory:

   - Write information on each door hanger.
   - Fill in the top portion of the door hangers. Then print labels with the water system name, ID#, county, contact person's name and phone number, and the date you distribute the notice. Attach a label to the bottom of each notice.
   - Complete the Drinking Water Warning template, make photocopies, and then staple a copy to the door hanger. This will draw attention to the notice.

Coliform Public Notice Certification Form (331-264): You must complete this form and mail it to our regional office, along with a copy of the public notice you gave to your customers, within 10 days after notifying your customers about an acute MCL violation.

News Releases: We sometimes advise systems serving more than 100 connections to use a news release to communicate with customers through the news media. These templates will help you present information in a format suitable for the media. Visit our website for electronic copies of these news releases.* If you need help contacting the media, call our nearest regional office.

- **Boil Water Advisory** (331-260-2): Send at the start of a boil water advisory. Gives advice to customers and explains what you're doing to resolve the problem.
- **Rescinding Boil Water Advisory** (331-260-3): Send at the end of a boil water advisory.

***Template available online at http://www.doh.wa.gov/ehp/dw/Coliform/coliform.htm**

For more information

Most of our publications are online at http://www.doh.wa.gov/ehp/dw/default.htm

If you have questions, call our regional office at:

Spokane Valley (509) 329-2100	Kent (253) 395-6750
Tumwater (360) 236-3030	After-hours Emergency (877) 481-4901

Your logo or company name here.

News Release

For Immediate Release: <DATE>
Contact: Water purveyor/system contact name and telephone number

<Water System> announces boil water advisory for all customers in <area>

CITY NAME – The <SYSTEM NAME> is advising all water customers to boil their drinking water after recent samples showed the presence of *E. coli*. The Washington State Department of Health (DOH) has been notified and <SYSTEM NAME> is working closely with the Office of Drinking Water to find the source of contamination and fix the problem, which may include disinfecting the system. The boil water advisory will remain in effect until further notice.

(Sample quote) "We are doing all we can to eliminate the bacteria from the water system. Safe and reliable drinking water is critical to good health and responding to this kind of emergency is our highest priority," said <System spokesperson>.

<NUMBER or NO> illnesses related to the community's drinking water have been reported. To correct the problem <WHAT IS BEING DONE> (e.g. Chlorine was applied to the entire system on DATE.)

The boil water advisory includes several precautionary steps for customers. These include using purchased bottled water or boiled water for drinking, brushing teeth, dishwashing, preparing food, and making ice. Water should come to a roiling boil for one minute, then cool to an appropriate temperature before using.

The advisory will remain in effect until <SYSTEM NAME> and DOH are confident the water is safe. When satisfactory results are reported, customers will be notified that the advisory has been lifted.

If you have questions, please call us at <TELEPHONE NUMBER>.

###

Your logo or company name here.

News Release

For Immediate Release: <DATE>

Contact: Water purveyor/system contact name and telephone number

<Water System Name> Boil Water Advisory Rescinded

CITY NAME – Customers of <SYSTEM NAME> no longer need to boil their drinking water. Recent test samples show the absence of *E. coli* bacteria.

<SAMPLE QUOTE> "Working with the Washington State Department of Health over the last <NUMBER OF > days, we have completed inspections, water quality sampling, disinfection, and flushing to resolve the contamination problem," stated <NAME OF WATER SYSTEM MANAGER>. "We're pleased to be able to lift the boil water advisory."

The inspection of the water system indicated <DESCRIPTION OF SOURCE OF CONTAMINATION, if known, and what will be done to maintain good water quality>

If you have shut off or not used fixtures, water fountains, ice machines, soda machines, and/or other equipment over the past several days, flush the fixture or equipment until there is a change in water temperature before putting it back into service.

The <SYSTEM NAME> encourages customers with questions to call <TELEPHONE NUMBER>.

###

APPENDIX P

DETAILED COST ANALYSES
(CAPITAL IMPROVEMENT PLAN)

CITY OF MCCLEARY
PRELIMINARY COST ESTIMATE
PROJECT SO-1B: DRILL AND EQUIP NEW 500 GPM WELL

NO.	DESCRIPTION	QUANTITY	UNIT PRICE	AMOUNT
1	Mobilization and Demobilization	1 LS	$ 50,000.00	$ 50,000.00
2	Locate Existing Utilities	1 LS	$ 1,500.00	$ 1,500.00
3	Trench Excavation Safety System	1 LS	$ 2,000.00	$ 2,000.00
4	Special Excavation of Unsuitable Material	20 CY	$ 35.00	$ 700.00
5	Sitework	1 LS	$ 10,000.00	$ 10,000.00
6	Erosion Control	1 LS	$ 1,500.00	$ 1,500.00
7	Foundation Material	75 TN	$ 30.00	$ 2,250.00
8	Crushed Surfacing Top Course	620 TN	$ 35.00	$ 21,700.00
9	Hot Mix Asphalt Repair	60 TN	$ 210.00	$ 12,600.00
10	Sawcutting	400 LF	$ 2.00	$ 800.00
11	Top Soil	50 CY	$ 25.00	$ 1,250.00
12	Restoration	1 LS	$ 1,000.00	$ 1,000.00
13	Control Density Fill	10 CY	$ 30.00	$ 300.00
14	Well Building	1 LS	$ 50,000.00	$ 50,000.00
15	Drill New Well, 100-foot Depth	1 LS	$ 111,000.00	$ 111,000.00
16	Equip New Well	1 LS	$ 50,000.00	$ 50,000.00
17	Sodium Hypochlorite Feed System	1 LS	$ 15,000.00	$ 15,000.00
18	Piping, Valves and Appurtenances	1 LS	$ 60,000.00	$ 60,000.00
19	Additional Fittings	750 LBS	$ 3.00	$ 2,250.00
20	Electrical, Telemetry, and Instrumentation	1 LS	$ 120,000.00	$ 120,000.00
21	Electrical Service	1 LS	$ 15,000.00	$ 15,000.00

Subtotal:	$ 528,850.00
Sales Tax (8.8%)	$ 46,538.80
Subtotal:	$ 575,388.80
Contingency (20%):	$ 114,611.20
TOTAL ESTIMATED CONSTRUCTION COST:	$ 690,000.00
Engineering and Administrative Costs (25%):	$ 173,000.00
R.O.W. and/or Easement Acquisition:	$ -
TOTAL ESTIMATED PROJECT COST (2018 Dollars):	$ 863,000.00

CITY OF MCCLEARY
PRELIMINARY COST ESTIMATE
PROJECT D-1: ASH STREET

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Mobilization/Demobilization (10%)	1 LS	$ 4,000.00	$ 4,000.00
2	Trench Excavation Safety Systems	1 LS	$ 1,000.00	$ 1,000.00
3	Erosion Control (2%)	1 LS	$ 1,000.00	$ 1,000.00
4	Locate Existing Utilities (2%)	1 LS	$ 1,000.00	$ 1,000.00
5	8-inch PVC Water Pipe, Including Fittings	250 LF	$ 55.00	$ 13,750.00
6	Additional Pipe Fittings	100 LB	$ 3.00	$ 300.00
7	8-inch Gate Valves	3 EA	$ 1,250.00	$ 3,750.00
8	Fire Hydrants	1 EA	$ 5,000.00	$ 5,000.00
9	Connections to Existing	1 EA	$ 2,500.00	$ 2,500.00
10	Service Connections	3 EA	$ 1,500.00	$ 4,500.00
11	Gravel Backfill	170 TN	$ 16.50	$ 2,805.00
12	Foundation Gravel	10 TN	$ 35.00	$ 350.00
13	Asphalt Concrete Pavement Repair	30 TN	$ 210.00	$ 6,300.00
14	Cold Mix Asphalt	10 TN	$ 200.00	$ 2,000.00
15	Crushed Surfacing, Top Course	20 TN	$ 35.00	$ 700.00
16	Surface Restoration	0 SY	$ 5.50	$ -

Subtotal:	$ 48,955.00
Sales Tax (8.8%)	$ 4,308.04
Subtotal:	$ 53,263.04
Contingency (20%):	$ 10,736.96
TOTAL ESTIMATED CONSTRUCTION COST:	$ 64,000.00
Engineering and Administrative Costs (25%):	$ 16,000.00
R.O.W. and/or Easement Acquisition:	$ -
TOTAL ESTIMATED PROJECT COST (2018 Dollars):	$ 80,000.00

CITY OF MCCLEARY
PRELIMINARY COST ESTIMATE
PROJECT D-2: 9TH STREET

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Mobilization/Demobilization (10%)	1 LS	$ 8,000.00	$ 8,000.00
2	Trench Excavation Safety Systems	1 LS	$ 1,000.00	$ 1,000.00
3	Erosion Control (2%)	1 LS	$ 1,500.00	$ 1,500.00
4	Locate Existing Utilities (2%)	1 LS	$ 1,500.00	$ 1,500.00
5	8-inch PVC Water Pipe, Including Fittings	500 LF	$ 55.00	$ 27,500.00
6	Additional Pipe Fittings	150 LB	$ 3.00	$ 450.00
7	8-inch Gate Valves	7 EA	$ 1,250.00	$ 8,750.00
8	Fire Hydrants	2 EA	$ 5,000.00	$ 10,000.00
9	Connections to Existing	2 EA	$ 2,500.00	$ 5,000.00
10	Service Connections	4 EA	$ 1,500.00	$ 6,000.00
11	Gravel Backfill	330 TN	$ 16.50	$ 5,445.00
12	Foundation Gravel	30 TN	$ 35.00	$ 1,050.00
13	Asphalt Concrete Pavement Repair	50 TN	$ 210.00	$ 10,500.00
14	Cold Mix Asphalt	20 TN	$ 200.00	$ 4,000.00
15	Crushed Surfacing, Top Course	50 TN	$ 35.00	$ 1,750.00
16	Surface Restoration	0 SY	$ 5.50	$ -

Subtotal:	$ 92,445.00
Sales Tax (8.8%)	$ 8,135.16
Subtotal:	$ 100,580.16
Contingency (20%):	$ 20,419.84
TOTAL ESTIMATED CONSTRUCTION COST:	$ 121,000.00
Engineering and Administrative Costs (25%):	$ 30,000.00
R.O.W. and/or Easement Acquisition:	$ -
TOTAL ESTIMATED PROJECT COST (2018 Dollars):	$ 151,000.00

CITY OF MCCLEARY
PRELIMINARY COST ESTIMATE
PROJECT D-3: PINE STREET

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Mobilization/Demobilization (10%)	1 LS	$ 8,000.00	$ 8,000.00
2	Trench Excavation Safety Systems	1 LS	$ 1,000.00	$ 1,000.00
3	Erosion Control (2%)	1 LS	$ 1,500.00	$ 1,500.00
4	Locate Existing Utilities (2%)	1 LS	$ 1,500.00	$ 1,500.00
5	8-inch PVC Water Pipe, Including Fittings	360 LF	$ 55.00	$ 19,800.00
6	Additional Pipe Fittings	100 LB	$ 3.00	$ 300.00
7	8-inch Gate Valves	8 EA	$ 1,250.00	$ 10,000.00
8	Fire Hydrants	2 EA	$ 5,000.00	$ 10,000.00
9	Connections to Existing	2 EA	$ 2,500.00	$ 5,000.00
10	Service Connections	10 EA	$ 1,500.00	$ 15,000.00
11	Gravel Backfill	240 TN	$ 16.50	$ 3,960.00
12	Foundation Gravel	20 TN	$ 35.00	$ 700.00
13	Asphalt Concrete Pavement Repair	40 TN	$ 210.00	$ 8,400.00
14	Cold Mix Asphalt	20 TN	$ 200.00	$ 4,000.00
15	Crushed Surfacing, Top Course	30 TN	$ 35.00	$ 1,050.00
16	Surface Restoration	0 SY	$ 5.50	$ -

Subtotal:	$ 90,210.00
Sales Tax (8.8%)	$ 7,938.48
Subtotal:	$ 98,148.48
Contingency (20%):	$ 19,851.52
TOTAL ESTIMATED CONSTRUCTION COST:	$ 118,000.00
Engineering and Administrative Costs (25%):	$ 30,000.00
R.O.W. and/or Easement Acquisition:	$ -
TOTAL ESTIMATED PROJECT COST (2018 Dollars):	$ 148,000.00

CITY OF MCCLEARY
PRELIMINARY COST ESTIMATE
PROJECT D-4: 4TH STREET

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Mobilization/Demobilization (10%)	1 LS	$ 14,000.00	$ 14,000.00
2	Trench Excavation Safety Systems	1 LS	$ 1,000.00	$ 1,000.00
3	Erosion Control (2%)	1 LS	$ 2,500.00	$ 2,500.00
4	Locate Existing Utilities (2%)	1 LS	$ 2,500.00	$ 2,500.00
5	8-inch PVC Water Pipe, Including Fittings	800 LF	$ 55.00	$ 44,000.00
6	Additional Pipe Fittings	250 LB	$ 3.00	$ 750.00
7	8-inch Gate Valves	10 EA	$ 1,250.00	$ 12,500.00
8	Fire Hydrants	2 EA	$ 5,000.00	$ 10,000.00
9	Connections to Existing	3 EA	$ 2,500.00	$ 7,500.00
10	Service Connections	14 EA	$ 1,500.00	$ 21,000.00
11	Gravel Backfill	530 TN	$ 16.50	$ 8,745.00
12	Foundation Gravel	40 TN	$ 35.00	$ 1,400.00
13	Asphalt Concrete Pavement Repair	80 TN	$ 210.00	$ 16,800.00
14	Cold Mix Asphalt	40 TN	$ 200.00	$ 8,000.00
15	Crushed Surfacing, Top Course	70 TN	$ 35.00	$ 2,450.00
16	Surface Restoration	0 SY	$ 5.50	$ -

Subtotal:	$ 153,145.00
Sales Tax (8.8%)	$ 13,476.76
Subtotal:	$ 166,621.76
Contingency (20%):	$ 33,378.24
TOTAL ESTIMATED CONSTRUCTION COST:	$ 200,000.00
Engineering and Administrative Costs (25%):	$ 50,000.00
R.O.W. and/or Easement Acquisition:	$ -
TOTAL ESTIMATED PROJECT COST (2018 Dollars):	$ 250,000.00

CITY OF MCCLEARY
PRELIMINARY COST ESTIMATE
PROJECT D-5: MOMMSEN ROAD

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Mobilization/Demobilization (10%)	1 LS	$ 13,000.00	$ 13,000.00
2	Trench Excavation Safety Systems	1 LS	$ 1,000.00	$ 1,000.00
3	Erosion Control (2%)	1 LS	$ 2,500.00	$ 2,500.00
4	Locate Existing Utilities (2%)	1 LS	$ 2,500.00	$ 2,500.00
5	8-inch PVC Water Pipe, Including Fittings	850 LF	$ 55.00	$ 46,750.00
6	Additional Pipe Fittings	250 LB	$ 3.00	$ 750.00
7	8-inch Gate Valves	3 EA	$ 1,250.00	$ 3,750.00
8	Fire Hydrants	2 EA	$ 5,000.00	$ 10,000.00
9	Connections to Existing	1 EA	$ 2,500.00	$ 2,500.00
10	Service Connections	14 EA	$ 1,500.00	$ 21,000.00
11	Gravel Backfill	560 TN	$ 16.50	$ 9,240.00
12	Foundation Gravel	50 TN	$ 35.00	$ 1,750.00
13	Asphalt Concrete Pavement Repair	90 TN	$ 210.00	$ 18,900.00
14	Cold Mix Asphalt	40 TN	$ 200.00	$ 8,000.00
15	Crushed Surfacing, Top Course	80 TN	$ 35.00	$ 2,800.00
16	Surface Restoration	0 SY	$ 5.50	$ -

Subtotal:	$ 144,440.00
Sales Tax (8.8%)	$ 12,710.72
Subtotal:	$ 157,150.72
Contingency (20%):	$ 31,849.28
TOTAL ESTIMATED CONSTRUCTION COST:	$ 189,000.00
Engineering and Administrative Costs (25%):	$ 47,000.00
R.O.W. and/or Easement Acquisition:	$ -
TOTAL ESTIMATED PROJECT COST (2018 Dollars):	$ 236,000.00

CITY OF MCCLEARY
PRELIMINARY COST ESTIMATE
PROJECT D-6B: TRENCHLESS WATER MAIN INSTALLATION

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Mobilization/Demobilization (10%)	1 LS	$ 17,000.00	$ 17,000.00
2	Trench Excavation Safety Systems	1 LS	$ 1,000.00	$ 1,000.00
3	Erosion Control (2%)	1 LS	$ 3,500.00	$ 3,500.00
4	Locate Existing Utilities (2%)	1 LS	$ 3,500.00	$ 3,500.00
5	8-inch PVC Water Pipe, Including Fittings	70 LF	$ 55.00	$ 3,850.00
6	12-inch PVC Water Pipe, Including Fittings	70 LF	$ 95.00	$ 6,650.00
7	8-inch HDPE Water Pipe installed by HDD	360 LF	$ 200.00	$ 72,000.00
8	Railroad Borings	1 LS	$ 50,000.00	$ 50,000.00
9	Additional Pipe Fittings	100 LB	$ 3.00	$ 300.00
10	8-inch Gate Valves	4 EA	$ 1,250.00	$ 5,000.00
11	12-inch Gate Valves	2 EA	$ 2,200.00	$ 4,400.00
12	Fire Hydrants	2 EA	$ 5,000.00	$ 10,000.00
13	Connections to Existing	4 EA	$ 2,500.00	$ 10,000.00
14	Service Connections	0 EA	$ 1,500.00	$ -
15	Gravel Backfill	50 TN	$ 16.50	$ 825.00
16	Foundation Gravel	10 TN	$ 35.00	$ 350.00
17	Asphalt Concrete Pavement Repair	0 TN	$ 210.00	$ -
18	Cold Mix Asphalt	0 TN	$ 200.00	$ -
19	Crushed Surfacing, Top Course	0 TN	$ 35.00	$ -
20	Surface Restoration	50 SY	$ 5.50	$ 275.00

Subtotal:	$ 188,650.00
Sales Tax (8.8%)	$ 16,601.20
Subtotal:	$ 205,251.20
Contingency (20%):	$ 40,748.80
TOTAL ESTIMATED CONSTRUCTION COST:	$ 246,000.00
Engineering and Administrative Costs (25%):	$ 62,000.00
R.O.W. and/or Easement Acquisition:	$ -
TOTAL ESTIMATED PROJECT COST (2018 Dollars):	$ 308,000.00

CITY OF MCCLEARY
PRELIMINARY COST ESTIMATE
PROJECT D-6C: ASH STREET AND 8TH STREET

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Mobilization/Demobilization (10%)	1 LS	$ 14,000.00	$ 14,000.00
2	Trench Excavation Safety Systems	1 LS	$ 1,000.00	$ 1,000.00
3	Erosion Control (2%)	1 LS	$ 2,500.00	$ 2,500.00
4	Locate Existing Utilities (2%)	1 LS	$ 2,500.00	$ 2,500.00
5	8-inch PVC Water Pipe, Including Fittings	900 LF	$ 55.00	$ 49,500.00
6	Additional Pipe Fittings	250 LB	$ 3.00	$ 750.00
7	8-inch Gate Valves	4 EA	$ 1,250.00	$ 5,000.00
8	Fire Hydrants	2 EA	$ 5,000.00	$ 10,000.00
9	Connections to Existing	3 EA	$ 2,500.00	$ 7,500.00
10	Service Connections	15 EA	$ 1,500.00	$ 22,500.00
11	Gravel Backfill	590 TN	$ 16.50	$ 9,735.00
12	Foundation Gravel	50 TN	$ 35.00	$ 1,750.00
13	Asphalt Concrete Pavement Repair	90 TN	$ 210.00	$ 18,900.00
14	Cold Mix Asphalt	40 TN	$ 200.00	$ 8,000.00
15	Crushed Surfacing, Top Course	80 TN	$ 35.00	$ 2,800.00
16	Surface Restoration	0 SY	$ 5.50	$ -

Subtotal:	$ 156,435.00
Sales Tax (8.8%)	$ 13,766.28
Subtotal:	$ 170,201.28
Contingency (20%):	$ 33,798.72
TOTAL ESTIMATED CONSTRUCTION COST:	$ 204,000.00
Engineering and Administrative Costs (25%):	$ 51,000.00
R.O.W. and/or Easement Acquisition:	$ -
TOTAL ESTIMATED PROJECT COST (2018 Dollars):	$ 255,000.00

CITY OF MCCLEARY
PRELIMINARY COST ESTIMATE
PROJECT D-7: RESERVOIR LINE REPLACEMENT

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Mobilization/Demobilization (10%)	1 LS	$ 17,000.00	$ 17,000.00
2	Trench Excavation Safety Systems	1 LS	$ 1,200.00	$ 1,200.00
3	Erosion Control (2%)	1 LS	$ 3,500.00	$ 3,500.00
4	Locate Existing Utilities (2%)	1 LS	$ 3,500.00	$ 3,500.00
5	12-inch PVC Water Pipe, Including Fittings	1160 LF	$ 95.00	$ 110,200.00
6	Additional Pipe Fittings	450 LB	$ 3.00	$ 1,350.00
7	12-inch Gate Valves	5 EA	$ 2,200.00	$ 11,000.00
8	Fire Hydrants	2 EA	$ 5,000.00	$ 10,000.00
9	Connections to Existing	3 EA	$ 2,500.00	$ 7,500.00
10	Service Connections	1 EA	$ 1,500.00	$ 1,500.00
11	Gravel Backfill	890 TN	$ 16.50	$ 14,685.00
12	Foundation Gravel	70 TN	$ 35.00	$ 2,450.00
13	Asphalt Concrete Pavement Repair	10 TN	$ 210.00	$ 2,100.00
14	Cold Mix Asphalt	0 TN	$ 200.00	$ -
15	Crushed Surfacing, Top Course	10 TN	$ 35.00	$ 350.00
16	Surface Restoration	930 SY	$ 5.50	$ 5,115.00

Subtotal:	$ 191,450.00
Sales Tax (8.8%)	$ 16,847.60
Subtotal:	$ 208,297.60
Contingency (20%):	$ 41,702.40
TOTAL ESTIMATED CONSTRUCTION COST:	$ 250,000.00
Engineering and Administrative Costs (25%):	$ 63,000.00
R.O.W. and/or Easement Acquisition:	$ -
TOTAL ESTIMATED PROJECT COST (2018 Dollars):	$ 313,000.00

CITY OF MCCLEARY
PRELIMINARY COST ESTIMATE
PROJECT D-8: SUMMIT ROAD PHASE 1

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Mobilization/Demobilization (10%)	1 LS	$ 57,000.00	$ 57,000.00
2	Trench Excavation Safety Systems	1 LS	$ 3,100.00	$ 3,100.00
3	Erosion Control (2%)	1 LS	$ 11,000.00	$ 11,000.00
4	Locate Existing Utilities (2%)	1 LS	$ 11,000.00	$ 11,000.00
5	12-inch PVC Water Pipe, Including Fittings	3100 LF	$ 95.00	$ 294,500.00
6	Additional Pipe Fittings	1250 LB	$ 3.00	$ 3,750.00
7	12-inch Gate Valves	8 EA	$ 2,200.00	$ 17,600.00
8	Fire Hydrants	5 EA	$ 5,000.00	$ 25,000.00
9	Connections to Existing	4 EA	$ 2,500.00	$ 10,000.00
10	Service Connections	24 EA	$ 1,500.00	$ 36,000.00
11	Gravel Backfill	2390 TN	$ 16.50	$ 39,435.00
12	Foundation Gravel	200 TN	$ 35.00	$ 7,000.00
13	Asphalt Concrete Pavement Repair	350 TN	$ 210.00	$ 73,500.00
14	Cold Mix Asphalt	150 TN	$ 200.00	$ 30,000.00
15	Crushed Surfacing, Top Course	310 TN	$ 35.00	$ 10,850.00
16	Surface Restoration	0 SY	$ 5.50	$ -

Subtotal:	$	629,735.00
Sales Tax (8.8%)	$	55,416.68
Subtotal:	$	685,151.68
Contingency (20%):	$	136,848.32
TOTAL ESTIMATED CONSTRUCTION COST:	$	822,000.00
Engineering and Administrative Costs (25%):	$	206,000.00
R.O.W. and/or Easement Acquisition:	$	-
TOTAL ESTIMATED PROJECT COST (2018 Dollars):	$	1,028,000.00

CITY OF MCCLEARY
PRELIMINARY COST ESTIMATE
PROJECT D-9: SUMMIT ROAD PHASE 2

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Mobilization/Demobilization (10%)	1 LS	$ 37,000.00	$ 37,000.00
2	Trench Excavation Safety Systems	1 LS	$ 1,800.00	$ 1,800.00
3	Erosion Control (2%)	1 LS	$ 7,000.00	$ 7,000.00
4	Locate Existing Utilities (2%)	1 LS	$ 7,000.00	$ 7,000.00
5	12-inch PVC Water Pipe, Including Fittings	1770 LF	$ 95.00	$ 168,150.00
6	Additional Pipe Fittings	700 LB	$ 3.00	$ 2,100.00
7	12-inch Gate Valves	8 EA	$ 2,200.00	$ 17,600.00
8	Fire Hydrants	5 EA	$ 5,000.00	$ 25,000.00
9	Connections to Existing	6 EA	$ 2,500.00	$ 15,000.00
10	Service Connections	23 EA	$ 1,500.00	$ 34,500.00
11	Gravel Backfill	1360 TN	$ 16.50	$ 22,440.00
12	Foundation Gravel	110 TN	$ 35.00	$ 3,850.00
13	Asphalt Concrete Pavement Repair	200 TN	$ 210.00	$ 42,000.00
14	Cold Mix Asphalt	90 TN	$ 200.00	$ 18,000.00
15	Crushed Surfacing, Top Course	180 TN	$ 35.00	$ 6,300.00
16	Surface Restoration	0 SY	$ 5.50	$ -

Subtotal:	$ 407,740.00
Sales Tax (8.8%)	$ 35,881.12
Subtotal:	$ 443,621.12
Contingency (20%):	$ 88,378.88
TOTAL ESTIMATED CONSTRUCTION COST:	$ 532,000.00
Engineering and Administrative Costs (25%):	$ 133,000.00
R.O.W. and/or Easement Acquisition:	$ -
TOTAL ESTIMATED PROJECT COST (2018 Dollars):	$ 665,000.00

CITY OF MCCLEARY
PRELIMINARY COST ESTIMATE
PROJECT D-10: SIMPSON AVENUE

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Mobilization/Demobilization (10%)	1 LS	$ 41,000.00	$ 41,000.00
2	Trench Excavation Safety Systems	1 LS	$ 2,500.00	$ 2,500.00
3	Erosion Control (2%)	1 LS	$ 8,000.00	$ 8,000.00
4	Locate Existing Utilities (2%)	1 LS	$ 8,000.00	$ 8,000.00
5	8-inch PVC Water Pipe, Including Fittings	2530 LF	$ 55.00	$ 139,150.00
6	Additional Pipe Fittings	750 LB	$ 3.00	$ 2,250.00
7	8-inch Gate Valves	20 EA	$ 1,250.00	$ 25,000.00
8	Fire Hydrants	6 EA	$ 5,000.00	$ 30,000.00
9	Connections to Existing	12 EA	$ 2,500.00	$ 30,000.00
10	Service Connections	34 EA	$ 1,500.00	$ 51,000.00
11	Gravel Backfill	1670 TN	$ 16.50	$ 27,555.00
12	Foundation Gravel	140 TN	$ 35.00	$ 4,900.00
13	Asphalt Concrete Pavement Repair	260 TN	$ 210.00	$ 54,600.00
14	Cold Mix Asphalt	110 TN	$ 200.00	$ 22,000.00
15	Crushed Surfacing, Top Course	230 TN	$ 35.00	$ 8,050.00
16	Surface Restoration	0 SY	$ 5.50	$ -

Subtotal:	$ 454,005.00
Sales Tax (8.8%)	$ 39,952.44
Subtotal:	$ 493,957.44
Contingency (20%):	$ 99,042.56
TOTAL ESTIMATED CONSTRUCTION COST:	$ 593,000.00
Engineering and Administrative Costs (25%):	$ 148,000.00
R.O.W. and/or Easement Acquisition:	$ -
TOTAL ESTIMATED PROJECT COST (2018 Dollars):	$ 741,000.00

CITY OF MCCLEARY
PRELIMINARY COST ESTIMATE
PROJECT D-11: MOX CHEHALIS ROAD EXTENSION

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Mobilization/Demobilization (10%)	1 LS	$ 40,000.00	$ 40,000.00
2	Trench Excavation Safety Systems	1 LS	$ 1,500.00	$ 1,500.00
3	Erosion Control (2%)	1 LS	$ 7,500.00	$ 7,500.00
4	Locate Existing Utilities (2%)	1 LS	$ 7,500.00	$ 7,500.00
5	8-inch PVC Water Pipe, Including Fittings	1490 LF	$ 55.00	$ 81,950.00
6	HDD 8-inch HDPE Water Pipe in 16-inch HDPE Casing	780 LF	$ 250.00	$ 195,000.00
7	Additional Pipe Fittings	450 LB	$ 3.00	$ 1,350.00
8	8-inch Gate Valves	6 EA	$ 1,250.00	$ 7,500.00
9	Fire Hydrants	5 EA	$ 5,000.00	$ 25,000.00
10	Connections to Existing	1 EA	$ 2,500.00	$ 2,500.00
11	Service Connections	2 EA	$ 1,500.00	$ 3,000.00
12	Gravel Backfill	980 TN	$ 16.50	$ 16,170.00
13	Foundation Gravel	80 TN	$ 35.00	$ 2,800.00
14	Asphalt Concrete Pavement Repair	150 TN	$ 210.00	$ 31,500.00
15	Cold Mix Asphalt	70 TN	$ 200.00	$ 14,000.00
16	Crushed Surfacing, Top Course	140 TN	$ 35.00	$ 4,900.00
17	Surface Restoration	0 SY	$ 5.50	$ -

Subtotal:	$ 442,170.00
Sales Tax (8.8%)	$ 38,910.96
Subtotal:	$ 481,080.96
Contingency (20%):	$ 95,919.04
TOTAL ESTIMATED CONSTRUCTION COST:	$ 577,000.00
Engineering and Administrative Costs (25%):	$ 144,000.00
R.O.W. and/or Easement Acquisition:	$ -
TOTAL ESTIMATED PROJECT COST (2018 Dollars):	$ 721,000.00

CITY OF MCCLEARY
PRELIMINARY COST ESTIMATE
PROJECT D-6A: POWERLINE CORRIDOR

NO.	ITEM	QUANTITY	UNIT PRICE	AMOUNT
1	Mobilization/Demobilization (10%)	1 LS	$ 32,000.00	$ 32,000.00
2	Trench Excavation Safety Systems	1 LS	$ 3,700.00	$ 3,700.00
3	Erosion Control (2%)	1 LS	$ 6,000.00	$ 6,000.00
4	Locate Existing Utilities (2%)	1 LS	$ 6,000.00	$ 6,000.00
5	8-inch PVC Water Pipe, Including Fittings	3700 LF	$ 55.00	$ 203,500.00
6	Additional Pipe Fittings	1100 LB	$ 3.00	$ 3,300.00
7	8-inch Gate Valves	10 EA	$ 1,250.00	$ 12,500.00
8	Fire Hydrants	2 EA	$ 5,000.00	$ 10,000.00
9	Connections to Existing	4 EA	$ 2,500.00	$ 10,000.00
10	Service Connections	0 EA	$ 1,500.00	$ -
11	Gravel Backfill	2440 TN	$ 16.50	$ 40,260.00
12	Foundation Gravel	200 TN	$ 35.00	$ 7,000.00
13	Asphalt Concrete Pavement Repair	0 TN	$ 210.00	$ -
14	Cold Mix Asphalt	0 TN	$ 200.00	$ -
15	Crushed Surfacing, Top Course	0 TN	$ 35.00	$ -
16	Surface Restoration	2880 SY	$ 5.50	$ 15,840.00

Subtotal:	$ 350,100.00
Sales Tax (8.8%)	$ 30,808.80
Subtotal:	$ 380,908.80
Contingency (20%):	$ 76,091.20
TOTAL ESTIMATED CONSTRUCTION COST:	$ 457,000.00
Engineering and Administrative Costs (25%):	$ 114,000.00
R.O.W. and/or Easement Acquisition:	$ -
TOTAL ESTIMATED PROJECT COST (2018 Dollars):	$ 571,000.00

DRAFT (6/25/18)

APPENDIX Q

ORDINANCE NO._____ - CITY ADOPTION OF WSP

MEETING MINUTES ADOPTING WSP

LOCAL GOVERNMENT CONSISTENCY – GRAYS HARBOR

LOCAL GOVERNMENT CONSISTENCY – CITY OF MCCLEARY

ORDINANCE NO. XXXX

AN ORDINANCE RELATING TO PUBLIC UTILITIES, AUTHORIZING THE ADOPTION OF THE CITY'S CROSS CONNECTION CONTROL AND BACKFLOW PREVENTION MANUAL, ADDING A NEW SECTION TO 13.04.200 BACKFLOW PREVENTION DEVICES

RECITALS:

1. The City operates and maintains a water system for the residents and businesses within its water service area.
2. The Washington Department of Health requires water utilities to implement and maintain a Cross Connection Control Program per WAC 246-290-490.
3. The Washington Department of Health sets the standards for the Cross Connection Control Program and requires the water utility to enforce said requirements.
4. The Washington Department of Health requires the utility to obtain a Cross Connection Control Specialist(s) to oversee said Cross Connection Control Program.

NOW, THEREFORE, BE IT ORDAINED AS FOLLOWS BY THE CITY COUNCIL OF THE CITY OF MCCLEARY:

SECTION 1: There shall be added to Chapter 13.04.200 of the Municipal Code a new section to read as follows:

The City of McCleary adopts the City's Cross Connection Control and Backflow Prevention Manual, which is included as an appendix in the City's Water System Comprehensive Plan.

The Plan establishes minimum cross connection control operating policies provides guidelines and requirements for installation, testing, and maintenance of approved backflow devices and establishes permitting, and inspection requirements for existing and new protection devices.

Additionally, the Plan establishes minimum standards for the City to protect the public potable water supply from possible contamination of pollution due to backflow or back siphon from a customer's private internal system into the public potable water system.

Washington State Department of Health
Division of Environmental Health
Office of Drinking Water

Local Government Consistency Determination Form

Water System Name: City of McCleary PWS ID: 52250 U

Planning/Engineering Document Title: Water System Plan Plan Date: February 2020

Local Government with Jurisdiction Conducting Review: Grays Harbor County

Before the Department of Health (DOH) approves a planning or engineering submittal under Section 100 or Section 110, the local government must review the documentation the municipal water supplier provides to prove the submittal is consistent with **local comprehensive plans, land use plans and development regulations** (WAC 246-290-108). Submittals under Section 105 require a local consistency determination if the municipal water supplier requests a water right place-of-use expansion. The review must address the elements identified below as they relate to water service.

By signing this form, the local government reviewer confirms the document under review is consistent with applicable local plans and regulations. If the local government reviewer identifies an inconsistency, he or she should include the citation from the applicable comprehensive plan or development regulation and explain how to resolve the inconsistency, or confirm that the inconsistency is not applicable by marking N/A. See more instructions on reverse.

Local Government Consistency Statement	For use by water system: Identify the page(s) in submittal	For use by local government: Yes or Not Applicable
a) The water system service area is consistent with the adopted land use and zoning within the service area.	Pgs 1-12 – 1-14	yes
b) The growth projection used to forecast water demand is consistent with the adopted city or county's population growth projections. If a different growth projection is used, provide an explanation of the alternative growth projection and methodology.	Pgs 2-12 – 2-14	n/a
c) For cities and towns that provide water service: All water service area policies of the city or town described in the plan conform to all relevant utility service extension ordinances.	Pgs 1-14 -1-20, and 7-3 – 7-7	yes
d) Service area policies for new service connections conform to the adopted local plans and adopted development regulations of all cities and counties with jurisdiction over the service area.	Pgs 1-14 thru 1-20	yes
e) Other relevant elements related to water supply are addressed in the water system plan, if applicable. This may include Coordinated Water System Plans, Regional Wastewater Plans, Reclaimed Water Plans, Groundwater Management Area Plans, and the Capital Facilities Element of local comprehensive plans.	Capital Facilities Element in Local Plan	yes

I certify that the above statements are true to the best of my knowledge and that these specific elements are consistent with adopted local plans and development regulations.

Jane W. Hewitt 9/30/20

Signature Date

Jane W. Hewitt, Principal Planner,

Printed Name, Title, & Jurisdiction

Grays Harbor County

Washington State Department of Health
Division of Environmental Health
Office of Drinking Water

Local Government Consistency Determination Form

Water System Name: City of McCleary PWS ID: 52250 U

Planning/Engineering Document Title: Water System Plan Plan Date: November 2020

Local Government with Jurisdiction Conducting Review: City of McCleary

Before the Department of Health (DOH) approves a planning or engineering submittal under Section 100 or Section 110, the local government must review the documentation the municipal water supplier provides to prove the submittal is consistent with **local comprehensive plans, land use plans and development regulations** (WAC 246-290-108). Submittals under Section 105 require a local consistency determination if the municipal water supplier requests a water right place-of-use expansion. The review must address the elements identified below as they relate to water service.

By signing this form, the local government reviewer confirms the document under review is consistent with applicable local plans and regulations. If the local government reviewer identifies an inconsistency, he or she should include the citation from the applicable comprehensive plan or development regulation and explain how to resolve the inconsistency, or confirm that the inconsistency is not applicable by marking N/A. See more instructions on reverse.

	For use by water system	For use by local government
Local Government Consistency Statement	**Identify the page(s) in submittal**	**Yes or Not Applicable**
a) The water system service area is consistent with the adopted land use and zoning within the service area.	Pgs 1-12 – 1-14	
b) The growth projection used to forecast water demand is consistent with the adopted city or county's population growth projections. If a different growth projection is used, provide an explanation of the alternative growth projection and methodology.	Pgs 2-12 – 2-14	
c) For cities and towns that provide water service: All water service area policies of the city or town described in the plan conform to all relevant utility service extension ordinances.	Pgs 1-14 -1-20, and 7-3 – 7-7	
d) Service area policies for new service connections conform to the adopted local plans and adopted development regulations of all cities and counties with jurisdiction over the service area.	Pgs 1-14 thru 1-20	
e) Other relevant elements related to water supply are addressed in the water system plan, if applicable. This may include Coordinated Water System Plans, Regional Wastewater Plans, Reclaimed Water Plans, Groundwater Management Area Plans, and the Capital Facilities Element of local comprehensive plans.	Capital Facilities Element in Local Plan	

I certify that the above statements are true to the best of my knowledge and that these specific elements are consistent with adopted local plans and development regulations.

_____ _____

Signature Date

_____

Printed Name, Title, & Jurisdiction

Consistency Review Guidance

For Use by Local Governments and Municipal Water Suppliers

This checklist may be used to meet the requirements of WAC 246-290-108. When using an alternative format, it must describe all of the elements; 1a), b), c), d), and e), when they apply.

For **water system plans (WSP)**, a consistency review is required for the service area and any additional areas where a municipal water supplier wants to expand its water right's place of use.

For **small water system management programs**, a consistency review is only required for areas where a municipal water supplier wants to expand its water right's place-of-use. If no water right place-of-use expansion is requested, a consistency review is not required.

For **engineering documents,** a consistency review is required for areas where a municipal water supplier wants to expand its water right's place-of-use (water system plan amendment is required). For noncommunity water systems, a consistency review is required when requesting a place-of-use expansion. All engineering documents must be submitted with a service area map (WAC 246-290-110(4)(b)(ii)).

A) Documenting Consistency: The planning or engineering document must include the following when applicable.

a) A copy of the adopted **land use/zoning** map corresponding to the service area. The uses provided in the WSP should be consistent with the adopted land use/zoning map. Include any other portions of comprehensive plans or development regulations that relate to water supply planning.

b) A copy of the **growth projections** that correspond to the service area. If the local population growth projections are not used, explain in detail why the chosen projections more accurately describe the expected growth rate. Explain how it is consistent with the adopted land use.

c) Include water service area policies and show that they are consistent with the **utility service extension ordinances** within the city or town boundaries. *This applies to cities and towns only.*

d) All **service area policies** for how new water service will be provided to new customers.

e) **Other relevant elements** the Department of Health determines are related to water supply planning. See Local Government Consistency – Other Relevant Elements, Policy B.07, September 2009.

B) Documenting an Inconsistency: Please document the inconsistency, include the citation from the comprehensive plan or development regulation, and explain how to resolve the inconsistency.

C) Documenting a Lack of Local Review for Consistency: Where the local government with jurisdiction did not provide a consistency review, document efforts made and the amount of time provided to the local government for review. Please include: name of contact, date, and efforts made (letters, phone calls, and emails). To self-certify, please contact the DOH Planner.