JANUARY 2022

FINAL AUGUST 2023

City of Battle Ground

WATER SYSTEM PLAN



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City of Battle Ground Water System Plan

JANUARY 2022
FINAL AUGUST 2023

Mayor
Adrian Cortes

Deputy Mayor
Philip Johnson

City Council
Brian Munson
Shane Bowman
Shauna Walters
Tricia Davis
Cherish DesRochers

Public Works Director
Mark Herceg, PE

City of Battle Ground
109 SW 1st Street
Battle Ground, WA 98604

Prepared By

RH2 Engineering, Inc.
22722 29th Drive SE, Suite 210
Bothell, WA 98021

Contact: Zach Schrempp
(425) 951-5319

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CERTIFICATION

This Water System Plan for the City of Battle Ground was prepared under the direction of the following professional engineers registered in the State of Washington.



Zach Schrempp, PE 12/28/2022



Michele Campbell, PE 12/28/2022

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E | EXECUTIVE SUMMARY

PURPOSE OF THE WATER SYSTEM PLAN

The City of Battle Ground's (City) water system is a major infrastructure, much of which is invisible to the customers that receive its water. The water system requires qualified staff to operate and maintain an ongoing capital improvement program to replace old components to meet the requirements mandated by federal and state laws. The primary purpose of the City of Battle Ground Water System Plan (WSP) is to identify and schedule water system improvements that correct existing system deficiencies and ensure a safe and reliable supply of water to current and future customers. This WSP complies with Washington State Department of Health (DOH) regulations under Chapter 246-290 Washington Administrative Code (WAC), which requires water purveyors to update their water system plans every 10 years.

The City's previous WSP was prepared in May 2013. This updated 2021 WSP reflects updated population projections that are consistent with the City's *Comprehensive Plan*. The WSP also reflects improvements and changes to the water system since the completion of the 2013 WSP.

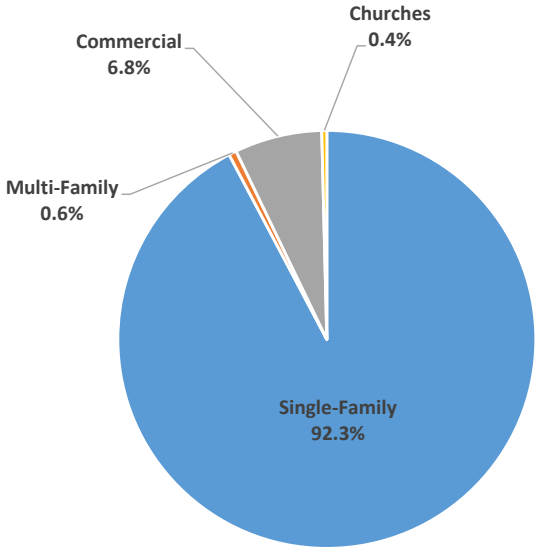
SUMMARY OF KEY ELEMENTS

This WSP presents a description of the existing water system and service area, a forecast of future water demands, policies and design criteria for water system operation and improvements, the operations and maintenance program, staffing requirements, a schedule of improvements, and a financial plan to accomplish the improvements. The WSP also includes several ancillary elements that include a water use efficiency plan, a water quality monitoring plan, a wellhead protection plan, and a cross-connection control program. A summary of the key issues related to these elements is provided in the following sections.

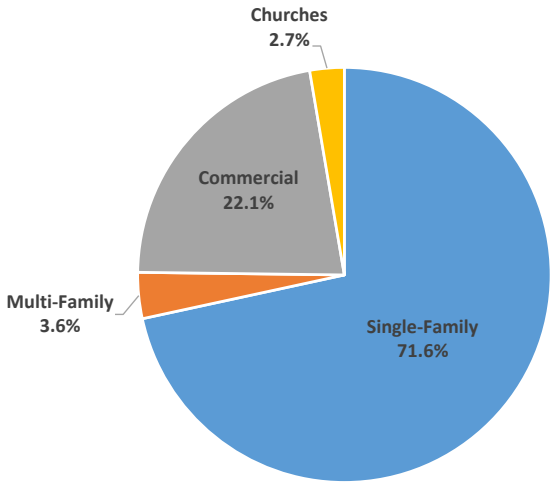
Water Service Area

The City provides water service to approximately 19,002 people throughout its water service area boundary, which includes a majority of the City's limits and some small areas of unincorporated Clark County. The City is responsible for providing public water service, utility management, and water system development within this area. The City will provide new water service within the retail water service area.

In 2019, the City provided water service to an average of 5,904 connections, which were mainly comprised of single-family connections. Single-family connections represent approximately 92.3 percent of all accounts, but the single-family class only consumed 71.6 percent of all water supplied to the system in 2019.



2019 Water Connections



2019 Water Consumption

Existing Water System

The City's water system was initially established in 1951. Wells No. 1 and 2 were drilled in the 1950s and were the original wells for the City. As growth occurred, Wells No. 4 and 5 were drilled in 1975, and more recently, Wells No. 6, 7, 8, and 9 were drilled and put into production. Wells No. 6, 7, and 8 are currently offline due to iron bacteria corrosion issues.

In addition to the City's groundwater sources, the City has a supply intertie with Clark Public Utilities (CPU) that was originally constructed in 2013 and upsized to a capacity of 2,000 gallons per minute (gpm) in 2020. The City's NE 219th Street Booster Pump Station (BPS) pumps water from CPU's Meadow Glade Pressure Zone to the City's 529 Zone. A summary of the City's sources is shown in **Table ES-1**.

Table ES-1
Supply Facilities Summary

Name	Pressure Zone	Year Constructed	Status	Existing Capacity (gpm)	Well Depth (feet)	Water Treatment
Wells						
Well No. 1	529 Zone	1950s	Active	190	148	Chlorination, Fluoridation
Well No. 2	529 Zone	1950s	Active	90	142	Chlorination, Fluoridation
Well No. 4	529 Zone	1975	Active	60 - 70	136	Chlorination, Fluoridation
Well No. 5	529 Zone	1975	Active	60 - 70	136	Chlorination, Fluoridation
Well No. 6	529 Zone	1996	Offline	0	400	Chlorination, Fluoridation, Sequestering w/ Sodium Silicate (Iron and Manganese)
Well No. 7	Horsethief Reservoir	1999	Offline	0	437	Chlorination, Fluoridation, Pyrolusite Adsorption (Iron and Manganese)
Well No. 8	Horsethief Reservoir	1999	Offline	0	438	Chlorination, Fluoridation, Pyrolusite Adsorption (Iron and Manganese)
Well No. 9	Horsethief Reservoir	2004	Active	500	421	Chlorination, Fluoridation, Pyrolusite Adsorption (Iron and Manganese)
Supply Intertie						
CPU NE 219th St	529 Zone	2013	Active	2,000	N/A	Fluoridation
Emergency Intertie						
CPU NE 122nd Ave	529 Zone	-	Emergency	547	N/A	N/A

The City's water system currently has six storage facilities. The five Tukes Mountain Reservoirs provide gravity storage directly to the 529 Zone. The Horsethief Reservoir has an overflow elevation of 296 feet; water must be pumped from this reservoir to the 529 Zone distribution system by the Horsethief BPS. Details of the City's storage facilities are shown in **Table ES-2**.

Table ES-2
Storage Facilities Summary

Reservoir	Approximate Location	Pressure Zone	Year Constructed	Construction Type	Capacity (MG)	Diameter (feet)	Height (feet)	Overflow Elev. (feet)
Horsethief Reservoir	West of intersection of SW 12th Avenue and SW 11th Circle	296 Zone	2004	Steel	2.06	110	31	296
Tukes Mountain No. 1	Tukes Mountain, north of intersection of E Main Street and NE 153rd Place	529 Zone	1954	Steel	0.25	35	35	529
Tukes Mountain No. 2			1970s	Concrete	0.18	25	50	529
Tukes Mountain No. 3			1980s	Concrete	0.17	25	45	529
Tukes Mountain No. 4			1980s	Concrete	0.15	25	40	529
Tukes Mountain No. 5			1999	Steel	1.03	68	38	529

The City's water system currently has three BPS facilities that provide supply to the 529 Zone and the closed 784 Zone, as shown in **Table ES-3**.

Table ES-3

Booster Pump Station Facilities Summary

Name	Suction Pressure Zone	Discharge Pressure Zone	Year Constructed	Number of Pumps	Pump Type	Pump Motor Size (HP)	Pump Capacity	Has VFDs?	Sum of Pump Capacities (gpm)[1]	Generator
NE 219th Street BPS	CPU Meadow Glade (467 Zone)	529 Zone	2013 (upsized 2020)	4	Horizontal end-suction	(4) 40	(4) 1,000 gpm @ 100' TDH	yes	4,000	On-site diesel generator
Horsethief BPS	Horsethief Reservoir (Overflow El. 296 feet)	529 Zone	2004	4	Horizontal end-suction	(2) 50	(2) 500 gpm @ 270' TDH	yes	3,000	On-site diesel generator
						(2) 100	(2) 1,000 gpm @ 270' TDH			
Tukes Mountain BPS	529 Zone	784 Zone	1990s	4	Vertical	5	30 gpm @ 240' TDH	no	2,330	Onsite
					Horizontal end-suction	30	300 gpm @ 240' TDH			
						(2) 40	(2) 1,000 gpm @ 100' TDH			

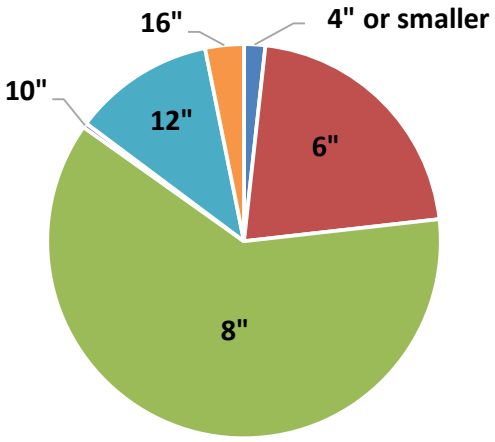
1 = The actual total station capacity is typically less than the sum of pump capacities, due to increased headlosses at higher flow rates. Total capacity also may be limited if the BPS electrical system is not designed to run all pumps concurrently. The NE 219th Street BPS capacity also does not take into account the lower volume currently available from CPU per the Water Supply Agreement.
TDH - Total dynamic head

The City's water system contains approximately 85 miles of water main ranging in size from 4 inches or smaller to 16 inches. As shown in **Table ES-4**, most of the water main (approximately 85 percent) within the system is 8 inches in diameter or less. The remaining 15 percent of the water main is 10 inches in diameter or larger.

Table ES-4

Water Main Diameter Inventory

Diameter (Inches)	Length (Feet)	% of Total
4 or smaller	7,851	1.7%
6	96,597	21.5%
8	277,245	61.6%
10	1,724	0.4%
12	52,280	11.6%
16	14,303	3.2%
Total	**450,000**	**100%**



Past Water Usage

In general, the amount of water consumed by the City's customers and other authorized users slowly increased from 2012 through 2019. Data for June through December 2014 was unavailable; only the supply for January through May 2014 are shown in **Table ES-5**. The City's average day demand (ADD) for each year is calculated from the City's annual supply totals in terms of gpm and gallons per day (gpd). **Table ES-5** lists the annual supply totals and the ADD.

Table ES-5

Historical Water Supply

Year	Annual Supply (gallons)	Average Day Demand (gpm)	Average Day Demand (gpd)
2012	502,385,663	953	1,372,638
2013	489,474,729	931	1,341,027
2014 [1]	180,743,132	344	495,187
2015	542,530,342	1,032	1,486,384
2016	542,677,680	1,030	1,482,726
2017	570,648,771	1,086	1,563,421
2018	597,503,886	1,137	1,636,997
2019	566,058,502	1,077	1,550,845

1 = Data for June through December 2014 unavailable.

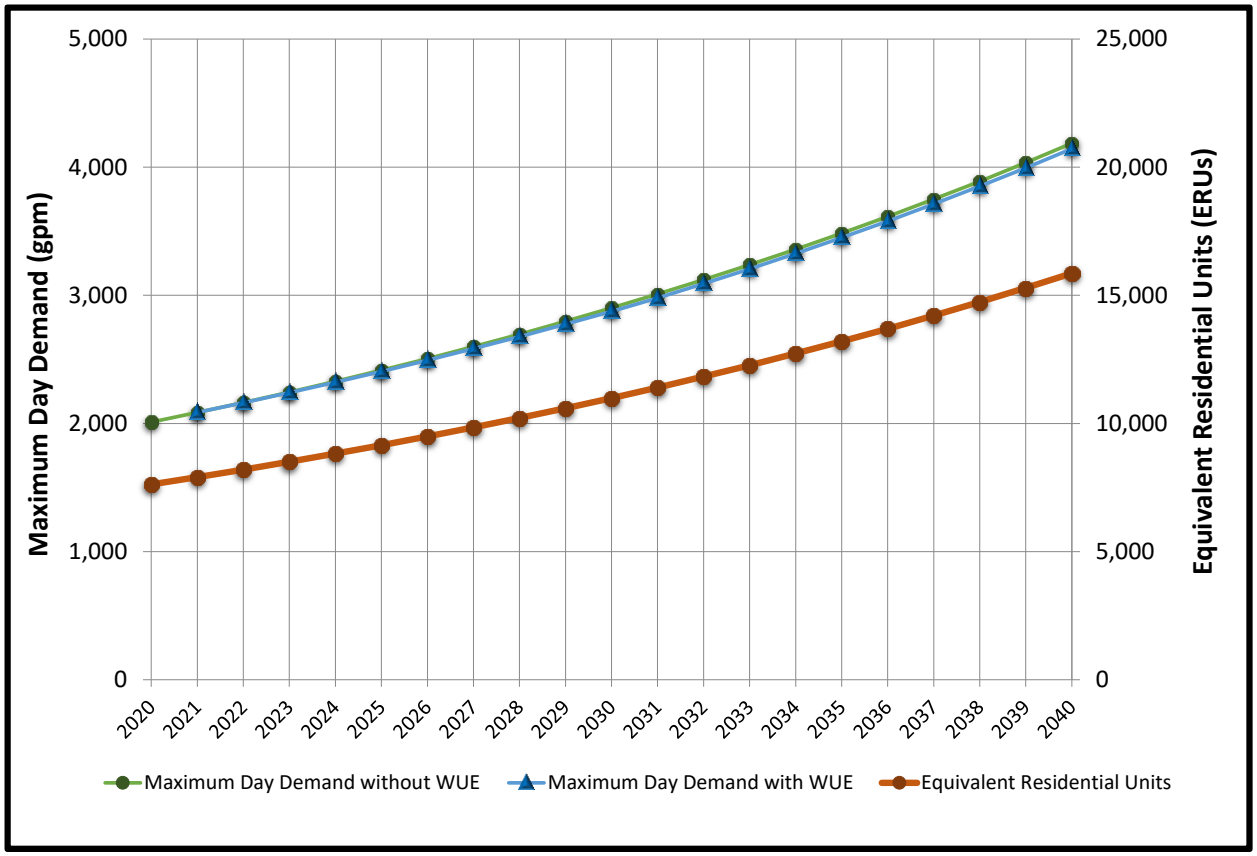
Future Water Demands and Water Supply

Overall water demand within the City's system is expected to increase by approximately 214 percent of 2019 demand by the end of the 20-year planning period. The City will need to develop additional source capacity by 2030 to meet projected future demands. **Chart ES-1**

presents the projected equivalent residential unit (ERU) forecasts based on projected water demands for the 20-year planning period.

Chart ES-1

Future Water Demands and ERU Projections (Demand Basis)



Water Source and Quality

The City's municipal water supply is provided by groundwater wells completed in the shallow Upper Troutdale Aquifer or the deep Sand and Gravel Aquifer and wholesale interties with CPU. These sources include Well No. 1 (S01), Well No. 2 (S02), Well No. 4 (S03), Well No. 5 (S04), Well No. 7 (S09), Well No. 8 (S10), Well No. 9 (S11), and the intertie with CPU (S13). Wells No. 7, 8, and 9 have been recognized by DOH as a wellfield (S12).

The City also currently has one primary wholesale intertie with CPU (NE 219th Street) that has a capacity of 2,000 gpm. The City also maintains an emergency intertie with CPU.

Wells No. 1, 2, 4, and 5 are chlorinated with 12.5-percent liquid sodium hypochlorite, and fluoride is added for dental benefits. When operating, Well No. 6 is treated with 12.5-percent liquid sodium hypochlorite for disinfection, fluoride for dental benefits, and sodium silicate sequestration for iron and manganese. However, Well No. 6 has been offline for the last few years due to iron bacteria corrosion issues.

Wells No. 7, 8, and 9 are chlorinated with 12.5-percent liquid sodium hypochlorite and treated with fluoride. Additionally, the treatment facility for Wells No. 7, 8, and 9 uses

pyrolusite/manganese dioxide ore (AS-721 media) to adsorb dissolved iron and manganese. Chlorine is added prior to the adsorption units to provide continuous regeneration of the manganese dioxide media, as well as for disinfection residual maintenance in the distribution system. Wells No. 7 and 8 are currently offline due to iron bacteria issues.

Operations and Maintenance

The City's operations and maintenance organization is staffed by well qualified, technically trained personnel. City staff regularly participate in safety and training programs to keep abreast of the latest changes in the water industry and ensure a smooth and safe operation of the water system.

The City has taken several steps to prepare for emergency situations. The City's Emergency Response Plan is intended to guide public works employees in restoring water service during a major emergency.

Water System Evaluation

The existing water system was evaluated to determine its ability to meet the policies and design criteria of the City and those mandated by DOH. The results of the evaluation are summarized as follows:

- The City needs to develop additional source capacity by 2030 to meet projected demands. The most cost-effective way of accomplishing this is expansion of the CPU intertie per existing agreements with CPU. The City may also opt to invest in rehabilitation and expansion of its groundwater sources.
- Additional storage will be required by 2030 to address storage deficiencies that will result from projected growth. It is anticipated that a new tank, with a usable storage component of approximately 1.5 million gallons, will be constructed adjacent to the five existing Tukes Mountain Reservoirs.
- Areas of the system require water main replacements to resolve deficiencies related to low fire flows, aging water main, and undesirable materials. The City plans to dedicate approximately $100,000 per year to the replacement of existing water mains.

Proposed Water System Improvements and Financing Plan

Improvements to the water system are necessary, primarily to resolve existing system deficiencies, but also to accommodate the increase in water demands from future growth. Improvements identified for the first 5 years of the capital improvement program (2021 through 2025) are estimated to cost approximately $4,020,000, which results in an average expenditure of approximately $804,000 per year. Improvements in the following 5 years (2026 through 2030) are estimated to cost approximately $6,400,000, or approximately $1,280,000 per year. Improvements for 2031 through 2040 are estimated to cost approximately $1,300,000, or approximately $130,000 per year. The financial analysis is intended to illustrate the feasibility of funding the operation and maintenance and capital improvements recommended for the water system in the next 10 years.

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1 | INTRODUCTION

WATER SYSTEM OWNERSHIP AND MANAGEMENT

The City of Battle Ground (City) is a municipal corporation that owns and operates a public water system that includes a majority of the City limits and some small areas of unincorporated Clark County. Water system data on file at the Washington State Department of Health (DOH) for the City's system is shown in **Table 1-1**.

Table 1-1

Water System Ownership Information

Information Type	Description
System Type	Group A - Community - Public Water System
System Name	City of Battle Ground Water
County	Clark
DOH System ID Number	047005
Address	1308 SE Grace Avenue, Battle Ground, WA 98604
Contact	Mark Herceg, PE Public Works Director
Contact Phone Number	(360) 342-5350

OVERVIEW OF EXISTING SYSTEM

In 2019, the City provided water service to an average of approximately 5,904 customer connections, or 8,976 equivalent residential units (ERUs), within the City's water service area. The City limits comprise an area of approximately 8.6 square miles, and the existing retail water service area is approximately 5.5 square miles. The 2019 residential population served by the water system was approximately 19,002 people, whereas the residential population residing in the City limits was approximately 21,520 people.

The City's water supply currently is provided by eight groundwater wells and one intertie with Clark Public Utilities (CPU). The City also maintains an emergency intertie with CPU. Each of the City's wells is treated with sodium hypochlorite and fluoride. Well No. 6 is treated with sodium silicate sequestration for iron and manganese. In addition, Wells No. 7, 8, and 9 are treated with pyrolusite/manganese dioxide ore to adsorb dissolved iron and manganese. Water storage is provided by 6 reservoirs that have a total capacity of approximately 3.84 million gallons (MG). The City's distribution system has two pressure zones. The system has 3 booster pump stations and approximately 85 miles of water main. A summary of the 2019 water system data is shown in **Table 1-2**.

Table 1-2

2019 Water System Data

Description	Data
Water System Residential Population	19,002
Water Service Area	5.5 square miles
Total Connections	5,904
Total ERUs	8,976
Demand per ERU	204 gallons per day
Annual Consumption	479,629,249 gallons
Average Day Demand	1,077 gpm
Distribution System Leakage	7.4%
Maximum Day/Average Day Demand Factor	1.81
Peak Hour/Maximum Day Demand Factor	1.64
Number of Pressure Zones	2
Number of Well Sources	8
Total Capacity of City Sources	900 gpm
Total Capacity of CPU Intertie	2,000 gpm
Number of Pump Stations and Total Capacity	3 (9,330 gpm)
Number of Reservoirs and Total Capacity	6 (3.84 MG)
Total Length of Water Main	85 miles

AUTHORIZATION AND PURPOSE

The City authorized RH2 Engineering, Inc., (RH2) to prepare this Water System Plan (WSP) as required by state law under Washington Administrative Code (WAC) 246-290-100. In accordance with WAC 246-290-100, the WSP shall be updated and submitted to DOH every 10 years. This WSP has been written to meet 10-year planning requirements. The previous WSP was prepared for the City in 2013. The purpose of this updated WSP is as follows:

- To evaluate existing water demand data and project future water demands.
- To analyze the existing water system to determine if it meets minimum requirements mandated by DOH and the City's own policies and design criteria.
- To identify water system improvements that resolve existing system deficiencies and accommodate the system's future needs for at least 20 years into the future.
- To prepare a schedule of improvements that meets the goals of the City's financial program.
- To document the City's existing water rights, their current status, and future requirements.
- To evaluate past water quality and identify water quality improvements, as necessary.

- To document the City's operations and maintenance program.
- To prepare water use efficiency, cross-connection control, wellhead protection, and water quality monitoring plans.
- To comply with all other WSP requirements of DOH.

SUMMARY OF WSP CONTENTS

A brief summary of the content of the chapters in the WSP is as follows.

- The **Executive Summary** provides a brief summary of the key elements of this WSP.
- **Chapter 1** introduces the reader to the City's water system, the objectives of the WSP, and its organization.
- **Chapter 2** presents the water service area, describes the existing water system, and identifies adjacent water purveyors.
- **Chapter 3** presents related plans, land use, and population characteristics.
- **Chapter 4** identifies existing water demands and projected future demands.
- **Chapter 5** presents the City's operational policies and design criteria.
- **Chapter 6** discusses the City's water sources, water rights, and water quality monitoring.
- **Chapter 7** discusses the water system analyses and existing system deficiencies.
- **Chapter 8** discusses the City's operations and maintenance program.
- **Chapter 9** presents the proposed water system improvements, their estimated costs, and the schedule for implementation.
- **Chapter 10** summarizes the financial status of the water system and presents a plan for funding the water system improvements.
- The **Appendices** contain additional information and plans that supplement the main chapters of the WSP.

DEFINITION OF TERMS

The following terms are used throughout this WSP.

Consumption: The true volume of water used by the water system's customers. The volume is measured at each customer's connection to the distribution system.

Connection Charge: A one-time fee paid by a property owner when connecting to the City's system that is made up of both the System Development Charge and the Meter Installation Charge.

Cross-Connection: A physical arrangement that connects a public water system, directly or indirectly, with facilities that could present the potential for contaminating the public water system.

Demand: The quantity of water required from a water supply source over a period of time to meet the needs of domestic, commercial, industrial, and public uses, and provide enough water to supply firefighting, system losses, and miscellaneous water uses. Demands are normally discussed

in terms of flow rate, such as million gallons per day (MGD) or gallons per minute (gpm), and are described in terms of a volume of water delivered during a certain time period. Flow rates pertinent to the analysis and design of water systems are as follows:

- **Average Day Demand (ADD)**: The total amount of water delivered to the system in a year divided by the number of days in the year.
- **Maximum Day Demand (MDD)**: The maximum amount of water delivered to the system during a 24-hour time period of a given year.
- **Peak Hour Demand (PHD)**: The maximum amount of water delivered to the system, excluding fire flow, during a 1-hour time period of a given year. A system's peak hour demand usually occurs during the same day as the MDD.

Distribution System Leakage (DSL): Water that is measured as going into the distribution system but not metered as going out of the system.

Equivalent Residential Units (ERUs): One ERU represents the amount of water used by one single-family residence for a specific water system. The demand of other customer classes can be expressed in terms of ERUs by dividing the demand of each of the other customer classes by the demand represented by one ERU.

Existing Service Area: The specific area within the retail service area where the City already provides direct service, remote service, or where service connections are currently available.

Fire Flow: The rate of flow of water required during firefighting, which is usually expressed in terms of gpm.

Future Service Area: 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 Revised Code of Washington (RCW) and Chapter 246-293 WAC. The City's future service area aligns with what is designated in the 2011 *Clark County Coordinated Water System Plan*.

Head: A measure of pressure or force exerted by water. Head is measured in feet and can be converted to pounds per square inch (psi) by dividing feet by 2.31.

Headloss: Pressure reduction resulting from pipeline wall friction, bends, physical restrictions, or obstructions.

Hydraulic Elevation: The height of a free water surface above a defined datum; the height above the ground to which water in a pressure pipeline would rise in a vertical open-end pipe.

Local Facilities Charge: A one-time fee paid by a property owner when connecting to the City's water system. The local facilities charge provides for reimbursement of a pro rata portion of the original cost of water system local distribution extensions.

Maximum Contaminant Level (MCL): The maximum permissible level of contaminant in the water that the purveyor delivers to any public water system user, measured at the locations identified under WAC 246-290-300, Table 3.

Meter Installation Charge: The installation charge or hook-up fee that is paid by a property owner to reimburse the City for the cost incurred to make the physical connection to the water system. This cost includes both direct and indirect costs for installing the service line off the system's water main up to and including the City-owned water meter and advanced metering infrastructure (AMI) equipment.

Potable: Water suitable for human consumption.

Pressure Zone: A portion of the water system that operates from sources at a common hydraulic elevation. For example, the 529 Zone refers to the City's lower pressure zone, which has a reservoir with an overflow elevation of 529 feet.

Purveyor: An agency, subdivision of the state, municipal corporation, firm, company, mutual or cooperative association, institution, partnership, or persons or other entity owning or operating a public water system. Purveyor also means the authorized agents of such entities.

Retail Service Area: The specific area where the City has a duty to serve new service connections when the circumstances meet the following four threshold factors, per DOH publication 331-366:

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.

Service Area: The largest area identified on a map where the City currently provides direct service and remote service, and the area it plans to serve.

Supply: Water that is delivered to a water system by one or more supply facilities, which may consist of supply stations, booster pump stations, springs, and wells.

Storage: Water that is "stored" in a reservoir to supplement the supply facilities of a system and provide water supply for emergency conditions. Storage is broken down into the following five components, which are defined and discussed in more detail in **Chapter 7**: operational storage; equalizing storage; standby storage; fire flow storage; and dead storage.

System Development Charge: A one-time fee paid by a property owner when connecting to the City's water system. This fee pays for a new customer's equitable share of the cost of the existing system. This fee offsets the costs of providing water to new customers and recognizes that the existing water system was largely built and paid for by the existing customers.

Wholesale Service Area: The service area of entities with whom the City has a contract to provide wholesale water service. The wholesale service area is part of the City's service area; however, the City has no duty to service the wholesale service area.

LIST OF ABBREVIATIONS

The abbreviations listed in **Table 1-3** are used throughout this WSP.

Table 1-3
Abbreviations

Abbreviation	Description
AC	asbestos cement
ADD	Average Day Demand
AMI	Advanced Metering Infrastructure
AWWA	American Water Works Association
BPS	Booster Pump Station
CCR	Consumer Confidence Report
CIP	Capital Improvement Program
City	City of Battle Ground
County	Clark County
CPU	Clark Public Utilities
CWSP	Coordinated Water System Plan
CWSSA	Critical Water Supply Service Area
DBP	Disinfection Byproduct
DOH	Washington State Department of Health
DSL	Distribution System Leakage
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
ERU	Equivalent Residential Unit
fps	feet per second
GMA	Growth Management Act
gpm	gallons per minute
HGL	hydraulic grade line
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal
MDD	Maximum Day Demand
MG	Million Gallons
MGD	Million Gallons per Day
mg/L	milligrams per liter
OFM	Office of Financial Management
OSHA	Occupational Safety & Health Administration
PHD	Peak Hour Demand
PRV	pressure reducing valve
psi	pounds per square inch
PSV	pressure sustaining valve
PVC	polyvinyl chloride
RCW	Revised Code of Washington
RTU	remote telemetry unit
SCADA	supervisory control and data acquisition
SDWA	Safe Drinking Water Act
SEPA	State Environmental Policy Act
SOC	Synthetic Organic Chemical
SWTR	Surface Water Treatment Rule
TDH	total dynamic head
THM	Trihalomethane
UGA	Urban Growth Area
USGS	United States Geological Survey
VOC	Volatile Organic Chemical
WAC	Washington Administrative Code
WISHA	Washington Industrial Safety & Health Act
WSP	Water System Plan
WUCC	Water Utility Coordinating Committee
WUE	Water Use Efficiency

2 | WATER SYSTEM DESCRIPTION

INTRODUCTION

This chapter describes the City of Battle Ground's (City) retail water service area and water service agreements, and provides a thorough description of the water system and its individual components. The results of the evaluation and analyses of the existing water system are presented in **Chapter 7**.

WATER SERVICE AREA

History

A cohesive community began to take shape in the Battle Ground area in the earlier twentieth century. The City was incorporated in 1951, and began providing water and sewer services at this time. The City population remained relatively small for a long time, reaching a population of approximately 3,758 people in 1990. Population growth since 1990 has been significant, with the population reaching 9,322 people by 2000, 17,571 people by 2010, and 22,180 people by 2020. Due to its centralized location and strong retail uses near State Route (SR) 502 and SR 503, the City has become an appealing city for commuters from Portland and Vancouver. Growth is expected to continue as the City fills out its Urban Growth Area (UGA) and incorporates more of the surrounding area into the City limits.

Historically, the City relied exclusively on groundwater for its source of water. Wells No. 1 and No. 2, drilled in the 1950s, were the original wells for the City. As growth occurred, Wells No. 4 and No. 5 were drilled, and more recently Wells No. 6, No, 7, No. 8, and No. 9 were drilled and put into production. Because of high levels of iron in the aquifer source, the City does not intend to further expand the groundwater source within the UGA and is instead utilizing water supplied from an intertie with Clark Public Utilities (CPU). The current CPU intertie, located on the western edge of the City limits south of NE 219th Street, was constructed in 2013 and upsized in 2020. The City also maintains an emergency intertie with CPU located near the intersection of NE 199th Street and NE 122nd Avenue at the Maple Grove School.

From the 1950s to the 1990s, the City constructed five reservoirs on Tukes Mountain at the eastern limits of the City's water service area. This location has resulted in high pressures in the majority of the distribution system, requiring most individual services to install private pressure reducing valves. In 2004, the City constructed the 2.0 million gallon (MG) welded steel Horsethief reservoir west of SW 20th Avenue, which has improved system operation with additional storage for times of high water demand. Water is supplied from this reservoir to the distribution system via the Horsethief Booster Pump Station (BPS).

The inventory of City facilities will be discussed in more detail in the remainder of this chapter.

Existing Retail Water Service Area

The City is located in central Clark County adjacent to the East Fork Lewis River, several miles north of the Vancouver metro area. The City limits encompass an area of approximately 8.6 square miles, as shown on **Figure 2-1**. The City's existing water distribution system extends from the CPU intertie in the west to the eastern City limits in the Tukes Mountain area. A small portion of the distribution system is located outside of the northern City limits.

The City's existing water rights can be used throughout the defined water service area per the 2003 Municipal Water Law. The City's existing retail service area, which covers an area of approximately 5.5 square miles, is shown on **Figure 2-1**. The existing retail water service area includes a majority of the City limits and some small areas of unincorporated Clark County. The City's future service area, which includes expansions both inside and outside the UGA, also is shown on **Figure 2-1**.

Geography, Geology, and Topography

Clark County (County) is bounded on the north by the Lewis River, on the east by the western slopes of the Cascade Mountains, and on the south and west by the Columbia River. Bottomland along the Columbia River transitions to plains and terraces. The terrain rises in the northeast to the foothills of the Cascades where elevations climb to 4,000 feet. The County covers approximately 633 square miles, with forest covering more than 50 percent of the land. Major forested areas are in the north and northeast sections of the County.

Historically, the existing topography was influenced by geologic forces but is more recently influenced by surface water erosion. Down faulting has formed the Chelatchie Prairie and the Yacolt basin areas in the northeastern sections of the County. In general, glaciation, with subsequent erosion and deposition, has played a major part in forming the terraced landscape, which occurs in the Fourth Plain area and glacial outwash lowlands along the Columbia River.

Major bodies of water include Vancouver Lake in the southwest corner, Lacamas Lake in the southeast corner, and Lake Merwin and the Yale Reservoirs on the northern boundary. These latter two bodies of water were created by dam construction for the generation of electrical power. Major rivers include the North Fork and East Fork of the Lewis River, the Washougal River, and the Columbia River. Stream systems include Salmon, Gee, Cedar, Burnt Bridger, Whipple, and Lacamas Creeks.

Most of the City's retail service area is relatively flat, with the vast majority of service connections located between approximately 260 and 360 feet in elevation. The predominant topographical feature is Tukes Mountain, which rises over 300 feet above the surrounding terrain on the east side of the water service area. Some steep slopes exist in this area. Features that present significant barriers to the development of the water distribution system include Weaver Creek and state highways SR 502 and SR 503. The City works closely with the Washington State Department of Transportation to coordinate the installation of water facilities along new or upgraded highways that have increasingly restricted access.

INVENTORY OF EXISTING WATER FACILITIES

This section provides a detailed description of the existing water system and the current operation of the facilities. The analysis of the existing water facilities is presented in **Chapter 7**. Additional information on the City's existing water system facilities is included on the Washington State Department of Health (DOH) Water Facilities Inventory (WFI) form in **Appendix A**.

Pressure Zones

The City serves customers within an elevation range of approximately 255 feet above sea level in the western edges of the City to approximately 570 feet above sea level on Tukes Mountain. The wide elevation range requires that the water pressure be increased or reduced to maintain pressures that are safe and sufficient to meet the flow requirements of the system. The City achieves this by dividing the water system into two different pressure zones, as shown on **Figure 2-1**. The pressure in each zone is regulated by reservoir levels, pump settings, and private pressure reducing valves, or a combination of these, as illustrated in the hydraulic profile (**Figure 2-2**).

529 Zone

The 529 Zone, which currently serves customers within an elevation range of approximately 255 feet to 415 feet, is the City's main pressure zone and the largest by area. The zone is directly supplied by the CPU Intertie/NE 219th Street BPS, the Horsethief BPS, and Wells No. 1, No. 2, No. 4, No. 5, and No. 6. The Horsethief BPS pumps water to the 529 Zone from the Horsethief Reservoir, which has an overflow elevation of 296 feet. Wells No. 7, No. 8, and No. 9 discharge to the Horsethief Reservoir. Supply also can be provided to the zone from a CPU emergency intertie near the intersection of NE 199th Street and NE 122nd Avenue at the Maple Grove School.

The five Tukes Mountain Reservoirs, which have an overflow elevation of approximately 529 feet, establish the hydraulic grade for the zone, as illustrated on **Figure 2-2**. This location has resulted in high pressures in the majority of the distribution system, requiring most individual services to install private pressure reducing valves (PRVs).

784 Zone

The 784 Zone serves the City's high elevation customers on Tukes Mountain within an elevation range of approximately 375 feet to 570 feet. The 784 Zone is a closed zone (without storage), supplied and pressurized by the Tukes Mountain BPS. As illustrated in the hydraulic profile (**Figure 2-2**), the Tukes Mountain BPS pumps water from the 529 Zone to supply the homes on Tukes Mountain that are too close in elevation to the reservoirs to receive adequate pressure by gravity.

Supply Facilities

The existing water system is supplied by eight groundwater wells and one intertie with CPU. An emergency intertie with CPU also is available. **Table 2-1** summarizes the City's existing supply sources and their capacities in gallons per minute (gpm). **Table 2-1** also summarizes water treatment facilities at each of the City's wells. Additional detail on existing sources is provided in **Chapter 6**. All water sources are equipped with flow meters to measure and record production rate and volume. All water sources except Wells No. 4 and No. 5 have remote operation and monitoring capability provided by a Supervisory Control and Data Acquisition system that is managed for the City by CPU. Remote operation and monitoring capability is being added to Wells No. 4 and No. 5 in 2021.

Table 2-1

Supply Facilities Summary

Name	Pressure Zone	Year Constructed	Status	Existing Capacity (gpm)	Well Depth (feet)	Water Treatment
Wells						
Well No. 1	529 Zone	1950s	Active	190	148	Chlorination, Fluoridation
Well No. 2	529 Zone	1950s	Active	90	142	Chlorination, Fluoridation
Well No. 4	529 Zone	1975	Active	60 - 70	136	Chlorination, Fluoridation
Well No. 5	529 Zone	1975	Active	60 - 70	136	Chlorination, Fluoridation
Well No. 6	529 Zone	1996	Offline	0	400	Chlorination, Fluoridation, Sequestering w/ Sodium Silicate (Iron and Manganese)
Well No. 7	Horsethief Reservoir	1999	Offline	0	437	Chlorination, Fluoridation, Pyrolusite Adsorption (Iron and Manganese)
Well No. 8	Horsethief Reservoir	1999	Offline	0	438	Chlorination, Fluoridation, Pyrolusite Adsorption (Iron and Manganese)
Well No. 9	Horsethief Reservoir	2004	Active	500	421	Chlorination, Fluoridation, Pyrolusite Adsorption (Iron and Manganese)
Supply Intertie						
CPU NE 219th St	529 Zone	2013	Active	2,000	N/A	Fluoridation
Emergency Intertie						
CPU NE 122nd Ave	529 Zone	-	Emergency	547	N/A	N/A

Wells

Wells No. 1 and No. 2



Wells No. 1 and No. 2

Originally constructed in the 1950s, Wells No. 1 and No. 2 are located at the intersection of SW 1st Street and NW 5th Avenue. Both wells supply water directly to the 529 Zone. Well No. 1 was drilled to a depth of 148 feet and produces approximately 190 gpm using a vertical turbine pump. Well No. 2, drilled to a depth of 142 feet, produces approximately 90 gpm using a submersible pump. These wells generally run continuously to provide supply during the summer and are only sometimes turned off during the winter. A portable generator can be used to power the wells. Both wells are chlorinated with 12.5-percent liquid sodium hypochlorite, and fluoride is added for dental benefits.

Wells No. 4 and No. 5





Wells No. 4 and No. 5

Wells No. 4 and No. 5 are located west of the intersection at SW 10th Street and SW 2nd Avenue. These wells supply water directly to the 529 Zone. Both wells are drilled to a depth of 136 feet and currently run essentially 24 hours a day, 7 days a week, reliably producing approximately 60 to 70 gpm each. There is no provision for backup power onsite, but the power grid in this area historically has been very reliable. Both wells are treated with 12.5-percent liquid sodium hypochlorite and fluoride.

Well No. 6



Well No. 6

Well No. 6 is located to the west of NE 112th Avenue, approximately halfway between SW 9th Way and SW 6th Street. Constructed in 1996, Well No. 6 was drilled to a depth of approximately 400 feet. When operating, a submersible pump supplies water directly to the 529 Zone at a flow rate of approximately 200 to 250 gpm. The well is treated with 12.5-percent liquid sodium hypochlorite for disinfection, fluoride for dental benefits, and sodium silicate sequestration for iron and manganese. In the event of a power failure, the well can be operated with a portable generator.

Well No. 6 has been offline for approximately the past 4 years due to iron bacteria corrosion issues. When operating, the well has repeatedly experienced pump/column failure every 2 to

3 years due to corrosion, necessitating replacement of the pump/mechanical equipment. The City currently is evaluating improvement options to bring Well No. 6 back online.

Wells No. 7, No. 8, and No. 9

Wells No. 7, No. 8, and No. 9 are located in the vicinity of the Horsethief Reservoir and pump water directly to the reservoir. Water is then pumped from the reservoir to the 529 Zone distribution system by the Horsethief BPS. Wells No. 7 and No. 8 are located in a concrete masonry unit building off SW 11th Street to the south of the reservoir, and Well No. 9 is located to the east of the reservoir and BPS along the access road from SW 11th Circle. Wells No. 7 and No. 8 were both constructed in 1999, while Well No. 9 was constructed in 2004. Wells No. 7, No. 8, and No. 9 were drilled to depths of 437, 438, and 421 feet, respectively. When operating, Well No. 7 produces approximately 350 gpm through a vertical turbine pump, Well No. 8 produces approximately 400 gpm through a vertical turbine pump, and Well No. 9 produces approximately 500 gpm through a submersible pump. In the event of a power failure, Wells No. 7 and No. 8 can be operated with a portable generator, and Well No. 9 can be operated by the Horsethief BPS generator.



Wells No. 7 and No. 8



Well No. 9

Water from all three wells is chlorinated with 12.5-percent liquid sodium hypochlorite and treated with fluoride. Additionally, the treatment facility for Wells No. 7, 8, and 9 uses pyrolusite/manganese dioxide ore (AS-721 media) to adsorb dissolved iron and manganese. Chlorine is added prior to the adsorption units to provide continuous regeneration of the manganese dioxide media, as well as for disinfection residual maintenance in the distribution system.

Wells No. 7 and No. 8 are currently offline due to reductions in capacity caused by iron bacteria. Well No. 9 also suffers from these problems, but not as severely as Wells No. 7 and No. 8. The City has tried multiple rehabilitation techniques with Wells No. 7 and No. 8 with little success. Further rehabilitation attempts are planned for 2021.

Interties

Water system interties are physical connections between two adjacent water systems. Interties normally are separated by a closed isolation valve or control valve. Emergency supply interties provide water from one system to another during emergency situations only. An emergency situation may occur when a water system loses its main source of supply or a major transmission main, or during firefighting situations, and is unable to provide a sufficient quantity of water to its customers. Normal supply interties provide water from one system to another during non-emergency situations and typically are supplying water at all times.

The City's main supply intertie with CPU is located on the western edge of the City limits, south of NE 219th Street. Originally constructed in 2013, the intertie was upsized to a design capacity of 2,000 gpm in 2020. The City's intertie BPS, described in further detail in the **Pump Station Facilities** section of this chapter, pumps water from CPU's Meadow Glade Pressure Zone to the City's 529 Zone. Fluoride treatment is added at the BPS.

The City also maintains an emergency intertie with CPU. The 4-inch intertie, with an approximate capacity of 547 gpm, is located near the intersection of NE 199th Street and NE 122nd Avenue at the Maple Grove School.

Pump Station Facilities

The City's water system has three booster pump station facilities: the NE 219th Street BPS that supplies water from CPU to the City's 529 Zone, the Horsethief BPS that supplies water from the Horsethief Reservoir to the 529 Zone, and the Tukes Mountain BPS that supplies water to the closed 784 Zone from the 529 Zone. A summary of the pumping facilities is shown in **Table 2-2**, and a detailed description of each facility follows.

Table 2-2

Booster Pump Station Facilities Summary

Name	Suction Pressure Zone	Discharge Pressure Zone	Year Constructed	Number of Pumps	Pump Type	Pump Motor Size (HP)	Pump Capacity	Has VFDs?	Sum of Pump Capacities (gpm)[1]	Generator
NE 219th Street BPS	CPU Meadow Glade (467 Zone)	529 Zone	2013 (upsized 2020)	4	Horizontal end-suction	(4) 40	(4) 1,000 gpm @ 100' TDH	yes	4,000	On-site diesel generator
Horsethief BPS	Horsethief Reservoir (Overflow El. 296 feet)	529 Zone	2004	4	Horizontal end-suction	(2) 50	(2) 500 gpm @ 270' TDH	yes	3,000	On-site diesel generator
						(2) 100	(2) 1,000 gpm @ 270' TDH			
Tukes Mountain BPS	529 Zone	784 Zone	1990s	4	Vertical	5	30 gpm @ 240' TDH	no	2,330	Onsite
					Horizontal end-suction	30	300 gpm @ 240' TDH			
						(2) 40	(2) 1,000 gpm @ 100' TDH			

1 = The actual total station capacity is typically less than the sum of pump capacities, due to increased headlosses at higher flow rates. Total capacity also may be limited if the BPS electrical system is not designed to run all pumps concurrently. The NE 219th Street BPS capacity also does not take into account the lower volume currently available from CPU per the Water Supply Agreement.
TDH - Total dynamic head

NE 219th Street BPS

The NE 219th Street BPS, which supplies water from the CPU intertie to the City's 529 Zone, is located on the western edge of the City limits, south of NE 219th Street. The BPS was constructed in 2013 with a firm capacity of 1,000 gpm and recently was upgraded to pump the full 2,000 gpm available per the City's Water Supply Agreement with CPU.



NE 219th Street Booster Station

The pump station is equipped with four 40 horsepower (hp) horizontal end-suction pumps with variable frequency drives (VFDs), each with a capacity of 1,000 gpm. Future completion of a transmission main between the CPU Paradise Point Water Treatment Plant and the NE 219th Street BPS will allow utilization of the BPS's full capacity. A permanent on-site diesel generator provides backup power for the BPS.

Horsethief BPS

The Horsethief BPS supplies water from the adjacent Horsethief Reservoir (overflow elevation 296 feet) to the City's 529 Zone. As shown in **Figure 2-2**, the Horsethief BPS is required to supply the water produced from Wells No. 7, No. 8, and No. 9 to the distribution system, as well as to utilize the water volume in the Horsethief Reservoir, which is stored at a lower hydraulic grade line (HGL) than the City's distribution system.



Horsethief Booster Station

The Horsethief BPS has 4 horizontal end-suction pumps with VFDs, with a total capacity of approximately 3,000 gpm. An on-site diesel generator provides backup power to the BPS.

Tukes Mountain BPS

The Tukes Mountain BPS was constructed in the 1990s to provide water to the 784 Zone on Tukes Mountain, which is a closed zone without storage. The BPS is located just north of the intersection of NE 14th Avenue and NE 2nd Street. The station is equipped with a 30 gpm jockey pump, a 300 gpm mid-range pump, and two 1,000 gpm fire pumps to provide supply to the 784 Zone. All pumps except the mid-range pump are equipped with PRVs to moderate the station's discharge pressure. Backup power is provided by an on-site generator.



Tukes Mountain Booster Station

Storage Facilities

The City's water system has six storage facilities that provide storage for the distribution system. A summary of the storage facilities is shown in **Table 2-3**, and a detailed description of each facility follows.

Table 2-3

Storage Facilities Summary

Reservoir	Approximate Location	Pressure Zone	Year Constructed	Construction Type	Capacity (MG)	Diameter (feet)	Height (feet)	Overflow Elev. (feet)
Horsethief Reservoir	West of intersection of SW 12th Avenue and SW 11th Circle	296 Zone	2004	Steel	2.06	110	31	296
Tukes Mountain No. 1	Tukes Mountain, north of intersection of E Main Street and NE 153rd Place	529 Zone	1954	Steel	0.25	35	35	529
Tukes Mountain No. 2			1970s	Concrete	0.18	25	50	529
Tukes Mountain No. 3			1980s	Concrete	0.17	25	45	529
Tukes Mountain No. 4			1980s	Concrete	0.15	25	40	529
Tukes Mountain No. 5			1999	Steel	1.03	68	38	529

Horsethief Reservoir

The Horsethief Reservoir, constructed in 2004, is a ground-level steel tank with a total volume of approximately 2.06 MG. The reservoir is located near the Horsethief subdivision in the southwest part of the City and stores water supplied by Wells No. 7, No. 8, and No. 9. The reservoir provides suction supply to the adjacent Horsethief BPS that pumps water to the 529 Zone. The reservoir is 110 feet in diameter, 31 feet tall, and has an overflow elevation of 296 feet. A stairway allows access to the top of the tank.



Horsethief Reservoir

Tukes Mountain Reservoirs

The five Tukes Mountain Reservoirs are located on Tukes Mountain on the eastern edge of the distribution system. All five reservoirs have an estimated overflow elevation of 529 feet, which establishes the hydraulic grade for the City's main 529 Zone. Tukes Mountain Reservoir No. 1, constructed in 1954, is a steel reservoir that is 35 feet in diameter and 35 feet tall with a capacity of approximately 0.25 MG. Tukes Mountain Reservoirs No. 2, No. 3, and No. 4 are 25-foot-diameter concrete reservoirs, constructed in the 1970s and 1980s to meet increasing demands, with heights of 40 to 50 feet. Tukes Mountain Reservoir No. 5, a 1.03 MG steel reservoir constructed in 1999, is the largest by volume, measuring 68 feet in diameter and 38 feet tall. Tukes Mountain Reservoir No. 5 is seismically restrained.



Tukes Mountain Reservoirs

Pressure Reducing Stations

Pressure reducing stations are connections between adjacent pressure zones that allow water to flow from the higher pressure zone to the lower pressure zone while reducing the pressure of the water to maintain a safe range of operating pressures in the lower zone. A pressure reducing station typically consists of a below-grade vault (typically concrete) that normally contains two PRVs, sometimes a pressure relief valve, piping, and other appurtenances. The PRV hydraulically varies the flow rate through the valve (up to the flow capacity of the valve) to maintain a constant set pressure on the downstream side of the valve for water flowing into the lower pressure zone.

Although the City does not utilize regional pressure reducing stations, high service pressures in the 529 Zone require individual PRVs on all service connections with pressure over 80 pounds per square inch (psi) at the meter.

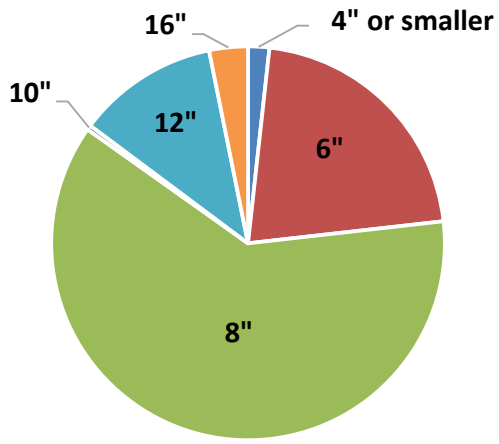
Distribution and Transmission System

The City's water system contains approximately 85 miles of water main ranging from 2 inches to 16 inches in diameter. As shown in **Table 2-4**, most of the water main (approximately 95 percent) within the system is 6, 8, or 12 inches in diameter.

Table 2-4

Water Main Diameter Inventory

Diameter (Inches)	Length (Feet)	% of Total
4 or smaller	7,851	1.7%
6	96,597	21.5%
8	277,245	61.6%
10	1,724	0.4%
12	52,280	11.6%
16	14,303	3.2%
Total	**450,000**	**100%**



While specific material and installation year information is generally not available in the City's water system mapping, the majority of the water main in the City's system is constructed of ductile iron (DI) or polyvinyl chloride (PVC). Some older asbestos cement (AC) and steel water mains are still in service. While the City's current water main construction standards call for DI pipe, the City has observed corrosion on DI pipes and early service saddle failures due to acidic soils. As a result, the City is considering changing the construction standards from DI to C900 PVC.

Water System Operation and Control/Telemetry and Supervisory Control System

Successful operation of any municipal water system requires gathering and using accurate water system information. A telemetry and supervisory control system gathers information and can control a system efficiently by automatically optimizing facility operations. A telemetry and supervisory control system also provides instant alarm notification to operations personnel in the event of equipment failures, operational problems, fire, or other emergency situations.

The City has an automated telemetry system that monitors and operates the water system, including signaling wells and booster pumps to turn on and off based on predetermined settings such as reservoir water levels. The telemetry system is managed for the City by CPU, and is monitored by CPU at its Operations Center at 8600 NE 117th Avenue in Vancouver, WA. Remote screens at the Battle Ground Operations Center allow City staff to monitor the telemetry system and intercept alarms or otherwise note water system operating conditions. Remote operation and monitoring capability is available for all sources except Wells No. 4 and No. 5 (this capability is being added to Wells No. 4 and No. 5 in 2021).

WATER SERVICE AGREEMENTS

Water Service Area Agreements

As documented in the *Clark County Coordinated Water System Plan*, all areas of the County fall within the designated service area of an existing water purveyor. The City and CPU have agreed that CPU will continue to serve any of its service area that is annexed by the City. Consistent with the City's service area, any area annexed that is not currently served by CPU will be served by the City.

SATELLITE SYSTEM MANAGEMENT

A Satellite System Management Agency (SSMA) is defined as a person or entity that is certified by DOH to own or operate more than one public water system without the necessity for a physical connection between such systems. SSMAs were created to stop the proliferation of small water systems, many of which could not meet federal and state water quality and water system planning regulations. The goal of SSMAs is to ensure that the people of Washington State will receive safe and reliable water supplies in the future from professionally managed or properly operated water systems. SSMAs can provide three different levels of service:

1. Ownership of the satellite system;
2. Operations and management of the satellite system; or
3. Contract services only.

The service can be provided to new systems, existing systems that are no longer viable, or existing systems placed into receivership status by DOH.

The City currently is not a certified SSMA and is not currently considering assuming such responsibility in the future.

ADJACENT WATER SYSTEMS

Several water systems are adjacent or close to the City's water service area. **Figure 2-3** shows the regional water supply setting, including the City's existing retail service area and future

service area, and other purveyors' service areas. Three major adjacent purveyors are shown in **Table 2-5** and **Figure 2-3** and described as follows in additional detail.

Table 2-5

Adjacent Systems

Water System Name	Approximate Location in Relation to the City's Retail Water Service Area	Approximate Number of Service Connections	Source of Supply
City of Ridgefield	West	4,276	7 wells, 3 interties
Clark Public Utilities	Surrounding Areas	35,141	45 wells, 2 interties
City of Vancouver	South	106,921	48 wells

City of Ridgefield

The City of Ridgefield is located to the west of the City. Ridgefield's water system serves approximately 4,276 connections, with a residential population of approximately 9,770 people and a non-residential population of approximately 4,986 people. Water is supplied from seven groundwater wells and three interties.

Clark Public Utilities

The Clark Public Utilities service area surrounds the City. The water system provides service to approximately 35,141 connections, with a residential population of approximately 98,232 people and a non-residential population of approximately 12,433 people. Water is supplied from 45 groundwater wells and 2 interties. The City has one normal supply intertie and one emergency intertie with CPU.

City of Vancouver

The City of Vancouver is located to the south of the City. Vancouver serves approximately 106,921 connections, with a residential population of approximately 257,083 people. Water is supplied from 48 groundwater wells.

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Tukes Mountain Res. No. 1
0.25 MG
Overflow Elev: 529'
Height: 35'

Tukes Mountain Res. No. 2
0.18 MG
Overflow Elev: 529'
Height: 50'

Tukes Mountain Res. No. 3
0.17 MG
Overflow Elev: 529'
Height: 45'

Tukes Mountain Res. No. 4
0.15 MG
Overflow Elev: 529'
Height: 40'

Tukes Mountain Res. No. 5
1.03 MG
Overflow Elev: 529'
Height: 38'

CPU Intertie
NE 219th St
(2,000 gpm)

NE 219th St BPS

Tukes Mountain BPS

Well No. 9
(500 gpm)

Well No. 6
(Offline)

Wells No. 1 and No. 2
(190 and 90 gpm)

Wells No. 4 and No. 5
(60-70 gpm each)

Wells No. 7 and No. 8
(Offline)

Horsethief Reservoir
2.06 MG
Overflow Elev: 296'
Height: 31'

Horsethief Pump Station

CPU Intertie
NE 122 Ave
(547 gpm)
(Emergency)

East Fork Lewis River
Mill Creek
Woodin Creek
Salmon Creek

NE Manley Rd
NE Lewisville Hwy
NE Axford Rd
NE 147th Ave
NE 249th St
NE 244th St
NW 25th St
NE 152nd Ave
NE 142nd Ave
NE 112th Ave
NE 122nd Ave
NE 132nd Ave
NE 239th St
NE 92nd Ave
NW 20th Ave
NW 10th Ave
N Parkway Ave
NE Grace Ave
NE 10th St
W Main St
NE 219th St
SW 20th Ave
S Parkway Ave
SE Grace Ave
SE Eaton Blvd
NE 199th St
NE 167th Ave
NE 189th St
SW 40th St
NE 117th Ave
NE Caples Rd
NE 154th St
NE 159th St
NE 152nd Ave

Legend

- Wells
- Intertie
- Pump Station
- Reservoir

Pressure Zones

- 529 Zone (Main)
- 784 Zone (Tukes Mountain)

Planning Boundaries

- City Limits
- Urban Growth Area
- Retail Service Area
- Future Service Area

C:\DWG\COPY_OF_FIGURE 2-1_EXISTING_SYSTEM.MXD BY: SPERKINS PLOT DATE: DEC 29, 2021 COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON SOUTH FIPS 4602 FEET

RH2 NORTH

1 inch = 1,000 feet

0 500 1,000 2,000 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2”

Figure 2-1
Existing Water System
City of Battle Ground Water System Plan

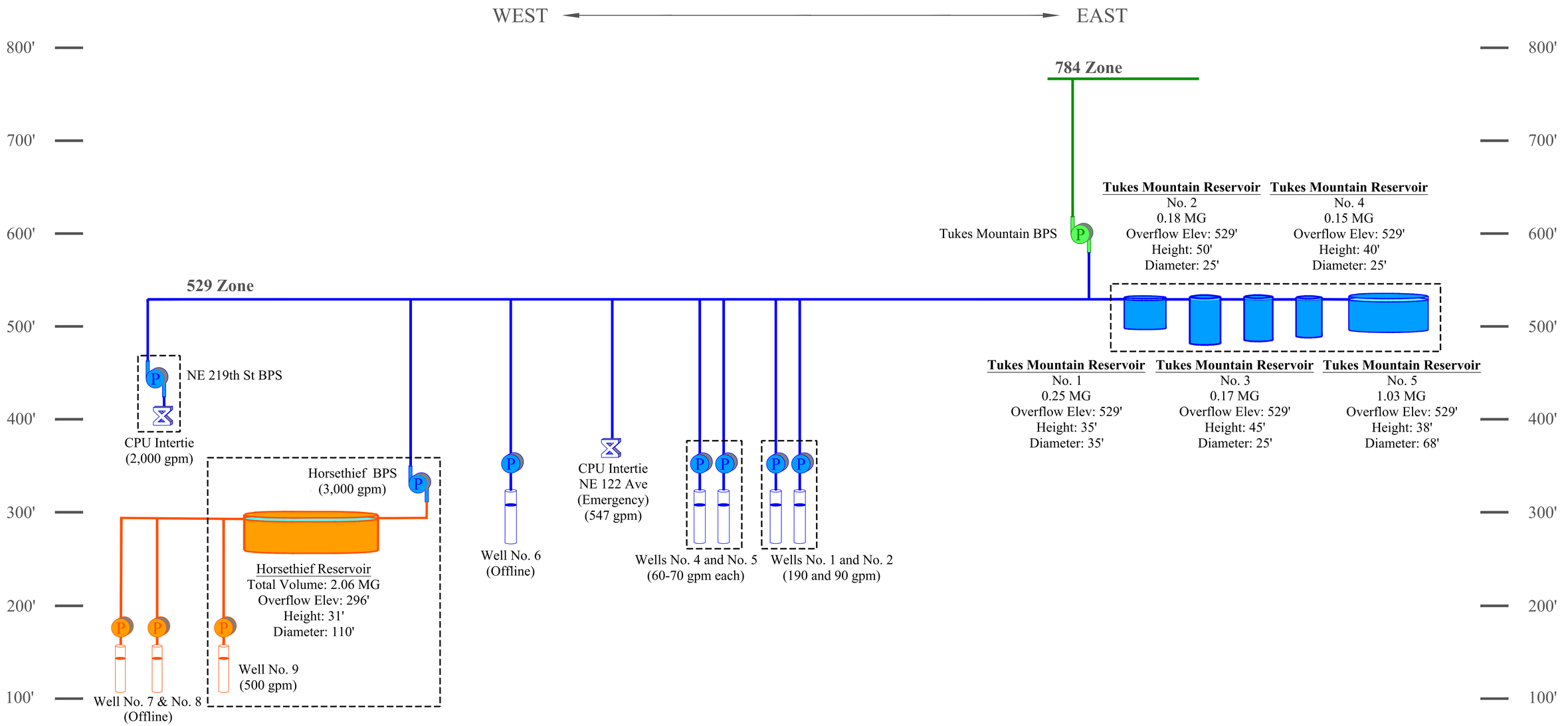
Vicinity Map



Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community

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Legend

- 529 Zone
- 784 Zone
- Booster Pump Station
- Facilities at Same Site
- Intertie
- Well Source

Figure 2-2
Existing System Hydraulic Profile
City of Battle Ground
Water System Plan

Date: Sep 21, 2021 Filename: J:\DATA\BTLG\20-0092\CAD\BTLGWSP-HPX.DWG

Figure 2-3
Adjacent Water Systems
City of Battle Ground Water System Plan

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Vicinity Map



Legend

- Battle Ground Future Service Area
- Battle Ground Existing Retail Service Area
- Battle Ground City Limits
- Battle Ground Urban Growth Area

Adjacent Water Systems

- Clark Public Utilities
- City of Ridgefield
- City of Vancouver

City of Ridgefield

City of Battle Ground

Clark Public Utilities

City of Vancouver

1 inch = 3,000 feet

0 1,500 3,000 6,000 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2"

RH2

NORTH

C:\DWG\COPY_OF_FIGURE 2-3_ADJACENT_SYSTEMS.MXD BY: SPERKINS PLOT DATE: DEC 29, 2021 COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON NORTH FIPS 4601 FEET

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3 | LAND USE AND POPULATION

INTRODUCTION

The State of Washington Growth Management Act (GMA) requires, among other things, consistency between land use and utility plans and their implementation. This chapter demonstrates the compatibility of the City of Battle Ground's (City) Water System Plan (WSP) with other plans, identifies the designated land uses within the existing and future service area, and presents population and employment projections within the City's planning area.

COMPATIBILITY WITH OTHER PLANS AND POLICIES

To ensure that the WSP is consistent with the land use policies that guide it and other related plans, the following planning documents were examined.

- State of Washington Growth Management Act
- *City of Battle Ground Comprehensive Plan 2015-2035*
- *Clark County (County) Comprehensive Growth Management Plan 2015-2035*
- *Clark County Coordinated Water System Plan*
- *Clark Public Utilities (CPU) Water System Plan*

Growth Management Act

The State of Washington GMA of 1990 (and its multiple amendments) defined four goals relevant to this WSP:

1. Growth should be in urban areas;
2. There should be consistency between land use and utility plans and their implementation;
3. There should be concurrency of growth with public facilities and services; and
4. Critical areas should be designated and protected.

Urban Growth Area

The GMA requires that the County designate an Urban Growth Area (UGA) where most future urban growth and development will be directed. The countywide UGA is defined in the County's *Comprehensive Plan* and encompasses the area where this urban growth and development is projected to occur over the 20-year planning period. The current County UGA boundaries in the vicinity of the City are shown on **Figure 3-1**.

Consistency

The GMA requires planning consistency from two perspectives. First, it requires consistency of plans between jurisdictions. This means that plans and policies of the City and County must be

consistent per Revised Code of Washington (RCW) 36.70A.100. Second, the GMA requires that the implementation of the WSP be consistent with comprehensive plans (RCW 36.70A.120).

The Washington State Department of Health (DOH) 2003 Municipal Water Law also requires that water system plans are consistent with local plans and regulations. The signed Consistency Statement Checklists included in **Appendix D** from the City and Clark County planning departments document the determination that this WSP is consistent with their plans and regulations.

Concurrency

Concurrency means that adequate public facilities and services be provided at the time that growth occurs. For example, growth should not occur where schools, roads, and other public facilities are overloaded. To achieve this objective, the GMA directs growth to areas already served or readily served by public facilities and services (RCW 36.70A.110). It also requires that when public facilities and services cannot be maintained at an acceptable level of service, the new development should be prohibited (RCW 36.70A.110).

Critical Areas

The GMA requires that critical areas be designated and protected. Critical areas include aquifer recharge areas, wetlands, frequently flooded areas, streams, wildlife habitat, landslide hazard areas, seismic hazard areas, and steep slopes. The City has adopted development regulations identifying and protecting critical areas as required. The State Environmental Policy Act (SEPA) Checklist in **Appendix E** addresses other environmental concerns.

City of Battle Ground Comprehensive Plan

The City's *Comprehensive Plan 2015-2035* was adopted in 2016. The plan was developed to describe the City's vision for 2035 and to provide goals and policies for achieving the vision, as well as to meet the requirements of the GMA.

The Land Use Element of the City's *Comprehensive Plan* is the City's vision of how growth and development should occur over a 20-year horizon. While the Land Use Element goals and policies set forth general standards for locating land uses, the *Comprehensive Plan* land use map (Figure 3-1) indicates geographically where certain types of uses may be appropriate. The land use map is a blueprint for the development of an area. The City's existing land use is shown in **Figure 3-1**.

The Land Use Element considers the general location of land uses, as well as the appropriate intensity and density of land uses given the current development trends. The Transportation and Capital Facilities Elements ensure that a new development will be served adequately without compromising adopted levels of service, which is consistent with the principal of concurrency as defined in the GMA.

Clark County Comprehensive Growth Management Plan

The current version of the *Clark County Comprehensive Growth Management Plan 2015-2035* was adopted in June 2016, and last amended in 2021. The plan includes the following components.

- Community Framework Plan
- Chapter 1: Land Use Element
- Chapter 2: Housing Element
- Chapter 3: Rural and Natural Resource Element
- Chapter 4: Environmental Element
- Chapter 5: Transportation Element
- Chapter 6: Capital Facilities and Utilities Element
- Chapter 7: Parks and Open Space Element
- Chapter 8: Historic Preservation Element
- Chapter 9: Economic Development Element
- Chapter 10: School Element
- Chapter 11: Community Design Element
- Chapter 12: Annexation Element
- Chapter 13: Shoreline Element
- Chapter 14: Procedures for Planning Element

The County's *Comprehensive Growth Management Plan* guides development and designates Land Use in unincorporated Clark County. County Land Use inside the City's future water service area is shown on **Figure 3-1**; the *Comprehensive Growth Management Plan* can be referenced for County Land Use outside the City's future water service area.

Clark County Coordinated Water System Plan

The *Clark County Coordinated Water System Plan* (CWSP), originally completed in 1983 and most recently updated in November 2011, was developed in response to the declaration of Clark County as a Critical Water Supply Service Area (CWSSA). The CWSP was developed under the guidance of the County's Water Utility Coordinating Committee (WUCC), which is a standing working group composed of principal managerial and technical officials with Clark County Community Planning, Public Health, Office of the Fire Marshal, Clark Public Utilities, DOH, cities of Battle Ground, Camas, La Center, Ridgefield, Vancouver, and Washougal, and the Town of Yacolt.

The purpose of the CWSP is to assist the area's water utilities in establishing an effective process for planning and developing public water systems and restricting the proliferation of small public water systems. The CWSP accomplishes this by establishing future service area boundaries, minimum design standards, service review procedures, appeals procedures, long-term regional water supply strategies, and a satellite system management program. As

shown in the following sections of this WSP, the City has established policies, design criteria, and goals that meet or exceed the requirements and goals of the CWSP.

Clark Public Utilities Water System Plan

Like the City, CPU is required to develop a WSP and update it every 10 years to comply with DOH regulations under Chapter 246-290 Washington Administrative Code (WAC). CPU's February 2011 WSP is currently being updated. The City relies on CPU for a significant amount of its water supply and will continue to do so in the future, rather than expanding the City-owned groundwater sources within the UGA. The current Water Supply Agreement between the two purveyors provides for a maximum supply rate of 2,000 gallons per minute from the NE 219th Street intertie.

As shown on **Figure 2-3**, CPU's service area includes a significant portion of the City limits and UGA. The City and CPU have agreed that CPU will continue to serve any of its service area that is annexed by the City in the future. Consistent with the City's service area policies, any area annexed that is not currently served by CPU will be served by the City.

LAND USE

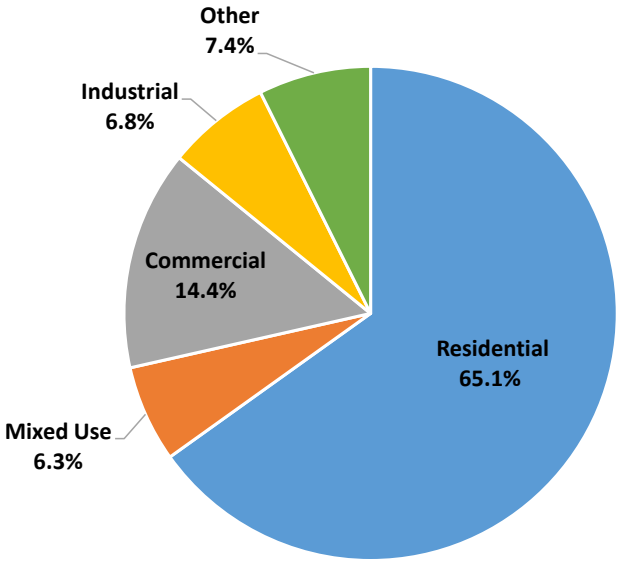
The existing retail service area includes a majority of the City limits and some small areas of unincorporated Clark County, for a total of approximately 5.5 square miles. The future service area includes approximately 2.5 additional square miles. The Land Use Map for the future service area, **Figure 3-1**, guides development and can be used to forecast future demands. Land use outside the City is designated by the County, as shown on **Figure 3-1**.

Approximately 65.1 percent of the area within the future service area is designated for residential use, as indicated in **Table 3-1**. Approximately 6.3 percent of the future service area is designated for mixed use; approximately 14.4 percent is designated for commercial use; approximately 6.8 percent is designated for industrial use; and approximately 7.4 percent is designated for other uses (Airpark, Parks, Public Facility, and Urban Reserve land uses).

Table 3-1

Land Use Inside Future Service Area

Land Use Type	Acres	% of Total
Residential	3,331	65.1%
Mixed Use	324	6.3%
Commercial	736	14.4%
Industrial	347	6.8%
Other	377	7.4%
Total	**5,114**	**100.0%**



POPULATION

Household Trends

The City's residential areas are comprised largely of single-family residences. The City strives to meet the County's objective to have a housing split of 75 percent single-family and 25 percent multi-family housing types. Per the Washington State Office of Financial Management (OFM), there were approximately 7,427 total housing units in the City in 2020. Of these, 5,896 were single-family housing units, 1,277 were multi-family housing units, and 254 were mobile homes or other types of housing unit. Per the OFM's Census 2010 Summary File 1, the average household size is estimated to be 3.09 people in the City, and 2.82 people in unincorporated Clark County.

Historical and Future City Population

The City and County have experienced rapid population growth over the past several decades. Based on OFM estimates, the population of Clark County increased by approximately 17 percent from 2010 to 2020; the population of the City increased by approximately 26 percent during the same period. **Table 3-2** illustrates the historical population growth within the City limits since 1990. The sources of the historical population numbers are the decennial census and OFM intercensal estimates.

Table 3-2

Population Trends within the City Limits

Year	Population
1990	3,758
1995	5,015
2000	9,322
2005	14,730
2010	17,571
2011	17,780
2012	17,920
2013	18,130
2014	18,680
2015	19,250
2016	19,640
2017	20,370
2018	20,890
2019	21,520
2020	22,180

The City's *Comprehensive Plan* projects that the City's population will reach 38,443 by 2035, which corresponds to a compound annual growth rate of approximately 3.7 percent. Projected future population growth within the City limits, shown in **Table 3-3** and **Chart 3-1**, is based on the assumption that this growth rate will continue through 2040. The City is projected to have a population of 46,178 people in 2040.

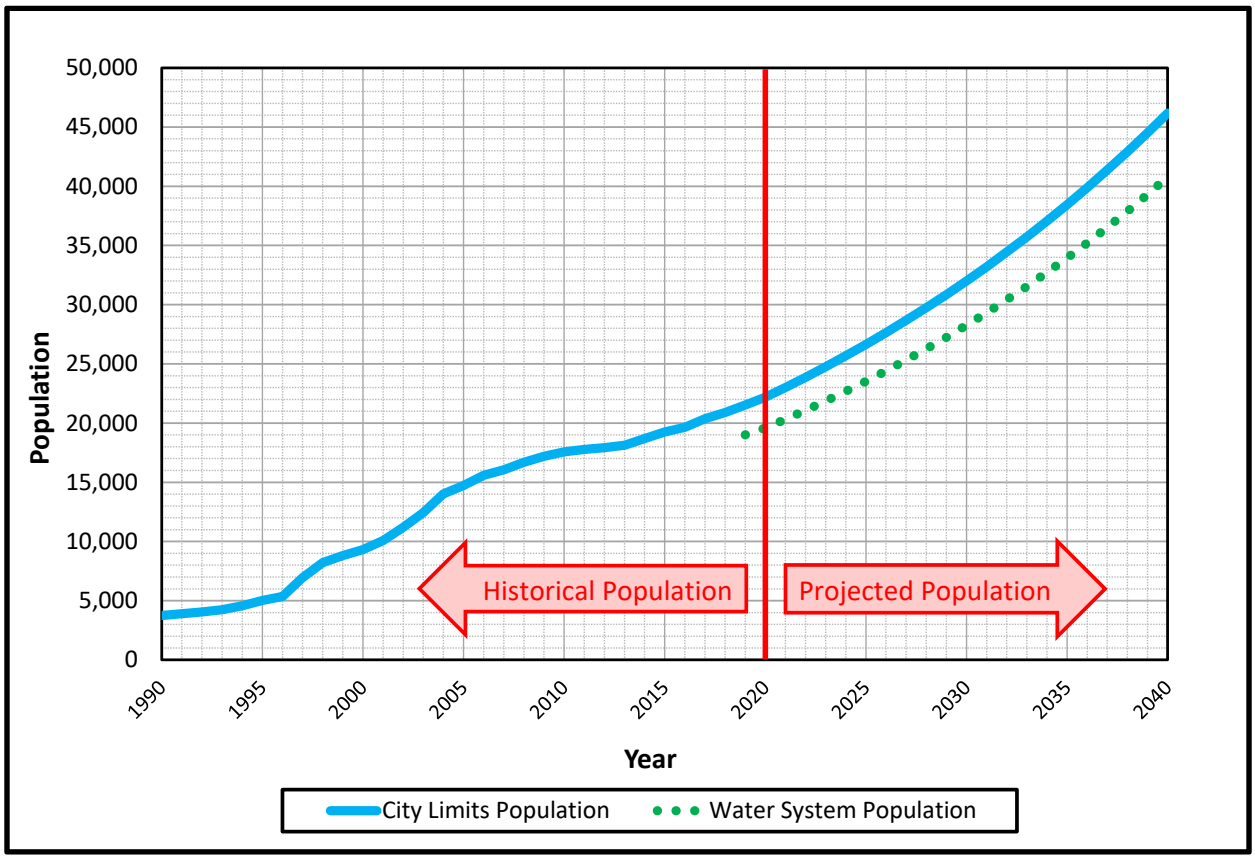
Table 3-3

Existing and Projected Water System Population

Year	City Population	Water System Population
	Existing	
2019	21,520	19,002
2020	22,180	19,584
	Projected	
2021	23,008	20,316
2022	23,868	21,075
2023	24,759	21,862
2024	25,684	22,678
2025	26,643	23,525
2026	27,638	24,404
2027	28,670	25,315
2028	29,741	26,260
2029	30,851	27,241
2030 (+ 10 years)	**32,004**	**28,258**
2031	33,199	29,314
2032	34,439	30,409
2033	35,725	31,544
2034	37,059	32,722
2035	38,443	33,944
2036	39,879	35,212
2037	41,368	36,527
2038	42,913	37,891
2039	44,516	39,306
2040 (+ 20 years)	**46,178**	**40,774**

Chart 3-1

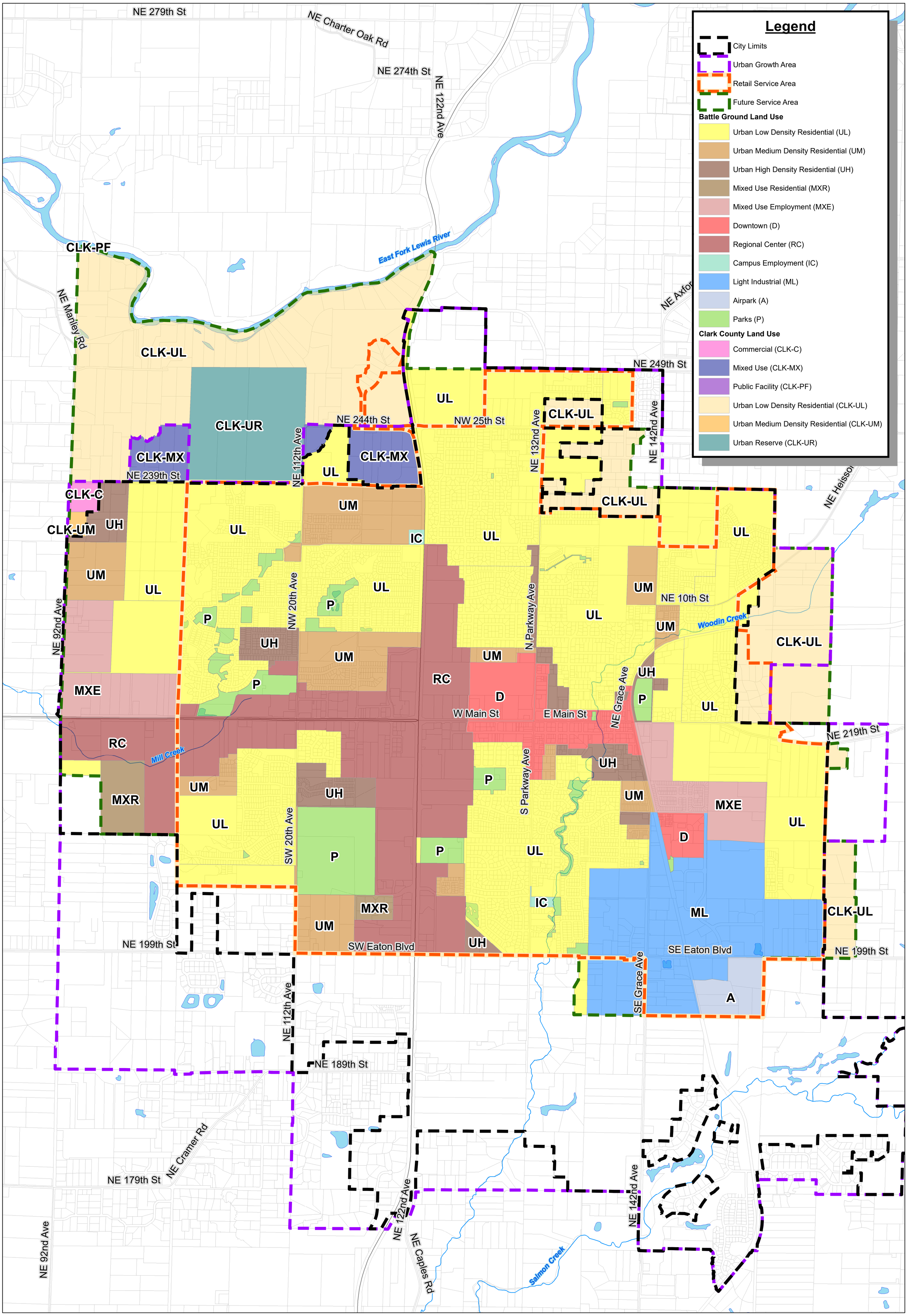
Population Projections



Water System Population

The actual number of people served by the City's water system is different than the population of the City limits. The City's 2020 Water Facilities Inventory (WFI) form, included in **Appendix A**, lists an estimated total of 5,403 single-family residences and 935 multi-family residential units served by the water system, for an estimated total of 6,338 households. Multiplying the total number of households by the estimated average household size in the City of 3.09 people results in an estimated 2020 water system population of 19,584 people, as shown in **Table 3-3**.

Estimated 2019 water system population and water system population projections through 2040 are shown in **Table 3-3**. The calculated percentage of the City limits population served by the water system in 2020 was applied to all other years. The water system is expected to provide service to approximately 40,774 people in 2040.



C:\DWG\COPY_OF_FIGURE 3-1_LANDUSE.MXD BY: SPERKINS PLOT DATE: DEC 29, 2021 COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON SOUTH FIPS 4602 FEET

RH2

NORTH

1 inch = 1,000 feet

0 500 1,000 2,000 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2”

Figure 3-1
Land Use

City of Battle Ground Water System Plan

Vicinity Map



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4 | WATER DEMANDS

INTRODUCTION

A detailed analysis of system demands is crucial to the planning efforts of a water supplier. A demand analysis first identifies current demands to determine if the existing system can effectively provide an adequate quantity of water to its customers under the most crucial conditions, in accordance with federal and state laws. A future demand analysis identifies projected demands to determine how much water will be needed to satisfy the water system's future growth and continue to meet federal and state laws.

The magnitude of water demands is typically based on three main factors: 1) population; 2) weather; and 3) water use classification. Population and weather have the two largest impacts on water system demands. Population growth tends to increase the annual demand, whereas high temperatures tend to increase the demand over a short period of time. Population does not solely determine demand because different user types use varying amounts of water. The use varies based on the number of users in each customer class, land use density, and irrigation practices. Water use efficiency efforts also impact demands and can be used to accommodate a portion of the system's growth without increasing a system's supply capacity.

Demands on the water system determine the size of storage reservoirs, supply facilities, water mains, and treatment facilities. Several different types of demands were analyzed and are addressed in this chapter, including average day demand, maximum day demand, peak hour demand, fire flow demand, future demands, and a demand reduction forecast based on the Water Use Efficiency Program.

Certificate of Water Availability

In accordance with the requirements of the Growth Management Act (GMA), the City of Battle Ground (City) must identify that water is available prior to issuing a building permit. The requirement for providing evidence of an adequate water supply was codified in 1990 under Revised Code of Washington (RCW) 19.27.097 in the Building Code section.

Per Battle Ground Municipal Code (BGMC) 13.110.050, the Public Works Department, upon approval of the City Council, may furnish water service to applicants outside the City limits, and within the service area, if they are adjacent to or within normal distance from existing water mains.

CURRENT POPULATION AND SERVICE CONNECTIONS

Water Use Classifications

The City has divided all water customers into four different classes for billing purposes, as shown in **Table 4-1**. These groups are: 1) single-family residential; 2) multi-family residential; 3) commercial; and 4) churches.

Table 4-1

Average Annual Metered Consumption and Service Connections

Year	Customer Class				
	Single-Family Residential	Multi-Family Residential	Commercial	Churches	Totals
Average Number of Connections					
2016	5,248	39	353	24	5,664
2017	5,319	40	376	24	5,760
2018	5,348	37	390	24	5,799
2019	5,446	35	399	23	5,904
Annual Consumption (gallons)					
2016	337,179,203	19,162,848	96,580,246	11,359,918	464,282,214
2017	348,948,305	21,500,511	104,589,638	10,941,009	485,979,462
2018	356,378,705	17,758,006	110,001,047	13,627,263	497,765,022
2019	343,489,021	17,204,448	106,025,150	12,910,629	479,629,249
Average Daily Consumption Per Connection (gpd/conn)					
2016	176	1,337	747	1,293	224
2017	180	1,473	761	1,249	231
2018	183	1,303	774	1,572	235
2019	173	1,334	728	1,538	223
Average	**178**	**1,362**	**753**	**1,413**	**228**

Residential Population Served

As described in **Chapter 3**, the residential population served by the City's water system is different than the population of the City limits. As shown in **Table 3-3**, the estimated 2019 water system population is approximately 19,002 people.

EXISTING WATER DEMANDS

Water Consumption

Water consumption is the amount of water used by all customers of the system as measured by the customer's meters. **Table 4-1** shows the historical average number of connections, annual consumption, and average daily consumption per connection for the four customer classes from 2016 through 2019. The total connections and consumption by customer class inside the City's water service area in 2019 are shown in **Charts 4-1** and **Chart 4-2**.

Chart 4-1
2019 Water Connections by Customer Class

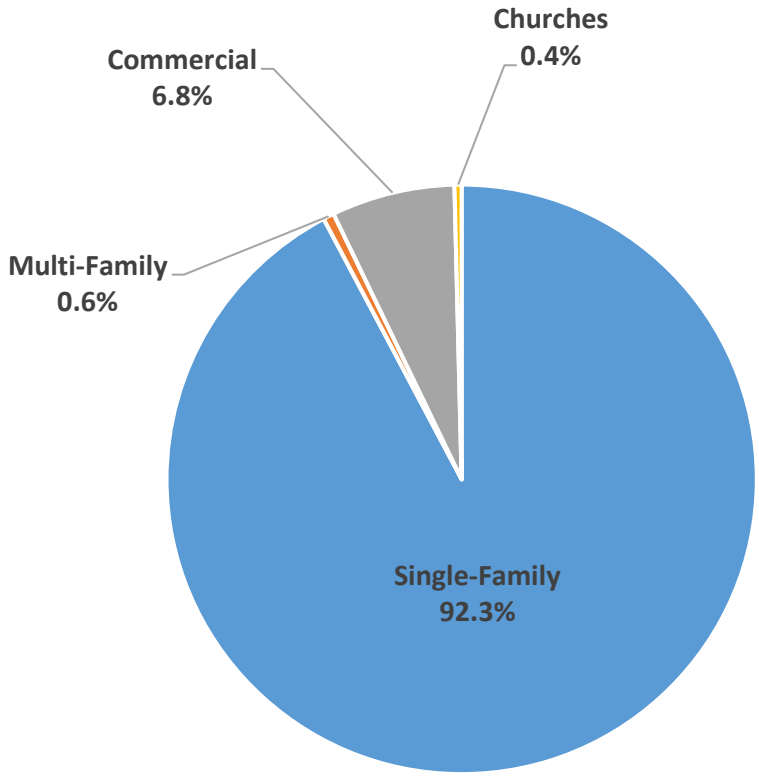
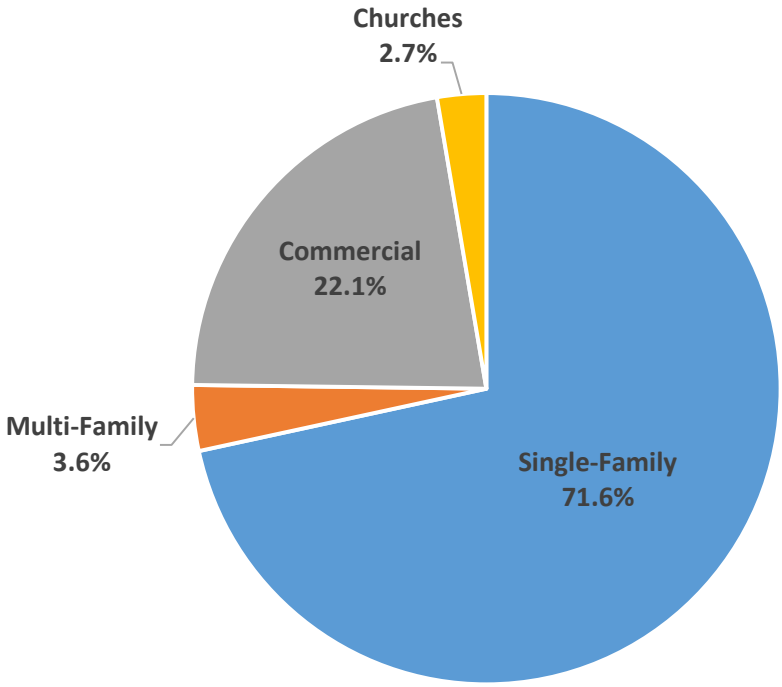


Chart 4-2
2019 Water Consumption by Customer Class



As shown in **Chart 4-1** and **Chart 4-2**, the percentage of single-family connections throughout the system is higher than the percentage of consumption attributed to these customers. This is due to single-family residential customers generally having a lower consumption per connection compared to other customer types. System-wide, as shown in **Table 4-1**, single-family residential customers use an average of 178 gallons per day (gpd) per connection, which is significantly less than the consumption per connection of any other customer class. Multiple units typically are served by one multi-family residential connection, resulting in additional consumption per connection compared to single-family residential connections. Compared to single-family units, lower consumption typically is expected for individual multi-family units, because the average household size of multi-family units is usually less than the average household size of single-family units. In addition, multi-family units consume considerably less water for lawn and garden maintenance.

Table 4-2 shows the 20 accounts that were the largest water users of the system in 2019 and their total amount of metered consumption for the year. The total water consumption of these 20 water accounts represented approximately 11.2 percent of the system's total metered consumption in 2019.

Table 4-2

2019 Largest Water Users

Address	Customer Name	Total Annual Consumption (gals)
300 SW 7th Avenue	Battle Ground Mobile Estates	8,568,188
813 SE Clark Avenue	Mallard Landing Assisted Living	5,056,832
104 W Main Street	Battle Ground School District #119	5,008,956
401 NW 12th Avenue	Fred Meyer	4,152,437
700 NW 9th Street	Battle Ground School District #119	3,723,055
101 NE 1st Avenue	Devonwood Apartments	2,749,839
1201 SW 13th Avenue	Wal-Mart	2,588,260
1611 SE Commerce Avenue	Oldcastle Glass Co	2,362,348
510 N Parkway Avenue	Brookfield Health and Rehabilitation of Cascadia	1,954,660
15 NE Grace Avenue	Andersen Plastics	1,937,455
422 SW 4th Street	City of Battle Ground	1,869,382
419 SE Clark Avenue	Clark Ave Apartments	1,869,382
318 SW 15th Avenue	Guyer Family Trust	1,806,546
1419 W Main Street	Best Western	1,632,249
300 W Main Street	Battle Ground School District #119	1,613,548
617 SE 4th Street	Rivergrove Apartments	1,574,649
1511 SW 13th Avenue	Scotton Landing II	1,428,031
713 W Main Street	Sunshine Laundry	1,412,322
2210 W Main Street	Battle Ground Market Center	1,359,210
407 SW 20th Avenue	Magnolia Square Associates	1,265,704
Largest Water Users Total Consumption		**53,933,053**
Water System Total Metered Consumption		**479,629,249**
Percent of Total		**11.2%**

The City reads customer meters monthly. Monthly consumption for each of the four customer classes (Single-Family Residential, Multi-Family Residential, Commercial, and Churches) is shown on **Charts 4-3**, **4-4**, **4-5**, and **4-6**. Historical monthly consumption for the entire system is shown in **Chart 4-7**. Most customer classes experience higher peaks in the summer months. Summer peaking usually is associated with irrigation and other residential summer water usage.

Chart 4-3

Historical Monthly Single-Family Residential Consumption

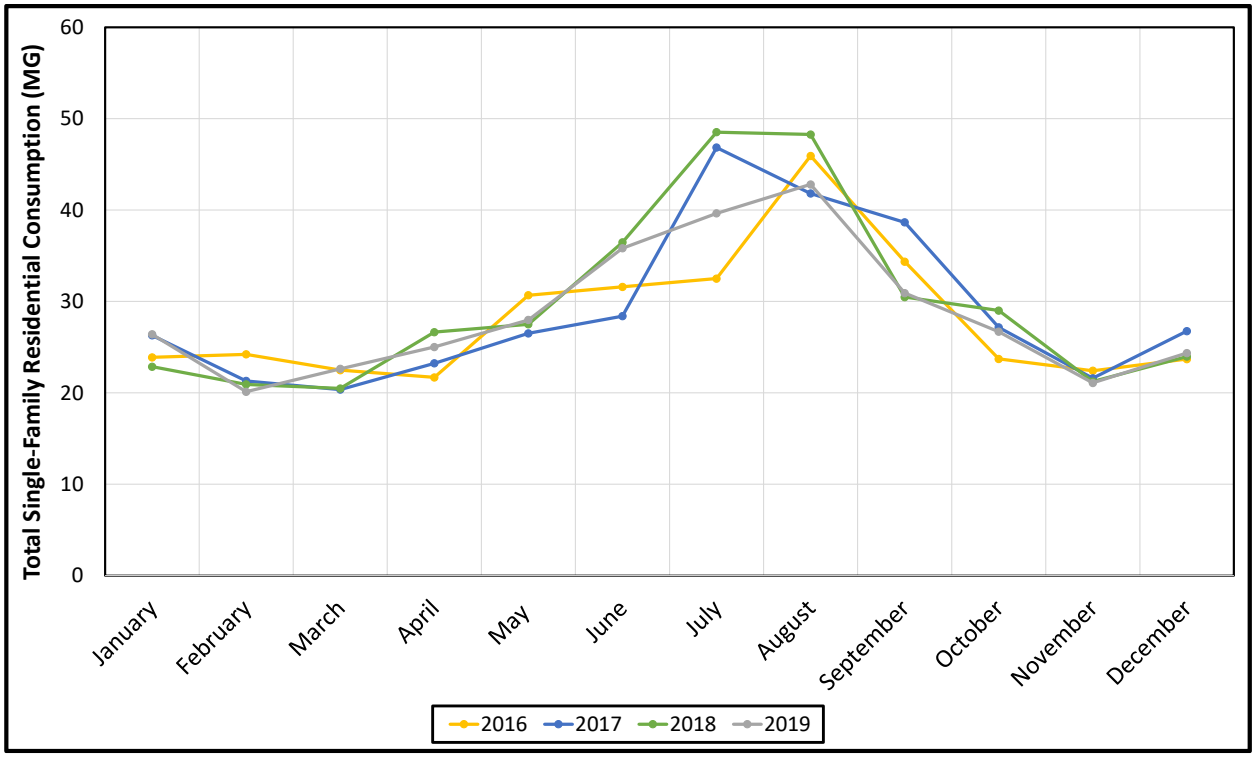


Chart 4-4

Historical Monthly Multi-Family Residential Consumption

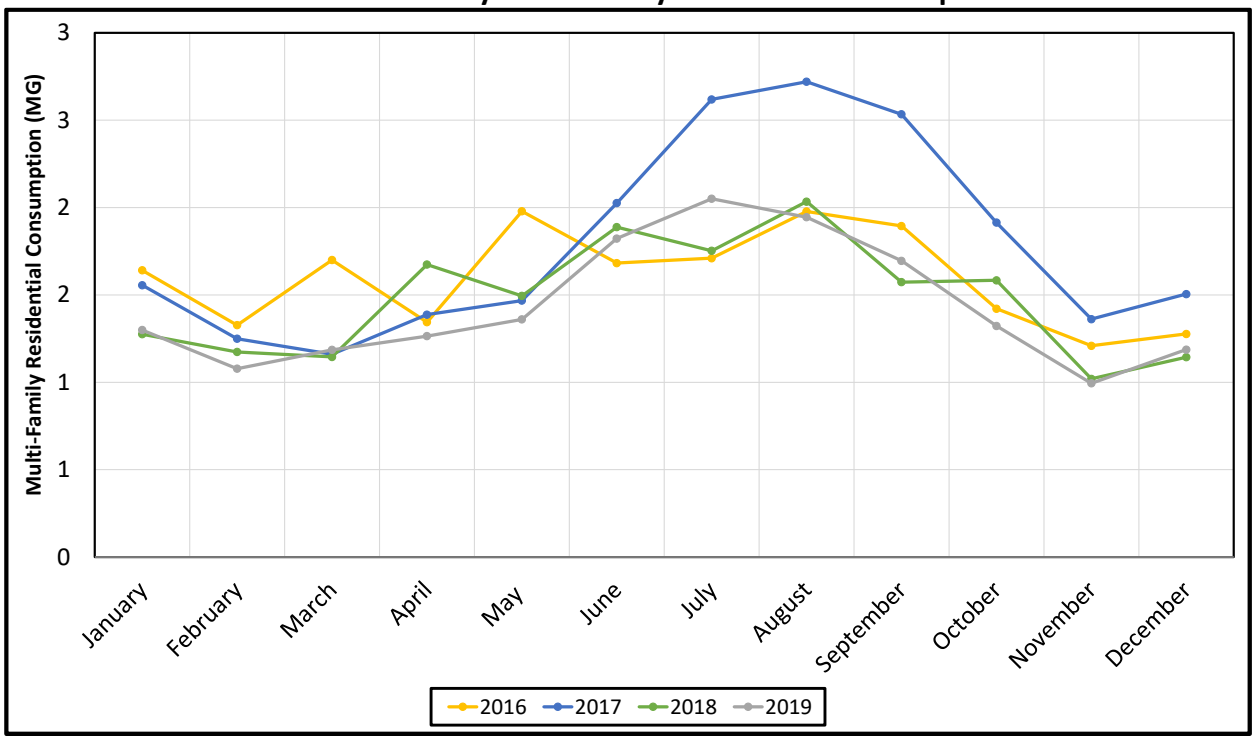


Chart 4-5

Historical Monthly Commercial Consumption

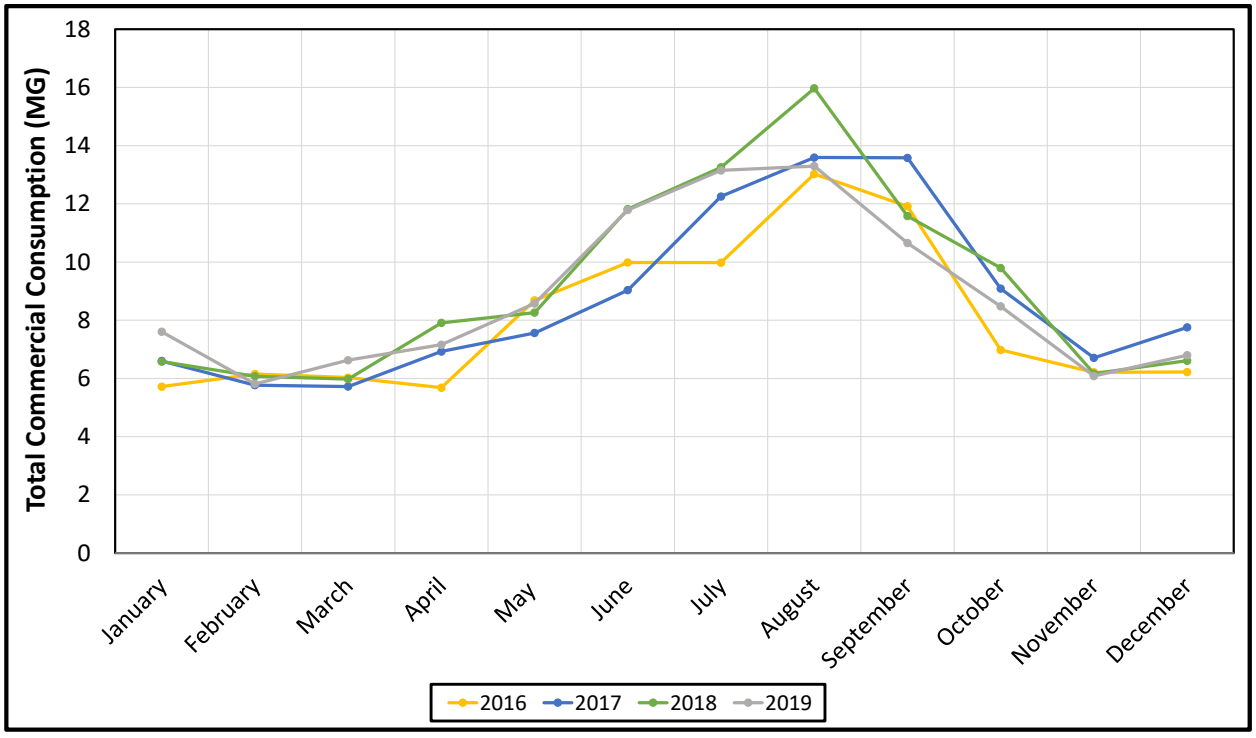


Chart 4-6

Historical Monthly Churches Consumption

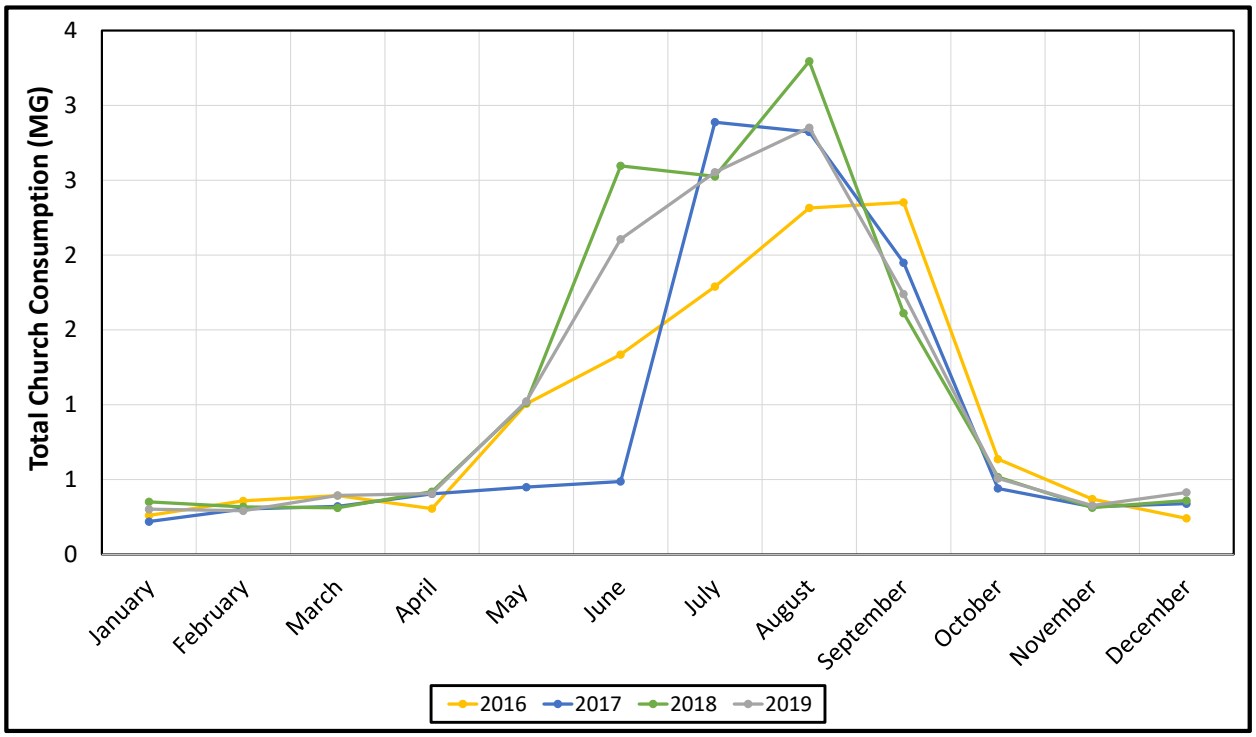
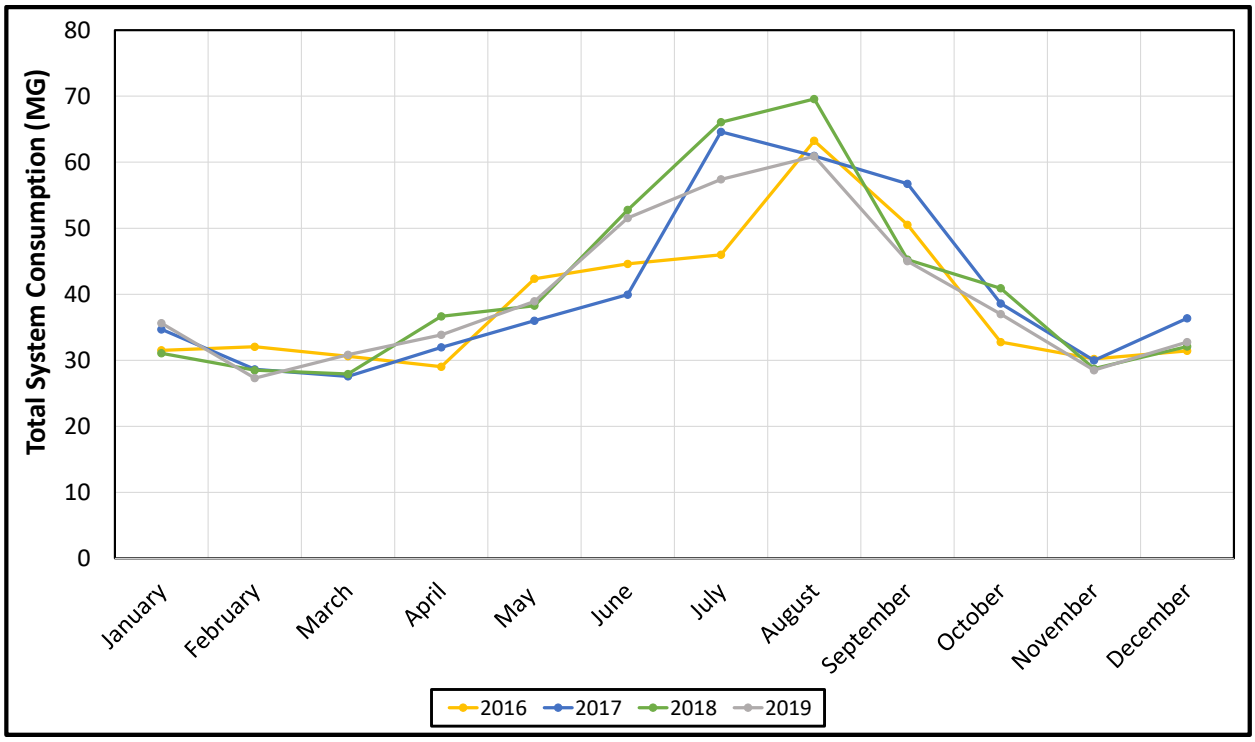


Chart 4-7

Historical Monthly Consumption – Total System



Water Supply

Water supply, or production, is the total amount of water supplied to the system, as measured by the meters at source of supply facilities. Water supply is different than water consumption in that water supply is the recorded amount of water put into the system and water consumption is the recorded amount of water taken out of the system. The measured amount of water supply of any system is typically larger than the measured amount of water consumption, due to non-metered water use and water loss (i.e., distribution system leakage), which will be described more in the **Distribution System Leakage** section. **Table 4-3** summarizes the total amount of water supplied to the system from 2012 to 2019. Data for June through December 2014 was unavailable; only the supply for January through May 2014 are shown in the supply tables and charts.

Table 4-3

Historical Water Supply

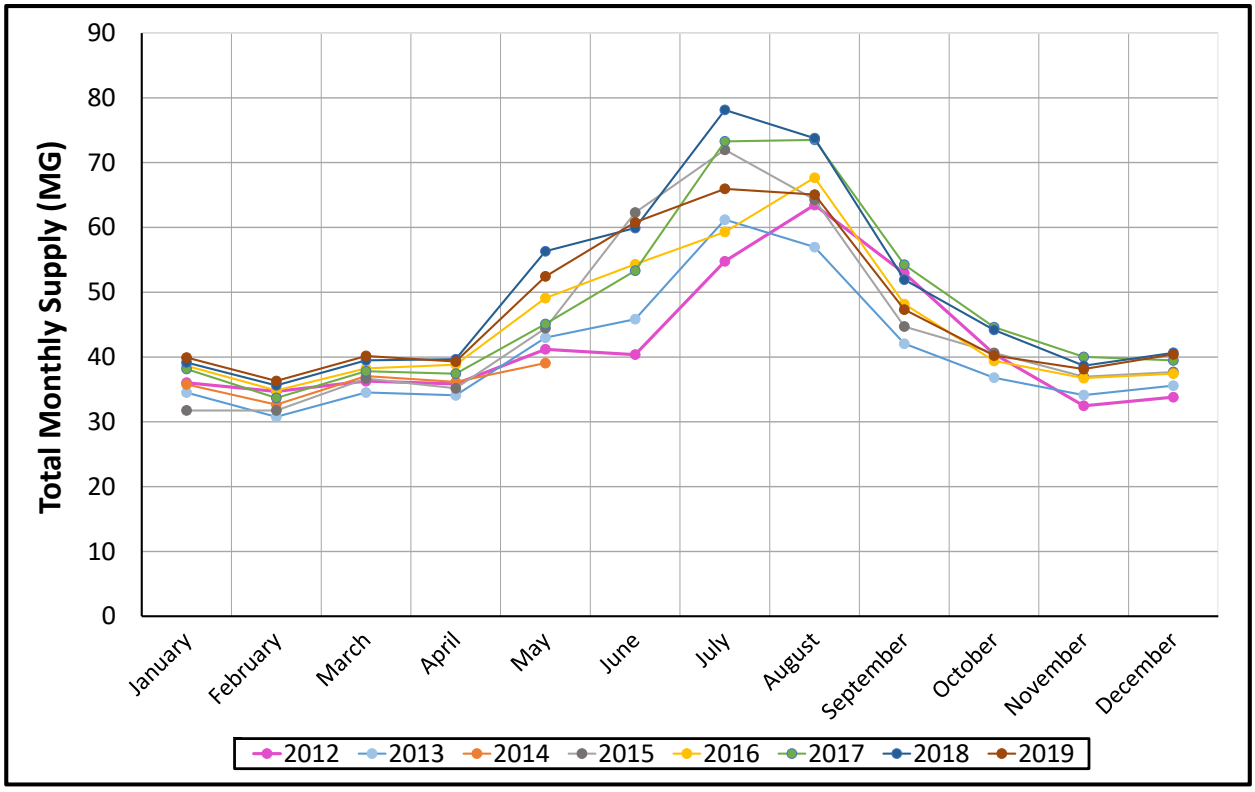
Year	Annual Supply (gallons)	Average Day Demand (gpm)	Average Day Demand (gpd)
2012	502,385,663	953	1,372,638
2013	489,474,729	931	1,341,027
2014 [1]	180,743,132	344	495,187
2015	542,530,342	1,032	1,486,384
2016	542,677,680	1,030	1,482,726
2017	570,648,771	1,086	1,563,421
2018	597,503,886	1,137	1,636,997
2019	566,058,502	1,077	1,550,845

1 = Data for June through December 2014 unavailable.

Like most other water systems, the City's water use varies seasonally. **Chart 4-8** shows the historical amount of water supplied to the City's system for each month from 2012 through 2019.

Chart 4-8

Historical Monthly Water Supply



As shown in **Chart 4-8**, water supply increases significantly during summer months, primarily due to irrigation and other residential summer water usage. The City's highest water use typically occurs in July and August.

Chart 4-9 shows the monthly water supply by source for 2019. **Chart 4-10** shows the annual water supply by source from 2012 to 2019. As shown in **Chart 4-9**, the City's groundwater sources currently can provide a significant amount of the required supply, except during the high demand summer months, when the Clark Public Utilities (CPU) intertie is needed to augment the supply.

Chart 4-9

2019 Monthly Water Supply by Source

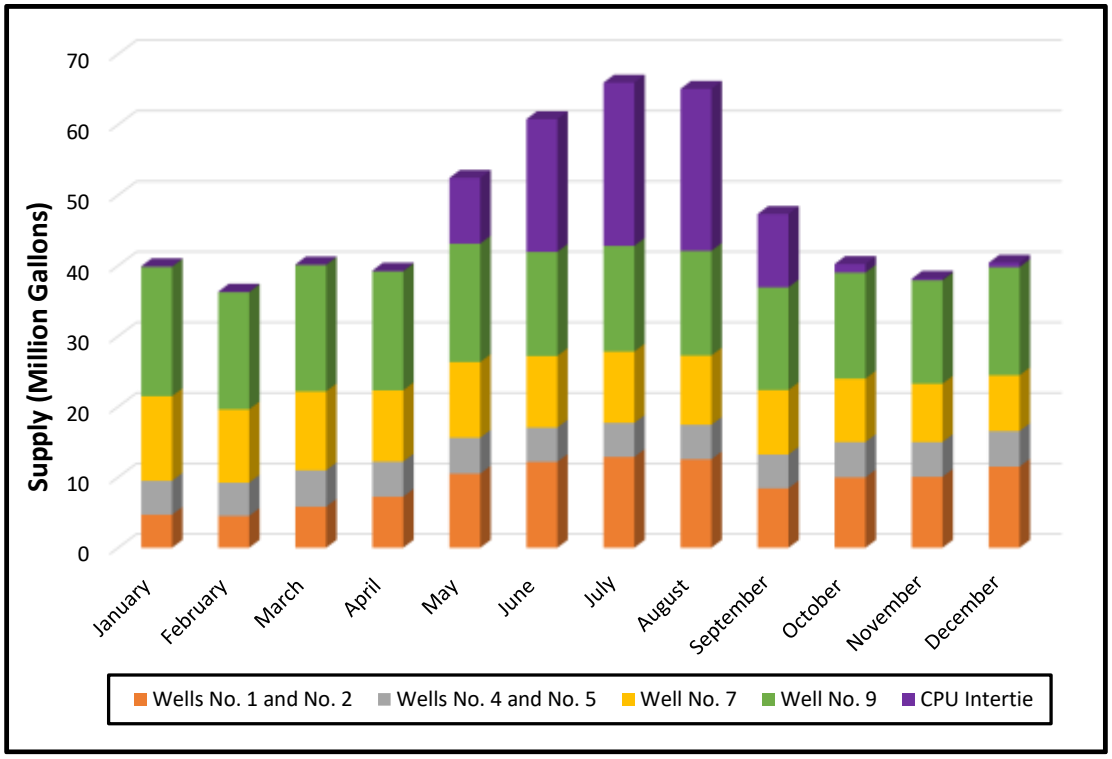
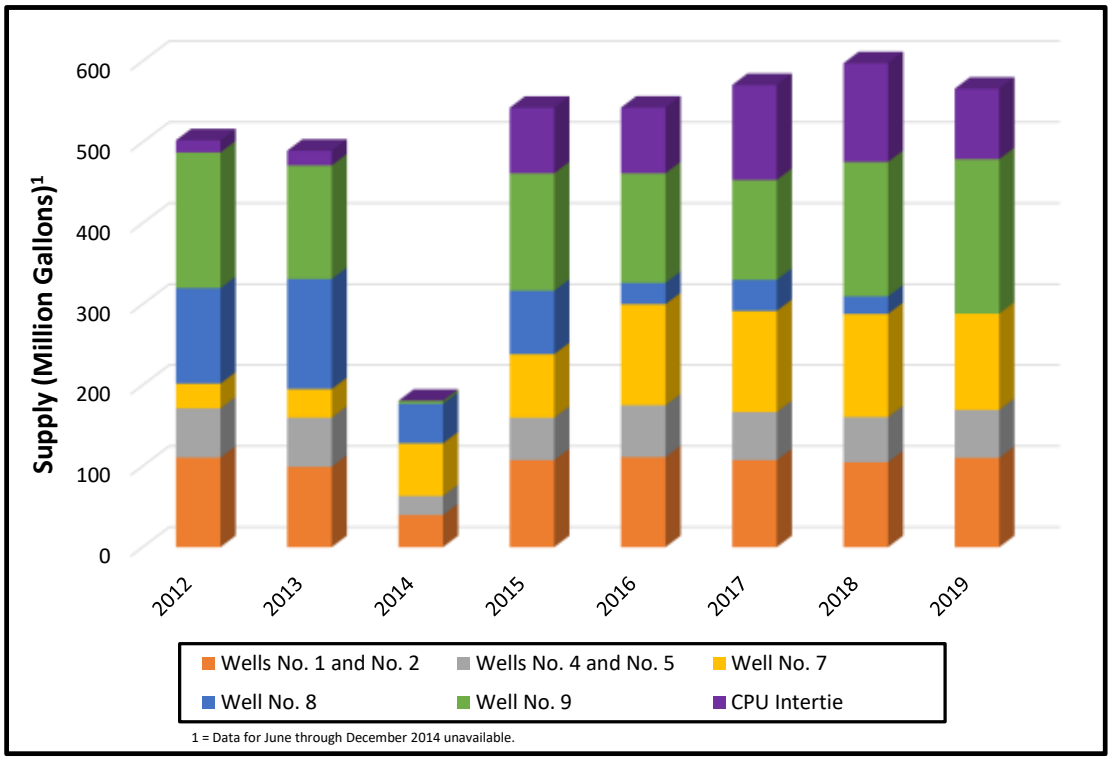


Chart 4-10

Annual Water Supply by Source



Distribution System Leakage

The difference between the amount of water supply and the amount of authorized water consumption is the amount of distribution system leakage (DSL). There are many sources of DSL in a typical water system, including water system leaks, inaccurate supply metering, inaccurate customer metering, illegal water system connections or water use, fire hydrant usage, water main flushing, and malfunctioning telemetry and control equipment resulting in reservoir overflows. Several of these types of usages, such as water main flushing and fire hydrant usage, may be considered authorized uses if they are tracked and estimated. Although real losses from the distribution system, such as reservoir overflows and leaking water mains, should be tracked for accounting purposes, these losses must be considered leakage. The Water Use Efficiency (WUE) Rule establishes a DSL standard of 10 percent or less based on a rolling 3-year average.

The amount of DSL in the City's system has generally been trending downward since 2016, as shown in **Table 4-4**. The current 3-year rolling average is less than 10 percent, which meets the WUE Rule DSL standard. The City will continue to record authorized water usage and improve the reporting of additional authorized water uses. The City also will implement the WUE Program contained in **Appendix F**.

Table 4-4

Distribution System Leakage

	Year			
Description	**2016**	**2017**	**2018**	**2019**
Authorized Consumption (AC)				
Metered Customer Use (MG)	464.3	486.0	497.8	479.6
Flushing (MG)	1.4	0.2	0.4	0.1
Sewer Truck (MG)	0.01	-	-	-
Sweeper (MG)	0.05	0.02	0.02	0.01
Vac Truck (MG)	0.01	-	0.02	0.04
Chlorine & Fluoride (MG)	-	0.03	0.03	-
Tree Watering (MG)	-	0.02	-	-
Well Back Wash (MG)	-	43.8	43.8	44.4
Total Authorized Consumption (MG)	465.8	530.0	542.0	524.1
Total Production (TP)				
Total Production/Supply (MG)	542.7	570.6	597.5	566.1
Distribution System Leakage (TP - AC)				
Total Distribution System Leakage (MG)	76.9	40.7	55.5	41.9
Total Distribution System Leakage (%)	14.2%	7.1%	9.3%	7.4%
Rolling 3-Year Average DSL (%)	---	---	10.2%	7.9%

Per Capita Demand

Table 4-5 presents the computation of the existing system per capita demand based on 2019 data. As shown in the upper portion of the table, the residential population served by the City's

water system in 2019 was approximately 19,002. This population served, and the total annual supply in 2019, were used to arrive at the existing per capita demand of 82 gpd.

Table 4-5

Existing Per Capita Demand

2019 Residential Population Served	
Calculated 2019 Residential Population Served	19,002
2019 Total Annual Supply (gal)	
2019 Total Annual Supply (gal)	566,058,502
Existing Per Capita Demand (gpd/capita)	**82**

Because the density and type of existing water users is generally consistent with expectations for the future development of the water system, no adjustments are necessary to the per capita demand figures for future customers. Often, future per capita demands are adjusted to account for large industrial customers that are not considered representative of future users. However, for the City, the existing 82 gpd per capita demand was assumed to be representative of the future per capita demand. This number is used later in this chapter to forecast water demands in future years based on future population estimates.

Pressure Zone Demand

Table 4-6 shows the estimated demand of each of the City's two existing pressure zones. The zone demands are estimated by allocating the demands of the top 20 water users from **Table 4-2** to the 529 Zone, then equally distributing the remaining demands throughout the system based on the hydraulic model node count. Based on this methodology, the 529 Zone accounts for approximately 99 percent of the total system demand, while the 784 Zone accounts for the remaining 1 percent. **Figure 2-1** in **Chapter 2** displays the City's pressure zones.

Table 4-6

2019 Demands by Pressure Zone

Pressure Zone	2019 Annual Supply (gallons)	Average Daily Demand (gpm)	Average Daily Demand (gpd)	Percent of Total Demand (%)
529 Zone	559,966,935	1,065	1,534,190	98.9%
784 Zone	6,091,567	12	16,690	1.1%
Total	**566,058,502**	**1,077**	**1,550,880**	**100%**

Peak Demands

Average Day Demand

Average day demand (ADD) is the total amount of water delivered to the system in a year divided by the number of days in the year. The ADD is determined from the historical water use patterns of the system and can be used to project future demands within the system. Water

production records from the City's well and CPU sources were reviewed to determine the system's ADD. The system's average day demand from 2012 through 2019 is shown in **Table 4-3**.

Maximum Day Demand

Maximum day demand (MDD) is the maximum amount of water used throughout the system during a 24-hour time period of a given year. MDD typically occurs on a hot summer day when lawn watering is occurring throughout much of the system. In accordance with Washington Administrative Code (WAC) 246-290-230, the distribution system shall provide fire flow at a minimum pressure of 20 pounds per square inch (psi) during MDD conditions. Supply facilities (wells, springs, pump stations, interties, etc.) typically are designed to supply water at a rate that is equal to or greater than the system's MDD.

MDD typically is determined from the combined flow of water into the system from all supply sources and reservoirs on the maximum day. Daily supply rates from the City's sources were reviewed to estimate the system's MDD; daily reservoir levels were not available, so it was assumed that there was generally no net change in stored water volume in the system on a daily basis. The City's MDD occurred on July 29, 2018, when temperatures reached approximately 85 degrees Fahrenheit. The supply from the City's sources on this day was approximately 2,059 gallons per minute (gpm), as shown in **Table 4-7**.

Table 4-7
Maximum Day Demands and Peaking Factors

Demand Type	Date	Demand (gpm)	Demand (gpd)
Average Day Demand (ADD)	2018	1,137	1,636,997
Maximum Day Demand (MDD)	July 29th, 2018	2,059	2,965,198
Peak Hour Demand (PHD)	Hourly data unavailable Equation 3-1 from WSDM[1]	3,375	4,859,549
Peaking Factors			
Maximum Day Demand/Average Day Demand (MDD/ADD)		1.81	
Peak Hour Demand/Maximum Day Demand (PHD/MDD)		1.64	
Peak Hour Demand/Average Day Demand (PHD/ADD)		2.97	

1 = Calculated number of ERUs for the year 2018 from **Table 4-9** was used in Equation 3-1 to determine PHD.

Peak Hour Demand

Peak hour demand (PHD) is the maximum amount of water used throughout the system, excluding fire flow, during a 1-hour time period of a given year. In accordance with WAC 246-290-230 – Distribution Systems, new public water systems or additions to existing systems shall be designed to provide domestic water at a minimum pressure of 30 psi during PHD conditions. Equalizing storage requirements typically are based on PHD data.

The PHD, like the MDD, typically is determined from the combined flow of water into the system from all supply sources and reservoirs. Hourly water production records and chart recordings of reservoir levels are not available for all the City's storage facilities, or the City's supply sources. Therefore, the system's PHD could not be computed based on actual system data. Instead, Equation 3-1 in the Washington State Department of Health's (DOH) *Water System Design Manual* was used to compute the system's PHD. This resulted in an estimated PHD of 3,375 gpm for 2018, as shown in **Table 4-7**.

DOH Equation 3-1

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

Where:

PHD = Peak hourly demand in gpm

C = Coefficient associated with ranges of equivalent residential units (ERUs)

N = Number of ERUs based on MDD

F = Factor associated with ranges of ERUs

ERU_{MDD} = Maximum day demand per ERU (gpd).

Equivalent Residential Units

The consumption of each customer class can be expressed in terms of ERUs for demand forecasting and planning purposes. One ERU_{ADD} is equivalent to the amount of water consumed by a single-family residence on an average day, not including DSL. One ERU_{MDD} is equivalent to the amount of water consumed by a single-family residence on the day that the water system experiences the highest demand of the year, not including DSL. The number of ERUs represented by the consumption of the other customer classes is determined from the total consumption of the customer class and the unit demand per ERU from the single-family residential demand data. The number of ERUs consumed by other authorized consumption and DSL also is calculated in this fashion.

Table 4-8 presents the computed number of ERUs for each customer class on a consumption basis for 2016 through 2019, as well as the number of ERUs consumed by DSL. The consumption shown is based on the totals of each customer class shown in **Table 4-1**. The average day consumption per ERU (ERU_{ADD}) of single-family residential customers from 2016 through 2019 was 178 gallons. The maximum day consumption per ERU (ERU_{MDD}) of single-family residential customers, calculated by multiplying the ERU_{ADD} by the MDD/ADD peaking factor presented in **Table 4-7**, was 322 gallons.

Table 4-8

Equivalent Residential Units – Consumption Basis

Year	Average Number of Connections	Average Annual Consumption (gallons)	Consumption per ERU_{ADD} (gpd/ERU_{ADD})	Consumption per ERU_{MDD} (gpd/ERU_{MDD})[1]	Total ERUs
Single-Family Residential (ERU Basis)					
2016	5,248	337,179,203	176	318	5,248
2017	5,319	348,948,305	180	326	5,319
2018	5,348	356,378,705	183	331	5,348
2019	5,446	343,489,021	173	313	5,446
Multi-Family Residential					
2016	39	19,162,848	176	318	298
2017	40	21,500,511	180	326	328
2018	37	17,758,006	183	331	266
2019	35	17,204,448	173	313	273
Commercial					
2016	353	96,580,246	176	318	1,503
2017	376	104,589,638	180	326	1,594
2018	390	110,001,047	183	331	1,651
2019	399	106,025,150	173	313	1,681
Churches					
2016	24	11,359,918	176	318	177
2017	24	10,941,009	180	326	167
2018	24	13,627,263	183	331	205
2019	23	12,910,629	173	313	205
Other Authorized Consumption					
2016	-	1,494,220	176	318	23
2017	-	44,011,470	180	326	671
2018	-	44,240,182	183	331	664
2019	-	44,495,412	173	313	706
Distribution System Leakage					
2016	-	76,901,246	176	318	1,197
2017	-	40,657,839	180	326	620
2018	-	55,498,682	183	331	833
2019	-	41,933,841	173	313	665
Total System					
2016	5,664	542,677,680	176	318	8,446
2017	5,760	570,648,771	180	326	8,699
2018	5,799	597,503,886	183	331	8,967
2019	5,904	566,058,502	173	313	8,976
Average (2016 to 2019)			**178**	**322**	

(1) = Estimated based on MDD/ADD peaking factor from **Table 4-7**.

ERUs also can be calculated from a system demand standpoint, including estimated DSL and other unmetered authorized consumption in the water usage for each ERU. While this approach does not allow a direct calculation of the number of ERUs consumed by DSL, it provides a more conservative approach for forecasting future water demands by assuming that the volume of DSL and unmetered authorized consumption will increase proportionally with future growth. Although DSL is typically low in areas of new water main construction, it is usually increasing in aging areas of the distribution system. The oldest areas of the distribution system convey water from supply sources to the new areas of the distribution system. Including estimated DSL in the water usage for each ERU helps approximate this increasing DSL volume as the overall system ages. For these reasons, the City should use the ERU demand basis calculations to prepare Certificates of Water Availability and track water availability for new service connections and future development.

Table 4-9 presents the computed number of ERUs for each customer class on a demand basis for 2016 through 2019, plus a proportional percentage of the total DSL. To estimate the demand for each customer class, the consumption totals for each customer class shown in **Table 4-1** are multiplied by the ratio between total production and metered customer use. The ERU_{ADD} of single-family residential customers for 2016 through 2019 was 210 gallons. The ERU_{MDD} of single-family residential customers, calculated by multiplying the ERU_{ADD} by the MDD/ADD peaking factor presented in **Table 4-7**, was 380 gallons.

Table 4-9
Equivalent Residential Units – Demand Basis

Year	Average Number of Connections	Average Annual Demand (gallons)	Demand per ERU_{ADD} (gpd/ERU_{ADD})	Demand per ERU_{MDD} (gpd/ERU_{MDD})[1]	Total ERUs
Single-Family Residential (ERU Basis)					
2016	5,248	394,112,938	205	372	5,248
2017	5,319	409,743,491	211	382	5,319
2018	5,348	427,787,514	219	397	5,348
2019	5,446	405,385,788	204	369	5,446
Multi-Family Residential					
2016	39	22,398,553	205	372	298
2017	40	25,246,417	211	382	328
2018	37	21,316,238	219	397	266
2019	35	20,304,692	204	369	273
Commercial					
2016	353	112,888,114	205	372	1,503
2017	376	122,811,669	211	382	1,594
2018	390	132,042,329	219	397	1,651
2019	399	125,130,896	204	369	1,681
Churches					
2016	24	13,278,074	205	372	177
2017	24	12,847,195	211	382	167
2018	24	16,357,804	219	397	205
2019	23	15,237,127	204	369	205
Total System					
2016	5,664	542,677,680	205	372	7,226
2017	5,760	570,648,771	211	382	7,408
2018	5,799	597,503,886	219	397	7,470
2019	5,904	566,058,502	204	369	7,605
Average (2016 to 2019)			**210**	**380**	

(1) = Estimated based on MDD/ADD peaking factor from **Table 4-7**.

The ERU_{ADD} of 210 gpd and ERU_{MDD} of 380 gpd will be used later in this chapter to forecast ERUs in future years based on estimated future demands. This demand per ERU value also will be used to determine the capacity (in terms of ERUs) of the existing system in **Chapter 7**.

Fire Flow Demand

Fire flow demand is the amount of water required during firefighting as defined by applicable codes. Fire flow requirements are established for individual buildings and expressed in terms of flow rate (gpm) and flow duration (hours). Fighting fires imposes the greatest demand on the water system because a large volume of water must be supplied over a short period of time, requiring each component of the system to be properly sized and configured to operate at its optimal condition. Adequate storage and supply are useless if the transmission or distribution system cannot deliver water at the required rate and pressure necessary to extinguish a fire.

General planning-level fire flow requirements were established for the City's different land use categories to provide a target level of service for planning and sizing future water facilities in areas that are not fully developed. The general planning-level fire flow requirement for each land use category or specific building type is shown in **Table 4-10**. The water system analyses presented in **Chapter 7** are based on an evaluation of the water system providing sufficient fire flow in accordance with these general planning-level fire flow requirements. The fire flow requirements shown in **Table 4-10** do not necessarily equate to actual existing or future fire flow requirements for all buildings, since this is typically based on building size, construction type, and fire suppression system provided. Improvements to increase the available fire flow to meet the actual fire flow requirements greater than those shown in **Table 4-10** shall be the responsibility of the developer.

Table 4-10

General Planning-Level Fire Flow Requirements

Land Use Category	Fire Flow Requirement (gpm)	Flow Duration (hours)
Single-Family Residential	1,000	1
All Other Land Use Categories	2,000	2

FUTURE WATER DEMANDS

Basis for Projecting Demands

Future demands were calculated from the results of the existing per capita demand computations shown in **Table 4-5**, and the projected population data from **Chapter 3**. Future demand projections were computed with and without water savings expected from implementing WUE measures contained in the City's WUE Program in **Appendix F**.

Demand Forecasts and Water Use Efficiency

Table 4-11 presents the projected water demand forecast for the City's water system. The actual demand data from 2019 also is shown for comparison purposes. Future ADDs were

projected based on population estimates for the given years and the estimated demand per capita. The future MDDs and PHDs shown were computed from the projected ADDs and the maximum existing system peaking factors shown in **Table 4-7**. The future demand projections also are shown with and without estimated reductions in water use from achieving WUE goals.

Table 4-11

Future Water Demand Projections

Description	Actual	Projected											
	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030 (+10 years)	2040 (+20 years)
Population Data													
Water Service Area Population	19,002	19,584	20,316	21,075	21,862	22,678	23,525	24,404	25,315	26,260	27,241	28,258	40,774
Increase from Base Year 2019	-	583	1,314	2,073	2,860	3,676	4,523	5,402	6,313	7,259	8,239	9,257	21,773
Demand Basis Data (gpd/capita)													
ADD without WUE	82	82	82	82	82	82	82	82	82	82	82	82	82
Average Day Demand (gpm)													
Demand without WUE	1,077	1,110	1,151	1,194	1,239	1,285	1,333	1,383	1,435	1,488	1,544	1,602	2,311
Demand with WUE	-	-	1,151	1,193	1,237	1,281	1,328	1,376	1,426	1,478	1,532	1,587	2,288
Maximum Day Demand (gpm)													
Demand without WUE	1,951	2,011	2,086	2,164	2,244	2,328	2,415	2,505	2,599	2,696	2,797	2,901	4,186
Demand with WUE	-	-	2,086	2,161	2,240	2,321	2,406	2,493	2,583	2,677	2,774	2,875	4,144
Peak Hour Demand (gpm)													
Demand without WUE	3,197	3,295	3,418	3,546	3,678	3,816	3,958	4,106	4,259	4,418	4,583	4,755	6,860
Demand with WUE	-	0	3,418	3,542	3,671	3,804	3,942	4,085	4,234	4,387	4,547	4,712	6,792

The analysis and evaluation of the existing water system with proposed improvements, as presented in **Chapters 7** and **9**, is based on the 2040 projected demand data without WUE reductions. This ensures that the future system will be sized properly to meet all requirements, whether or not additional water use reductions are achieved. However, the City will continue to pursue reductions in water use by implementing the WUE Program contained in **Appendix F**.

Table 4-12 presents the existing and projected ERUs of the system. The ERU forecasts are based on the projected water demands from **Table 4-11** and the average ERU_{ADD} demand that was computed from actual 2016 to 2019 data. ERU forecasts based on the average ERU_{ADD} consumption also are presented for comparison purposes.

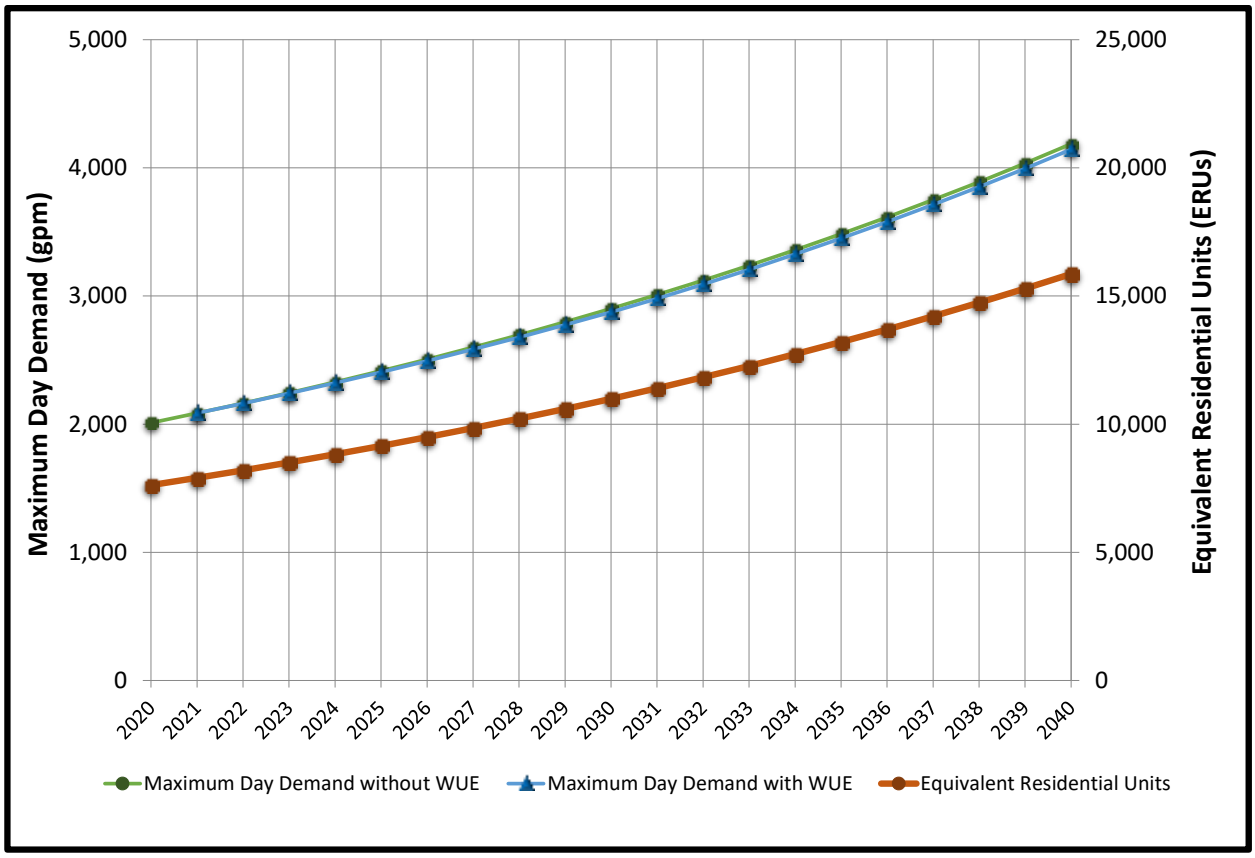
Table 4-12
Future ERU Projections

Description	Actual	Projected											
	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030 (+10 years)	2040 (+20 years)
Demand Data (gpm)													
ADD without WUE	1,077	1,110	1,151	1,194	1,239	1,285	1,333	1,383	1,435	1,488	1,544	1,602	2,311
ADD with WUE	-	-	1,151	1,193	1,237	1,281	1,328	1,376	1,426	1,478	1,532	1,587	2,288
MDD without WUE	1,951	2,011	2,086	2,164	2,244	2,328	2,415	2,505	2,599	2,696	2,797	2,901	4,186
MDD with WUE	-	-	2,086	2,161	2,240	2,321	2,406	2,493	2,583	2,677	2,774	2,875	4,144
Demand per ERU - Consumption Basis													
ERU_{ADD} without WUE (gpd/ERU_{ADD})	173	178	178	178	178	178	178	178	178	178	178	178	178
ERU_{ADD} with WUE (gpd/ERU_{ADD})	-	-	178	177	177	177	177	177	177	176	176	176	176
ERU_{MDD} without WUE (gpd/ERU_{MDD})	313	322	322	322	322	322	322	322	322	322	322	322	322
ERU_{MDD} with WUE (gpd/ERU_{MDD})	-	-	322	321	321	321	321	320	320	320	319	319	319
ERUs - Consumption Basis													
Total System ERUs	8,976	8,997	9,333	9,682	10,043	10,419	10,808	11,211	11,630	12,064	12,515	12,982	18,732
Demand per ERU - Demand Basis													
ERU_{ADD} without WUE (gpd/ERU_{ADD})	204	210	210	210	210	210	210	210	210	210	210	210	210
ERU_{ADD} with WUE (gpd/ERU_{ADD})	-	-	210	210	209	209	209	209	209	208	208	208	208
ERU_{MDD} without WUE (gpd/ERU_{MDD})	369	380	380	380	380	380	380	380	380	380	380	380	380
ERU_{MDD} with WUE (gpd/ERU_{MDD})	-	-	380	380	379	379	379	378	378	377	377	377	376
ERUs - Demand Basis													
Total System ERUs	7,605	7,618	7,902	8,198	8,504	8,821	9,151	9,492	9,847	10,215	10,596	10,992	15,860

The projected maximum day water demand and demand-basis ERU data from **Tables 4-11** and **4-12** are shown graphically in **Chart 4-11**. **Chart 4-11** will be used in **Chapter 7** to compare demand projections with source of supply availability.

Chart 4-11

Future Water Demand and ERU Projections (Demand Basis)



5 | POLICIES AND DESIGN CRITERIA

WATER UTILITY SERVICE AREA POLICIES

Wholesale Water and Wheeling of Water

The City of Battle Ground (City) water utility will consider requests for wholesale water sales arrangements only with other major water purveyors. It would consider a request for wheeling water through the distribution system. Important considerations include monitoring and control, a hydraulic evaluation of the potential impacts, water quality, and water rights changes.

Direct Connection

The water utility requires direct service from its main water system.

Design and Performance Standards

The City has prepared a comprehensive set of engineering and construction standards for all new utility projects. Water system standards are summarized in this chapter and in **Appendix H**.

Drinking water materials and additives shall conform to the requirements specified in Washington Administrative Code (WAC) 246-290-220.

Oversizing Policy

The water utility will provide financial assistance for oversizing of water facilities when the needs of the system exceed the development's requirements.

System Extension

All extensions to the water utility's system must meet its adopted engineering standards. Where desirable to meet long-term system needs, the water utility will pay for oversizing of facilities as appropriate.

CONDITIONS OF SERVICE

Purveyor Responsibilities

The water utility is responsible for providing water that meets quality and quantity standards of the State of Washington and the utility's design standards. The water utility will attempt to minimize service interruptions during maintenance, repair, and construction activities.

Customer Responsibilities

The customer is responsible for payment of all charges incurred from their water service and for responding to the water utility's requests for water conservation during emergencies.

Connection Fees

The water utility will assess new customers and/or consider upgrading existing water customers system development charges and fees. Refer to **Chapter 10** of this Water System Plan for additional details.

Meter and Materials Requirements

The water utility will provide all water meters. The water utility will install all water meters that are 1 inch and smaller. The water utility will inspect all meters after installation.

Consent

The customer must consent to access by the utility for inspection, maintenance, and repair of water facilities. All new facilities must be located within either the public right-of-way or within a dedicated utility easement.

Cross-Connection

The water utility has a cross-connection control program. When cross connections are identified or assemblies and/or plumbing are found to be defective, the utility will provide assistance to correct the problem, but will ultimately terminate service if left uncorrected. The customer is responsible for the purchase, installation, maintenance, and annual testing of cross-connection control assemblies that meet the utility's standards.

Service Connection Responsibility

Service taps on new mains will be completed by the project proponent, provided the water utility has been notified and a water utility inspector is onsite. A party acceptable to the water utility shall make all service taps on existing mains. All connections to existing water facilities require 48 hours' notification.

Developer Extension Requirements

All developer extensions must meet the water utility's engineering and construction standards, including design by a professional engineer. Financing of extensions is the developer's responsibility, with the possible addition of utility oversizing by the water utility. Developer extensions involving booster pumps stations, reservoirs, new sources, or other facilities besides distribution mains must complete the Washington State Department of Health (DOH) project approval and review process, after approval by the City and before construction can begin.

Utility Easements

All piping, pumping, source, storage, and other facilities shall be located on public rights-of way or dedicated utility easements. Utility easements must be a minimum of 20 feet in width and piping shall be installed no closer than 5 feet from the easement's edge.

COMPLAINTS

The water utility will evaluate all customer complaints to determine if they indicate a potential problem with the existing water treatment process, system facilities, or operational practices. The utility will be responsive to customer concerns and take appropriate action, as applicable, to address water quality or quantity concerns based on available resources and the significance the problem. Complaints may be made orally or in writing to the utility at any time through the utility contacts listed on the water bills. The utility will maintain records of all complaints received and the actions taken to identify the source of the problem and to either resolve the problem or reduce the potential for future impacts.

In order to avoid unnecessary customer concerns, customers shall be informed of planned water service outages at least 24 hours in advance.

PROJECT REVIEW PROCEDURES

All projects will be reviewed through approval by an Engineering Technician. The City Engineer will provide oversight to ensure projects meet all City and state standards. The review will ensure that the project meets the needs of the City's Comprehensive Plans and all City zoning requirements. If a project meets all requirements for approval, it is approved by the City Engineer, and then it is forwarded to the Public Works Director for signature.

Following approval of the project, but before construction starts, a Pre-Construction Meeting is held between the Engineering Technician, the Project Design Engineer, the Developer, and the Contractor. This meeting will allow City staff to review the City's construction requirements with the Contractor and to make sure that all necessary permits have been obtained.

POLICIES AND REQUIREMENTS FOR OUTSIDE PARTIES

Developers intending to install water lines need to fill out an application and receive approval from the City before beginning construction. Part of the permitting process is a review of the project as described in the previous section. Plans and specifications for any distribution system facility need to be stamped and signed by a Professional Engineer registered in the State of Washington who has experience in water system design. All fees need to be received by the City before approval for construction is issued.

Booster pumps, pressure reducing valves (PRVs), and storage tanks need to be submitted to DOH for plan review and approval. Approval from DOH is required for these facilities before the City will approve the project for construction. Projects that consist of water line extensions only do not need separate approval from DOH (water line extension only projects without DOH review are only allowed during the life of this approved Water System Plan).

DESIGN STANDARDS (PERFORMANCE STANDARDS AND SIZING CRITERIA)

The City's design and construction standards are consistent with standards agreed upon in the *Clark County Coordinated Water System Plan*.

In accordance with the City's Construction Standards, the minimum water main size shall be 8 inches in diameter. Mains less than 8 inches in diameter, but no smaller than 4 inches in diameter, may be constructed subject to approval by the City Engineer in cul-de-sacs of not more than 400 feet in length where the water main cannot be extended in the future, provided that the main is a minimum of 8 inches in diameter to the last hydrant.

In general, where the area is zoned for high-density residential, the minimum pipe diameter is 8 inches. Commercial and industrial area distribution systems are sized to meet the appropriate fire flow requirements, but no smaller than 8 inches in diameter. The City Engineer may reduce the minimum pipe size requirements only when a hydraulic and demand analysis indicates a smaller size will meet future needs. A larger size also may be required if fire protection requirements dictate. The minimum pressure requirement is 20 pounds per square inch during a fire flow event. Mains will be looped whenever practical. Dead-end lines will have fire hydrants or blow-offs to flush out the water line. Water lines will be constructed of NSF-approved ductile iron or C900 polyvinyl chloride (PVC) pipe.

Booster pumps are designed to operate no more than 16 hours per day unless they are the only supply to the pressure zone. Pump sizing is based on maximum capacity requirements over the 24-hour peak day period. PRVs and pump stations will have redundant pumps and/or PRVs with isolation valves to allow for removal of valves or pumps for maintenance, repairs, or replacement. Facilities requiring electricity to operate shall have an outside electrical connection for a generator hook-up or their own emergency generator.

The maximum fire hydrant separation allowed is 700 feet in residential areas, with no residence more than 500 feet away. Hydrant spacing in commercial areas is a maximum of 300 feet. Valves are installed at all crosses and tees with all branches containing a valve. Auxiliary valves are installed on each hydrant branch.

Storage tank sizing will be based on Water System Plan design demands and accepted engineering practices. The City and the Developer will agree on the storage tank size prior to design of the storage tank.

CONSTRUCTION STANDARDS (MATERIALS AND METHODS)

American Water Works Association (AWWA) Standards need to be followed for the design and construction of distribution system facilities for the City. These AWWA standards include the following.

- Standard C104-C153 (ANSI Standards for Ductile Iron Pipe and Fittings)
- Standard C500-C560 (Standards for Valves and Hydrants for Waterworks)
- Standard C600-99 (Installation of Ductile Iron Water Mains and their Appurtenances)

- Standard C605-94 (Underground Installation of PVC Pressure Pipe and Fittings for Water)
- Standard C606-97 (Grooved and Shouldered Joints)
- Standard C651-99 (Disinfecting Water Mains)
- Standard C652-02 (Disinfection of Water Storage Facilities)
- Standard C800-01 (Underground Service Line Valves and Fittings)
- Standard C900-950 (Plastic Pipe)

CONSTRUCTION CERTIFICATION AND FOLLOW-UP PROCEDURES

During construction, the City's Engineering Technicians or other Engineering personnel will inspect construction on a regular basis to ensure it is meeting the City's Construction Standards. The Contractor is required to keep a record of all pressure and leak tests, disinfection procedures and results, and any changes made during construction from approved drawings.

Upon completion of the project, the Contractor is required to submit copies of record drawings for the project, pressure and disinfection test results, and an operation and maintenance manual, if applicable, for the constructed facilities. The record drawings need to be stamped and signed by a Professional Engineer registered in the State of Washington. Along with these drawings and test results, where applicable, a DOH Construction Completion Report Form needs to be filled out, signed, and submitted to the state. This form needs to be stamped and signed by a Professional Engineer registered in the State of Washington.

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6 | WATER SOURCE AND QUALITY

INTRODUCTION

The two basic objectives of a water system are to provide a sufficient quantity of water to meet customer usage demands and to provide high-quality water. **Chapter 7** discusses the City of Battle Ground's (City) ability to supply a sufficient quantity of water and identifies future source requirements. This chapter discusses the City's existing water sources, water rights, water quality regulations, and water quality monitoring results.

EXISTING WATER SOURCES AND TREATMENT

Water Sources

The City's municipal water supply is provided by groundwater wells completed in the shallow Upper Troutdale Aquifer or the deep Sand and Gravel Aquifer and wholesale interties with Clark Public Utilities (CPU). These sources include Well No. 1 (S01), Well No. 2 (S02), Well No. 4 (S03), Well No. 5 (S04), Well No. 7 (S09), Well No. 8 (S10), Well No. 9 (S11), the normal supply intertie with CPU (S13), and an emergency intertie with CPU. Well Nos. 7, 8, and 9 have been recognized by the Washington State Department of Health (DOH) as a wellfield (S12).

Well Nos. 1 and 2

The Well Nos. 1 and 2 site is located at 11 SW 5th Avenue. The wells are completed in the Upper Troutdale Aquifer. The current combined maximum pumping rate of the two wells is 280 gallons per minute (gpm).

Well Nos. 4 and 5

The Well Nos. 4 and 5 site is located on City property east of Highway 503 (SW 10th Avenue) at approximately SW 10th Street. The wells are completed in the Upper Troutdale Aquifer. The current combined maximum pumping rate of the two wells is 150 gpm.

Well No. 6

The Well No. 6 site is located west of SW 20th Avenue in approximately the 800 block. The well is completed in the Sand and Gravel Aquifer. The current maximum pumping rate of the well is 100 gpm, although it is currently only used as an emergency backup source.

Well Nos. 7, 8, and 9

The Horsethief Wellfield consists of Well Nos. 7, 8, and 9. These wells are located at 2817 SW 11th Street (Well Nos. 7 and 8) and across the street to the north on the Horsethief Reservoir and Pump Station site (Well No. 9). The wells are completed in the Sand and Gravel Aquifer.

The current maximum pumping rate of Well No. 9 is 500 gpm. Wells No. 7 and 8 are currently offline.

Clark Public Utilities Interties

There is currently one primary wholesale intertie with CPU (219th Street) at the Meadow Glade Pump Station site that has a capacity of 2,000 gpm. This intertie is a source of supply for the City, and the City is authorized to take up to 2,000 gpm and 3,226 acre-feet per year (afy) (**Appendix C**). There is also one emergency intertie, NE 122nd Avenue – Maple Grove School, with a 547 gpm capacity.

Water Treatment

The water treatment processes utilized at the City's sources are described in **Chapter 2**.

WATER RIGHTS AND INTERTIES

Overview

A water right is a legal authorization to use a specified amount of public water for specific beneficial purposes. The water right amount is expressed in terms of instantaneous withdrawal rate and annual withdrawal volume. Washington State law requires users of public water to receive approval from the Washington State Department of Ecology (Ecology) prior to actual use of the water. This approval is granted in the form of a water right permit, which is developed into a certificate. However, a water right is not required for certain purposes (typically individual residences) that use 5,000 gallons per day (gpd) or less of groundwater from a well.

The process of obtaining a water right involves submitting a water right application that is reviewed by Ecology. If the request is approved, a water right is issued to allow for water use to commence. A water right permit provides permission to construct the necessary wells or diversions, pumps, and pipes to start using water. The water right permit remains in effect until the permit holder determines that its project is complete, and they have used as much water as they will under the water right. At that time, the permit holder files a proof of appropriation form, which attests to the rate and volume of water used under the water right. A water right certificate is issued by Ecology following a proof of examination and determination that the amount of water put to beneficial use is consistent with the amount and conditions indicated on the water right permit.

A water right permit can only be issued by Ecology if the proposed use meets the following requirements:

- Water will be put to beneficial use.
- There will be no impairment to existing or senior rights.
- Water is physically and legally available for appropriation.
- Issuance of the requested water right will not be detrimental to the public interest.

During preparation of the report of examination, Ecology considers existing basin management plans, stream closures, minimum instream flows, hydraulic continuity (surface water interconnected to groundwater), utilization of existing water sources, water conservation, and availability of alternative water supplies, among other things. The water right decision process is increasingly becoming more complex and time consuming due to the many competing interests for water, environmental issues, and regulatory requirements.

Existing Water Rights and Wholesale Agreements

The City currently holds three ground water certificates and one ground water permit for its sources of municipal water supply. The City's water rights total 2,325 gpm and 1,912 afy.

In addition to its own groundwater sources, the City currently has one permanent and one emergency intertie to CPU. The wholesale agreement between CPU and the City authorizes the City to take 2,000 gpm as a source of supply (**Appendix C**). The City has assumed that this rate of water could be taken continuously for a maximum annual volume of 3,226 afy. In addition, the City can physically take up to 547 gpm on an emergency basis through its emergency intertie.

A summary of the City's water rights is presented in **Table 6-1**, and the principal water right documents are contained in **Appendix I**, while the agreements between CPU and the City are contained in **Appendix C**.

Table 6-1

Existing Water Rights and Wholesale Agreement

				Instantaneous Rate (gpm)		Annual Volume (afy)	
Water Right	**Priority Date**	**Document**	**Source Name**	**Additive**	**Non-Additive**	**Additive**	**Non-Additive**
GWC 2605-A	6/3/1954	Certificate	Well No. 1 & 2	350	0	270	0
G2-23122C	8/30/1974	Certificate	Well No. 4 & 5	250	0	269	0
G2-29208C	8/13/1986	Certificate	Well No. 6	350	0	430	0
G2-29477(A)P	8/13/1986	Superseding Permit	Wells No. 7, 8, & 9	1,375	0	943	207
			Water Right Total	**2,325**	**gpm**	**1,912**	**afy**
Wholesale Intertie with Clark Public Utilities [1, 2]			**Intertie Total**	**2,000**	**gpm**	**3,226**	**afy**
			Grand Total	**4,325**	**gpm**	**5,138**	**afy**

Notes:
Proof of Appropriation under G2-29477(A)P due April 1, 2026.
Well Nos. 1, 2, 4, and 5 tap the Upper Troutdale Aquifer. Well Nos. 6, 7, 8, and 9 tap the deep Sand and Gravel Aquifer.
All existing City wells are located within Water Resource Inventory Area 28 - Salmon-Washougal.
[1] Water Supply and Aid to Construction Agreement between Clark Public Utilities and the City of Battle Ground for Calendar Years 2021-2040 dated March 2, 2021.
[2] Intertie annual volume assumed to be 3,226 afy since that is equal to the instantaneous rate of 2,000 gpm, continuously.

The City's existing water rights are all for wells located in Water Resource Inventory Area (WRIA) 28 – Salmon-Washougal. Each water right is discussed in more detail in the following sections.

Ground Water Certificate 2605-A (G2-*03661C)

Ground Water Certificate (GWC) 2605-A, with a priority date of June 3, 1954, currently authorizes the withdrawal of 350 gpm and 270 afy from Well Nos. 1 and 2 for municipal water supply within the City's water service area.

Ground Water Certificate G2-23122C

G2-23122C, with a priority date of August 30, 1974, currently authorizes the withdrawal of 250 gpm and 269 afy from Well Nos. 4 and 5 for municipal water supply within the City's water service area.

Ground Water Certificate G2-29208C

G2-29208C, with a priority date of August 13, 1986, currently authorizes the withdrawal of 350 gpm and 430 afy from Well No. 6 for municipal water supply within the City's water service area. The quantity authorized is considered to be a portion of the amount reserved by the adoption of Chapter 173-592 Washington Administrative Code (WAC), Reservation of Future Public Water Supply for Clark County. The reservation contained in that rule has since been transferred to WAC 173-528-120, as Chapter 173-592 WAC has been repealed. The rule dictates the priority date of August 13, 1986, even though the City submitted the application to Ecology on March 27, 1995.

Ground Water Permit G2-29477(A)P

G2-29477(A)P, with a priority date of August 13, 1986, currently authorizes the withdrawal of 1,375 gpm and 1,150 afy (943 afy additive, 207 afy non-additive) from Well Nos. 7, 8, and 9 for municipal water supply within the City's water service area. The quantity authorized is considered to be a portion of the amount reserved by the adoption of Chapter 173-592 WAC, Reservation of Future Public Water Supply for Clark County. The reservation contained in that rule has since been transferred to WAC 173-528-120, as Chapter 173-592 WAC has been repealed. The rule dictates the priority date of August 13, 1986, even though the City submitted the application to Ecology on March 25, 1997. The development schedule on this permit was extended in January 2021 and now requires full beneficial use by April 1, 2026. If the City has not made full beneficial use of this water right permit, then it will need to file an extension request before the due date and provide evidence to Ecology showing due diligence toward using the full water right.

Existing Water Right Discussion

All the City's water rights meet the definition as being for municipal water supply purposes (Revised Code of Washington (RCW) 90.03.015(4)). The City is a municipal water supplier (RCW 90.03.015(3)). The place of use of the City's water rights is equal to the service area defined in this Water System Plan (WSP) and will be revised with future updates to the City's WSP.

As can be seen from **Table 6-1**, all four of the groundwater rights are specific to certain wells or wellfields that tap specific aquifers. Well Nos. 1, 2, 4, and 5 are completed in the shallow Upper Troutdale Aquifer, while Well Nos. 6, 7, 8, and 9 are completed in the deep Sand and Gravel Aquifer.

Water rights GWC 2605-A and G2-23122C authorize 600 gpm and 539 afy (additive) to be withdrawn from the Upper Troutdale Aquifer.

Water rights G2-29208C and G2-29477(B)P authorize 1,725 gpm and 1,373 afy (additive) to be withdrawn from the Sand and Gravel Aquifer.

Water right G2-29477(B)P includes 207 afy of non-additive annual volume. This additional annual volume can be withdrawn from the Sand and Gravel Aquifer (Well Nos. 7, 8 and 9) under this permit, if there is a corresponding reduction in annual volume pumped under one of the other City water rights. If this reduction in annual volume pumped is from Well Nos. 1, 2, 4, or 5, then the City could pump up to a maximum of 1,580 afy from the Sand and Gravel Aquifer. The non-additive annual volume under G2-29477(A)P provides the City with flexibility in the wells and aquifers utilized.

Pending Water Right Application

The City currently has one pending new water right application.

Ground Water Application G2-30194

Ground Water Application G2-30194, with a priority date of March 16, 1995, requests that the City be able to withdraw an additional 1,200 gpm and 1,000 afy from a new well targeting the deep Sand and Gravel Aquifer. The Proposed Well is located very close to the boundary between WRIA 27 – Lewis and WRIA 28 – Salmon-Washougal. Its final location, and the hydrogeology of that area, will dictate which water resources management program will be used to determine legal water availability and applicable reservations or minimum instream flows as specified in Chapter 173-527 WAC – Lewis or Chapter 173-528 WAC – Salmon-Washougal. This application remains pending in Ecology's water right application processing queue.

Water Supply Evaluation

An evaluation of the City's existing water rights and interties (wholesale agreements) was performed to determine the sufficiency of the water rights and wholesale agreements to meet both existing and future water demands. **Table 6-2** compares the combined maximum instantaneous water right and wholesale agreement rates authorized with the maximum day demand (MDD) of the system, and the combined maximum annual water right and wholesale agreement volume with the average day demand (ADD) of the system. As shown in **Table 6-2**, the City has sufficient instantaneous and annual water rights and wholesale agreements to meet existing demands.

Table 6-2

Existing Water Rights and Wholesale Agreement Evaluation

Description	Instantaneous Rights/ Maximum Day Demand (gpm)	Annual Rights/ Average Day Demand (afy)	(gpm)
Total Water Rights and Interties	4,325	5,138	3,185
Existing (2019) Water Demand	1,951	1,737	1,077
Surplus (or Deficient) Rights	**2,374**	**3,401**	**2,108**

Table 6-3 summarizes the results of the future water right and wholesale agreement evaluation, which compares the combined water rights and wholesale agreements with the system's future 10-year and 20-year demand projections. It was assumed that the City's wholesale intertie with CPU would be upsized to 4,000 gpm capacity by 2030. The analyses considered future demand projections without water use reductions from the City's planned water use efficiency (WUE) efforts, as shown in the table. The City's WUE goals are to reduce the average equivalent residential unit annual water consumption by 1 percent within 10 years, and maintain system-wide DSL at less than 10 percent per year based on a 3-year rolling average. The results of the future water right and wholesale agreement evaluation indicate the City has sufficient instantaneous and annual water rights and wholesale agreements to meet the demand through the year 2040.

Table 6-3

Future Water Rights and Wholesale Agreement Evaluation

Description	Instantaneous Rights/ Maximum Day Demand (gpm)	Annual Rights/ Average Day Demand (afy)	(gpm)
Year 2030 (+ 10 years) Without Water Use Efficiency			
Total Water Rights and Interties	6,325	8,364	5,185
Projected (2030) Water Demand	2,901	2,583	1,602
Surplus (or Deficient) Rights	**3,424**	**5,781**	**3,584**
Year 2040 (+ 20 years) Without Water Use Efficiency			
Total Water Rights and Interties	6,325	8,364	5,185
Projected (2040) Water Demand	4,186	3,728	2,311
Surplus (or Deficient) Rights	**2,139**	**4,636**	**2,874**
Year 2030 (+ 10 years) With Water Use Efficiency			
Total Water Rights and Interties	6,325	8,364	5,185
Projected (2030) Water Demand	2,875	2,560	1,587
Surplus (or Deficient) Rights	**3,450**	**5,804**	**3,598**
Year 2040 (+ 20 years) With Water Use Efficiency			
Total Water Rights and Interties	6,325	8,364	5,185
Projected (2040) Water Demand	4,144	3,690	2,288
Surplus (or Deficient) Rights	**2,181**	**4,674**	**2,897**

Physical Pumping Capacity vs. Water Right Authorization

While the City has water rights and wholesale agreements that are projected to meet future demand through 2040, the City is currently only able to pump its wells at a combined maximum pumping rate of 930 gpm for production, which is 1,395 gpm less than the authorized limit of 2,325 gpm. The combined production rate from all wells and the intertie is currently 2,930 gpm.

The City will either need to expand its physical pumping capacity under its water rights or increase its ability (both through agreement and physically) to obtain wholesale water from CPU between the 10- and 20-year planning horizon to prevent the City's demand from exceeding the physical pumping capacity of the City's sources of supply.

LONG-TERM WATER SUPPLY PLANNING

Feasibility of Transferring Existing Water Rights

The City's wells are all currently located within WRIA 28 Salmon-Washougal. The water rights are administratively divided by the aquifer the wells are completed in. It should be feasible to transfer water rights with wells completed in the Upper Troutdale Aquifer to other wells completed in the same aquifer. It also should be feasible to transfer water rights with wells completed in the deep Sand and Gravel Aquifer to other wells completed in the same aquifer. However, the City will not be able to move water rights to wells completed in different aquifers.

Water right changes can help rectify issues, such as annual volume overuse on GWC 2605-A and underuse on G2-23122C.

In addition, transfers to new wells will not be allowed if they will impair existing users, will have a greater impact on a closed water body, or are detrimental to the public welfare.

Alternatives Analysis

The City is interested in exploring different alternatives with respect to its future supply.

Past Work

Harper Houf Peterson Righellis Inc. (HHPR) developed a Well Replacement Strategy for the City in 2017. The 2017 investigation by HHPR identified the potential additional supply sources as:

- Well Maintenance;
- Filtration at Well No. 6; and
- New Well.

This strategy was only focused on the City's wells and did not consider wholesale water from CPU as a source. The alternatives analysis in this chapter considers all reasonable options.

Change in Conditions Over Time

Table 6-4 shows the change in City well production over time.

Table 6-4

Well Pumping Rates Over Time Compared to Water Right Limits

Well	Aquifer	Water Right Limit (gpm)	2013 Conditions (gpm)	2017 Conditions (gpm)	2021 Conditions (gpm)
Well No. 1	Upper Troutdale	350	280	280	280
Well No. 2					
Well No. 4	Upper Troutdale	250	150	150	150
Well No. 5					
Well No. 6	Sand and Gravel	350	145 (2011)	100 [1]	100 [1]
Well No. 7	Sand and Gravel	1,375	300	240	0
Well No. 8			370	170	0
Well No. 9			400	280	500
Subtotal	*Upper Troutdale*	*600*	*430*	*430*	*430*
Subtotal	*Sand and Gravel*	*1,725*	*1,215*	*790*	*600*
Combined Total		**2,325**	**1,645**	**1,220**	**1,030**

[1]Not in production due to iron and manganese concentration and lack of treatment at wellhead.

Well Nos. 1, 2, 4, and 5, completed in the Upper Troutdale Aquifer, continue to operate without problem.

Well No. 6 continues to not be used due to water quality concerns (high iron and manganese) and a lack of treatment located onsite.

The City had difficulty rehabilitating Well No. 7 and is waiting for this analysis to be complete before it decides whether to proceed with attempting it again. This well is not currently being used.

The City has ceased using Well No. 8 because it was using more water to backwash the filters than it was producing.

The City has replaced the pumping equipment in Well No. 9, which had been identified as being the cause of production declines in that well, as opposed to well screen clogging. Well No. 9 production has increased to 500 gpm.

Considered Alternatives

For this assessment, and building on the 2017 HHPR work, the following eight alternatives were assessed:

1. Rehabilitate existing wells (a. Upper Troutdale Aquifer and b. Sand and Gravel Aquifer).
2. Drill additional wells (a. Upper Troutdale Aquifer and b. Sand and Gravel Aquifer).
3. Provide iron and manganese removal at Well No. 6 (Sand and Gravel Aquifer).
4. Route additional wells to existing Horsethief Treatment Facility for iron and manganese removal (Sand and Gravel Aquifer).

5. Construct wells at new locations and change existing water rights (a. Upper Troutdale Aquifer [UTA]) and b. Sand and Gravel Aquifer [SGA]).
6. Construct a new City wellfield in designated regional supply areas.
7. Team with CPU on its new wellfields in designated regional supply areas.
8. Transfer water rights to CPU wells completed in the Sand and Gravel Aquifer at locations with better water quality.

Unit Capital Costs

The unit costs identified in **Table 6-5** were used in this alternatives analysis for capital expenses to allow for equal comparison between different alternatives.

Table 6-5

Capital Costs Used

Description	Planning-Level Cost	Service Life (years)
12-inch-diameter well completed in the Upper Troutdale Aquifer - 150 feet deep	$1,250,000	75
12-inch-diameter well completed in the Sand and Gravel Aquifer - 400 feet deep	$2,000,000	20
24-inch-diameter mainline (per foot)	$545	75
12-inch-diameter mainline (per foot)	$388	75
8-inch-diameter mainline (per foot)	$351	75
Small pressure filtration treatment facility - up to 500 gpm	$1,200,000 for 100 gpm, then an additional $150,000 per 100 gpm	20
Small chlorination treatment facility - up to 500 gpm (lump sum cost)	$730,000	15
Well rehabilitation (per well per occurrence)	$65,000	10 years UTA 3 years SGA
DOH Source Approval Report	$50,000	NA
Water right application preparation and processing	$50,000	NA

Alternatives Analysis Cost Estimates

Table 6-6 through **6-8** break out the capital costs per gpm per year of production capacity.

Table 6-6

Capital Costs Typical Sand and Gravel Aquifer Well with Treatment

Description	Planning-Level Cost	Service Life (years)	Cost Per Year
12-inch-diameter well completed in the Sand and Gravel Aquifer - 400 feet deep	$2,000,000	20	$100,000
Small chlorination treatment facility - up to 500 gpm (lump sum cost)	$730,000	15	$48,667
Small pressure filtration treatment facility - 200 gpm	$1,350,000	20	$67,500
Well rehabilitation (per well per occurrence)	$65,000	3 years SGA	$21,667
DOH Source Approval Report	$50,000	20	$2,500
		Total	**$240,334**
Assuming an average pumping rate of 200 gpm, the cost per year per gpm =			**$1,202**

Table 6-7

Capital Costs Typical Upper Troutdale Well with Treatment

Description	Planning-Level Cost	Service Life (years)	Cost Per Year
12-inch-diameter well completed in the Upper Troutdale Aquifer - 150 feet deep	$1,250,000	75	$16,667
Small chlorination treatment facility - up to 500 gpm (lump sum cost)	$730,000	15	$48,667
Well rehabilitation (per well per occurrence)	$65,000	10 years UTA	$6,500
DOH Source Approval Report	$50,000	75	$667
		Total	**$72,501**
Assuming an average pumping rate of 100 gpm, the cost per year per gpm =			**$725**

Table 6-8

Capital Costs Routing Well No. 6 to Treatment

Description	Planning-Level Cost	Service Life (years)	Cost Per Year
8-inch-diameter mainline (3,500 Feet)	$1,228,500	10	$122,850
Well rehabilitation (per well per occurrence)	$65,000	3 years SGA	$21,667
		Total	**$144,517**
Assuming an average pumping rate of 100 gpm and that Well No. 6 will last an additional 10 years, the cost per year per gpm =			**$1,445**

Recently, CPU has constructed two wellfields in regional water supply areas, as designated in Water Resource Management Programs for Lewis Basin, WRIA 27 and Salmon-Washougal Basin, WRIA 28. These wellfields are the Paradise Point Wellfield and the Two Lakes Wellfield facilities. The Water Resource Management Programs identified specific areas where water was legally available for appropriation and new water rights could be issued. These areas are referred to as regional supply areas and fall within the service area of CPU (**Figure 6-1**).

If the City chooses to team with CPU on development of these sources, it will allow for cost sharing. The City gets a source of supply and CPU expands it source capacity and pipeline infrastructure within its service area.

To get access to 1,000 gpm of supply, the City had to pay capital costs of approximately $600,000 for a well and treatment facility expansion at the Paradise Point Wellfield. After the initial up-front cost, the City is not responsible for ongoing costs, just the cost of water purchased. Even if these facilities have a service life of only 15 years, the cost per gpm per year would be $600,000 divided by 15 years or $40,000 per year. This equates to $40 per gpm per year ($40,000 per year divided by 1,000 gpm).

To get access to 2,000 gpm of supply, the City will have to pay half of the cost of the Pioneer to Cherry Grove Transmission Line. This is a 24-inch-diameter pipe that will be approximately 5.5 miles (29,040 feet) in length and will extend from just east of the City of Ridgefield to the City's intertie and Meadow Glade Pump Station. Based on cost estimates provided by CPU, the anticipated cost of the pipeline will be $8,000,000. Based on the existing agreement between the City and CPU, the City's share will be 50 percent, or $4,000,000. Once constructed, the pipeline will be owned and operated by CPU and the City will not be directly responsible for any additional capital costs. Assuming a pipeline service life of 75 years, the cost per gpm per year would be $4,000,000 divided by 75 years or $53,333 per year. This equates to $27 per gpm per year ($53,333 per year divided by 2,000 gpm).

Alternatives Analysis Findings

The eight alternatives described previously are compared here to try to focus on the preferred alternative that should be studied in more depth by the City.

The wells completed within the Upper Troutdale Aquifer have been in operation for a long duration, and their production rate has stayed constant in recent years. Well rehabilitation only needs to be performed as part of routine maintenance and not due to excessive production decline. In addition, the water from these wells only needs to be chlorinated and fluoridated and does not need to have the iron and manganese concentration reduced; therefore, they are the City's least expensive well sources to operate. Investment in constructing additional Upper Troutdale Aquifer wells to pump at the City's water right limit for this aquifer is recommended.

Enough data exists to suggest that the Sand and Gravel Aquifer, in proximity to the City, is not a good source of supply. The water is more costly to treat, the wells require frequent rehabilitation, production capacity drops quickly over time, and the total life expectancy of a production well is short (approximately 20 years). If the City chooses to invest in additional extraction of water from the Sand and Gravel Aquifer near the City, this scenario will consist of nearly constant well construction and rehabilitation to maintain levels of production at the water right limits. For this reason, RH2 recommends utilizing and rehabilitating the existing functioning wells but ceasing future investment in Sand and Gravel Aquifer production wells in the City limits.

Teaming with CPU on the construction of a large-diameter water main to take advantage of CPU's wellfields constructed in the regional water supply areas will provide the City with a regional source of supply.

There are wells tapping the Sand and Gravel Aquifer that have water that has lower concentrations of iron and manganese than occur near the City. CPU operates many wells tapping this aquifer, and transferring water rights to portions of the aquifer with better water quality can allow for full use of the City's water rights at a reasonable cost.

Preferred Alternatives

Based on the anticipated capital and operations and maintenance costs, reliability of the sources, and the City's preferences, there are four preferred alternatives.

1. Team with CPU on its new wellfields in the regional water supply areas and associated infrastructure to deliver water from the wellfields to the City.
2. Drill an additional well or wells at the current Well Nos. 4 and 5 site to maximize use of the Upper Troutdale Aquifer water rights. The existing wells are likely nearing the end of their service life. Preserving this source of supply will allow the City to maintain some control over its water supply for resilience, even when transitioning to the use of more water from CPU.
3. Bring Well No. 6 back online with on-site treatment.

4a. Replace Well Nos. 7 and 8 if technology changes make this feasible.

4b. Approach CPU with the idea to transfer the City's Sand and Gravel Aquifer water rights to better locations to the southwest, which is already tapped by CPU wells, with groundwater containing less iron and manganese as a credit against system development charges. This will allow these water rights to be fully utilized while eliminating the ongoing operations and maintenance issues associated with City wells in this aquifer.

RECLAIMED WATER

Existing Reclaimed Water Use

The City does not currently produce or use reclaimed water.

DRINKING WATER REGULATIONS

Overview

The quality of drinking water in the United States is regulated by the Environmental Protection Agency (EPA). Under provisions of the Safe Drinking Water Act (SDWA), the EPA is allowed to delegate primary enforcement responsibility for water quality control to each state. In the State of Washington, the Department of Health (DOH) is the agency responsible for implementing

and enforcing drinking water regulations. For the State of Washington to maintain primacy (delegated authority to implement requirements) under the SDWA, the state must adopt drinking water regulations that are at least as stringent as the federal regulations. In meeting these requirements, the State, in cooperation with the EPA, has published drinking water regulations that are contained in Chapter 246-290 WAC.

Existing Regulations

The Federal SDWA was enacted in 1974 as a result of public concern about water quality. The SDWA sets standards for the quality of drinking water and requires water treatment if these standards are not met. The SDWA also sets water testing schedules and methods that water systems must follow. In 1986, the SDWA was amended as a result of additional public concern and frequent contamination of groundwater from industrial solvents and pesticides. The 1986 Amendments require water systems to monitor and treat for a continuously increasing number of water contaminants identified in the new federal regulations. The SDWA was amended again and re-authorized in August of 1996.

In response to the 1986 SDWA Amendments, the EPA established six rules, known as the Phase I Rule, Phase II and IIb Rules, Phase V Rule, Surface Water Treatment Rule, Total Coliform Rule, and Lead and Copper Rule. The EPA regulates most chemical contaminants through the Phase I, II, IIb, and V Rules. The City's active sources are affected by many of these rules.

The EPA set two limits for each contaminant that is regulated under the rules. The first limit is a health goal, referred to as the Maximum Contaminant Level Goal (MCLG). The MCLG is zero for many contaminants, especially known cancer-causing agents (carcinogens). The second limit is a legal limit, referred to as the Maximum Contaminant Level (MCL). MCLs are equal to or higher than the MCLGs; however, most MCLs and MCLGs are the same, except for contaminants that are regulated as carcinogens. The health goals (MCLGs) for carcinogens are typically zero, because they cause cancer, and it is assumed that any amount of exposure may pose some risk of cancer. A summary of each rule follows.

To fully understand the discussion that follows, a brief definition of several key terms is provided below.

- Organic Chemicals – Animal or plant produced substances containing carbon and other elements such as hydrogen and oxygen.
- Synthetic Organic Chemicals (SOCs) – Man-made organic substances, including herbicides, pesticides, and various industrial chemicals and solvents.
- Volatile Organic Chemicals (VOCs) – Chemicals, as liquids, that evaporate easily into the air.
- Inorganic Chemicals (IOCs) – Chemicals of mineral origin that are naturally occurring elements. These include metals such as lead and cadmium.

Phase I Rule

The Phase I Rule, which was the EPA's first response to the 1986 Amendments, provides limits for eight VOCs that may be present in drinking water. VOCs are used by industries in the manufacturing of rubber, pesticides, deodorants, solvents, plastics, and other chemicals. VOCs are found in everyday items such as gasoline, paints, thinners, lighter fluid, mothballs, and glue, and typically are encountered at dry cleaners, automotive service stations, and elsewhere in industrial processes. The City currently complies with all contaminant monitoring requirements under this rule.

Phase II and IIb Rules

The Phase II and IIb Rules update and create limits for 38 contaminants (organics and inorganics). Some of the contaminants are frequently applied agricultural chemicals (nitrate), while others are more obscure industrial chemicals. The City currently complies with all contaminant monitoring requirements under these rules.

Phase V Rule

The Phase V Rule sets standards for 23 additional contaminants, of which 18 are organic chemicals (mostly pesticides and herbicides) and 5 are IOCs (such as cyanide). The City currently complies with all contaminant monitoring requirements under this rule.

Surface Water Treatment Rule

The Surface Water Treatment Rule (SWTR) governs surface water sources, such as rivers, lakes, and reservoirs (which are open to the atmosphere and subject to surface runoff), and groundwater sources under the influence of surface water (GWI). The SWTR seeks to prevent waterborne diseases caused by the microbes *Cryptosporidium, Legionella,* and *Giardia lamblia*, which are present in most surface waters. The rule requires disinfection of all surface water and GWI sources. All surface water and GWI sources also must be filtered, unless a filtration waiver is granted. A filtration waiver may be granted to systems with pristine sources that continuously meet stringent source water quality and protection requirements. The City currently does not have any surface water or GWI sources; therefore, this rule is not applicable.

Interim Enhanced Surface Water Treatment Rule

The Interim Enhanced Surface Water Treatment Rule (IESWTR) became effective concurrent with the Stage 1 Disinfectants/Disinfection Byproducts Rule. The rule primarily applies to public water systems that serve 10,000 or more people and use surface water or GWI sources. The rule also requires primacy agencies (i.e., DOH in Washington State) to conduct sanitary surveys of all surface water and GWI systems, regardless of size. The rule is the first to directly regulate the protozoan *Cryptosporidium* and has set the MCLG for *Cryptosporidium* at zero. The City currently does not have any surface water or GWI sources; therefore, this rule is not applicable.

Long Term 1 Enhanced Surface Water Treatment Rule

This Long Term 1 Enhanced Surface Water Treatment Rule (LT1ESWTR) addresses water systems using surface water or GWI sources serving fewer than 10,000 people. The rule extends protections against *Cryptosporidium* for smaller water systems. The City currently does not have any surface water or GWI sources; therefore, this rule is not applicable.

Revised Total Coliform Rule

The Revised Total Coliform Rule (RTCR) sets an MCL for *Escherichia coli (E. coli)*, and specifies the frequency and timing of coliform testing based on population served, public water system type, and source water type. When total coliform is detected, a treatment technique is triggered. The water system must assess its water system facilities and operations and fix any sanitary defects. For confirmed *E. coli* incidents, known as an *E. coli* MCL violation, the water system must perform a Level 2 assessment and provide public notice within 24 hours. If a positive sample is collected on a consecutive system, the City also will need to collect source samples.

Coliform is a group of bacteria, some of which live in the digestive tract of humans and many animals and are excreted in large numbers with feces. Coliform can be found in sewage, soils, surface waters, and vegetation. The presence of any coliform in drinking water indicates a potential health risk and potential waterborne disease outbreak, which may include gastroenteric infections, dysentery, hepatitis, typhoid fever, cholera, and other infectious diseases. *E. coli* is a member of the coliform group that is almost exclusively of fecal origin, and their presence can lead to increased health risks.

A copy of the City's Water Quality Monitoring Plan, including the coliform monitoring program and *E. coli* response plan, is contained in **Appendix J**. Within the past 6 years, the City detected the presence of coliform in its distribution system 3 times (July 2016, September 2019, and January 2021).

Lead and Copper Rule

The Lead and Copper Rule identifies action levels for both lead and copper. An action level is different than an MCL. An MCL is a legal limit for a contaminant, and an action level is a trigger for additional prevention or removal steps. The action level for lead is greater than 0.015 milligrams per liter (mg/L). The action level for copper is greater than 1.3 mg/L. If the 90^{th} percentile concentration of either lead or copper from the group of samples exceeds these action levels, a corrosion control study must be undertaken to evaluate strategies and make recommendations for reducing the lead or copper concentration below the action levels. The rule requires systems that exceed the lead level to educate the affected public about reducing its lead intake. Systems that continue to exceed the lead action level after implementing corrosion control and source water treatment may be required to replace piping in the system that contains lead sources. Corrosion control typically is accomplished by increasing the pH of the water to make it less corrosive, which reduces its ability to break down water pipes and absorb lead or copper.

The EPA is in the process of implementing a lead trigger level of 10 micrograms per liter (µg/L), which would require additional monitoring and treatment requirements.

Lead is a common metal found throughout the environment in lead-based paint, air, soil, household dust, food, certain types of pottery, porcelain, pewter, brass, and water. Lead can pose a significant health risk if too much of it enters the body. Lead builds up in the body over many years and can cause damage to the brain, red blood cells, and kidneys. The greatest risk is to young children and pregnant women. Lead can slow normal mental and physical development of growing bodies. The City is not aware of any lead service lines in its distribution system. Some cast iron mains are known to have leaded joints; these are gradually removed from the distribution system over time as cast iron mains are replaced with new piping constructed with modern materials.

Copper is a common, natural, and useful metal found in our environment. It is also a trace element needed in most human diets. The primary impact of elevated copper levels in water systems is stained plumbing fixtures. At certain levels (well above the action levels), copper may cause nausea, vomiting, and diarrhea. It also can lead to serious health problems in people with Wilson's disease. Long-term exposure to elevated levels of copper in drinking water also could increase the risk of liver and kidney damage. The City currently complies with all contaminant monitoring and treatment requirements under this rule.

Radionuclides Rule

The Radionuclides Rule establishes MCLs for alpha, beta, and photon emitters, and radium 226/228. Radionuclides are elements that undergo a process of natural decay and emit radiation in the form of alpha or beta particles and gamma photons. The radiation can cause various kinds of cancers, depending on the type of radionuclide exposure from drinking water. The regulations address both man-made and naturally occurring radionuclides in drinking water.

The Radionuclides Rule establishes an MCLG of zero for the four regulated contaminates and MCLs of 5 picocuries per liter (pCi/L) for combined radium-226 and radium-228, 15 pCi/L for gross alpha (excluding radon and uranium), 4 millirems per year (mrem/year) for beta particle and photon radioactivity, and 30 µg/L for uranium. The City currently complies with all contaminant monitoring requirements under this rule.

Watershed Control Program

The Washington State mandate for watershed protection and the required elements of a watershed control program are contained in WAC 246-290-135, Source Protection. A watershed control program is a proactive and ongoing effort of a water purveyor to exercise surveillance over the conditions and activities within the watershed affecting source water quality to protect the health of its customers, as outlined in WAC 246-290-668, Watershed Control. Group A public water systems that use surface water or groundwater under the influence of surface water as their source are required to develop and implement a watershed control program. All required elements of a watershed control program must be documented and included in the

purveyor's Water System Plan (applicable to the City) or Small Water System Management Program (not applicable to the City). The City's water sources are groundwater, with none classified as being under the influence of surface water; therefore, this requirement is not applicable.

Wellhead Protection Program

The Washington State mandate for wellhead protection, and the required elements of a wellhead protection program, is contained in WAC 246-290-135, Source Protection. A wellhead protection program is a proactive and ongoing effort of a water purveyor to protect the health of its customers by preventing contamination of the groundwater that it supplies for drinking water. Group A public water systems that use groundwater as their source are required to develop and implement a wellhead protection program. All required elements of a local wellhead protection program must be documented and included in either the Water System Plan (applicable to the City) or a Small Water System Management Program document (not applicable to the City). A copy of the City's Wellhead Protection Program is contained in **Appendix K**.

Consumer Confidence Report

The Consumer Confidence Report (CCR) is the centerpiece of the right-to-know provisions of the 1996 Amendments to the SDWA. The annual report must be updated and re-issued to all customers by July 1st of each year thereafter. This rule is currently being revised to possibly require delivery to customers every 6 months for water systems over 10,000 people. The EPA also will require additional language to be included, but these final revisions are yet to be determined.

The CCR is a report on the quality of water that was delivered to the water users during the previous calendar year. The reports must contain certain specific elements, but also may contain other information that the purveyor deems appropriate for public education. Some, but not all, of the information that is required in the reports includes the source and type of the drinking water, type of treatment, contaminants that have been detected in the water, potential health effects of the contaminants, identification of the likely source of contamination, violations of monitoring and reporting, and variances or exemptions to the drinking water regulations. A copy of the City's most recent CCR is contained in **Appendix L**.

Stage 1 Disinfectants/Disinfection Byproducts Rule

Disinfection byproducts (DBPs) are formed when free chlorine reacts with organic substances, most of which occur naturally. These organic substances (called precursors) are a complex and variable mixture of compounds. The DBPs themselves may pose health risks.

The rule applies to the City and most other water systems, including systems serving fewer than 10,000 people that add a chemical disinfectant to the drinking water during any part of the treatment process. The rule reduced the MCL for total trihalomethanes (TTHMs), which are a composite measure of four individual trihalomethanes (THM), from the previous interim level

of 0.10 mg/L to 0.08 mg/L. The rule establishes MCLs and requires monitoring of three additional categories of DBPs (0.06 mg/L for five haloacetic acids (HAA5), 0.01 mg/L for bromate, and 1.0 mg/L for chlorite). The rule establishes maximum residual disinfectant levels for chlorine (4.0 mg/L), chloramines (4.0 mg/L), and chlorine dioxide (0.8 mg/L). The rule also requires systems using surface water or groundwater directly influenced by surface water to implement enhanced coagulation or softening to remove DBP precursors, unless alternative criteria are met. The City currently complies with all contaminant monitoring requirements under this rule.

Unregulated Contaminant Monitoring Rule

The EPA established the Unregulated Contaminant Monitoring Rule (UCMR) to generate data on contaminants that are being considered for inclusion in new drinking water standards. The information collected by select public water systems will ensure that future regulations established by the EPA are based on sound science.

Three separate lists of unregulated contaminants are maintained under the UCMR: List 1, List 2, and List 3. Contaminants are organized on the tiered lists based on the availability of standard testing procedures and the known occurrence of each contaminant, with List 1 containing contaminants that have established standard testing procedures and some, but insufficient, information on their occurrence in drinking water. Monitoring for contaminants on the three lists is limited to a maximum of 30 contaminants within a 5-year monitoring cycle, and the EPA is required to publish new contaminant monitoring lists every 5 years. As new lists are published, contaminants will be moved up in the lists if adequate information is found to support additional monitoring. All public water systems serving more than 10,000 people and a randomly selected group of smaller water systems are required to monitor for contaminants. The City currently monitors for some unregulated contaminants.

Arsenic

Arsenic is highly toxic, affects the skin and nervous system, and may cause cancer. The Arsenic Rule sets the MCLG of arsenic at zero and reduces the MCL from the previous standard of 0.05 mg/L to 0.01 mg/L. Arsenic's monitoring requirements are consistent with the existing requirements for other inorganic contaminants. The City is currently in compliance with contaminant monitoring requirements under this rule.

Filter Backwash Recycling Rule

Public water systems using surface water or groundwater under the direct influence of surface water that utilize filtration processes and recycling must comply with the Filter Backwash Recycling Rule. The rule aims to reduce risks associated with recycling contaminants removed during filtration.

The rule requires filter backwash water to be returned to a location that allows complete treatment. In addition, filtration systems must provide detailed information regarding the

treatment and recycling process to the state. The City's groundwater sources that utilize filtration are not under the direct influence of surface water; therefore, this rule does not apply.

Stage 2 Disinfectants/Disinfection Byproducts Rule

The EPA implemented the Stage 2 Disinfectants/Disinfection Byproducts Rule (Stage 2 D/DBPR) simultaneously with the Long Term 2 Enhanced Surface Water Treatment Rule.

Similar to the Stage 1 D/DBPR, this rule applies to most water systems that add a disinfectant to the drinking water other than ultraviolet light or those systems that deliver such water. The Stage 2 D/DBPR changes the calculation procedure requirement of the MCLs for two groups of disinfection byproducts: TTHM and HAA5. The rule requires each sampling location to determine compliance with MCLs based on their individual annual average DBP levels (termed the Locational Running Annual Average), rather than utilizing a system-wide annual average. The rule also proposes new MCLGs for chloroform (0.07 mg/L), trichloroacetic acid (0.02 mg/L), and monochloroacetic acid (0.03 mg/L).

Additionally, the rule requires systems to document peak DBP levels and prepare an Initial Distribution System Evaluation (IDSE) to identify Stage 2 D/DBPR compliance monitoring sites. IDSEs require each water system to prepare a separate IDSE plan and report, with the exception of those systems who obtain a 40/30 Certification or a Very Small System Waiver. In order to qualify for the 40/30 Certification, all samples collected during Stage 1 monitoring must have TTHM and HAA5 levels less than or equal to 0.040 mg/L and 0.030 mg/L, respectively. The City currently complies with all contaminant monitoring requirements under this rule and has completed its IDSE plan.

Long Term 2 Enhanced Surface Water Treatment Rule

Following the publishing of the IESWTR, the EPA introduced the LT1ESWTR to supplement the preceding regulations. The second part of the regulations of the LT1ESWTR are mandated in the Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR). The final rule was implemented simultaneously with the Stage 2 D/DBPR described in the previous section. This rule applies to all systems that use surface water or GWI sources.

This rule establishes treatment technique requirements for filtered systems based on their risk level for contamination, calculated from the system's average *Cryptosporidium* concentration. Requirements include up to 2.5-log *Cryptosporidium* treatment, in addition to existing requirements under the IESWTR and LT1ESWTR. Filtered systems that demonstrate low levels of risk will not be required to provide additional treatment. Unfiltered systems under this rule must achieve at least a 2-log inactivation of *Cryptosporidium* if the mean level in the source water remains below 0.01 oocysts/L. If an unfiltered system's mean level of *Cryptosporidium* exceeds 0.01 oocysts/L, the LT2ESWTR requires the system to provide a minimum 3-log inactivation of *Cryptosporidium*. All unfiltered systems also are required to utilize a minimum of two disinfectants in their treatment process.

The LT2ESWTR also addresses systems with unfinished water storage facilities. Under this rule, systems must either cover their storage facilities or achieve inactivation and/or removal of

4-log virus, 3-log *Giardia lamblia,* and 2-log *Cryptosporidium* on a state-approved schedule. Lastly, the rule extends the requirement of the disinfection profiles mandated under the LT1ESWTR to the proposed Stage 2 D/DBPR. The City currently does not have any surface water sources; therefore, this rule is not applicable.

Groundwater Rule

The EPA promulgated the Groundwater Rule (GWR) to reduce the risk of exposure to fecal contamination that may be present in public water systems that use groundwater sources. The GWR also specifies when corrective action (which may include disinfection) is required to protect consumers who receive water from groundwater systems from bacteria and viruses. The GWR applies to public water systems that use groundwater and to any system that mixes surface and ground waters if the groundwater is added directly to the distribution system and provided to consumers without treatment equivalent to surface water treatment.

The rule targets risk through an approach that relies on the following four major components:

1. Periodic sanitary surveys of groundwater systems that require the evaluation of eight critical elements and the identification of significant deficiencies (such as a well located near a leaking septic system). DOH conducted its most recent sanitary survey of the City's water system in November 2018.
2. Source water monitoring to test for the presence of *E. coli*, enterococci, or coliphage in the sample. There are two monitoring provisions:
    - Triggered monitoring for systems that do not already provide treatment that achieves at least 99.99-percent (4-log) inactivation or removal of viruses and that have a total coliform positive routine sample under the Revised Total Coliform Rule sampling in the distribution system; and
    - Assessment monitoring is a complement to triggered monitoring. A state has the option to require systems to conduct source water assessment monitoring at any time to help identify high risk systems.
3. Corrective actions required for any system with a significant deficiency or source water fecal contamination. The system must implement one or more of the following corrective action options: correct all significant deficiencies; eliminate the source of contamination; provide an alternate source of water; or provide treatment that reliably achieves 99.99-percent inactivation or removal of viruses.
4. Compliance monitoring to ensure that treatment technology installed to treat drinking water reliably achieves at least 99.99-percent inactivation or removal of viruses.

The City has addressed all deficiencies identified in its most recent sanitary survey and complies with all other requirements of the rule.

Future Regulations

Drinking water regulations are continuously changing in an effort to provide higher quality and safer drinking water. Modifications to the existing rules described previously and implementation of new rules are planned for the near future. A summary of upcoming drinking water regulations that will most likely affect the City is presented in the following sections.

Per- and Polyfluoroalkyl Substances

In 2016, the EPA established a health advisory level for per- and polyfluoroalkyl substances (PFAS) at 70 parts per trillion (ppt). DOH proposed a regulation for PFAS in 2017, and this process is currently underway. The primary source of PFAS contamination was the historical use of PFAS-based firefighting foam used by the US military, local fire departments, and airports. It is not currently known when or what a PFAS regulation may require as adopted by the EPA or what will be the rule's implementation schedule. Since the final PFAS rule requirements are uncertain, the impact of this rule on the City is unknown at this time.

Radon

In July of 1991, the EPA proposed a regulation for radon, as well as three other radionuclides. The 1996 SDWA Amendments required the EPA to withdraw the 1991 proposal due to several concerns that were raised during the comment period. A new proposed regulation was published in the Federal Register on November 2, 1999. Comments on the proposed rule were due to the EPA by February 4, 2000. Final federal requirements for addressing radon were delayed until 2008 but have not yet been published. The rule proposes a 300 pCi/L MCL for community water systems that use groundwater or an alternative, less stringent MCL of 4,000 pCi/L for water systems where their state implements an EPA-approved program to reduce radon risks in household indoor air and tap water. It is not currently known when or what a radon regulation may require as adopted by the EPA or what the implementation schedule for the rule will be. Because the final radon rule requirements are uncertain, the impact of this rule on the City is unknown at this time.

Unregulated Contaminant Monitoring Rule Revisions

In accordance with the original UCMR and the SDWA, once every 5 years the EPA will issue a new list of no more than 30 unregulated contaminants to be monitored by public water systems. The fourth UCMR was proposed on December 11, 2015, and includes a list of 30 chemicals that will be monitored during the 2017 through 2021 monitoring cycle, and approves several new testing methods to conduct the monitoring. For this upcoming cycle, all systems serving more than 10,000 people and a larger representative sample of smaller water systems will be required to monitor for contaminants. The rule also requires additional water system data to be reported with the monitoring results, establishes a procedure for determining minimum reporting levels, and proposes several revisions to the implementation of the monitoring program.

SOURCE WATER QUALITY

This section presents the current water quality standards for groundwater sources and the results of the City's recent source water quality monitoring efforts. A discussion of the water quality requirements and monitoring results for the City's distribution system is presented in the section that follows.

Drinking Water Standards

Drinking water quality is regulated at the federal level by the EPA and at the state level by DOH. Drinking water standards have been established to maintain high-quality drinking water by limiting the levels of specific contaminants (i.e., regulated contaminants) that can adversely affect public health and are known or likely to occur in public water systems. Non-regulated contaminants do not have established water quality standards and are generally monitored at the discretion of the water purveyor and in the interest of customers.

The regulated contaminants are grouped into two categories of standards – primary and secondary. Primary standards are drinking water standards for contaminants that could affect health. Water purveyors are required by law to monitor and comply with these standards and notify the public if water quality does not meet any one of the standards. Secondary standards are drinking water standards for contaminants that have aesthetic effects, such as unpleasant taste, odor, or color (staining). The national secondary standards are unenforceable federal guidelines or goals where federal law does not require water systems to comply with them. However, states may adopt their own enforceable regulations governing these contaminants. The State of Washington has adopted regulations that require compliance with some of the secondary standards. Water purveyors are not required to notify the public if their water quality does not meet the secondary standards.

Source Monitoring Requirements and Waivers

The City is required to perform water quality monitoring at each of its active sources for inorganic chemical and physical substances, organic chemicals, and radionuclides. The monitoring requirements that the City must comply with are specified in WAC 246-290-300. A description of the source water quality monitoring requirements and procedures for each group of substances is contained in the City's Water Quality Monitoring Plan, which is included as **Appendix J**.

DOH has developed the Susceptibility Assessment Survey Form for water purveyors to complete for use in determining a drinking water source's potential for contamination. The results of the susceptibility assessment may provide monitoring waivers that allow reduced source water quality monitoring. Based on the results of the susceptibility assessment survey for each source, DOH assigned high susceptibility ratings to Wells No. 1 and 2, moderate susceptibility to Wells No. 4 and 5, and low susceptibility to Wells No. 7, 8, and 9.

Source Monitoring Results

The City's sources maintain a high level of water quality and have met or exceeded all drinking water standards within the last 6 years.

Well No. 1 was last monitored for IOCs in April 2016**.** The City has a waiver for IOCs through 2025. VOCs were last monitored in May 2020**,** with testing required in June 2021. SOCs were last monitored in August 2013**,** with a waiver through August 2022. Radionuclides were last monitored in September 2016, with the standard sample due in September 2022. Well No. 1 is also sampled yearly for nitrates and every 3 years for manganese and iron.

Well No. 2 was last monitored for IOCs in May 2019**.** The City has a waiver for IOCs through 2028. VOCs were last monitored in November 2020**,** with testing required in October 2021. SOCs were last monitored in June 2013**,** with a waiver through June 2022. Radionuclides were last monitored in September 2016, with the standard sample due in September 2022. Well No. 2 is also sampled yearly for nitrates and every 3 years for manganese and iron.

Well No. 4 was last monitored for IOCs in May 2017**.** The City has a waiver for IOCs through 2026. VOCs were last monitored in May 2017**,** with testing required in May 2023. SOCs were last monitored in August 2013**,** with a waiver through August 2022. Radionuclides were last monitored in November 2017, with the standard sample due in November 2023. Well No. 4 is also sampled yearly for nitrates and every 3 years for iron.

Well No. 5 was last monitored for IOCs in May 2017**.** The City has a waiver for IOCs through 2026. VOCs were last monitored in May 2016**,** with testing required in May 2022. SOCs were last monitored in April 2014**,** with a waiver through April 2023. Radionuclides were last monitored in November 2017, with the standard sample due in November 2023. Well No. 5 is also sampled yearly for nitrates and every 3 years for iron.

Wells No. 7, 8, and 9 were last monitored for IOCs in July 2016**.** The City has a waiver for IOCs through 2025. VOCs were last monitored in April 2020**,** with testing required in April 2026. SOCs were last monitored in April 2015**,** with a waiver through April 2024. Radionuclides were last monitored in January 2020, with the standard sample due in January 2026. Wells No. 7, 8, and 9 are also sampled yearly for nitrates.

The results of inorganic chemical (including nitrate) and VOC monitoring for the City's sources indicate that all primary and secondary standards were met.

DISTRIBUTION SYSTEM WATER QUALITY

Monitoring Requirements and Results

The City is required to perform water quality monitoring within the distribution system for coliform bacteria, disinfectant (chlorine) residual concentration, DBPs, lead and copper, and asbestos in accordance with Chapter 246-290 WAC. A description of the distribution system water quality monitoring requirements and procedures are contained in the City's Water Quality Monitoring Plan that is included in **Appendix J**.

Coliform Monitoring

The City is required to collect a minimum of 30 coliform samples per month from different locations throughout the system. The results of coliform testing from the past 6 years were all satisfactory, with the exception of 3 positive total coliform samples taken in July 2016, September 2019, and January 2021. All follow up repeat samples were negative.

Disinfectant Residual Concentration Monitoring

Disinfection requirements applicable to the City are contained in WAC 246-290-310, which states that a disinfectant residual concentration shall be detectable in all active parts of the distribution system and that the maximum residual disinfectant level shall be 4.0 mg/L for chlorine and chloramines. The City targets a free chlorine residual around 1.0 mg/L leaving its chlorination facilities to ensure a detectable residual throughout the distribution system.

Disinfectants/Disinfection Byproducts Monitoring

THM and HAA5 are DBPs that are formed when free chlorine reacts with organic substances (i.e., precursors), most of which occur naturally. Formation of THM and HAA5 are dependent on such factors as the amount and type of chlorine used, water temperature, concentration of precursors, pH, and chlorine contact time. THM have been found to cause cancer in laboratory animals and are suspected to be human carcinogens. The City must collect and report a minimum of two TTHM and two HAA5 samples on a yearly basis. No exceedances of the TTHM or HAA5 MCL were recorded in the last 6 years.

Lead and Copper Monitoring

The Lead and Copper Rule identifies the action level for lead as being greater than 0.015 mg/L, and the action level for copper as being greater than 1.3 mg/L. Every 3 years, the City must collect and report a minimum of 30 samples. The City last sampled for lead and copper in July of 2020. All previous samples indicate the City is in compliance with these regulations.

Asbestos

Asbestos monitoring is required if the sources are vulnerable to asbestos contamination or if the distribution system contains more than 10 percent of asbestos cement (AC) pipe. The current MCL for asbestos is 7 million fibers per liter (MFL) and greater than 10 microns in length. Monitoring must be accomplished during the first 3-year compliance period of each 9-year compliance cycle. The water sample must be taken at a tap where asbestos contamination is most likely to occur. The last sample for asbestos was recorded in 1996. The City obtained a waiver through 2028 requiring no further asbestos sampling, as asbestos pipe now represents less than 10 percent of total piping.

Figure 6-1
Regional Water Supply Areas
City of Battle Ground Water System Plan

Legend

- Battle Ground Future Service Area
- Battle Ground Existing Retail Service Area
- Battle Ground City Limits
- Battle Ground Urban Growth Area
- WRIA 27 Regional Supply Area
- WRIA 28 Regional Supply Area
- WRIA

Lewis

Salmon-Washougal

This map is a graphic representation derived from the City of Battle Ground Geographic Information System. It was designed and intended for the City of Battle Ground staff use only; it is not guaranteed to survey accuracy. This map is based on the best information available on the date shown on this map.

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Vicinity Map



Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community

1 inch = 8,000 feet

0 4,050 8,100 16,200 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2"

RH2

NORTH

COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON NORTH FIPS 4601 FEET

PLOT DATE: NOV 5, 2021 BY: ADUNN

J:\DATA\BTLG\20-0092\GIS\FIGURE 6-1_REGIONAL_SUPPLY_AREAS.MXD

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7 | WATER SYSTEM ANALYSIS

INTRODUCTION

This chapter presents the analysis of the City of Battle Ground's (City) existing water system. Individual water system components were analyzed to determine their ability to meet policies and design criteria under existing and future water demand conditions. The policies and design criteria are presented in **Chapter 5**, and the water demands are presented in **Chapter 4**. A description of the water system facilities and current operation is presented in **Chapter 2**. The last section of this chapter presents the existing and projected system capacity analyses that were performed to determine the maximum number of equivalent residential units (ERUs) that can be served by the City's water system.

PRESSURE ZONES

The ideal static pressure of water supplied to customers is between 40 and 80 pounds per square inch (psi). Pressures within a water distribution system are commonly as high as 120 psi, requiring pressure reducing valves (PRVs) on individual service lines to reduce the pressure to 80 psi or less. It is difficult for the City's water system (and most others) to maintain distribution system pressures between 40 and 80 psi, primarily due to the topography of the water service area.

Table 7-1 lists the City's two pressure zones, the highest and lowest elevation served in each zone, and the minimum and maximum distribution system pressures within each zone based on maximum static water conditions (full reservoirs with no demand). While this table presents the results of the pressure evaluations based on the adequacy of the pressure zones (under static conditions), the hydraulic analysis section later in this chapter presents the results of the pressure evaluation based on the adequacy of the water mains (under dynamic conditions).

Table 7-1

Minimum and Maximum Distribution System Static Pressures

	Highest Elevation Served		Lowest Elevation Served	
Pressure Zone	Elevation (feet)	Static Pressure (psi)	Elevation (feet)	Static Pressure (psi)
529 Zone	415	49	255	119
784 Zone	570	93	375	177

NOTE: Most individual services have private PRVs installed.

Static pressures in the water system are generally very high, especially in the 784 Zone. In the 529 Zone, where pressures are generally below 120 psi, the City has elected to maintain the existing hydraulic grade due to the cost of constructing new water system facilities and re-designing private fire protection systems. Capital Improvement Project (CIP) F3, described in **Chapter 9**, will evaluate reducing the discharge pressure of the Tukes Mountain Booster Pump Station (BPS), which would reduce the hydraulic grade of the 784 Zone and, accordingly, reduce customer pressures in the zone.

SOURCE CAPACITY EVALUATION

This section evaluates the combined capability of the City's existing sources to determine if they have sufficient capacity to meet the overall demands of the water service area based on existing and future water demands. The section that follows will address the evaluation of the individual facilities to determine if they have sufficient capacity to meet the existing and future demands of the water system. This section also identifies facility deficiencies that are not related to the capacity of the sources.

Analysis Criteria

Supply facilities must be capable of adequately and reliably supplying high-quality water to the system. In addition, supply facilities must provide a sufficient quantity of water at pressures that meet the requirements of Washington Administrative Code (WAC) 246-290-230. The evaluation of the combined capacity of the sources in this section is based on the criteria that they provide supply to the system at a rate that is equal to or greater than the maximum day demand (MDD) of the system.

Source Capacity Analysis Results

The combined capability of the City's active sources to meet both existing and future demand requirements, based on existing and projected pumping and treatment capacities of the individual supply facilities, is presented in **Table 7-2**. The demands used in the evaluation for 2030 and 2040 are future demand projections without reductions from water use efficiency efforts, as shown in **Table 4-13** of **Chapter 4**. Therefore, if additional reductions in water use are achieved through water use efficiency (WUE) efforts, the total source capacity required in the future will be less than that shown in **Table 7-2**.

Table 7-2

Water Source Capacity Evaluation

Description	Base Year 2019	Projected 2030 (+10 years)	Projected 2040 (+20 years)
Required Supply (gpm)			
Maximum Day Demand	**1,951**	**2,901**	**4,186**
Available Source Capacity (gpm)			
Well No. 1	190	190	190
Well No. 2	90	90	90
Well No. 4	60	60	60
Well No. 5	60	60	60
Well No. 9	500	500	500
CPU NE 219th St Intertie[1]	2,000	4,000	4,000
Total Source Capacity	**2,900**	**4,900**	**4,900**
Surplus or Deficient Source Capacity (gpm)			
Surplus or Deficiency	**949**	**1,999**	**714**

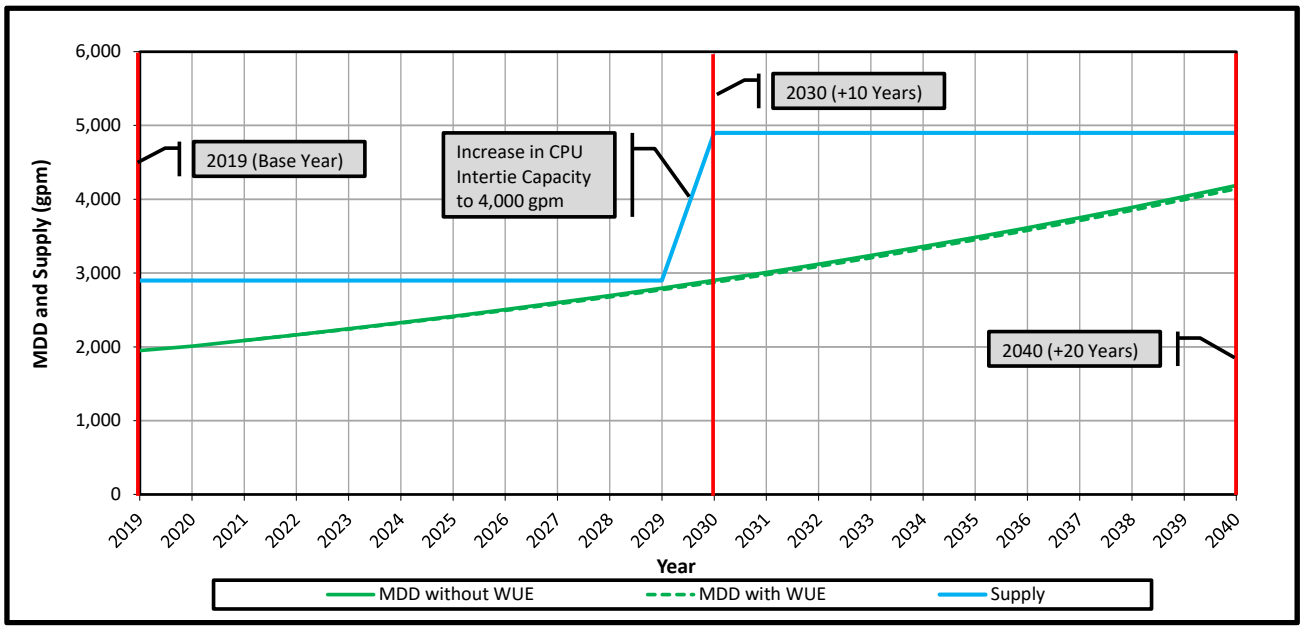
1 = Assumes that CPU intertie capacity will increase to 4,000 gpm by 2030.

The results of the analysis indicate that the City has approximately 949 gallons per minute (gpm) of surplus source capacity to meet existing (year 2019) demands, but will have a source capacity deficiency of approximately 1 gpm by 2030, increasing to 1,286 gpm at the end of the 20-year planning period without improvements. To remedy the projected source capacity deficiency, the City plans to work with Clark Public Utilities (CPU) to construct the new Pioneer to Cherry Grove Transmission Line between the CPU Paradise Point Water Treatment Plant and the City's NE 219th Street BPS (CIP F1), and make capacity upgrades to the NE 219th Street BPS (CIP F2). These projects will increase the flow rate available from the CPU intertie from 2,000 gpm to 4,000 gpm, as shown in **Table 7-2**.

Chart 7-1 shows the relationship between future and projected supply and demands.

Chart 7-1

Future Water Supply and Demand Projections



Facility Deficiencies

Well No. 4 and Well No. 5

These wells do not presently have remote operation and monitoring capability. This capability is being added in 2021.

Well No. 6

This well experiences iron bacteria corrosion issues that lead to brown water calls. The well has been offline for approximately the past 4 years.

Well No. 7 and Well No. 8

These wells are currently offline due to reductions in capacity caused by iron bacteria. Multiple rehabilitation techniques have been tried with little success. Further rehabilitation attempts are planned in 2021.

Well No. 9

This well also suffers from reduced capacity due to iron bacteria, but not as severely as Well No. 7 and Well No. 8.

WATER SUPPLY FACILITIES EVALUATION

This section evaluates the existing supply facilities to determine if they have sufficient capacity to provide water supply at a rate that meets the existing and future demands of each of the zones

they supply. **Figures 2-1** and **2-2** in **Chapter 2** display the pressure zones described within this section. This section also identifies deficiencies that are not related to the capacity of the supply facilities.

Analysis Criteria

The evaluation to determine if supply facilities have adequate capacity is based on one of two criteria, as follows: 1) if the pressure zone that the facility provides supply into has water storage, then the amount of supply required is equal to the MDD of the zone; or 2) if the pressure zone that the facility provides supply into does not have water storage, then the amount of supply required is equal to the peak hour demand (PHD) and maximum fire flow requirement of the zone. The higher supply requirement of the latter criteria is compensating for the lack of equalizing and fire flow storage that typically is utilized to provide short-term supply during times of peak system demands. Where fire flow is supplied by pumping, it must be assumed for the analyses that the largest pump supplying the pressure zone is out of service. Calculations were performed for each pressure zone based on these criteria, with a description of the results provided in the following sections.

Supply Analysis Results

529 Zone

The City's 529 Zone contains the Tukes Mountain Reservoirs; therefore, it is subject to the MDD requirement. Because the 784 Zone is supplied directly from the 529 Zone, the maximum day demand of this zone also is included in the required supply. The 529 Zone is directly supplied by Well Nos. 1, 2, 4, and 5, the Horsethief BPS, and the NE 219th Street BPS, which have a combined capacity of approximately 5,400 gpm. This capacity is anticipated to increase to 7,400 gpm in the future with the completion of upgrades to the CPU intertie (CIPs F1 and F2). As shown in **Table 7-3**, the 529 Zone is expected to have a surplus supply capacity of approximately 3,214 gpm at the end of the 20-year planning period.

Table 7-3

529 Zone Supply Capacity Evaluation

Description	Base Year 2019	Projected 2030 (+10 years)	Projected 2040 (+20 years)
Required Supply (gpm)			
529 Zone MDD	1,930	2,870	4,141
784 Zone MDD	21	31	45
Total Required Supply	**1,951**	**2,901**	**4,186**
Available Supply Capacity (gpm)			
Well No. 1	190	190	190
Well No. 2	90	90	90
Well No. 4	60	60	60
Well No. 5	60	60	60
Horsethief BPS	3,000	3,000	3,000
NE 219th St BPS[1]	2,000	4,000	4,000
Total Supply Capacity	**5,400**	**7,400**	**7,400**
Surplus or Deficient Supply Capacity (gpm)			
Surplus or Deficiency	**3,449**	**4,499**	**3,214**

1 = Assumes that CPU intertie capacity will increase to 4,000 gpm by 2030.

784 Zone

The City's 784 Zone is a closed zone without storage; therefore, the required supply is the PHD plus the maximum fire flow requirement. The 784 Zone is supplied by the Tukes Mountain BPS, which has a capacity of approximately 1,330 gpm with the largest pump out of service. As shown in **Table 7-4**, the 784 Zone is expected to have a surplus supply capacity of approximately 256 gpm at the end of the 20-year planning period.

Table 7-4

784 Zone Supply Capacity Evaluation

Description	Base Year 2019	Projected 2030 (+10 years)	Projected 2040 (+20 years)
Required Supply (gpm)			
784 Zone PHD	34	51	74
784 Zone Maximum Fire Flow	1,000	1,000	1,000
Total Required Supply	**1,034**	**1,051**	**1,074**
Available Supply Capacity (gpm)			
Tukes Mountain BPS	2,330	2,330	2,330
Largest Pump Out of Service	(1,000)	(1,000)	(1,000)
Total Supply Capacity	**1,330**	**1,330**	**1,330**
Surplus or Deficient Supply Capacity (gpm)			
Surplus or Deficiency	**296**	**279**	**256**

Facility Deficiencies

Tukes Mountain BPS

The functionality of the Tukes Mountain BPS could be improved by numerous small projects. These projects, described in **Chapter 9** (CIP F3), would potentially include installing a variable frequency drive for the jockey pump, reviewing pump curves and optimizing pump programming, reducing the discharge pressure of the BPS, upgrading the programmable logic controller, and installing a new flow meter that registers low flows.

STORAGE FACILITIES

This section evaluates the City's existing water storage tanks to determine if they have sufficient capacity to meet the existing and future storage requirements of the system. This section also identifies facility deficiencies that are not related to the capacity of the water tanks.

Analysis Criteria

Water storage is typically made up of the following components: operational storage; equalizing storage; standby storage; fire flow storage; and dead storage. Each storage component serves a different purpose and will vary from system to system. A definition of each storage component and the criteria used to evaluate the capacity of the City's storage tanks is provided as follows.

Operational Storage – Volume of the reservoir used to supply the water system under normal conditions when the source or sources of supply are not delivering water to the system (i.e., sources are in the off mode). Operational storage is essentially the average amount of drawdown in the reservoir during normal operating conditions, which represents a volume of storage that will most likely not be available for equalizing storage, fire flow storage, or standby storage. The

operational storage is based on the amount of storage between the fill, or pump starting setpoint level, and the overflow elevation of the tank.

Equalizing Storage – Volume of the reservoir used to supply the water system under peak demand conditions when the system demand exceeds the total rate of supply of the sources. The Washington State Department of Health (DOH) requires that equalizing storage be stored above an elevation that will provide a minimum pressure of 30 psi at all service connections throughout the system under PHD conditions. Because the City's supply sources primarily operate on a "call on demand" basis to fill the reservoirs, the equalizing storage requirements are determined using the standard DOH formula that considers the difference between the system PHD and the combined capacity of the supply sources:

$$\mathbf{ES = (PHD - Q_S)(150\ minutes)}, \text{ but in no case less than zero}$$

Where:

ES = Equalizing Storage, in gallons

PHD = Peak Hour Demand, in gpm

Q_S = Sum of all installed and active sources, except emergency supply, in gpm.

If the capacities of the sources that supply each zone are sufficient to meet the peak hour demands of their zones, the equalizing storage requirement for that supply area is zero.

Standby Storage – Volume of the reservoir used to supply the water system under emergency conditions when supply facilities are out of service due to equipment failures, power outages, loss of supply, transmission main breaks, and any other situation that disrupts the supply source. DOH requires that standby storage be stored above an elevation that will provide a minimum pressure of 20 psi at all service connections throughout the system. The criteria for determining the standby storage requirements for the City's system is based on the DOH recommendation that standby storage equal 1 day of maximum day demands. This volume may be reduced for pressure zones with multiple sources of supply that each have permanent backup power that starts automatically. The calculated volume is sufficient to supply the system for a 24-hour period when the primary supply facility is out of service and the system is experiencing maximum day demands:

$$\mathbf{SB = (1\ day)[(ERU_{MDD})(N) - (1\ day)(Q_S\text{-}Q_L)]}$$

Where:

SB = Standby Storage, in gallons

ERU_{MDD} = Maximum Day Demand per ERU, in gallons per day (gpd) per ERU

N = Number of ERUs

Q_S = Sum of all installed and continuously available sources with permanent backup power that starts automatically, except emergency supply, in gpd

Q_L = The capacity of the largest continuously available source with permanent backup power that starts automatically available to the system, in gpd.

DOH recommends that the minimum standby storage volume be no less than 200 gallons per ERU.

Fire Flow Storage – Volume of the reservoir used to supply water to the system at the maximum rate and duration required to extinguish a fire at the building with the highest fire flow requirement. The magnitude of the fire flow storage is the product of the fire flow rate and duration of the system's maximum fire flow requirement established by the local fire authority. DOH requires that fire flow storage be stored above an elevation that will provide a minimum pressure of 20 psi at all points throughout the distribution system under MDD conditions.

Dead Storage – Volume of the reservoir that cannot be used because it is stored at an elevation that does not provide system pressures that meet the minimum pressure requirements established by DOH. This unusable storage occupies the lower portion of most ground-level reservoirs. Water that is stored below an elevation that cannot provide a minimum pressure of 20 psi is considered dead storage for the analyses that follow.

Storage Analysis Results

As shown in **Table 7-5**, the system has an existing maximum storage capacity of approximately 3.84 million gallons (MG) provided by the Tukes Mountain Reservoirs and Horsethief Reservoir. However, for the purposes of these analyses, the entire volume of the Horsethief Reservoir (2.06 MG) is considered dead storage because it is not capable of supplying the water system by gravity (water from this reservoir must be pumped to the distribution system), and the pumping capacity of the Horsethief BPS is included in the 529 Zone supply capacity evaluation (**Table 7-3**). Therefore, the water system has a maximum available gravity storage component of approximately 1.78 MG.

Table 7-5

Storage Capacity Evaluation

Description	Base Year 2019	Projected 2030 (+10 years)	Projected 2040 (+20 years)
Available/Usable Storage (MG)			
Maximum Storage Capacity - Tukes Mountain Reservoirs[1]	1.78	3.28	3.28
Maximum Storage Capacity - Horsethief Reservoir	2.06	2.06	2.06
Dead (Non-Usable) Storage	(2.06)	(2.06)	(2.06)
Total Available Storage	**1.78**	**3.28**	**3.28**
Required Storage (MG)			
Operational Storage[2]	0.03	0.06	0.06
Equalizing Storage[3]	0.00	0.00	0.00
Standby Storage	1.52	2.20	3.17
Fire Flow Storage[4]	0.00	0.00	0.00
Total Required Storage	**1.55**	**2.26**	**3.23**
Surplus or Deficient Storage (MG)			
Surplus or Deficient Amount	**0.23**	**1.02**	**0.05**

1 = Assumes construction of new 1.5 MG Reservoir (CIP F5) by 2030.

2 = Operational storage volume assumed to equal the top 0.7 feet of the Tukes Mountain Reservoirs.

3 = Future equalizing storage volume assumes that NE 219th Street BPS capacity will be increased to 4,000 gpm by 2030.

4 = The required fire flow storage volume of 0.24 MG is assumed to be nested within the standby storage volume.

The operational storage component is assumed to equal the volume of the top 0.7 feet of the 5 existing Tukes Mountain Reservoirs. Construction of a future reservoir (CIP F5) may impact this volume, and it should be re-evaluated during the predesign phase for the new reservoir.

Currently, no equalizing storage is required because the supply capacity exceeds the system's peak hour demand.

Because a substantial amount of the City's supply capacity can be maintained with automatic backup power, the required standby storage is equal to the DOH-recommended minimum of 200 gallons per ERU, corresponding to slightly less than 1 day of average day demand.

The required fire flow storage of 0.24 MG, based on the City's maximum planning-level fire flow requirement of 2,000 gpm for 2 hours, is assumed to be nested within the standby storage volume.

As shown in **Table 7-5**, the City will require approximately 1.5 MG of additional storage capacity by the end of the planning period. Without construction of additional storage, the City will have a storage deficiency of approximately 0.48 MG in 2030 and 1.45 MG in 2040. As described in **Chapter 9**, the City plans to complete a reservoir siting study (CIP F4) and construct a new 1.5 MG reservoir (CIP F5) by 2030 to remedy the projected storage deficiency. It is assumed that this reservoir would be constructed at the Tukes Mountain site, adjacent to the existing reservoirs.

Facility Deficiencies

As described in **Chapter 9**, the City plans to inspect the inlet/outlet transmission main to the Tukes Reservoir site (CIP WM2), as its condition has not been recently assessed.

DISTRIBUTION AND TRANSMISSION SYSTEM

This section evaluates the City's existing distribution and transmission system (i.e., water mains) to determine if they are adequately sized and looped to provide the necessary flow rates and pressures to meet the existing and future requirements of the system. This section also identifies deficiencies that are not related to the capacity of the water mains.

Analysis Criteria

Distribution and transmission mains must be capable of adequately and reliably conveying water throughout the system at acceptable flow rates and pressures. The criteria used to evaluate the City's distribution and transmission system are the state mandated requirements for Group A water systems contained in WAC 246-290-230 – Distribution Systems. The pressure analysis criteria state that the distribution system "…shall be designed with the capacity to deliver the design PHD quantity of water at 30 psi (210 kPa) under PHD flow conditions measured at all existing and proposed service water meters…" It also states that if fire flow is to be provided, "… the distribution system shall also provide MDD plus the required fire flow at a pressure of at least 20 psi (140 kPa) at all points throughout the distribution system…"

Hydraulic analyses of the existing system were performed under existing PHD conditions to evaluate its current pressure capabilities and identify existing system deficiencies. The existing system also was analyzed under existing MDD conditions to evaluate the current fire flow capabilities and identify additional existing system deficiencies. Additional hydraulic analyses were then performed with the same hydraulic model under future PHD and MDD conditions and with the proposed improvements to demonstrate that the identified improvements will eliminate the deficiencies and meet the requirements far into the future. The following is a description of the hydraulic model, the operational conditions, and facility settings used in the analyses.

Hydraulic Model

Description

A computer-based hydraulic model of the existing water system was updated to the CONNECT edition of the WaterGEMS program (developed by Bentley Systems, Inc.). All water mains in the City's water system, including dead-end mains, were included in the model and were based on water system mapping and as-built records provided by the City. Junction node elevations were assigned based on 2-foot-interval contour data obtained from Clark County. A hydraulic model node diagram that provides a graphical representation of the model of the water system is contained in **Appendix M**.

Demand Data

The hydraulic model of the existing system contains demands based on 2019 water demand data provided by the City. The peaking factors calculated in **Chapter 4** were used to analyze the system under PHD and MDD conditions.

The hydraulic model of the proposed system contains 10-year demand levels that are projected for the year 2030, and 20-year demand levels that are projected for the year 2040.

Facilities

The hydraulic model of the existing system contains all active existing system facilities. For the proposed system analyses in the years 2030 and 2040, the hydraulic model contains all active existing system facilities and proposed system improvements identified in **Chapter 9** for the 10- and 20-year planning periods, respectively.

The facility settings for the pressure analyses corresponded to a PHD event in the water system. All sources of supply that currently are available to the system or will be available in the future for the years 2030 and 2040 analyses during a peak period were operating at their typical high demand pumping rates. The reservoir levels were modeled to reflect full utilization of operational and equalizing storage. The operational conditions for the pressure analyses are summarized in **Table 7-6**.

Table 7-6

Hydraulic Analyses Operational Conditions

Description	PHD Pressure Analyses			Fire Flow Analyses		
	2019	2030 (+10 years)	2040 (+20 years)	2019	2030 (+10 years)	2040 (+20 years)
Demand	2019 PHD	2030 PHD	2040 PHD	2019 MDD	2030 MDD	2040 MDD
Storage Facilities HGL (feet)						
Tukes Mountain No. 1	528.3	528.3	528.3	523.0	525.4	525.4
Tukes Mountain No. 2	528.3	528.3	528.3	523.0	525.4	525.4
Tukes Mountain No. 3	528.3	528.3	528.3	523.0	525.4	525.4
Tukes Mountain No. 4	528.3	528.3	528.3	523.0	525.4	525.4
Tukes Mountain No. 5	528.3	528.3	528.3	523.0	525.4	525.4
Horsethief Reservoir[1]	265.0	265.0	265.0	265.0	265.0	265.0
Future 1.5 MG Reservoir[2]	-	528.3	528.3	-	525.4	525.4
Supply Facilities Status						
Well No. 1	ON	ON	ON	ON	ON	ON
Well No. 2	ON	ON	ON	ON	ON	ON
Well No. 4	ON	ON	ON	ON	ON	ON
Well No. 5	ON	ON	ON	ON	ON	ON
Well No. 6	OFF	OFF	OFF	OFF	OFF	OFF
Well No. 7	OFF	OFF	OFF	OFF	OFF	OFF
Well No. 8	OFF	OFF	OFF	OFF	OFF	OFF
Well No. 9	ON	ON	ON	ON	ON	ON
NE 219th St BPS	ON	ON	ON	ON	ON	ON
BPS Facilities Status						
Tukes Mountain BPS[3]	ON	ON	ON	ON	ON	ON
Horsethief BPS[3]	ON	ON	ON	ON	ON	ON

1 = To be conservative for modeling purposes, it was assumed that the Horsethief Reservoir was at its minimum level.
2 = It is assumed that the future 1.5 MG Reservoir will have the same operational storage band as the existing Tukes Mountain Reservoirs.
3 = Largest pump out of service for fire flow analyses.

Separate fire flow analyses were performed on the system to size distribution system improvements and calculate fire flow availability. The hydraulic model for the fire flow analyses contained settings that correspond to MDD events. All sources of supply that currently are available to the system during a peak period were operating at their normal pumping rates, and reservoir levels were modeled to reflect full utilization of operation, equalizing, and fire flow storage based on the maximum planning-level fire flow requirement. **Table 7-6** summarizes the operational conditions for the fire flow analyses for the existing and future planning periods.

Calibration

Hydraulic model calibration is the process of adjusting hydraulic model data, so the model closely reflects actual system pressures and flows under similar demand and operating conditions. Initial Darcy-Weisbach roughness coefficients were entered into the model based on computed estimates of the coefficients from available pipe age and material data. For example, assuming that the internal surface of water pipes becomes rougher as it gets older, older water mains were assigned higher roughness coefficients than new water mains.

Hydrant flow tests were performed in 14 locations in late 2020, with hydrant flows, static pressures, and residual pressures measured during each test for use in calibrating the hydraulic model. Where available, telemetry data for the City's water system facilities was used to initialize the settings of the facilities in the hydraulic model. Pressure transducers recording at 2-second intervals were installed throughout each pressure zone during the flow tests to verify the static and residual pressures at intermediate points in the system (between the water system facilities and the hydrant flow test locations).

The majority of the City's field fire flow results were found to be consistent with the hydraulic model results after adjusting pipe roughness coefficients within typical ranges in the hydraulic model. Some limited inconsistent testing results were found in the northwestern portion of the distribution system. These likely are due to closed or partially closed valves, incorrect water main diameters, or other differences between the modeled system configuration and field conditions. In some areas, limited telemetry data from City facilities made it challenging to determine accurate facility settings for the calibration. The City will continue to investigate discrepancies and improve the functionality of the telemetry system, which will enable the hydraulic model calibration to be improved over time.

Hydraulic Analysis Results

Hydraulic analyses were performed to determine the capability of the system to meet the pressure and flow requirements identified in **Chapter 5** and contained in WAC 246-290-230. The first analysis was performed to determine the pressure throughout the system under existing (i.e., 2019) PHD conditions. The results of this analysis were used to identify locations of low and high pressures. To satisfy the minimum pressure requirements, the pressure at all water service locations must be at least 30 psi during PHD conditions. In addition, the system should not have widespread areas with high pressures, generally considered to be more than 120 psi. A summary of the pressure deficiencies identified from the results of this analysis is shown on **Figure 7-1**.

The second set of analyses was performed to determine the capability of the existing water system to provide fire flow throughout the system under MDD conditions. A separate fire flow analysis was performed for each node in the model where fire flow is provided to determine the available fire flow at a minimum residual pressure of 20 psi at all points throughout the distribution system and a maximum allowable water main velocity of 8 feet per second (fps). Approximately 1,500 fire flow analyses were performed to comprehensively evaluate the water system. For each node analyzed, the resulting fire flow was compared to its general planning-level fire flow requirement, which was assigned according to its land use classification. As is typical of most water systems, the City's distribution system was constructed to meet fire flow requirements that were in place at the time of construction. Land use classification changes and/or increases in fire flow requirements over time may create deficiencies. A summary of the results of the analyses for all distribution system nodes is shown on **Figure 7-2**.

Deficiencies

As shown on **Figure 7-1**, customer pressures are above 80 psi throughout much of the distribution system. High customer pressures are addressed with the installation of individual PRVs. In the

529 Zone, where pressures are generally below 120 psi, the City has elected to maintain the existing hydraulic grade due to the cost of constructing new water system facilities and re-designing private fire protection systems. CIP F3, described in **Chapter 9**, will evaluate the feasibility of reducing the discharge pressure from the Tukes Mountain BPS, which would reduce customer pressures in the 784 Zone.

While some areas of the system can currently provide planning-level fire flow while maintaining pressures above 20 psi and velocities below 8 fps, many areas of the system are not capable of providing planning-level fire flow within these parameters. This does not necessarily represent an existing deficiency, as existing buildings were approved with the fire flow available at the time of their construction. CIP WM1, described in **Chapter 9**, identifies the water main improvements required to increase the available fire flow to the planning-level requirements or higher. All new water main installations are required to use cement mortar lined ductile iron water main in accordance with the City's Construction Standards and Specifications, which are contained in **Appendix H**.

TELEMETRY AND SUPERVISORY CONTROL SYSTEM

This section evaluates the City's existing telemetry and supervisory control system to identify deficiencies related to its condition and current operational capability.

Evaluation and Deficiencies

The City's supervisory control and data acquisition (SCADA) system is managed by CPU. Remote operation and monitoring capability at the Battle Ground Operations Center is available for all sources except Well Nos. 4 and 5 (this capability is being added to Well Nos. 4 and 5 in 2021). The City may evaluate implementing remote access (e.g. field laptop or tablet) to the SCADA system in the future.

SYSTEM CAPACITY

This section evaluates the capacity of the City's existing and future water system components (supply, storage, transmission, and water rights) to determine the maximum number of ERUs it can serve. Once established, system capacity becomes useful in determining how much capacity is available in the water system to support new customers that apply for water service through the building permit process. The system capacity information, together with the projected growth of the system expressed in ERUs, as shown in **Chart 4-11** of **Chapter 4**, also provides the City with a schedule of when additional system capacity is needed.

Analysis Criteria

The capacity of the City's system was determined from the limiting capacity of the water rights, source and treatment, transmission, and storage facilities. The annual water rights capacity evaluation was based on the existing annual water rights, as summarized in **Chapter 6**, and the system's average day demand per ERU (ERU_{ADD}). The instantaneous water rights capacity evaluation was based on the existing instantaneous water rights, as summarized in **Chapter 6**, and

the system's maximum day demand per ERU (ERU_{MDD}). The source and treatment capacity analysis was based on the limiting capacity of the source and treatment facilities and the system's ERU_{MDD}. The transmission capacity analysis was based on the total capacity of the transmission system for the supply sources and the system's ERU_{MDD}.

The storage capacity analysis was based on the storage capacity for equalizing and standby storage and the computed storage requirement per ERU. Operational capacity was excluded from the storage analysis because this component is generally not directly determined by water demand or ERUs. It was assumed that fire flow storage was nested within the larger standby storage volume. For the analyses, a reserve amount equivalent to the operational storage requirement was deducted from the total available storage capacity to determine the storage capacity available for equalizing and standby storage. This storage capacity available for equalizing and standby storage was divided by the existing number of ERUs presented in **Chapter 4** to determine the storage requirement per ERU.

The ERU-based demand data was derived from the average day demand (ADD) of the system and demand peaking factors from **Chapter 4**.

Capacity Analysis Results

A summary of the results of the existing and projected system capacity analysis is shown in **Table 7-7** and **Chart 7-2**.

Table 7-7
System Capacity Analysis

Description	Base Year 2019	Projected 2030 (+10 years)	Projected 2040 (+20 years)
Demands Per ERU Basis			
ERU_{ADD} (gpd)[1]	204	210	210
ERU_{MDD} (gpd)[1]	369	380	380
Water Rights Capacity: Annual Average Based			
Water Rights Capacity - Annual Average Based (gpd)	4,586,905	7,466,906	7,466,906
ERU_{ADD} (gpd)[1]	204	210	210
Water Rights Annual Average Based Source Capacity (ERUs)	**22,493**	**35,587**	**35,587**
Water Rights Capacity: Instantaneous Based			
Water Rights Capacity - Instantaneous Based (gpd)	6,228,000	9,108,000	9,108,000
ERU_{MDD} (gpd)[1]	369	380	380
Water Rights Instantaneous Based Source Capacity (ERUs)	**16,861**	**23,964**	**23,964**
Source and Treatment Capacity: Maximum Day Based			
Source Capacity - Maximum Day Based (gpd)	4,176,000	7,056,000	7,056,000
ERU_{MDD} (gpd)[1]	369	380	380
Maximum Day Based Source Capacity (ERUs)	**11,306**	**18,565**	**18,565**
Storage Capacity[2]			
Maximum Equalizing & Standby Storage Capacity (gal)	1,748,188	3,221,205	3,221,205
Equalizing & Standby Storage Requirement per ERU (gal)	200	200	200
Maximum Storage Capacity (ERUs)	**8,741**	**16,106**	**16,106**
Transmission Capacity			
Transmission Capacity (gpd)[3]	14,438,800	14,438,800	14,438,800
ERU_{MDD} (gpd)	369	380	380
Maximum Transmission Capacity (ERUs)	**39,090**	**37,990**	**37,990**
Maximum System Capacity			
Maximum System Capacity (ERUs)	**8,741**	**16,106**	**16,106**
Limiting Facility	**Storage**	**Storage**	**Storage**
Unused Available System Capacity			
Maximum System Capacity (ERUs)	8,741	16,106	16,106
Projected ERUs	7,605	10,992	15,860
Unused Available System Capacity (ERUs)	**1,136**	**5,114**	**246**

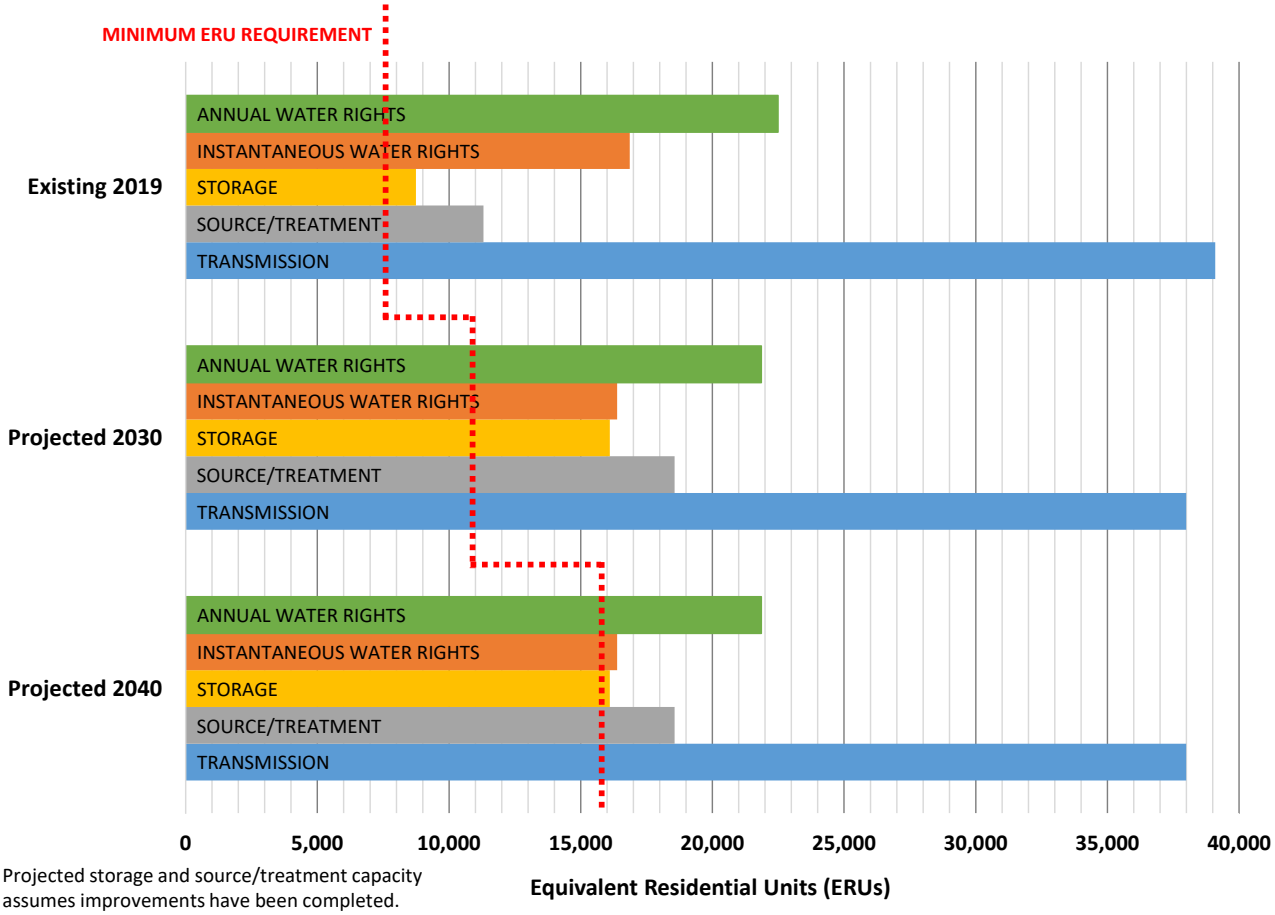
1 = Includes distribution system leakage.

2 = Projected storage capacity assumes storage improvements have been completed.

3 = Includes NE 219th St BPS and Horsethief BPS 16-inch-diameter discharge transmission mains.

Chart 7-2

System Capacity Analysis



Projected storage and source/treatment capacity assumes improvements have been completed.

The results of the existing system capacity analysis indicate that the limiting capacity of the system is storage, which currently can support up to a maximum of approximately 8,741 ERUs. The existing water system has an unused surplus capacity of approximately 1,136 ERUs.

The 10-year projected system capacity analysis, as shown in **Table 7-7** and **Chart 7-2**, includes storage improvements that are planned to be completed within the 10-year planning period as described in **Chapter 9**. The results of the 2030 system capacity analysis indicate that the proposed improvements will increase the system capacity to approximately 16,106 ERUs, based on the limiting component of storage. The 2030 water system will have an unused surplus capacity of approximately 5,114 ERUs.

The 20-year projected system capacity analysis, as shown in **Table 7-7** and **Chart 7-2**, includes the storage and source capacity improvements that are planned to be completed within the 20-year planning period as described in **Chapter 9**. The results of the 2040 system capacity analysis indicate that the proposed improvements will increase the system capacity to approximately 16,106 ERUs, based on the limiting component of storage. The 2040 water system will have an unused surplus capacity of approximately 246 ERUs.

Tukes Mountain Res. No. 1
0.25 MG
Overflow Elev: 529'
Height: 35'

Tukes Mountain Res. No. 2
0.18 MG
Overflow Elev: 529'
Height: 50'

Tukes Mountain Res. No. 3
0.17 MG
Overflow Elev: 529'
Height: 45'

Tukes Mountain Res. No. 4
0.15 MG
Overflow Elev: 529'
Height: 40'

Tukes Mountain Res. No. 5
1.03 MG
Overflow Elev: 529'
Height: 38'

CPU Intertie
NE 219th St
(2,000 gpm)

NE 219th St BPS

Tukes Mountain BPS

Well No. 9
(500 gpm)

Wells No. 1 and No. 2
(190 and 90 gpm)

Well No. 6
(200 gpm)
(Offline)

Wells No. 4 and No. 5
(60-70 gpm each)

Wells No. 7 and No. 8
(750 gpm)
(Offline)

Horsethief Reservoir
2.06 MG
Overflow Elev: 296'
Height: 31'

Horsethief Pump Station

CPU Intertie
NE 122 Ave
(547 gpm)
(Emergency)

East Fork Lewis River
Mill Creek
Woodin Creek
Salmon Creek

NE Manley Rd
NE Lewisville Hwy
NE Axford Rd
NE 147th Ave
NE 249th St
NE 152nd Ave
NE 244th St
NW 25th St
NE 112th Ave
NE 122nd Ave
NE 142nd Ave
NE 132nd Ave
NE 239th St
NE 92nd Ave
NW 20th Ave
NW 10th Ave
N Parkway Ave
NE Grace Ave
NE 10th St
W Main St
W Main St
NE 219th St
SW 20th Ave
S Parkway Ave
SE Grace Ave
NE 167th Ave
SE Eaton Blvd
NE 199th St
NE 189th St
NE 122nd Ave
SW 40th St
NE 117th Ave
NE 142nd Ave
NE 159th St
NE Caples Rd
NE 154th St
NE 152nd Ave

Legend

High Pressures

- 80 - 100 psi
- 100 - 120 psi
- Greater than 120 psi
- Wells
- CPU Intertie
- Pump Station
- Reservoir

Pressure Zones

- 529 Zone (Main)
- 784 Zone (Tukes Mountain)

Planning Boundaries

- City Limits
- Urban Growth Area
- Retail Service Area
- Future Service Area

C:\DWG\COPY_OF_FIGURE 7-1_EXISTING_PRESSURES.MXD BY: SPERKINS PLOT DATE: JAN 13, 2022 COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON SOUTH FIPS 4602 FEET

RH2

NORTH

1 inch = 1,000 feet

0 500 1,000 2,000 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2”

THE CITY OF BATTLE GROUND

Figure 7-1
Existing High Pressure Areas
City of Battle Ground Water System Plan

Vicinity Map



This map is a graphic representation derived from the City of Battle Ground Geographic Information System. It was designed and intended for the City of Battle Ground staff use only; it is not guaranteed to survey accuracy. This map is based on the best information available on the date shown on this map.

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Tukes Mountain Res. No. 1
0.25 MG
Overflow Elev: 529'
Height: 35'

Tukes Mountain Res. No. 2
0.18 MG
Overflow Elev: 529'
Height: 50'

Tukes Mountain Res. No. 3
0.17 MG
Overflow Elev: 529'
Height: 45'

Tukes Mountain Res. No. 4
0.15 MG
Overflow Elev: 529'
Height: 40'

Tukes Mountain Res. No. 5
1.03 MG
Overflow Elev: 529'
Height: 38'

CPU Intertie
NE 219th St
(2,000 gpm)

NE 219th St BPS

Tukes Mountain BPS

Well No. 9
(500 gpm)

Wells No. 1 and No. 2
(190 and 90 gpm)

Well No. 6
(200 gpm)
(Offline)

Wells No. 4 and No. 5
(60-70 gpm each)

Horsethief Reservoir
2.06 MG
Overflow Elev: 296'
Height: 31'

Horsethief Pump Station

Wells No. 7 and No. 8
(750 gpm)
(Offline)

CPU Intertie
NE 122 Ave
(547 gpm)
(Emergency)

East Fork Lewis River
Mill Creek
Woodin Creek
Salmon Creek

NE Manley Rd
NE Lewisville Hwy
NE Axford Rd
NE 147th Ave
NE 249th St
NE 244th St
NW 25th St
NE 142nd Ave
NE 152nd Ave
NE 112th Ave
NE 122nd Ave
NE 132nd Ave
NE 239th St
NE 92nd Ave
NW 20th Ave
NW 10th Ave
N Parkway Ave
NE Grace Ave
NE 10th St
W Main St
NE 219th St
SW 20th Ave
S Parkway Ave
SE Grace Ave
SE Eaton Blvd
NE 199th St
NE 167th Ave
SW 40th St
NE 122nd Ave
NE 142nd Ave
NE 159th St
NE Caples Rd
NE 152nd Ave

Legend

Available Fire Flow (% of Planning-Level Requirement)

- Less than 40%
- 40% - 70%
- 70% - 90%
- 90% - 100%
- 100% - 120%
- Greater than 120%
- Wells
- CPU Intertie
- Pump Station
- Reservoir

Pressure Zones

- 529 Zone (Main)
- 784 Zone (Tukes Mountain)

Planning Boundaries

- City Limits
- Urban Growth Area
- Retail Service Area
- Future Service Area

C:\DWG\COPY_OF_FIGURE 7-2_EXISTING_FF.MXD BY: SPERKINS PLOT DATE: JAN 13, 2022 COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON SOUTH FIPS 4602 FEET

RH2

NORTH

1 inch = 1,000 feet

0 500 1,000 2,000 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2”

THE CITY OF BATTLE GROUND

Figure 7-2
Existing Available Fire Flow
City of Battle Ground Water System Plan

Vicinity Map



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8 | OPERATIONS AND MAINTENANCE

INTRODUCTION

The City of Battle Ground's Water Division current mailing address and phone number are as follows.

Battle Ground Public Works – Water Division	1308 SE Grace Avenue Battle Ground, WA 98604 (360) 342-5350
State Department of Health ID Number	047005

WATER SYSTEM MANAGEMENT AND PERSONNEL

Management of the City of Battle Ground's (City's) water system is led by the City Council, with each member serving staggered 4-year terms. The Public Works Director (Director) leads the Public Works Department, which includes the water system. The Director reports to the City Manager. Key Public Works personnel are as follows.

- Public Works Director
- City Engineer
- Associate Civil Engineer
- Engineering Technician II
- Public Works Supervisor

Public Works Director

The Public Works Director is ultimately responsible for all functions of the Public Works Department, including water, wastewater, streets, storm drainage, fleet, facilities, and parks. The Director has the authority to implement both daily and long range water utility policies in a manner most beneficial to the water utility and its customers. The Public Works Director evaluates and selects long range water utility planning programs for conformance with the water utility's goals, objectives, and budgetary constraints.

City Engineer/Associate Civil Engineer

The engineering positions are responsible for all system design, as well as plan and specification reviews for customer and utility improvement projects. The engineers manage all capital improvement projects from planning to construction. The City Engineer also handles requests for customer service, develops engineering drawings, and coordinates construction of new services.

Engineering Technician II

One Engineering Technician is responsible for the review of customer improvement projects. Another Engineering Technician coordinates and inspects the installation and repair of mains by contractors hired by the water utility. This individual oversees the laying of all new water mains, system tie-ins, installation of services, and pressure tests to ensure that all material and work conforms to the water utility's standard specifications.

Public Works Supervisor

The Public Works Supervisor (Supervisor) manages the operation and maintenance of all aspects of the water system. These duties include overseeing the water meter program, late shift duties, the cross-connection control program, distribution system maintenance, water quality sampling, crew training, and customer inquiries. The Supervisor is responsible for scheduling, monitoring, and testing the distribution system and all sources of supply. This individual has an understanding of the Washington State Department of Health (DOH) water testing regulations and reporting requirements for the system. This position is recognized by DOH as being in charge of the daily operational activities of the water system and carries a Water Distribution Manager (WDM) III certification as required by DOH.

Waterworks Certification

In accordance with Chapter 246-290 Washington Administrative Code (WAC), Waterworks Operator Certification, all public water systems with more than 100 services are required to have a certified operator. Certified personnel are required for positions in charge of managing the water system and positions assigned to the lead responsibility for monitoring or improving water quality. The City's water operations staff currently includes personnel with WDM, Water Distribution Specialist (WDS), and Cross-Connection Control Specialist (CCS) certifications as summarized in **Table 8-1**. The City worked with DOH to identify the appropriate treatment plant operator certification level for the City's existing iron and manganese treatment at Wells No. 6, 7, 8, and 9. It was determined that a Water Treatment Plant Operator (WTPO) I certification was necessary. After the determination, the City proceeded with obtaining the required WTPO certification.

Table 8-1

Water System Operator Certification

Operator Name	Certifications	Certificate Number
Don Risto	WDM III and CCS	10303
	BAT	B4827
Bobby Miller	WTPO I, WSD, and CCS	11621
Dean Vandermeer	WDM I and CCS	14285
Tim Kofstad	WDM I	15012
Adam Allen	WDM I and CCS	15187
	BAT	B7299

SYSTEM OPERATION

System Overview

As presented in **Chapter 2**, the City has eight wells, six reservoirs, and three booster pump stations. Wells No. 1, 2, 4, 5, and 6 all pump to the Tukes Mountain Reservoirs, which supply the Main Pressure Zone by gravity. Wells No. 7, 8, and 9 pump to the Horsethief Reservoir. The Horsethief Pump Station supplies water from the Horsethief Reservoir up to the Tukes Mountain Reservoirs. The Tukes Mountain Pump Station pumps water from the Main Pressure Zone to supply the homes on Tukes Mountain that are too close in elevation to the reservoirs to receive adequate pressure by gravity. Greater than 95 percent of all water system connections are in the Main Zone and served by gravity from the Tukes Mountain Reservoirs, which are operated at a nominal hydraulic grade of 529 feet. High service pressures in the Main Zone require individual pressure reducing valves (PRVs) on all service connections with pressures over 80 pounds per square inch at the meter.

The City maintains one active supply connection to adjacent water provider Clark Public Utilities (CPU) at NE 219th Street and NE 92nd Avenue. The City has an emergency connection to CPU at SW Eaton Boulevard and SW 9th Avenue. The City's former connection to the City School District has been abandoned.

Routine Operation

The City has an automated telemetry system that monitors and operates the water system, including signaling wells and booster pumps to turn on and off based on predetermined settings such as reservoir water levels. This telemetry system is monitored by CPU at its Operations Center at 8600 NE 117th Avenue. Remote screens at the Battle Ground Operations Center allow City staff to monitor the telemetry system and intercept alarms or otherwise note water system operating conditions.

Well pumps are turned on as needed to maintain reservoir levels. The City normally uses Wells No. 7, 8, and 9 as the primary wells (Wells No. 7 and 8 are currently offline), followed by Wells No. 1 and 2, and then Wells No. 4 and 5. Well No. 6 is not operated due to high levels of iron bacteria, except for high demand periods in the summer. Wells No. 7, 8, and 9 fill the Horsethief Reservoir during the day. During normal operation, the Horsethief Pump Station supplies water from the Horsethief Reservoir to the Tukes Mountain Reservoirs in the evening. The Tukes Mountain Pump Station is operated based on demand in the Tukes Mountain Pressure Zone. This pumping schedule allows the City to operate pumps during non-peak power times. During high water demands, the wells and booster pumps operate as needed to keep the reservoirs as full as possible.

Operation and Maintenance Procedures

Table 8-2 lists the major water system components along with operation, maintenance, and equipment information about each component.

Table 8-2

Operation and Maintenance Table

Component	Operations	Maintenance	Equipment
Wells No. 1, 2, and 6	1. Daily flow meter readings 2. Daily inspection for leaks 3. Refill sodium hypochlorite tanks as needed	1. Repair leaks as needed 2. Repair any problems with sodium hypochlorite ASAP 3. Maintain well buildings 4. Maintain pumps per specs	1. Well Pumps 2. Disinfection System 3. Telemetry Equipment 4. Pipes and accessories 5. Sodium Hypochlorite Tanks
Wells No. 4, 5, 7, 8, and 9	1. Daily flow meter readings 2. Daily inspection for leaks 3. Refill sodium hypochlorite tanks as needed	1. Repair leaks as needed 2. Repair any problems with sodium hypochlorite ASAP 3. Maintain well buildings 4. Maintain pumps per specs	1. Well Pumps 2. Disinfection System 3. Telemetry Equipment 4. Pipes and accessories 5. Sodium Hypochlorite Tanks
CPU Intertie	1. Daily flow meter readings 2. Daily inspection for leaks	1. Repair leaks as needed 2. Maintain building 3. Maintain pumps per specs 4. Maintain emergency generator	1. Pumps 2. Telemetry Equipment 3. Pipes and accessories 4. Generator
Reservoirs	1. Daily inspection for leaks, vandalism, intrusion, etc. 2. Daily recording of reservoir levels	1. Clean reservoir every 3-5 years. Use divers to eliminate the need to take reservoirs out of service. 2. Maintain vents, overflows, and other components in proper working condition	1. Reservoir Floats 2. Vent Screens 3. Overflow and Drainage Systems 4. Telemetry Equipment
Horsethief Booster Pumps	1. Daily flow meter readings 2. Daily inspection for leaks, proper valve operation, etc.	1. Maintain pumps and valves per manufacturer specs 2. Repair any leaks or worn out piping, valves, ports, etc.	1. Booster Pumps 2. Control Valves 3. Gate Valves 4. Telemetry Equipment 5. Flow meter 6. Pressure Transducer
Tukes Mountain Booster Pumps	1. Daily flow meter readings 2. Daily inspection for leaks, proper valve operation, etc.	1. Maintain pumps and valves per manufacturer specs 2. Repair any leaks or worn out piping, valves, ports, etc.	1. Booster Pumps 2. Control Valves 3. Gate Valves 4. Telemetry Equipment 5. Flow meter 6. Pressure Transducer

EMERGENCY RESPONSE PLAN

Introduction

The Emergency Response Plan is intended to guide public works employees in restoring water service during a major emergency. A major emergency is an event that results in loss of water to a large service area or numerous small areas, and requires the total mobilization of the Public Works Department and outside agencies and resources to restore service. Emergencies may result from natural causes of extreme intensity, duration, and extent or from man-made events, such as civil disorder or system contamination.

During a declared emergency condition, all the water system operations will be carried out through the Water Command Center, located within the Operations Center. The functions of the water staff and their locations during an emergency are summarized in the following sections. **Table 8-3** presents a list of contacts to be used during a City emergency. A summary of system components potentially impacted by various types of emergencies is shown in **Table 8-4**.

Table 8-3

Water System Emergency Contact List

Description	Contacts	Phone Number
City Hall	City Manager	(360) 342-5000
Public Works	Public Works Director	(360) 342-5075
On Call (24 Hours)	Operations Supervisor	(360) 342-5370
Clark County Public Health	County	(360) 397-8428
CPU Water Operations	CPU Water Staff	(360) 992-8022
ODW Southwest Region	Regional Office Main Line	(360) 236-3030
ODW Emergency Hotline	After Hours and Weekends	(877) 481-4901

Table 8-4

Potential Disaster Effects

Disaster Type	Wells	Storage	Transmission Network	Distribution System	Telemetry & Control	Power Supply Systems
Earthquake	x	x	x	x	x	x
Severe Windstorm	x	x			x	x
Ice/Snow Storm	x	x		x	x	x
Flooding	x		x	x		x
Fire	x	x			x	x
Volcanic Eruption	x	x	x	x	x	x
Drought	x					
Water Supply Contamination	x	x	x	x		
Water Main Break	x	x	x	x	x	x
Vandalism	x	x	x	x	x	x
Explosion/Bomb	x	x	x	x	x	x
Nuclear Warfare	x	x	x	x	x	x

Inventory status report and list of material suppliers are to be kept up-to-date and readily accessible to avoid unnecessary delay in restoration of service. Throughout the emergency, voice contact will be maintained between work crews, the Public Works Supervisor, the Public Works Operations Manager, and other key personnel to enhance coordination of work efforts. It is important that the Public Works Director and City Hall are kept apprised of the emergency to permit proper public notification.

Boil Water Advisories

Events Requiring Boil Water Advisory

Boil water advisories are established in response to a repeat positive sample for fecal coliform bacteria according to the sampling procedures described in the City's Coliform Monitoring Plan in **Appendix J** of this Water System Plan. Emergencies such as floods, earthquakes, and other disasters can result in damage to water system infrastructure, thereby also warranting a boil water advisory as a cautionary measure.

Initiating Advisory

Chain of Command

The Public Works Supervisor, upon receiving notice of a repeat positive coliform sample or qualifying emergency, is responsible for immediately contacting the Operations Manager and Public Works Director and consulting with the DOH Office of Drinking Water. The Director is responsible for issuing a boil water advisory based on the evidence presented by the Supervisor and direction provided by DOH. In the Director's absence, the City Engineer is responsible for issuing boil water advisories.

DOH contacts for drinking water emergencies:

- During business hours: Southwest Regional office (360) 236-3030
- After hours emergency hotline: (877) 481-4901

Public Notification

DOH will be consulted prior to release of information to the public. A consensus will be reached with DOH regarding information to be released and actions to be taken. It is important not to release conflicting information so as not to confuse the public. Clark County Public Health will be notified of the boil water advisory prior to public notification so they may respond to potential public inquiries.

Clark County Public Health Contacts:

- During business hours: (360) 397-8428
- After hours emergency hotline: (888) 727-6230

As a courtesy, CPU also should be informed of a boil water advisory from the City as some City residents receive their water from CPU and may be confused about what action they need to take.

Boil water advisories are issued to the public through radio, television, and newspapers using the Flash Alert Assistance program for the local area.

- www.flashalert.net
- (360) 834-1953

Public notification also is displayed prominently on the City's website. Citizens who have signed up for the City's emergency alert option will receive an automatic e-mail message. Door hangers with the advisory information may be provided to residents in the affected area at the Director's discretion.

An initial press release will be issued following initiation of a boil water advisory to inform the public of the situation, action being taken by the City to resolve it, and action the public needs to take to protect their health. Consolidated press releases, announced on morning and evening television and radio news broadcasts, also will be used to keep the public informed of

any updates. Press releases, public notification flyers, and related document templates are available in DOH's Coliform Public Health Advisory Packet: http://www.doh.wa.gov/ehp/dw/Coliform/coliform.htm.

Lifting Advisory

Criteria for Lifting Advisory

The City will repair any damaged infrastructure identified as the possible source of contamination, disinfect the related facilities, and/or flush distribution system piping as needed. Once repair and disinfection is complete, a boil water advisory will be rescinded following 2 consecutive days of no detection of coliform bacteria in the system.

Chain of Command

The Director is responsible for rescinding a boil water advisory. In the Director's absence, the City Engineer is responsible for lifting boil water advisories.

Public Notification

Once the boil water advisory is rescinded, a notice is developed to inform the public regarding appropriate measures for use of the water supply, including flushing of pipes and fixtures as required.

Follow-Up

A thorough investigation of the contamination source should be conducted and strategies developed to avoid similar future occurrences. The public should be informed and given updates regarding investigation findings to restore confidence in the quality of water provided by the City.

The City is required to submit a Public Notice Certification form to DOH within 10 days of initiating the boil water advisory. The form is available from DOH as Form No. 331-264. It is also included in DOH's Coliform Public Health Advisory Packet: http://www.doh.wa.gov/ehp/dw/Coliform/coliform.htm.

Major Emergency During Non-Working Hours

All water system staff will report and attend to their assigned trouble centers. Water system crews will report to work only upon notification. The notification can occur by phone, person, or media broadcasts.

Sequence of Events

1. Declaration of a major emergency by the City Manager.
2. Dispatch notified of water outage and area.
3. Dispatch notifies crew person on the on-call list.
4. Crew person investigates and determines severity and extent of outage.

5. Public Works Operations Manager or Public Works Supervisor notifies Public Works Director of emergency. If Public Works Director cannot be reached, Public Works Operations Manager or Public Works Supervisor notifies the City Engineer, who makes the decision on the declaration of an emergency. If the Public Works Director or City Engineer are not available, then the Public Works Operations Manager or Public Works Supervisor may declare an emergency of the water utility.
6. Emergency stations are manned. Highest level staff member notifies City Hall and the City Manager.

Emergency Duties

Public Works Director

REPORTS TO – City Manager

1. RESPONSIBILITIES

A. Receives and logs service outage calls.
B. Ensures reported outages are on service restoration priority.
C. Transmits information from office records to field crews as required.
D. Provides message service to field crews and their families.

2. STAFF SUPPORT

Engineering and Customer Service Personnel

3. DIRECT CONTACTS

A. Other emergency service personnel, as required.
B. Members of the general public or water system customers.

4. LOCATION

Either at City Hall at 109 SW 1st Street or the Public Works Operations Center at 1308 SE Grace Avenue. Alternatively, as directed by the City Manager, at the Police Department Emergency Operations Center at 505 SW 1st Street.

Public Works Supervisor (DOH Responsible Charge Person)

REPORTS TO – Public Works Director

1. RESPONSIBILITIES

A. Has overall control of water utility resources.
B. Assesses damage to water system.
C. Sets priorities for restoration of water service.
D. Coordinates efforts to restore water service.
E. Makes arrangements for mutual aid.
F. Provides emergency status updates to Public Works Operations and City Hall.

G. Contacts DOH Engineer immediately if emergency may cause, or threatens to cause, water loss or threatens public health (Chapter 246-290 WAC). DOH number is (360) 664-0768 or the after-hours number is (877) 481-4901.
H. Contacts Clark County Department of Health at (360) 397-8428.
I. Advises local fire districts of emergency if water flow for firefighting is impaired.

2. SUPERVISES

Maintenance Crews

3. DIRECT CONTACTS

A. Public Works Director
B. Maintenance workers
C. Clark Public Utilities at (360) 992-8000
D. Members of the general public or water system customers

4. LOCATION

Public Works Operations Center at 1308 SE Grace Avenue. Alternatively, as directed by the Public Works Director, at City Hall at 109 SW 1st Street.

Emergency Response Procedures

A series of potential disasters and other emergency conditions that could impact the City's water system, as well as actions to be taken in the event of each emergency, are presented as follows. Emergency restoration priorities apply for all types of emergencies.

Emergency Restoration Priorities

Supply

Wells and booster pumps will be restored insofar as practicable, in the following order.

1. CPU Intertie
2. Well No. 9 and Horsethief Booster Pump Station
3. Wells No. 7 and 8
4. Wells No. 1 and 2
5. Wells No. 4 and 5
6. Well No. 6

Emergency Services and Priority Customers

1. Transmission mains from wells to reservoirs.
2. Life support system patients, such as kidney dialysis and Vancouver Clinic.
3. Major fire mains along State Route 502, Rasmussen, E Main, Onsdorff Boulevard, NE 10th Street, SW 20th Avenue, NW 20th Avenue, and Grace Avenue.

4. Water services to all pump stations, starting with Pump Station No. 1 (STP) and Pump Station No. 5 (Gardner).
5. Individual customer water services.

Identified Life Support Systems

A list needs to be developed of all the patients who currently have dialysis machines or respirators in the City's water system service area. In case of emergency situations, they will be instructed to call 911.

Emergency: Earthquake

Description

A major earthquake, with a magnitude of 5.0 or higher, and an intensity of 9 on the Modified Mercalli scale, could disrupt the source, transmission, pumping, storage, distribution, and telemetry components of the water system. In addition, power failures and interruption may occur to conventional communications, such as the above-ground fiber optic cable that links the Water Operations Center to the server at City Hall.

Response

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

Emergency: Power Failure/Outage

Description

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

Response

In addition to their field response, water personnel will immediately contact the electric utility to determine the nature, extent, and expected duration of the power outage. Depending on the impact to the City's sources of supply, water utility staff also may contact CPU and investigate the possibility of opening the emergency intertie connection at NE 199th Street and Maple Grove School.

Available Backup Generators

1. CPU – Auxiliary generators may be available if not in use by CPU.
   A. 180 kilowatt (kW)
   B. 125 kW
   C. 50 kW
   D. 50 kW
2. Other Equipment – In addition to CPU's auxiliary generators, the following firms may have backup generators as noted.
   A. Hanson Drilling – one 15 kW, one 30 kW
   B. Mather & Sons – one 15 kW
   C. Halton Tractor, Portland – up to 930 kW
   D. E.C. Distributing, Portland – up to 75 kW
   E. R.S.C. Rentals – up to 125 kW

Emergency Generator Startup Procedures

Before Leaving the Yard:

A. Unhook battery charger electric cord.
B. Turn battery charger on/off switch to off.
C. Check oil level.
D. Check fuel level.

Notes: The Hand-Off-Auto (HOA) switch is on the pump electric panel inside the pump house. Use the Man/Aux switch inside the pump house to switch all power from the CPU power system to the backup generator, or vice versa.

Procedure at Well or Pump Station Site:

A. Turn HOA switch to "OFF."
B. Turn Man/Aux switch to "OFF."
C. Plug in power cord to panel, and lock into position.
D. Remove right front door panel.
E. Open the back door on the pump station generator.
F. Set and lock hand throttle to approximately one half throttle.
G. Switch engine control switch to manual; engine will start and automatically shut off starter.
H. Run at half throttle until engine is warmed up.
I. Adjust throttle to obtain 60 Hertz on meter.
J. Switch MAN/AUX switch to AUX.
K. Start pump by switching HOA switch to HAND.

Procedure After Using the Generator:

A. Top off and fill fuel tank.
B. Check the oil level.
C. Turn the battery charger on/off switch to ON.
D. Plug in the battery charger and make sure it is working.

Emergency: Water Transmission Main Damage

Description

Rupture or leakage in the transmission lines from wells could be a result of earthquake, pressure surge, vandalism, bomb blast, construction, soil scour during a flood, corrosion, or material failure. A major break could drain connected storage facilities and present a flood and erosion threat to nearby areas. It is unlikely that the entire system would be affected.

Response

Such an event requires prompt action by the water utility personnel to isolate the damaged section; thereby minimizing the disruption of service for the rest of the system. If transmission paths from wells are shutdown, the affected wells will be turned off manually, and a red tag placed on the telemetry system. The size and nature of the rupture must be evaluated promptly to ensure that adequate repair materials, excavation equipment, dewatering facilities, and trained personnel are deployed immediately. A field response also will address the need to re-route traffic and warn businesses and residences possibly affected by the break. Floods may result in transmission main ruptures at the crossings with Mill Creek. All creek crossings will be checked if system damage is suspected. Ruptured pipeline crossings may be secured until flooding subsides and working conditions are safe.

When the water system loses positive pressure there is a heightened potential for water contamination. A boil water advisory will be needed until the safety of the water supply is verified through coliform sampling. DOH will be consulted to evaluate whether a water outage requires an advisory, the extent of the system that should be included in the advisory, and when the advisory should be lifted.

Emergency water supplies also can be provided at strategic hydrants by installing hydrant meters within affected areas. For prolonged outages, arrangements may be made to haul water by tankers to impacted areas. Proceed with restoration of service in accordance with the service restoration priorities.

Emergency: Structural Damage to a Reservoir

Description

Reservoirs are designed to withstand earthquakes that can be expected within the City's seismic zone. Severe earthquakes may result in the buckling of steel plates and possible cracks in reinforced concrete, resulting in minor leaks in the tanks.

Response

In the event of an earthquake, each reservoir will be checked for signs of damage. If any damage is evident, the water level in the reservoir will be drawn down below the level of the damage. The tank will be taken out of service, if necessary, until it can be inspected and repaired. A report of all repairs will be completed and sent to the Public Works Director and City Engineer. In addition to the field response, DOH and other applicable health agencies should be contacted to advise them of the situation.

Emergency: Contamination of Source of Supply

Description

Sources of contamination may occur in the aquifer or the wells, and can be the result of either man-made or natural occurrences. A partial list of possible sources for well contamination includes effluent from septic tank drain fields, runoff from storm drainage facilities, leachate from pesticide use and/or landfills, spills from fuel storage tanks, other chemical or petroleum spills, contamination from animal wastes, vandalism, volcanic fallout, and undesirable aquatic organisms.

Response

The initial response will be to isolate the contaminated facilities from the rest of the system. Other appropriate measures will be determined according to the type, location, nature, and entry path of the contaminant. In addition to field response, water system personnel must contact the appropriate health authorities. They need to determine, if possible, the extent of contamination in the system and prepare an appropriate public information program.

Emergency: High Water Demand

Description

Pumps and reservoirs are not keeping up with water demand. The water levels in all reservoirs are declining.

Response

During periods of high water demand, the City will purchase wholesale water supply through its approved interties with CPU, according to the wholesale water purchase agreements. The City also will continue to implement public education goals from the Water Use Efficiency Program, including installing seasonal Conservameter signs, publishing water conservation advertising in the Reflector and on the City's web page, and making available to the public any other water conservation information that may be requested. Seasonal irrigation reduction will be implemented at City parks and other facilities to emphasize the importance of conservation.

SAFETY PROCEDURES

The City water system currently uses sodium hypochlorite for disinfection at all facilities to eliminate the inherent problems with use and storage of chlorine gas. At this time, most of the major water system hazards are prevented through the safe handling and storage of the sodium hypochlorite materials used in the disinfection process.

Other potential hazards are related to lifting and reinstalling treatment or pumping equipment for repair. Each site has various pumps and pipeline components that, when removed for maintenance, require special lifting equipment and preparation for safe handling. Proper workplace lifting techniques are used during any water system maintenance project. The Horsethief Pump Station and the CPU Intertie on NE 219th Street both include a portable lift capable of lifting any of the pumps and piping pieces inside the building. Journeyman electricians are hired in the event work is needed in the electrical control panel, and in the case of the telemetry system, CPU staff are contacted.

Additionally, the City ensures that operations staff are up to date in all their first aid training and provides each vehicle with a first aid kit. Each operator also gets annual training in Blood Borne Pathogens, Confined Space Entry, and other required training. The City is continuously working to bring in certified instructors, to provide required safety training, and to maintain currency for all the training requirements of each operations position.

CROSS-CONNECTION CONTROL PROGRAM

The City operates a cross-connection control program to reduce the risk of backflow into the water system. Battle Ground Municipal Code (BGMC) 13.112.110 establishes the cross-connection control program, and the City currently employs four certified CCS. There are over 1,086 double check valve backflow assemblies (DCVA) and over 146 reduced pressure backflow assemblies (RBPA) in the system. The City also requires DCVAs on all irrigation systems. During the building permit review process at City Hall, City staff check for new plumbing connections to verify that there will not be any that are cross connected. The City also has a strong program to enforce the annual backflow testing requirement and regularly achieves good compliance through the use of three successive reminder notices and eventually a lock-out notice. **Table 8-5** lists the status of the City's Cross-Connection Control Program in regard to the minimum elements required by WAC 246-290-490.

Table 8-5

Cross-Connection Control Program Status

Element	Status
Ordinance Establishing Authority	Ordinance #13-07 adopted in May of 2013, enforced through BGMC 13.112
Procedures for Evaluating New and Existing Connections	Within BGMC 13.112.119 and written program, see **Appendix G**
Procedures for Eliminating Cross-Connections	Written program is attached in **Appendix G**
Provide at Least One CCS on Staff	City currently employs four CCS
Procedures for Testing Requirements	All backflow assemblies are tracked in asset management database
Assembly Testing Quality Control	Local backflow testers are tracked in asset management database
Procedures for Responding to Backflow Incidents	Included in Public Works Department Policy and Procedures Manual
Cross-Connection Education Program	Education materials are provided with the annual testing notices
Database of Cross-Connection Control Records	Managed in the asset management database
Extra Requirements for Reclaimed Water	Not applicable

CUSTOMER COMPLAINT RESPONSE PROGRAM

All customer complaints are taken by the Public Works Department and written down. The complaint is then entered in the Lucity asset management system through a work request form. With this form, the operator visits the site of the complaint and investigates as much as possible to determine the cause. If the operator is able to solve the problem, they proceed with a solution. If they are unable to determine the cause, or determine that the problem is not the City's to repair, then the operator will explain this to the customer and submit a short report to close out the work request record. If the operator needs assistance in resolving the complaint, they will typically call in for additional help.

All complaints are recorded and kept on file at the Public Works office at 1308 SE Grace Avenue. Most of complaints related to the water system are related to either a failed PRV, which are on the customer side of the meter or leaking services, which are usually on the City side, as well as occasional complaints of colored water related to the iron and manganese in the water supply.

RECORD KEEPING AND REPORTING

The City meets at a minimum the record keeping requirements of the DOH Drinking Water Program, WAC 246-290-480. These record keeping requirements are as follows:

- Coliform results are kept for 5 years.
- Chemical analysis results are never discarded.
- Daily source meter readings are kept for 10 years.

- Other records of operation and analysis are kept for 3 years, including records of action taken by the system to correct violations of primary drinking water standards.
- Copies of sanitary surveys and any record associated with a sanitary survey will be kept for 10 years.
- Project reports, construction documents, drawings, inspection reports, and approvals of water system facilities will be kept for the life of the facility.
- Daily chlorine residual readings are kept for a minimum of 3 years.

Reporting requirements to DOH for the City include the following:

- Any failure to comply with monitoring requirements or the violation of a primary Maximum Contaminant Level.
- Copies of water quality monitoring results required by DOH.
- Copies of information relating to the status of monitoring waivers.
- The City shall submit an annual Water Facilities Inventory (WFI) form.
- The City shall submit an updated WFI to DOH within 30 days of any change in the WFI.
- The City will notify DOH of any positive coliform sample. Reporting requirements are in the coliform monitoring plan included in **Appendix J**.

ASSET MANAGEMENT

The City is currently using Lucity for its asset management software in combination with system maps to track assets related to the water system. With these two items the City can track where its infrastructure is and how to operate it, such as valve locations for turning on and off water flow. The City's current system has some limitations that are making it difficult to track information the way the City would like to.

The City has purchased Enterprise Asset Management and is in the process of purchasing licenses from ESRI. Existing Lucity data will be migrated over to the new system by early 2023. Staff will then populate any gaps and should have a City-wide asset list of all water infrastructure by the end of 2023.

Existing asset inventory sheets have been included in **Appendix P**.

OPERATIONS AND MAINTENANCE IMPROVEMENTS

The City's capital improvement program in **Chapter 9** does not include any improvements to the operation or maintenance of the system. Although some of the capital projects will change the operation and maintenance (O&M) of the system, the projects will not necessarily improve the actual O&M costs of the system.

The City has previously considered the option of creating a pressure zone with a lower hydraulic grade than the Main Zone within the City to reduce leakage in the Main Zone and save money on pumping costs. The option of splitting the Main Zone includes additional costs because a new intermediate pumping facility would be needed. Additionally, all private fire protection

systems within the City would need to be re-designed to accommodate the lower supply pressure to continue to supply the fire flows that they were originally designed to provide. The impact on existing fire systems and costs for a new pump station have been determined to outweigh the savings from reduced pumping and leakage. The City has decided to maintain the existing established pressure zones.

No other O&M related enhancements have been considered with this updated Water System Plan, with the exception of possibly adding generators to existing well sites.

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9 | WATER SYSTEM IMPROVEMENTS

INTRODUCTION

This chapter presents proposed improvements to the City of Battle Ground's (City) water system that are necessary to resolve existing system deficiencies and accommodate the projected growth of water customers. The water system improvements were identified from an evaluation of the results of the water system analyses presented in **Chapter 7**. The water system improvements were sized to meet both the existing and future demand conditions of the system.

A Capital Improvement Program (CIP) number has been assigned to each proposed improvement. The CIP projects, along with their assigned numbers, are shown in plan view on **Figure 9-1a** (Capital Improvement Projects) and **Figure 9-1b** (WM1 – Annual Water Main Replacement Program). The improvements also are illustrated in the hydraulic profile of the future water system (**Figure 9-2**). The improvements are organized and presented in this chapter according to the following categories.

- Recent Water System Improvements
- Water Main Improvements
- Facility Improvements
- Miscellaneous Improvements

The remainder of this chapter presents a brief description of each group of improvements, the criteria for prioritization, the basis for the cost estimates, and the schedule for implementation.

DESCRIPTION OF IMPROVEMENTS

This section provides a general description of each group of improvements and an overview of the deficiencies they will resolve. Most of the improvements are necessary to resolve existing system deficiencies.

Recent Water System Improvements

The water system has undergone several changes since 2013, when the City's Water System Plan (WSP) was last updated. The City has implemented several of the recommended projects as scheduled in its previous CIP. **Table 9-1** lists the projects that have been completed. In addition to these major projects, the City has implemented many smaller projects, including water main replacements and extensions.

Table 9-1

Improvements Completed Since 2013 WSP

Project Description	Year Completed
NE 219th St BPS/CPU Intertie Initial Construction	2013
8-inch-diameter Distribution to Hydrant on SW 3rd Street	2017
Regional Source and Transmission Development	2020
NE 219th St BPS Capacity Upgrade	2020

Water Main Improvements

The following water main improvements were identified from the results of the distribution and transmission system analyses discussed in **Chapter 7**.

CIP WM1: Annual Water Main Replacement Program

Deficiency: Most of the water main improvements shown in **Figure 9-1b** have been identified as required to meet planning-level fire flow requirements throughout the distribution system. As described in **Chapter 7**, these water mains do not necessarily represent an existing deficiency, as existing buildings were approved with the fire flow available at the time of their construction. CIP WM1 is intended to guide the City's water main replacement program by identifying the approximate water main sizes required to meet planning-level fire flow throughout the system.

Improvements: Replace existing water main with new ductile iron water main in accordance with the City's Construction Standards and Specifications, which are contained in **Appendix H**. The individual water main improvements grouped under this project are numbered 1, 2, 3, etc., as shown in **Figure 9-1b**. The selection of specific projects will be accomplished during the City's annual budget development process and will be guided by the prioritization presented later in this chapter. This provides the City with the flexibility to coordinate these projects with other projects that may occur within the same area. A variable allowance per year has been established for the annual replacement of the water mains based on the City's available budget.

CIP WM2: Inspection of Tukes Mountain Reservoirs Inlet/Outlet Transmission Main

Deficiency: The inlet/outlet transmission main to the Tukes Mountain Reservoirs site has not been inspected recently. Because of the criticality of this pipeline, as well as its location and limited access, the City desires to inspect it and evaluate its condition to determine if any maintenance or improvements are needed.

Improvements: Perform an inspection of the inlet/outlet transmission main to the Tukes Mountain Reservoirs site.

Facility Improvements

The following water system facility improvements were identified from the results of the water system analyses that are discussed in **Chapter 7**.

CIP F1: Pioneer to Cherry Grove Transmission Line

Deficiency: Additional supply from the Clark Public Utilities (CPU) intertie will be required by the end of the 20-year planning period to meet projected demands.

Improvements: Per the Water Supply and Aid to Construction Agreement between CPU and the City, the City will share equally in the cost to construct the new transmission main, which will have a capacity of up to 4,000 gallons per minute (gpm). The project cost reported in **Table 9-6** represents the City's share of the cost.

CIP F2: NE 219th Street BPS Upgrades

Deficiency: Once the Pioneer to Cherry Grove Transmission Line project (CIP F1) is completed, the NE 219th Street Booster Pump Station (BPS) will need to be upgraded to fully utilize the 4,000 gpm flow rate available from CPU.

Improvements: Upgrade the NE 219th Street BPS to 4,000 gpm firm capacity by installing larger or additional pumps. Other improvements, such as a larger emergency generator and rechlorination system, may be required in conjunction with the increase in pumping capacity.

CIP F3: Tukes Mountain BPS Upgrades

Deficiency: The functionality of the Tukes Mountain BPS could be improved by numerous small projects. Existing distribution system pressures in the 784 Zone are generally extremely high.

Improvements: Add a variable frequency drive to the jockey pump, review pump curves and optimize pump programming, potentially reduce the discharge pressure of the BPS, upgrade the programmable logic controller, and install a new flow meter that registers low flows.

CIP F4: Reservoir Siting Study

Deficiency: A new reservoir at the Tukes Mountain site will be required by 2030 to remedy projected storage deficiencies. The City is aware of environmental limitations on property adjacent to the existing reservoirs and desires to complete a reservoir siting study to determine a suitable location for the new reservoir.

Improvements: Complete a reservoir siting study to recommend a location for the proposed 1.5 million gallon (MG) reservoir (CIP F5).

CIP F5: New 1.5 MG Reservoir

Deficiency: The City is projected to have a storage deficiency of approximately 0.45 MG in 2030 and 1.42 MG in 2040.

Improvements: Following completion of CIP F4, construct a new 1.5 MG reservoir adjacent to the existing Tukes Mountain Reservoirs to remedy the storage deficiency.

CIP F6: Additional Well(s) in Upper Troutdale Aquifer (Optional)

Deficiency: The City's existing wells completed in the Upper Troutdale Aquifer (Well Nos. 1, 2, 4, and 5) are only able to produce 430 gpm, while the water rights authorizing these wells allows for up to 600 gpm.

Improvements: Construct two new wells on the Well Nos. 4 and 5 site capable of pumping up to a combined 170 gpm to fully utilize these water rights.

CIP F7: Bring Well No. 6 Online with On-Site Iron Filters (Optional)

Deficiency: Water quality of the water pumped from Well No. 6 exceeds the Secondary Maximum Contaminant Level for iron and manganese. At the current concentration, they can cause the water to stain clothing and appliances and have a metallic taste.

Improvements: Construct a water treatment facility at the Well No. 6 site that is capable of treating up to 250 gpm to reduce the iron and manganese concentration to acceptable levels.

CIP F8: Replace Well Nos. 7 and 8 if Technology Advancements Allow (Optional)

Deficiency: The existing wells in the Horsethief Wellfield do not have sufficient pumping capacity to fully utilize the water right.

Improvements: Construct new wells at the Horsethief Wellfield site to expand the pumping capacity by an additional 875 gpm up to the water right limit of the site, which is 1,375 gpm.

Miscellaneous Improvements

The following improvements are planning efforts and program elements that are required to comply with various water regulations or are improvements that do not fit into one of the previous categories.

CIP M1: Risk and Resiliency Assessment and Emergency Response Plan

Deficiency/Requirement: America's Water Infrastructure Act of 2018 requires the City to develop or update its Risk and Resilience Assessment by June 30, 2021, and its Emergency Response Plan by December 30, 2021. These documents must then be updated on a 5-year interval.

Improvements: Update the Risk and Resiliency Assessment and Emergency Response Plan every 5 years to meet the requirements that are in effect at the time of the update.

CIP M2: Water System Plan Update

Deficiency/Requirement: Washington Administrative Code (WAC) 246-290-100 requires that the City's WSP be updated every 10 years and submitted to the Washington State Department of Health for approval.

Improvements: Update the WSP every 10 years to meet the requirements that are in effect at the time of the update.

CIP M3: Additional Field Investigation/Hydraulic Model Calibration

Deficiency: Additional field investigation and model calibration needs to be performed to better calibrate the northwest portions of the distribution system hydraulic model.

Improvements: Perform additional field investigation and desktop model calibration to improve the distribution system hydraulic model calibration.

ESTIMATING COSTS OF IMPROVEMENTS

Project costs for the proposed improvements were estimated based on costs of similar, recently constructed water projects in the western Washington/Oregon area and are presented in 2021 dollars. The project cost estimates include the estimated construction cost of the improvement, sales tax of 8.4 percent, and a 20-percent contingency, as well as indirect costs

estimated at 35 percent of the construction cost for engineering preliminary design, final design, and construction management services, permitting, legal, and administrative services.

Construction cost estimates for water main projects were determined from the water main unit costs (i.e., cost per foot length) shown in **Table 9-2** and the proposed diameter and approximate length of each improvement.

Table 9-2

Water Main Unit Costs

Water Main Diameter (inches)	Project Cost per Foot Length (2021 $ per LF)
Standard Piping	
8	$384
12	$424
16	$464

The unit costs for each water main size are based on estimates of all construction-related improvements, such as materials and labor for the water main installation, water services, fire hydrants, fittings, valves, connections to the existing system, trench restoration, asphalt surface restoration, other work necessary for a complete installation, indirect costs, contingency, and sales tax. Additional costs were added to some water main improvements to cover anticipated, increased costs related to the project location and degree of difficulty.

PRIORITIZING IMPROVEMENTS

The water system improvements were evaluated against established criteria to schedule projects that will correct the most deficiencies and meet the greatest need for improvement prior to projects correcting fewer deficiencies. A description of the criteria and method for prioritizing each category of improvements is provided in the sections that follow.

Water Main Improvements

Table 9-3 lists the criteria that were established for prioritizing the water main improvements. The Existing Water Main Benefit Area category ranks the water main improvements based on the size of the area that will benefit from the replacement. The Existing Water Main Fire Flow Capability category ranks the water main improvements based on the ability of the existing water mains to provide the required fire flow, as determined from the results of the hydraulic analyses in **Chapter 7**. The Existing Water Main Benefit Area was weighted more heavily than the Existing Water Main Fire Flow Capability.

Table 9-3

Water Main Improvements Priority Ranking Criteria

Points	Category	Weight Factor	Weighted Points
	Existing Water Main Benefit Area		
3	Large Benefit Area (i.e. transmission main)	2	6
2	Medium Benefit Area	2	4
1	Small Benefit Area (i.e. localized area)	2	2
	Existing Water Main Fire Flow Capability		
3	Available Fire Flow is 74% or Less of Required Fire Flow	1	3
2	Available Fire Flow is 75-89% of Required Fire Flow	1	2
1	Available Fire Flow is 90% or Greater of Required Fire Flow	1	1

The water main priority ranking criteria were applied to the annual water main replacement projects, which are grouped under CIP WM1. CIP WM1 Projects 1 through 321, as shown in **Figure 9-1b**, are presented in **Table 9-4** and sorted by CIP number with their priority ranking. The CIP projects that received a ranking of "high" based on the criteria shown in **Table 9-3** are presented in **Table 9-5**.

Table 9-4

Prioritized Annual Water Main Replacement Projects (Sorted by Number)

CIP No.	Priority		Estimated Cost	Size			Description		
	Rank	Points		Length (ft)	Diam (in)	Ex Diam	In	From	To
1	M	5	$575,000	1,355	12	8	NW 26th Ave, NE 239th St	NW 18th St	Dead End
2	M	5	$59,000	137	12	8	NW Onsdorff Blvd	NW 29th Ave	Dead End
3	M	5	$81,000	189	12	8	NW 27th Ct	NW Onsdorff Blvd	Dead End
4	M	5	$131,000	307	12	8	Unknown	NW 29th Pl	NW 29th Ave
5	M	5	$75,000	176	12	8	NE 102nd Ave	NW 30th Ave	Dead End
6	M	5	$42,000	97	12	8	NW 14th St	NW 30th Ave	NE 102nd Ave
7	M	5	$204,000	479	12	8	NW 29th Ave, NW 29th Ct	NW 14th St	Dead Ends
8	L	3	$182,000	427	12	8	NW 14th St	NW 27th Ave	NW 29th Ave
9	M	5	$67,000	157	12	8	NW 28th Ct	NW 14th St	Dead End
10	M	5	$51,000	119	12	8	NW 27th Ave	NW 15th St	Dead End
11	M	5	$51,000	120	12	8	NW 15th Way	NW 24th Ave	Dead End
12	M	5	$47,000	110	12	8	NW 23rd Ave	NW 15th St	Dead End
13	M	5	$25,000	57	12	8	NW Onsdorff Blvd	NW 15th St	N of NW 15th St
14	M	5	$38,000	88	12	8	NW 12th St	NW 27th Ave	Dead End
15	M	5	$142,000	334	12	8	NW 22nd Pl	NW 12th St	NW 22nd Pl
16	M	5	$103,000	241	12	6	NW 13th St	NW 21st Pl	Dead End
17	M	5	$7,000	15	12	8	Daybreak Middle School	NW 22nd Ave	Daybreak Middle School
18	M	5	$66,000	154	12	8	Daybreak Middle School	Daybreak Middle School	S of NE 239th St
19	M	5	$56,000	132	12	8	Daybreak Middle School	Daybreak Middle School	S of NE 239th St
20	M	4	$169,000	398	12	8	Daybreak Middle School	NW 20th Ave	Daybreak Middle School
21	M	5	$40,000	94	12	8	NW 9th St	NW 7th St	Dead End
22	M	5	$194,000	457	12	6, 8	NW 6th St, NW 30th Ave	NW 30th Path	Dead End
23	M	5	$29,000	68	12	4	Dead End	NW 3rd Way	Dead End
24	M	5	$122,000	287	12	8	NW 3rd Cir	NW 29th Ave	Dead End
25	M	5	$48,000	111	12	8	NW 2nd Cir	NW 29th Ave	Dead End
26	M	5	$186,000	437	12	8	NW Self Storage	NW 29th Ave	Dead End
27	H	7	$390,000	919	12	8	NW 29th Ave	W Main St	NW 3rd Way
28	H	7	$36,000	77	16	12	W Main St	NW 30th Ave	NW 30th Ave
29	M	5	$584,000	1,376	12	8	Battle Ground Market Center	W Main St	NW 20th Ave
30	M	5	$34,000	79	12	8	Battle Ground Market Center	Battle Ground Market Center	Dead End
31	M	5	$104,000	244	12	8	Battle Ground Market Center	Battle Ground Market Center	Dead End
32	M	5	$118,000	277	12	8	Vancouver Clinic	W Main St	Dead End
33	M	5	$170,000	399	12	8	Creekside Place Memory Care	SW 20th Ave	Dead End
34	M	5	$534,000	1,257	12	8	SW 3rd Cir, SW 4th Way, SW 26th Pl, SW 5th Way	SW 24th Ave	Dead End
35	M	5	$85,000	200	12	6	SW 5th Cir	SW 24th Ave	Dead End
36	M	5	$139,000	326	12	6	SW 9th Cir	SW 24th Ave	Dead End
37	M	5	$90,000	210	12	8	SW 11th Cir	SW 24th Ave	Dead End
38	M	5	$151,000	354	12	8	SW 11th Cir	SW 24th Ave	Dead End
39	M	5	$57,000	133	12	8	SW 27th Ct	SW 11th St	Dead End
40	M	5	$137,000	323	12	8	SW 11th St	Well No. 7/No. 8 Access Road	Dead End
41	M	5	$126,000	296	12	8	SW 21st Ave	SW 12th St	Dead End
42	L	3	$134,000	348	8	6	Well No. 6 Site	SW 20th Ave	SW 21st Ave
43	M	5	$36,000	84	12	6	Well No. 6 Site	Well No. 6 Site	Well No. 6 Site
44	M	5	$32,000	75	12	6	SW 21st Ave	Well No. 6 Site	Dead End
45	M	5	$29,000	67	12	8	Unknown	SW 4th St	Dead End
46	H	7	$1,008,000	2,627	8	6	SW 2nd St, SW 19th Ave, SW 1st St, SW 3rd St, SW 17th Ave, Easement	SW 20th Ave, W Main St	SW 17th Ave, SW 3rd St
47	M	5	$78,000	182	12	2	SW 19th Pl	SW 2nd St	Dead End
48	M	5	$68,000	158	12	2	SW 18th Ct	SW 3rd St	Dead End
49	M	5	$318,000	748	12	8	Magnolia Square Senior Apartments	SW 20th Ave	Dead End
50	H	7	$415,000	978	12	6, 8	SW 6th St	SW 20th Ave	SW 17th Ave

Table 9-4

Prioritized Annual Water Main Replacement Projects (Sorted by Number) (Continued)

CIP No.	Priority		Estimated Cost	Size			Description		
	Rank	Points		Length (ft)	Diam (in)	Ex Diam	In	From	To
51	M	5	$321,000	756	12	8	SW 15th St and Westwood Commons Dead End	SW 3rd St	SW 5th St
52	M	5	$67,000	156	12	8	SW 1st Way	SW 15th Ave	Dead End
53	L	3	$213,000	500	12	8	SW 15th Ave	SW 1st Way	W Main Street
54	M	5	$76,000	179	12	6, 8	Parking Lot	SW 15th Ave	Ace Hardware
55	M	5	$45,000	105	12	6	Ace Hardware Parking Lot	Parking Lot	Dead End
56	L	3	$64,000	166	8	6	Dutch Bros Coffee Parking Lot	Parking Lot	Parking Lot
57	M	5	$10,000	23	12	8	W Main St	SW 15th Ave	E of SW 15th Ave
58	M	5	$192,000	452	12	8	NW 1st Way	NW 18th Ave	Dead End
59	M	5	$61,000	142	12	4	NW 17th Ct	NW 4th St	Dead End
60	M	5	$56,000	130	12	8	NW 15th Ave	NW 4th St	Dead End
61	M	5	$157,000	369	12	8	NW 3rd Cir	NW 15th Ave	Dead End
62	M	5	$733,000	1,727	12	8	Back of Fred Meyer, NW 12th Ave, Mill Creek Apartments	NW 4th St	NE 5th Way
63	M	5	$91,000	214	12	8	Front of Fred Meyer	NW 12th Ave	NW 10th Ave
64	M	5	$108,000	279	8	8	Fred Meyer Parking Lot	NW 12th Ave	E of NW 12th Ave
65	M	5	$98,000	231	12	8	NW 1st St	NW 12th Ave	Dead End
66	M	5	$109,000	257	12	8	SW 1st St	SW 12th Ave	Dead End
67	M	5	$109,000	257	12	8	SW 2nd St	SW 12th Ave	Dead End
68	M	5	$162,000	382	12	8	New Heights Church Walkway	NW 15th Ave	New Heights Church
69	M	5	$530,000	1,248	12	6, 8	NW 18th Ave, NW 18th Ct, NW 14th St, NW 19th Ct, NW 14th Cir	NW Onsdorff Blvd	Dead End
70	M	5	$55,000	129	12	6	NW 14th Cir	NW 16th Ave	Dead End
71	M	5	$67,000	156	12	6	NW 15th Ct	NW 14th St	Dead End
72	M	5	$41,000	96	12	8	World of Grace Church Parking Lot	S of NW Onsdorff Blvd	E of NW 12th Ave
73	M	5	$44,000	102	12	8	World of Grace Church Parking Lot	S of NW Onsdorff Blvd	W of NW 10th Ave
74	M	5	$84,000	196	12	8	NW 12th St	Dead End	NW 19th Ave
75	M	5	$32,000	75	12	4	1600 Block of NW 12th St	NW 12th St	Dead End
76	M	5	$62,000	145	12	6	NW 14th Ct	NW 11th St	Dead End
77	M	5	$173,000	407	12	6, 8	NW 10th St, NW 18th Ct	NW 19th Ave	Dead End
78	M	5	$94,000	221	12	6	NW 10th Cir	Dead End	NW 15th Ave
79	M	5	$190,000	448	12	8	NW 19th Ave, NW 9th Way	NW 9th St	Dead End
80	M	5	$105,000	247	12	8	NW 16th Ct	NW 9th St	Dead End
81	M	5	$137,000	323	12	8	NW 18th Ave	NW 9th St	Dead End
82	M	5	$140,000	328	12	8	NW 17th Ave	NW 9th St	Dead End
83	M	5	$142,000	334	12	8	NW 16th Ave	NW 9th St	Dead End
84	M	5	$727,000	1,712	12	8	NW 11th Ave, Undeveloped Parcel	NW 8th St	N of NW 5th Way
85	M	5	$320,000	754	12	8	NE 244th St, NW 25th St, NW 9th Ave, NW 24th St	NE 117th Ave	NW 8th Ave
86	M	4	$109,000	282	8	6	Church of the Holy Spirit	SW 9th Ave	S of SW 9th Ave
87	M	4	$70,000	181	8	6	NW 23rd St	NW 6th Ave	E of NW 6th Ave
88	M	4	$78,000	202	8	6	NW 21st Cir	NW 6th Ave	Dead End
89	M	5	$42,000	109	8	4	NW 20th Cir	Dead End	NW 8th Ave
90	M	5	$42,000	109	8	4	NW 19th Cir	Dead End	NW 8th Ave
91	M	5	$42,000	109	8	4	NW 18th Cir	Dead End	NW 8th Ave
92	M	5	$32,000	83	8	4	NW 17th Cir	Dead End	NW 8th Ave
93	M	5	$38,000	97	8	4	NW 16th Cir	Dead End	NW 8th Ave
94	M	4	$154,000	401	8	6	NW 7th Ct	NW 18th St	Dead End
95	M	5	$47,000	121	8	4	NW 7th Ct	NW 17th St	Dead End

Table 9-4

Prioritized Annual Water Main Replacement Projects (Sorted by Number) (Continued)

CIP No.	Priority		Estimated Cost	Size			Description		
	Rank	Points		Length (ft)	Diam (in)	Ex Diam	In	From	To
96	M	4	$75,000	195	8	6	NW 5th Ct	NW 19th St	Dead End
97	M	4	$75,000	195	8	6	NW 5th Ct	Dead End	NW 19th St
98	M	4	$72,000	187	8	6	NW 3rd Ct	NW 19th St	Dead End
99	M	4	$48,000	125	8	6	NW 19th St	NW 3rd Ct	E of NW 3rd Ct
100	M	4	$80,000	207	8	6	NW 3rd Ct	Dead End	NW 19th St
101	M	4	$88,000	227	8	6	NW 16th Cir	Dead End	NW 4th Ave
102	M	4	$75,000	194	8	6	NW 2nd Ave	NW Onsdorff Blvd	NW 16th St
103	M	5	$40,000	102	8	4	NW 17th Cir	Dead End	NW 2nd Ave
104	M	4	$159,000	414	8	6	NW 13th Cir	Dead End	NW 6th Ave
105	M	5	$77,000	200	8	4	NW 13th Cir	NW 6th Ave	Dead End
106	M	5	$68,000	177	8	4	NW 5th Ct	NW 14th St	Dead End
107	M	5	$65,000	167	8	4	NW 3rd Ct	Dead End	NW 13th St
108	M	5	$128,000	301	12	8	S of NE 3rd Ave	NE 17th St	Dead End
109	M	5	$206,000	485	12	8	Sacred Heart Church E Parcel Boundary	NE 5th Ave	NE Ornsdorff Blvd
110	M	5	$405,000	955	12	8	NE 14th St, NE 1st Ct	NE 132nd Ave	NE Ornsdorff Blvd
111	M	5	$59,000	139	12	8	NE 13th St	NE 4th Ave	Dead End
112	M	5	$223,000	524	12	6	NE 12th St	NE 3rd Ave	Dead End
113	H	7	$3,108,000	8,098	8	6	School Property	W Main St	NW 6th Ave
114	M	5	$14,000	31	12	6	W of N Parkway Ave	Unknown	Dead End
115	M	5	$226,000	532	12	6	E of NW 10th Ave, Safeway	W Main St	N of W Main St
116	M	5	$204,000	480	12	6	Alley behind Papa Murphy's	W Main St	N of W Main St
117	M	5	$324,000	762	12	6	NW 5th Ave	W Main St	N of W Main St
118	M	5	$151,000	355	12	6	W of Battle Ground High School Entry	W Main St	N of W Main St
119	M	6	$273,000	709	8	6	NW 12th St	NW 6th Ave	NW 4th Ave
120	M	6	$263,000	685	8	6	NW 11th St	NW 6th Ave	NW 4th Ave
121	H	7	$462,000	1,203	8	6	NW 10th St	NW 6th Ave	NW 2nd Ave
122	H	7	$277,000	720	8	6	NW 12th St	NW 4th Ave	NW 2nd Ave
123	M	5	$31,000	71	12	4	NW 3rd Ct	NW 12th St	Dead End
124	M	5	$119,000	279	12	6	NW 3rd Ct	Dead End	NW 12th St
125	M	5	$42,000	97	12	8	NW 2nd Ave	NW 10th St	Dead End
126	M	6	$646,000	1,682	8	6	NW 9th St	NW 6th Ave	N Parkway Ave
127	H	7	$221,000	575	8	6	NW 5th Ave	NW 9th St	NW 7th St
128	H	7	$207,000	539	8	6	NW 6th Ave	W of NW 7th St	NW 5th Ave
129	H	7	$469,000	1,221	8	6	Unknown, NW 7th St	NW 6th Ave	NW 2nd Ave
130	M	5	$421,000	1,096	8	6	NW 4th Ave, NW 8th St, NW 3rd Ave	NW 7th St	NW 7th St
131	H	7	$216,000	562	8	6	NW 2nd Ave	NW 9th St	NW 7th St
132	M	5	$100,000	235	12	6	NW 6th Ave	W of NW 7th St	Dead End
133	M	5	$116,000	273	12	6	NW 5th Ave	NW 7th St	Dead End
134	M	5	$96,000	225	12	6	NW 4th Pl	NW 7th St	Dead End
135	H	7	$305,000	793	8	6	NE 12th St	N Parkway Ave	NE 3rd Ave
136	M	5	$97,000	228	12	6	Midway between N Parkway Ave and NE 3rd Ave	NE 12th St	NE 10th St
137	M	5	$299,000	777	8	6	NE 10th St	N Parkway Ave	NE 3rd Ave
138	M	5	$154,000	400	8	6	NE 3rd Ave	NE 12th St	NE 10th St
139	M	5	$51,000	120	12	6	NE 3rd Ave	NE 10th St	Dead End
140	M	5	$301,000	708	12	4, 6	NE 10th St, NE 4th Ct	NE 3rd Ave	Dead End
141	M	5	$274,000	646	12	6	NE 9th St	N Parkway Ave	Dead End
142	H	7	$291,000	756	8	6	NE 7th St	N Parkway Ave	NE 3rd Ave
143	H	7	$654,000	1,704	8	6	NE 6th St	NE 3rd Ave	NE Clark Ave
144	H	7	$572,000	1,348	12	6	NE 7th St, NE Clark Ave	NE 3rd Ave	NE 6th St
145	M	5	$93,000	218	12	2	NE 1st Ct	NE 7th St	Dead End
146	M	5	$94,000	221	12	2	NE 2nd Ct	NE 7th St	Dead End
147	M	5	$142,000	333	12	6	NE 3rd Ct	NE 7th St	Dead End
148	M	5	$95,000	223	12	2	NE 4th Ct	NE 7th St	Dead End
149	M	5	$95,000	223	12	2	NE 5th Ct	NE 7th St	Dead End
150	M	5	$260,000	613	12	4, 6	NE Clark Ave, Unknown	NE 7th St	Dead Ends

Table 9-4

Prioritized Annual Water Main Replacement Projects (Sorted by Number) (Continued)

CIP No.	Priority		Estimated Cost	Size			Description		
	Rank	Points		Length (ft)	Diam (in)	Ex Diam	In	From	To
151	M	5	$51,000	120	12	4	NE 7th St	NE Clark Ave	Dead End
152	M	5	$17,000	40	12	8	W of NE 3rd Ave	NE 5th St	Dead End
153	M	5	$298,000	701	12	6	NE 5th St	NE 3rd Ave	Dead End
154	H	7	$411,000	1,069	8	6	NE 4th St, NE 1st Ave	N Parkway Ave	NE 1st St
155	M	5	$164,000	385	12	6	W of NE 4th St, Unknown	NE 4th St	St Helens Manor
156	M	5	$197,000	464	12	4	NE 4th St	NE 3rd Ave	Dead End
157	M	5	$199,000	467	12	4	NE 3rd St	NE 3rd Ave	E of NE 3rd Ave
158	H	7	$404,000	1,051	8	6	NE Clark Ave	NE 1st St	NE 6th St
159	M	5	$159,000	373	12	8	NE 2nd St, Unknown	NE Clark Ave	N of NE 1st St
160	M	6	$511,000	1,331	8	6	NE Grace Ave	NE 1st St	NE 6th St
161	H	7	$772,000	1,819	12	6	NE Fairground Ave, Unknown	E Main St	NE Grace Ave
162	M	5	$95,000	224	12	6	NE 4th Way	Dead End	NE Grace Ave
163	M	5	$328,000	772	12	6	NE 8th Ave	NE 6th St	S of NE 8th Way
164	M	5	$462,000	1,088	12	6	NE 10th St, NE 8th Ave, NE 8th St	Dead End	NE Grace Ave
165	M	5	$97,000	228	12	6	NE 8th Way	W of NE Grace Ave	NE Grace Ave
166	H	7	$505,000	1,189	12	6	NE Grace Ave	NE 10th St	NE 6th St
167	H	7	$343,000	807	12	6, 8	NE 10th St, NE 12th Ave	NE 142nd Ave	NE 9th Way
168	H	7	$561,000	1,462	8	6	NE 9th Way, NE 14th Ave, NE 9th St, NE 12th Ave	NE 12th Ave	NE 14th Ave
169	M	5	$186,000	438	12	4, 6, 8	NE 11th Ct	NE 9th Way	Dead End
170	H	7	$286,000	673	12	8	NE 10th St	NE 142nd Ave	NE 12th Ave
171	H	7	$380,000	895	12	6	NE 142nd Ave	NE 13th St	NE 10th St
172	M	5	$318,000	748	12	8	NE 11th Ave, NE 14th Way, NE 12th Ave	N of NE 14th Way	NE 13th St
173	M	5	$118,000	277	12	8	NE 13th St	NE 14th Ave	Dead End
174	H	7	$647,000	1,525	12	6, 8	NE 12th St, NE 17th Ave, NE 10th St, Unknown	E of NE 12th Ave	NE 18th Ave
175	M	5	$130,000	337	8	4	NE 15th Cir, Unknown	NE 18th Ave	S of NE 15th Cir
176	M	5	$67,000	174	8	4	Unknown	N of NE 16th Loop	NE 16th Loop
177	L	3	$93,000	218	12	8	NE 27th St	NE 4th Ave	Dead End
178	L	3	$303,000	714	12	8	NE 4th Ave, NE 29th St	NE 249th St	NE 28th St
179	H	7	$444,000	1,045	12	6	E of SW 10th Ave and S of Wilco Farm Store	W Main St	SW 7th Ave
180	M	5	$144,000	339	12	2, 8	E of Jacksons/Shell, Unknown	W Main St	W of SW 7th Ave
181	M	5	$120,000	281	12	8	NE 11th Ct	Dead End	E Main St
182	M	4	$115,000	299	8	6	NE 14th Ct	Dead End	E Main St
183	M	4	$70,000	180	8	6	NE 16th Ct	Dead End	NE 1st St
184	M	4	$63,000	162	8	6	NE 2nd Cir	Dead End	NE 14th Ave
185	M	4	$86,000	222	8	6	NE 6th Cir	NE 17th Ave	Dead End
186	M	5	$623,000	1,467	12	8	NE 15th Ave, NE 14th Ave, NE 4th St	Dead End	E Main St
187	H	7	$432,000	1,017	12	6, 8	SW 7th Ave, Unnamed Alley	E of SW 10th Ave	S of SW 1st St
188	H	7	$1,469,000	3,827	8	6	Battle Ground Mobile Estates	Kiwanis Park	SW 7th Ave
189	M	5	$48,000	113	12	6	Battle Ground Mobile Estates	Battle Ground Mobile Estates	Dead End
190	H	7	$78,000	203	8	6	SW 5th Ave, McDonalds	W Main St	N of SW 1st St
191	M	5	$105,000	246	12	8	SW 5th Ave, McDonalds, SW 1st St	S of W Main St	SW 1st St
192	M	5	$229,000	538	12	8	SW 1st St	SW 5th Ave	SW 3rd Ave
193	H	7	$435,000	1,024	12	6	Battle Ground Police, Unknown, SW 4th Ave	S of SW 1st St	SW 4th St
194	H	7	$214,000	504	12	6	SW 3rd Ave	SW 1st St	N of SW 4th St
195	H	7	$273,000	709	8	6	Kiwanis Park, SW 4th St	Unknown	W of SW 4th Ave
196	H	7	$231,000	544	12	2, 8	SW 3rd St	E of SW 2nd Ct	S Parkway Ave
197	M	5	$109,000	256	12	8	SW 2nd Ct	Dead End	SW 3rd St
198	M	5	$122,000	287	12	6, 8	SE Grace Ave	E Main St	SE 1st St
199	M	5	$11,000	25	12	8	SE 1st St	SE Grace Ave	SW of SE Grace Ave
200	M	5	$277,000	651	12	6	SE Clark Ave, SE 2nd St	E of SE 5th Ave	Dead End

Table 9-4

Prioritized Annual Water Main Replacement Projects (Sorted by Number) (Continued)

CIP No.	Priority		Estimated Cost	Size			Description		
	Rank	Points		Length (ft)	Diam (in)	Ex Diam	In	From	To
201	M	5	$13,000	29	12	8	Unknown	SE 4th St	N of SE 4th St
202	M	5	$253,000	595	12	8	SE 4th St	SE 4th St Loop	Clark Ave Apartments
203	M	5	$15,000	35	12	6	SE 2nd St	W of SE 1st Ave	SE 1st Ave
204	H	7	$193,000	503	8	6	SE 2nd St, S Cherry Ave	SE 2nd Ave	SE 3rd St
205	H	7	$128,000	333	8	6	SE 4th Ave	SE 3rd St	SE 4th St
206	M	6	$391,000	1,018	8	6	SE 4th St	S Parkway Ave	SE 4th Ave
207	M	6	$183,000	476	8	6	SE 3rd St	SE 2nd Ave	SE 4th Ave
208	M	5	$126,000	297	12	6	SE 3rd St	S of SE 5th Ave	SE 4th Ave
209	M	6	$207,000	537	8	6	SW 4th St	SW 2nd Ave	S Parkway Ave
210	M	6	$213,000	554	8	6	SW 4th Way	SW 2nd Ave	S Parkway Ave
211	H	7	$248,000	646	8	6	SW 5th St	SW 2nd Ave	SW 6th St
212	H	7	$345,000	897	8	6	SW 6th St	SW 3rd Ave	S Parkway Ave
213	M	6	$88,000	228	8	6	SW 3rd Ave	SW 6th St	SW Rasmussen Blvd
214	M	5	$104,000	245	12	2	Kiwanis Park	W of SW 2nd Ave	SW 2nd Ave
215	M	5	$145,000	341	12	4, 6	SW 6th Cir	Dead End	SW 3rd Ave
216	M	5	$90,000	211	12	4	SW 2nd Ct	SW 6th St	Dead End
217	M	5	$220,000	517	12	4, 6	SW 1st Ct	SW 6th St	Dead End
218	M	5	$157,000	370	12	8	SE 5th Cir	Dead End	SE 2nd Ave
219	M	5	$110,000	258	12	8	SE 5th Cir	SE 2nd Ave	Dead End
220	M	5	$205,000	482	12	4, 8	SE 6th Cir	SE 2nd Ave	Dead End
221	M	5	$69,000	162	12	4	SE 7th Cir	SE 2nd Ave	Dead End
222	M	5	$96,000	225	12	8	SE 9th Cir	SE 1st Ave	Dead End
223	M	5	$166,000	391	12	8	SE 9th Cir	Dead End	SE 1st Ave
224	M	5	$56,000	132	12	8	SW 2nd Ave	SW 9th St	N of SW 10th St
225	M	5	$101,000	238	12	8	SE 5th Cir	Dead End	SE 5th Ave
226	M	5	$59,000	138	12	8	SE 5th Ave	SE 6th St	SE 7th St
227	M	5	$69,000	162	12	8	SE 6th Ct	SE 6th St	Dead End
228	M	5	$102,000	240	12	8	SE 6th Ct	Dead End	SE 10th St
229	M	5	$182,000	427	12	8	SE 7th Ct	Dead End	SE 10th St
230	M	5	$285,000	671	12	8	SE 9th Cir, SE 9th Ct	Dead End	SE Grace Ave
231	M	5	$180,000	423	12	8	SE 11th St	SE Clark Ave	Dead End
232	M	5	$579,000	1,365	12	8	SE 11th Way, SE 9th Ave, SE 12th St, SE Clark Ave	SE Clark Ave	SE Clark Ave
233	M	5	$22,000	51	12	8	W of SW 10th St	W of SW 10th St	SW 10th St
234	H	7	$559,000	1,456	8	6	SW 10th St	Dead End	S Parkway Ave
235	H	7	$271,000	705	8	6	SW 11th St	Dead End	SW 12th St
236	M	6	$370,000	964	8	6	SW 12th St	Dead End	SW 2nd Ave
237	M	5	$69,000	161	12	2	SW 11th Cir	SW 11th St	Dead End
238	H	7	$769,000	2,004	8	6	SW 2nd Ave	SW 10th St	SW 18th St
239	H	7	$423,000	1,100	8	6	SW 11th St	SW 2nd Ave	SE 2nd Ave
240	H	7	$325,000	847	8	6	SE 13th St, SE 2nd Ave	S Parkway Ave	SE 11th St
241	M	5	$171,000	402	12	4, 6	SE 11th St	SE 2nd Ave	Dead End
242	M	5	$42,000	98	12	6	SE 2nd Ave	SE 13th St	Dead End
243	M	5	$115,000	271	12	6	SE 1st Ave	SE 13th St	Dead End
244	M	5	$81,000	191	12	2	SW 12th Cir	SW 2nd Ave	Dead End
245	M	5	$202,000	476	12	6	SW 14th Cir	SW 2nd Ave	Dead End
246	M	5	$73,000	171	12	8	Unknown	S Parkway Ave	E of S Parkway Ave
247	H	7	$291,000	757	8	6	SW 4th Ave, SW 13th St	SW 12th St	SW 2nd Ave
248	M	6	$216,000	562	8	6	SW 5th Ave	SW 12th St	SW Scotton Way
249	M	5	$48,000	112	12	4	SW 13th Cir	SW 5th Ave	Dead End
250	H	7	$329,000	857	8	6	SW 14th St	SW 5th Ave	SW 2nd Ave

Table 9-4

Prioritized Annual Water Main Replacement Projects (Sorted by Number) (Continued)

CIP No.	Priority		Estimated Cost	Size			Description		
	Rank	Points		Length (ft)	Diam (in)	Ex Diam	In	From	To
251	M	5	$271,000	637	12	8	Unknown	SW Scotton Way	Maple Grove School
252	H	7	$303,000	789	8	6	SW Scotton Way, SW 4th Ave	SW 5th Ave	SW 18th St
253	H	7	$263,000	684	8	6	SW 18th St	SW 4th Ave	SW 2nd Ave
254	H	7	$405,000	1,055	8	6	SW 19th St, SW 2nd Ave	SW 4th Ave	SW 18th St
255	M	5	$155,000	364	12	4	SW 16th Cir	SW 4th Ave	Dead End
256	M	5	$53,000	123	12	4	SW 17th Cir	Dead End	SW 2nd Ave
257	M	5	$30,000	69	12	8	End of SW 9th Ave	N of SW Scotton Way	SW Scotton Way
258	M	5	$141,000	331	12	8	Unknown	SW 13th Ave	Columbia Credit Union
259	M	5	$19,000	43	12	8	SW 13th Ave	SW 13th Ave	S of SW 13th Ave
260	M	5	$665,000	1,568	12	8	SW 13th Ave, Unknown	SW Scotton Way	S of SW 13th Ave
261	M	5	$255,000	600	12	8	SW 15th Ave	SW Scotton Way	Dead End
262	M	5	$127,000	299	12	8	Battle Ground Cinema Parking Lot	W of SW 9th Ave	SW 9th Ave
263	M	5	$84,000	198	12	8	Unknown	SW 9th Ave	E of SW 9th Ave
264	M	5	$155,000	365	12	8	River HomeLink	W of SW 9th Ave	N of SW Eaton Blvd
265	M	5	$80,000	188	12	8	SW Eaton Blvd	SW 9th Ave	E of SW 9th Ave
266	M	5	$110,000	259	12	8	S of SW Eaton Blvd	SW 9th Ave	E of SW 9th Ave
267	M	5	$86,000	202	12	8	Church On the Rock	Church On the Rock	N of SW Eaton Blvd
268	M	5	$376,000	885	12	6, 8	SW 3rd Ave, Unknown	SW 3rd Ave	SW 4th Ave
269	H	7	$327,000	851	8	6	SW 16th St	SW 2nd Ave	SW 18th St
270	H	7	$141,000	365	8	6	SW 18th St	SW 2nd Ave	SW 16th St
271	M	5	$160,000	377	12	8	SE 16th St	S Parkway Ave	Dead End
272	M	5	$174,000	409	12	8	SE 18th St, SE 2nd Ave	S Parkway Ave	Dead End
273	M	5	$172,000	404	12	6	S Parkway Ave	SW 18th St	SW Eaton Blvd
274	M	5	$227,000	534	12	8	SE 13th St, SE 3rd Ave	SE 14th St	SE 4th Ave
275	M	5	$48,000	112	12	8	SE Scotton Way	Dead End	SE 3rd Ave
276	M	5	$84,000	198	12	8	SE Scotton Way	SE 4th Ave	End of Road
277	M	5	$276,000	649	12	6	SE 9th Ave	Dead End	SE Eaton Blvd
278	M	5	$56,000	132	12	6	SE Grace Ave	SE 22nd St	S of SE 22nd St
279	M	5	$303,000	714	12	6	SE 22nd St, SE 11th Pl	SE Grace Ave	Dead End
280	M	5	$143,000	335	12	8	SE Rasmussen Blvd	SE Grace Ave	SE 11th Pl
281	M	5	$45,000	105	12	8	SE 8th Way	Dead End	SE 11th Pl
282	M	5	$31,000	73	12	8	Parking Lot	S of SE Rasmussen Blvd	SE 8th Way
283	M	5	$32,000	74	12	8	SE 7th St	SE 7th St	Dead End
284	M	6	$66,000	155	12	8	Unnamed Alley	SE 7th St	SE Rasmussen Blvd
285	M	5	$393,000	926	12	8	SE 7th St, SE 11th Ave, SE 6th St	SE 7th St	SE 7th St
286	M	5	$32,000	74	12	8	SE 11th Ave	N of SE 6th St	SE 6th St
287	M	5	$479,000	1,129	12	8	SE 11th Ave, SE 5th St	SE 11th Ave	SE 6th St
288	M	5	$152,000	358	12	8	SE 14th Ave	Dead End	SE 6th St
289	M	5	$635,000	1,496	12	8	SE 14th Pl, SE 5th Way, SE 15th Ave, SE 7th Way	SE 14th Pl	SE 14th Pl
290	M	5	$194,000	456	12	8	SE Rasmussen Blvd	SE 14th Ave	SE Commerce Ave
291	M	5	$12,000	28	12	8	SE Rasmussen Blvd	SE Rasmussen Blvd	Dead End
292	M	5	$21,000	48	12	8	SE Commerce Ave	SE Commerce Ave	Dead End
293	M	5	$21,000	48	12	8	SE Commerce Ave	SE Commerce Ave	Dead End
294	M	5	$121,000	285	12	8	Battle Ground Village	SE 14th Ave	Unknown
295	M	5	$5,000	10	12	8	Battle Ground Village	Battle Ground Village	Dead End
296	M	5	$27,000	62	12	6	SE Commerce Ave	SE Commerce Ave	Dead End
297	M	5	$18,000	41	12	8	SE 10th St	SE 10th St	Dead End
298	M	5	$17,000	38	12	8	SE 10th St	SE 10th St	Dead End
299	M	5	$194,000	457	12	8	Battle Ground Village, SE 10th St	SE 10th St	Unknown
300	M	5	$17,000	38	12	8	SE 10th St	SE 10th St	Dead End

Table 9-4

Prioritized Annual Water Main Replacement Projects (Sorted by Number) (Continued)

CIP No.	Priority		Estimated Cost	Size			Description		
	Rank	Points		Length (ft)	Diam (in)	Ex Diam	In	From	To
301	M	5	$247,000	582	12	8	Seasons on the Park	SE 10th St	Dead End
302	M	5	$20,000	46	12	8	SE 12th Ave	SE 12th Ave	Dead End
303	M	5	$153,000	359	12	8	Seasons on the Park	SE 12th Ave	Unknown
304	M	5	$8,000	18	12	8	Seasons on the Park	Unknown	Dead End
305	M	5	$27,000	63	12	8	SE 11th St	SE 11th St	Dead End
306	M	5	$12,000	26	12	8	SE 11th St	SE 11th St	Dead End
307	M	5	$33,000	76	12	8	SE Commerce Ave	SE Commerce Ave	Dead End
308	M	5	$660,000	1,556	12	8	SE 13th St, SE 14th Pl, SE 16th St	SE Commerce Ave	SE Commerce Ave
309	M	5	$194,000	456	12	8	Unknown	SE Commerce Ave	Dead End
310	M	5	$172,000	404	12	8	Maddox Industrial Transformer	SE Commerce Ave	Dead End
311	M	6	$241,000	567	12	8	SE Commerce Ave	SE 16th St	SE 17th St
312	M	5	$86,000	201	12	4, 8	Telemark	SE Commerce Ave	Dead End
313	H	7	$267,000	628	12	8	SE 17th St	SE Commerce Ave	SE 18th Ave
314	H	7	$305,000	719	12	8	SE 18th Ave, SE 16th St, SE 19th Ave	SE 17th St	SE 17th St
315	M	5	$21,000	49	12	8	SE 17th St	SE 17th St	Dead End
316	M	5	$26,000	60	12	8	SE 18th Ave	SE 18th Ave	Dead End
317	M	5	$23,000	53	12	8	SE 18th Ave	SE 18th Ave	Dead End
318	M	5	$248,000	583	12	8	Stewart Mechanical	SE 16th St	Dead End
319	M	5	$54,000	127	12	8	Unknown	SE 16th St	Dead End
320	M	5	$44,000	103	12	8	Unknown	SE 19th Ave	Dead End
321	H	7	$1,272,000	2,998	12	8	SE 17th St, SE 20th Ave, SE 15th St, SE 21st Ave, SE 13th St	SE 17th St	Dead End
Total			**$63,506,000**						

Table 9-5

High Priority Annual Water Main Replacement Projects (Sorted by Number)

CIP No.	Priority		Estimated Cost	Size			Description		
	Rank	Points		Length (ft)	Diam (in)	Ex Diam	In	From	To
27	H	7	$390,000	919	12	8	NW 29th Ave	W Main St	NW 3rd Way
28	H	7	$36,000	77	16	12	W Main St	NW 30th Ave	NW 30th Ave
46	H	7	$1,008,000	2,627	8	6	SW 2nd St, SW 19th Ave, SW 1st St, SW 3rd St, SW 17th Ave, Easement	SW 20th Ave, W Main St	SW 17th Ave, SW 3rd St
50	H	7	$415,000	978	12	6, 8	SW 6th St	SW 20th Ave	SW 17th Ave
113	H	7	$3,108,000	8,098	8	6	School Property	W Main St	NW 6th Ave
121	H	7	$462,000	1,203	8	6	NW 10th St	NW 6th Ave	NW 2nd Ave
122	H	7	$277,000	720	8	6	NW 12th St	NW 4th Ave	NW 2nd Ave
127	H	7	$221,000	575	8	6	NW 5th Ave	NW 9th St	NW 7th St
128	H	7	$207,000	539	8	6	NW 6th Ave	W of NW 7th St	NW 5th Ave
129	H	7	$469,000	1,221	8	6	Unknown, NW 7th St	NW 6th Ave	NW 2nd Ave
131	H	7	$216,000	562	8	6	NW 2nd Ave	NW 9th St	NW 7th St
135	H	7	$305,000	793	8	6	NE 12th St	N Parkway Ave	NE 3rd Ave
142	H	7	$291,000	756	8	6	NE 7th St	N Parkway Ave	NE 3rd Ave
143	H	7	$654,000	1,704	8	6	NE 6th St	NE 3rd Ave	NE Clark Ave

Table 9-5

High Priority Annual Water Main Replacement Projects (Sorted by Number) (Continued)

CIP No.	Priority		Estimated Cost	Size			Description		
	Rank	Points		Length (ft)	Diam (in)	Ex Diam	In	From	To
144	H	7	$572,000	1,348	12	6	NE 7th St, NE Clark Ave	NE 3rd Ave	NE 6th St
154	H	7	$411,000	1,069	8	6	NE 4th St, NE 1st Ave	N Parkway Ave	NE 1st St
158	H	7	$404,000	1,051	8	6	NE Clark Ave	NE 1st St	NE 6th St
161	H	7	$772,000	1,819	12	6	NE Fairground Ave, Unknown	E Main St	NE Grace Ave
166	H	7	$505,000	1,189	12	6	NE Grace Ave	NE 10th St	NE 6th St
167	H	7	$343,000	807	12	6, 8	NE 10th St, NE 12th Ave	NE 142nd Ave	NE 9th Way
168	H	7	$561,000	1,462	8	6	NE 9th Way, NE 14th Ave, NE 9th St, NE 12th Ave	NE 12th Ave	NE 14th Ave
170	H	7	$286,000	673	12	8	NE 10th St	NE 142nd Ave	NE 12th Ave
171	H	7	$380,000	895	12	6	NE 142nd Ave	NE 13th St	NE 10th St
174	H	7	$647,000	1,525	12	6, 8	NE 12th St, NE 17th Ave, NE 10th St, Unknown	E of NE 12th Ave	NE 18th Ave
179	H	7	$444,000	1,045	12	6	E of SW 10th Ave and S of Wilco Farm Store	W Main St	SW 7th Ave
187	H	7	$432,000	1,017	12	6, 8	SW 7th Ave, Unnamed Alley	E of SW 10th Ave	S of SW 1st St
188	H	7	$1,469,000	3,827	8	6	Battle Ground Mobile Estates	Kiwanis Park	SW 7th Ave
190	H	7	$78,000	203	8	6	SW 5th Ave, McDonalds	W Main St	N of SW 1st St
193	H	7	$435,000	1,024	12	6	Battle Ground Police, Unknown, SW 4th Ave	S of SW 1st St	SW 4th St
194	H	7	$214,000	504	12	6	SW 3rd Ave	SW 1st St	N of SW 4th St
195	H	7	$273,000	709	8	6	Kiwanis Park, SW 4th St	Unknown	W of SW 4th Ave
196	H	7	$231,000	544	12	2, 8	SW 3rd St	E of SW 2nd Ct	S Parkway Ave
204	H	7	$193,000	503	8	6	SE 2nd St, S Cherry Ave	SE 2nd Ave	SE 3rd St
205	H	7	$128,000	333	8	6	SE 4th Ave	SE 3rd St	SE 4th St
211	H	7	$248,000	646	8	6	SW 5th St	SW 2nd Ave	SW 6th St
212	H	7	$345,000	897	8	6	SW 6th St	SW 3rd Ave	S Parkway Ave
234	H	7	$559,000	1,456	8	6	SW 10th St	Dead End	S Parkway Ave
235	H	7	$271,000	705	8	6	SW 11th St	Dead End	SW 12th St
238	H	7	$769,000	2,004	8	6	SW 2nd Ave	SW 10th St	SW 18th St
239	H	7	$423,000	1,100	8	6	SW 11th St	SW 2nd Ave	SE 2nd Ave
240	H	7	$325,000	847	8	6	SE 13th St, SE 2nd Ave	S Parkway Ave	SE 11th St
247	H	7	$291,000	757	8	6	SW 4th Ave, SW 13th St	SW 12th St	SW 2nd Ave
250	H	7	$329,000	857	8	6	SW 14th St	SW 5th Ave	SW 2nd Ave
252	H	7	$303,000	789	8	6	SW Scotton Way, SW 4th Ave	SW 5th Ave	SW 18th St
253	H	7	$263,000	684	8	6	SW 18th St	SW 4th Ave	SW 2nd Ave
254	H	7	$405,000	1,055	8	6	SW 19th St, SW 2nd Ave	SW 4th Ave	SW 18th St
269	H	7	$327,000	851	8	6	SW 16th St	SW 2nd Ave	SW 18th St
270	H	7	$141,000	365	8	6	SW 18th St	SW 2nd Ave	SW 16th St
313	H	7	$267,000	628	12	8	SE 17th St	SE Commerce Ave	SE 18th Ave
314	H	7	$305,000	719	12	8	SE 18th Ave, SE 16th St, SE 19th Ave	SE 17th St	SE 17th St
321	H	7	$1,272,000	2,998	12	8	SE 17th St, SE 20th Ave, SE 15th St, SE 21st Ave, SE 13th St	SE 17th St	Dead End
Total			**$23,680,000**						

Other Improvements

The additional water main and facility improvements were prioritized based on existing deficiencies, safety concerns, maintenance requirements, and capacity requirements. The miscellaneous improvements were prioritized based on regulatory requirements and assessment of the water system needs. The priority order of these improvements is reflected in the schedule of improvements, which is presented in the next section.

SCHEDULE OF IMPROVEMENTS

The improvement prioritization results were used to assist in establishing an implementation schedule that can be used by the City for preparing its budget. The implementation schedule for the proposed improvements is shown in **Table 9-6**. A variable allowance per year has been established for the annual replacement of water mains based on the City's available budget. The City will identify and schedule the replacement of these water mains during its annual budget process. This provides the City with the flexibility to coordinate these projects with road or other projects within the same area.

Future Project Cost Adjustments

All cost estimates shown in the tables are presented in year 2021 dollars. These cost estimates will need to be adjusted to account for the effects of inflation and changing construction market conditions to determine future costs at the actual time of project implementation. Future costs can be estimated using the Engineering News Record Construction Cost Index for the Seattle area or by applying an estimated rate of inflation that reflects the current and anticipated future market conditions.

Table 9-6
Proposed Improvements Implementation Schedule

No.	Description	Estimated Cost (2021 $)	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031-2040	Beyond 2040
						Water Main Improvements								
WM1	Annual Water Main Replacement Program[1]	$63,506,000	$100K	$100K	$100K	$100K	$100K	$100K	$100K	$100K	$100K	$100K	$1,000K	$61,506K
WM2	Inspection of Tukes Mountain Reservoirs Inlet/Outlet Transmission Main	$50,000			$50K									
						Facility Improvements								
F1	Pioneer to Cherry Grove Transmission Line	$4,000,000		$800K	$800K	$800K	$800K	$800K						
F2	NE 219th Street BPS Upgrades	$1,200,000							$600K	$600K				
F3	Tukes Mountain BPS Upgrades	$200,000			$200K									
F4	Reservoir Siting Study	$50,000								$50K				
F5	New 1.5 MG Reservoir	$3,600,000									$1,800K	$1,800K		
F6	Additional Well(s) in Upper Troutdale Aquifer (Optional)	$2,040,000												$2,040K
F7	Bring Well No. 6 Online with On-Site Iron Filters (Optional)	$1,400,000												$1,400K
F8	Replace Well Nos. 7 and 8 if Technology Advancements Allow (Optional)	$9,080,000												$9,080K
						Miscellaneous Improvements								
M1	Risk & Resiliency Assessment and Emergency Response Plan[2]	$200,000					$50K					$50K	$100K	
M2	Water System Plan Update	$400,000										$200K	$200K	
M3	Additional Field Investigation/Hydraulic Model Calibration	$20,000			$20K									
Total Estimated Costs of Improvements		**$85,746,000**	**$100K**	**$900K**	**$1,170K**	**$900K**	**$950K**	**$900K**	**$700K**	**$750K**	**$1,900K**	**$2,150K**	**$1,300K**	**$74,026K**

1 = Annual project cost can be adjusted to meet City budget goals. Remainder of project costs can be shifted to the 2040+ horizon.
2 = Updates at 5-year intervals are assumed.

Tukes Mountain Res. No. 1
0.25 MG
Overflow Elev: 529'
Height: 35'

Tukes Mountain Res. No. 2
0.18 MG
Overflow Elev: 529'
Height: 50'

Tukes Mountain Res. No. 3
0.17 MG
Overflow Elev: 529'
Height: 45'

Tukes Mountain Res. No. 4
0.15 MG
Overflow Elev: 529'
Height: 40'

Tukes Mountain Res. No. 5
1.03 MG
Overflow Elev: 529'
Height: 38'

CPU Intertie
NE 219th St
(2,000 gpm)

NE 219th St BPS

Tukes Mountain BPS

Well No. 9
(500 gpm)

Horsethief Reservoir
2.06 MG
Overflow Elev: 296'
Height: 31'

Horsethief Pump Station

Well No. 6
(200 gpm)
(Offline)

Wells No. 1 and No. 2
(190 and 90 gpm)

Wells No. 4 and No. 5
(60-70 gpm each)

Wells No. 7 and No. 8
(750 gpm)
(Offline)

CPU Intertie
NE 122 Ave
(547 gpm)
(Emergency)

M3 F1 F2 F3 F4 F5 F6 F7 F8 WM2

East Fork Lewis River
Mill Creek
Woodin Creek
Salmon Creek

NE Manley Rd
NE Lewisville Hwy
NE Axford Rd
NE 147th Ave
NE 249th St
NE 152nd Ave
NE 142nd Ave
NE 244th St
NW 25th St
NE 112th Ave
NE 122nd Ave
NE 132nd Ave
NE 239th St
NE 92nd Ave
NW 20th Ave
NW 10th Ave
N Parkway Ave
NE Grace Ave
NE 10th St
W Main St
SW 20th Ave
S Parkway Ave
SE Grace Ave
SE Eaton Blvd
NE 199th St
NE 167th Ave
NE 219th St
NE 189th St
SW 40th St
NE 117th Ave
NE 154th St
NE Caples Rd
NE 156th St
NE 159th St
NE 152nd Ave

Legend

- Wells
- CPU Intertie
- Pump Station
- Reservoir

Pressure Zones
- 529 Zone (Main)
- 784 Zone (Tukes Mountain)

Planning Boundaries
- City Limits
- Urban Growth Area
- Retail Service Area
- Future Service Area

Note: WM1 (Annual Water Main Replacement Program) projects shown on **Figure 9-1b**.

C:\DWG\COPY_OF_FIGURE 9-1A_CIP.MXD BY: SPERKINS PLOT DATE: JAN 13, 2022 COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON SOUTH FIPS 4602 FEET

RH2

NORTH

1 inch = 1,000 feet

0 500 1,000 2,000 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2”

THE CITY OF BATTLE GROUND

Figure 9-1a
Capital Improvement Projects
City of Battle Ground Water System Plan

Vicinity Map



Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community

This map is a graphic representation derived from the City of Battle Ground Geographic Information System. It was designed and intended for the City of Battle Ground staff use only; it is not guaranteed to survey accuracy. This map is based on the best information available on the date shown on this map.

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Tukes Mountain Res. No. 1
0.25 MG
Overflow Elev: 529'
Height: 35'

Tukes Mountain Res. No. 2
0.18 MG
Overflow Elev: 529'
Height: 50'

Tukes Mountain Res. No. 3
0.17 MG
Overflow Elev: 529'
Height: 45'

Tukes Mountain Res. No. 4
0.15 MG
Overflow Elev: 529'
Height: 40'

Tukes Mountain Res. No. 5
1.03 MG
Overflow Elev: 529'
Height: 38'

CPU Intertie
NE 219th St
(2,000 gpm)

NE 219th St BPS

Tukes Mountain BPS

Well No. 9
(500 gpm)

Wells No. 1 and No. 2
(190 and 90 gpm)

Well No. 6
(200 gpm)
(Offline)

Wells No. 4 and No. 5
(60-70 gpm each)

Wells No. 7 and No. 8
(750 gpm)
(Offline)

Horsethief Reservoir
2.06 MG
Overflow Elev: 296'
Height: 31'

Horsethief Pump Station

CPU Intertie
NE 122 Ave
(547 gpm)
(Emergency)

East Fork Lewis River
Mill Creek
Woodin Creek
Salmon Creek

NE Manley Rd
NE Lewisville Hwy
NE 147th Ave
NE Axford Rd
NE 249th St
NE 142nd Ave
NE 152nd Ave
NE 244th St
NE 112th Ave
NW 25th St
NE 122nd Ave
NE 132nd Ave
NE 239th St
NE 92nd Ave
NW 10th Ave
N Parkway Ave
NE Grace Ave
NW 20th Ave
W Main St
E Main St
NE 219th St
S Parkway Ave
SW 20th Ave
NE 167th Ave
SE Eaton Blvd
NE 199th St
NE 189th St
SE Grace Ave
SW 40th St
NE 142nd Ave
NE 159th St
NE 156th St
NE 112th Ave
NE 154th St
NE Caples Rd
NE 117th Ave
NE 152nd Ave

Legend

- Wells
- CPU Intertie
- Pump Station
- Reservoir

Pressure Zones

- 529 Zone (Main)
- 784 Zone (Tukes Mountain)

Planning Boundaries

- City Limits
- Urban Growth Area
- Retail Service Area
- Future Service Area

C:\DWG\COPY_OF_FIGURE 9-1B_WM1_CIP.MXD BY: SPERKINS PLOT DATE: JAN 13, 2022 COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON SOUTH FIPS 4602 FEET

RH2

NORTH

1 inch = 1,000 feet

0 500 1,000 2,000 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2”

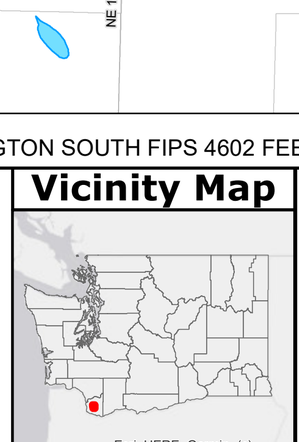
THE CITY OF BATTLE GROUND

Figure 9-1b

WM1 - Annual Water Main Replacement Program

City of Battle Ground Water System Plan

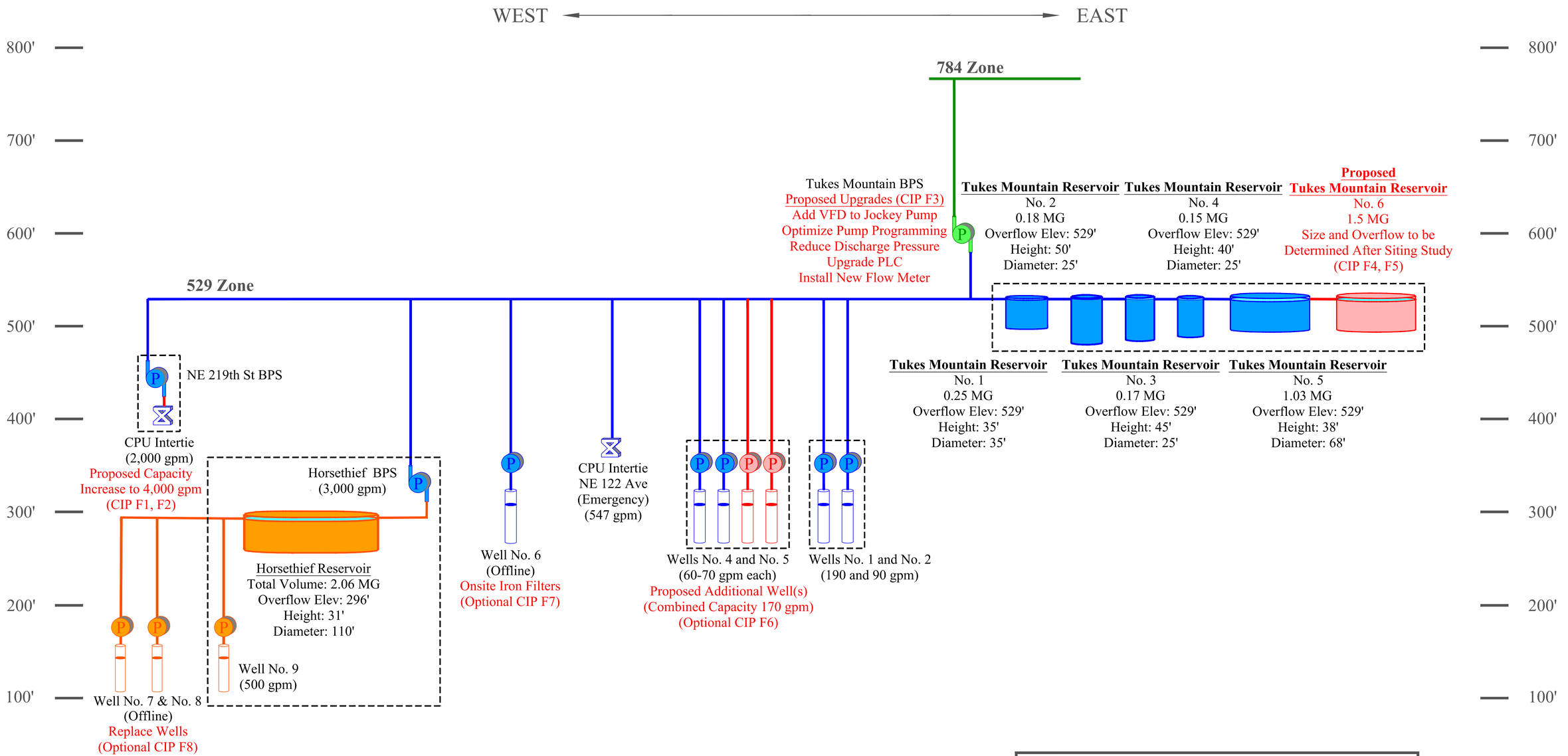
Vicinity Map



Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community

This map is a graphic representation derived from the City of Battle Ground Geographic Information System. It was designed and intended for the City of Battle Ground staff use only; it is not guaranteed to survey accuracy. This map is based on the best information available on the date shown on this map.

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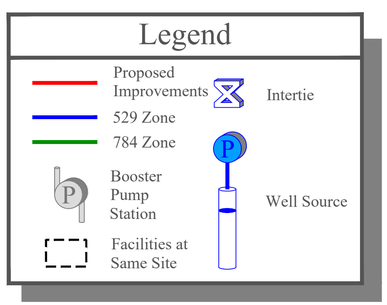


Figure 9-2
Proposed Improvements Hydraulic Profile
City of Battle Ground
Water System Plan

Date: Dec 21, 2021 Filename: J:\DATA\BTLG\20-0092\CAD\BTLGWSP-HPP.DWG

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10 | FINANCIAL ANALYSIS

INTRODUCTION

This chapter of the City of Battle Ground's (City) 2021 Water System Plan (WSP) puts forth a strategy for implementing the capital and non-capital recommendations identified throughout the WSP. A financial analysis is presented to evaluate the ability of the City to financially support the necessary improvements to the water system identified in the Capital Improvement Program (CIP) put forth in **Chapter 9**. A 10-year proposed budget is provided that identifies the overall revenue requirements compared to anticipated income. This section is not intended to be a rate analysis, but is provided as a cursory review of revenue requirements and identification of potential funding sources.

FINANCIAL RESPONSIBILITY

Provision of public water service is essential to the preservation of public health and safety, and protection of the environment. Because water and other utility systems must maintain a high level of integrity, they require a much greater capital investment to operate and maintain than most other public services. Most water utility costs are fixed, due to the nature of funding large capital improvements, and the relatively stable costs of operating labor, insurance, and other expenses that do not vary with water use. Fixed costs, which are incurred regardless of customer consumption, are associated with making the service available at the point of customer use. A smaller proportion of a utility system's cost is variable and changes with the volume of water consumed and/or used (i.e. the cost of purchased water, power for pumping, etc.). The City strives to maintain reasonable water rates while maintaining the integrity of the water system and the service provided by the Water Department. The water utility is operated out of a separate utility fund, adding to the viability of the utility and the ability to set water rates dedicated to the maintenance and upgrade of the water system as required to meet the public health and safety needs of current and projected system customers.

FUNDING SOURCES

Funding sources available to the City for capital projects consist primarily of debt mechanisms or cash funding through various rates and fees. Historically, federal and state grant programs were available for financial assistance; however, these have been mostly eliminated or replaced by loan programs. Remaining miscellaneous grant programs are generally lightly funded and heavily subscribed. Although competitive, the benefits of low-interest loan programs in the State of Washington include relatively low administrative costs and the ability to spread costs over a period of time to reduce sudden rate impacts.

Income from water sales is the primary source of revenue and is utilized to finance Water Department expenses that are not otherwise funded by developer extensions, assessments, system development charges (SDCs), or miscellaneous fees. Typical expenses financed from water sales include: operation and maintenance; water supply and quality analysis; administrative, accounting,

and collection expenses; debt service requirements; system renewal and replacement; and other general operating expenses.

The City's rate schedule as of January 1, 2021 is listed in **Table 10-1**. Water rates are subject to periodic changes, and current rates are available on the City's website at http://www.cityofbg.org. Rates include a block rate structure. The City's rate structure is designed to encourage conservation, which reduces consumption and sales related to consumption. It is imperative that water sales and revenues are closely monitored to ensure water rates and revenues are sufficient. Revenues and expenses are monitored throughout the year to ensure operations are occurring as anticipated in the City's approved budget. Annual budgets are prepared to estimate revenues and expenditures for the following years. Water rates are periodically reviewed to determine the adequacy of projected revenues to cover anticipated expenditures. It is important to review rates and system connection charges at the completion of WSP updates, when updated population, employment, and demand projections are developed to confirm project needs during the 10-year planning horizon and beyond.

Table 10-1

2021 Water Rates, Charges, and Fees

Meter Size	Meter Cost	System Development Charge[1]	Residential Monthly Rates[2]	Commercial/ Multi-Family Monthly Rates[2]	Irrigation Monthly Rates[2]
5/8"	See Note 3	$3,515.00	$11.20	$24.50	$11.79
3/4"	$306.00	$5,269.00	$33.04	$32.00	$12.84
1"	$397.00	$8,872.00	$49.59	$48.03	$16.00
1-1/2"	$626.00	$21,074.00	$87.24	$84.49	$20.22
2"	$693.00	$35,119.00	$139.03	$134.65	$31.80
3"	$3,799.00	$80,767.00	n/a	$321.85	$117.13
4"	$4,339.00	$143,975	n/a	$469.23	$148.73

Monthly Rates	(per ccf)	Usage	Residential	Commercial/ Multi-Family	Irrigation
		all usage	---	$3.33	$4.74
		0-6 ccf	$1.80	---	---
		7-12 ccf	$2.57	---	---
		over 12 ccf	$4.12	---	---

Miscellaneous Fees			
Meter Removal Fee	$45.00	Reinstate/Admin Fee	$27.00
Meter Set & Inspection Fee	$256.00	After Hours Fee	$95.00
Late Charge	$10.00	Account Set Up Fee	$22.00

Note 1: SDC Connection Fees outside City Limits are 1.5 times the in-City rate.
Note 2: Rates outside City Limits are 1.5 times the in-City rate.
Note 3: Meter cost is included in the Meter Set & Inspection Fee for a 5/8" meter.

To establish an affordable and sustainable rate structure, the City performed a rate study. The rate increases allow the City to offer competitive rates without harm to adequately operating the water system. The City anticipates the need to take on additional debt for funding a portion of the CIP F1 and F2 capital projects over the term of this WSP; however, system development charges are likely to cover most of the related payments. Debt options include:

- State-funded programs: Public Works Trust Fund Loans; and
- Bonds: Assessment Bonds; General Obligation (G.O.) Bonds; Councilmatic G.O. Bonds; and Revenue Bonds.

FINANCING PLAN AND PAST PERFORMANCE

In 2018, the City completed a water rate study and subsequently adopted a new structure for water rates that addressed the operating and capital needs for the system. The new rates included adding an automatic annual cost of living increase for fees associated with use and meters; increasing the meter fee based on size and flow; and eliminating the winter and summer rates to have one year-round rate. The implemented changes have been in place since January 1, 2019, and have proven to be a sustainable rate structure to fund the operating and capital needs of the system. The current rate structure has been set to handle emergency situations. In the event of large or small emergencies, funds can be diverted from capital projects or the capital fund balance can be used to cover expenses.

The estimated costs of the proposed capital improvement projects recommended, as well as anticipated revenue and operating expenses for the 10-year planning horizon, are detailed in **Table 10-2**. It is anticipated that projects identified in the WSP will be financed from cash on hand, except for CIP F1 and F2. It is important to note that the anticipated revenue and expenses beyond the council-adopted budget for 2021 are estimates based on minimal growth that include a cost of living increase for the water revenues and expenses over the term of this WSP. A historical look at revenues and expenses is provided in **Table 10-3**. The combination of the historical data, in conjunction with the financial plan for future revenues and expenditures, demonstrate the financial viability of the City's water utility.

The funding for capital improvements in this WSP is balanced. However, the City recognizes that the economy and other factors can change the needs of the water system. The City periodically contracts or performs rate studies to analyze changes in circumstance. The last rate study was completed and adopted in 2018 and is updated annually.

Table 10-2

Water Operating Fund Projections

	2021 Budget	2022 Proposed Budget	2023 Projection	2024 Projection	2025 Projection	2026 Projection	2027 Projection	2028 Projection
Revenues								
Charges	$ 93,495	$ 120,930	$ 123,778	$ 126,694	$ 129,679	$ 132,736	$ 135,865	$ 139,068
Rates	$ 2,840,219	$ 2,883,426	$ 2,820,001	$ 2,876,401	$ 2,933,929	$ 2,992,607	$ 3,052,459	$ 3,113,509
Miscellaneous Revenues	$ 130,977	$ 932,600	$ 2,604,053	$ 158,527	$ 162,494	$ 137,356	$ 143,433	$ 127,140
Operating Revenues	**$ 3,064,691**	**$ 3,936,956**	**$ 5,547,832**	**$ 3,161,622**	**$ 3,226,102**	**$ 3,262,699**	**$ 3,331,757**	**$ 3,379,717**
SDC Revenues	**$ 547,355**	**$ 627,115**	**$ 548,254**	**$ 564,811**	**$ 581,868**	**$ 599,441**	**$ 617,544**	**$ 636,194**
Bond Proceeds	**$ -**	**$ -**	**$ -**	**$ -**	**$ 5,723,762**	**$ -**	**$ -**	**$ -**
Total Revenues	**$ 3,612,046**	**$ 4,564,071**	**$ 6,096,086**	**$ 3,726,433**	**$ 9,531,732**	**$ 3,862,140**	**$ 3,949,301**	**$ 4,015,911**
Expenditures								
Salaries & Wages	$ 397,050	$ 443,300	$ 456,599	$ 470,297	$ 484,406	$ 498,938	$ 513,906	$ 529,323
Personnel Benefits	$ 179,800	$ 191,000	$ 202,460	$ 214,608	$ 227,484	$ 241,133	$ 255,601	$ 270,937
Supplies	$ 899,170	$ 1,076,200	$ 1,121,555	$ 1,168,883	$ 1,218,273	$ 1,269,814	$ 1,323,604	$ 1,379,741
Services	$ 1,297,470	$ 1,209,792	$ 1,234,121	$ 1,264,122	$ 1,294,856	$ 1,326,285	$ 1,358,531	$ 1,391,525
Capital	$ 1,267,064	$ 1,540,000	$ 2,930,000	$ 1,216,000	$ 8,210,000	$ 175,000	$ 110,000	$ 921,400
Transfer Out - Debt Service	$ 355,060	$ 361,544	$ 368,206	$ 375,052	$ 889,727	$ 896,955	$ 904,381	$ 912,013
Total Expenditures	**$ 4,395,614**	**$ 4,821,836**	**$ 6,312,941**	**$ 4,708,962**	**$ 12,324,746**	**$ 4,408,125**	**$ 4,466,023**	**$ 5,404,939**
Change In Fund Balance	$ (783,568)	$ (257,765)	$ (216,855)	$ (982,529)	$ (2,793,014)	$ (545,985)	$ (516,722)	$ (1,389,027)
Ending Fund Balance	**$10,362,716**	**$10,104,950**	**$ 9,888,095**	**$ 8,905,566**	**$ 6,112,553**	**$ 5,566,568**	**$ 5,049,846**	**$ 3,660,819**

Table 10-3

Water Operating Fund History

	2015 Actuals	2016 Actuals	2017 Actuals	2018 Actuals	2019 Actuals	2020 Actuals
Revenues						
Charges	$ 92,015	$ 126,872	$ 144,737	$ 170,771	$ 201,584	$ 84,063
Rates	$ 2,298,143	$ 2,376,813	$ 2,583,975	$ 2,709,849	$ 2,677,567	$ 2,771,459
Miscellaneous Revenues	$ 34,399	$ 57,913	$ 73,964	$ 132,884	$ 232,872	$ 151,335
Operating Revenues	**$ 2,424,557**	**$ 2,561,598**	**$ 2,802,676**	**$ 3,013,504**	**$ 3,112,023**	**$ 3,006,857**
SDC Revenues	**$ 596,298**	**$ 567,930**	**$ 445,107**	**$ 506,195**	**$ 598,872**	**$ 573,051**
Total Revenues	**$ 3,016,435**	**$ 3,129,528**	**$ 3,247,783**	**$ 3,519,699**	**$ 3,710,895**	**$ 3,579,908**
Expenditures						
Salaries & Wages	$ 340,980	$ 363,769	$ 391,748	$ 373,774	$ 396,879	$ 404,673
Personnel Benefits	$ 140,318	$ 160,504	$ 154,863	$ 177,243	$ 189,674	$ 168,691
Supplies	$ 454,113	$ 474,569	$ 579,193	$ 523,730	$ 559,414	$ 877,609
Services	$ 858,180	$ 811,102	$ 943,644	$ 1,011,806	$ 895,577	$ 1,075,607
Capital	$ 190,628	$ 164,690	$ 476,205	$ 166,984	$ 210,471	$ 219,246
Transfer Out - Debt Service	$ -	$ 156,518	$ 211,560	$ 217,376	$ 223,354	$ 348,748
Total Expenditures	**$ 1,984,219**	**$ 2,131,152**	**$ 2,757,213**	**$ 2,470,913**	**$ 2,475,369**	**$ 3,094,574**
Change In Fund Balance	$ 1,032,216	$ 998,376	$ 490,570	$ 1,048,786	$ 1,235,526	$ 485,334
Ending Fund Balance	**$ 6,887,692**	**$ 7,886,068**	**$ 8,376,638**	**$ 9,425,424**	**$ 10,660,950**	**$ 11,146,284**

AFFORDABILITY ANALYSIS

A common affordability benchmark for utility rates is to test the monthly median income equivalent against the existing and projected monthly utility rates. If monthly bills are less than 2.0 percent of the median household income for the demographic area, they are generally

considered affordable (per Drinking Water State Revolving Fund subsidy guidelines). An affordability analysis is presented in **Table 10-4**.

Table 10-4

Affordability Analysis

	Current	With Projected Increases					
	2022	2023	2024	2025	2026	2027	2028
Median	$ 82,096	$ 84,559	$ 87,096	$ 89,709	$ 92,400	$ 95,172	$ 98,027
2% monthly	$ 136.83	$ 140.93	$ 145.16	$ 149.51	$ 154.00	$ 158.62	$ 163.38
Projected Monthly Bill	$ 28.01	$ 29.13	$ 30.29	$ 31.50	$ 32.76	$ 34.07	$ 35.44

*Assumes 8 ccf monthly

The forecast shows that the City remains well within the benchmark of affordability throughout the forecast period.

CONCLUSION

Based on the source data and assumptions used, the financial analysis indicates that the rate adjustment strategy provided herein would be sufficient to fund utility operations and the CIP developed for this Water System Plan Update, while maintaining reasonably affordable rates. The City reviews its rates annually to evaluate equity and develop conservation-enhanced rate structures for each class.

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Appendix A

Water Facilities Inventory (WFI) Form

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Washington State Department of Health
Division of Environmental Health
Office of Drinking Water

WATER FACILITIES INVENTORY (WFI) FORM

ONE FORM PER SYSTEM

Quarter: 1
Updated: 10/30/2020
Printed: 6/3/2022
WFI Printed For: On-Demand
Submission Reason: Treatment Update

RETURN TO: Central Services - WFI, PO Box 47822, Olympia, WA, 98504-7822 or email wfi@doh.wa.gov

1. SYSTEM ID NO.	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
04700 5	BATTLE GROUND WATER DEPT CITY OF	CLARK	A	Comm

6. PRIMARY CONTACT NAME & MAILING ADDRESS	7. OWNER NAME & MAILING ADDRESS
DONALD E. RISTO [PW SUPV.] 1308 SE GRACE AVE BATTLE GROUND, WA 98604	BATTLE GROUND WATER DEPT, CITY OF DONALD E. RISTO 109 SW 1ST ST STE 122 BATTLE GROUND, WA 98604 WATER SUPERVISOR
STREET ADDRESS IF DIFFERENT FROM ABOVE	**STREET ADDRESS IF DIFFERENT FROM ABOVE**
ATTN ADDRESS CITY STATE ZIP	ATTN ADDRESS CITY STATE ZIP

9. 24 HOUR PRIMARY CONTACT INFORMATION		10. OWNER CONTACT INFORMATION	
Primary Contact Daytime Phone: (360) 342-5361		Owner Daytime Phone: (360) 342-5361	
Primary Contact Mobile/Cell Phone: (360) 798-7044		Owner Mobile/Cell Phone: (360) 798-7044	
Primary Contact Evening Phone: (xxx)-xxx-xxxx		Owner Evening Phone: (xxx)-xxx-xxxx	
Fax:	E-mail: xxxxxxxxxxxxxxxxxxx	Fax: (360) 342-5069	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	[ ] Hospital/Clinic	[x] Residential
[x] Commercial / Business	[x] Industrial	[x] School
[x] Day Care	[ ] Licensed Residential Facility	[ ] Temporary Farm Worker
[x] Food Service/Food Permit	[x] Lodging	[x] Other (church, fire station, etc.):
[ ] 1,000 or more person event for 2 or more days per year	[ ] Recreational / RV Park	

13. WATER SYSTEM OWNERSHIP (mark only one)				14. STORAGE CAPACITY (gallons)
[ ] Association	[ ] County	[ ] Investor	[ ] Special District	
[x] City / Town	[ ] Federal	[ ] Private	[ ] State	3,750,000

- SEE NEXT PAGE FOR A COMPLETE LIST OF SOURCES -

WATER FACILITIES INVENTORY (WFI) FORM - Continued

1. SYSTEM ID NO.	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
04700 5	BATTLE GROUND WATER DEPT CITY OF	CLARK	A	Comm

15	16	17	18 SOURCE CATEGORY									19 USE			20	21 TREATMENT						22	23	24 SOURCE LOCATION			
Source Number	LIST UTILITY'S NAME FOR SOURCE AND WELL TAG ID NUMBER. Example: WELL #1 XYZ456 IF SOURCE IS PURCHASED OR INTERTIED, LIST SELLER'S NAME Example: SEATTLE	INTERTIE SYSTEM ID NUMBER	WELL	WELL FIELD	WELL IN A WELL FIELD	SPRING	SPRING FIELD	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 INTERVAL IN FEET	CAPACITY (GALLONS PER MINUTE)	1/4, 1/4 SECTION	SECTION NUMBER	TOWNSHIP	RANGE
S01	WELL #1 AFP601		X									X			Y		X		X			148	190	NW NE	03	03N	02E
S02	WELL #2 AFP602		X									X			Y		X		X			142	90	NW NE	03	03N	02E
S03	WELL #4 AFP603		X									X			Y		X		X			136	75	NW SE	03	03N	02E
S04	WELL #5 AFP604		X									X			Y		X		X			136	75	NW SE	03	03N	02E
S05	13333 / Clark PUD NE 122 Ave	13333 X												X	Y	X							547	SW SE	03	3NN	02E
S06	InAct 04/26/2011 04710 / BG High & L	04710 D												X	Y	X							100	SW SE	34	04N	02E
S07	13333 / Clark PUD NE Grace Ave	13333 X												X	Y	X							500	NE SW	35	4NN	02E
S08	WELL #6 ABT804		X											X	Y		X		X			400	200	SE NE	04	03N	02E
S09	WELL #7 ABB112 12"				X							X			Y		X		X		X	346	350	NW SE	04	03N	02E
S10	WELL #8 ABB118 12"				X							X			Y		X		X		X	347	400	NW SE	04	03N	02E
S11	WELL #9 AKW137 12"				X							X			Y		X		X			320	500	NW SE	04	3N	02E
S12	WF (S09, S10, S11)			X								X			Y	X						320	1250	NW SE	04	03N	02E
S13	13333 / Clark PUD NE 219th St	13333 X										X			N				X				1000	NE NE	05	3NN	02E

WATER FACILITIES INVENTORY (WFI) FORM - Continued

1. SYSTEM ID NO.	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
04700 5	BATTLE GROUND WATER DEPT CITY OF	CLARK	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?)		6338	Unspecified
A. Full Time Single Family Residences (Occupied 180 days or more per year)	5403		
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	88		
B. Full Time Residential Units in the Apartments, Condos, Duplexes, Dorms that are occupied more than 180 days/year	935		
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)	1	1	
B. Institutional, Commercial/Business, School, Day Care, Industrial Services, etc.	402	402	
28. TOTAL SERVICE CONNECTIONS		6741	

29. FULL-TIME RESIDENTIAL POPULATION

A. How many residents are served by this system 180 or more days per year? 20890

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?	30750	30750	30750	30750	30750	3750	3750	3750	30750	30750	30750	30750
B. How many days per month is water accessible to the public?	30	30	30	30	30	30	30	30	30	30	30	30

32. REGULAR NON-RESIDENTIAL USERS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
A. If you have schools, daycares, or businesses connected to your water system, how many students, daycare children and/or employees are present each month that are NOT already included in the residential population?	6349	6349	6349	6349	6349	301	301	301	6949	6349	6349	6349
B. How many days per month are they present?	30	30	30	30	30	30	30	30	30	30	30	30

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

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

35. Reason for Submitting WFI:

☐ Update - Change ☐ Update - No Change ☐ Inactivate ☐ Re-Activate ☐ Name Change ☐ New System ☐ Other _____

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

SIGNATURE: _____ **DATE:** _____

PRINT NAME: _____ **TITLE:** _____

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WS ID	WS Name
04700	BATTLE GROUND WATER DEPT CITY OF

Total WFI Printed: 1

Washington State Department of Health
Division of Environmental Health
Office of Drinking Water

Water Facilities Inventory (WFI)

Report Create Date:	6/3/2022		
Water System Id(s):	047005		
Print Data on Distribution Page:	ALL		
Print Copies For:	DOH Copy		
Water System Name:	ALL		
County:	-- Any --		
Region:	ALL		
Group:	ALL		
Type:	ALL		
Permit Renewal Quarter:	ALL		
Water System Is New:	ALL		
Water System Status:	ALL		
Water Status Date From:	ALL	**To**	ALL
Water System Update Date	ALL	**To**	ALL
Owner Number:	ALL		
SMA Number:	ALL		
SMA Name:	ALL		
Active Connection Count From:	ALL	**To:**	ALL
Approved Connection Count	ALL	**To:**	ALL
Full-Time Population From:	ALL	**To:**	ALL
Water System Expanding	ALL		
Source Type:	ALL		
Source Use:	ALL		
WFI Printed For:	On-Demand		

Appendix B

Retail Water Service Area Agreement

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RESOLUTION no. 11-12

A RESOLUTION ADOPTING THE 2011 CLARK COUNTY COORDINATED WATER SYSTEM PLAN; AUTHORIZING AN INTERLOCAL AGREEMENT FOR ADJUSTING OR CONFIRMING WATER SERVICE AREA BOUNDARIES; AND AUTHORIZING AN INTERLOCAL AGREEMENT PERTAINING TO EXTRATERRITORIAL FIRE HYDRANT SERVICES

WHEREAS, the cities of Battle Ground, Camas, La Center, Ridgefield, Vancouver and Washougal, the Town of Yacolt, Public Utility District No. 1 of Clark County, and Clark County (collectively the "Water Utility Coordinating Committee (WUCC)") manage aspects of land use, public health, or their respective water systems pursuant to an existing Coordinated Water System Plan and established water service boundaries,and

WHEREAS, the members of the WUCC have varying roles respectively in developing, reviewing, approving or complying with capita! facilities and land use planning under the Growth Management Act, as adopted by the State of Washington and subsequently amended, and

WHEREAS, the Public Water System Coordination Act (under Chapter 70.116 RCW) and WAC 246-293-250 require the development of a Coordinated Water System Plan, including the establishment of future water service boundaries, and

WHEREAS, members of the WUCC have determined that is necessary to revise their existing Coordinated Water System Plan and water service boundaries, and

WHEREAS, in conjunction with their planned revision of the Coordinated Water System Plan and water service boundaries, but under separate agreement, the members of the WUCC also intend to establish their respective responsibilities regarding extraterritorial fire hydrant services.

now, THEREFORE, BE IT RESOLVED by the City Council of the City of Battle Ground, State of Washington, that:

1. The 2011 revised version of the Coordinated Water System Plan is hereby adopted by the City of Battle Ground, and

2. The attached Interlock Agreement for Adjusting or Confirming Future Water Service Area Boundaries is hereby approved; and

3. The attached Fire Hydrant Interlock Agreement is hereby approved.

ADOPTED IN OPEN MEETING THIS H*ln DAY OF OCTOBER, 2011

Michael J. Paulo, Mayor

Attelled By:

Claire Lide Cit Cl@l:in,/

Appro ed as to form_

_in 1/

Brian H. Wolfe, City Att mey

County Auditor, each copy shall constitute an agreement binding upon at Water Purveyors.

This agreement shall become effective once it is approved by the Clark County Board of Commissioners, as specified in WAC 246-293-250 Future *Water Service Area Agreements.*

This Interlock Agreement for Adjusting or Confirming Future Water Service Area Boundaries is hereby approved:

_____ Date _____
John M. Williams, City Manager
City of Battle Ground

_____ Date _____
Mayor Scott Higgins
City of Camas

_____ Date _____
Wayne Nelson, General Manager
Clark Public Utilities

_____ Date _____
Justin Clary, City Manager
City of Ridgefield

_____ Date _____
Eric Holmes, City Manager
City of Vancouver

_____ Date _____
Mayor Sean Guard
City of Washougal

APPROVED BY THE CLARK COUNTY BOARD OF COMMISSIONERS

_____ Attest: _____
Commissioner Tom Mielke, Chair
Clark County Board of Commissioners

Rebecca Tilton
Clerk to the Board

Addendum B

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Appendix C

Water Service Agreements

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ADM 6-6
BG Interlocal

Short-Term Agreement for Wholesale Supply, for Calendar Year 2005

Regional Water Supply Agreement for Implementing Water System Interties Under Clark County Coordinated Water System Plan

The authority for this agreement is granted by the Public Water System Coordination Act of 1977, Chapter 70.116 RCW.

WHEREAS, Such an agreement promotes efficient water resource management within the Salmon Creek Basin by utilizing existing water rights permits; and,

WHEREAS, such an agreement is consistent with the Clark County Coordinated Water System Plan (CWSP) to meet regional supply needs; and,

WHEREAS, Water service areas for each party and responsibilities for water supply service are designated in the CWSP to help assure that time, effort, and money are best used by avoiding unnecessary duplication of service to properly manage the area's valuable resources; and,

WHEREAS, Water system interties are mutually beneficial as part of a cooperative effort to provide safe and adequate water supply to North Clark County; and,

WHEREAS, the following administrative procedures and management system will enable all of the water purveyors to participate in a regional program;

NOW THEREFORE, Clark Public Utilities and the City of Battle Ground having entered into this Agreement by their signature, concur with the following:

GENERAL TERMS AND OBJECTIVES

1. Clark Public Utilities and the City of Battle Ground are committed to providing potable water on a cost-of-service basis for those areas located within their respective service areas. Clark Public Utilities and the City of Battle Ground are therefore committed to water service policies consistent with recommendations of the CWSP and their Water System Plans.

2. A new intertie will be constructed by the Receiving Party (the City of Battle Ground) and water supply improvements will be implemented by the Supplying Party (Clark Public Utilities) to allow water supply, estimated at 500 gpm or more to be supplied through the intertie.

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3. The intertie between Clark Public Utilities and the City of Battle Ground will be implemented under the same terms and conditions as existing intertie except for appropriate unit cost adjustments that reflect actual cost of service.

4. The existing intertie between the Parties will be closed upon completion of a new intertie. The motor-operated valve from the existing intertie will be relocated to the new intertie location, and SCADA will be installed to allow both parties to monitor the flow through the intertie.

CONDITIONS OF SERVICE

1. Interties must be metered and water utilized subject to conservation objectives and programs outlined in the CWSP and each Utility's Water System Plan. Initially a meter will be installed capable of measuring 500 gallons per minute (gpm) at the intertie service conditions.

2. Extension of service, as well as resale to other water purveyors, must be consistent with the approved CWSP and this agreement.

3. No service will be permitted that will result in a degradation of water quality. The Supplying Party (Clark Public Utilities) will be responsible for monitoring water quality at the Intertie. The Receiving Party (City of Battle Ground) will be responsible for monitoring distribution system water quality, adding fluoride (if needed) and maintaining a backflow prevention program.

4. The Intertie Constructing Party (City of Battle Ground) will be responsible for maintaining the main extension, Intertie, and metering equipment. Construction and maintenance costs will not be included in the rates charged to the Receiving Party (City of Battle Ground).

5. Requests for water will be at the direction of the Receiving Party (City of Battle Ground).

6. Operation of the Intertie for will be at the direction of the Supplying Party (Clark Public Utilities). The Supplying Party will supply water whenever water is avialable, and a request is made by the receiving party.

WATER RIGHTS

With the Department of Ecology's approval, the Receiving Party (City of Battle Ground) will transfer approximately 1,000 AF of annual, excess water rights to the Supplying Party (Clark Public Utilities) to ensure that the Supplying Party's annual quantity is not exceed by providing water supply through the Intertie. The following water rights will be transferred:

Well No.	Location	Source Aquifer***	Control No.	Status	Priority Date	Transferring Instantaneous Quantity (Qi) gpm	Remaining Instantaneous Quantity (Qi) gpm	Transferring Primary Annual Quantity (Qa) af/yr	Remaining Primary Annual Quanity (Qa) af/yr	Current Well Capacity gpm	2004 Water Use af/yr
Well 3*	3N/2 E-3B	UT	2284	Certificate	10/18/ 1954	375	0		0	0	0.0
Wells 7, 8 & 9**	3N/2 E-4K	SGA	G2-29477	Permit	8/13/ 1986	625	1,375	1000 (943 remaining	943	1,200	726.8
Totals						1,000	1,375	1,000	943	1,200	726.8

Notes:

* Well 3 has been decommissioned as per the provisions of G2-29208.

** Capacity of Wells 7 and 8 have been diminished due to clogging by iron bacteria.

*** Source aquifers include Upper Troutdale aquifer (UT) and Sand and Gravel aquifer (SGA)

A yearly water resources use estimate will be prepared by both parties and shared among them. The water resource use estimate will include:

1 Water demand forecast, average use,
2 Water demand forecast, peak day use,
3 Water rights permits and certificates, instantaneous capacity,
4 Water rights permits and certificates, annual capacity,
5 Installed pumping capacities.

If this agreement is terminated by either party, for any reason, the Supplying Party (Clark Public Utilities) agrees to Transfer the following water rights to the Receiving Party, unless otherwise agreed to by both parties.

Well No.	Location	Source Aquifer***	Control No.	Status	Priority Date	Transferring Instantaneous Quantity (Qi) gpm	Remaining Instantaneous Quantity (Qi) gpm	Transferring Primary Annual Quantity (Qa) af/yr	Remaining Primary Annual Quanity (Qa) af/yr	Current Well Capacity gpm	2004 Water Use af/yr
Well 3*	3N/2 E-3B	UT	2284	Certificate	10/18/ 1954	375	0		0	0	0.0
Wells 7, 8 & 9**	3N/2 E-4K	SGA	G2-29477	Permit	8/13/ 1986	625	1,375	1000 (943 remaining	943	1,200	726.8
Totals						1,000	1,375	1,000	943	1,200	726.8

Notes:

* Well 3 has been decommissioned as per the provisions of G2-29208.

** Capacity of Wells 7 and 8 have been diminished due to clogging by iron bacteria.

*** Source aquifers include Upper Troutdale aquifer (UT) and Sand and Gravel aquifer (SGA)

By transferring water rights to the Supplying Party, the Receiving Party does not forfeit its rights to future financial consideration for this permanent transfer of its excess water rights, under a future agreement.

By receiving these water rights for this agreement, the Supplying Party agrees to waive the system development charge for the new intertie to be constructed by the Receiving Party.

By waiving the system development charge for the intertie for this agreement, the Supplying Party does not forfeit its right to charge a system development charge, or capital contributions under a future agreement.

COST OF WATER SUPPLY

1. Rates charged for water service will be cost-of-service based. Rates will remain in effect until a new cost-of-service study has been completed and adopted by Clark Public Utilities Commissioners. Rates will be set by resolution of the Supplying Party and will go into effect in accordance with the enacting document The Receiving Party will be notified when an update of the Cost of Service Analysis is being initiated by the Supplying Party and prior to public review of the proposed rates.

2. Rates for Service will include the monthly customer service charge , and monthly rate volume charge identified in the Public Authority service class of the current cost-of-service study.

3. In the event the intertie meter is upsized, the Receiving Party will be responsible for the differential cost between sizes. Upsizing of intertie meters will be required when the meters exceed their rated capacity more than 50% of the time they register flow.

SUPPLY AND SERVICE TYPE

The type of service and amount of flow available for this agreement is summarized in the table below.

Service Summary for Clark Public Utilities – City of Battle Ground Short-Term Intertie Agreement	
Type of Service	**Amount**
The amount of flow available during peak hours is:	As available, limited by intertie design.
The amount of flow available during off-peak hours is:	As available, limited by intertie design.
The amount of non-guaranteed service flow is:	As available, limited by intertie design.
The Initial cost of service Rate for service is:	$1.25*
The capital contribution for guaranteed service is	Not applicable in this agreement.

* - current volume rate for Clark Public Utilities, 2005

Either Party may terminate this agreement by delivering a signed letter (Termination Letter) to the other Party stating the intent to terminate the agreement. The agreement will terminate not less than 120 days after receipt of the signed Termination Letter is received.

The undersigned Parties agree to all of the terms and conditions contained in this agreement.

Supplying Agency
Clark Public Utilities

By: Douglas Eginink

Title: Director of Water Services

Date: 5-2-05

Receiving Agency
City of Battle Ground

By:

Title: CITY MGR

Date: 4-26-05

EXPIRES 2029

Water Supply Agreement between
Clark Public Utilities and the City of Battle Ground
for Calendar Years 2009 - 2029

THIS AGREEMENT is made and entered into this 4th day of August, 2009, by and between Clark Public Utilities ("Clark") and the City of Battle Ground (the "City").

WHEREAS, the authority for this Agreement is granted by the Public Water System Coordination Act of 1977, Chapter 70.116 RCW.

WHEREAS, such an agreement promotes efficient water resource management within the Salmon Creek Basin by utilizing existing water rights permits; and

WHEREAS, such an agreement is consistent with the Clark County Coordinated Water System Plan (CWSP) to meet regional supply needs; and

WHEREAS, water service areas for each party and responsibilities for water supply service are designated in the CWSP to help assure that time, effort, and money are best used by avoiding unnecessary duplication of infrastructure to properly manage the areas' valuable resources; and

WHEREAS, water system interties are mutually beneficial as part of a cooperative effort to better manage groundwater resources and to provide safe and adequate water supply to North Clark County; and

WHEREAS, Clark currently anticipates that it has the ability to provide excess water from its system to the City to help the City meet its water supply needs for next twenty years; and

WHEREAS, the City has requested water service from Clark and Clark has agreed to provide such water service subject to the terms of this Agreement.

NOW THEREFORE, the City, having entered into this Agreement by its signature, concurs with the following:

GENERAL TERMS AND OBJECTIVES

1. This Agreement shall supersede and replace the Short-Term Water Supply Agreement signed by the parties on May 2, 2005.

2. The City shall construct and maintain ownership, at its expense, a new intertie along NE 219th Street (SR 502) east of NE 92nd Avenue. Clark shall perform water supply improvements west of the current water service boundary (NE 92nd Avenue) to allow an initial water supply of 1,000 gpm. As additional water supply is developed by Clark, and future pumps are added to the system at the intertie by the City, such volume is expected to allow a maximum of 3,000 gpm to be supplied through the new intertie. The new intertie

between Clark and the City will be operated by Clark using Clark's Supervisory Control and Data Acquisition (SCADA) system to maintain mutually agreed upon set points for the City's reservoirs. During times of emergencies or high demand Clark and the City will communicate their water needs and will manage the system to provide a minimum level of service for both purveyors. If the parties observe that demand for water exceeds the available supply and there is clear evidence that, unless limitations are imposed, water use at normal levels will lead to a rapid depletion of water source reserves, such as drought situations or when significant facility failures occur, the City agrees to impose conservation and emergency measures concurrently with Clark. The existing intertie (Maple Grove, Flow 9) between the parties will remain as an emergency backup upon completion of the new intertie and until the City no longer needs this point of connection.

3. Clark and the City will continue to serve, within their respective water service boundaries, as designated through the CWSP and as shown on the Clark County GIS mapping system. Subject to approval by both parties, minor service modifications are allowed to ensure efficient service delivery.

4. SCADA will be installed in the new booster building (intertie) to allow both parties to monitor the status of the facility in real time. Clark will oversee control of the intertie regarding ON/OFF settings and flow needs based on requests from the City and the capacity status of Clark's water system. The City will grant access for installation of intertie appurtenances in the intertie building.

CONDITIONS OF SERVICE

Interties will be metered and the water utilized is subject to conservation objectives and programs outlined in the CWSP and each party's Water System Plan. Initially, a meter will be installed capable of measuring 1,000 gallons per minute (gpm) at the intertie service location.

No service will be permitted that will result in a degradation of Clark's water quality. Clark will be responsible for monitoring water quality to the intertie and maintaining the metering equipment. The City will be responsible for monitoring its distribution system water quality and adding fluoride at the intertie location (if needed).

The City will be responsible for maintaining the main extension within the city limits, the intertie, and its metering equipment.

Either party may terminate this Agreement with six (6) months prior notice to the other party of its election to terminate the Agreement, subject to approval by the Department of Health.

WATER RIGHTS

The City previously transferred excess water rights of 1,000 AF of annual and 1,000 gpm instantaneous flow to Clark in 2005. This was to facilitate Clark's installation of a water supply well capable of meeting the City's first stage demand and to ensure that Clark's annual quantity limit was not exceeded by supplying water through the intertie.

A yearly water resources use estimate will be prepared by both parties and shared among them. The water resources use estimate will include:

1. Water demand forecast, average use
2. Water demand forecast, peak day use
3. Water rights permits and certificates, instantaneous capacity
4. Water rights permits and certificates, annual capacity
5. Installed pumping capacities

COST OF WATER SUPPLY

1. Clark will charge its prevailing rate for water service (Public Authority Service class). Rates are subject to periodic updates reflecting Clark's cost-of-service.

2. Rates, fees, and system development charges for service will be applied in accordance with the Public Authority Service class of Clark's rate schedules for water service.

3. The intertie water meter shall be upsized at the City's expense when the flow requested by the City exceeds the accuracy limits established by the manufacturer of the meter installed. An additional system development charge shall be paid by the City to Clark for the added capacity.

CURRENT CHARGES

The current system development charge for a 6-inch meter that can measure the 1,000 gpm flow is $211,970.

The monthly charge is the sum of the basic charge per meter and the volume charge for water used.

MONTHLY VOLUME CHARGE
$1.60 per 100 cubic feet (ccf) – Block 1
$2.08 per 100 cubic feet (ccf) – Block 2
$2.56 per 100 cubic feet (ccf) – Block 3
These rates will be applied on a daily basis using a 30-day average.

MONTHLY BASIC CHARGE AND VOLUME PER BLOCK

Schedule (Suffix)	Meter	Basic Charge (Monthly)	Block 1 (Cubic Feet)	Block 2 (Cubic Feet)	Block 3 (Cubic Feet)
59 (G Meter)	6-inch	$509.15	0 – 165,600	165,601 – 331,200	Over 331,200

The City will construct and maintain ownership of an intertie at its expense, which will be comprised of a booster station and pipe gallery, prior to the booster station that will be used to meter flows. Initial construction will allow 500 to 1,000 gpm flow through the booster station. As the water demand increases and water supply facilities are developed, additional pumps can be added by the City to give a maximum flow of 3,000 gpm over a 20-year time frame.

To assist Clark in the development of future supplies, the City will support Clark's efforts in acquiring water right applications, grants, and loans.

The undersigned parties agree to all of the terms and conditions contained in this Agreement.

Clark Public Utilities

By: _____
Title: CEO / General Manager
Date: 8-4-09

City of Battle Ground

By: _____
Title: DENNIS OSBORN, CITY MANAGER
Date: July 21 09

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Water Supply and Aid to Construction Agreement between Clark Public Utilities and the City of Battle Ground for Calendar Years 2021 - 2040

THIS AGREEMENT is made and entered into this day 2nd day of March, 2021 by and between Clark Public Utilities ("Clark") and the City of Battle Ground (the "City"), collectively the "Parties."

WHEREAS, the authority for this Agreement is granted by the Public Water System Coordination Act of 1977, Chapter 70.116 RCW; and

WHEREAS, such an agreement promotes efficient water resource management within Salmon Creek and Lewis River Basins by utilizing existing water rights permits; and

WHEREAS, such an agreement is consistent with the Clark County Coordinated Water System Plan ("CWSP") to meet regional supply needs; and

WHEREAS, water service areas for each party and responsibilities for water supply service are designated in the CWSP to help assure that time, effort, and money are best used by avoiding unnecessary duplication of infrastructure to properly manage the areas' valuable resources; and

WHEREAS, water system interties are mutually beneficial as part of a cooperative effort to better manage groundwater resources, protect in-stream flows and to provide safe and adequate water supply to North Clark County; and

WHEREAS, during certain times of the year, Clark provides the City with a significant portion of its water supply that is needed to serve the City's residents; and

WHEREAS, Clark currently provides water service to the City through an intertie; and

WHEREAS, based on certain additional improvements to its water system, as requested by the City, Clark anticipates that it will have the ability to provide excess water from its system to the City to help the City meet its water supply needs for the next twenty (20) years; and

WHEREAS, the City of Ridgefield has entered a separate agreement with Clark to receive additional water from Clark's system; and

WHEREAS, the system improvements requested by the City and separately by the City of Ridgefield would not have been performed by Clark at this time, but for this Agreement;

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and

WHEREAS, the City has agreed to share the cost of the improvements to Clark's system with the City of Ridgefield as provided herein; and

WHEREAS, except for the shared costs of the improvements to Clark's system, the agreement between the City of Ridgefield and Clark has no impact on the terms and conditions of this Agreement and the water supply to be provided by Clark to the City as contemplated herein; and

WHEREAS, the City is relying on the water provided under this Agreement to meet its requirements under its water system plan; and

WHEREAS, the Parties recognize that Clark has a legal duty to service its customers equally.

NOW, THEREFORE, the Parties, having entered into this Agreement by their signature, agree with the following:

I. GENERAL TERMS AND OBJECTIVES

1. This Agreement shall replace the Short-Term Water Supply Agreement executed by Parties on May 2, 2005, and amended on August 4, 2009, and the Water Supply and Aid to Construction Agreement executed July 7, 2020.

2. Clark owns and maintains the intertie along NE 219th Street (SR 502) east of NE 92nd Avenue (the "Intertie"). The City owns and maintains a booster pump station (the "Booster Station") near the Intertie that houses a static water meter (the "Meter") that measures the volume of water Clark provides the City through the Intertie.

3. Clark is currently supplying up to 1,000 gallons of water per minute (gpm) to the City through the Intertie, which volume is measured by the City's Meter. As additional water supply becomes available through Clark's development of the new Paradise Point Regional Water Supply System ("PPWSS"), which includes the Paradise Point Wellfield and Paradise Treatment Plant, Clark will be able to provide the City with an additional 1,000 gpm (for a total of maximum of 2,000 gpm) except in such circumstances when Clark may be unable to provide up to the full 1,000 gpm as outlined in Section 6 herein. In order to enable Clark to provide this additional water supply, the City has agreed to pay Clark an aid to construction charge for work associated with certain improvement to the PPWSS, as outlined herein.

   The City will pay Clark an amount equal to one-half (50%) of the total costs associated with installing an additional production well (plus associated equipment) at the Paradise Point Wellfield, designated as Well #4. In addition, the City will also pay Clark for one-half (50%) of the cost one (1) filter bank at the Paradise

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Treatment Plant. The other one-half (50%) of the total costs associated with these improvements shall be paid for by the City of Ridgefield. Clark will design, construct, own, and operate these additional facilities in the PPWSS.

The total costs of Well #4 (plus associated equipment) and the one (1) filter bank is $1,184,128. The City shall be responsible for one-half (50%) of the total cost for a total payment owed of $592,064. Construction of these facilities is complete, and the City will pay Clark its share of the actual material and construction costs ($592,064.00), which will be invoiced by Clark and payable by June 30, 2021.

When the City later contributes to the construction of a new water transmission line, described in Section I (5), upon terms to be agreed upon separately in a new agreement between the Parties, Clark will make an additional 2,000 gpm available to the City, except in such circumstances where Clark may be unable to provide up to the full 2,000 gpm as outlined in Section 6 herein, for cumulative total water supply that will not exceed 4,000 gpm unless otherwise mutually agreed between the Parties.

4. The Intertie will need to be upgraded by the City before it will be able to use the additional 1,000 gpm described in Section I (3). This work includes, but is not limited to, installing additional pumps at the City's Booster Station and associated control systems. This work will be performed by the City, at its expense, and the City will own and operate these new facilities.

5. At some point in the future, the Parties intend to construct a new large diameter waterline between the City's Intertie and the Paradise Point Water Treatment Plant, which will be known as the "Pioneer to Cherry Grove Transmission Line." Once this line is completed it will have a capacity of up to 4,000 gpm. The design and construction costs of this new line shall be shared equally between Clark and the City. The Parties will work together to develop the planning and construction schedule for the Pioneer to Cherry Grove Transmission Line, which work is expected to start no later than January 1, 2030.

6. Clark acknowledges that during certain times of the year, the City will depend on this additional water capacity to serve its residents. Clark agrees that it will use its best efforts to meet the City's water supply needs, as outlined in this Agreement, and provide uninterrupted service. But the Parties recognize that Clark must treat all of its water customers equally and that it cannot guarantee that it will be able to meet any specific customer's water demand when Clark experiences water shortages as a result of drought, equipment failure, or other causes outside of Clark's control.

7. Once Clark completes construction of its facilities, it shall maintain them at its expense.

8. Clark will continue to operate the Intertie using its Supervisory Control and Data Acquisition (SCADA) system. Clark will also maintain water levels in the City's

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reservoirs at agreed set points. If curtailment becomes necessary due to an emergency or limited water supply, Clark and the City will coordinate to minimize the impact to the City's customers. During such event, Clark will provide the City with as much advanced notice as possible.

9. Clark and the City will continue to provide service within their respective water service boundaries, as designated through the CWSP and as shown on the Clark County GIS mapping system.

10. The City and Clark shall periodically review the City's population and demand projections to insure that the planning documents are up to date.

II. CONDITIONS OF SERVICE

1. All interties with the City will be metered.

2. Clark will be responsible for monitoring water quality serving the Intertie. The City will be responsible for monitoring its distribution system's water quality and adding fluoride (if needed). Water quality testing at the Intertie will be coordinated by the Parties.

3. The City will be responsible for maintaining the Booster Station, the Meter, and the main extension within the City.

III. WATER RIGHTS

The City previously transferred excess water rights of 1,000 AF of annual and 1,000 gpm instantaneous flow to Clark in 2005. This was to facilitate Clark's installation of a water supply well capable of meeting the City's first stage demand and to ensure that Clark's annual quantity limit was not exceeded by supplying the City water through the Intertie.

IV. COST OF WATER SUPPLY

1. Clark will charge the City its prevailing rate for water service (Public Authority Service rate class), which rate is subject to change by Clark's Board of Commissioners. Attached as Exhibit "A" is Clark's current water rates. Clark agrees to meet with the City and review any information provided by the City to reevaluate the City's appropriate water rate class.

2. Other rates, fees, and System Development Charges (SDC) for services under this Agreement will also be applied in accordance with the Public Authority Service rate class.

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3. The capacity of the water meter at the Intertie will be increased as needed to meet the City's water demand. If the meter capacity is adjusted, the City will be responsible for the applicable SDC.

4. Payments made by the City for one-half (50%) of the construction of Well #4, its associated facilities, and the one (1) filter bank at the Paradise Point Treatment Plant, the total amount of which is $592,064, will be treated as payments in lieu of the City's future SDCs for increased meter capacity on the Intertie, up to the amount paid by the City under this Agreement. The opportunity to use these in lieu payments for SDCs on the Intertie will expire on December 31, 2030.

V. SYSTEM DEVELOPMENT CHARGES

Presently, the City uses the equivalent of a six-inch (6") meter for its water service through the Intertie, which has a current SDC of $271,030. Once Well # 4 is operational and the City increases its use to more than 1,000 gpm, the City will be responsible for a SDC for the equivalent of an eight-inch (8") meter that can measure up to 2,400 gpm. Once this occurs, the value of the City's current six-inch (6") SDC will be credited to the then applicable eight-inch (8") SDC and the available in lieu payment described under Section IV (4) will also be applied.

VI. COOPERATION FOR FUTURE WATER RIGHTS

To assist Clark in the development of future water supply sources, the City will support Clark's efforts to acquire additional water rights and its pursuit of any water system development grants or loans.

VII. ASSIGNMENT/SUBCONTRACTING

No party to this Agreement shall transfer or assign, in whole or in part, its respective rights or obligations under this Agreement without the prior written consent of the other parties. Consent for assignment or transfer shall not be unreasonably withheld.

VIII. INDEPENDENT CAPACITY

Employees or agents of a Party engaged in the performance of projects under this Agreement shall continue to be employees or agents of that Party and shall not be considered employees or agents of any other Party to this Agreement.

IX. ALTERATIONS AND AMENDMENTS

This Agreement may only be amended by written agreement between the Parties that is signed by personnel authorized to bind each Party.

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X. DISPUTES

The principal executive or their designee of each Party shall attempt to resolve all disputes regarding the terms of this Agreement in good faith. In the event the dispute is not resolved by the Parties, the matter will be referred to the Superior Court of the State of Washington in and for Clark County.

Parties shall bear their own legal fees, costs, and expenses related to enforcing rights and responsibilities of this Agreement.

XI. RECORDS MAINTENANCE

The Parties shall retain project records that sufficiently and properly reflect all direct and indirect costs incurred for the performance of services in this Agreement. Records shall be subject to inspection, review, or audit by each Party and the Office of the Washington State Auditor. All records shall be retained in accordance with the State of Washington records retention schedule.

XII. GOVERNANCE

This Agreement is entered into under the authority granted by the State of Washington and provisions of the Agreement shall be construed to conform to Washington State laws.

XIII. WAIVER AND SEVERABILITY

Failure by any Party to this Agreement to exercise rights under this Agreement shall not preclude that Party from subsequent exercise of those rights and shall not constitute a waiver of those rights or any other right under this Agreement. Waiver of any rights under this Agreement requires a written statement signed by an authorized representative of the Party waiving such rights.

If any provision of this Agreement or provision of a document incorporated by reference to this Agreement is found invalid, the invalidity shall not affect other provisions of this Agreement if the other provisions can be given effect without the invalid provision. The provisions of this Agreement are declared severable. In the event that certain language or a section of this Agreement is invalidated, the Parties will negotiate alternative terms to effectuate the Parties' intent. If the Parties are unable to reach agreement on alternative terms within 30 days of the invalidity determination, this Agreement will terminate.

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XIV. ENTIRE AGREEMENT

This Agreement contains all the terms and conditions agreed upon by the parties on the subject of this Agreement. No other understandings, oral or otherwise, exist or bind the Parties.

XV. INDIRECT OR THIRD-PARTY BENEFICIARIES

The Parties do not intend, by this Agreement, to assume contractual obligations to any other party than the Parties named in this Agreement. There are no indirect or third-party beneficiaries to this Agreement.

XVI. NOTICES

Any notices given under this Agreement shall be delivered and addressed to:

Clark Public Utilities
Attn: Director of Water
PO Box 8900
Vancouver, WA 98668

City of Battle Ground
Attn: City Manager
109 SW 1st Street, Suite 221
Battle Ground, WA 98604

The undersigned Parties agree to all of the terms and conditions contained in this Agreement.

IN WITNESS WHEREOF, the Parties execute this Agreement by their duly authorized officers as of the 2nd day of March, 2021.

CLARK PUBLIC UTILITIES

DocuSigned by:
BY: Lena Kittler
B954A3862E8849F...

TITLE: CEO/General Manager

CITY OF BATTLE GROUND

DocuSigned by:
BY: Erin Erdman
8212D866B3BB448...

TITLE: City Manager

Approved as to form:

DocuSigned by:
John Eldridge
7F643C7B4B14441...

John Eldridge/General Counsel

Approved as to form:

DocuSigned by:
Christine Hayes
[illegible]

Christine Hayes/City Attorney

DocuSign Envelope ID: 3F69B358-1BB6-446F-AF8E-1C1C2D4217FC

Exhibit A

CLARK'S CURRENT WATER RATES

Rate Class (per Resolution No, 6974)

PUBLIC AUTHORITIES SERVICE
REVENUE CLASS 0

APPLICABILITY

This revenue class applies to schools, municipalities, political subdivisions, or agencies of county, state, or federal governments.

MONTHLY CHARGE

The sum of the basic charge per meter and the volume charge for water used.

MONTHLY VOLUME CHARGE

$1.85 per 100 cubic feet (ccf) – Block 1
$2.40 per 100 cubic feet (ccf) – Block 2
$2.95 per 100 cubic feet (ccf) – Block 3

These rates will be applied on a daily basis using a 30-day average.

MONTHLY BASIC CHARGE AND VOLUME PER BLOCK

Schedule (Suffix)	Meter	Basic Charge	Block 1 (Cubic Feet)	Block 2 (Cubic Feet)	Block 3 (Cubic Feet)
53 (A or A/B Meter)	5/8" x ¾"	$9.00	0 - 1,800	1,801 - 3,600	Over 3,600
54 (B Meter)	1"	$16.10	0 - 4,500	4,501 - 9,000	Over 9,000
55 (C Meter)	1 ½"	$36.00	0 - 9,000	9,001 - 18,000	Over 18,000
56 (D Meter)	2"	$64.15	0 - 18,000	18,001 - 36,000	Over 36,000
57 (E Meter)	3"	$144.00	0 - 41,400	41,401 - 82,800	Over 82,800
58 (F Meter)	4"	$256.05	0 - 73,800	73,801 - 147,600	Over 147,600
59 (G Meter)	6"	$572.80	0 - 165,600	165,601 - 331,200	Over 331,200
60 (H Meter)	8"	$1018.15	0 - 295,200	295,201 - 590,400	Over 590,400

TERMS OF SERVICE

Service under this rate is subject to the District's general terms and conditions for water service. The District reserves the right to regulate at all times the hours when customers will be permitted to use District water for any nonessential household purposes.

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SERVICE INSTALLATION FEES (per Resolution No. 7196)

Service Size	**Fee**
Up to 1"	$2,200
1 ½" and larger	Time and Materials

Customers requesting services larger than one inch will be billed for time and material costs for the installation of the service.

Meter Set Only
(Lots in subdivisions that currently have boxes)

Size	Current Charge	(Breakdown)
5/8 x ¾	$3,255	$355 meter + $2,900 SD
¾"	$4,540	$370 meter + $4,170 SD
1"	$7,890	$460 meter + $7,430 SD
1 ½"	$17,380	$670 meter + $16,710 SD
2" Meter	$30,820	$1,130 meter + $29,690 SD
3" Meter	$68,290	$1,480 meter + $66,810 SD
4" Meter	$121,110	$2,320 meter + $118,790 SD
6" Meter	$271,030	$3,760 meter + $267,270 SD

Meter Set and Service
(Land without meter box but water main in the street)

Size	**Total Charge**
5/8 x ¾ Meter	$5,455 total cost
¾" Meter	$6,740 total cost
1" Meter	$10,090 total cost
1 ½" Meter	$19,580*
2" Meter	$33,020*
3" Meter	$70,490*
4" Meter	$123,310*
6" Meter	$273,230*

*Meter sizes greater than 1 ½" are subject to an additional time & material charge.

Mark Herceg

From: Russell Knutson <rknutson@clarkpud.com>
Sent: Monday, October 24, 2022 9:29 AM
To: Mark Herceg
Subject: [External] -RE: [External] - CPU Water Agreement

No problem Mark. We fully intend to renew the intertie agreement.

Russ Knutson, PE

From: Mark Herceg [mailto:mark.herceg@cityofbg.org]
Sent: Monday, October 24, 2022 9:24 AM
To: Russ Knutson <rknutson@clarkpud.com>
Subject: [External] - CPU Water Agreement

Russ

We have been working on updating our WSP. DOH has reviewed and we are just finalizing our changes. One of their comments is that because Plan approval is for 10-years and our Agreement with you for the Intertie would expire before that 10-years they want something from CPU that states that you intend to work with us to renew the Agreement when it expires, otherwise they are only going to approve the plan until 2029. If you can respond to this e-mail and state that would be CPU's intent then I will submit this to DOH as part of our Plan. Thanks and let me know if you have any questions.

Mark

Mark Herceg, PE
Public Works Director
City of Battle Ground
Public Works
P: (360) 342-5075
F: (360) 342-5057
E-Mail: mark.herceg@cityofbg.org

Visit our Website
Follow us on Facebook

NOTICE OF PUBLIC DISCLOSURE: This e-mail account is public domain. Any correspondence from or to this e-mail account may be a public record. Accordingly, this e-mail, in whole or in part, may be subject to disclosure pursuant to RCW 42.56, regardless of any claim of confidentiality or privilege asserted by an external party.

CAUTION: This email originated from outside the City of Battle Ground. **Do not click on links or open attachments** unless you recognize the sender and know the content is safe.

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Appendix D

Consistency Statement Checklists

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Washington State Department of Health
Division of Environmental Health
Office of Drinking Water

Local Government Consistency Determination Form

Water System Name: City of Battle Ground PWS ID: 047005

Planning/Engineering Document Title: Water System Plan Plan Date: January 2022

Local Government with Jurisdiction Conducting Review: City of Battle Ground Community Dev.

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.	Figure 3-1	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.	Table 3-3	Yes
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.	Chapter 5	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.	Pages 3-1 through 3-4	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.	Pages 3-1 through 3-4	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.

Sam Crummett — 10/25/2022

Signature — Date

Sam Crummett, Community Development Director, City of Battle Ground

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.

The Department of Health is an equal opportunity agency. 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).

Washington State Department of Health
Division of Environmental Health
Office of Drinking Water

Local Government Consistency Determination Form

Water System Name: City of Battle Ground PWS ID: 047005

Planning/Engineering Document Title: Water System Plan Plan Date: January 2022

Local Government with Jurisdiction Conducting Review: Clark 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.

	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.	Figure 3-1	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.	Table 3-3	Yes
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.	Chapter 5	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.	Pages 3-1 through 3-4	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.	Pages 3-1 through 3-4	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.

Michael Sallis Michael Sallis Jr. 5/17/2022

Signature Date

Michael Sallis, Planner III, Clark County Community Planning

Printed Name, Title, & Jurisdiction

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Appendix E
SEPA Checklist

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City of Battle Ground

Community Development Department
109 SW 1st Street, Suite 127, Battle Ground, WA 98604
(360) 342.5047 | Fax (360) 342-5049

DETERMINATION OF NON-SIGNIFICANCE (DNS)

Battle Ground Comprehensive Plan Amendments

Date: December 2, 2021

Description of Proposal: The city is proposing amendments to the City of Battle Ground 2015 Comprehensive Plan to advance and implement the goals described in the City's Vision. This includes amendments to the Official Zoning Map to include a new Westside District, Comprehensive Plan Map, Chapter 7 – Parks, 2021 Fire District 3 Capital Facilities Plan & Impact Fees; 2019 Hockinson School District Capital Facilities Plan & Impact Fees.

The Comprehensive Plan also serves as an integrating mechanism to ensure that other plans implement the goals described in the City's Vision; and the following documents are considered an integral part of this Plan and adopted by reference: City of Battle Ground 2021 Transportation System Plan; City of Battle Ground 2021 Water System Plan; City of Battle Ground 2015 Parks, Recreation and Open Space Plan, as amended.

For further review of these amendments please see: https://www.cityofbg.org/496/Active-Development-Projects

Proponent: City of Battle Ground, Community Development Department, Attn: Sam Crummett, 109 SW 1st Street, Suite 127, Battle Ground, WA 98604.

Location: The proposal applies to all properties located within the city of Battle Ground, Washington.

Lead agency: City of Battle Ground, Community Development Department. The lead agency for this proposal has determined that it does not have a probable significant adverse impact on the environment. An Environmental Impact Statement is not required under RCW 43.21C.030(2)(c). This decision was made after review of a completed environmental checklist and other information on file with the lead agency. This information is available to the public on request.

This DNS is issued under WAC 197-11-340; the lead agency will not act on this proposal for 14 days from the date below. **Comments must be submitted by 5:00 p.m., December 16, 2021.** Comments may be sent to: City of Battle Ground, 109 SW 1st Street, Suite 127, Battle Ground, WA 98604 or sam.crummett@cityofbg.org. For further information regarding this proposal, please contact Sam Crummett, Community Development Director, (360) 342-5042.

Pursuant to BGMC 18.145.030, any appeals of a threshold determination made pursuant to this chapter shall be of the notice of final decision as provided for in BGMC 17.200.080; except threshold determinations for Type III land use actions, which shall be made within fifteen days of the issuance of the threshold determination.

Information is available in an alternate language by request to cityclerk.info@cityofbg.org
Información será traducida al español a petición de cityclerk.info@cityofbg.org
Информация имеется на русском языке по запросу на cityclerk.info@cityofbg.org
如需相关信息的中文版本，请来函索取：cityclerk.info@cityofbg.org
Gửi yêu cầu nhận thông tin sẵn có bằng tiếng Việt đến cityclerk.info@cityofbg.org
Za informacije na bosanskom jeziku obratite se na adresu cityclerk.info@cityofbg.org

Ang impormasyon ay makukuha sa Tagalog sa pamamagitan ng kahilingan sa cityclerk.info@cityofbg.org

SEPA ENVIRONMENTAL CHECKLIST

Purpose of checklist:

Governmental agencies use this checklist to help determine whether the environmental impacts of your proposal are significant. This information is also helpful to determine if available avoidance, minimization or compensatory mitigation measures will address the probable significant impacts or if an environmental impact statement will be prepared to further analyze the proposal.

Instructions for applicants:

This environmental checklist asks you to describe some basic information about your proposal. Please answer each question accurately and carefully, to the best of your knowledge. You may need to consult with an agency specialist or private consultant for some questions. You may use "not applicable" or "does not apply" only when you can explain why it does not apply and not when the answer is unknown. You may also attach or incorporate by reference additional studies reports. Complete and accurate answers to these questions often avoid delays with the SEPA process as well as later in the decision-making process.

The checklist questions apply to all parts of your proposal, even if you plan to do them over a period of time or on different parcels of land. Attach any additional information that will help describe your proposal or its environmental effects. The agency to which you submit this checklist may ask you to explain your answers or provide additional information reasonably related to determining if there may be significant adverse impact.

Instructions for Lead Agencies:

Please adjust the format of this template as needed. Additional information may be necessary to evaluate the existing environment, all interrelated aspects of the proposal and an analysis of adverse impacts. The checklist is considered the first but not necessarily the only source of information needed to make an adequate threshold determination. Once a threshold determination is made, the lead agency is responsible for the completeness and accuracy of the checklist and other supporting documents.

Use of checklist for nonproject proposals:

For nonproject proposals (such as ordinances, regulations, plans and programs), complete the applicable parts of sections A and B plus the SUPPLEMENTAL SHEET FOR NONPROJECT ACTIONS (part D). Please completely answer all questions that apply and note that the words "project," "applicant," and "property or site" should be read as "proposal," "proponent," and "affected geographic area," respectively. The lead agency may exclude (for non-projects) questions in Part B - Environmental Elements –that do not contribute meaningfully to the analysis of the proposal.

A. Background [HELP]

1. Name of proposed project, if applicable:

City of Battle Ground Proposed Comprehensive Plan Amendments

2. Name of applicant:

City of Battle Ground

3. Address and phone number of applicant and contact person:

Address: Battle Ground City Hall
109 SW 1st Street, Suite 127
Battle Ground, WA 98604

Contact Person: Sam Crummett, Community Development Director
sam.crumett@cityofbg.org
(360) 342-5042

4. Date checklist prepared:

November 18, 2021

5. Agency requesting checklist:

City of Battle Ground

6. Proposed timing or schedule (including phasing, if applicable):

Legislative History:	
Planning Commission Public Hearing: Planning Commission Public Hearing: Planning Commission Public Hearing: Planning Commission Public Hearing:	June 2, 2021 September 29, 2021 October 27, 2021 November 10, 2021
City Council Public Hearing: City Council Public Hearing: City Council Public Hearing: City Council Code Adoption:	June 21, 2021 October 4, 2021 November 15, 2021 December 6, 2021

7. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain.

Comprehensive Plan amendments are a non-site specific project that will result in a list of potential policy actions and code amendments to be implemented over time.

8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.

Not applicable; this is a non-project action and is not site-specific.

9. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain.

Not applicable; this is a non-project action and is not site-specific. Existing projects would be developed under regulations in place at the time of complete application. Future projects could be affected if policy changes under discussion in the Comprehensive Plan are implemented.

10. List any government approvals or permits that will be needed for your proposal, if known.

None; this is a non-project action and is not site-specific.

11. Give brief, complete description of your proposal, including the proposed uses and the size of the project and site.

The city is proposing amendments to the City of Battle Ground 2015 Comprehensive Plan to advance and implement the goals described in the City's Vision. This includes amendments to the Official Zoning Map to include a new Westside District, Comprehensive Plan Map, Chapter 7 – Parks, 2021 Fire District 3 Capital Facilities Plan & Impact Fees; 2019 Hockinson School District Capital Facilities Plan & Impact Fees.

The Comprehensive Plan also serves as an integrating mechanism to ensure that other plans implement the goals described in the City's Vision; and the following documents are considered an integral part of this Plan and adopted by reference: City of Battle Ground 2021 Transportation System Plan; City of Battle Ground 2021 Water System Plan; City of Battle Ground 2015 Parks, Recreation and Open Space Plan, as amended.

For further review of these amendments please see: https://www.cityofbg.org/496/Active-Development-Projects

12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist.

City of Battle Ground – within city limits.

B. Environmental Elements [HELP]

1. *Earth* [help]

a. General description of the site:

(circle one): Flat, rolling, hilly, steep slopes, mountainous, other _____

Not applicable; this is a non-project action and is not site-specific.

b. What is the steepest slope on the site (approximate percent slope)?

Not applicable; this is a non-project action and is not site-specific.

c. What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any agricultural land of long-term commercial significance and whether the proposal results in removing any of these soils.

Not applicable; this is a non-project action and is not site-specific.

d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe.

Not applicable; this is a non-project action and is not site-specific.

e. Describe the purpose, type, total area, and approximate quantities and total affected area of any filling, excavation, and grading proposed. Indicate source of fill.

Not applicable; this is a non-project action and is not site-specific.

f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe.

Not applicable; this is a non-project action and is not site-specific.

g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)?

Not applicable; this is a non-project action and is not site-specific.

h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any:

Not applicable; this is a non-project action and is not site-specific.

2. Air [help]

a. What types of emissions to the air would result from the proposal during construction, operation, and maintenance when the project is completed? If any, generally describe and give approximate quantities if known.

Not applicable; this is a non-project action and is not site-specific.

b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe.

Not applicable; this is a non-project action and is not site-specific.

c. Proposed measures to reduce or control emissions or other impacts to air, if any:

Not applicable; this is a non-project action and is not site-specific.

3. Water [help]

a. Surface Water: [help]

1) Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into.

Not applicable; this is a non-project action and is not site-specific.

2) Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans.

Not applicable; this is a non-project action and is not site-specific.

3) Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material.

Not applicable; this is a non-project action and is not site-specific.

4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known.

Not applicable; this is a non-project action and is not site-specific.

5) Does the proposal lie within a 100-year floodplain? If so, note location on the site plan.

Not applicable; this is a non-project action and is not site-specific.

6) Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge.

Not applicable; this is a non-project action and is not site-specific.

b. Ground Water: [help]

1) Will groundwater be withdrawn from a well for drinking water or other purposes? If so, give a general description of the well, proposed uses and approximate quantities withdrawn from the well. Will water be discharged to groundwater? Give general description, purpose, and approximate quantities if known.

Not applicable; this is a non-project action and is not site-specific.

2) Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals. . .; agricultural; etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve.

Not applicable; this is a non-project action and is not site-specific.

c. Water runoff (including stormwater):

1) Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? If so, describe.

Not applicable; this is a non-project action and is not site-specific.

2) Could waste materials enter ground or surface waters? If so, generally describe.

Not applicable; this is a non-project action and is not site-specific.

3) Does the proposal alter or otherwise affect drainage patterns in the vicinity of the site? If so, describe.

Not applicable; this is a non-project action and is not site-specific.

d. Proposed measures to reduce or control surface, ground, and runoff water, and drainage pattern impacts, if any:

Not applicable; this is a non-project action and is not site-specific.

4. Plants [help]

a. Check the types of vegetation found on the site:

____deciduous tree: alder, maple, aspen, other
____evergreen tree: fir, cedar, pine, other
____shrubs
____grass
____pasture
____crop or grain
____ Orchards, vineyards or other permanent crops.
____ wet soil plants: cattail, buttercup, bullrush, skunk cabbage, other
____water plants: water lily, eelgrass, milfoil, other
____other types of vegetation

Not applicable; this is a non-project action and is not site-specific.

b. What kind and amount of vegetation will be removed or altered?

Not applicable; this is a non-project action and is not site-specific.

c. List threatened and endangered species known to be on or near the site.

Not applicable; this is a non-project action and is not site-specific.

d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any:

Not applicable; this is a non-project action and is not site-specific.

e. List all noxious weeds and invasive species known to be on or near the site.

Not applicable; this is a non-project action and is not site-specific.

5. Animals [help]

a. List any birds and other animals which have been observed on or near the site or are known to be on or near the site.

Examples include:

birds: hawk, heron, eagle, songbirds, other:
mammals: deer, bear, elk, beaver, other:
fish: bass, salmon, trout, herring, shellfish, other _____

Not applicable; this is a non-project action and is not site-specific.

b. List any threatened and endangered species known to be on or near the site.

Not applicable; this is a non-project action and is not site-specific.

c. Is the site part of a migration route? If so, explain.

Not applicable; this is a non-project action and is not site-specific.

d. Proposed measures to preserve or enhance wildlife, if any:

Not applicable; this is a non-project action and is not site-specific.

e. List any invasive animal species known to be on or near the site.

Not applicable; this is a non-project action and is not site-specific.

6. Energy and Natural Resources [help]

a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc.

Not applicable; this is a non-project action and is not site-specific.

b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.

Not applicable; this is a non-project action and is not site-specific.

c. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any:

Not applicable; this is a non-project action and is not site-specific.

7. Environmental Health [help]

a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal? If so, describe.

Not applicable; this is a non-project action and is not site-specific.

1) Describe any known or possible contamination at the site from present or past uses.

Not applicable; this is a non-project action and is not site-specific.

2) Describe existing hazardous chemicals/conditions that might affect project development and design. This includes underground hazardous liquid and gas transmission pipelines located within the project area and in the vicinity.

Not applicable; this is a non-project action and is not site-specific.

3) Describe any toxic or hazardous chemicals that might be stored, used, or produced during the project's development or construction, or at any time during the operating life of the project.

Not applicable; this is a non-project action and is not site-specific.

4) Describe special emergency services that might be required.

Not applicable; this is a non-project action and is not site-specific.

5) Proposed measures to reduce or control environmental health hazards, if any:

Not applicable; this is a non-project action and is not site-specific.

b. Noise

1) What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)?

Not applicable; this is a non-project action and is not site-specific.

2) What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site.

Not applicable; this is a non-project action and is not site-specific.

3) Proposed measures to reduce or control noise impacts, if any:

Not applicable; this is a non-project action and is not site-specific.

8. Land and Shoreline Use [help]

a. What is the current use of the site and adjacent properties? Will the proposal affect current land uses on nearby or adjacent properties? If so, describe.

Not applicable; this is a non-project action and is not site-specific.

b. Has the project site been used as working farmlands or working forest lands? If so, describe. How much agricultural or forest land of long-term commercial significance will be converted to other uses as a result of the proposal, if any? If resource lands have not been designated, how many acres in farmland or forest land tax status will be converted to nonfarm or nonforest use?

Not applicable; this is a non-project action and is not site-specific.

1) Will the proposal affect or be affected by surrounding working farm or forest land normal business operations, such as oversize equipment access, the application of pesticides, tilling, and harvesting? If so, how:

Not applicable; this is a non-project action and is not site-specific.

c. Describe any structures on the site.

Not applicable; this is a non-project action and is not site-specific.

d. Will any structures be demolished? If so, what?

Not applicable; this is a non-project action and is not site-specific.

e. What is the current zoning classification of the site?

Not applicable; this is a non-project action and is not site-specific.

f. What is the current comprehensive plan designation of the site?

Not applicable; this is a non-project action and is not site-specific.

g. If applicable, what is the current shoreline master program designation of the site?

Not applicable; this is a non-project action and is not site-specific.

h. Has any part of the site been classified as a critical area by the city or county? If so, specify.

Not applicable; this is a non-project action and is not site-specific.

i. Approximately how many people would reside or work in the completed project?

Not applicable; this is a non-project action and is not site-specific.

j. Approximately how many people would the completed project displace?

Not applicable; this is a non-project action and is not site-specific.

k. Proposed measures to avoid or reduce displacement impacts, if any:

Not applicable; this is a non-project action and is not site-specific.

l. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:

Not applicable; this is a non-project action and is not site-specific.

m. Proposed measures to reduce or control impacts to agricultural and forest lands of long-term commercial significance, if any:

Not applicable; this is a non-project action and is not site-specific.

9. Housing [help]

a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing.

Not applicable; this is a non-project action and is not site-specific.

b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing.

Not applicable; this is a non-project action and is not site-specific.

c. Proposed measures to reduce or control housing impacts, if any:

Not applicable; this is a non-project action and is not site-specific.

10. Aesthetics [help]

a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed?

Not applicable; this is a non-project action and is not site-specific.

b. What views in the immediate vicinity would be altered or obstructed?

Not applicable; this is a non-project action and is not site-specific.

c. Proposed measures to reduce or control aesthetic impacts, if any:

Not applicable; this is a non-project action and is not site-specific.

11. Light and Glare [help]

a. What type of light or glare will the proposal produce? What time of day would it mainly occur?

Not applicable; this is a non-project action and is not site-specific.

b. Could light or glare from the finished project be a safety hazard or interfere with views?

Not applicable; this is a non-project action and is not site-specific.

c. What existing off-site sources of light or glare may affect your proposal?

Not applicable; this is a non-project action and is not site-specific.

d. Proposed measures to reduce or control light and glare impacts, if any:

Not applicable; this is a non-project action and is not site-specific.

12. Recreation [help]

a. What designated and informal recreational opportunities are in the immediate vicinity?

Not applicable; this is a non-project action and is not site-specific.

b. Would the proposed project displace any existing recreational uses? If so, describe.

Not applicable; this is a non-project action and is not site-specific.

c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any:

Not applicable; this is a non-project action and is not site-specific.

13. Historic and cultural preservation [help]

a. Are there any buildings, structures, or sites, located on or near the site that are over 45 years old listed in or eligible for listing in national, state, or local preservation registers? If so, specifically describe.

Not applicable; this is a non-project action and is not site-specific.

b. Are there any landmarks, features, or other evidence of Indian or historic use or occupation? This may include human burials or old cemeteries. Are there any material

evidence, artifacts, or areas of cultural importance on or near the site? Please list any professional studies conducted at the site to identify such resources.

Not applicable; this is a non-project action and is not site-specific.

c. Describe the methods used to assess the potential impacts to cultural and historic resources on or near the project site. Examples include consultation with tribes and the department of archeology and historic preservation, archaeological surveys, historic maps, GIS data, etc.

Not applicable; this is a non-project action and is not site-specific.

d. Proposed measures to avoid, minimize, or compensate for loss, changes to, and disturbance to resources. Please include plans for the above and any permits that may be required.

Not applicable; this is a non-project action and is not site-specific.

14. Transportation [help]

a. Identify public streets and highways serving the site or affected geographic area **and describe proposed access to the existing street system. Show on site plans, if any.**

Not applicable; this is a non-project action and is not site-specific.

b. Is the site or affected geographic area currently served by public transit? If so, generally describe. If not, what is the approximate distance to the nearest transit stop?

Not applicable; this is a non-project action and is not site-specific.

c. How many additional parking spaces would the completed project or non-project proposal have? How many would the project or proposal eliminate?

Not applicable; this is a non-project action and is not site-specific.

d. Will the proposal require any new or improvements to existing roads, streets, pedestrian, bicycle or state transportation facilities, not including driveways? If so, generally describe (indicate whether public or private).

Not applicable; this is a non-project action and is not site-specific.

e. Will the project or proposal use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe.

Not applicable; this is a non-project action and is not site-specific.

f. How many vehicular trips per day would be generated by the completed project or proposal? If known, indicate when peak volumes would occur and what percentage of

the volume would be trucks (such as commercial and nonpassenger vehicles). What data or transportation models were used to make these estimates?

Not applicable; this is a non-project action and is not site-specific.

g. Will the proposal interfere with, affect or be affected by the movement of agricultural and forest products on roads or streets in the area? If so, generally describe.

Not applicable; this is a non-project action and is not site-specific.

h. Proposed measures to reduce or control transportation impacts, if any:

Not applicable; this is a non-project action and is not site-specific.

15. Public Services [help]

a. Would the project result in an increased need for public services (for example: fire protection, police protection, public transit, health care, schools, other)? If so, generally describe.

Not applicable; this is a non-project action and is not site-specific.

b. Proposed measures to reduce or control direct impacts on public services, if any.

Not applicable; this is a non-project action and is not site-specific.

16. Utilities [help]

a. Circle utilities currently available at the site:
electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system, other _____

Not applicable; this is a non-project action and is not site-specific.

b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed.

Not applicable; this is a non-project action and is not site-specific.

C. Signature [HELP]

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature:

Name of signee: Sam Crummett

Position and Agency/Organization: Community Development Director, City of Battle Ground – Community Development Department

Date Submitted: _____

D. Supplemental sheet for nonproject actions [HELP]

(**IT IS NOT NECESSARY** to use this sheet for project actions)

Because these questions are very general, it may be helpful to read them in conjunction with the list of the elements of the environment.

When answering these questions, be aware of the extent the proposal, or the types of activities likely to result from the proposal, would affect the item at a greater intensity or at a faster rate than if the proposal were not implemented. Respond briefly and in general terms.

1. How would the proposal be likely to increase discharge to water; emissions to air; production, storage, or release of toxic or hazardous substances; or production of noise?

None of the Comprehensive Plan changes would cause an increase of the aforementioned items. The City has adopted critical areas ordinance, stormwater regulations, and other codes that adequately regulate discharges/emissions. Any development code changes would be reviewed through a separate process. City standards to control these effects would be continued to be enforced at a project level.

Proposed measures to avoid or reduce such increases are:

None needed.

2. How would the proposal be likely to affect plants, animals, fish, or marine life?

The proposed Comprehensive Plan amendments will not have any direct effects. While the strategies in these documents support future growth, City standards to control the environmental impacts of development would continue to be enforced at the project level.

Proposed measures to protect or conserve plants, animals, fish, or marine life are:

None needed.

3. How would the proposal be likely to deplete energy or natural resources?
As a non-project action, these amendments will not have any direct impacts on energy usage.

Proposed measures to protect or conserve energy and natural resources are:

None needed.

4. How would the proposal be likely to use or affect environmentally sensitive areas or areas designated (or eligible or under study) for governmental protection; such as

parks, wilderness, wild and scenic rivers, threatened or endangered species habitat, historic or cultural sites, wetlands, floodplains, or prime farmlands?

As a non-project action, these amendments will not have any direct impacts.

Proposed measures to protect such resources or to avoid or reduce impacts are:

None needed; existing Critical Area regulations and Shoreline Management are not affected by these amendments.

5. How would the proposal be likely to affect land and shoreline use, including whether it would allow or encourage land or shoreline uses incompatible with existing plans?

These changes will not affect shoreline management regulations and existing environmental protections as established in Title 18 of the BGMC (Environmental Protection). Future development will be subject to review and must meet adopted zoning and development regulations as well as applicable engineering standards, state regulations, and project-specific SEPA review when required.

Proposed measures to avoid or reduce shoreline and land use impacts are:

None needed.

6. How would the proposal be likely to increase demands on transportation or public services and utilities?

No changes would cause an increase on demands of transportation or public services and utilities. Future growth will increase demand for services, but the requirements for concurrency and coordination among service providers will prepare for this growth. Future development will be subject to review and must meet adopted zoning and development regulations as well as applicable engineering standards, state regulations, and project-specific SEPA review when required.

Proposed measures to reduce or respond to such demand(s) are:

None needed.

7. Identify, if possible, whether the proposal may conflict with local, state, or federal laws or requirements for the protection of the environment.

No conflicts with conflict with local, state, or federal laws or requirements for the protection of the environment have been identified. Future development projects will be reviewed at the time of submittal for consistency with local, state, and federal laws.

Lower Columbia Fish Recovery Board (LCFRB) Comments City of Battle Ground Proposed Comprehensive Plan Amendments – Draft Water System Plan December 16, 2021

The Lower Columbia Fish Recovery Board (LCFRB) staff have completed a review of the December 2, 2021 State Environmental Policy Act (SEPA) determination for the above referenced proposal. The focus of our review was on the proposed updates to the City's Water System Plan, dated November 8, 2021, which is referenced in the SEPA determination. We offer the following comments and recommendations for your consideration.

As part of the Watershed Management Act (Chapter 90.82) planning process, the LCFRB was selected by the initiating governments in southwest Washington to serve as Lead Agency for development of the WRIA 27/28 Watershed Management Plan (WRIA 27/28 Plan). In 2006, that plan was formerly adopted by the Planning Unit as well as the Joint Legislative Authorities, and it has since been codified in state rule (Chapter 173-527 and -528). The City of Battle Ground was a member of the Planning Unit and a key partner in developing the WRIA 27/28 Plan. The adopted plan provides the agreed-upon framework for managing water supplies and instream flows in Southwest Washington.

The East Fork Lewis River is a high priority for salmon and steelhead recovery efforts, and supports five Endangered Species Act (ESA) listed populations of Chinook, steelhead, chum and coho. All of these populations are considered "Primary", meaning they are critically important for recovering these species at the regional scale. Lower summer flows and associated high water temperatures in the lower East Fork Lewis River remain a primary bottleneck to fish survival, and will becoming increasingly important limiting factors with anticipated climate change impacts. The adopted WRIA 27/28 Plan identified several key strategies and actions intended to specifically address these recovery bottlenecks.

As part of the WRIA 27/28 watershed planning effort, the relationships between surface water and ground water in the East Fork Lewis River subbasin were reviewed (PGG 2003a). This review indicates that Battle Ground's wells in the Upper Troutdale and Sand and Gravel Aquifers likely capture baseflow from both the East Fork and Salmon Creek. In light of this, the adopted plan identified the following key actions for the City of Battle Ground:

> ***Enhance conservation.*** Battle Ground should enhance its current conservation efforts, with the goal of reducing the production required of existing wells. This is a Planning Unit recommendation for voluntary action. Implementation should not be mandated by the State.
>
> ***Perform a review of alternative sources of supply*.** Due to the potential for withdrawal from the City's existing wells to impact stream flows in the East Fork Lewis River and

Salmon Creek, Battle Ground should undertake a review of alternative sources of supply, similar to that discussed in Section 3.3.1. The City's plans for a new well should also be subject to Section 3.3.1. Use of reclaimed water may also be of value. This is a Planning Unit recommendation for voluntary action. Implementation should not be mandated by the State.

***Purchase water from Clark Public Utilities*.** It is likely that new water supplies available to Battle Ground will have hydraulic continuity with the East Fork Lewis and Salmon Creek. Due to the regional significance of the East Fork Lewis to salmon recovery and foreseeable population growth, purchase of water from a CPU regional water source is critical. This is a Planning Unit recommendation for voluntary action. Implementation should not be mandated by the State.

Since adoption of the WRIA 27/28 Plan, Clark Public Utilities has worked diligently to establish a regional water supply ("Paradise Point") located near the confluence of the East and North Forks of the Lewis River. The intent of that water supply is to provide a regional water source to meet the future water supply needs for north Clark County, while reducing water withdrawal impacts on the East Fork Lewis River from wells that are in continuity with surface waters. Modeling suggests that transitioning to the Paradise Point regional water supply could enhance summer stream flows by 3 to 4 cubic feet per second.

We understand that as part of the water supply planning process, the City of Battle Ground conducted an alternatives analysis for long-term water supply that resulted in identification of the following 4 highest priority alternatives for consideration:

1. Team with CPU on its new wellfields in the Regional Water Supply Areas and associated infrastructure to deliver water from the wellfields to the City;

2. Drill an additional well or wells at the current Well Nos. 4 and 5 site to maximize use of the Upper Troutdale Aquifer water rights. The existing wells are likely nearing the end of their service life. Preserving this source of supply will allow the City to maintain some control over its water supply for resilience, even when transitioning to the use of more CPU water;

3. Bring Well No. 6 back online with onsite treatment;

4a. Replace Wells No. 7 and No. 8 if technology changes make this feasible; and,

4b. Approach CPU with the idea to transfer the City's Sand and Gravel Aquifer water rights to better locations, to the southwest with groundwater containing less iron and manganese.

The LCFRB strongly encourages the City of Battle Ground to pursue option 1 above as the highest priority going forward. This option would provide access to water resources to meet new and expanded needs, while reducing impacts to stream flows over the long term. This option aligns well with the goals, objectives and strategies outlined in the adopted WRIA 27/28 plan.

Thank you for the opportunity to provide these comments. If you have any questions or need additional information, please do not hesitate to contact LCFRB Program Manager Denise Smee at (360) 425-1554, or via email at dsmee@lcfrb.gen.wa.us.

Appendix F

Water Use Efficiency Program

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WATER USE EFFICIENCY PROGRAM

Introduction

The City of Battle Ground (City) recognizes that water is a valuable and essential natural resource that needs to be used wisely. This Water Use Efficiency (WUE) Program provides an approach to increase water use efficiency within the City's water service area.

Background

The Water Use Efficiency Rule

The Washington State Department of Health (DOH) implemented the WUE Rule, effective on January 22, 2007, as required by the Municipal Water Supply – Efficiency Requirements Act, also known as the Municipal Water Law (MWL), passed by the Washington State Legislature in September 2003. The MWL requires the state to implement the WUE Rule. The intent of the rule is to help reduce the demand that growing communities, agriculture, and industry have placed on the state's water resources, and to better manage these resources for fish and other wildlife. Municipal water suppliers are obligated under the WUE Rule to enhance the efficient use of water by the system and/or its consumers. The requirements of the WUE Rule are set forth in Chapter 246-290, Part 8, Washington Administrative Code (WAC).

Water Use Efficiency Requirements

DOH has provided guidance for municipal water suppliers on how to prepare and implement a WUE program that complies with the WUE Rule. The Water Use Efficiency Guidebook, published by DOH, was most recently revised and updated in 2017. The guidebook identifies the water use reporting, forecasting, and efficiency program requirements for public water systems. A WUE program meeting these requirements is a necessary element of a water system plan as required by the DOH and is necessary to obtain water right permits from the Washington State Department of Ecology (Ecology). The Water Use Efficiency Guidebook defines the necessary components of a WUE program as four fundamental elements.

1. Planning requirements, which include collecting data, forecasting demand, evaluating WUE measures, calculating distribution system leakage, and implementing a WUE program to meet goals.
2. A distribution system leakage (DSL) standard of 10 percent or less based on a 3-year rolling average.
3. Goal setting to provide a benchmark for achievement and to help define the success of the WUE program.
4. Annual performance reporting on progress towards meeting WUE goals.

Water Use Efficiency Program

The City's current WUE Program elements are summarized in this section.

Planning Requirements And WUE Program Activities

The City's water use data, demand forecasts, supply characteristics, and other planning requirements are contained throughout this Water System Plan (WSP). The City is committed to continue collecting water use data beyond that presented in **Chapter 4** for evaluation of its WUE Program and water use patterns, and for forecasting demands for future facilities. Consistent with WAC 246-290-810, the WUE program effectiveness will continue to be evaluated within each WSP update.

Recent WUE program activities are presented in the Selected Measures section.

Water Use Efficiency Goals And The Public Process

Per WAC 246-290-830, WUE goals must be set through a public process and shall be evaluated and reestablished as part of a WSP update. The City formally adopted water use efficiency goals in 2011 via its City Council and last updated its WUE Program as part of its 2014 WSP. The goals and objectives of the City's previous WUE Program are as follows:

- Reduce the average equivalent residential unit annual water consumption by a minimum of 1% (2 gpd) within six years.
- Reduce annual distribution system leakage (DSL) to 10% or less within six years.

In analyzing the first goal the 2014 WSP (Table 2-5) indicated that water consumption per ERU was 195 gpd. As shown in Table 4-8 of this WSP water consumption for all uses based an average between 2016 and 2019 is now at 178 gpd. This is a reduction of 8.7% well exceeding the City's goal of 1%.

System-wide DSL is discussed in **Chapter 4** and has been less than 10% each year since 2017, and the City's 3-year rolling average between 2017 and 2019 is 7.9%. The proposed WUE goals for the 2021 to 2031 water system planning cycle are as follows.

- Reduce the average equivalent residential unit annual water consumption by an additional 1% (2 gpd) within ten years.
- Maintain system-wide DSL at less than 10% per year and based on a 3-year rolling average.

In compliance with the WUE Rule, a public hearing will be held at a City Council meeting to present and discuss the new goals. The City Council will affirm the new goals at the meeting.

Water Use Efficiency Program Evaluation And Performance Reporting

The City will continue to evaluate overall demand, per capita water use, and the amount of DSL on an annual basis (coinciding with the production of the Consumer Confidence Report (CCR)). The City will also evaluate the performance of its WUE Program and implemented measures at this time by analyzing demand data and determining the long-term trend towards reducing water usage and meeting WUE goals. If the WUE Program monitoring shows that progress towards meeting the WUE goals is not being accomplished, more rigorous WUE Program implementation or additional WUE Program items will be considered, along with a cost-effective evaluation of measures.

The City will continue to provide annual WUE performance reports to its consumers in the CCR and detail the results of water use monitoring and progress towards achieving the system's WUE goals. The City will comply with DOH Annual WUE Performance report requirements, due to DOH by July 1st of each year.

Evaluation And Selection Of Water Use Efficiency Measures

The City's evaluation of WUE measures and selected levels of implementation are presented within this section. The measures fall within three categories of implementation: 1) mandatory measures that must be implemented; 2) measures that must be evaluated; and 3) measures selected by the City that either must be evaluated or implemented.

The City served 5,905 water service connections as of the end of 2019, which is the base year of the City's WSP. Based on the number of connections, at least six WUE measures must be evaluated or implemented. Measures that are mandatory cannot be credited towards the system's WUE measures. Since the City implements or plans on implementing all the evaluated measures presented here, a cost-effective evaluation is not required.

Mandatory Measures

Source Meters

The volume of water produced by the system's sources must be measured using a source meter or other meter installed upstream of the distribution system. Source meters currently are installed and operating at each of the City's sources. If any new sources are installed in the future, they will be equipped with a source meter. Meter testing and repairs are ongoing as-needed as part of the City's preventive maintenance program.

Service Meters

All public water systems that supply water for municipal purposes must install individual service meters for all water users. Service meters currently are installed and operating at all connections throughout the distribution system. All future connections that are installed or activated will be equipped with a service meter.

Meter Calibration

The City must calibrate and maintain meters based on generally accepted industry standards and manufacturer information. Compliance will be maintained by the City by performing maintenance on the source and service meters every 5 to 10 years at a minimum. Meter calibration verification testing is performed on an as-needed basis, typically annually.

Water Loss Control Action Plan

To control leakage, systems that do not meet the DSL standard must implement a Water Loss Control Action Plan (WLCAP). The City's rolling 3-year average DSL is below 10% based on the information presented in **Chapter 4** of the WSP. Therefore, a WLCAP is not required to be implemented.

Customer Education

Annual customer education regarding the importance of using water efficiently is a required element of all WUE programs. Customer education is provided in the City's annual CCR to customers and includes information on the system's DSL, progress towards meeting WUE goals, and tips for customers on using water more efficiently. Additional customer education and outreach measures are identified in the Selected Measures section.

Measures That Must Be Evaluated

Rate Structure

Evaluation of rate structures to increase water demand efficiency is required (WAC 246-290-100(4)(j)(iv)), and actual implementation of a conservation rate structure counts as a WUE measure (WAC 246-290-810(4)(d)). The City implements an inclining block rate structure, which is a conservation rate structure. The City charges a flat monthly meter access fee (based on meter size) and a water usage fee (increasing with the amount of water consumed) in each billing period. The City previously included 3 ccf of usage in the base rate, but eliminated that practice to further encourage conservation. The 2021 residential rate structure is shown in **Table 1**, and the 2021 rate structure for non-single-family residential customers is shown in **Table 2**.

Table 1
2021 Single-Family Residential Rate Structure

Monthly Meter Fees	
Meter Size	**Base Rate**
5/8"	$11.20
3/4"	$33.04
1"	$49.59
1-1/2"	$87.24
2"	$139.03

Water Usage Fee (Per 100 Cubic Feet)	
Consumption	**Rate**
0-6 ccf	$1.80
7-12 ccf	$2.57
Over 12 ccf	$4.12

Table 2
2021 Commercial/Multi-Family Residential Rate Structure

Monthly Meter Fees	
Meter Size	**Base Rate**
5/8”	$24.50
3/4"	$32.00
1”	$48.03
1-1/2”	$84.49
2”	$134.65
3”	$321.85
4”	$469.23

Water Usage Fee (Per 100 Cubic Feet)	
Consumption	**Rate**
All Usage	$3.33

Reclamation Opportunities

Reclaimed water is treated effluent from a wastewater treatment system that is suitable for a direct beneficial use or a controlled use that would not otherwise occur. The use of reclaimed water is regulated under Chapter 90.46 of the Revised Code of Washington (RCW). Water systems with 1,000 or more connections must evaluate reclamation opportunities (WAC 246-290-100(4)(f)(vii)), but only actual use of reclaimed water counts as a WUE measure (WAC 246-290-810(4)(d)) or multiple WUE measures if the reclaimed water is used for multiple purposes.

The City’s wastewater is conveyed to the Salmon Creek Treatment Plant in Vancouver for treatment and disposal. The Discover Clean Water Alliance operates the plant and there are currently no opportunities for reclaimed water at this plant.

The City investigated a Water Reclamation Facility in the mid-2000s, but it ultimately was not approved by the Department of Ecology.

The City will continue to evaluate the feasibility of using reclaimed water in the future as conditions change.

Selected Measures

The City has chosen to implement five different WUE measures in addition to those that are mandatory or required to be evaluated. Because several of these WUE measures affect multiple customer classes, the City’s WUE program counts as nine WUE measures (**Table 3**), which is greater than the requirement of six WUE measures based on the number of service connections.

Water Bill Showing Consumption History

The City presents consumption history charts and information on water bills for all customer classes and plans to continue to do so in the future.

Water Use Ordinances

The City passed Ordinance #10-09, which was codified in BGMC 13.113, which allows the Public Works Director to promote the conservation of the City's water supply in order to protect the health, welfare, and safety of water users.

Conservation Rates

The City's billing structure is set up to reward those who conserve water.

Advertising

The City advertises water conservation through its water conservameter signs (shown below). The City has two signs, which are placed in prominent locations in the City during the dry seasons. City staff adjusts the signs depending on water demand and conservation needs.



Battle Ground Conservameter Sign

Targeted Marketing

The City provides water conservation information on its website (https://www.cityofbg.org/239/Water-Conservation). This information is available year round, but the City sends out marketing (Facebook, Press Releases) in early summer.

Table 3
Selected WUE Measures

Mandatory WUE Measures

Measures	Implementation Status
Source Meters Installed	x
Service Meters Installed	x
Meter Calibration Compliance	x
Water Loss Control Action Plan	Not Applicable
Customer Education	x

WUE Measures That Must Be Evaluated

Measures	Implementation Status
Rate Structure	x
Reclamation Opportunities	x

Selected WUE Measures

	Implementation Status	
Measure	Single-Family Residential	Multi-Family Residential/ Commercial
Water Bill Showing Consumption History	x	x
Water Use Ordinances	x	x
Conservation Rates	x	
Advertising	x	x
Targeted Marketing	x	x

Water Use Efficiency Program Schedule And Budget

The WUE measures described above and selected for implementation by the City are summarized in **Table 4** with their corresponding schedule and budget. The successful implementation of this program is expected to:

- Reduce the average equivalent residential unit annual water consumption by an additional 1% (2 gpd) within ten years.
- Maintain system-wide DSL at less than 10% per year and based on a 3-year rolling average.

Accomplishing these goals is expected to reduce the system-wide average daily demand by approximately 1% by 2031.

Table 4
Selected WUE Measures

Mandatory WUE Measures

Measure	Schedule	Budget
Source Meters Installed	Ongoing	O&M Funded
Service Meters Installed	Ongoing	O&M Funded
Meter Calibration Compliance	Ongoing	O&M Funded
Water Loss Control Action Plan	Not Applicable	Not Applicable
Customer Education	Ongoing	O&M Funded

WUE Measures That Must Be Evaluated

Measure	Schedule	Budget
Rate Structure	Ongoing	Not Applicable
Reclamation Opportunities	Ongoing	Not Applicable

Selected WUE Measures

Measure	Schedule	Budget
Water Bill Showing Consumption History	Ongoing	Not Applicable
Water Use Ordinances	Ongoing	Not Applicable
Conservation Rates	Ongoing	Not Applicable
Advertising	Ongoing	$1,000 Per Year
Targeted Marketing	Ongoing	$1,000 Per Year

Attachment A
Authorizing Resolution

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CITY OF BATTLE GROUND
RESOLUTION NO. 21-12

A RESOLUTION ESTABLISHING WATER USE EFFICIENCY GOALS FOR THE CITY OF BATTLE GROUND WATER SYSTEM AS REQUIRED UNDER THE STATE MUINICPAL WATER LAW AND REGULATIONS.

WHEREAS, the in 2003 Washington State Legislature adopted the Municipal Water Law (House Bill 1338) that was largely codified as Chapter 90.03 RCW, which in part required the Washington State Department of Health to establish water use efficiency requirements designed to ensure certainty and flexibility of municipal water rights in addition to efficient use of water; and

WHEREAS, the Washington State Department of Health developed Water Use Efficiency Requirements that are now codified with WAC Chapter 246-290; and

WHEREAS, WAC 246-290-830 requires municipal water suppliers to be able to provide documentation to the Washington State Department of Health that a Water Use Efficiency Program has been developed per the requirements of RCW 246-290-810 and that said Program demonstrates the required Water Use Efficiency Goals as outlined by WAC 246-290-830; and

WHEREAS, WAC 246-290-830 provides a process for municipal water suppliers to establish Water Use Efficiency Goals, which includes a requirement to hold a public forum at least two weeks after a public notice of said forum is provided and after said public forum the elected governing board of the municipal water system shall review and consider all comments received in adopting the Water Use Efficiency Goals and the various materials relied upon shall be available for the public fully documenting the basis for the goals adopted; and

WHEREAS, the City Council of the City of Battle Ground held a public forum on Monday, November 15, 2021, for which notice was provided at least two weeks prior to the forum. The public was given an opportunity to participate and provide comment, and comments were received, reviewed, and considered by the Council; and

NOW, THEREFORE, be it resolved by the City Council of the City of Battle Ground, hereby adopts the attached Water Use Efficiency Program.

PASSED BY THE COUNCIL AND APPROVED BY THE MAYOR OF THE CITY OF BATTLE GROUND IN OPEN MEETING THIS 6TH DAY OF DECEMBER, 2021.

CITY OF BATTLE GROUND, WASHINGTON

By: _____
Adrian Cortes, Mayor

Attest:

By: Kay Kammer
Kay Kammer, City Clerk

Approved as to form:

By: _____
Christine Hayes, City Attorney

Appendix G

Cross-Connection Control Program

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CROSS-CONNECTION CONTROL PROGRAM



CITY OF BATTLE GROUND

Cross-Connection Control Program

As required by WAC 246-290-490, cross-connection control, utilities have the responsibility to protect customers from water contamination due to cross-connections. A cross-connection is any actual or potential physical connection between a public water system or the consumer's water system and any source of non-potable liquid, solid, or gas that could contaminate the potable water supply by backflow. The City's current regulations were adopted via Ordinance #13-07 (**Attachment A**) and can be found as part of the Battle Ground Municipal Code under Water Use Regulations 13.112.

This ordinance and corresponding Municipal Code provide the City's water department the ability to protect the water supply from contamination by prohibiting cross-connections, requiring backflow prevention devices, and adopting State standards for cross-connection regulations. The ordinance and corresponding Municipal Code provides procedures for the abatement of cross-connections and the installation of backflow prevention devices.

The City has four employees certified as cross-connection control specialists. The City's cross-connection control program and records are continually updated and information of each cross-connection device are on file with the City. The Public Works Department and the Building Department coordinate notification to customers who have devices that need to be tested. The City currently uses Lucity as its backflow program management software.

The City maintains the following information on file for its cross-connection control program:

- Date of last inspection.
- Results of inspection.
- Recommended protection.
- List of approved assemblies.
- Test and maintenance reports.
- List of certified testers.
- Customer account number, billing address, service address, phone numbers, device history and maintenance records.

The City's Cross-Connection Control Program requires the inspection of backflow prevention devices at the time of installation. These devices are also scheduled to be inspected annually after installation, after the device is repaired, after the device is relocated or reinstated, and as necessary if tests indicate repeated failure.

Owners of backflow prevention devices are notified by mail that their devices are due for inspection. An example of the backflow prevention letter that is sent out to owners is attached as **Attachment B**. However, it is the responsibility of the customer to see that their device is tested. Failure to provide the City with a backflow prevention device inspection report from a certified cross-connection control specialist will result in the customer's water service being terminated. This termination is then reported to the Washington State Department of Health (DOH).

The City hosts information on its website related to Backflow Prevention (Backflow Prevention | Battle Ground, WA - Official Website (cityofbg.org)) including a list of Certified Backflow Testers.

Attachment A
Ordinance #13-07

ORDINANCE NO. 13-07

AN ORDINANCE AMENDING CERTAIN PROVISIONS OF TITLES 2, 9, 10, 12, 13, 16, 17, AND 18 OF THE BATTLE GROUND MUNICIPAL CODE

WHEREAS, the Growth Management Act allows for comprehensive plan and zoning text amendments to occur once per year; and

WHEREAS, the Planning Commission conducted a public hearing on Wednesday May 1, 2013 and recommended approval of the proposed changes as presented by staff with a modification; and

WHEREAS, the proposed changes have been provided to the Department of Commerce for review; and

WHEREAS, the City Council met on February 19, 2013 and April 15, 2013 to review the proposed amendments; and

WHEREAS, the City Council finds it in the pubic interest to amend various chapters of the Battle Ground Municipal Code;

NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF BATTLE GROUND, WASHINGTON DOES ORDAIN AS FOLLOWS:

Section 1. New. Section 2.80, Indemnity of Personnel, of the Battle Ground Municipal Code is hereby added to read:

Chapter 2.80, Indemnity of Personnel

BGMC 2.80.010 Definitions.

Unless the context indicates otherwise, the words and phrases used in this chapter shall have the following meaning:
A. "Employee" means any person who is or has been employed by the city in either a full-time or part-time capacity and for compensation.
B. "Official" means any person who is serving or has served as an elected City Official and any person who is serving or has served as an appointed member of any board, commission or committee created by any elected City official. Official does not include independent contractors performing the duties of appointed positions.

BGMC 2.80.020 Legal Representation.

As a condition of service or employment with the City of Battle Ground, the City shall provide to an official or employee and their marital community, subject to the conditions and requirements of this chapter, and notwithstanding the fact that such official or employee may have concluded service or employment with the City, such legal representation as may

3. There is no public street access alternative available to serve the additional lots; and
4. The right-of-way of the existing private street cannot be expanded.
C. Units Served—Determination of.
1. Lots abutting and having a legal right of access to a private street but gaining access to a public street shall be excluded from the units being served by each abutting private street.
2. Where potential additional lots are planned to be served by the private street, there shall be established on the plat an easement for roadway and utility installations which provides for future extensions of the private street to serve the remainder of the potential lots for which the street is designed. (Ord. 04-021 § 7 (part), 2004: Ord. 99-004 § 1 (part), 1999: Ord. 95-769 § 1 (part), 1995)

Section 7. Amendatory. Section 12.116.175 Developments—Traffic impact study, of the Battle Ground Municipal Code is hereby amended to read:

BGMC 12.116.175 Developments—Traffic impact study.

A. In order to assess the traffic impacts of a proposed development, the planning director or development approval authority will require submittal of a traffic study, unless exempted by subsection C of this section, undertaken by an engineer licensed to practice in the state of Washington with special training and experience in traffic engineering and transportation. The city engineer shall develop guidelines, in accordance with recognized traffic engineering and transportation principles, regarding the content of such studies, which is available from the city.
B. A queuing analysis shall be performed as part of the traffic impact study for any driveway where the queuing distance is under seventy-five feet for arterials, fifty feet for collectors, and twenty-five feet for local streets, as measured from the edge of the right-of-way to the first conflict point.
C. Exemptions:
1. For development of property with an existing use, no traffic impact study shall be required, pursuant to the provisions of this chapter, where the proposed development will generate less than ten new p.m. and a.m. peak hour vehicle trips.
2. For development of bare land no traffic impact study shall be required, pursuant to the provisions of this chapter, where the proposed development will generate less than ten new p.m. and a.m. peak hour vehicle trips. However, an engineer licensed to practice in the state of Washington with special training and experience in traffic engineering and transportation shall provide a letter addressing trip generation, trip distribution, and any safety related issues, such as but not limited to sight distance. (Ord. 04-021 § 7 (part), 2004)

Section 8. Amendatory. Section 13.112.110 Cross-connections prohibited when, of the Battle Ground Municipal Code is hereby amended to read:

BGMC 13.112.110 Cross-connections prohibited when.

Regulations of the Washington State Department of Health prohibit cross-connections between the public water supply and unapproved sources. No cross-connections of any type shall be permitted with other sources of supply, or where the circumstances are such that

there is danger of backflow of sewer water from unapproved sources or other contaminated liquids through plumbing fixtures, while using or treating equipment, storage tanks and reservoirs, unless prior evidence of compliance with the state plumbing code and approval of the State Health Department is presented.

A. Any and all cross-connections between the city water system and any other water source shall be controlled (or eliminated) under the direction and supervision of the public works director or his/her authorized designee. All such connections shall include backflow prevention assemblies approved by the Clark County health district or the Washington State Department of Health or air-gap separations in lieu thereof. Such installations shall be inspected and tested by a Washington State certified backflow assembly tester (B.A.T.) not less than once each year and may be inspected more often in the discretion of the public works director or his/her designee.

B. Inspections shall be conducted at the user's expense by a qualified B.A.T. to be approved by the public works director. Results of the inspection and testing shall be certified to the city within thirty days of the date the inspection is ordered and notice given to the user.

C. Persons authorized by the public works director shall have access to any premises where such cross-connection exists or is hereafter installed for the purpose of inspecting said installation. Failure of the user to cooperate in the installation, maintenance, repair, inspection or testing of backflow prevention assemblies shall be subject to termination of water service in addition to any other penalties provided by law.

D. The public works director, and/or his/her designee, shall be guided by Chapter 10, Uniform Plumbing Code, state of Washington, and the current edition of the Cross-Connection Control Manual—Accepted Procedure and Practice, published by the Pacific Northwest Section, American Waterworks Association, or as it may hereafter be amended.

E. The owner and/or user of any property where a cross-connection now or hereafter exists shall be liable to third parties for any and all damages sustained as a result of said cross-connection. This liability shall include indemnification of the city of Battle Ground for any such damages suffered by it, including attorneys' fees and costs of defense. (Ord. 07-02 § 1, 2007: Ord. 00-028 § 6 (part), 2000)

F. The minimum backflow protection on an irrigation or any other system shall be a double-check valve assembly (DCVA). Atmospheric Vacuum Breakers (AVB) shall not be used as the sole backflow preventer in any type of system. Residential hose bibs are excluded. Irrigation systems or any other system with chemical injection of any kind shall have a minimum of a Reduce Pressure Backflow Preventer (RPBA) installed.

Section 9. Amendatory. Section 16.105.050 Exemptions, of the Battle Ground Municipal Code is hereby amended to read:

BGMC 16.105.050 Exemptions.

The provisions of this title shall not apply to the following:

A. Cemeteries and other burial plots, while used for that purpose;

B. Divisions of land into lots or tracts, each of which is one one-hundred-twenty-eighth of a section of land or larger, or five acres or larger if the land is not capable of description as a fraction of a section of land; provided, that such lots or tracts meet applicable zoning and land use regulations, the plat is recorded in the office of the county auditor, the plat does not

-770 Natural environment.
-772 NEPA.
-774 Nonproject.
-775 Open record hearing.
-776 Phased review.
-778 Preparation.
-780 Private project.
-782 Probable.
-784 Proposal.
-786 Responsible alternative.
-788 Responsible official.
-790 SEPA.
-792 Scope.
-793 Scoping.
-794 Significant.
-796 State agency.
-797 Threshold determination.
-799 Underlying governmental action.
(Ord. 00-015 § 2 (part), 2000)

Section 28. Severability. If any provision of this Ordinance is found to be invalid or unenforceable for any reason such finding shall not affect the validity of the enforceability of any other provision of this Ordinance.

Section 29. Effective Date. This Ordinance shall be in full force and effect thirty (30) days after passage by the City Council and shall be published according to the law.

ADOPTED AT A REGULAR SESSION OF THE CITY COUNCIL OF THE CITY OF BATTLE GROUND, WASHINGTON AT A REGULAR MEETING THEREOF THIS 20th DAY OF MAY, 2013.

CITY OF BATTLE GROUND

Lisa Walters

Lisa Walters, Mayor

Attest:

Kay Kammer

Kay Kammer, City Clerk

Approved as to form:

Brian H. Wolfe, City Attorney

Attachment B
Sample Backflow Prevention Letter

Backflow Inspection Notification Letter
First & Second Notice

[Date]

[Customer Name]
[Customer Address1]
[Customer Address2]

Dear Customer,

Our records indicate that you have one or more backflow prevention devices installed in your water supply plumbing that are due for testing. These devices are typically found on home lawn sprinkler systems, building water supply lines, fire protection lines, gas charged soda dispensing machines, bar equipment, and private wells.

It is important that this backflow device work properly to safeguard your health and the health of others by protecting our drinking water. Annual testing is required by Washington State Law (WAC 246-290) and testing must be performed by a Washington State Certified Tester. Testers who perform the annual test are private contractors who charge a fee for their services. Please have your assembly tested within 30 days.

For your convenience a list of certified testers who are registered with the City of Battle Ground is included. The tester will notify the City's Water Department that the test has been completed. Please be sure to obtain, and keep a copy of the test results for your records.

If you have already had your backflow devices tested please fax a copy of your test report to 360-342-5359 or mail a copy to the City of Battle Ground's Public Works Operations Department at 1308 SE Grace Avenue; Battle Ground, WA 98604.

For further information regarding backflow please visit the City of Battle Ground's website at www.cityofbg.org/590/backflow-prevention. If you have questions regarding this notice or have issues due to COVID-19 which may impede testing please contact the City's Public Works Operations Department at 360-342-5361.

Thank you for helping us to preserve the quality of our drinking water!

Sincerely,

Donald E Risto

Don Risto
Cross Connection Control Manager

WASHINGTON STATE CERTIFIED
BACKFLOW TESTERS FOR 2021

The City of Battle Ground makes no representation regarding the abilities, performance or quality of service of the testers listed below. Further the City does not assume or accept any responsibilities for the actions or performance of such testers. This list is provided merely for the convenience of our water service customers. Customers are required to use their own judgment with respect to contracting with these or any other testers.

NAME OF COMPANY	PHONE NO.	NAME OF TESTER	CERT #
Walsh & Company Landscaping	360-772-2871	Bob Van Vranken	B4410
JM Landscaping	360-624-3209	John Murphy	B1063
JM Landscaping	360-241-9981	Aaron Coriell	B6226
A-1 Backflow	360-907-1519	Gino Catania	B3722
A-1 Backflow	360-907-1519	Nancy Catania	B5716
Ron Hendrickson	360-448-8285	Ronald Hendrickson	B3787
40 Dollar Backflow	360-518-4123	John Orefice	B1573
Pagel's Landscaping	360-574-4391	Steven Pagel	B2213
C&E Lawn Sprinkler	360-903-0795	Dale Wright	B0594
Backflow By The Best	360-606-0870	Dale Hammirch	B4133
Bruce Boylan	360-993-1772	Bruce Boylan	B1129
Fire Systems West	360-693-9906	Katie Ferzacca	B2971
Aqua-Tech Backflow Services	1-503-251-1683	John Bricker	B1008
American Backflow	1-503-289-1745	Mike Younce	B4174
Water Metrics	1-503-603-9988	Eddy Tor	B4156
Mathewson's Backflow	360-828-8483	Scott Mathewson	B4568
Aquatech & Associates	360-694-3599	Russ Glaser	B1972
Landscape Management	360-256-0706	Delfino Sanchez	B5386
Silver Star Lanscaping	360-787-8529	Jerry Peebles	B5801
Frontier Landscaping	360-574-8979	Shawn Downs	B5928
Drakes 7 Dees	360-975-1728	Lee Clifton	B4591
Dependable Backflow	360-909-9516	Michael Schlonga	B6159
AAA Backflow	360-263-4840	Michael Wilson	B6295
Certified Testing Services	360-600-3273	Darrin Fleming	B6480
Always Testing	1-800-767-6051	Darin Schnee	B3822

Backflow Inspection Notification Letter
Third Notice

THIRD AND FINAL NOTICE

[Date]

Notice of Pending Water Disconnection

Dear Customer,

In [Date1] and [Date 2] notices were sent out to inform you that the backflow prevention device installed in your Battle Ground water supply plumbing needed to be tested by a Washington State certified tester. To date we have not received a report indicating that this test was performed.

Our records indicate the assembly(s) at this location still needs to be tested. Annual testing is required by Washington State Law (WAC 246-290). Backflow prevention devices that do not function properly possess a potential health hazard to your family and the public water supply.

Please contact a certified tester, from the enclosed tester's list, in order to comply with this third and final notification.

Failure to comply with this notice will make your Battle Ground water supply eligible for service disconnection within 30 days. The law makes this a serious matter and if there is noncompliance it must be turned over to the City Attorney.

To prevent this action please mail, within 30 days, a successful test report to:

City of Battle Ground Public Works
1308 SE Grace Avenue
Battle Ground, WA 98604

Or fax a copy to 360-342-5359

If you have any questions regarding this notification please contact me at 360-342-5361. Thank you for your cooperation in protecting the public water supply.

Sincerely,

Donald E Risto

Don Risto
Cross Connection Control Manager

WASHINGTON STATE CERTIFIED
BACKFLOW TESTERS FOR 2019

The City of Battle Ground makes no representation regarding the abilities, performance or quality of service of the testers listed below. Further the City does not assume or accept any responsibilities for the actions or performance of such testers. This list is provided merely for the convenience of our water service customers. Customers are required to use their own judgment with respect to contracting with these or any other testers.

NAME OF COMPANY	PHONE NO.	NAME OF TESTER	CERT #
A-1 Backflow	360-907-1519	Gino Catania	B3722
A-1 Backflow	360-907-1519	Nancy Catania	B5716
40 Dollar Backflow	360-518-4123	John Orefice	B1573
Pagel's Landscape	360-574-4391	Steven Pagel	B2213
C&E Lawn Sprinklers, Inc.	360-903-0795	Dale Wright	B0594
C&E Lawn Sprinklers, Inc.	360-694-2035	Derek Wright	B2716
Backflow By The Best	360-606-0870	Dale Hammirch	B4133
Mr. Sprinkler	360-772-3396	Jeff Lancaster	B3723
Water Metrics	1-503-603-9988	Eddy Tor	B4156
Water Metrics	1-503-603-9988	Jens-Uwe Klabunde	B5313
Beacon Backflow LLC	360-241-0903	Art Sell	B2530
Beacon Backflow LLC	360-241-0903	Devin Newton	B6688
Aquatech & Associates	360-694-3629	Russ Glaser	B1972
Landscape Management Service	360-256-0706	Delfino Sanchez	B5386
Silver Star Landscape	360-787-8529	Jerry Peebles	B5801
Dependable Backflow Services	360-909-9516	Michael Schlonga	B6159
AAA Backflow NW	360-263-4840	Michael Wilson	B6295
Columbia Cross Connection	1-503-235-6141	Austin Gallagher	B6391
Columbia Cross Connection	1-503-235-6141	Michael Gallagher	B6430
Certified Testing Services	360-600-3273	Darrin Fleming	B6480
Backflows NW	1-425-277-2888	Tyler Jansen	B6241
Lewis Backflow Specialties	360-936-2288	James Lewis	B6520
Always Testing	1-800-767-6051	Darin Schnee	B3822
Drake 7 Dees	360-975-1728	Lee Clifton	B4591
Ron Hendrickson LLC	360-448-8285	Ron Hendrickson	B3787
Water Course Irrigation	360-666-4848	Kevin B. Quick	B5814
Walsh & Co. Landscaping	360-772-2871	Bob Van Vrankon	B4410

Appendix H

Water System Construction Standards

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SECTION 3
WATER DESIGN AND CONSTRUCTION REQUIREMENTS

3-1 DESIGN REQUIREMENTS

3-1.01 *Introduction*

The City of Battle Ground's water utility provides drinking water to the City and to a water service area outside the City. The goal of the Engineering Department is to provide technical management, comprehensive planning, and sound engineering to expand and maintain a safe, reliable and sustainable water supply, distribution, and storage system for high-quality customer service and fire protection.

The Battle Ground Engineering Department provides engineering, standards, and conducts reviews to support a water supply and distribution system that is safe, reliable, durable, and maintainable. Privately-funded water mains proposed to be connected to the City's system are reviewed for compliance with City standards and to ensure that water mains can continue to be extended to new users in a logical and cost-effective manner.

The following requirements are intended to be helpful during the initial stages of the design of new developments needing connection to the City of Battle Ground water system. The Requirements do not replace professional engineering design or specific project reviews. City staff, including Fire Department officials, may impose different requirements based on site-specific reviews.

These requirements are intended to supplement but not duplicate the construction and installation details in "Construction Requirements" Section 1-2 and Water Standard Details WA-1.0 to WA-7.0.

3-1.02 *Distribution System Extensions to Support Development*

Developing properties must extend utility lines to the site, across the property frontage, and through the property, to allow connection and provide for future extensions for the development of adjacent parcels. Proposed water line sizes and alignments must be designed in accordance with the latest Water System Plan, or other appropriate master plans, as determined by the City staff for overall system development and network extension.

3-1.03 *Connection to Existing System*

All new water mains must connect to an existing public water main. This can be accomplished by cutting the existing main and inserting a tee or cross, by tapping an existing main, or by removing a cap or plug on an existing main and connecting to the end of the main. Connection to an existing main may be done only after disinfection, testing, and approval by City staff of the new main. An exception to this is to use a pre-sterilized, closed, approved valve to connect to the new main before any water is allowed to flow. A note should be added to the construction drawing, with text similar to the following: "After disinfection, pressure testing, bacteriological testing, and approval of the new main, connection to the existing main can be made."

3-1.04 *Water Main Locations and Easements*

Water mains shall generally be in public rights of way, except where needed to serve onsite fire hydrants, buildings on private roads, and adjacent properties.

The standard location for water mains is on the north or east side of street centerline, 6 feet from the curb, on the street side of the curb. Other locations may be approved by the Development Review Engineer.

Public water facilities that are not in the public right-of-way must be in an easement dedicated to the City of Battle Ground. The easement is intended to allow access for maintenance by City staff, and to prevent

any structure or tree from interfering with the facility or hindering access to it. The easement shall be of a standard form, provided by the Community Development Department.

Water facilities that require easements on private property include water mains, fire hydrants, water services to the water meter, and water meters. The easement boundary should generally be near the downstream side of a water meter or 7.5 feet past the fire hydrant.

Easements shall be 20 feet wide or greater. Allowances for 15 foot easements may be granted on a case by case basis. Shared utility easements with water and one other utility such as sanitary sewer or storm water shall generally be minimum 20 feet wide, with no exceptions. Shared utility easements with water and two other utilities such as sanitary sewer and storm water shall generally be minimum 25 feet wide. Wider easements may be required depending on the depth and size of the utilities. Easements shall have no structures on them, and shall be paved or covered with approved landscaping (not to include trees). Easements for private roads shall include the entire roadway and all water meters. The easement shall be described as such.

3-1.05 ***System Reliability and Looping***

Looped water mains are desirable for fire flow, system reliability during maintenance, and for water quality. Dead ends shall be avoided, except as needed to provide for future service and fire hydrants. Water main loops shall be completed wherever possible. An extension to provide for future looping may be required, even if such extension is not required to serve adjacent properties. Dead-end extensions shall be provided with a standard blowoff assembly, or with a standard temporary blowoff assembly per the Water Standard Details.

3-1.06 ***Water Pipe Materials and Size***

Water services shall be sized as required by water demand and on-site fire protection service flow. ¾ inch water services shall be Polyethylene. 1.5 inch and 2 inch water services shall be Type K Copper. 3 inch water services and larger shall be Class 52 Ductile Iron Pipe.

Water mains shall be constructed of ductile iron pipe (Class 52 up to and including 12 inches in diameter, Pressure Class 350 for 16 inches and larger) and per the Water Standard Details.

New water mains that are provided for future extensions will be sized consistent with the City of Battle Ground Water System Plan, as interpreted by City staff. For locations not covered by the Comprehensive Plan, City staff will determine the necessary size during the development review process. For preliminary planning, size the new main according to the existing grid, or 8 inches diameter, whichever is larger.

Mains of a size larger than indicated above may be required based on fire flow needs and the water system pressure at a particular location.

In certain cases, the City may require a water main that is larger than needed by the development alone. If this oversized main is 12 inch or more in diameter, the City may provide water SDC credits for the difference between the larger main required, and the size of the main needed for the development alone.

Dead end mains 50 feet in length or shorter, which serve only a hydrant, shall be a minimum of 6 inches in diameter. Dead end runs longer than 50 feet to a hydrant shall be a minimum 8 inches in diameter.

Dead end mains to the end of a residential cul-de-sac, where the water main can not be extended in the future, shall be minimum 8 inches in diameter to the last hydrant, and 4 inches in diameter past the last hydrant to the end. The diameter reduction is to minimize the amount of potentially stagnant water in the end of a main. However, wherever possible the main shall be looped. The Engineering Department shall determine if it is impossible to loop the line.

3-1.07 *Depth of Cover*

The minimum pipe cover is 3 feet for mains smaller than 12 inch and 4 feet for pipe 12 inches and larger, except for services as shown in the Water Standard Details. The cover shall not exceed 6 feet unless greater depth is required to avoid other utilities, or where special circumstances arise and greater cover is approved by the City.

3-1.08 *Coordination with Other Utilities and Water Main Profiles*

Parallel runs of water and sanitary sewer main shall be separated by 10 feet, edge to closest edge. If 10 feet separation is impossible, separations of between 5 feet and 10 feet may be approved, based on City staff review and on the guidance in Washington Department of Ecology's "Criteria for Sewage Works Design". Sewer mains should cross under water mains and be separated by 18 inches vertically. Where sewer mains cross over water mains, there shall be minimum 18 inches of vertical separation and the sewer mains shall be constructed of ductile iron pipe or other approved material, and the sewer main joints shall be located as far as possible from the water main. Oblique crossings (close to parallel) shall be avoided.

The water main shall be located more than 5 feet from other non-sanitary-sewer utility pipes, measured center-to-center. An edge-to-edge separation of 3 feet may be allowed where no reasonable alternative exists, if approved by the City of Battle Ground.

To facilitate coordination with other utilities, and City staff review of proposed water facilities, water main profile drawings must be included for all mains 12 inches or more in diameter. Profile drawings should show all crossings with other utilities. Water mains must be deflected vertically, or vertical bends must be used, as necessary, to provide 6 inch minimum crossing clearance with other utilities (18 inches minimum crossing clearance where water mains cross below sewer mains).

3-1.09 *Air Release, Vacuum Release, and Blow-Off Valves*

A combination air-vacuum release valve, Water Standard Detail WA-4.1, shall be installed at designated high points in 8 inch in diameter or larger main line runs. The release valve may not be required if a fire hydrant is close to the high point.

Standard blowoff assemblies, Water Standard Detail WA-4.2, shall be installed at designated low points in 8 inch diameter and larger mains, and near the end of dead-end mains that will not be extended in the future. The blowoff may not be required if a fire hydrant is close to the end of the main.

Standard temporary construction blowoff assemblies shall be installed in the plug at the end of water mains to be extended later, per Water Standard Detail WA-4.3.

3-1.10 *Isolation Valves*

Isolation valves must be installed to facilitate new connections to the system and to provide for the isolation of pipe segments during maintenance. Generally three isolation valves per tee and four isolation valves per cross are required. At least one isolation valve per 1000 feet of main run must be installed.

Where tees or crosses are installed to provide for both new and future connections, isolation valves should be located so as to minimize loss of service when the future connection is made.

3-1.11 *Restrained Joints*

Bends, tees, dead ends, valves, and all reducers shall be supported from separation by mechanical restraints. There must be no unrestrained joints within a sufficient distance from the fitting to provide the necessary earth support and frictional resistance. This distance must be calculated by accepted engineering methods, such as the calculative methods provided by the Ductile Iron Pipe Research Association (see Resources). Design assumptions are indicated in Water Standard Detail WA-3.2.

Restrained joints must be Megalug or approved equal. Tie rods may not be used for buried water mains. Thrust blocks are not allowed.

Isolation valves for hydrants shall be located or restrained such that the hydrant can be removed for maintenance without the closed valve being displaced due to water pressure. This is normally achieved by a flange by mechanical joint (MJ) valve being bolted to an MJ by flange branch tee in the street main, per Water Standard Detail WA-3.0. Where the hydrant isolation valve is not at a tee, additional restrained joints upstream from the valve may be required.

Underground flanged joints are only allowed for restraining valves installed for "Live Taps", fire hydrants, or fire protection services. They can not be used elsewhere, because of the difficulty of achieving the precise alignment needed for flanged joints during field repair.

All the joints on fire hydrant mains including the tee are to be restrained. Thrust blocks for hydrants shall not be allowed.

Two adjacent MJ fittings, or a valve and adjacent MJ fitting, may be joined with a Foster adapter or similar approved product.

3-1.12 *Deflection at Pipe Joints*

Water main pipe joints can be deflected to achieve a non-linear alignment, provided the deflection at each joint does not exceed 80% of the maximum allowed by the connection. The deflection angle shall be stated on the civil plans.

3-1.13 *Cross-Connection Control*

The prevention of non-potable water or any harmful substance from entering the distribution system is extremely important to public safety. The City of Battle Ground recognizes the Washington State Department of Health regulations (WAC 246-290-490) with regard to the protection of the public via minimum requirements for design, construction, operation, and maintenance of public water supplies. All developers or applicants constructing public water mains or facilities should be familiar with, and comply with, these requirements. These referenced regulations and standards are the minimum required and the City specifically reserves the right to require additional safety features and items as may be deemed appropriate by the City. Water Standard Details WA-5.0 to WA-5.3 provides some guidance as to when backflow prevention devices are required. For other information or interpretation contact the Engineering Department.

3-1.14 *Water Demand versus Meter Size*

For water services that require more flow than available through a standard 5/8 inch-3/4 inch residential meter, the water meter size requested should be sized to serve the expected peak and continuous demands. Guidance for the safe maximum operating capacity and the recommended rate for continuous operation can be found in the American Water Works Association Standards, C-700 through C-710. General guidance can be found in the American Water Works Association Manual of Water Supply Practices, "Sizing Water Service Lines and Meters", M22.

The minimum diameter for a new service pipe is 1 inch. The service pipe shall be reduced at the meter as necessary.

3-1.15 *WSDOT/Railroad Crossings*

The developer shall obtain and make full payment for any permits required from WSDOT/railroad prior to constructing a water main under any highway or railroad tracks. The permit should be on behalf of the City of Battle Ground. All requirements of the permit shall be met prior to acceptance of any construction. Requirements usually include boring with a steel casing for installation of the main.

3-2 CONSTRUCTION REQUIREMENTS

3-2.01 *General*
Materials and construction methods shall be in conformance with the most current version of the Standard Specifications for Road, Bridge & Municipal Construction as prepared by Washington State Department of Transportation. All references to American Water Works Association (AWWA) specifications shall mean their latest revision. Operation of or connection to existing city water facilities shall only be performed under the observation of authorized city personnel.

3-2.02 *Ductile Iron Pipe*
All water main pipe furnished shall be new ductile iron (DI) pipe conforming to the requirements of AWWA C151. Pipe sizes 12 inch and smaller shall be Class 52 and pipe 16 inch and larger shall be Class 51 or Pressure Class 350, unless otherwise noted on the plans. All pipe shall be furnished in 18 to 20 foot lengths and shall be cement lined per AWWA C104. All rubber gasket joints for ductile iron shall conform to the requirements of AWWA C111.

3-2.03 *Ductile Iron or Cast Iron Fittings*
All fittings shall conform to the requirements of AWWA C110 or C153. Fittings shall be of the size, type, and type of joint as called for on the plans. All fittings shall have a pressure rating of 350 psi minimum. All fittings shall be ductile iron. All ductile iron fittings shall be cement or fusion bonded epoxy lined. Fusion bonded epoxy lined fittings shall conform to the requirements of AWWA C509. All compact fittings shall be ductile iron, cement lined, and have a pressure rating of 350 psi. All rubber gasket joints for ductile iron fittings shall conform to the requirements of AWWA C111. All reducers shall be restrained. All vertical elbow installations shall be engineered, and calculations submitted with plans to the City's Engineering Department for approval. Bolts for buried flanged fittings shall be galvanized, zinc-cadmium plated, or low alloy steel and coated with 2 coats of bitumastic coating after installation. Bolts for mechanical joints shall be NSS Cor-Ten steel or ductile iron only. No flange by flange fittings are allowed, flange by mechanical joint fittings are only allowed on fire hydrant and fire protection tees, "live taps", compound meters, DCVA, and RPBA.

3-2.04 *Restrained Joint Pipe*
All Restrained Joint Pipe, as called for on the plans, shall be TR Flex by US Pipe, Lok Ring by American Pipe, or approved equal.

3-2.05 *Allowable Restraint Systems*
On water main fittings and valves 12 inch in diameter and smaller, mechanical joint restraining glands, Megalug brand or approved equal, are required. See "Design Requirements: Restrained Joints" Section 1-1.11 regarding the number of joints adjacent to a fitting that must be restrained. The minimum working pressure rating of restrained joint systems shall be 350 psi. Restraining gaskets may be used where thrust restraint is required for push-on joint (tyton) pipe, 12 inch or smaller. Restraining gaskets shall be US Field Lok or approved equal and installed per manufacturer's written instructions. Tie rods for joint restraint shall not be allowed.

3-2.06 *Valves*
Resilient-seated gate valves may be used for valve installations of 8 inch and smaller and shall be used on all fire hydrant and fire protection service lines. Resilient-seated gate valves shall conform to AWWA C509 or C515 and shall be epoxy coated on the inside. Butterfly valves may be used for valve installations of 6 inch and 8 inch, except for fire hydrant and fire protection installations. Butterfly valves shall be used for all valve installations of 10 inch and larger. Butterfly valves shall conform to AWWA C504 and shall be Class 150-B with short body. Butterfly valves shall be required to have a minimum of 28 turns to move from fully open to fully closed. The operator shall be mounted directly on the valve with no exposed or external couplings. Units shall be fully gasketed and grease packed. Valves shall be installed with the operator on the side of the pipe nearest the road centerline. All valves shall be furnished

with an underground manual (AWWA 2 inch square) operating nut with a counterclockwise rotation. Install the operator nut such that the depth from finish grade to the operator nut is 18 to 36 inches. Valves shall be installed directly to tees and crosses, spools are not allowed. No flange by flange valves shall be allowed.

3-2.07 ***Valve Boxes***
Valve boxes shall be Fort Vancouver Pattern No. 910, cast iron or approved equal. Valve box extensions shall be one piece and constructed of 6 inch ASTM D 3034 SDR 35 PVC pipe. Valve boxes not set in paved areas shall be set in a concrete or asphalt pad per Water Standard Detail WA-3.1.

3-2.08 ***Standard Air Release Valves***
Manual and Combination Air Release Valves are to be furnished as called for in the plans. Valves shall be of the size indicated and shall be suitable for a working pressure of 150 psi. All Air Release Valves shall be installed at the crest of pipe runs. Valves shall be APCO No. 145C or approved equal.

3-2.09 ***Standard Blowoff Assembly***
Standard blowoff assemblies are to be placed 1 foot from the end of a dead end main, when that main will not be extended. Standard blowoff assemblies shall be placed at low points in the main, as indicated in the plans, to allow for main cleaning.

Temporary construction blowoff assemblies shall be placed on the end of water mains that will be extended, or connected to at a later date.

3-2.10 ***Tapping Sleeves***
Tapping sleeves shall be rated at 150 psi working pressure with ANSI/AWWA C207 Class D 150 pound flanges or equivalent stainless steel pattern. All sleeves shall be designated by the manufacturer as suitable for the service proposed. All fabricated steel tapping sleeves shall have fusion-applied epoxy coating. All stainless steel tapping sleeves shall have stainless steel nuts and bolts. All bolts for the sleeve body shall be the drop-in type, not welded. All nuts and bolts shall be stainless steel (with nuts or bolts treated to prevent galling) or high-strength, low alloy steel bolts with the steel meeting ANSI/AWWA C111/A21.11 specifications. After a tap is made, all exposed areas of the pipe and sleeve shall be coated with either bitumastic coating or Brown primer and Trenton #1 wax or approved equal. Tapping sleeve gaskets shall be NSF approved for potable water. Sleeves shall be tested, on the pipe, at 150 psi for 15 minutes with no pressure drop prior to making the tap. All sleeves shall have a test outlet and plug. Sleeves furnished for ductile iron pipe taps, reduced outlet taps on steel pipe, or reduced outlet taps on cast iron pipe larger than 12 inches, shall be fabricated steel with outlet gasket. JCM 412, Dresser style 610, Smith-Blair 622, Romac FTS420, Ford FTSC, or approved equal. For reduced outlet taps on steel, JCM 422 is also approved. Size on size taps on steel pipe shall not be allowed. Tapping sleeves furnished for taps on cast iron 12 inches and smaller, or taps on asbestos cement, shall be stainless steel with full circumferential gasket: Romac SST III, JCM432, Smith-Blair 664/5, Dresser 630, Ford FTSS, or approved equal. Tapping sleeves for pipes not listed above must be approved by the City.

3-2.11 ***Tapping Valves***
Tapping valves shall have the same construction as specified for gate valves. The inlet end of valve shall be flanged and outlet end shall be a mechanical joint. Tapping valves shall be supported by an 8 inch by 8 inch concrete block prior to making the tap. Tapping sleeves and valves shall be used only when specifically called for in the plans.

3-2.12 ***Standard Fire Hydrant Assembly***
All fire hydrants shall conform to AWWA standard specifications (C502) for fire hydrants. All fire hydrants shall be of the latest design that the manufacturer is producing. All hydrants shall be 3 port with two 2-1/2 inch hose nozzles with national standard fire hose coupling screw thread, 7-1/2 threads per inch, and one 4-1/2 inch steamer nozzle with Storz quick connect fitting or equal.

Quick connect coupling: Aluminum alloy hydrant adapters shall be 5 inch and secured to steamer nozzle if adapter is threaded on steamer nozzle. Each unit shall have 1/4 inch #20 thread stainless steel set screws for permanently securing adapters to hydrant. Each unit will have a blind cap with plastic coated aircraft cable attaching it to the hydrant steamer post. Facing on the adapter shall be metal and not rubber gasketing to avert sticking during freezing weather conditions. The blind cap shall fit the adapter tight enough so that it cannot be removed without a spanner wrench.

All hydrant nozzle caps must be installed with gaskets. All hydrants shall have 'O' ring seals on the operating stem, and all working parts shall be of bronze and all 'O' ring surfaces shall be rust-free material. The compression hydrant operating threads shall be lubricated and shall be 'O' ring sealed from water, moisture and foreign matter. The operating nut shall be 1-1/2" square. The center of the lowest port shall be minimum 17 inches from the ground bury mark.

All hydrants shall be constructed with mechanical joint connections and provisions shall be made to automatically drain the barrel in order to protect the unit from freezing. The barrel shall be a minimum 7 inches interior diameter and of such length as to be suitable for installation with connections to piping. Minimum barrel length shall be 28-1/4 inches. All working parts shall be removable through the top of the hydrant without the necessity of digging.

All hydrants shall have the interior and exterior prepared and coated or painted per AWWA standard C502. The exterior of the barrel shall be factory painted with safety yellow. The Storz adapter shall not be painted. Mechanical restraint shall be used on all fire hydrants. Thrust blocks are not allowed on fire hydrants.

3-2.13 *Trench Excavation, Bedding, and Backfill*

The existing road surface shall be cut in a neat line by saw or wheel cutting prior to removal. Trench backfill shall be according to the backfill section, shown on the plan and/or the right-of-way permit. Per restoration details, all excess material not used for trench backfill shall be removed and disposed of by the contractor. Placement of backfill shall be brought up at substantially the same rate on both sides of the pipe and care shall be taken so that the pipe is not floated or displaced.

During construction, the contractor shall stockpile the excavated trench materials so as to do the least damage to adjacent lawns, gardens, shrubbery, trees or fences, regardless of the ownership of these areas. All excavated materials shall be removed from these areas, and these surfaces shall be left in a condition equivalent to, or better than their original condition and free from all rocks, gravel, boulders, or other foreign material.

Replace topsoil areas as specified. All existing drainage ditches and culverts shall be reopened and graded, and original drainage restored. All damaged irrigation lines, house drainage pipe, drain tiles, sewer laterals, and culverts shall be repaired or replaced. All clearing, grubbing, and stripping shall be performed in advance of excavation operations.

All weeds, roots, trash, debris, and similar objectionable materials shall be removed from excavation areas. All asphalt rubble, rocks, trash, or debris shall be hauled away. Asphalt pavement shall be neatly saw-cut at designated limits and shall be removed and hauled away.

3-2.14 *Compaction of Backfill*

The contractor shall conduct periodic testing of backfill compaction, using a nuclear densometer, at intervals of the City inspector's choosing. The contractor shall provide safe trench conditions at all times for testing at any depth. Compaction control tests to determine optimum moisture content and maximum density shall be by the following methods:

A. For granular materials - Method of test for compaction of granular materials (WSDOT Materials Manual Test Method No. 606).

B. Field moisture and density of backfill material shall be determined by the Nuclear Moisture/Density Gauge.

The contractor shall fill all open trenches at the completion of each day's work or plate with city inspector approval. Open trenches over night shall not be allowed. Trenches filled but not compacted shall be re-excavated the following working day and compacted according to these specifications.

3-2.15 ***Cutting and Plugging Existing Pipe***

Where shown on the plans, the contractor shall cut and plug the existing main. The existing main, which is to be abandoned, shall have a concrete plug poured around and in the end of the pipe to be abandoned and the part of the main which is to remain shall have a new metal plug installed on the existing pipe, cross, or tee, or shall be connected to the new fitting or pipe with thrust restraint. All valve boxes on mains which are abandoned (cut and plugged) shall be removed and the holes shall be patched to match finished surface.

Cutting of all pipe and specifically asbestos cement pipe shall conform to the latest rules and regulations of the Department of Labor and Industries.

3-2.16 ***Water Services and Meters***

Water services are to be installed by the contractor and inspected by the city. Call (360) 342-5071 48 hours in advance. Water meters will be installed by the City when the following have been satisfied:

1) Acceptance of newly installed mains and services by the Construction Inspector including:
    a) Disinfection, flushing, and testing of mains
    b) Submittal and approval of record drawings
2) Payment of required hookup fees and main charges
3) Completion of requirements per the right-of-way permit from the Construction Inspector, which will occur just prior to issuance of the Certificate of Occupancy

*) City personnel will not install the meter if the meter box or its contents is out of compliance with the City's water meter detail

The minimum water service size to be installed shall be ¾ inch in diameter and constructed of a material consistent with "Design Requirements: Water Pipe Materials and Size" Section 1-1.06.

3-2.17 ***Abandoning Water Service***

If an existing meter is to be taken out of service, when the main is not being abandoned, the service shall be abandoned by turning off the corporation stop at the main, followed by cutting and plugging the service just after the corporation stop, and removing the meter set (yoke), angle stop, etc.

3-2.18 ***Hydrostatic Testing***

All sizes of pipe shall be tested hydrostatically as per the requirements of section 7-09.3(23) in the most current version of the *WSDOT Standard Specifications*, or at 200 psi for 30 minutes with no pressure drop.

3-2.19 ***Disinfecting Water Mains***

Disinfection and bacteriological testing of water mains shall conform to the requirements of AWWA C651. Flushing shall be per the requirements of section 7-09.3(24)A in the most current version of the *WSDOT Standard Specifications*. Discharges to the storm system shall be de-chlorinated to a concentration of 0.1 ppm or less, pH-adjusted, if necessary, and volumetrically and velocity controlled to prevent re-suspension of sediments per NPDES Phase II Stormwater Permit S5.C.3.b.ii.

3-2.20 *Preventing Reverse Flow*

Pipelines that have not been disinfected may be connected to the existing distribution system with a pre-tested closed inline valve and only at points approved by the Engineer. The contractor shall supply documentation from the valve supplier certifying that the valve has been pre-tested.

3-3 RESOURCES

American Water Works Association Standards, covering many aspects of water supply, treatment, and distribution.

City of Battle Ground, "Battle Ground Municipal Code Title 13: Water and Sewers," available from Battle Ground's website: *http://www.cityofbg.org*.

City of Battle Ground, Water Standard Details, available from the Engineering Department, City Hall, 109 SW 1st Street, Battle Ground, Washington or the City's website: *http://www.cityofbg.org*.

Ductile Iron Pipe Research Association (DIPRA), Birmingham, Alabama, "Installation Guide for Ductile Iron Pipe," Chapter 5, Restraining Thrusts, and DIPRA computer program, "Thrust Restraint for Ductile Iron Pipe."

Great Lakes Upper Mississippi River Board of State Public Health & Environmental Managers, Recommended Standards for Water Works (also known as 10-State Standards), latest version.

Washington Department of Ecology, Water Quality Program, Publication #98-37 WQ, "Criteria for Sewage Works Design (Orange Book)".

Washington State Department of Health, Environmental Health Programs, Division of Drinking Water, "Water System Design Manual", DOH #331-123, June 1999. Post-1999 revisions are available on: *http://www.doh.wa.gov/ehp/dw/publications/design.htm*.

Washington State Department of Transportation, Standard Specifications for Road, Bridge, and Municipal Construction, M41-10, latest version adopted by the City of Battle Ground.

3-4 WATER STANDARD PLAN DETAIL SHEETS

Standard Plan Description and Numbers

WATER STANDARD DETAILS		
Detail	**Number**	**Latest**
Water General Notes	WA-1.0	9/21/07
Backflow Prevention General Notes	WA-1.1	9/24/07
1" Water Service	WA-2.0	9/24/07
1½" & 2" Water Service	WA-2.1	8/7/07
Compound Water Service	WA-2.2	9/24/07
Fire Hydrant Assembly	WA-2.3	9/24/07
Hydrant Retaining Wall	WA-2.4	4/16/07
Main Line And Valves	WA-3.0	8/7/07
Standard Valve Box And Cover	WA-3.1	4/16/07
Mechanical Restraints	WA-3.2	4/16/07
Typical Trench Backfill And Bedding	WA-3.3	9/24/07
Standard Manual Air Release Valve	WA-4.0	4/16/07
Combination Air Release Valve	WA-4.1	4/16/07
Standard Blowoff Assembly	WA-4.2	9/24/07
Temporary Construction Blowoff Assembly	WA-4.3	4/16/07
Pipe And Casing	WA-4.4	4/16/07
Standard Double Check Valve Assembly (2" & Smaller)	WA-5.0	4/16/07
Standard Double Check Valve Assembly (2.5" & Larger)	WA-5.1	4/16/07
DCVA Installation	WA-5.2	9/24/07
Standard Reduced Pressure Backflow Assembly (2" & Smaller)	WA-5.3	9/24/07
Standard Reduced Pressure Backflow Assembly (2.5" & Larger)	WA-5.4	4/16/07
Standard Fire Protection Backflow Installation Locations	WA-6.0	9/24/07
Single-Family Water Meter/Backflow Installation Locations	WA-6.1	9/24/07
Non Single-Family Water Meter/Backflow Installation Locations	WA-6.2	9/24/07
Testing Schedule	WA-7.0	4/16/07

WATER GENERAL NOTES

GENERAL:

1. ALL MATERIALS AND CONSTRUCTION METHODS SHALL BE IN CONFORMANCE WITH THE LATEST EDITION OF THE "CITY OF BATTLE GROUND CONSTRUCTION STANDARDS" AND THE LATEST EDITION OF THE "STANDARD SPECIFICATIONS FOR ROADS, BRIDGES AND MUNICIPAL CONSTRUCTION" HEREINAFTER REFERRED TO AS THE "STANDARD SPECIFICATIONS" PREPARED BY THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION, EXCEPT AS NOTED HEREIN OR ON THE STANDARD PLANS. ALL REFERENCES TO AWWA AND/OR APWA SPECIFICATIONS SHALL MEAN THEIR LATEST REVISION.

2. ALL WATER LINE CONSTRUCTION IS SUBJECT TO INSPECTION AND APPROVAL BY THE CITY OF BATTLE GROUND, PRIOR TO COVER. ALL TESTING SHALL BE APPROVED PRIOR TO PAVING. THE CONTRACTOR SHALL NOTIFY THE ENGINEERING OFFICE AT LEAST 48 HOURS PRIOR TO THE START OF CONSTUCTION. A PRE-CONSTRUCTION MEETING IS REQUIRED PRIOR TO THE BEGINNING OF CONSTRUCTION.

3. ALL PIPES FURNISHED SHALL BE NEW, AND CONFORM TO THE REQUIREMENTS OF AWWA DI CL52.

4. A TRAFFIC CONTROL PLAN IS REQUIRED PRIOR TO CONSTRUCTION WITHIN A CITY OR CLARK COUNTY RIGHT-OF-WAY.

5. WHERE EXISTING SERVICE MUST BE INTERRUPTED, THE CONTRACTOR SHALL OBTAIN APPROVAL FROM THE CITY AND NOTIFY ALL CUSTOMERS AFFECTED AS TO THE DATE AND DURATION OF THE INTERRUPTION. NOTIFICATION MUST BE DONE TWO (2) WORKING DAYS IN ADVANCE OF INTERRUPTION. THE CONTRACTOR SHALL SCHEDULE CONSTRUCTION TO PROVIDE MINIMUM INTERRUPTION OF SERVICES AS DETERMINED BY THE INSPECTOR. UNDER NO CIRCUMSTANCES SHALL A CONTRACTOR SCHEDULE A WATER MAIN SHUT-DOWN WITHOUT THE REQUIRED 48 HOUR NOTICE. THE CONTRACTOR SHALL NOT OPERATE THE CITY'S WATER FACILITIES WITHOUT APPROVAL FROM THE CONSTRUCTION INSPECTOR.

6. WHEN EXTENDING AN EXISTING LINE THE CONTRACTOR IS REQUIRED TO INSTALL A VALVE AT THE END OF THE LINE IF ONE DOES NOT EXIST PRIOR TO MAKING A CONNECTION TO THE NEW LINE. THE VALVE MUST REMAIN CLOSED UNTIL THE NEW LINE HAS BEEN TESTED AND ACCEPTED BY THE CITY. AS AN ALTERNATIVE THE CONTRACTOR MAY CONSTRUCT AND TEST THE NEW LINE PRIOR TO MAKING THE FINAL CONNECTION TO THE EXISTING LINE. THE LINE MUST BE ACCEPTED BY THE CITY BEFORE MAKING THE FINAL CONNECTION.

7. CONTRACTOR TO CONTACT FIRE DISTRICT 11 AT (360) 687-2171 FOR FIRE FLOW TEST PRIOR TO ENGINEERING ACCEPTANCE.

WATER METERS:

8. ALL WATER METERS WILL BE FURNISHED AND INSTALLED BY THE CITY.

WATER GENERAL NOTES					PLAN #
THE CITY OF BATTLE GROUND	CITY OF BATTLE GROUND APPROVED CITY ENGINEER 9/24/07 DATE	REVISIONS:	DATE:	DRAWN:	DESIGNED:
		1	8/12/98	BSG	GGH
		2	8/30/05	ALL	MCH
		3	4/16/07	JMH	MCH
		4	9/21/07	MCH	MCH
					WA-1.0

1. All reduced pressure and backflow devices shall be Washington State approved.

2. Fire sprinkler and irrigation systems shall be protected with State approved backflow protection.

3. All commercial, industrial and multi-family facilities shall be protected with Washington State approved backflow protection.

4. Further backflow prevention shall be required depending on water usage, i.e. boilers, chillers, chemical addition, booster pumps, wells etc.

5. All hosebibs shall be protected with vacuum breakers.

6. If chemicals are added to the Fire Protection System, a reduced pressure principle backflow preventer is required.

7. If a well is now existing on-site or is drilled in the future, a reduced pressure backflow assembly will be required at each meter.

8. Where a vault is required, a galv. steel wall mounted chamber ladder w/extensions is required and shall be centered under the access door.

9. Double check assemblies shall be installed in either an approved vault or inside the building in a mechanical room.

10. Reduced pressure assemblies shall be installed either outside above ground or inside the building.

11. All backflow devices shall be protected from freezing.

12. Backflow prevention assembly vaults (i.e.: fire and service protection) must be installed at the customer's side of the easement or property line. Alternate locations must be requested in writing and approved by City of Battle Ground Development Engineer prior to installation.

13. No part of the backflow prevention assembly shall be submerged in water or installed in a location subject to flooding. If a backflow prevention assembly is installed in a vault or basement, adequate drainage shall be provided.

14. All fire protection services shall have a iron body gate valve at the public main and shall be private after that valve.

15. All domestic services with backflow protection shall be private after the domestic water meter.

Mail test results to:

City of Battle Ground
Operations Center
109 SW 1st Street, Ste. 122
Battle Ground, WA. 98604
Fax# (360) 342-5359

BACKFLOW PREVENTION GENERAL NOTES

PLAN #

THE CITY OF BATTLE GROUND

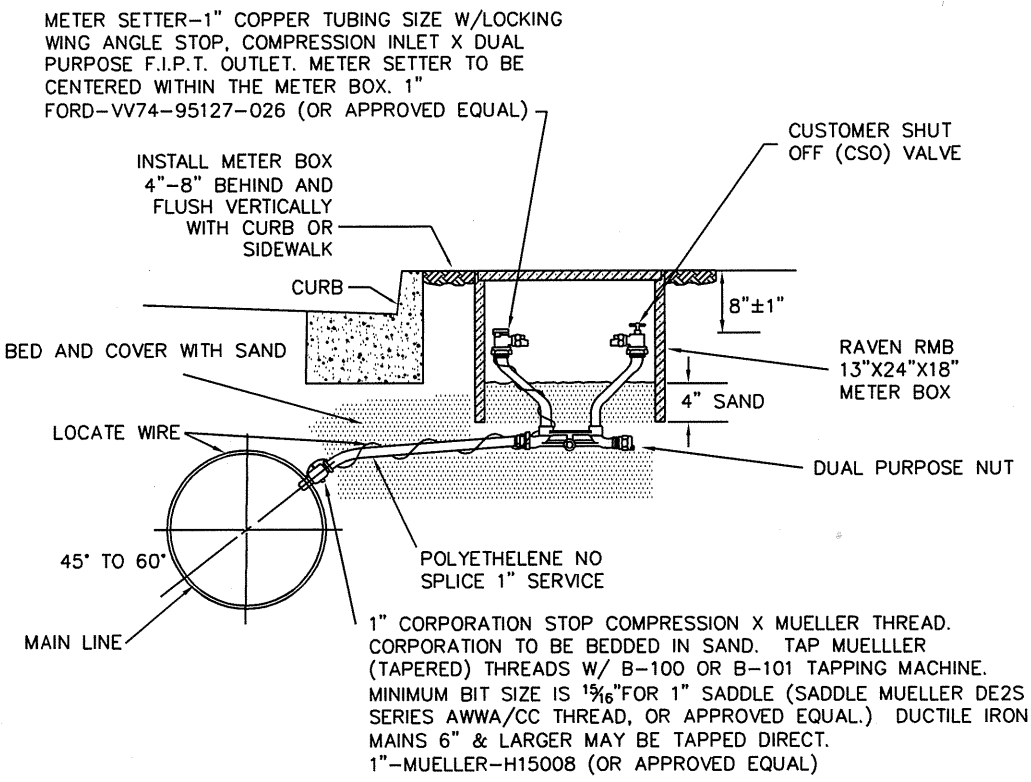
CITY OF BATTLE GROUND
APPROVED

9/24/07

CITY ENGINEER DATE

REVISIONS:	DATE:	DRAWN:	DESIGNED:
1	4/16/07	JMH	MCH
2	9/24/07	MCH	MCH

WA-1.1



NOTES:

1. ALL METERS SHALL BE INSTALLED BY THE CITY OF BATTLE GROUND.
2. PRIOR TO CITY INSTALLATION OF METERS, ALL SERVICE APPLICATIONS MUST BE COMPLETED AND APPROVED, SERVICE FEES PAID IN FULL, AND AS–BUILTS SUBMITTED AND APPROVED.
3. CONTRACTOR SHALL CONTACT CITY ENGINEERING DIVISION AT (360) 342–5071, 48 HOURS PRIOR TO INSTALLING ANY WATER SERVICE CONNECTIONS.
4. METERS WILL NOT BE SET BY THE CITY PRIOR TO DISINFECTION OF THE MAIN AND SERVICE AND PRIOR TO A SUCCESSFUL BACTERIOLOGICAL TEST.
5. USE 1" POLYETHYLENE FROM CORP STOP TO METER SETTER MIN. 18" DEPTH BELOW PAVEMENT.
6. WATER SERVICES SHALL BE PRESSURE TESTED ALONG WITH THE MAIN. DURING PRESSURE TESTING THE MAIN SHALL BE OPEN TO INSPECTION AT ALL CORPS.
7. ALL UTILITY CONNECTION APPLICATIONS MUST BE COMPLETED, APPROVED AND PAID IN FULL.
8. IF ALL THE ABOVE STANDARDS HAVE BEEN MET, YOU MAY CALL THE CITY AT (360) 342–5350 AND REQUEST INSPECTION & INSTALLATION. PLEASE ALLOW UP TO 48 HOURS FOR INSPECTION & INSTALLATION. PLEASE GIVE NAME OF SUBDIVISION, LOT #, ADDRESS AND UTILITY CONNECTION APPLICATION #.
9. LAY ONE PIECE LOCATE WIRE ALONG WITH POLYETHYLENE PIPE. CONNECT WIRE TO WATER MAIN & METER STOP.
10. METER BOX IS NOT ALLOWED IN HARD SURFACED AREAS WITHOUT PRIOR WRITTEN APPROVAL. METER BOX SHALL BE SLIGHTLY HIGHER (1/8" MAX.) THAN SURROUNDING GRADE AND MADE TO DRAIN AWAY FROM THE BOX.

1" WATER SERVICE

PLAN #

THE CITY OF BATTLE GROUND

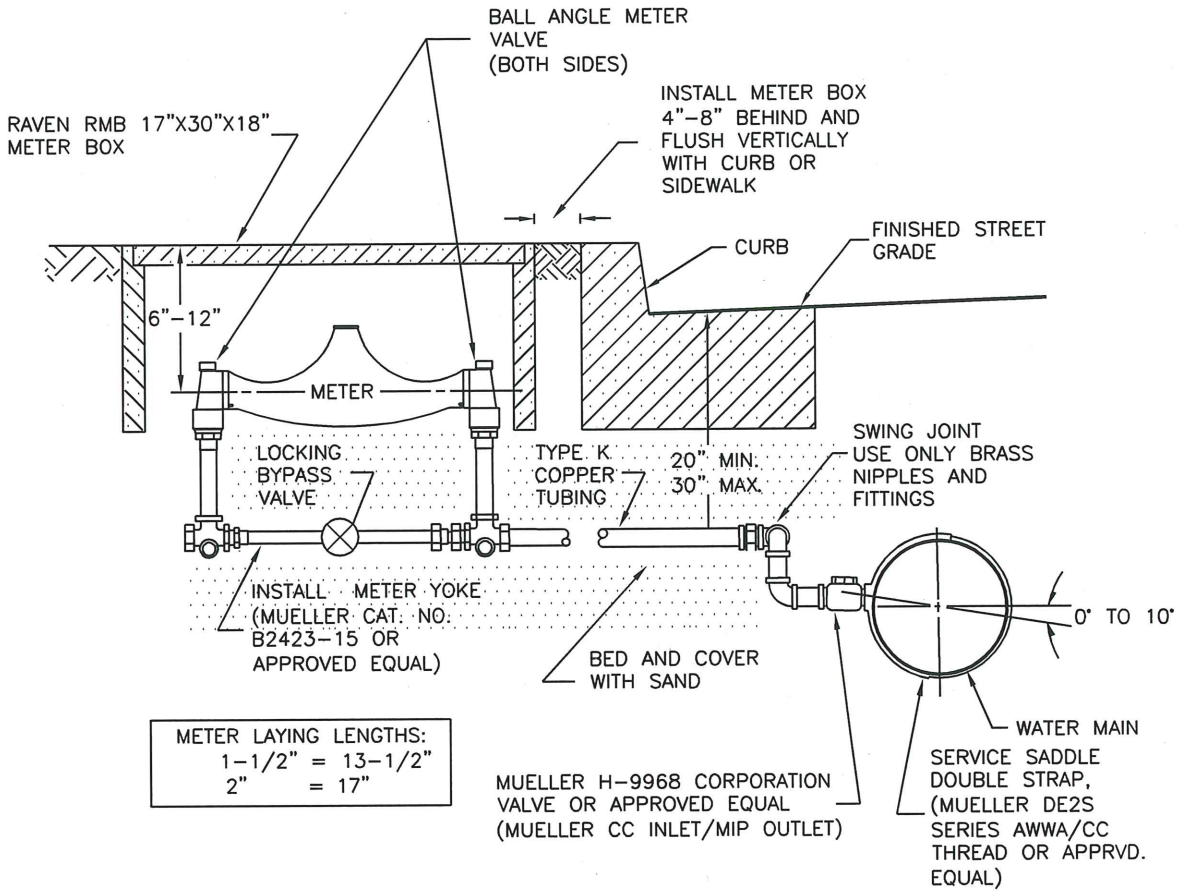
CITY OF BATTLE GROUND
APPROVED

9/24/07

CITY ENGINEER — DATE

REVISIONS:	DATE:	DRAWN:	DESIGNED:
1	3/02/07	JMH	MCH
2	4/16/07	CMS	MCH
3	8/7/07	MCH	MCH
4	9/24/07	MCH	MCH

WA–2.0



NOTES:

1. ALL METERS SHALL BE INSTALLED BY THE CITY OF BATTLE GROUND.
2. PRIOR TO CITY INSTALLATION OF METERS, ALL SERVICE APPLICATIONS MUST BE COMPLETED AND APPROVED. SERVICE FEES PAID IN FULL AND AS–BUILTS SUBMITTED AND APPROVED.
3. CONTRACTOR SHALL CONTACT CITY ENGINEERING DIVISION AT (360) 342–5071, 48 HOURS PRIOR TO INSTALLING ANY WATER SERVICE CONNECTIONS.
4. METERS WILL NOT BE SET BY THE CITY PRIOR TO DISINFECTION OF THE MAIN AND SERVICE, AND PRIOR TO A SUCCESSFUL BACTERIOLOGICAL TEST.
5. WATER SERVICES SHALL BE PRESSURE TESTED ALONG WITH THE MAIN.
6. DURING THE PRESSURE TEST, THE MAIN SHALL BE OPEN FOR INSPECTION OF ALL CORPORATION STOPS.
7. USE 1–7/8" BIT FOR ALL 2" SADDLE TAPS AND 1–3/8" BIT FOR 1–1/2" SADDLE TAPS.
8. METER BOX IS NOT ALLOWED IN HARD SURFACED AREAS WITHOUT PRIOR WRITTEN APPROVAL. METER BOX SHALL BE SLIGHTLY HIGHER (1/8" MAX.) THAN SURROUNDING GRADE AND MADE TO DRAIN AWAY FROM BOX.
9. BROOKS 65 METER BOX AND EXTENSION MAY BE ALLOWED WITH 1–1/2" METER SETS ONLY.

1–1/2" & 2" WATER SERVICE

PLAN #

THE CITY OF BATTLE GROUND

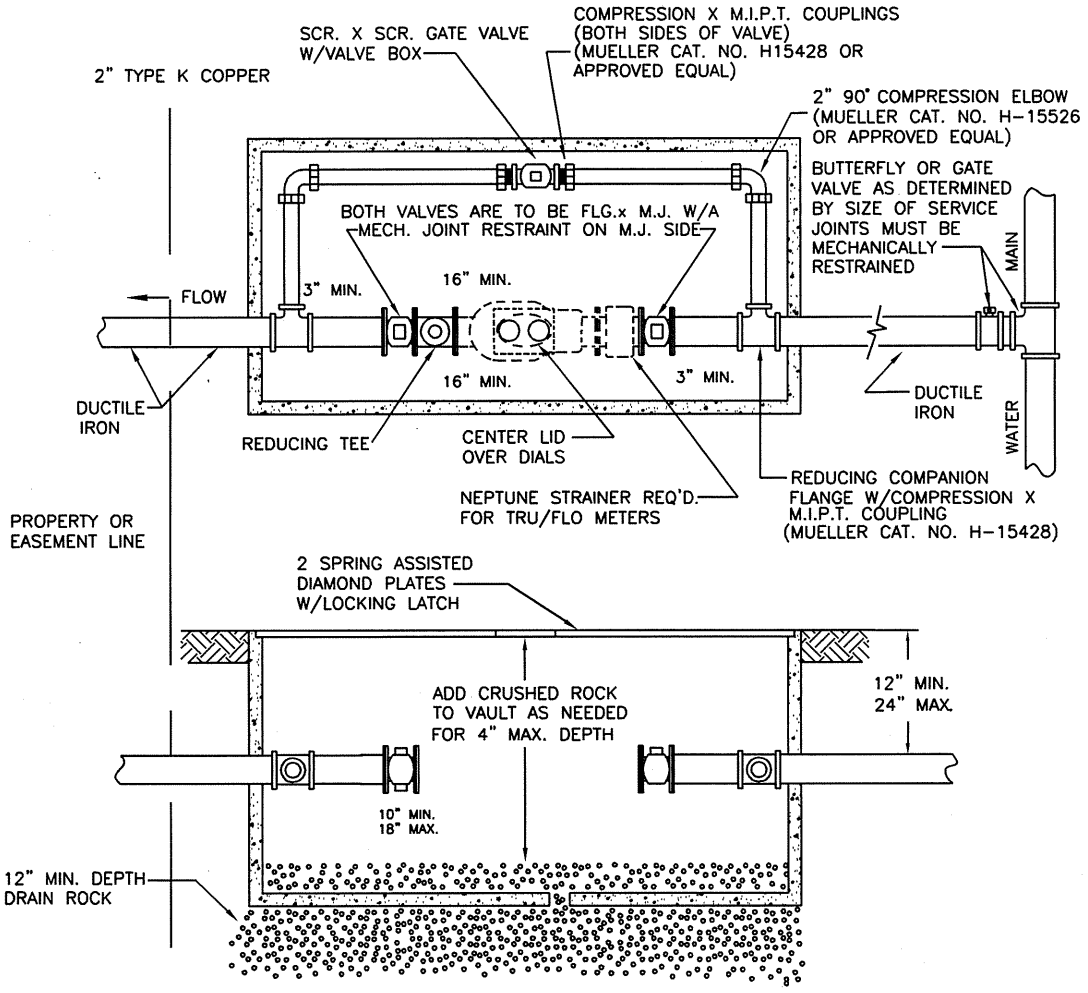
CITY OF BATTLE GROUND
APPROVED

8/22/01

CITY ENGINEER DATE

REVISIONS:	DATE:	DRAWN:	DESIGNED:
1	8/12/98	BSG	GGH
2	4/16/07	JMH	MCH
3	8/7/07	MCH	MCH

WA–2.1



VAULT

UTILITY VAULT CO. #575-LA-3660P
#676-WA-3660P W/#3660 GAL. LID

R.C.P. VAULTS #76632 W/#57-TL-B LID

VAULTS SHALL BE SIZED TO ALLOW FOR MIN. CLEARANCE.

IN SUSPECTED HIGH GROUND WATER AREAS, THE DRAIN MAY BE OMITTED IF APPROVED BY THE CITY WATER ENGINEER.

METER SIZE	BY-PASS LINE SIZE	BY-PASS MATERIAL
3"	2" MIN.	GAL.
4"	2" MIN.	GAL.
6"	4"	D.I.
8"	6"	D.I.

NEPTUNE STRAINER:
3" = #53107-000
4" = #53107-100
6" = #52000-201
8" = #52000-302

NOTES:

1. PRIOR TO METER INSTALLATION, GATE VALVES SHALL BE ALIGNED & SPACED W/RIGID SPOOL (DRILLED WITH HOLES SO AS NOT TO ALLOW WATER PASSAGE).
2. CITY TO SUPPLY METER SPACER, REDUCING TEE AND STRAINER. CONTACT CITY INSPECTOR 2 WEEKS PRIOR TO INSTALLATION.
3. TEN PIPE DIAMETERS OF STRAIGHT PIPE REQ'D. IN & OUT OF METER. (IF USING 6" PIPE, NO BENDS ALLOWED WITHIN 5' OF THE METER IN EITHER DIRECTION. FOR EXAMPLE: 6" x 10 = 60").
4. ALL METERS SHALL BE INSTALLED BY THE CITY OF BATTLE GROUND. CONTRACTOR TO INSTALL TEMP. SPACER AS PER NOTE 1.
5. METER BOX IS NOT ALLOWED IN HARD SURFACED AREA WITHOUT PRIOR WRITTEN APPROVAL. METER BOX SHALL BE SLIGHTLY HIGHER THAN SURROUNDING GRADE.

COMPOUND WATER SERVICE

PLAN #

THE CITY OF BATTLE GROUND

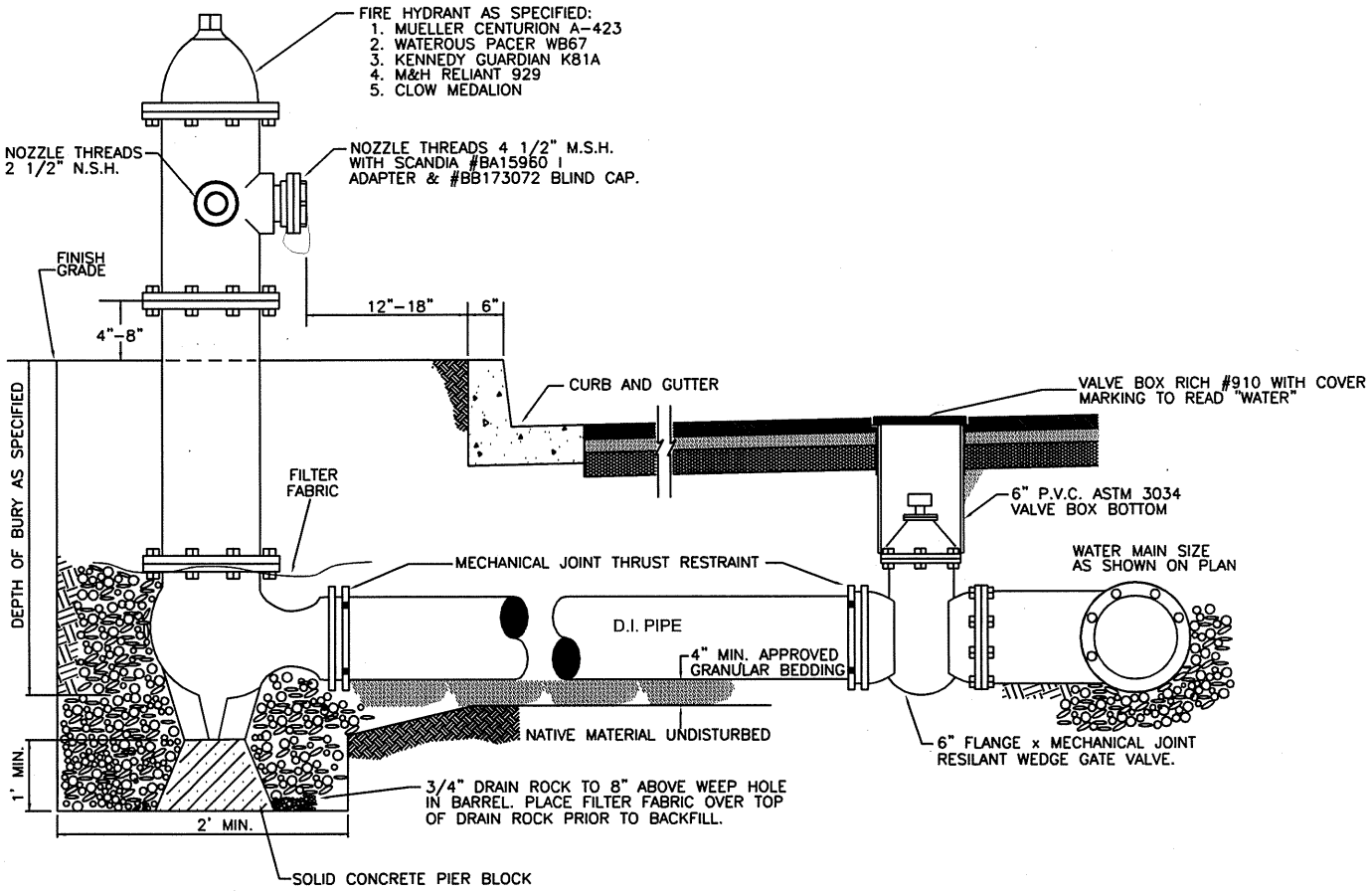
CITY OF BATTLE GROUND
APPROVED

9/24/07

CITY ENGINEER — DATE

REVISIONS:	DATE:	DRAWN:	DESIGNED:
1	8/12/98	BSG	GGH
2	4/16/07	JMH	MCH
3	9/24/07	MCH	MCH

WA-2.2



CONSTRUCTION NOTES:

1. FIRE HYDRANT INSTALLATIONS SHALL BE APPROVED BY THE CITY INSPECTOR PRIOR TO BACKFILLING.
2. IN GENERAL FIRE HYDRANT LOCATIONS SHALL BE AS SHOWN ON THE PLANS BUT SHALL CONFORM TO THIS DETAIL. FIRE HYDRANTS SHALL NOT BE SET UNTIL LOCATION AND DEPTH ARE APPROVED BY THE CITY.
3. NO DOMESTIC OR FIRE PROTECTION SERVICES SHALL BE TAPPED OFF OF THE FIRE HYDRANT PIPING.
4. A 4'X4'X4" CONCRETE PAD SHALL BE CENTERED AROUND THE FIRE HYDRANT.
5. CONCRETE PAD SHALL BE PLACED FLUSH IN ELEVATION AND ADJOINED W/BACK OF CURB (IF SIDEWALK IS DETACHED) OR BACK OF SIDEWALK (IF SIDEWALK IS ATTACHED). EXPANSION JOINT MATERIAL SHALL BE PLACED BETWEEN THE CONCRETE PAD AND CURB/SIDEWALK AND BETWEEN CONCRETE AND FIRE HYDRANT.
6. CONCRETE PAD SHALL BE FINISHED TO SIDEWALK STANDARDS.
7. ALL JOINTS SHALL BE RESTRAINED UTILIZING MECHANICAL RESTRAINT SYSTEMS. CONCRETE THRUST BLOCKS SHALL NOT BE ALLOWED.
8. FIRE HYDRANTS SHALL BE FACTORY PAINTED WITH SAFETY YELLOW HIGH GLOSS EQUIPMENT ENAMEL (TOUCH UP IF NECESSARY AFTER INSTALLATION).
9. FIRE HYDRANT MAINS SHALL BE 8" MIN., A 6" MAIN CAN BE USED FOR A DEAD-END RUN OF LESS THAN 50' TO A HYDRANT SUBJECT TO ADEQUATE FIRE FLOW.
10. PROVIDE A BLUE TYPE 2 RPM @ CENTERLINE ON HYDRANT SIDE OF STREET.

FIRE HYDRANT ASSEMBLY

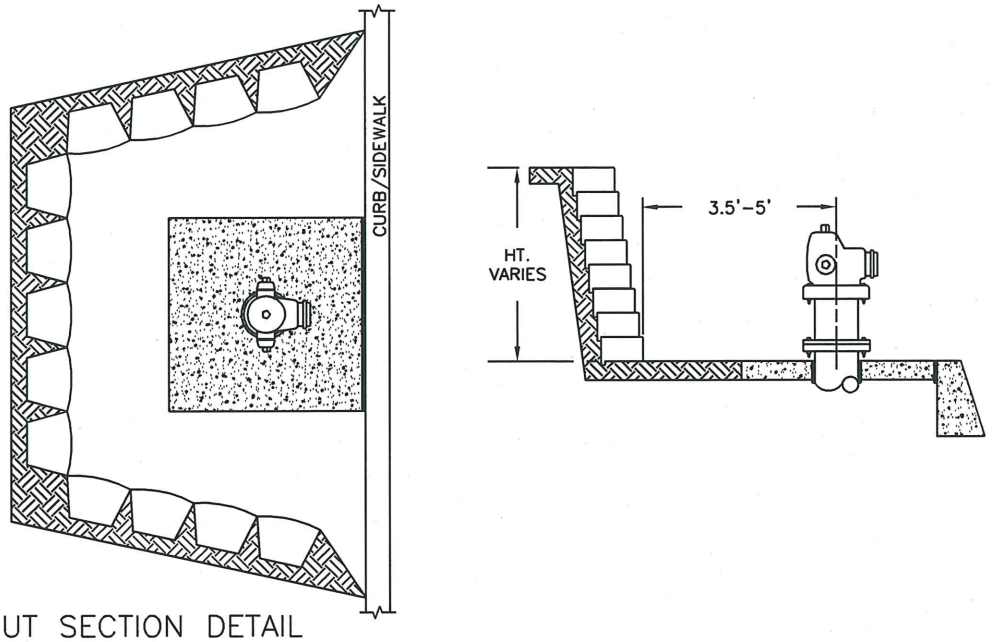
PLAN #

CITY OF BATTLE GROUND
APPROVED

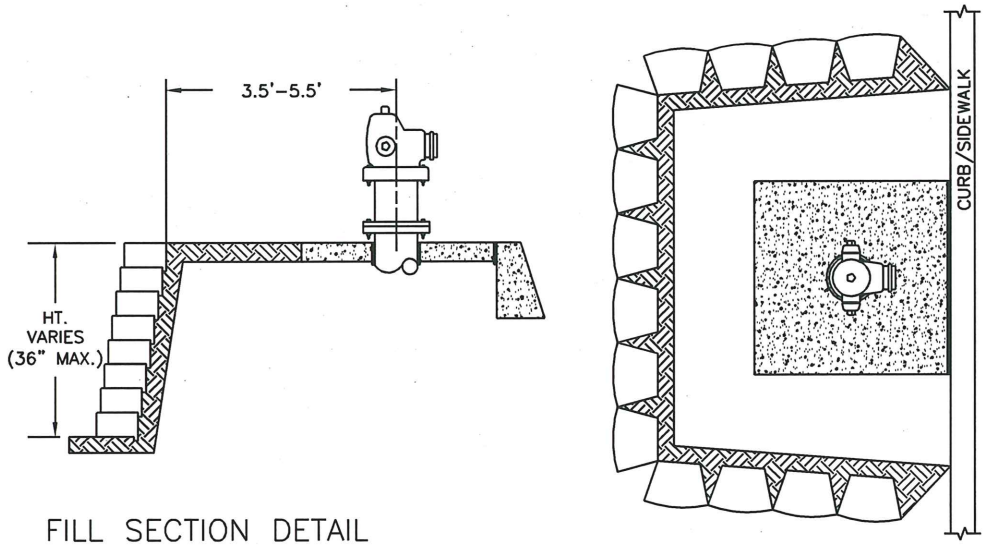
9/24/07
CITY ENGINEER — DATE

REVISIONS:	DATE:	DRAWN:	DESIGNED:
1	4/16/07	JMH	MCH
2	9/24/07	MCH	MCH

WA-2.3



CUT SECTION DETAIL



FILL SECTION DETAIL

NOTES:

1. CONSULT U.B.C. FOR RETAINING WALL CONSTRUCTION REQUIREMENTS.
2. THE AREA WITHIN THE RETAINING WALL BOUNDARIES FROM THE CURB/SIDEWALK TO THE REAR RETAINING WALL SHALL HAVE A MAXIMUM SLOPE OF 1% IN ANY DIRECTION.
3. THE 4'x4' CONCRETE PAD SHALL HAVE A MAXIMUM SLOPE OF 1%.
4. RETAINING WALL SHALL MAINTAIN A MINIMUM RADIUS OF 3.5' AROUND THE HYDRANT

HYDRANT RETAINING WALL

PLAN #

CITY OF BATTLE GROUND
APPROVED

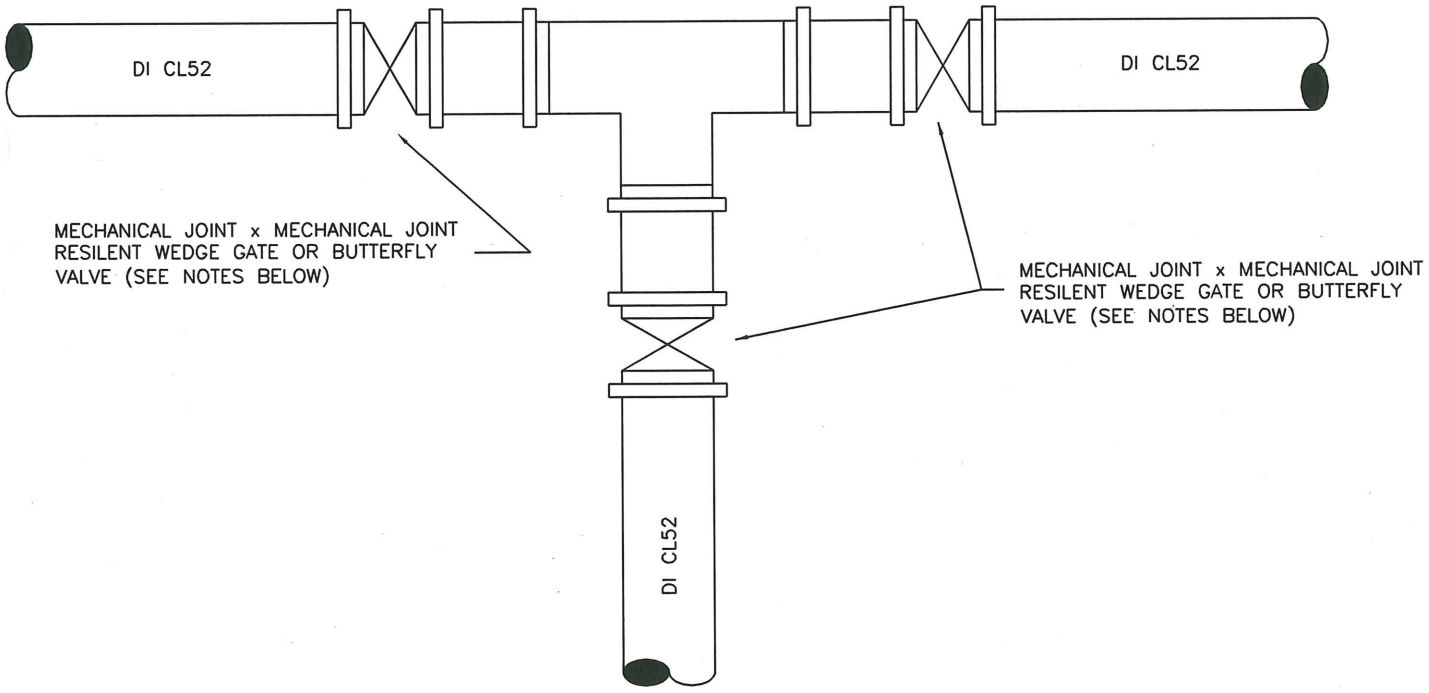
4/16/07

CITY ENGINEER DATE

REVISIONS:	DATE:	DRAWN:	DESIGNED:
1	4/16/07	JMH	MCH

WA-2.4

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NOTES:

1. USE DUCTILE IRON PIPE REQUIREMENTS.
2. VALVES TO BE INSTALLED AT ALL BRANCHES. FOR LONG MAIN LINE RUNS INLINE VALVE SPACING NOT TO EXCEED 1000'. LOOP WATER SYSTEM WHERE EVER POSSIBLE. KEEP DEAD ENDS TO A MINIMUM.
3. A NEW VALVE WILL BE INSTALLED AT POINT OF EXTENSION OF SAID LINE, TO PREVENT CROSS CONNECTION AND POSSIBLE CONTAMINATION OF EXISTING LINES.
4. NO DEVIATION ON THE NUMBER OF VALVES UNLESS AUTHORIZED IN WRITING BY THE CITY ENGINEER.
5. MECHANICALLY RESTRAIN ALL JOINTS.
6. RESILIENT-SEATED OR WEDGE GATE VALVES MAY BE USED FOR VALVE INSTALLATIONS OF 8 INCH AND SMALLER.
7. RESILIENT-SEATED OR WEDGE GATE VALVES SHALL BE USED ON ALL FIRE HYDRANT AND FIRE PROTECTION SERVICE.
8. RESILIENT-SEATED OR WEDGE GATE VALVES SHALL CONFORM TO AWWA C509 AND SHALL BE EPOXY COATED ON THE INSIDE.
9. BUTTERFLY VALVES SHALL BE USED FOR ALL VALVE INSTALLATIONS OF 10 INCH AND LARGER.
10. BUTTERFLY VALVES SHALL CONFORM TO AWWA C504 AND SHALL BE CLASS 150-B WITH SHORT BODY.
11. BUTTERFLY VALVES SHALL BE REQUIRED TO HAVE A MINIMUM OF 28 TURNS TO MOVE FROM FULLY OPEN TO FULLY CLOSED POSITION. THE OPERATOR NUT SHALL BE MOUNTED DIRECTLY ON THE VALVE WITH NO EXPOSED OR EXTERNAL COUPLINGS. UNITS SHALL BE FULLY GASKETED AND GREASE PACKED. VALVES SHALL BE INSTALLED WITH THE OPERATOR ON THE SIDE OF THE PIPE NEAREST THE ROAD CENTERLINE.
12. ALL VALVES SHALL BE FURNISHED WITH AN UNDERGROUND MANUAL OPERATOR WITH AN AWWA 2 INCH SQUARE OPERATING NUT AND SHALL OPEN WITH A COUNTER-CLOCKWISE ROTATION. VALVES SHALL BE FURNISHED WITH JOINTS AS CALLED FOR ON THE PLANS.

MAIN LINE AND VALVES

PLAN #

THE CITY OF BATTLE GROUND

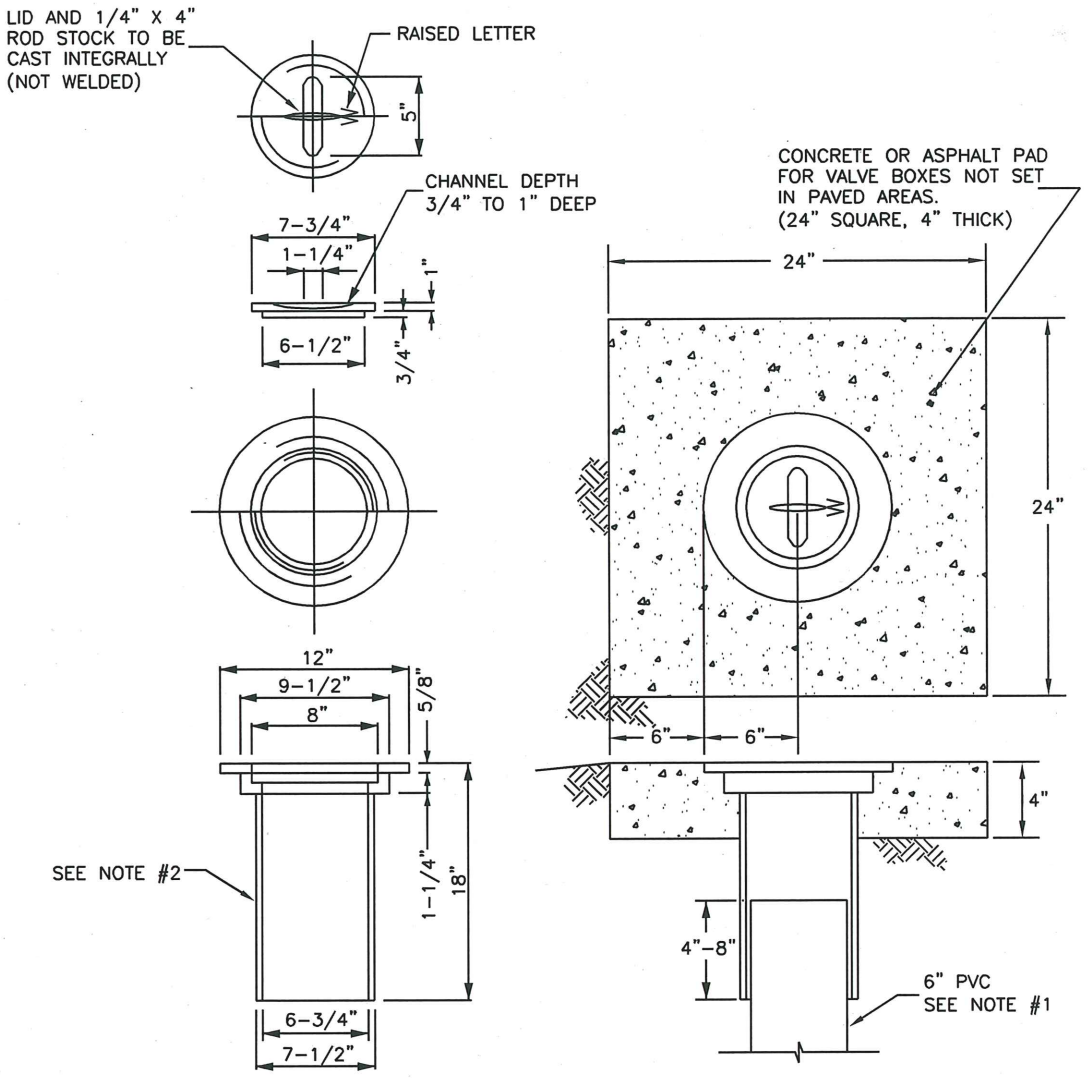
CITY OF BATTLE GROUND
APPROVED

CITY ENGINEER

9/22/07
DATE

REVISIONS:	DATE:	DRAWN:	DESIGNED:
1	8/12/98	BSG	GGH
2	8/30/05	ALL	MCH
3	4/16/07	JMH	MCH
4	8/7/07	MCH	MCH

WA-3.0



NOTES:

1. EXTENSIONS SHALL BE 6" ASTM D 3034 SDR 35 PVC PIPE (ONE PIECE)
2. VALVE BOX SHALL BE U.S. FILTER/PACIFIC WATER WORKS NO. 910 OR EQUAL.
3. THERE SHALL BE 1/2" CLEARANCE UNDER THE PIN CAST INTO THE LID.
4. THE OPERATOR NUT SHALL HAVE A DEPTH FROM 18"-30" FROM FINISH GRADE TO THE OPERATOR NUT.

STANDARD VALVE BOX AND COVER

PLAN #

THE CITY OF BATTLE GROUND

CITY OF BATTLE GROUND
APPROVED

9/16/07

CITY ENGINEER DATE

REVISIONS:	DATE:	DRAWN:	DESIGNED:
1	8/12/98	BSG	GGH
2	4/16/07	JMH	MCH

WA-3.1

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Mechanical Restraints

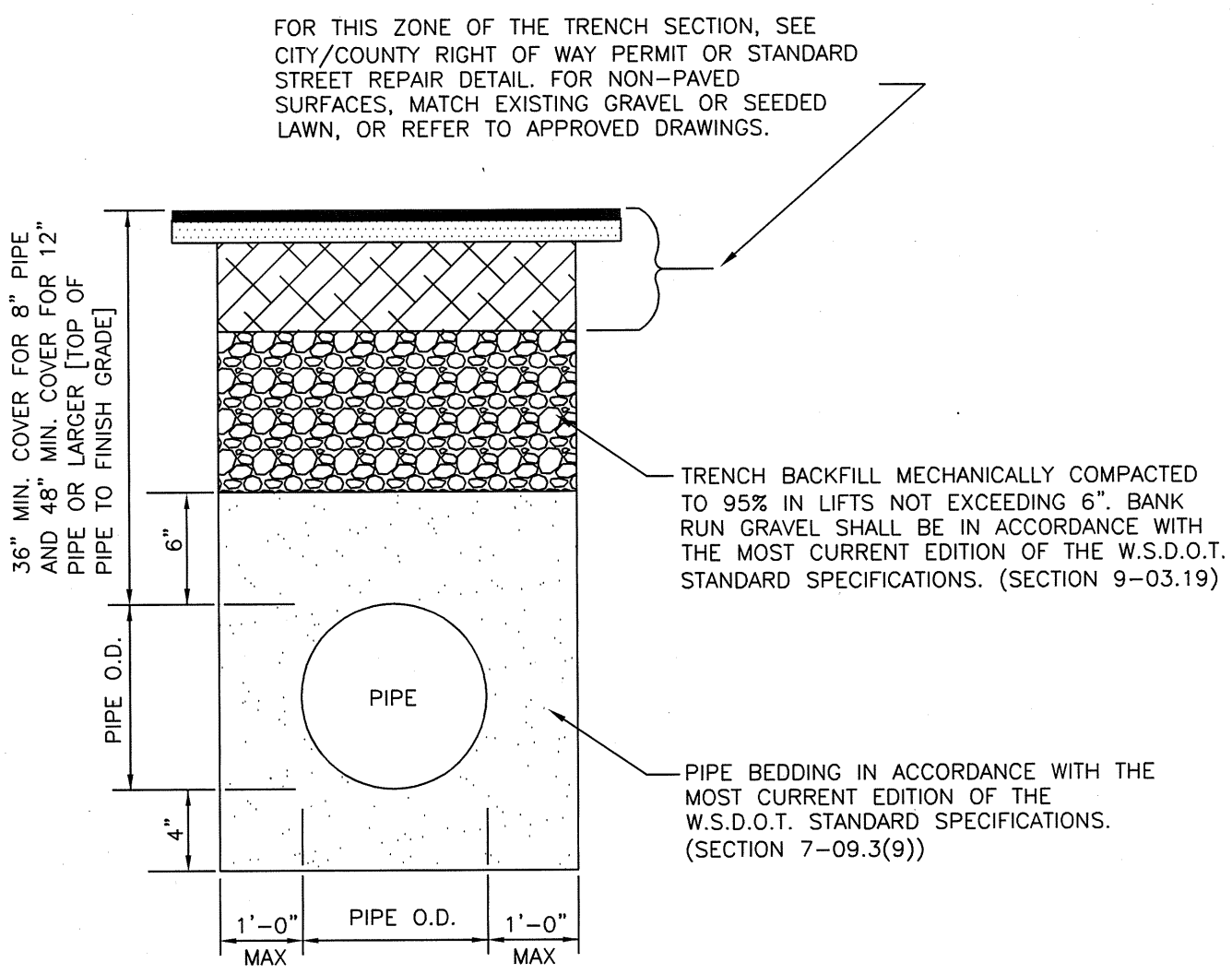
Bends, tees, dead ends, valves, and all reducers shall be supported from separation by mechanical restraints. There must be no unrestrained joints within a sufficient distance from the fitting to provide the necessary earth support and frictional resistance. This distance must be calculated by accepted engineering methods, such as the calculative methods provided by the Ductile Iron Pipe Research Association (DIPRA). The following assumptions need to be made for restraint design for water lines requiring restraints:

1. Assume a Type 5 laying condition per Standard Detail WA-3.3.
2. Provide what soil designation was used in the calculations.
3. Use a design pressure of 200 psi.
4. Use a safety factor of 1.5.
5. Model tees and crosses as 90° bends. Required restrained length shall be used for all three legs of tee or four legs of the cross.
6. Restraint lengths need to be listed on the water plan sheet of the engineering plans.

Note: The above assumptions are based on the DIPRA program.

MECHANICAL RESTRAINTS					PLAN #
THE CITY OF BATTLE GROUND	CITY OF BATTLE GROUND APPROVED CITY ENGINEER 5/9/07 DATE	REVISIONS:	DATE:	DRAWN:	DESIGNED:
		1	4/16/07	JMH	MCH
					WA-3.2

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NOTE:

1. OVERSIZE MATERIAL (4"+) SHALL NOT BE ALLOWED IN TRENCH.
2. COMPACTION PERCENTAGES REFER TO RELATIVE DRY DENSITY AS DETERMINED BY STANDARD PROCTOR AASHTO MODIFIED T 180
3. ALL EXISTING PAVED SURFACES SHALL BE SAW CUT A MINIMUM OF 6" OUTSIDE OF EDGE OF TRENCH TO PROVIDE A NEAT STRAIGHT EDGE.
4. THE EDGES OF ALL EXISTING ASPHALT SURFACES SHALL BE CLEANED AND A TACK COAT SHALL BE APPLIED. ALL JOINTS SHALL BE SAND SEALED.
5. ALL BACKFILL SHALL BE MECHANICALLY COMPACTED IN LIFTS WHICH IN NO CASE EXCEED 12" LOOSE.

TYPICAL TRENCH BACKFILL AND BEDDING

PLAN #

THE CITY OF BATTLE GROUND

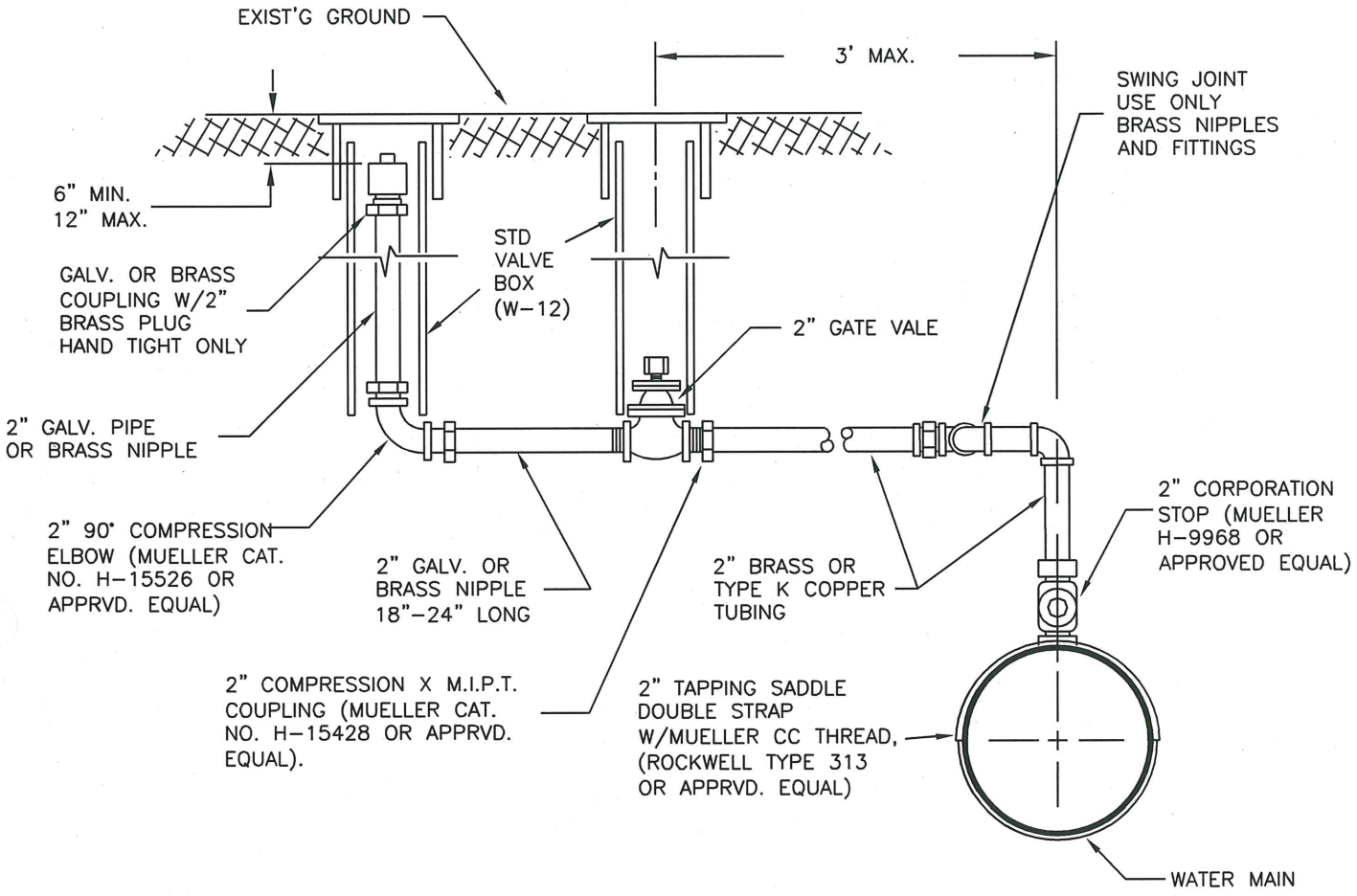
CITY OF BATTLE GROUND
APPROVED

9/24/07

CITY ENGINEER — DATE

REVISIONS:	DATE:	DRAWN:	DESIGNED:
1	4/16/07	JMH	MCH
2	9/24/07	MCH	MCH

WA-3.3



STANDARD MANUAL AIR RELEASE VALVE

PLAN #

CITY OF BATTLE GROUND APPROVED

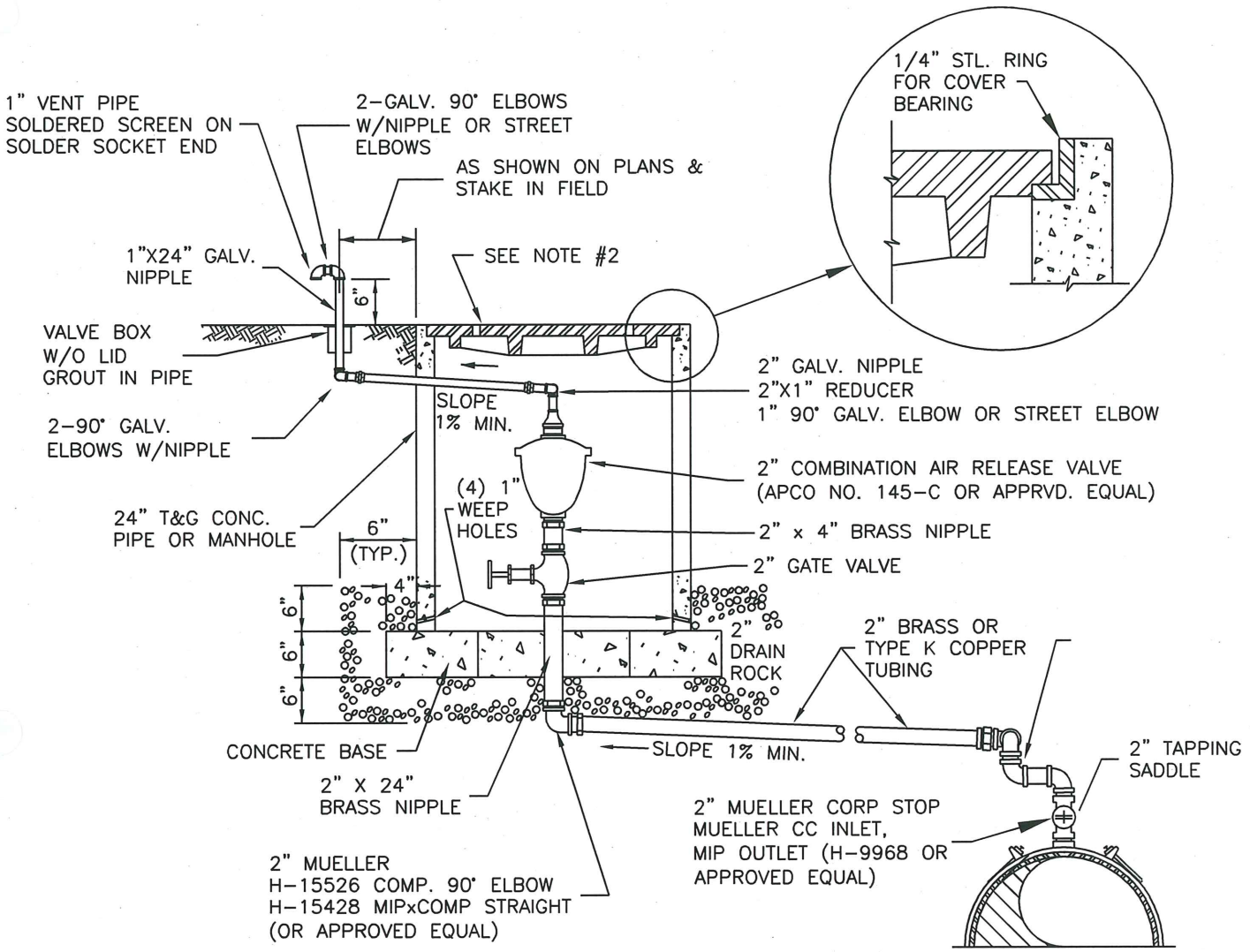
4/16/07

CITY ENGINEER — DATE

REVISIONS:	DATE:	DRAWN:	DESIGNED:
1	4/16/07	JMH	MCH

WA-4.0

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NOTE:

1. PLACE VENT AND AIR RELEASE UNIT ASSEMBLY OUTSIDE OF HARD SURFACED AREA IN R.O.W. OR 15' EASEMENT DEDICATED TO THE CITY OF VANCOUVER
2. MANHOLE COVER SHALL BE SALEM IRON WORKS NO. A2974 OR APPROVED EQUAL W/4 1/2" VENT HOLES ON 17" CIRCLE.

COMBINATION AIR RELEASE VALVE

PLAN #

THE CITY OF BATTLE GROUND

CITY OF BATTLE GROUND
APPROVED

CITY ENGINEER — DATE 4/16/07

REVISIONS:	DATE:	DRAWN:	DESIGNED:
1	4/16/07	JMH	MCH

WA-4.1

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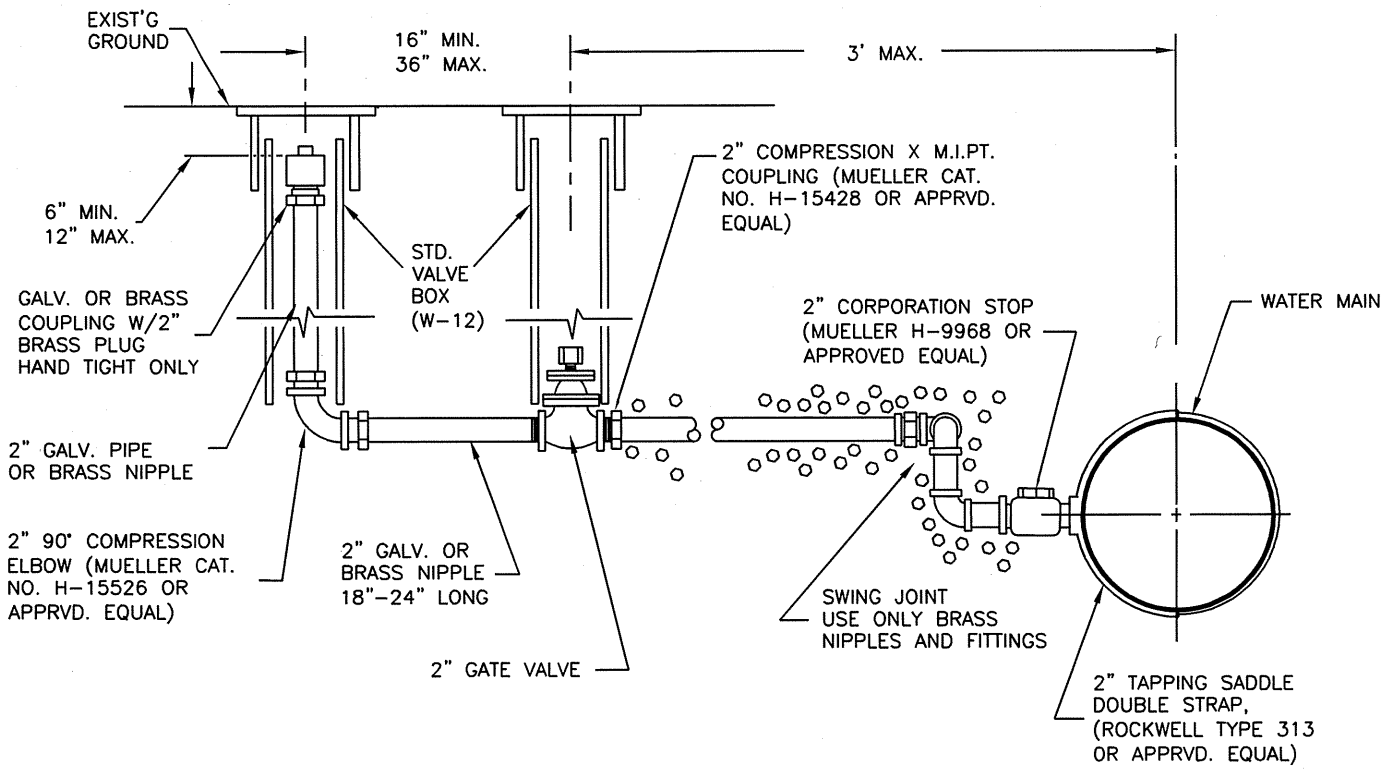


TABLE "A"

MAIN DIAMETER	BLOW-OFF DIAMETER
<12"	2" MINIMUM
≥12"	4" MINIMUM

NOTES:

1. BLOWOFFS SHALL BE INSTALLED 1' FROM THE END OF THE MAIN.
2. (5/8-) GRAVEL SHALL BE USED AS BEDDING AROUND THE SERVICE.
3. ALL PIPING UPSTREAM OF THE 2" GATE VALVE SHALL BE TYPE K COPPER OR BRASS

STANDARD BLOWOFF ASSEMBLY

PLAN #

THE CITY OF BATTLE GROUND

CITY OF BATTLE GROUND
APPROVED

9/24/07

CITY ENGINEER DATE

REVISIONS:	DATE:	DRAWN:	DESIGNED:
1	4/16/07	JMH	MCH
2	9/24/07	MCH	MCH

WA-4.2

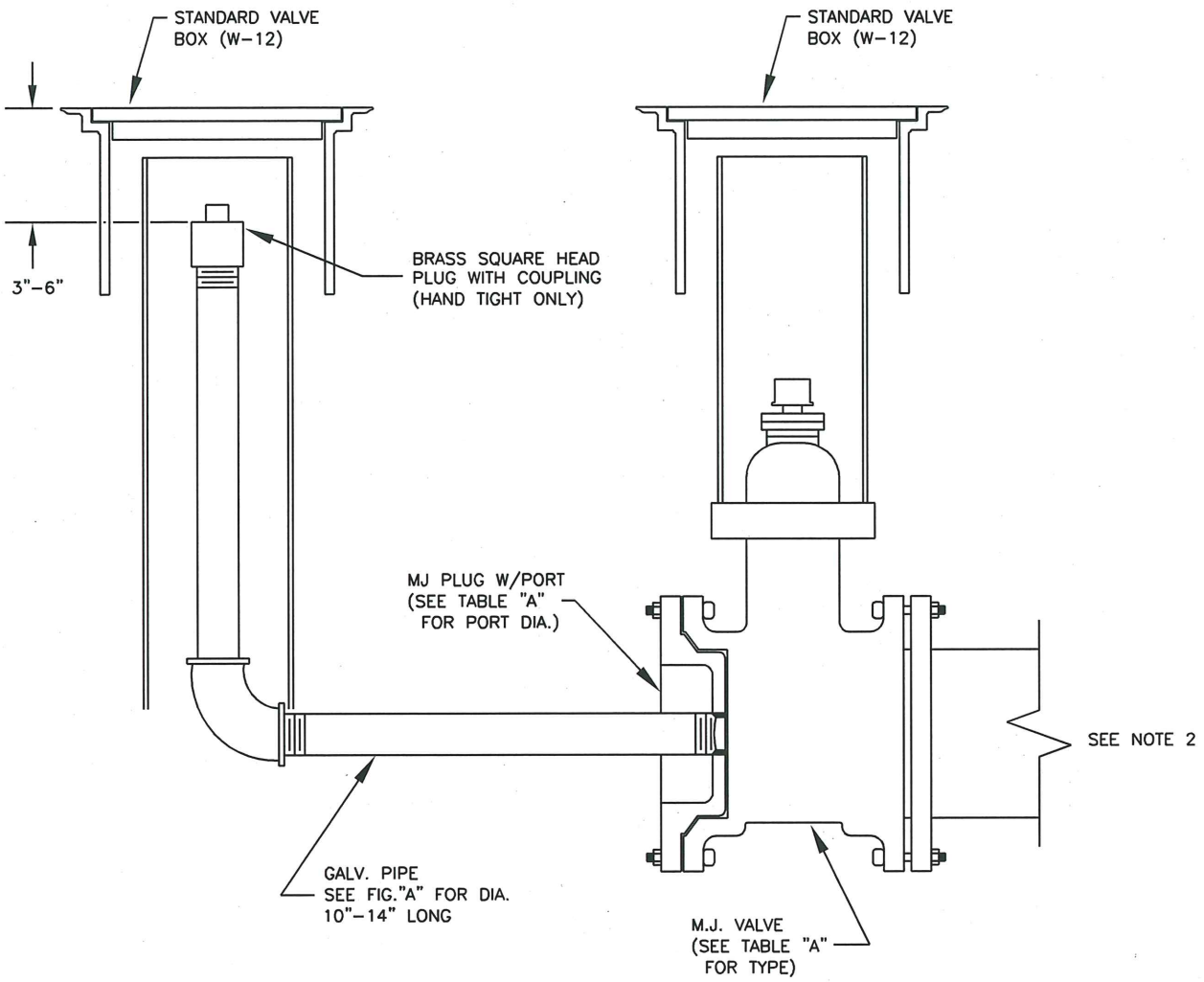


TABLE "A"

MAIN DIAMETER	VALVE TYPE	BLOW-OFF DIAMETER
<10"	GATE	2" MINIMUM
≥10"	BUTTERFLY	4" MINIMUM

TABLE "B"

MAIN DIAMETER	4"	6"	8"	10"	12"	14"	16"	18"
RESTRAINT LENGTH	54'	76'	98'	119'	108'	123'	138'	153'

NOTES:

1. SIZE OF BLOWOFF DETERMINED BY SIZE AND LENGTH OF MAIN
2. ALL JOINTS SHALL BE RESTRAINED UPSTREAM OF VALVE. SEE TABLE 'B' FOR MINIMUM RESTRAINT DISTANCES.
3. RESTRAINT LENGTHS FOR MAINS LARGER THAN 18" SHALL BE NOTED ON THE CIVIL PLANS PRIOR TO CIVIL PLAN APPROVAL.

TEMP. CONSTRUCTION BLOWOFF ASSEMBLY

PLAN #

CITY OF BATTLE GROUND APPROVED

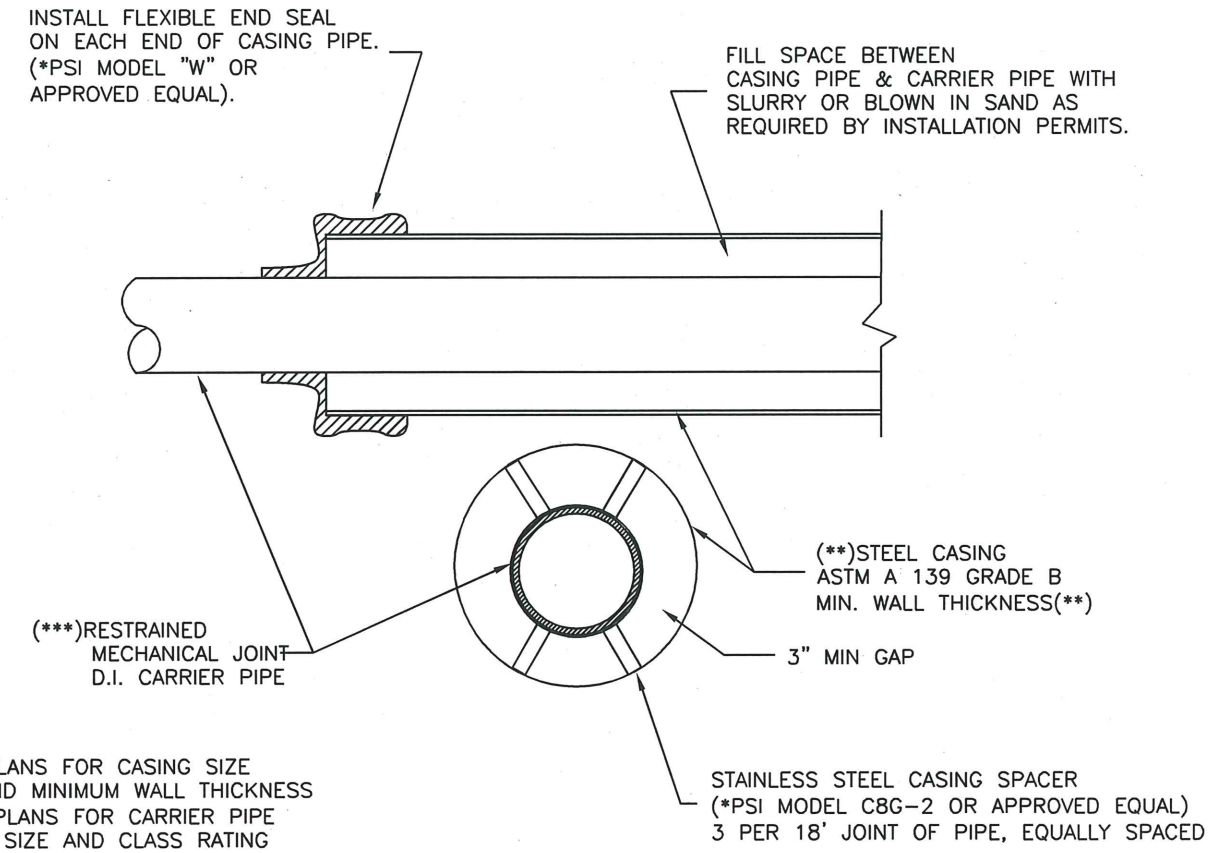
CITY ENGINEER

4/16/07
DATE

REVISIONS:	DATE:	DRAWN:	DESIGNED:
1	4/16/07	JMH	MCH

WA-4.3

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(**)SEE PLANS FOR CASING SIZE AND MINIMUM WALL THICKNESS
(***)SEE PLANS FOR CARRIER PIPE SIZE AND CLASS RATING
*Pipeline Seal and Insulator, Inc.

1. PUBLIC AND PRIVATE MAINS SHALL BE PLACED IN SEPARATE CASINGS.
2. FOR CASINGS UNDER RAILROAD TRACKS, WRITTEN PERMISSION FROM THE OWNER OF THE RAILROAD TRACKS IS REQUIRED PRIOR TO OBTAINING CITY OF BATTLE GROUND PERMITS TO PROCEED.
3. NO PRIVATE UTILITIES SHALL BE ALLOWED IN CITY OF BATTLE GROUND CASINGS.

PIPE AND CASING

PLAN #

CITY OF BATTLE GROUND
APPROVED

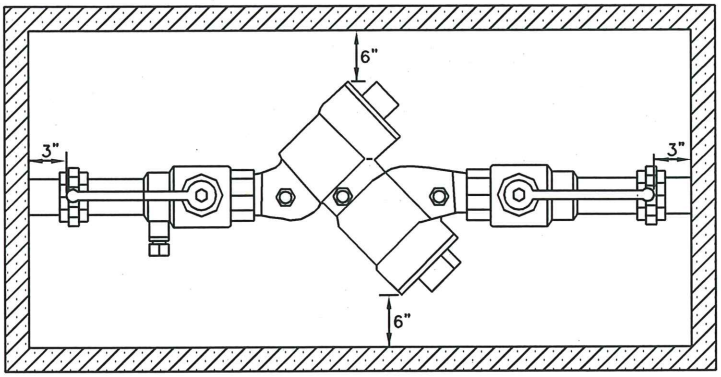
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CITY ENGINEER — DATE

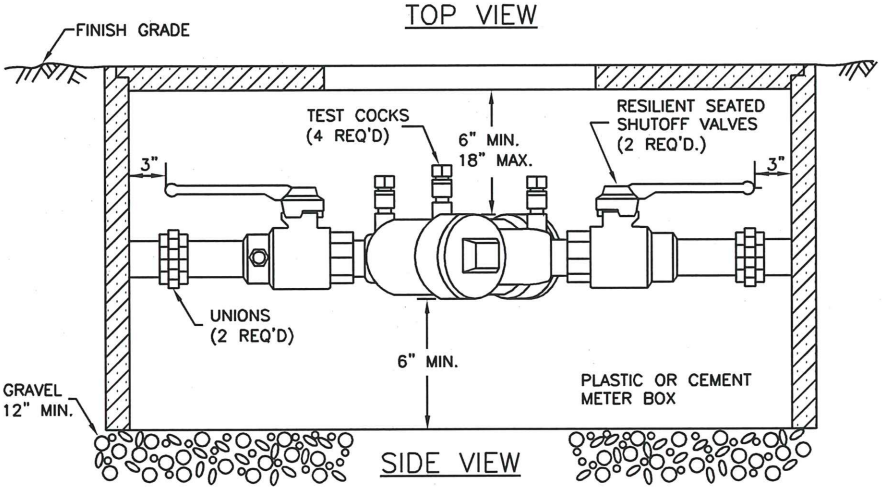
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1	4/16/07	JMH	MCH

WA-4.4

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TOP VIEW



SIDE VIEW

NOTES:

1. APPROVED DOUBLE CHECK VALVE ASSEMBLY (DCVA) TO LAY HORIZONTAL WITH GROUND. (VERTICAL ALLOWED IF APPROVED BY WA. DEPT. OF HEALTH)
2. DCVA MAY BE INSTALLED ABOVE OR BELOW GROUND PROVIDED ALL CLEARANCES ARE MET.
3. DESIGN FOR BACK SIPHONAGE AND BACK PRESSURE.
4. TEST COCKS TO EITHER FACE OUTWARDS OR UPWARDS FROM ASSEMBLY.
5. THOROUGHLY FLUSH LINES PRIOR TO INSTALLATION OF BACKFLOW PREVENTER.
6. DO NOT INSTALL IN AN AREA SUBJECT TO FLOODING.
7. DCVA MUST BE ACCESSIBLE.
8. PROTECT DCVA FROM FREEZING.
9. DCVA SHALL BE APPROVED BY THE STATE OF WASHINGTON
10. A PLUMBING PERMIT IS REQUIRED–CONTACT THE APPROPRIATE JURISDICTION'S PERMITS COUNTER
11. DCVA MUST BE TESTED AFTER INSTALLATION, THEN ANNUALLY BY A WA. STATE CERTIFIED BACKFLOW TESTER. RESULTS SHALL BE SENT TO THE CITY WATER QUALITY SERVICES.

STANDARD DOUBLE CHECK VALVE ASSEMBLY 2" AND SMALLER

PLAN #

THE CITY OF BATTLE GROUND

CITY OF BATTLE GROUND
APPROVED

4/16/07

CITY ENGINEER DATE

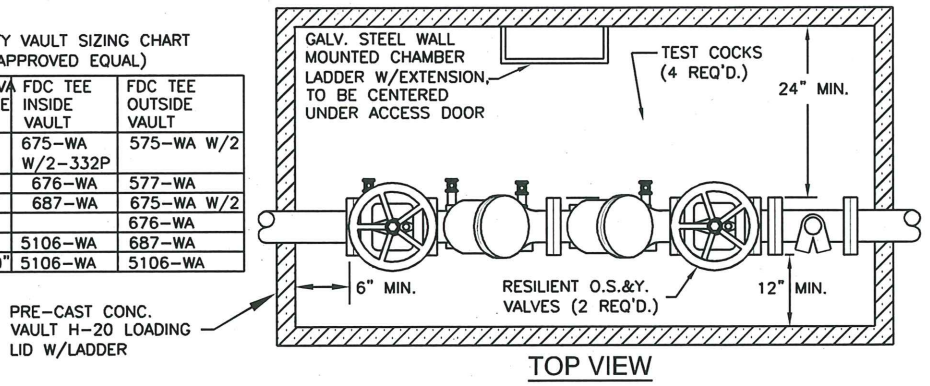
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WA–5.0

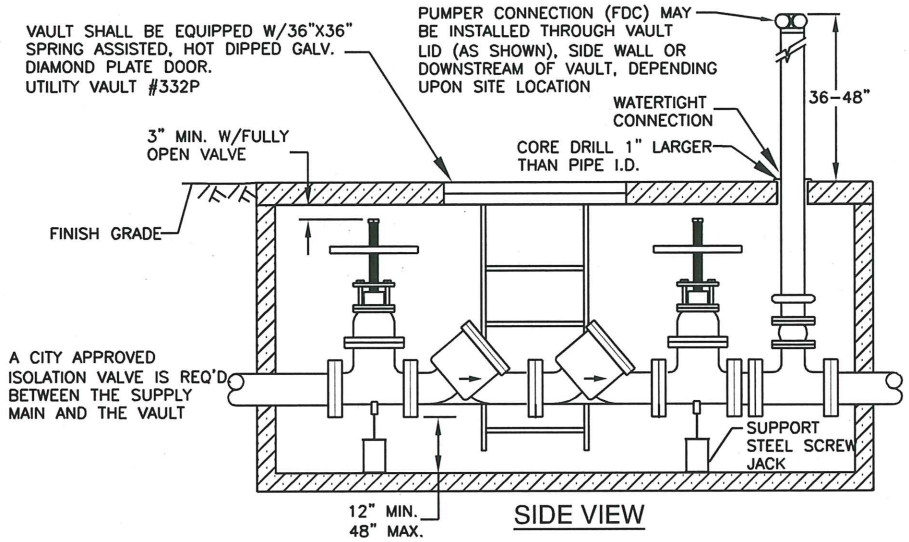
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UTILITY VAULT SIZING CHART
(OR APPROVED EQUAL)

PIPE DEPTH UP TO	DCVA SIZE	FDC TEE INSIDE VAULT	FDC TEE OUTSIDE VAULT
4'	4"	675-WA W/2-332P	575-WA W/2
6'	4"	676-WA	577-WA
4'	6"	687-WA	675-WA W/2
6'	6"		676-WA
6'	8"	5106-WA	687-WA
6'	10"	5106-WA	5106-WA



TOP VIEW



SIDE VIEW

NOTES:

1. DCVA MUST BE ON DEPT. OF HEALTH APPROVED LIST.
2. THE DCVA MAY BE INSTALLED ABOVE OR BELOW GROUND PROVIDED ALL CLEARANCES ARE MET.
3. APPROVED DCVA TO LAY HORIZONTAL WITH THE GROUND. (VERTICAL IF APPROVED BY DEPT. OF HEALTH)
4. THE WATER LINE SHALL BE DISINFECTED, FLUSHED AND PRESSURE TESTED PRIOR TO INSTALLING THE BACKFLOW ASSEMBLY. THE DCVA SHALL BE PROTECTED FROM FREEZING AND FLOODING.
5. ALL PIPE, VALVE AND FITTING JOINTS, FROM SUPPLY MAIN, SHALL BE FLANGED OR RESTRAINED.
6. GROUT PIPE ENTRANCE AND EXIT, IN VAULT, WITH WATERTIGHT GROUT.
7. ALL VAULTS SHALL BE PRE-APPROVED BY THE FIRE MARSHALL PRIOR TO INSTALLATION.
8. DCVA SHALL BE INSTALLED AT THE PROPERTY LINE OR EASEMENT LINE, THE BUILDINGS FALL HEIGHT AWAY FROM THE BUILDING AND ON OWNER'S PROPERTY.
9. DCVA SHALL HAVE A MINIMUM OF 3' CLEARANCE FROM ALL STRUCTURES.
10. DCVA SHALL BE TESTED AFTER INSTALLATION AND PRIOR TO ACCEPTANCE AND ALSO YEARLY THEREAFTER BY A WASHINGTON STATE CERTIFIED BACKFLOW ASSEMBLY TESTER. TEST RESULTS SHALL BE SENT TO THE CITY OF BATTLE GROUND OPERATIONS CENTER.
11. PROVIDE 2" DRAIN TO DAY LIGHT OR SUMP PUMP TO STORM POND.
12. INSTALL BALL DRIP VALVE (NFPA 13).
13. CITY OF BATTLE GROUND PLUMBING PERMIT IS REQUIRED FOR INSTALLATION FOR DCVA.
14. DCVA MUST BE APPROVED BY THE CITY OF BATTLE GROUND OPERATIONS CENTER @ 360-342-5350.

STANDARD DOUBLE CHECK VALVE ASSEMBLY 2½" & LARGER

PLAN #

THE CITY OF BATTLE GROUND

CITY OF BATTLE GROUND
APPROVED

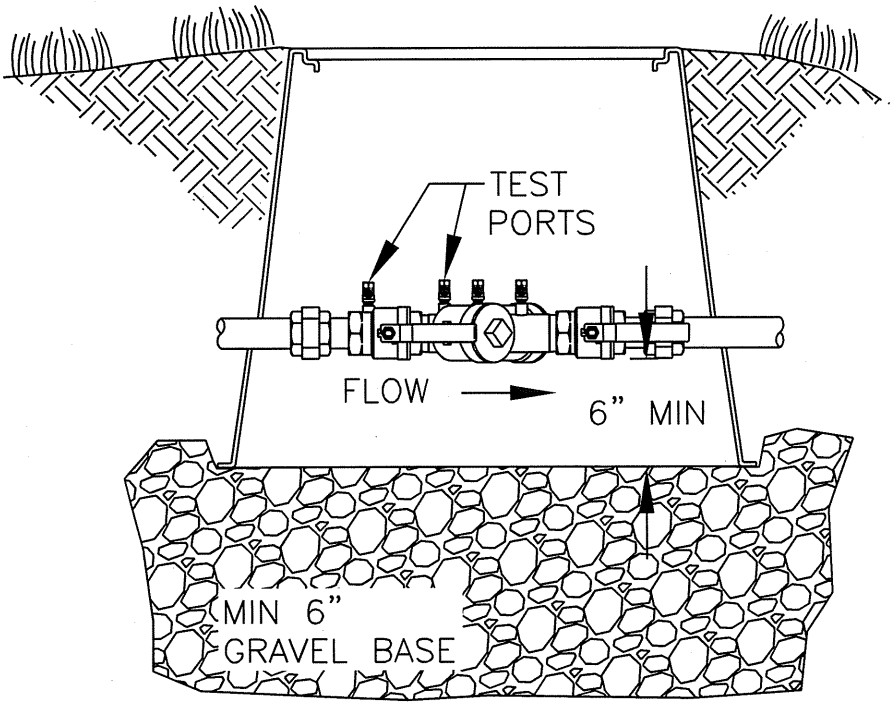
4/16/07

CITY ENGINEER DATE

REVISIONS:	DATE:	DRAWN:	DESIGNED:
1	8/12/98	BSG	GGH
2	4/16/07	JMH	MCH

WA-5.1

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ELEVATION

NOTES:

1. APPROVED DOUBLE CHECK VALVE ASSEMBLY (DCVA) TO LAY HORIZONTAL WITH GROUND. (VERTICAL ALLOWED IF APPROVED BY WA. DEPT. OF HEALTH)
2. DCVA MAY BE INSTALLED ABOVE OR BELOW GROUND PROVIDED ALL CLEARANCES ARE MET.
3. DESIGN FOR BACK SIPHONAGE AND BACK PRESSURE.
4. TEST COCKS TO EITHER FACE OUTWARDS OR UPWARDS FROM ASSEMBLY.
5. THOROUGHLY FLUSH LINES PRIOR TO INSTALLATION OF BACKFLOW PREVENTER.
6. DO NOT INSTALL IN AN AREA SUBJECT TO FLOODING.
7. DCVA MUST BE ACCESSIBLE.
8. PROTECT DCVA FROM FREEZING.
9. DCVA SHALL BE APPROVED BY THE STATE OF WASHINGTON
10. A PLUMBING PERMIT IS REQUIRED–CONTACT THE APPROPRIATE JURISDICTION'S PERMITS COUNTER
11. DCVA MUST BE TESTED AFTER INSTALLATION, THEN ANNUALLY BY A WA. STATE CERTIFIED BACKFLOW TESTER. RESULTS SHALL BE SENT TO THE CITY OF BATTLE GROUND OPERATIONS CENTER.

DCVA INSTALLATION

PLAN #

THE CITY OF BATTLE GROUND

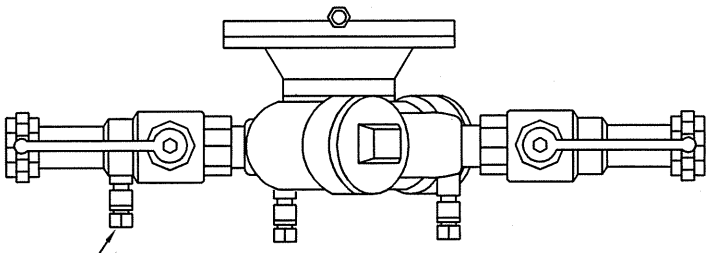
CITY OF BATTLE GROUND
APPROVED

9/24/07

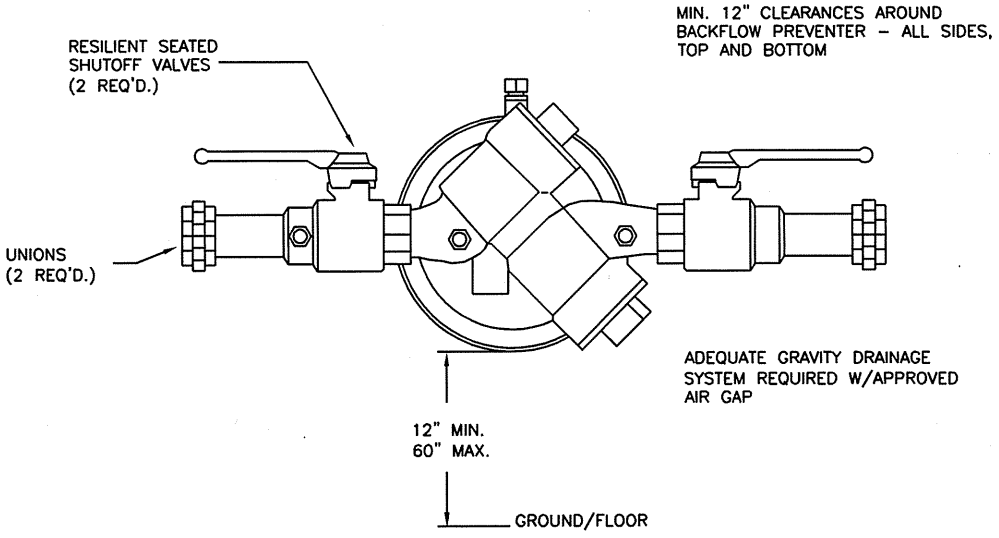
CITY ENGINEER — DATE

REVISIONS:	DATE:	DRAWN:	DESIGNED:
1	4/16/07	CMS	MCH
2	9/24/07	MCH	MCH

WA–5.2



TOP VIEW



SIDE VIEW

NOTES:

1. APPROVED REDUCED PRESSURE BACKFLOW ASSEMBLY (RPBA) TO LAY HORIZONTAL WITH GROUND. (VERTICAL ALLOWED IF APPROVED BY WA. DEPT. OF HEALTH)
2. DESIGN RPBA FOR BACK SIPHONAGE AND BACK PRESSURE.
3. THOROUGHLY FLUSH LINES PRIOR TO INSTALLATION OF BACKFLOW PREVENTER.
4. DO NOT INSTALL IN AN AREA SUBJECT TO FLOODING.
5. RPBA MUST BE ACCESSIBLE.
6. PROTECT RPBA FROM FREEZING.
7. A PLUMBING PERMIT IS REQUIRED–CONTACT THE APPROPRIATE JURISDICTION'S PERMITS COUNTER
8. RPBA MUST BE TESTED AFTER INSTALLATION, THEN ANNUALLY BY A WA. STATE CERTIFIED BACKFLOW TESTER. RESULTS SHALL BE SENT TO THE CITY WATER QUALITY SERVICES.
9. RPBA SHALL BE APPROVED BY THE STATE OF WASHINGTON.
10. RPBA FOR ABOVE GROUND INSTALLATION ONLY.

STANDARD REDUCED PRESSURE BACKFLOW ASSEMBLY 2" & SMALLER

PLAN #

THE CITY OF BATTLE GROUND

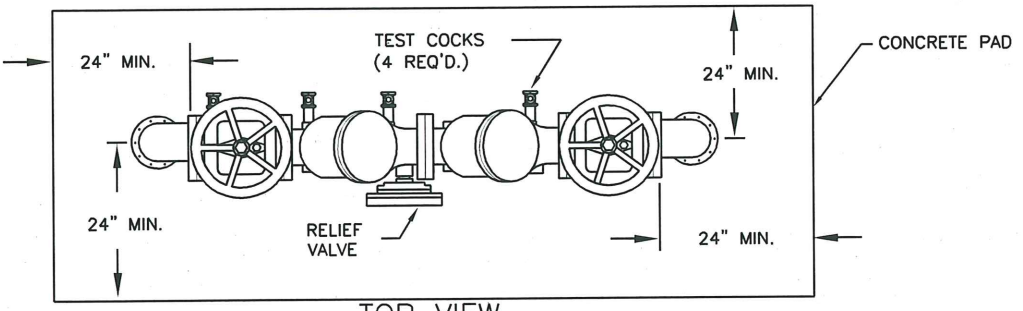
CITY OF BATTLE GROUND
APPROVED

9/24/07

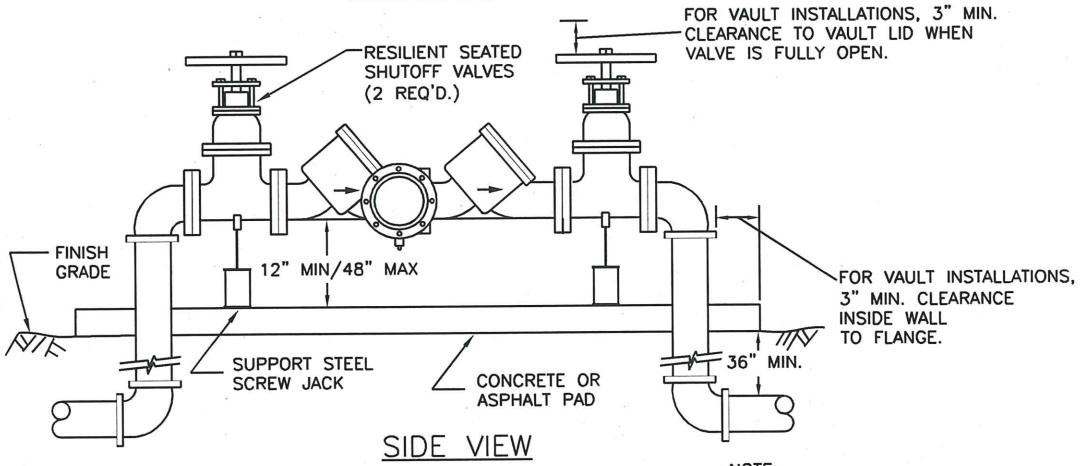
CITY ENGINEER — DATE

REVISIONS:	DATE:	DRAWN:	DESIGNED:
1	4/16/07	JMH	MCH
2	9/24/07	MCH	MCH

WA–5.3



TOP VIEW



SIDE VIEW

NOTE:
A CITY APPROVED VALVE IS REQ'D.
BETWEEN THE SUPPLY MAIN AND
THE R.P.B.A.

NOTE:
PROVIDE HEAT
AND/OR INSULATION

NOTES:

1. APPROVED REDUCED PRESSURE BACKFLOW ASSEMBLY (RPBA) TO LAY HORIZONTAL ONLY. (VERTICAL IF APPROVED BY DEPT. OF HEALTH)
2. DESIGNED FOR BACK SIPHONAGE AND BACK PRESSURE.
3. THE WATER LINE SHALL BE DISINFECTED, FLUSHED AND PRESSURE TESTED PRIOR TO INSTALLING THE RPBA. THE RPBA SHALL BE PROTECTED FROM FREEZING AND FLOODING.
4. ALL PIPE, VALVES AND FITTING JOINTS FROM SUPPLY MAIN, SHALL BE FLANGED AND RESTRAINED.
5. GROUT PIPE ENTRANCE AND EXIT IN VAULT, WITH WATERTIGHT GROUT.
6. ALL ENCLOSURES SHALL BE PRE-APPROVED PRIOR TO INSTALLATION.
7. RPBA SHALL BE INSTALLED AT PROPERTY LINE OR EASEMENT LINE AND ON OWNER'S PROPERTY.
8. ADEQUATE GRAVITY DRAINAGE SYSTEM REQUIRED WITH APPROVED AIR GAP.
9. MINIMUM 24" CLEARANCE ON ALL SIDES AROUND RPBA.
10. THE RPBA SHALL BE TESTED AFTER INSTALLATION AND PRIOR TO ACCEPTANCE, ALSO YEARLY THEREAFTER BY A CERTIFIED BACKFLOW ASSEMBLY TESTER. TEST RESULTS SHALL BE SENT TO THE CITY OF BATTLE GROUND PUBLIC WORKS DEPARTMENT.
11. HEAT AND/OR INSULATION SHALL BE PROVIDED TO PREVENT FREEZING

(ABOVE GROUND INSTALLATIONS ONLY)

STANDARD REDUCED PRESSURE BACKFLOW ASSEMBLY 2 1/2" & LARGER

PLAN #

THE CITY OF BATTLE GROUND

CITY OF BATTLE GROUND
APPROVED

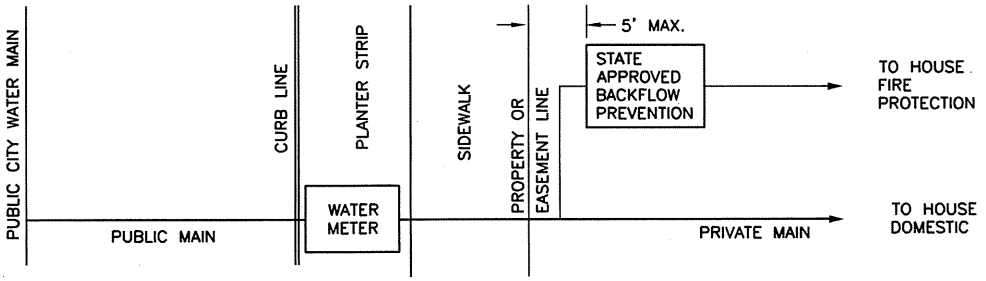
4/16/07

CITY ENGINEER DATE

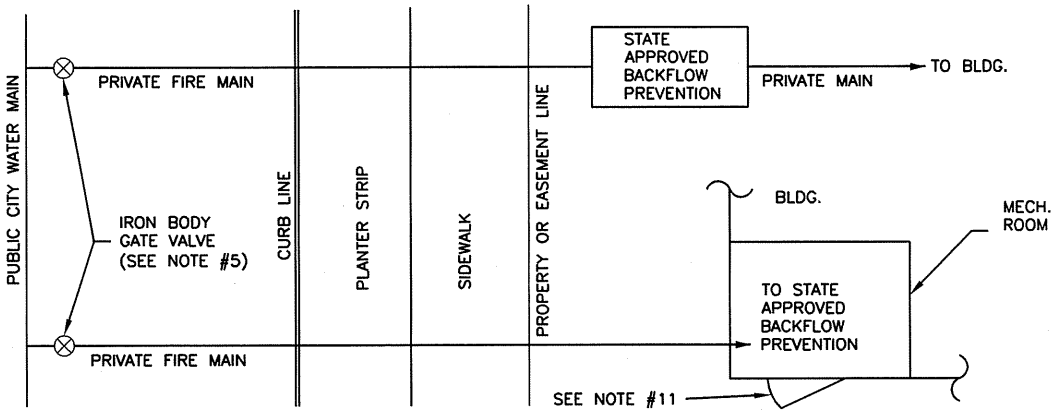
REVISIONS:	DATE:	DRAWN:	DESIGNED:
1	4/16/07	JMH	MCH

WA-5.4

N:\CAD Data\Standard Dwgs\Water Details\WA-5.4_Standard RPBA 2.5in larger.dwg 4/10/2007 9:18:40 AM



SINGLE-FAMILY FIRE PROTECTION INSTALLATION



NON SINGLE-FAMILY BACKFLOW PREVENTION INSTALLATION

NOTES:

1. ALL FIRE PROTECTION SERVICES SHALL HAVE AN IRON BODY GATE VALVE AS DESCRIBED IN 1-2.06 IN THE CITY OF BATTLE GROUND ENGINEERING DEPARTMENT'S WATER DESIGN AND CONSTRUCTION REQUIREMENTS. VALVES SHALL BE LOCATED AT THE CONNECTION TO THE WATER MAIN. WATER METERS ARE NOT REQUIRED ON FIRE PROTECTION.
2. ALL BACKFLOW DEVICES SHALL BE LOCATED PER APPROVED PLANS.
3. BACKFLOW DEVICES, LOCATED OUTSIDE OF A BUILDING, SHALL BE PLACED IN A STANDARD PLASTIC METER BOX, PLASTIC IRRIGATION BOX, OR CONCRETE VAULT WITH LID PER WA-5.0, WA-5.1, WA-5.2, AND WA-5.3, AS APPROPRIATE.
4. COMMERCIAL BACKFLOW DEVICES MAY BE INSTALLED INSIDE THE BUILDING IN A MECHANICAL ROOM, AS ALLOWED BY THE I.B.C. AND U.P.C. AS AMENDED BY THE STATE OF WASHINGTON, PROVIDED THE ROOM REMAINS ACCESSIBLE TO INSPECTORS.
5. ALL COMMERCIAL FIRE PROTECTION SERVICES SHALL BE PRIVATELY OWNED AND MAINTAINED DOWNSTREAM OF THE GATE VALVE LOCATED AT THE PUBLIC MAIN.
6. ALL BACKFLOW DEVICES ARE PRIVATELY OWNED, MAINTAINED, AND MUST BE TESTED ANNUALLY BY A CERTIFIED BACKFLOW ASSEMBLY TESTER.
7. SINGLE FAMILY WATER METERS SHALL BE SIZED TO MEET THE REQUIRED FIRE FLOW.
8. ALL FIRE PROTECTION SERVICES, EXCEPT SINGLE FAMILY APPLICATIONS, SHALL BE TAPPED SEPARATELY FROM DOMESTIC SERVICES AND FIRE HYDRANT LEADS.
9. A FIRE HYDRANT IS REQUIRED WITHIN A 100 FEET OF THE FIRE DEPARTMENT CONNECTION (FDC).
10. THE FDC MUST BE REMOTE FROM THE BUILDING A MINIMUM DISTANCE EQUAL TO ONE-AND-A-HALF TIMES THE HEIGHT OF THE BUILDING.
11. A DOOR ON THE EXTERIOR OF THE BUILDING MAY BE REQUIRED WITHIN 5 FEET OF THE SPRINKLER RISER PURSUANT TO BGMC 15.105.140.

STANDARD FIRE PROTECTION BACKFLOW INSTALLATION LOCATIONS

PLAN #

CITY OF BATTLE GROUND APPROVED

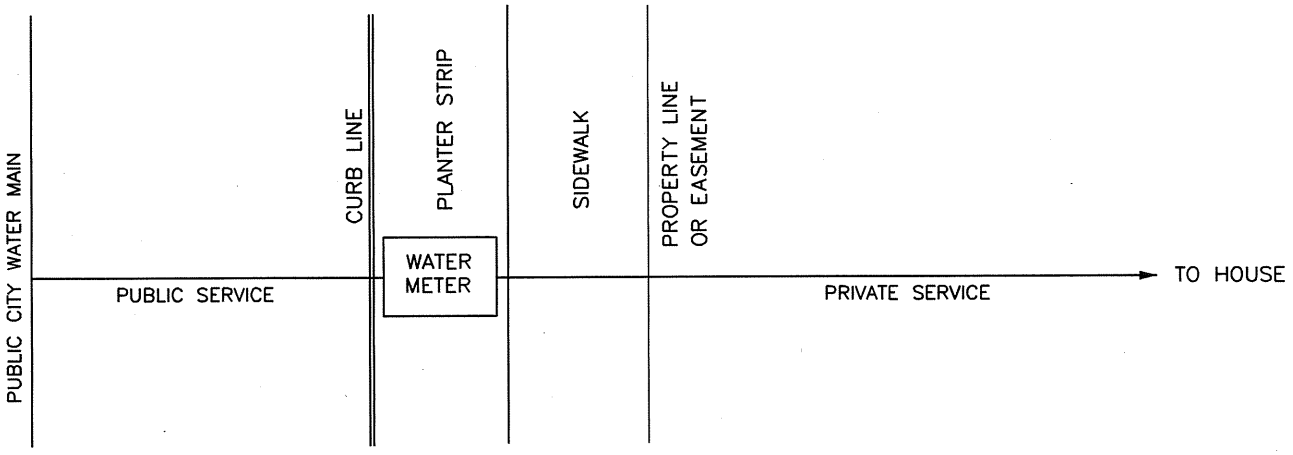
9/24/07

CITY ENGINEER — DATE

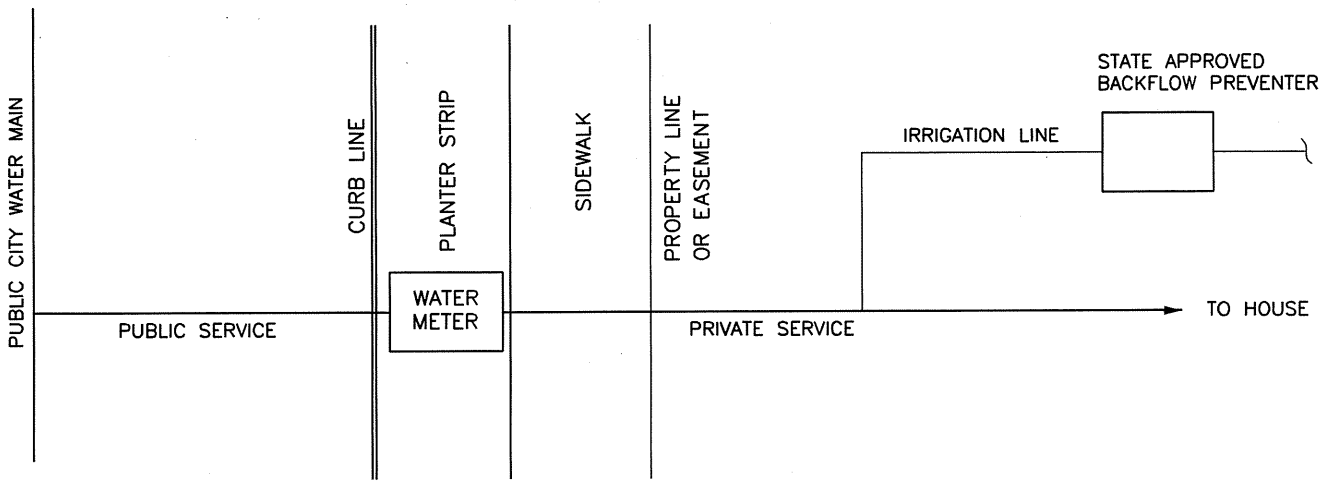
REVISIONS:	DATE:	DRAWN:	DESIGNED:
1	4/16/07	JMH	MCH
2	9/24/07	MCH	MCH

WA-6.0

SINGLE-FAMILY WATER METER INSTALLATION LOCATION



SINGLE-FAMILY WATER METER/DCVA LOCATION FOR IRRIGATION LINE INSTALLATION

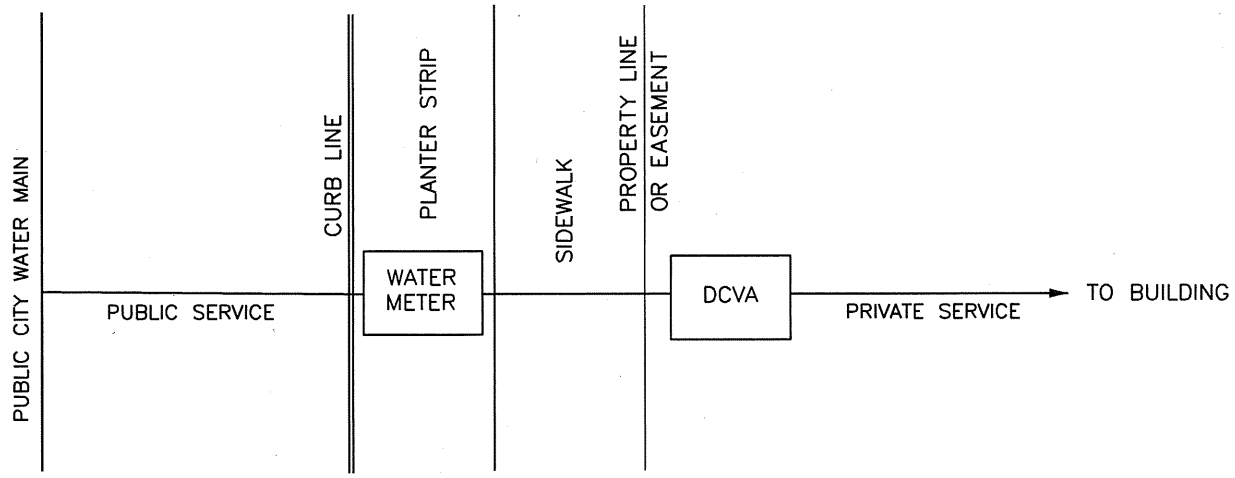


NOTES:

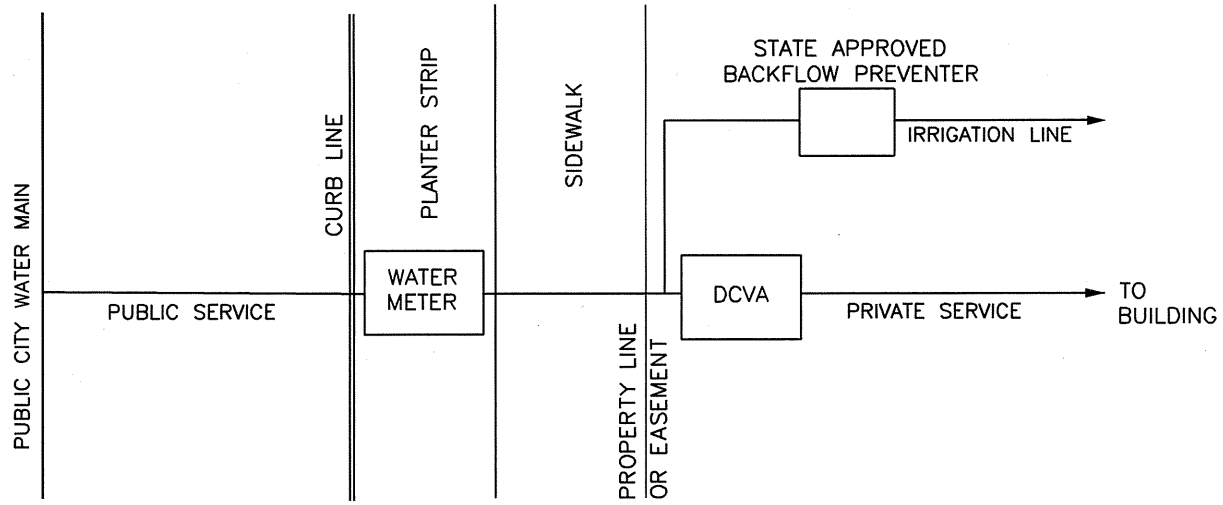
1. DOMESTIC SERVICES SHALL BE TAPPED FROM MAIN LINES AND NOT FROM FIRE PROTECTION AND OR HYDRANT LINES.
2. AN IRRIGATION PERMIT FROM THE CITY OF BATTLE GROUND IS REQUIRED FOR ALL IRRIGATION SYSTEMS.
3. ALL BACKFLOW DEVICES ARE PRIVATELY OWNED AND MAINTAINED. BACKFLOW DEVICES MUST BE TESTED ANNUALLY BY A CERTIFIED BACKFLOW ASSEMBLY TESTER.

SINGLE-FAMILY WATER METER/BACKFLOW INSTALLATION LOCATIONS					PLAN #
THE CITY OF BATTLE GROUND	CITY OF BATTLE GROUND APPROVED CITY ENGINEER 9/24/07 DATE	REVISIONS:	DATE:	DRAWN:	DESIGNED:	WA-6.1
		1	4/16/07	JMH	MCH	
		2	9/24/07	MCH	MCH	

NON SINGLE-FAMILY WATER METER/DCVA INSTALLATION LOCATION



NON SINGLE-FAMILY WATER METER/DCVA INSTALLATION LOCATION W/IRRIGATION LINE



NOTES:

1. DOMESTIC SERVICES SHALL BE TAPPED FROM MAIN LINES AND NOT FROM FIRE PROTECTION OR HYDRANT LINES.
2. AN IRRIGATION PERMIT FROM THE CITY OF BATTLE GROUND IS REQUIRED FOR ALL IRRIGATION SYSTEMS.
3. ALL BACKFLOW DEVICES ARE PRIVATELY OWNED AND MAINTAINED. BACKFLOW DEVICES MUST BE TESTED ANNUALLY BY A CERTIFIED BACKFLOW ASSEMBLY TESTER.

NON SINGLE-FAMILY WATER METER/BACKFLOW INSTALLATION LOCATIONS	PLAN #

THE CITY OF BATTLE GROUND

CITY OF BATTLE GROUND
APPROVED

9/24/07

CITY ENGINEER — DATE

REVISIONS:	DATE:	DRAWN:	DESIGNED:
1	4/16/07	JMH	MCH
2	9/24/07	MCH	MCH

WA-6.2

TEST	SPECIFICATIONS	FREQUENCY	TESTING AGENCY	COMMENTS
S.G. CUT SEC. COMPACTION	AASHTO T-180	PROOF ROLL OR AS REQ'D BY CITY	CERTIFIED LAB	FIELD REPORTS REQ. PRIOR TO BASE ROCK
S.G. FILL COMPACTION	AASHTO T-180	EVERY 2500 CY MIN 2 @ 95%	CERTIFIED LAB	FIELD REPORTS REQ. PRIOR TO BASE ROCK
UTILITY BACKFILL COMPACT.	AASHTO T-180	AS REQUIRED BY CITY	CERTIFIED LAB	FOR FAILED TEST 2 @ 100 FT.,REPORTS PRIOR TO BASE ROCK 95%
EASEMENT UTIL. BACKFILL	AASHTO T-99	AS REQUIRED BY CITY	CERTIFIED LAB	PRIOR TO FINAL ACCEPTANCE 95%
LOT AREA COMPACTION	AASHTO T-99	MIN 1/ LOT FILL OVER 1'	CERTIFIED LAB	PRIOR TO FINAL ACCEPTANCE
BACTERIA WATER SAMPLE	AWWA	AS REQ'D. PER CITY	CITY OF BATTLE GROUND	PRIOR TO PRESSURE TEST &BASE ROCK
WATER PRESSURE TEST	WSDOT 7-11.3	MAIN, SERVICE, F.H.	CITY OF BATTLE GROUND	PRIOR TO BASE ROCK
P. SEWER PRESSURE TEST	WSDOT	MAIN, SERVICE, AIR/VAC	CERTIFIED LAB	PRIOR TO BASE ROCK
P. SEWER TONE TEST	WSDOT	MAIN, SERVICE	CERTIFIED LAB	PRIOR TO BASE ROCK
GRAV. SEWER AIR TEST	WSDOT 7-17.3	MAIN AND LATERALS	LAB/CONTRACTOR	PRIOR TO BASE ROCK
GRAV. SEWER VAC. TEST MH	WSDOT	AFTER INSTALLATION	LAB/CONTRACTOR	AFTER PAVEMENT INSTALLED
GRAV. SEWER MANDREL TEST	WSDOT 7-17.3	AFTER INSTALLATION	CONTRACTOR	PRIOR TO BASE ROCK
GRAV. SEWER TV TEST	WSDOT 7-17.3	AFTER INSTALLATION	CONTRACTOR	PRIOR TO PAVING
PRESSURE WASH SAN. SEWER	-	AS DIRECTED PER CITY	CONTRACTOR	AS DIRECTED PER CITY
ASE ROCK GRADING	WSDOT 9-03.9	ONE PER SOURCE	CERTIFIED LAB	PRIOR TO PLACEMENT
BASE ROCK COMPACTION	WSDOT T-180	95%	CERTIFIED LAB	
TOP ROCK GRADING	WSDOT 9-03.9	ONE PER SOURCE	CERTIFIED LAB	PRIOR TO PLACEMENT
TOP ROCK COMPACTION	AASHTO T-180	95%	CERTIFIED LAB	
AC GRADE & OIL CONTENT	WSDOT 9-03.8	ONE PER SOURCE	CERTIFIED LAB	PRIOR TO PLACEMENT
AC COMPACTION	WSDOT	95%	CERTIFIED LAB	
SUBGRADE GRADE CK ELEV	WSDOT	PER STATION (0+25)	CONTRACTOR	PRIOR TO ROCK
BASE ROCK GRADE CK ELEV	WSDOT	PER STATION (0+50)	CONTRACTOR	PRIOR TO TOP ROCK
TOP ROCK GRADE CK ELEV	WSDOT	PER STATION (0+50)	CONTRACTOR	PRIOR TO PAVEMENT
CONCRETE SLUMP AND STRENGTH TEST	WSDOT	ONE PER SOURCE	CERTIFIED LAB	

TESTING TYPE AND FREQUENCY

PLAN #

THE CITY OF BATTLE GROUND

CITY OF BATTLE GROUND
APPROVED

4/16/07

CITY ENGINEER — DATE

REVISIONS:	DATE:	DRAWN:	DESIGNED:
1	4/16/07	JMH	MCH

WA-7.0

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Appendix I
Water Rights Information

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Water Right Self-Assessment Form for Water System Plan

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

Water Right Permit, Certificate, or Claim # *If water right is interruptible, identify limitation in yellow section below	WFI Source # If a source has multiple water rights, list each water right on separate line	Existing Water Rights Qi= Instantaneous Flow Rate Allowed (GPM or CFS) Qa= Annual Volume Allowed (Acre-Feet/Year) This includes wholesale water sold				Current Source Production – Most Recent Calendar Year Qi = Max Instantaneous Flow Rate Withdrawn (GPM or CFS) Qa = Annual Volume Withdrawn (Acre-Feet/Year) This includes wholesale water sold				10-Year Forecasted Source Production (determined from WSP) This includes wholesale water sold				20-Year Forecasted Source Production (determined from WSP) This includes wholesale water sold			
		Primary Qi Maximum Rate Allowed	Non-Additive Qi Maximum Rate Allowed	Primary Qa Maximum Volume Allowed	Non-Additive Qa Maximum Volume Allowed	Total Qi Maximum Instantaneous Flow Rate Withdrawn	Current Excess or (Deficiency) Qi	Total Qa Maximum Annual Volume Withdrawn	Current Excess or (Deficiency) Qa	Total Qi Maximum Instantaneous Flow Rate in 10 Years	10-Year Forecasted Excess or (Deficiency) Qi	Total Qa Maximum Annual Volume in 10 Years	10-Year Forecasted Excess or (Deficiency) Qa	Total Qi Maximum Instantaneous Flow Rate in 20 Years	20-Year Forecasted Excess or (Deficiency) Qi	Total Qa Maximum Annual Volume in 20 Years	20-Year Forecasted Excess or (Deficiency) Qa
1. GWC 2605-A	S01 – Well No. 1 S02 – Well No. 2	350 gpm	0 gpm	270 afy	0 afy	280 gpm	70 gpm	339 afy	(69 afy)	280 gpm	70 gpm	270 afy	0 afy	280 gpm	70 gpm	270 afy	0 afy
2. G2-23133C	S03 – Well No. 4 S04 – Well No. 5	250 gpm	0 gpm	269 afy	0 afy	150 gpm	100 gpm	182 afy	87 afy	150 gpm	100 gpm	182 afy	87 afy	150 gpm	100 gpm	182 afy	87 afy
3. G2-29208C	S08 – Well No. 6	350 gpm	0 gpm	430 afy	0 afy	0 gpm	350 gpm	0 afy	430 afy	0 gpm	350 gpm	0 afy	430 afy	200 gpm	350 gpm	0 afy	430 afy
4. G2-29477(A)P	S12 – Wellfield (S09, S10, S11) S09 – Well No. 7 S10 – Well No. 8 S11 – Well No. 9	1,375 gpm	0 gpm	943 afy	207 afy	1,250 gpm	125 gpm	950 afy	(7 afy)	500 gpm	875 gpm	640 afy	303 afy	500 gpm	875 gpm	640 afy	303 afy
	TOTALS =	2,325 gpm		1,912 afy		1,680 gpm	645 gpm	1,470 afy	442 afy	930 gpm	1,395 gpm	1,092 afy	820 afy	930 gpm	1,395 gpm	1,092 afy	820 afy
Column Identifiers for Calculations:		A		B		C	=A-C	D	=B-D	E	= A-E	F	=B-F	G	=A-G	H	=B-H

PENDING WATER RIGHT APPLICATIONS: Identify any water right applications that have been submitted to Ecology.

Application Number	New or Change Application?	Date Submitted	Quantities Requested			
			Primary Qi	Non-Additive Qi	Primary Qa	Non-Additive Qa
G2-30194	New	5/20/2004	1,200 gpm	0 gpm	1,000 afy	0 afy

INTERTIES: Systems receiving wholesale water complete this section. Wholesaling systems must include water sold through intertie in the current and forecasted source production columns above.

Name of Wholesaling System Providing Water	Quantities Allowed In Contract		Expiration Date of Contract	Currently Purchased Current quantity purchased through intertie				10-Year Forecasted Purchase Forecasted quantity purchased through intertie				20-Year Forecasted Purchase Forecasted quantity purchased through intertie			
	Maximum Qi Instantaneous Flow Rate	Maximum Qa Annual Volume		Maximum Qi Instantaneous Flow Rate	Current Excess or (Deficiency) Qi	Maximum Qa Annual Volume	Current Excess or (Deficiency) Qa	Maximum Qi 10-Year Forecast	Future Excess or (Deficiency) Qi	Maximum Qa 10-Year Forecast	Future Excess or (Deficiency) Qa	Maximum Qi 20-Year Forecast	Future Excess or (Deficiency) Qi	Maximum Qa 20-Year Forecast	Future Excess or (Deficiency) Qa
1. Clark Public Utilities	2,000 gpm/ 4,000 gpm	3,226 afy/ 6,452 afy	12/31/2040	2,000 gpm	0 gpm	267 afy	2,959 afy	2,000 gpm	0 gpm	1,492 afy	1,734 afy	4,000 gpm	0 gpm	2,636 afy	3,816 afy
TOTALS =	2,000 gpm/ 4,000 gpm	3,226 afy/ 6,452 afy		2,000 gpm	0 gpm	267 afy	2,959 afy	2,000 gpm	0 gpm	1,492 afy	1,734 afy	4,000 gpm	0 gpm	2,636 afy	3,816 afy
Column Identifiers for Calculations:	A	B		C	=A-C	D	=B-D	E	=A-E	F	=B-F	G	=A-G	H	=B-H

INTERRUPTIBLE WATER RIGHTS: Identify limitations on any water rights listed above that are interruptible.

Water Right #	Conditions of Interruption	Time Period of Interruption
1 None		
2		
3		

ADDITIONAL COMMENTS:

Existing year = 2019. 10-year forecast = 2030. 20-year forecast = 2040.
Well Nos. 1, 2, 4, and 5 withdraw water from the Upper Troutdale Aquifer.
Well Nos. 6, 7, 8, and 9 withdraw water from the deep Sand and Gravel Aquifer.
Well No. 6 is currently an emergency backup supply since it lacks treatment to reduce the iron and manganese concentration.
By 2040, the City will be able to take 4,000 gpm and 6,452 afy from the intertie with CPU since the Pioneer to Cherry Grove Transmission Main will be complete.

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Certificate GWC 2605-A

Well Nos. 1 and 2 – Upper Troutdale Aquifer

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2605

S. F. No. 7361—3-53—3M. 34100.

CERTIFICATE RECORD NO. 6 PAGE NO. 2605-A

STATE OF WASHINGTON, COUNTY OF Clark

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 BATTLE GROUND, 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* the NW¼NE¼, sec.3, T.3 N.,R.2 E.W.M.

for the purpose of municipal water supply

under and subject to provisions contained in Ground Water Permit No. 3537 *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* 6 *at page* 2605-A *; that the right hereby confirmed dates from* June 3, 1954 *; 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* 350 gallons per minute; 270 acre-feet per year for municipal water supply. ~~for irrigation of xxxxxxxxxxxxxxxxxxxxxxxx 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:

Town of Battle Ground, Clark 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 12th *day of* July, 1956.

M. G. Walker

State Supervisor of Water Resources.

ENGINEERING DATA
O.K. RWR

S. F. No. 7355—9-52—75C. 32559.

Proof of Appropriation of Water

Application No. ..... Permit No. 3537

1. Name of Permittee Town of Battle Ground

2. Postoffice address Battle Ground, Washington

3. Source of appropriation Well.

4. Name or number of works (if any) .....

5. For what purpose or purposes is water used? Municipal water supply

6. Give date of beginning of construction April 1954

7. Give date of completion of construction work, including water distribution system September 30, 1954

8. Give date when water was completely applied to proposed use October 1, 1954

9. If used for irrigation:

   Give number of acres described in permit .....

   Give number of acres actually irrigated .....

10. If used for power: HP actually developed .....

11. LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS USED:

12. During what months is water used? All

13. Does map filed with your application show correctly the location of well or point of diversion for withdrawal of water, and area of land where water is used? .....

14. If the dimensions, location or type of structure do not correspond to those described in your permit, state what changes have been made, giving dimensions, etc. .....

15. Actual measured discharge or diversion of permanent system: ..... (gpm or cfs)

(Sign certification on reverse side)

OK like permit RHP

STATE PRINTING PLANT OLYMPIA, WASHINGTON

RECEIVED
JUL 9 1956
DEPARTMENT OF
CONSERVATION & DEVELOPMENT

STATE OF WASHINGTON,
County of Clark } ss.

I, Sidney L. Falin, being first duly sworn, depose and say that I have read the above and foregoing proof of appropriation; that I know the contents thereof; and that the facts therein stated are true.

IN WITNESS WHEREOF, I have hereunto set my hand this 26th day of June, 1956

Sidney L. Falin

Subscribed and sworn to before me this 26th day of June, 1956

L. L. Rasmussen

Notary Public.

S. F. No. 7354—8-54—5M. 39179.

STATE OF WASHINGTON

DEPARTMENT OF CONSERVATION AND DEVELOPMENT

DIVISION OF WATER RESOURCES

Permit to Appropriate Public Ground Waters of the State of Washington

Book No. 8 of Ground Water Permits, on page 3537 under Application No. 3661

TOWN OF BATTLE GROUND, WASHINGTON

~~of~~

is hereby granted a permit to appropriate the following described public ground waters of the State of Washington, subject to existing rights, and to the limitations and provisions set out herein.

Priority date of this permit is June 3, 1954

Source of the proposed ground water appropriation is a well

within ..... area, ... sub-area ..... zone. Name or number of works is .....

Quantity of water appropriated shall be limited to the amount which can be beneficially applied and not to exceed 350 gallons per minute; 270 acre-feet per year, to be used for the following purposes: municipal water supply

as more definitely set out below.

Location of the well, tunnel, or infiltration trench is S.84°45.4' West a distance of 1477 feet from the Northeast corner of Sec. 3

being within the NW¼ of NE¼ of Sec. 3, Twp. 3 N., Rge. 2 E.W.M.

county of Clark

Use, or uses to which water is to be applied:

For municipal supply: 350 gallons per minute; 270 acre-feet per year, to supply the Town of Battle Ground

For irrigation: ..... gallons per minute; ..... acre-feet per year, for the irrigation of ..... acres.

For miscellaneous uses: ..... gallons per minute; ..... acre-feet per year, for .....

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Town of Battle Ground, Clark County, Washington.

DESCRIPTION OF WORKS FROM WHICH WATER IS TO BE WITHDRAWN

The well will be drilled (Dug or drilled) and have a diameter of 12 inches, and depth of 144 feet.

Description of tunnel or infiltration trench:

(Please read carefully provisions below)

Particular specifications required by the Supervisor of Water Resources:

Construction work shall begin on or before Started

and shall thereafter be prosecuted with reasonable diligence and completed on or before June 1, 1956

and complete application of water to proposed use shall be made on or before Junel, 1957

Given under my hand and the seal of this office at Olympia, Washington, this 21st day of December, 1954

M Gwaltney

State Supervisor of Water Resources

Report of Examination on Ground Water

Received date 6-3-54 Date of exam. 7-21-54 Appli. No. 3661

Name Town of Battle Ground, Wash. Address c/o Sidney L. Falin, Town Clerk

Type of works well Dimensions 8" x 142'

Progress of works Wells #1 & #2; pumping operations not begun

Quantity ~~claimed or~~ applied for 350 g.p.m. 565 acre-feet per year

Legal sub. NW¼NE¼ Sec. 3 Twp. 3 N. Rge. 2 E. County Clark

Use Municipal water supply

Irrigation-acreage: Present Planned Feasible

Municipal: Population 1200 as of 1974

Industrial

Time pump will be operated continuously

Other water rights appurtenant to this land

Proximity to existing works, springs, wells, or streams Ben Dial SW 230'; Jesse Smith SE 400'

Area Sub-area Zone

RECOMMENDATIONS

Approved for 350 g.p.m. 270 acre-feet per year, subject to existing water rights. (1 acre-foot 325,850 gallons.)

The water requirement is calculated on a withdrawal of 200 gallons per day per capita, or a total of 270 acre-feet annually for 1200 persons.

The applicant will furnish information to this office as to the size and type of equipment installed and the gallons per minute furnished.

The installation of an access port to well as described in attached Ground Water Bulletin No. 1, is recommended.

Applicant's attention is directed to the close proximity of existing structures. If this withdrawal causes interference with these works the applicant may have to reduce the withdrawal rate to satisfy existing rights, or furnish water to meet those requirements as they existed at the time this application was made.

It is noted that 2 wells have been drilled and pipelines are in the process of completion.

Issue as recommended subject to existing rights.

Signed this 29th day of November, 1954. Fred D. Hahn

FRED D. HAHN, Deputy Supervisor

RIDGEFIELD

Affidavit of Publication

MID-COUNTY REFLECTOR

BATTLE GROUND

RECEIVED
NOV 10 1954
DEPARTMENT OF
CONSERVATION & DEVELOPMENT

STATE OF WASHINGTON
COUNTY OF CLARK } ss.

JOHN H. DODGE, being first duly sworn on oath deposes and says that he is the PUBLISHER of the MID-COUNTY REFLECTOR, a weekly newspaper. That said newspaper is a legal newspaper and has been approved as a legal newspaper by order of the superior court in the county in which it is published and it is now and has been for more than six months prior to the date of the publications hereinafter referred to, published in the English language, continually as a weekly newspaper in Ridgefield, Clark County, Washington, and it is now and during all of said time was printed in an office maintained at the aforesaid place of publication of said newspaper. That

the annexed is a true copy of Water Right application as it was published in regular issues (and not in supplement form) of said newspaper once a week for a period of two consecutive weeks,

commencing on the 21st day of Oct., 1954, and ending

on the 28th day of Oct.,

1954, both dates inclusive and that such newspaper was regularly distributed to its subscribers during all of said period. That the full amount of the fee charge for the foregoing publication is

the sum of $4.52, which amount has been paid in full, at the rate of $2.00 a hundred words for the first insertion and $1.50 a hundred words for each subsequent insertion.

John H Dodge

Subscribed and sworn to before me this 8th

day of November, 1954

Olivia D. Dodge

Notary Public in and for the
State of Washington,

Residing at Battle Ground, Wn.

SEAL

STATE OF WASHINGTON
OFFICE OF SUPERVISOR OF
WATER RESOURCES
OLYMPIA

NOTICE OF AMENDED GROUND WATER RIGHT APPLICATION NO. 3661

TAKE NOTICE: That TOWN OF BATTLE GROUND, Washington, on June 3, 1954, filed application for permit to withdraw public ground waters through a well situated within the NW¼ of NE¼ of Section 3, Township 3N., Range 2E.W.M., in Clark County, in the amount of 350 gallons per minute, subject to existing rights continuously, each year for the purpose of municipal supply.

Any objections must be accompanied by a two dollar ($2.00) recording fee and filed with the State Supervisor of Water Resources within thirty (30) days from October 28, 1954.

Witness my hand and official seal this 13th day of September, 1954.

M. G. WALKER
State Supervisor of
Water Resources

Oct. 21, 28

129 words.
3½
387
65
4.52

S. F. No. 370-B—5-51—7500. 28567.

00 examination fee should accompany each application.

STATE OF WASHINGTON
DEPARTMENT OF CONSERVATION AND DEVELOPMENT
Division of Water Resources

RECEIVED
JUN 3 1954
DIV. OF WATER RESOURCES

APPLICATION FOR A PERMIT

To Appropriate Public Ground Waters
OF THE STATE OF WASHINGTON

Application No. G. W. 3661

I, Town of Battle Ground, Washington
(Name of applicant)

of Battle Ground, Washington
(Complete post office address)

do hereby make application for a permit to appropriate the following described public ground waters of the State of Washington, subject to existing rights. This application is made under the provisions of Chap. 263 of the Session Laws of 1945, and amendments thereto of the State of Washington and subject to the rules and regulations of the Department of Conservation and Development, Division of Water Resources.

1. *The proposed appropriation will be from* well
(Well, tunnel, infiltration trench)

located 1/4 mile W. and 135' 5° of intersection Hway 1-S & 1-U, Battle Ground, Wash.
(Give approximate distance and direction from nearest city or town)

Area ..... (Leave blank) *Sub-area* ..... (Leave blank)

Zone ..... (Leave blank)

Applicant's name or number of well or other works, if any Well No. 1

2. *The quantity of water which applicant intends to withdraw for beneficial use is* 350

gallons per minute; ~~565~~ 270 *acre feet per year.*

3. *The use or uses to which water is to be applied* Municipal Water Supply
(Domestic supply, irrigation, municipal, manufacturing, industrial use, etc.)

4. *The time during which water will be required each year* Continuously

5. *Location of well or other works for withdrawal of water: In county of* Clark

(a) S 84° - 45.4' W. distance of 1477' from N.E. Cor. Sec. 3, T3N, R2EWM
(Give distance and bearing from nearest corner of section or legal subdivision)

being within the ~~NE¼ NW¼~~ nw¼-ne¼ *of Sec.* 3, *Twp.* 3 *N., Rge.* 2E (E. or W.)
(Give smallest legal subdivision)

or (b) *If within limits of recorded platted property, town or city: Lot* ....., *Block* .....,

of .....
(Give name of plat or addition) (If within town or city, give name)

(c) *Show this location on accompanying section plat, in duplicate. Other adequate maps or drawings will be acceptable.*

6. DESCRIPTION OF WORKS:

(a) Well will be drilled *(Dug or drilled) and have a diameter of* ~~8~~ 12 *inches and an estimated depth of* ~~142~~ 144 *feet.*

(b) Tunnels or trenches to be described: (Attach additional sheets if needed for full description.)

(c) Distribution system to be described:

(d) If pumps are to be used, give size and type:

(e) Give capacity and type of motor or engine to be used:

(f) If the location of the well, tunnel, or other works is less than one-fourth mile from a natural stream or stream channel, give the distance to the nearest point on each of such channels and the difference in elevation between the stream bed and the ground surface at the source of development:

(g) Ownership of each existing well or other works from which ground water is withdrawn within a radius of one-quarter mile and the distance and direction from well or other works being reported herein:

(Name)	(Direction)	(Distance)
Ben Dial	S.W.	230 feet
Jesse Smith	S.E.	400 feet

SUPPLY THE FOLLOWING INFORMATION ACCORDING TO USE PROPOSED:

7. *For Municipal Supply: To supply the city, town, or community of* Battle Ground *, in the county of* Clark *, having a present population of* 800 *, and an estimated population of* 1200 *, in 19*74*.*

8. *For Irrigation: Number of acres to be irrigated* [redacted] *acres.*

9. *Legal Description of Property on which water is to be used for all purposes other than municipal supply:* (COPY LEGAL DESCRIPTION FROM DEED)

(If more space is required, attach separate sheet)

(On accompanying plat show location of the existing wells or works)

10. *What interest do you have in the above described property?* Owner

(Owner, lessee, contract buyer, etc.)

11. *Do you have any other water rights appurtenant to the above described property?* No

If so, from what source?

12. *Construction work will begin on or before* March 1954 (Test Drilling)

13. *Construction work will be completed on or before* September 1, 1954

14. *Water will be put to complete beneficial use on or before* August 1, 1954

Town of Battle Ground.
(Signature of applicant)
Sidney L. Falin, Town Clerk.

15. *Name and address of owner of land on which well or works are located:*

Town of Battle Ground (Name)

Battle Ground, Washington (Address)

Sidney L. Falin Town Clerk.
(Signature of legal landowner)

Signed in the presence of us as witnesses:

Alma H. Nickerson (Name) — Box 344, Battle Ground, Wash (Address of witness)

Martha Becker (Name) — Rt 5 Box 386 Vancouver, Wash (Address of witness)

STATE OF WASHINGTON, COUNTY OF THURSTON. } ss.

This is to certify that I have examined the foregoing application, together with the accompanying maps and data, and return the same for correction or completion as follows:

In order to retain its priority, this application must be returned to the State Supervisor of Water Resources, with corrections, on or before ....., 19.....

WITNESS my hand this .....*day of* ....., 19.....

State Supervisor of Water Resources.

6-1-57

Progress Sheet—Ground Water Application

NAME Town of Battle Ground Assigned to

G. W. APPLI. NO. 3661 PERMIT NO. 3537 CERT. NO. 2605 A

AMENDED CANCELLED

Application received 6-3-54 Initial $10.00 fee received 6-3-54
Statement of additional examination fee $ Sent Received
Application returned for completion or correction Received

TEMPORARY PERMIT: Approved by Issued

PUBLICATION:
O.K.'d by RHR Date 6-4-54 Notice sent 6-4-54
Protests
Filed
Affidavit received and checked 7-13-54 Time expired 8-19-54
Amended notice sent 9-13-54 Affidavit received 11-10-54
Time expires 11-29-54

DEPT. OF GAME REPORT

EXAMINATION Made 7-21-54 by WH
O. K.'d for permit 12-17-54 by RHR
Statement of permit fee sent 12-1-54 Amount $ 20.00 Received 12-17-54

PERMIT NO. 3537 ISSUED 12-21-54

BEGINNING OF CONSTRUCTION: Notice sent started Filed
Extension fee $ Extended to
Extended to

WELL DRILLER'S REPORT: Sent 6-4-54 Filed ~~10-18-54~~ 8-12-54

COMPLETION OF CONSTRUCTION: Notice sent ~~completed~~ 12-20-54 Filed 6-12-56
$2.00 extension fee Extended to
To

PROOF OF APPROPRIATION: Sent 6-12-56 Filed 7-9-56
$2.00 extension fee Extended to

Statement of certificate fee sent 6-12-56 $ 3.00 Received 7-9-56

CERTIFICATE OF GROUND WATER RIGHT NO. 2605 A ISSUED 7-12-56

THIS PAGE INTENTIONALLY LEFT BLANK

Certificate G2-23122C

Well Nos. 4 and 5 – Upper Troutdale Aquifer

THIS PAGE INTENTIONALLY LEFT BLANK

STATE OF WASHINGTON

DEPARTMENT OF ECOLOGY

CERTIFICATE OF WATER RIGHT

☐ *Surface Water* (Issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the Department of Ecology.)

☒ *Ground Water* (Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology.)

CERTIFICATE NUMBER	PERMIT NUMBER	APPLICATION NUMBER	PRIORITY DATE
G 2-23122 C	G 2-23122 P	G2-23122	August 30, 1974

NAME

TOWN OF BATTLE GROUND

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
P. O. BOX 233	Battle Ground	Washington	98604

This is to certify that the herein named applicant has made proof to the satisfaction of the Department of Ecology of a right to the use of the public waters of the State of Washington as herein defined, and under and specifically subject to the provisions contained in the Permit issued by the Department of Ecology, and that said right to the use of said waters has been perfected in accordance with the laws of the State of Washington, and is hereby confirmed by the Department of Ecology and entered of record as shown.

PUBLIC WATER TO BE APPROPRIATED

SOURCE

2 wells

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	250	269

QUANTITY, TYPE OF USE, PERIOD OF USE

269 acre-feet per year — municipal supply — continuously

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION/WITHDRAWAL

1000 feet east and 120 feet south of the center of Sec. 3

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
NW¼SE¼	3	3	2 E	28	Clark

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY WATER TO BE USED ON

Area served by Town of Battle Ground.

PROVISIONS

The Water Resources Act of 1971 specifies certain criteria regarding utilization and management of the waters of the State in the best public interest. Issuance of this certificate was based on sufficient waters available, at least during portions of the year. However, it is pointed out to the certificate holder that his use of the water may be subject to regulation at certain times, based on the necessity to maintain water quantities sufficient for preservation of the natural environment.

The access port as required on your permit shall be maintained at all times.

Owing to the proximity of neighboring wells, the certificate holder is reminded of his responsibility towards same and advised that he may be required to regulate his withdrawal pumping rate if existing rights are injuriously affected.

A suitable measuring device shall be installed and maintained in accordance with WAC 508-64-020 through WAC 508-64-040.

The right to the use of the water aforesaid hereby confirmed is restricted to the lands or place of use herein described, except as provided in RCW 90.03.380, 90.03.390, and 90.44.020.

This certificate of water right is specifically subject to relinquishment for nonuse of water as provided in RCW 90.14.180.

Given under my hand and the seal of this office at Olympia, Washington, this 25th *day of* March, *19*77.

WESLEY A. HUNTER, ACTING DIRECTOR
~~JOHN A. BIGGS, Director~~
Department of Ecology

ENGINEERING DATA
OK

by E. W. Asselstine
E. W. ASSELSTINE, Regional Manager

FOR COUNTY USE ONLY

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

PROOF OF APPROPRIATION OF WATER

APPLICATION NUMBER: G2-23122

PERMIT NUMBER: G2-23122P

NAME OF PERMITTEE: City of Battle Ground

POST OFFICE ADDRESS (CITY) (STATE) (ZIP CODE): P. O. Box 233 Battle Ground, WA 98604

ACTUAL SOURCE OF APPROPRIATION: Wells

PURPOSE OR PURPOSES WATER IS USED FOR: Municipal Supply

DATE WATER WAS COMPLETELY APPLIED TO PERMITTED USE: December 17, 1976

IF USED FOR IRRIGATION: NUMBER OF ACRES ACTUALLY IRRIGATED:

IF SOURCE IS A WELL, IS AN ACCESS PORT NOW INSTALLED: [X] YES [ ] NO

MONTHS DURING WHICH WATER IS USED: Continuously

PUMP SIZE: 20 HP 135 gpm @ 414 ft. TDH
20 HP 115 gpm @ 412 ft. TDH

ACTUAL AMOUNT WITHDRAWN OR DIVERTED FROM PERMANENT SYSTEM: 250 [X] GPM [ ] CFS 269 ac-ft/yr

HAVE ALL PROVISIONS AS REQUIRED BY PERMIT BEEN ACCOMPLISHED: [X] YES [ ] NO

IF NO, EXPLAIN: based on pumping at a rate of 250 G.P.M. 16 hrs/day 365 days/year. or 269 ac-ft.

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS USED (USE ADDITIONAL SHEET IF NECESSARY)

Area served by City of Battle Ground

RECEIVED
JAN 7 1977
DEPARTMENT OF ECOLOGY
SOUTHWEST REGIONAL OFFICE

STATE OF WASHINGTON,
County of Clark } ss.

I, Everett A. Eaton, being first duly sworn, depose and say that I have read the above and foregoing proof of appropriation; that I know the contents thereof; and that the facts therein stated are true.

IN WITNESS WHEREOF, I have hereunto set my hand this 4th day of January, 19 77.

O.K. for Cert.
Issue for
250 G.P.M. & 269 Ac-Ft/Yr

Everett A. Eaton
Permittee Signature

Subscribed and sworn to before me this 4th day of January, 19 77

Walter R. Bastett
Notary Public

P/A

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

PERMIT

TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

☐ SURFACE WATER ☒ GROUND WATER

PERMIT NUMBER	APPLICATION NUMBER	PRIORITY DATE	
G2-23122P	G2-23122	August 30, 1974	

NAME
TOWN OF BATTLE GROUND

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
400 E Main St	Battle Ground	Washington	98604

The applicant is, pursuant to the Report of Examination which has been accepted by the applicant, hereby granted a permit to appropriate the following described public waters of the State of Washington, subject to existing rights and to the limitations and provisions set out herein.

11-7-76 See additional provisions

PUBLIC WATER TO BE APPROPRIATED

SOURCE
2 wells

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	1,000 250	1,232 269

QUANTITY, TYPE OF USE, PERIOD OF USE
1,232 acre-feet per year municipal supply continuously
269

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION/WITHDRAWAL
1000 feet east and 120 feet south of the center of Sec. 3

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
NW¼SE¼	3	3	2 E	28	Clark

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY WATER TO BE USED ON

Area served by Town of Battle Ground.

DESCRIPTION OF PROPOSED WORKS

well - 12" casing

DEVELOPMENT SCHEDULE

BEGINNING DATE	COMPLETION DATE	DATE COMPLETE APPLICATION OF WATER TO BE MADE
April 1, 1976	April 1, 1977	April 1, 1978

PROVISIONS

The installation of an access port as described in Ground Water Bulletin No. 1 shall be required prior to issuance of final certificate of water right.

Owing to the proximity of neighboring wells, the permittee is reminded of his responsibility toward same and advised that he may be required to regulate his withdrawal and pumping rate if existing rights are injuriously affected.

A suitable measuring device shall be installed and maintained in accordance with WAC 508-64-020 through WAC 508-640940.

Permittee is advised that notice of proof of appropriation of water (under which final certificate of water right issues) should not be filed until the permanent diversion facilities have been installed together with a mainline system capable of delivering the recommended quantity of water to an existing or proposed distribution system within the area to be served.

Issued as a supplemental supply in the amount of 270 acre-feet per year under Ground Water Certificate Nos. 2284 and 2605; and a primary right for 962 acre-feet per year for municipal supply under this permit. The total annual withdrawal under all rights, shall not exceed 1,232 acre-feet per year.

The Water Resources Act of 1971 specifies certain criteria regarding utilization and management of the waters of the State in the best public interest. Issuance of this permit was based on sufficient waters available, at least during portions of the year. However, it is pointed out to the permittee that his use of the water may be subject to regulation at certain times, based on the necessity to maintain water quantities sufficient for preservation of the natural environment.

This permit shall be subject to cancellation should the permittee fail to comply with the above development schedule and/or fail to give notice to the Department of Ecology on forms provided by that Department documenting such compliance.

Given under my hand and the seal of this office at Olympia, Washington, this ..... 23rd ..... *day of* ..... May ....., *19* ..... 75 .

JOHN A. BIGGS, *Director*
Department of Ecology

ENGINEERING DATA
OK P

by .....
R. Jerry Bollen
Assistant Director

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

REPORT OF EXAMINATION
TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

☐ SURFACE WATER ☒ GROUND WATER

APPLICATION NO.	PRIORITY DATE OF APPLICATION
G2-23122	August 30, 1974

NAME
TOWN OF BATTLE GROUND

ADDRESS (STREET)	(CITY)	STATE	ZIP CODE
400 E Main St	Battle Ground	Washington	98604

PUBLIC WATERS TO BE APPROPRIATED

SOURCE 4-9-76
2 wells

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	1,000	1,232

QUANTITY, TYPE OF USE	PERIOD OF USE	
1,232 acre-feet per year	municipal supply	continuously

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION/WITHDRAWAL
1000 feet east and 120 feet south of the center of Sec. 3

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE E OR W	W.M.	W.R.I.A.	COUNTY
NW¼SE¼	3	3	2 E		28	Clark

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY WATER TO BE USED ON

Area served by Town of Battle Ground.

(SEE REVERSE SIDE)

DESCRIPTION OF PROPOSED WORKS

well - 12" casing

DEVELOPMENT SCHEDULE

BEGINNING DATE	COMPLETION DATE	DATE COMPLETE APPLICATION OF WATER TO BE MADE
April 1, 1976	April 1, 1977	April 1, 1978

PROVISIONS AND RECOMMENDATIONS

"The installation of an access port as described in attached Ground Water Bulletin No. 1 shall be required prior to issuance of final certificate of water right. The applicant may, for his own convenience, wish to install an airline and gage in addition to the access port."

Owing to the proximity of neighboring wells, the applicant is reminded of his responsibility toward same and advised that he may be required to regulate his withdrawal and pumping rate if existing rights are injuriously affected.

Use of the waters to be appropriated under this application will be for a public water supply. State Board of Health rules require every owner of a public water supply to obtain written approval from the Water Supply and Waste Section, Health Services Division, PO Box 1788, Olympia, WA 98504 prior to any new construction or alterations of a public water supply.

"A suitable measuring device shall be installed and maintained in accordance with WAC 508-64-020 through WAC 508-640940." (Installation, operation and maintenance requirements attached hereto.)

Applicant is advised that notice of proof of appropriation of water (under which final certificate of water right issues) should not be filed until the permanent diversion facilities have been installed together with a mainline system capable of delivering the recommended quantity of water to an existing or proposed distribution system within the area to be served.

It is recommended that this application be approved for 1,000 gallons per minute and 1,232 acre-feet per year for municipal supply of a 5,500 population in 1995.

The annual quantity is based on a maximum per capita demand of 200 gallons per day.

The lands described in this application have Ground Water Certificate Nos. 2284 and 2605 appurtenant thereto for a total of 270 acre-feet per year for municipal supply of 1200 people. Therefore, permit when issued, shall have the following provision: "Issued as a supplemental supply in the amount of 270 acre-feet per year under Ground Water Certificate Nos. 2284 and 2605; and a primary right for 962 acre-feet per year for municipal supply under this permit. The total annual withdrawal under all rights, shall not exceed 1,232 acre-feet per year."

The Water Resources Act of 1971 specifies certain criteria regarding utilization and management of the waters of the State in the best public interest. Favorable consideration of this application has been based on sufficient waters available, at least during portions of the year. However, it is pointed out to the applicant that his use of the water may be subject to regulation at certain times, based on the necessity to maintain water quantities sufficient for preservation of the natural environment.

Signed at Olympia, Washington,
this 21 day of August, 1975.

William H. Miller

WILLIAM H. MILLER, District Supervisor
Department of Ecology

THE REFLECTOR, BATTLE GROUND, WASHINGTON, 98604

Affidavit of Publication

STATE OF WASHINGTON } ss.
COUNTY OF CLARK }

JOHN H. DODGE, being first duly sworn on oath deposes and says that he is the PUBLISHER of THE REFLECTOR, a weekly newspaper. That said newspaper is a legal newspaper by order of the superior court in the county in which it is published and it is now and has been for more than six months prior to the date of the publication hereinafter referred to, published in the English language, continually as a weekly newspaper in Battle Ground, Clark County, Washington, and it is now and during all of said time was printed in an office maintained at the aforesaid place of publication of said newspaper. That the annexed is a true

copy of Application to Public Waters as it was published in regular issues (and not in supplement form) of said newspaper once a week for a

period of two consecutive weeks

commencing on the 31st day of

Oct, 19 74, and ending

on the 7th day of Nov.

19 75, both dates inclusive and that such newspaper was regularly distributed to its subscribers during all of said period. That the full amount of the fee charged

for the foregoing publication is the sum of $ 10.00 which amount has been paid in full at the rate of 18 cents per line for the first insertion and 14 cents per line for each subsequent insertion. Minimum charge $5

J H Dodge

Subscribed and sworn to before me this 7th

day of Nov. 19 74

Olivia D Dodge
Notary Public in and for the
State of Washington

~~Residing at Battle Ground, Washington~~

SEAL

Two wells have been drilled for a total quantity of 2500 GPM. Since Application was published for a 1000 GPM and the wells are within 65' of each other I feel the public has been notified and have administratively changed the Permit to include both wells.

4-7-76

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
NOTICE OF APPLICATION TO APPROPRIATE PUBLIC WATERS

TAKE NOTICE:

That TOWN OF BATTLE GROUND of Battle Ground, Washington on August 30, 1974 under Application No. G3-29119 filed for permit to appropriate public waters, subject to existing rights, from 2 wells in the amount of 1000 gallons per minute, continuously each year for municipal supply. The source of the proposed appropriation is located within NW¼SE¼ of Section 3, Township 3N., Range 2E. W.M., in Clark County.

Protests or objections to approval of this application must include a detailed statement of the basis for objection; protests must be accompanied by a two dollar ($2.00) recording fee and filed with the Department of Ecology, Southwest Regional Office, Olympia, WA 98504 within thirty (30) days from November 7, 1974.

Oct 31, Nov 7

O.K. Acknowledged 2-11-75

RECEIVED
FEB 10 1975
DEPARTMENT OF ECOLOGY
SOUTHWEST REGIONAL OFFICE

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

RECEIVED
AUG 30 1974
DEPARTMENT OF ECOLOGY
SOUTHWEST REGIONAL OFFICE

APPLICATION FOR PERMIT
TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

☐ SURFACE WATER ☒ GROUND WATER

$10.00 MINIMUM STATUTORY EXAMINATION FEE REQUIRED WITH APPLICATION

(GRAY BOXES FOR OFFICE USE ONLY)

APPLICATION NO.	W.R.I.A.	COUNTY	PRIORITY DATE	TIME	ACCEPTED
223122	28	Clark	8-30-74	2PM	AM

APPLICANT'S NAME: Town of Battle Ground
TELEPHONE NUMBER: 687-4212

DATE & PLACE OF INCORPORATION IF APPLICANT IS A CORPORATION: June, 1951 Clark County

ADDRESS (STREET): 400 East Main Street (CITY): Battle Ground (STATE): Washington (ZIP CODE): 98604

1. SOURCE OF SUPPLY

IF SURFACE WATER	IF GROUND WATER
SOURCE (NAME OF STREAM, LAKE, SPRING, ETC.) (IF UNNAMED, SO STATE)	SOURCE (WELL, TUNNEL, INFILTRATION TRENCH, ETC.) Wells #5 4-7-76
TRIBUTARY OF	SIZE AND DEPTH 12 inch casing diameter

2. USE

USE TO WHICH WATER IS TO BE APPLIED (DOMESTIC SUPPLY, IRRIGATION, MINING, MANUFACTURING, ETC.): Municipal supply

CUBIC FEET PER SECOND OR GALLONS PER MINUTE	ACRE FEET PER YEAR
1000 ☐ CFS ☒ GPM	615

TIMES DURING YEAR WATER WILL BE REQUIRED: Continuously

IF IRRIGATION, NUMBER OF ACRES	NUMBER OF HOMES OR UNITS, IF DOMESTIC	ESTIMATED POPULATION 20 YEARS FROM THIS DATE IF MUNICIPAL SUPPLY
		5500

DATE PROJECT WILL BE STARTED	DATE PROJECT WILL BE COMPLETED
September 10, 1974	July 1, 1975

3. LOCATION OF POINT OF DIVERSION/WITHDRAWAL

ON ACCOMPANYING PLATS OR MAPS, ACCURATELY MARK AND IDENTIFY EACH POINT OF DIVERSION. GIVE MEASURED DISTANCE AND BEARING, OR NORTH-SOUTH AND EAST-WEST DISTANCES FROM NEAREST SECTION CORNER.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE (E. OR W.) W.M.	COUNTY
NW¼ SE¼	3	3 North	2 East	Clark

1000' east & 120' south of Center of Sec. 3

DO YOU OWN THE LAND ON WHICH THIS SOURCE IS LOCATED. IF NOT, INSERT NAME & ADDRESS OF OWNER: Richard and Betty L. Gardner, Route 2, Battle Ground, Washington 98604

4. IF THIS IS WITHIN THE LIMITS OF A RECORDED PLATTED PROPERTY, COMPLETE THIS SECTION

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

5. LEGAL DESCRIPTION OF PROPERTY *ON WHICH WATER IS TO BE USED*

COPY LEGAL DESCRIPTION FROM DEED, OR ATTACH COPY OF DEED. TAX STATEMENT DESCRIPTIONS ARE NOT ACCEPTABLE. ALSO OUTLINE THIS PROPERTY ON THE MAPS OR PLATS SUBMITTED WITH THIS APPLICATION.

That portion of the Northwest quarter of the Southeast quarter of Section 3, Township 3 North, Range 2 East of the Willamette Meridian, described as follows:

Beginning at a point on the East boundary of the above mentioned Section 3 that is South 0°21'30" West 110 feet from the quarter corner between Sections 2 and 3; and running thence North 89°55'30" West 1615 feet along an extension of the North line of "K" Street as proposed in a plat to be recorded as "Oak Grove Meadows", to a point which is the Southeast corner of a well site, and the true point of beginning of this description; thence North 0°21'30" East 16 feet; thence North 89°55'30" West 16 feet; thence South 0°21'30" West 16 feet; thence South 89°55'30" East 16 feet to the point of beginning; and

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

RECEIVED
AUG 30 1974
DEPARTMENT OF ECOLOGY
SOUTHWEST REGIONAL OFFICE

APPLICATION FOR PERMIT
TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

☐ SURFACE WATER ☒ GROUND WATER

$10.00 MINIMUM STATUTORY EXAMINATION FEE REQUIRED WITH APPLICATION

(GRAY BOXES FOR OFFICE USE ONLY)

APPLICATION NO.	W.R.I.A.	COUNTY	PRIORITY DATE	TIME	ACCEPTED
223122	28	CLARK	8-30-74	2 PM	am

APPLICANT'S NAME: Town of Battle Ground
TELEPHONE NUMBER: 687-4212

DATE & PLACE OF INCORPORATION IF APPLICANT IS A CORPORATION: June, 1951 Clark County

ADDRESS (STREET): 400 East Main Street (CITY): Battle Ground (STATE): Washington (ZIP CODE): 98604

1. SOURCE OF SUPPLY

IF SURFACE WATER	IF GROUND WATER
SOURCE (NAME OF STREAM, LAKE, SPRING, ETC.) (IF UNNAMED, SO STATE)	SOURCE (WELL, TUNNEL, INFILTRATION TRENCH, ETC.) Two wells #5 4-7-76
TRIBUTARY OF	SIZE AND DEPTH 12 inch casing diameter

2. USE

USE TO WHICH WATER IS TO BE APPLIED (DOMESTIC SUPPLY, IRRIGATION, MINING, MANUFACTURING, ETC.): Municipal supply

CUBIC FEET PER SECOND OR GALLONS PER MINUTE: 1000 ☐ CFS ☒ GPM

ACRE FEET PER YEAR: 615

TIMES DURING YEAR WATER WILL BE REQUIRED: Continuously

IF IRRIGATION, NUMBER OF ACRES	NUMBER OF HOMES OR UNITS, IF DOMESTIC	ESTIMATED POPULATION 20 YEARS FROM THIS DATE IF MUNICIPAL SUPPLY
		5500

DATE PROJECT WILL BE STARTED	DATE PROJECT WILL BE COMPLETED
September 10, 1974	July 1, 1975

3. LOCATION OF POINT OF DIVERSION/WITHDRAWAL

ON ACCOMPANYING PLATS OR MAPS, ACCURATELY MARK AND IDENTIFY EACH POINT OF DIVERSION. GIVE MEASURED DISTANCE AND BEARING, OR NORTH-SOUTH AND EAST-WEST DISTANCES FROM NEAREST SECTION CORNER.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE (E. OR W.) W.M.	COUNTY
NW¼ SE¼	3	3 North	2 East	Clark

1000' east & 120' south of Center of Sec. 3

DO YOU OWN THE LAND ON WHICH THIS SOURCE IS LOCATED. IF NOT, INSERT NAME & ADDRESS OF OWNER: Richard and Betty L. Gardner, Route 2, Battle Ground, Washington 98604

4. IF THIS IS WITHIN THE LIMITS OF A RECORDED PLATTED PROPERTY, COMPLETE THIS SECTION

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

5. LEGAL DESCRIPTION OF PROPERTY *ON WHICH WATER IS TO BE USED*

COPY LEGAL DESCRIPTION FROM DEED; OR ATTACH COPY OF DEED. TAX STATEMENT DESCRIPTIONS ARE NOT ACCEPTABLE. ALSO OUTLINE THIS PROPERTY ON THE MAPS OR PLATS SUBMITTED WITH THIS APPLICATION.

Not attached.

Area served by Town of Battle Ground

CONTINUE ON REVERSE SIDE

WHAT IS YOUR INTEREST IN THE PROPERTY ON WHICH THE WATER IS TO BE USED (PROPERTY OWNER, LESSEE, CONTRACT PURCHASER, ETC.)

None

ARE THERE ANY EXISTING WATER RIGHTS APPURTENANT TO THE LAND ON WHICH THE WATER IS TO BE USED

[X] YES [ ] NO

IF YES, FROM WHAT SOURCE AND UNDER WHAT AUTHORITY

Battle Ground School District #119 well, authority unknown

Gw Cert. 2284 & 2605

6. SIGNATURES

Vandalia Sweeney
APPLICANT'S SIGNATURE

Richard N. Gardner
LEGAL LANDOWNER'S SIGNATURE

Rt. 2 Box 30 S Battle Ground, Wn. 98604
LEGAL LANDOWNER'S ADDRESS

IF 10 ACRE-FEET OR MORE OF WATER IS TO BE STORED AND/OR IF THE WATER DEPTH WILL BE 10 FEET OR MORE AT THE DEEPEST POINT, A STORAGE PERMIT MUST BE FILED IN ADDITION TO THIS PERMIT. THESE FORMS CAN BE SECURED, TOGETHER WITH INSTRUCTIONS, FROM THE DEPARTMENT OF ECOLOGY.

REMARKS (TYPE OF SYSTEM PROPOSED)

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY } ss.

This is to certify that I have examined the foregoing application together with the accompanying maps and data, and return the same for correction or completion as follows: .....

.....

.....

In order to retain its priority, this application must be returned to the Department of Ecology, with corrections, on or before ....., 19.....

Witness my hand this .....*day of* ....., 19.....

.....
Department of Ecology

4-1-78
DA

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

COMPUTER INPUT
- [x] APPLICATION
- [ ] PERMIT
- [ ] CERTIFICATE
- [ ] OTHER

PROGRESS SHEET

☐ SURFACE WATER ☒ GROUND WATER

NAME			TELEPHONE NO.
TOWN OF BATTLE GROUND			687-4212
ADDRESS	(CITY)	(STATE)	(ZIP CODE)
400 East Main St.	Battle Ground	Wn.	98604
ASSIGNED TO ~~PO Box 393~~		TELEPHONE NO.	DATE ASSIGNED
ADDRESS	(CITY)	(STATE)	(ZIP CODE)

APPLICATION NO.	PERMIT NO.	CERTIFICATION NO.
G 223122	P	C
DATE AMENDED	DATE CANCELLED	W.R.I.A.

APPLICATION

DATE APPLICATION RECEIVED	INITIAL $10.00 FEE RECEIVED	DATE FEE RECEIVED
8-30-74	☒ YES ☐ NO	9-17-74
STATEMENT OF ADDITIONAL EXAMINATION FEE $	DATE SENT	DATE RECEIVED
DATE RETURNED FOR COMPLETION OR CORRECTION		DATE RECEIVED

TEMPORARY PERMIT

APPROVED BY	DATE ISSUED

PUBLICATION

APPROVED BY	DATE APPROVED	DATE NOTICE SENT
GBS	10/7/74	10-23-74
PROTESTED BY AND DATE		

Xerox copy rec'd 2/13/75.

DATE AFFIDAVIT RECEIVED	CHECKED BY	TIME EXPIRED	DATE AMENDED NOTICE SENT	DATE AFFIDAVIT RECEIVED	TIME EXPIRED
2-10-75		12-7-74			

DEPARTMENT OF GAME AND FISHERIES REPORT

APPROVED	PROVISO	PROTEST

EXAMINATION

DATE EXAMINATION MADE	MADE BY	DATE REPORT OF EXAM. WRITTEN	WRITTEN BY	CHECKED BY
4-7-75	WHM	4-7-75	WHM	
DATE PERMIT FEE REQUESTED	AMOUNT DUE		DATE RECEIVED	
4-28-75	20.00		5-6-75	

PERMIT

PERMIT APPROVED BY	DATE APPROVED	PERMIT NO.	DATE ISSUED
P	5-22-75	P	5-23-75

BEGINNING OF CONSTRUCTION

DATE NOTICE SENT	DATE FILED	EXTENSION FEE
6-5-75	6-12-75	
EXTENDED TO	EXTENDED TO	

WELL DRILLER'S AND/OR CONSTRUCTION REPORT

DATE SENT	DATE FILED
6-5-75	1-7-77

COMPLETION OF CONSTRUCTION

DATE NOTICE SENT	DATE FILED	EXTENSION FEE
	6-12-75	
EXTENDED TO	EXTENDED TO	

PROOF OF APPROPRIATION

DATE SENT	DATE FILED	EXTENSION FEE	EXTENDED TO
6-20-75			
DATE CERTIFICATE FEE REQUESTED	AMOUNT DUE	DATE RECEIVED	DATE APPROVED FOR CERTIFICATE
			1-10-77

APPROVED BY: DH

CERTIFICATION

PROOF EXAM. REQUIRED	CERTIFICATE NUMBER	DATE ISSUED
☐ YES ☐ NO	C	3.25.77

REMARKS

DSHS

PROGRESS

Certificate G2-29208C

Well No. 6 – Sand and Gravel Aquifer

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City of Battle Ground
PO Box 37
Battle Ground, Washington 98604-0037

STATE OF WASHINGTON
CERTIFICATE OF WATER RIGHT

Document Title: Certificate of Water Right

Agency: Department of Ecology
Southwest Regional Office
P.O. Box 47775
Olympia, WA 98504-7775

Applicant: City of Battle Ground
PO Box 37
Battle Ground, WA 98604-0037

Reference Number:

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
August 13, 1986	G2-29208	G2-29208	G2-29208

This is to certify that the herein named applicant has made proof to the satisfaction of the Department of Ecology of a right to the use of the public waters of the State of Washington as herein defined, and under and specifically subject to the provisions contained in the Permit issued by the Department of Ecology, and that said right to the use of said waters has been perfected in accordance with the laws of the State of Washington, and is hereby confirmed by the Department of Ecology and entered of record as shown, but is limited to an amount actually beneficially used.

PUBLIC WATERS TO BE APPROPRIATED

SOURCE	TRIBUTARY OF (IF SURFACE WATERS)
Well #6	

MAX. CUBIC FEET PER SECOND	MAX. GALLONS PER MINUTE	MAX. ACRE-FEET PER YEAR
	350	430

QUANTITY/TYPE OF USE/PERIOD OF USE

430 Acre-feet per year	Municipal supply	Year-round, as needed

LEGAL DESCRIPTION OF LOCATION OF DIVERSION/WITHDRAWAL

1/4 1/4	SECTION	TOWNSHIP N.	RANGE (E. OR W.) W.M.	W.R.I.A.	COUNTY
SE¼ NE¼	4	3	2E	28	Clark

PARCEL # 192683472

ADDITIONAL LEGAL IS ON PAGE 2

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

1/4 1/4	SECTION	TOWNSHIP N.	RANGE (E. OR W.) W.M	W.R.I.A.	COUNTY
N/A	N/A	N/A	N/A	28	Clark

PARCEL # N/A

ADDITIONAL LEGAL IS ON PAGE 2

CONTINUED LEGAL DESCRIPTION FOR LOCATION OF DIVERSION/WITHDRAWAL

2000 feet South and 50 feet West of the Northeast corner of Section 4.

CONTINUED LEGAL DESCRIPTION FOR PROPERTY ON WHICH WATER IS TO BE USED

Area served by the City of Battle Ground.

PROVISIONS

All conditions and requirements contained in reports of examination or permits previously issued apply to this certificate unless specifically noted below.

An approved measuring device shall be installed and maintained for each of the sources identified by this water right in accordance with the rule "Requirements for Measuring and Reporting Water Use", Chapter 173-173 WAC. Water use data shall be recorded *monthly* and maintained by the property owner for a minimum of five years, and shall be promptly submitted to Ecology upon request.

The well access port shall be maintained at all times.

Issuance of this water right is subject to the implementation of the minimum requirements established in the Conservation Planning Requirements, Guideline and Requirements for Public Water Systems Regarding Water Use Reporting, Demand Forecasting Methodology, and Conservation Programs, July 1994, and as revised.

Under RCW 90.03.005 and 90.54.020(6), conservation and improved water use efficiency must be emphasized in the management of the State's water resources, and must be considered as a potential new source of water. Accordingly, as part of the terms of this water right, the applicant shall prepare and implement a water conservation plan approved by Department of Health. The standards for such a plan may be obtained from either the Department of Health or the Department of Ecology.

The quantity authorized by this document for appropriation is considered to be a portion of the amount reserved by the adoption of Chapter 173-592, Reservation of Future Public Water Supply For Clark County. The priority date of this permit is August 13, 1986.

"This certificate is issued with the understanding that the City of Battle Ground has agreed to participate in the June 1995 Salmon Creek Basin Monitoring and Management Plan. Participation in this Plan, will provide the City of Battle Ground guidance, assistance, and acceptable criteria to meet the need for data

(continued on page 3)

The right to use of the water aforesaid hereby confirmed is restricted to the lands or place of use herein described, except as provided in RCW 90.03.380, 90.03.390, and 90.44.100.

This certificate of water right is specifically subject to relinquishment for non-use of water as provided in Chapter 90.14 RCW.

Given under my hand and the seal of this office at Olympia, Washington, this 11th *day of* July, *2002.*

Tom Fitzsimmons, Director
Department of Ecology

By _____
J. Mike Harris, Section Supervisor

ENGINEERING DATA
OK
ECY 040-1-2 (Rev. 8-97)

Provisions Continued

collection, analysis, resource management including the protection of senior water rights or of game fish and/or food fish populations of the stream, and data submittal. If future monitoring and evaluation show that the flow of Salmon Creek has fallen below a threshold level, as defined under the Monitoring and Management Plan, the permittee and Ecology shall take corrective action as prescribed in the Monitoring and Management Plan through water rights enforcement, curtailment of pumping, or otherwise, to further identify cause(s) and alleviate the adverse effects. This permit is not subject to future formal establishment of minimum or base flows pursuant to chapter 90.22 and 90.54 Revised Code of Washington."

RECEIVED
DEPT OF ECOLOGY/SWRO

'02 FEB 25 AM 10:36

Date Stamp

Reviewed by:

WASHINGTON STATE DEPARTMENT OF ECOLOGY

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

PROOF OF APPROPRIATION OF WATER

PERMIT NUMBER	CHANGE APPROVAL NUMBER
02-29208	

NAME OF PERMITTEE	CONTACT NAME (IF DIFFERENT)
City of Battle Ground	

MAILING ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
P.O. Box 37 East Main Street	Battle Ground	WA	98604

PHONE NUMBER	FAX NUMBER
(360) 342-5060	(360) 342-5057

SOURCE(S) OF WATER	LOCATION OF SOURCE(S)					
	NO.	¼	¼	SECTION	TOWNSHIP N.	RANGE, (E/W)M
Groundwater	6	SE	NE	4	3N	2E

LIST ALL PURPOSES WATER IS USED FOR.

DATE WATER WAS COMPLETELY APPLIED TO BENEFICIAL USE	TIME OF YEAR WATER IS USED:	IF SEASONALLY, LIST THE START AND END DATE
July 15, 1996	☒ Continuous/Year round ☐ Seasonal	Start: End:

DESCRIBE HOW CONSTRUCTION AND DEVELOPMENT RELATED PROVISIONS (AS REQUIRED BY PERMIT) HAVE BEEN OR ARE TO BE MET (USE ADDITIONAL SHEET OF PAPER IF NECESSARY)

DESCRIPTION OF SPECIFIC AREA ON WHICH WATER IS BENEFICIALLY USED(USE ADDITIONAL SHEET OF PAPER IF NECESSARY)

Water service area for the City of Battle Ground.

NO.	¼	¼	SECTION	TOWNSHIP N.	RANGE, (E/W)M

PHYSICAL WITHDRAWAL OR DIVERSION INFORMATION

For Pump Designed Water System Information:

TYPE OF PUMP: ☒ Submersible ☐ Turbine ☐ Centrifical ☐ Other _____

MAKE	MODEL #	SERIAL #	HORSEPOWER
Goulds	7CHC	FR376984	75
MOTOR	**BHP**	**SPEED**	**RPM**
Franklin	75	3525	3525

☑ Water lubricated ☐ Oil Lubricated

BOOSTER PUMP / BREAK HORSEPOWER	PRESSURE	OPEN DISCHARGE
☐ Yes ☐ No		☐ Yes ☒ No
PUMP DISCHARGE HEAD PRESSURE	**DISCHARGE PIPE DIAMETER**	
psi 110	6"	

For Ground Water Withdrawal (if more than one, please include attachment)

Ecology Unique Well Identification Number(s) ABT 804 [Include a copy of the well log(s)]

PUMP SETTING (DEPTH)	STATIC WATER LEVEL	DYNAMIC (PUMPING) LEVEL
253' BGL to suction screen	213' 11" feet below land surface	241 feet below land surface
ACCESS PORT INSTALLED?	**AIRLINE INSTALLED?**	**AIRLINE LENGTH**
☒ Yes	☐ Yes	Ft.

For Non-Pump Designed Water Systems

METHOD OF WATER DIVERSION	DESCRIPTION OF WORKS	
	SCREEN MESH SIZE	METHOD OF CONTROL

USE OF WATER FOR:

1. Irrigation (Please include map of all irrigated lands):

TYPE OF SYSTEM	NUMBER OF SPRINKERS OR EMMITERS	SPRINKLER/EMMITER MAKE	MODEL & RATED DISCHARGE

SIZE NOZZLE/EMMITER OPENINGS	AVERAGE PRESSURE AT SPRINKLER/EMMITER HEADS	NUMBER OF ACRES DEVELOPED	TYPE OF CROP(S)

2. Municipal or Domestic Supply

NUMBER OF DOMESTIC UNITS CURRENTLY SERVED:	NUMBER OF DOMESTIC UNITS TO BE SERVED	POPULATION CURRENTLY SERVED
4636	6773	11,000

ALSO, provide the following information, if applicable:

- [XX] Department of Health public water system identification number. #047005
- [ ] Map of the delivery system (provide copy if water system is done)
- [ ] Map of present service area and lots presently using water (Non-Municipal Users).
- [ ] If platted property, provide copy of the file plat map or file reference number Non-Municipal Users).
- [ ] Other incidental beneficial uses associated with the domestic supply (Non-Municipal Users).

3. Industrial or Commercial

TYPE OF INDUSTRY OR COMMERCIAL PROCESS

If a waste discharge permit is required for the facility, include a reference to the permit number_____

4. Other Use of Water (describe): _____

WATER USE AND *MEASUREMENT

IS A FLOW METER OR MEASURING DEVICE INSTALLED? [X] Yes [ ] No	LOCATION OF METER(S) OR MEASURING DEVICE(S)		
	In the pump house, on discharge piping.		
MAKE	SERIAL NUMBER	INSTALLATION DATE	INSTALLED BY:
Seaflow Inc.	FT 400	1996	Schneider Equipments
METER READING	DATE		
Meter manually reset daily.			

*Include copy of meter specifications

Actual amount withdrawn or diverted from permanent system on an instantaneous and annual basis. Please include meter data or describe method used to estimate annual volume.

CUBIC FEET PER SECOND	ACRE FEET PER YEAR	GALLONS PER MINUTE	TOTAL GALLONS PER YEAR
.78	248.76	350	468,280

If the existing water use as indicated by meter data, etc., is less than you anticipate to be the full extent of the water right which you are reporting through submission of this form, please explain on a separate sheet.

I, Rob Charles, do certify that I have completed appropriation of water under Water Right Permit or approved water right change number, 62-29208. This notice and attached documents are true and accurate statements and describe and support my assertion that I have satisfied the terms of the permit/change in compliance with the law.

Permittee(s) Signature _____ Date 2/20/02

State of Washington
County of Cowlitz Co

Signed and sworn to (or affirmed) before me on 20th OF FEBRUARY, 2002 *by* Rob Charles

Seal or Stamp

ANNA L. BOCCHI NOTARY PUBLIC STATE OF WASHINGTON COMMISSION EXPIRES OCTOBER 18, 2003

(Signature) _____

Notary Public
(Title)

My appointment expires 10-18-03

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

PERMIT

TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

☐ Surface Water (issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the Department of Ecology.)

☒ Ground Water (issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology.)

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
August 13, 1986	G2-29208	G2-29208	

NAME
City of Battle Ground

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
PO Box 37	Battle Ground	Washington	98604-0037

The applicant is, pursuant to the Report of Examination which has been accepted by the applicant, hereby granted a permit to appropriate the following described public waters of the State of Washington, subject to existing rights and to the limitations and provisions set out herein.

PUBLIC WATERS TO BE APPROPRIATED

SOURCE
Well #6

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	400	430

QUANTITY, TYPE OF USE, PERIOD OF USE		
430 Acre-feet per year	Municipal supply	Year-round, as needed

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION–WITHDRAWAL
2000 feet South and 50 feet West of the Northeast corner of Section 4.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
SE¼ NE¼	4	3	2E	28	Clark

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Area served by the City of Battle Ground.

DESCRIPTION OF PROPOSED WORKS

A 12-inch well drilled to a depth of 298 feet capable of producing 400 gpm. Well ID#ABT-804

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	WATER PUT TO FULL USE BY THIS DATE:
Started	July 1, 1997	July 1, 1998

PROVISIONS

Installation and maintenance of an access port as described in WAC 173-160-355 is required. An air line and gauge may be installed in addition to the access port.

An approved metering device shall be installed and maintained in accordance with RCW 90.03.360, WAC 508-64-020 through -040. Meter readings shall be recorded at least monthly.

"This permit is issued with the understanding that the City of Battle Ground has agreed to participate in the June 1995 Salmon Creek Basin Monitoring and Management Plan. Participation in this Plan, will provide the City of Battle Ground guidance, assistance, and acceptable criteria to meet the need for data collection, analysis, resource management including the protection of senior water rights or of game fish and/or food fish populations of the stream, and data submittal. If future monitoring and evaluation show that the flow of Salmon Creek has fallen below a threshold level, as defined under the Monitoring and Management Plan, the permittee and Ecology shall take corrective action as prescribed in the Monitoring and Management Plan through water rights enforcement, curtailment of pumping, or otherwise, to further identify cause(s) and alleviate the adverse effects. This permit is not subject to future formal establishment of minimum or base flows pursuant to Chapter 90.22 and 90.54 Revised Code of Washington."

"Prior to issuance of a certificate for this water right, Well No. 3, authorized by Water Right Certificate No. 2284, shall be properly abandoned by a licensed well driller in accordance with Chapter 173-160-415 WAC."

The quantity authorized by this document for appropriation is considered to be a portion of the amount reserved by the adoption of Chapter 173-592, Reservation of Future Public Water Supply For Clark County. The priority date of this permit is August 13, 1986.

Issuance of this water right may be subject to implementation of the minimum requirements established in the Conservation Planning Requirements, Guidelines and Requirements for Public Water Systems Regarding Water Use Reporting, Demand Forecasting Methodology, and Conservation Programs, July 1994, and as revised.

Under RCW 90.03.005 and 90.54.020(6), conservation and improved water use efficiency must be emphasized in the management of the State's water resources, and must be considered as a potential new source of water. Accordingly, as part of the terms of this water right, the applicant may be required to prepare and implement a water conservation plan approved by Department of Health. The standards for such a plan may be obtained from either the Department of Health or the Department of Ecology.

This permit shall be subject to cancellation should the permittee fail to comply with the above development schedule and/or fail to give notice to the Department of Ecology on forms provided by that Department documenting such compliance.

Given under my hand and the seal of this office at Olympia, Washington,

this 19th *day of* September, *19* 96.

Department of Ecology

ENGINEERING DATA
OK GB

by Gale Blomstrom

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
AMENDED

REPORT OF EXAMINATION

TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

☐ Surface Water (Issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the Department of Ecology.)

☒ Ground Water (Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology.)

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
August 13, 1986	G2-29208		

NAME
City of Battle Ground

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
PO Box 37	Battle Ground	Washington	98604-0037

PUBLIC WATERS TO BE APPROPRIATED

SOURCE
Well #6

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	400	430

QUANTITY, TYPE OF USE, PERIOD OF USE		
430 Acre-feet per year	Municipal supply	Year-round, as needed

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION–WITHDRAWAL
2000 feet South and 50 feet West of the Northeast corner of Section 4.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
SE¼ NE¼	4	3	2E	28	Clark

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Area served by the City of Battle Ground.

DESCRIPTION OF PROPOSED WORKS

A 12-inch well drilled to a depth of 298 feet capable of producing 400 gpm. Well ID#ABT-804

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	WATER PUT TO FULL USE BY THIS DATE:
Started	July 1, 1997	July 1, 1998

REPORT

BACKGROUND:

On March 27, 1995, the City of Battle Ground applied for a permit, under the provisions of Chapter 90.44 Revised Code of Washington (RCW), to appropriate public ground water from a well in the amount of 400 gallons per minute (gpm) for municipal supply. The application was accepted for processing and assigned application number G2-29208.

Pursuant to Chapter 173-592 Washington Administrative Code (WAC), Reservation of Future Public Water Supply for Clark County, the priority date of this application is August 13, 1986.

A legal notice of the applicants proposed appropriation was published April 5, and 12, 1995 in the Battle Ground Reflector. No objections were received in response to the public notice.

A preliminary permit to drill and test well(s) was issued by this office on May 9, 1995. On October 17, 1995, AGI Technologies submitted a final report on the construction, development, and testing of the City of Battle Ground's Well No. 6.

Based on the provisions of Chapters 90.03 and 90.44 RCW, and the following information, I recommend approval of application G2-29208 for 400 gpm, and 430 acre-feet per year (a-f/y), continuously year-round for municipal supply to the area served by the City of Battle Ground's water-supply system.

INVESTIGATION:

In consideration of the application, I conducted a field examination and met with representatives of the City and their consultant. I reviewed the information submitted with the application, relevant reports, and Department of Ecology's records. These findings were reviewed by a staff hydrogeologist.

Site Location and Description

The well site is located west of downtown Battle Ground approximately one-quarter mile south of SR502 on 112th Avenue (address is 21118 NE 112th). The surrounding area is predominately pasture and wetlands. The site is near the surface-water divide between Salmon Creek and East Fork Lewis River drainage basins. Topographically, the area and the City of Battle Ground are in the Salmon Creek drainage basin.

Pasture land to the northwest of the well site is being developed rapidly with many new homes under construction. Water from this well will supply these newly developed areas, along with the needs of the existing water supply system.

Water-Right Certificates Owned by City of Battle Ground

Certificate No.	Source	gpm	a-f/y	a-f/y (supplemental)
2605	Well (1&2)	350	270	
2284	Well (3)	375		270
G2-23122	Well (4&5)	250	269	

Currently, the City of Battle Ground owns water rights for 975 gpm and 539 a-f/y. Wells 1 and 2 together produce 280 gpm continuously, Well 3 is not being used, and Wells 4 and 5 together produce 155 gpm continuously. These wells withdraw from the same aquifer, referred to by AGI as the "Battle Ground Aquifer" or "Upper Troutdale". Production rates of the wells are limited by pump size.

Wells 1 and 2 are the "primary source" supply wells, and Wells 4 and 5 are used for peak demand. Well 3 should be properly abandoned. Water supply for the City of Battle Ground has been augmented by Clark Public Utilities, through an intertie and by the use of water authorized by Water Right Certificate 720-D issued to the Battle Ground School District. Both of these supplies are used, as needed, for peak demand. Water is pumped to storage, supplying four above-ground storage facilities. These facilities store approximately 770,000 gallons of water.

Eleven Ground Water Right Certificates, including three to the City of Battle Ground, authorizing a total withdrawal of 2,094 gpm and 886.4 acre-feet per year have been issued in the vicinity of the applicant. The rights were issued for municipal supply, domestic use, stockwater, and irrigation. The wells range in depth from 88 to 165 feet below ground surface. There are also four Surface Water Right Certificates issued for a combined total of .5 cubic feet per second and 24 acre-feet per year for irrigation and domestic supply.

Other wells in the vicinity are recorded by well logs. These wells range in depth from 75 to 219 feet. Yields from these wells range from 7 to 100 gallons per minute. The depth and static water levels of these wells indicate that they are completed in the Upper Troutdale aquifer.

Production records for 1995 show that the water demand for the Battle Ground's water system was 640 acre-feet (Table 1). The City produced 524.9 acre-feet from its production wells 1, 2, 4 and 5. The additional water was acquired from wholesale intertie agreements between CPU and the school district as cited above.

TABLE 1.

Source	Gallons	Acre-feet
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Wells 1,2,4,5	171,037,960	524.9
Total	**208,014,360**	**640.1**

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Currently, Battle Ground serves water to a population of approximately 5,400 people. The population for year 2014 for the service area is anticipated to be 16,000 people (Water System Plan for City of Battle Ground, 1994). To serve this population will require approximately 1,600,000 gallons per day, or 1,792 acre-feet per year.

As water rights currently allocated to the City amount to only 539 acre-feet per year, additional primary rights are needed for the City to meet both current and future demand.

AGI Technologies predicts that production Well No. 6 will produce 400 gallons per minute on a sustained basis. Pumping at this rate for an average of 16 hours per day would produce approximately 430 a-f/y. I recommend that this annual quantity be allocated as a primary water right under this permit.

Water allocated by this permit will alleviate the need for peak-demand supplies that currently are obtained from Clark Public Utilities and Battle Ground School District. The City of Battle Ground intends to maintain these interties for emergency supply.

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Climate

Average annual precipitation at the Battle Ground climate station was 60.1 inches for the period 1949 to 1974. Snyder, D. T., et al. (1994; Estimation of ground-water recharge from precipitation, runoff into drywells, and on-site water-disposal systems in the Portland Basin, Oregon and Washington, USGS Water-Resources Investigation Report 92-4010) estimated average annual recharge in the area at about 14 to 24 inches (750 to 1280 ac-ft/mi^2), or 23 to 40% of the average precipitation.

The annual pumpage for this appropriation, 430 ac-ft/yr, will capture ground-water recharge equivalent to that occurring on about one-third to one-half square mile. However, actual capture will occur over a several square miles because not all of the recharge reaches the confined aquifer and because the cone-of-depression will spread out until the amount pumped is captured from surface waters in both the Salmon Creek and East Fork Lewis River basins. Despite the short-term indications that the aquifer is confined, in the long-term (month to years), this ground-water-flow system may respond to pumping with increased vertical leakage and, eventually, as if it were unconfined.

Clark County Reservation

Under the provisions of Chapter 173-592, Reservation of Future Public Water Supply for Clark County, ground water was reserved for future beneficial use for public water supply in Clark County. Since the enactment of this reservation, water rights issued pursuant to WAC 173-592 have received a priority date of

August 13, 1986, the effective date of said regulation. The total reservation quantity is 97,000 gpm and 65,300 acre-feet per year (A-F/Y) prorated by aquifer as follows:

1) Columbia River Alluvium (1A) and Sandy River Mudstone (1C) 77,000 gpm, 51,800 A-F/Y;
2) Upper Troutdale (1B-2B) 20,000 gpm, 13,500 A-F/Y

To date, ground water rights totaling 17,600 gpm and 2, 985.7 A-F/Y have been issued subject to WAC 173-592. This appropriation will, when permitted, be debited against the reserved quantity of the reservation.

Salmon Creek Basin Monitoring and Management Plan

In June 1995, the Salmon Creek Basin Monitoring and Management Plan was finalized. The document outlines the steps to implement the Salmon Creek Basin Water Resources Management Plan which was developed under a Memorandum of Understanding among the Department of Ecology, Clark County, Clark Public Utilities, and the Department of Health.

The management plan provides for continued data collection and analysis of surface water flow, ground water levels, and precipitation data. An operational framework which includes monitoring, environmental enhancement, public education programs, resource management, and criteria for future water right permit decisions are part of this plan.

CONCLUSION:

In accordance with Chapters 90.03 and 90.44 RCW, the Department of Ecology finds that the proposed appropriation is for a beneficial use; that the water is available from the source in question; the appropriation will not impair senior rights; and will not be detrimental to the public welfare.

An appropriation of this magnitude, if fully used, will lower heads in the vicinity by several feet and will become an important component of the area's water budget. To account for the expected changes and to aid in tracking the cumulative effects of other wells in the area, the well's monthly production and water levels should be measured. Also, nearby non-pumping wells of varying depths should be monitored to track the three-dimensional changes in heads.

The City of Battle Ground will be required by provision to this permit to meter production, monitor static water levels, evaluate impacts to the water source, and prepare and implement a water conservation plan approved by the Department of Health. The City of Battle Ground has agreed to participate in the June 1995, Salmon Creek Basin Monitoring and Management Plan. Participation in this Plan will provide the City of Battle Ground guidance, assistance, and acceptable criteria to meet the need for data collection, analysis, resource management, and data submittal.

RECOMMENDATIONS:

Based on the above information and conclusions, I recommend approval of this application and issuance of a permit for 400 gpm and 430 acre feet per year to be used year round as needed for municipal supply by the City of Battle Ground.

Provisions

The water source and/or water transmission facilities are not wholly located upon land owned by the applicant. Issuance of a permit by this department for appropriation of the waters in question does not convey a right of access to, or other right to use, land which the applicant does not legally possess. Obtaining such a right is a private matter between applicant and owner of that land.

The water appropriated under this application will be used for public water supply. The State Board of Health rules require public water supply owners to obtain written approval from the Office of Water Supply, Department of Health, Mail Stop 7822, Building 3, Olympia, Washington 98504-7822, prior to any new construction or alterations of a public water supply system.

Installation and maintenance of an access port as described in WAC 173-160-355 is required. An air line and gauge may be installed in addition to the access port.

An approved metering device shall be installed and maintained in accordance with RCW 90.03.360, WAC 508-64-020 through -040 (installation, operation, and maintenance requirements are attached). Meter readings shall be recorded at least monthly.

"In order to maintain a sustainable supply of water, pumping must be managed by the City of Battle Ground so that static water levels do not progressively decline from year to year. Water levels shall be measured and recorded monthly, using a consistent methodology. The length of the pumping period or recovery period prior to each measurement shall be constant, and shall be included in the record. Water use shall also be reported."

"Water-pumpage, well-monitoring, and static-water-level data, along with a summary and analysis of the data, shall be submitted annually, or more frequently upon request, to Ecology's Southwest Regional Office Water Resources Program. The data shall be submitted in digital format and shall include the following elements:

For Water Use Reporting:

1. Measurement method (totaling meter, acoustic meter, etc.) for each well
2. Total volume pumped from each well by month in thousands or millions of gallons
3. Unique Well ID number

For Water Level Reporting:

1. Unique well number
2. Measurement date and time
3. Measurement method (air line, electric tape, pressure transducer, etc.)
4. Well status (pumping, recently pumped, etc.)
5. Water level accuracy (to nearest foot, tenth of foot, etc.)
6. Description of the measuring point (top of casing, sounding tube, etc.)
7. Measuring point elevation above land surface to the nearest 0.2 foot

For Water Quality Monitoring:

1. Unique well number
2. Sampling date and time
3. Chloride concentration (mg/L)
4. Submit paper copy of laboratory report

"This permit is issued with the understanding that the City of Battle Ground has agreed to participate in the June 1995 Salmon Creek Basin Monitoring and Management Plan. Participation in this Plan, will provide the City of Battle Ground guidance, assistance, and acceptable criteria to meet the need for data collection, analysis, resource management including the protection of senior water rights or of game fish and/or food fish populations of the stream, and data submittal. If future monitoring and evaluation show that the flow of Salmon Creek has fallen below a threshold level, as defined under the Monitoring and Management Plan, the permittee and Ecology shall take corrective action as prescribed in the Monitoring and Management Plan through water rights enforcement, curtailment of pumping, or otherwise, to further identify cause(s) and alleviate the adverse effects. This permit is not subject to future formal establishment of minimum or base flows pursuant to Chapters 90.22 and 90.54 Revised Code of Washington."

"Prior to issuance of a certificate for this water right, Well No. 3, authorized by Water Right Certificate No. 2284, shall be properly abandoned by a licensed well driller in accordance with Chapter 173-160-415 WAC."

The quantity authorized by this document for appropriation is considered to be a portion of the amount reserved by the adoption of Chapter 173-592, Reservation of Future Public Water Supply For Clark County. The priority date of this permit is August 13, 1986.

Issuance of this water right may be subject to implementation of the minimum requirements established in the Conservation Planning Requirements, Guidelines and Requirements for Public Water Systems Regarding Water Use Reporting, Demand Forecasting Methodology, and Conservation Programs, July 1994, and as revised.

Under RCW 90.03.005 and 90.54.020(6), conservation and improved water use efficiency must be emphasized in the management of the State's water resources, and must be considered as a potential new source of water. Accordingly, as part of the terms of this water right, the applicant may be required to prepare and implement a water conservation plan approved by Department of Health. The standards for such a plan may be obtained from either the Department of Health or the Department of Ecology.

In accordance with Chapters 90.03 and 90.44 RCW, I find there is water available for appropriation from the source in question, that the appropriation as recommended is a beneficial use, and should not impair existing rights or be detrimental to public welfare.

REPORTED BY: Chris Anderson Date: August 20, 1996

The statutory permit fee for this application is $20.00.

FINDINGS OF FACT AND DECISION

Upon reviewing the above report, I find all facts, relevant and material to the subject application, have been thoroughly investigated. Furthermore, I find water is available for appropriation and the appropriation as recommended, is a beneficial use and will not be detrimental to existing rights or the public welfare.

Therefore, I **ORDER** a permit be issued under Ground Water Application Number G2-29208, subject to existing rights and indicated provisions, to allow appropriation of public ground water for the amount and uses specified in the foregoing report.

Signed at Olympia, Washington, this 20th day of August ,1996.

Gale Blomstrom

Gale Blomstrom
Shorelands & Water Resources Supervisor
Southwest Regional Office

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

REPORT OF EXAMINATION

TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

☐ Surface Water (issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the Department of Ecology.)

☒ Ground Water (issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology.)

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
August 13, 1986	G2-29208		

NAME
City of Battle Ground

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
PO Box 37	Battle Ground	Washington	98604-0037

PUBLIC WATERS TO BE APPROPRIATED

SOURCE
Well #6

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	400	430

QUANTITY, TYPE OF USE, PERIOD OF USE		
430 Acre-feet per year	Municipal supply	Year-round, as needed

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION–WITHDRAWAL
2000 feet South and 50 feet West of the Northeast corner of Section 4.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
SE¼ NE¼	4	3	2E	28	Clark

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Area served by the City of Battle Ground.

DESCRIPTION OF PROPOSED WORKS

A 12-inch well drilled to a depth of 298 feet capable of producing 400 gpm. Well ID#ABT-804

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	WATER PUT TO FULL USE BY THIS DATE:
Started	July 1, 1997	July 1, 1998

REPORT

BACKGROUND:

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INVESTIGATION:

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The City of Battle Ground will be required by provision to this permit to meter production, monitor static water levels, evaluate impacts to the water source, and prepare and implement a water conservation plan approved by the Department of Health. The City of Battle Ground has agreed to participate in the June 1995, Salmon Creek Basin Monitoring and Management Plan. Participation in this Plan will provide the City of Battle Ground guidance, assistance, and acceptable criteria to meet the need for data collection, analysis, resource management, and data submittal.

RECOMMENDATIONS:

Based on the above information and conclusions, I recommend approval of this application and issuance of a permit for 400 gpm and 430 acre feet per year to be used year round as needed for municipal supply by the City of Battle Ground.

Provisions

The water source and/or water transmission facilities are not wholly located upon land owned by the applicant. Issuance of a permit by this department for appropriation of the waters in question does not convey a right of access to, or other right to use, land which the applicant does not legally possess. Obtaining such a right is a private matter between applicant and owner of that land.

The water appropriated under this application will be used for public water supply. The State Board of Health rules require public water supply owners to obtain written approval from the Office of Water Supply, Department of Health, Mail Stop 7822, Building 3, Olympia, Washington 98504-7822, prior to any new construction or alterations of a public water supply system.

"Installation and maintenance of an access port as described in WAC 173-160-355 is required."

"An approved metering device shall be installed and maintained in accordance with RCW 90.03.360, and WAC 508-64-020 through -040. Meter readings shall be recorded at least monthly."

"Under RCW 90.44.250 and 90.54.030, the Department of Ecology is directed to become informed about all aspects of the water resources of the State. In order to maintain a sustainable supply of water, pumping must be managed by the City of Battle Ground so that static water levels do not progressively decline from year to year. The length of the pumping period or recovery period prior to each measurement shall be constant, and shall be included in the record. The Department is authorized to make such investigations as may be necessary to determine the location, extent, depth, volume, and flow of all ground waters within the State. Accordingly, the applicant shall monitor and provide an annual summary of the previous years' monthly water level data and monthly totals of water pumped for this well and all other Battle Ground production wells. The summary shall be submitted in tabular format to Ecology's Southwest Regional Office annually, during the month of February, or more frequently if requested by the department. The City of Battle Ground has agreed to participate in the June 1995, Salmon Creek Basin Monitoring and Management Plan. Participation in this Plan will provide the City of Battle Ground guidance, assistance, and acceptable criteria to meet the need for data collection, analysis, resource management, and data submittal."

"Prior to issuance of a certificate for this water right, Well No. 3, authorized by Water Right Certificate No. 2284, shall be properly abandoned by a licensed well driller in accordance with WAC 173-160-415."

"The quantity authorized by this document for appropriation is considered to be a portion of the amount reserved by the adoption of Chapter 173-592 WAC, Reservation of Future Water Supply for Clark County. The priority date of this permit is August 13, 1986."

Issuance of this water right is subject to the implementation of the minimum requirements established in the Conservation Planning Requirements, Guideline and Requirements for Public Water Systems Regarding Water Use Reporting, Demand Forecasting Methodology, and Conservation Programs, July 1994, and as revised.

Under RCW 90.03.005 and 90.54.020(6), conservation and improved water use efficiency must be emphasized in the management of the states water resources, and must be considered as a potential new source of water. Accordingly, as part of the terms of this water right, the applicant shall prepare and implement a water conservation plan approved by Department of Health. The standards for such a plan may be obtained from either the Department of Health or the Department of Ecology.

In accordance with Chapters 90.03 and 90.44 RCW, I find there is water available for appropriation from the source in question, that the appropriation as recommended is a beneficial use, and should not impair existing rights or be detrimental to public welfare.

REPORTED BY: Chris Anderson Date: July 25, 1996

The statutory permit fee for this application is $20.00.

FINDINGS OF FACT AND DECISION

Upon reviewing the above report, I find all facts, relevant and material to the subject application, have been thoroughly investigated. Furthermore, I find water is available for appropriation and the appropriation as recommended, is a beneficial use and will not be detrimental to existing rights or the public welfare.

Therefore, **I ORDER** a permit be issued under Ground Water Application Number G2-29208, subject to existing rights and indicated provisions, to allow appropriation of public ground water for the amount and uses specified in the foregoing report.

Signed at Olympia, Washington, this 25th day of July, 1996.

Gale Blomstrom

Gale Blomstrom
Shorelands & Water Resources Supervisor
Southwest Regional Office

The Reflector
21914 N.E. 112th Ave., P.O. Box 2020, Battle Ground, Washington 98604-2020
(206) 687-5151 • FAX: (206) 687-5162

Affidavit of Publication

STATE OF WASHINGTON [SS.
COUNTY OF CLARK

Marvin J. Case, being first duly sworn on oath, desposes and says that he is Publisher of THE REFLECTOR, a weekly newspaper. That said newspaper is a legal newspaper by order of the superior court in the county in which it is published and it is now and has been for more than six months prior to the date of publication hereinafter referred to, published in the English language, continually as a weekly newspaper in Battle Ground, Clark County, Washington, and is now and during all of said time was printed in an office maintained at the aforesaid place of publication of said newspaper. That the annexed is a true copy of Water Right Notice as it was published in regular issues (and not in supplement form) of said newspaper once a week for a period of 2 consecutive weeks commencing on the 5 day of April, 19 95, and ending on the 12th day of April 19 95, both dates inclusive and that such newspaper was regularly distributed to its subscribers during all of said period. That the full amount of the fee charged for the foregoing publication is the sum of $ 25.00 which amount has been paid in full at the rate of $4.25 per column inch for the first insertion and $3.50 per column inch for each subsequent insertion.

Subscribed and sworn to before me this 1st day of May, 19 95

Barbara Adamson

Notary Public in and for the State of Washington
Residing at Battle Ground, Washington

SEAL

NOTICE OF APPLICATION TO APPROPRIATE PUBLIC WATERS
STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

TAKE NOTICE: That City of Battle Ground of Battle Ground, Washington, on March 27, 1995 under Application No. G2-29208 filed for permit to appropriate public waters, subject to existing rights, from 2 wells in the amount of 400 gallons per minute as needed year round each year, for municipal supply. The source of the proposed appropriation is located within SE 1/4 NE 1/4 of Section 4, Township 3 N, Range 2E W.M, in Clark County.

Protests or objections to approval of this application must include a detailed statement of the basis for objection; protests must be accompanied to a two dollar ($2.00) recording fee and filed with the Department of Ecology, at the address shown below, within thirty (30) days from April 12.

Dept. of Ecology
P.O. Box 47775
Olympia, WA 98504-7775
Apr5,12

RECEIVED
'95 MAY -3 A9:20
S.W. REGIONAL OFFICE

State of Washington
Application for a Water Right

Please follow the attached instructions to avoid unnecessary delays.

For Ecology Use
Fee Paid 10-
Date 3/27/95
√# 16038

Section 1. APPLICANT - PERSON, ORGANIZATION, OR WATER SYSTEM

Name CITY OF BATTLE GROUND Home Tel:( ) -

Mailing Address P.O. BOX 37 Work Tel:(360) 687 - 4971

City BATTLE GROUND State WA Zip+4 98604 +0037 FAX:(360) 687 - 0622

MAR 27 A9:43
S.W REGIONAL OFFICE

Section 2. CONTACT - PERSON TO CALL ABOUT THE APPLICATION

☐ **Same as above**

Name FRANK HODGSON Home Tel:(360) 573 - 2429

Mailing Address P.O. BOX 37 Work Tel:(360) 687 - 3175

City BATTLE GROUND State WA Zip+4 98604 + FAX:(360) 687 - 5218

Relationship to applicant DIRECTOR OF PUBLIC WORKS

Section 3. STATEMENT OF INTENT

The applicant requests a permit to use not more than 400 (☒ gallons per minute or ☐ cubic feet per second) from a ☐ surface water source or ☐ ground water source (check only one) for the purpose(s) of PUBLIC WATER SUPPLY SYSTEM. Attach a "legal" description of the place of use. (**See instructions**.) *NOTE: A tax parcel number or a plat number is not sufficient.*

Estimate a maximum annual quantity to be used in acre-feet per year: 644

☐ Check if the water use is proposed for a short-term project. Indicate the period of time that the water will be needed:
From ___/___/___ to ___/___/___

Section 4. WATER SOURCE

If SURFACE WATER	If GROUNDWATER
Name the water source and indicate if stream, spring, lake, etc. If unnamed, write "unnamed spring," "unnamed stream," etc.: Number of diversions:	A permit is desired for 1 or 2 well(s).
Source flows into (name of body of water):	Size & depth of well(s): 12" 300' to 400'

LOCATION

Enter the north-south and east-west distances in feet from the point of diversion or withdrawal to the nearest section corner: 2060' south & 16' west of the N.E. corner of Section 4.

¼ of	¼ of	Section	Township	Range(E/W)	County	If location of source is platted, complete below: Lot	Block	Subdivision
S.E.	N.E.	4	3N	2E	CLARK			

For Ecology Use Date Received: 3/27/95 Priority Date: 3/27/95

SEPA: (Exempt)/Not Exempt FERC License.# Dept. Of Health #

Date Accepted As Complete 3/29/95 By SJ Date Returned By WRIA: 28

ECY 040-1-14
Rev. 12/94 F

APPLICATION

Appl. No.: G2-29208

Section 5. GENERAL WATER SYSTEM INFORMATION

A. Name of system, if named: PROPOSED CITY WELL NO. 6 (LEGGETT)

B. Briefly describe your proposed water system. (See instructions.)

THE NEW WELL WILL BE CONNECTED WITH THE EXISTING CITY DISTRIBUTION SYSTEM BY 2,100 FT. MAIN EXTENSION.

C. Do you already have any water rights or claims associated with this property or system? ☒ YES ☐ NO
PROVIDE DOCUMENTATION.

Section 6. DOMESTIC / PUBLIC WATER SUPPLY SYSTEM INFORMATION
(Completed for all domestic/public supply uses.)

A. Number of "connections" requested: 1710 Type of connection ALL
(Homes, Apartment, Recreational, etc.)

B. Are you within the area of an approved water system? ☒ YES ☐ NO
If yes, explain why you are unable to connect to the system. *Note: Regional water systems are identified by your County Health Department.* WELL BEING DEVELOPED FOR ADDITIONAL MUNICIPAL SUPPLY.

Complete C. and D. only if the proposed water system will have fifteen or more connections.

C. Do you have a current water system plan approved by the Washington State Department of Health? SUBMITTED DECEMBER 1994 ☐ YES ☒ NO
If yes, when was it approved? _____ Please attach the current approved version of your plan.

D. Do you have an approved conservation plan? COVERED IN DEC. 1994 WATER SYSTEM PLAN ☐ YES ☒ NO
If yes, when was it approved? _____ Please attach the current approved version of your plan.

Section 7. IRRIGATION/AGRICULTURAL/FARM INFORMATION
(Complete for all irrigation and agriculture uses.)

A. Total number of acres to be irrigated: _____

B. List total number of acres for other specified agricultural uses:

Use_____Acres_____
Use_____Acres_____
Use_____Acres_____

C. Total number of acres to be covered by this application: _____

D. Family Farm Act (Initiative Measure Number 59, November 3, 1977)
Add up the acreage in which you have a controlling interest, including only:
‡ Acreage irrigated under water rights acquired after December 8, 1977;
‡ Acreage proposed to be irrigated under this application;
‡ Acreage proposed to be irrigated under other pending application(s).

1. Is the combined acreage greater than 2000 acres? ☐ YES ☐ NO
2. Do you have a controlling interest in a Family Farm Development Permit? ☐ YES ☐ NO
If yes, enter permit no:_____

E. Farm uses:
Stockwater - Total # of animals _____ Animal type _____ (If dairy cattle, see below)
Dairy - # Milking _____ # Non-milking _____

Section 8. WATER STORAGE

Will you be using a dam, dike, or other structure to retain or store water? ☐ YES ☒ NO

NOTE: If you will be storing 10 acre-feet or more of water and/or if the water depth will be 10 feet or more at the deepest point, and some portion of the storage will be above grade, you must also apply for a reservoir permit. You can get a reservoir permit application from the Department of Ecology.

Section 9. DRIVING DIRECTIONS

Provide detailed driving instructions to the project site.
FROM INTERSECTION OF N.E. 112TH AVENUE & WASHINGTON STATE HIWAY 502, GO SOUTH ON N.E. 112TH AVENUE APPROXIMATELY .4 MILES TO 21118 N.E. 112TH AVENUE. WELL SITE IS APPROXIMATELY 120' WEST OF N.E. 112TH AVENUE.

Section 10. REQUIRED MAP

A. Attach a map of the project. (See instructions.)

Section 11. PROPERTY OWNERSHIP

A. Does the applicant own the land on which the water will be used? ☐ YES ☒ NO
If no, explain the applicant's interest in the place of use and provide the name(s) and address(es) of the owner(s):

THE WATER WILL BE USED BY THE CITY OF BATTLE GROUND PUBLIC WATER SYSTEM NO. 047005.

B. Does the applicant own the land on which the water source is located? ☐ YES ☒ NO
If no, submit a copy of agreement:

I certify that the information above is true and accurate to the best of my knowledge. I understand that in order to process my application, I grant staff from the Department of Ecology access to the site for inspection and monitoring purposes. Even though I may have been assisted in the preparation of the above application by the employees of the Department of Ecology, all responsibility for the accuracy of the information rests with me.

Frank Hodgson — Applicant (or authorized representative)

3-22-95 — Date

Landowner for place of use (if same as applicant, write "same")

Date

Use this page to continue your answers to any questions on the application. Please indicate section number before answer.

We are returning your application for the following reason(s):	
_____ Examination fee was not enclosed	APPLICANT PLEASE RETURN TO CASHIER, PO BOX 5128, LACEY, WA 98503-0210
_____ Section number(s) _____ is/are incomplete	APPLICANT PLEASE RETURN TO THE APPROPRIATE REGIONAL OFFICE
Explanation:	
Please provide the additional information requested above and return your application by _____ _____ *(date).*	

Ecology staff_____ Date_____

To receive this document in alternative format, contact Lisa Newman at (360) 407-6604 (Voice) or (360) 407-6006 (TDD).

Reservation Priority Date 8/13/86

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

PROGRESS SHEET

COMPUTER INPUT
- ☐ APPLICATION
- ☐ PERMIT
- ☐ CERTIFICATE
- ☐ OTHER

☐ SURFACE WATER ☒ GROUND WATER 342-5078 ROB

NAME		TELEPHONE NO.
City of Battle Ground contact: Cal Newton 360-342-5065		(360) ~~687-4971~~ 342-5002
ADDRESS (CITY)	(STATE)	(ZIP CODE)
PO Box 37 Battle Ground	Washington	98604-0037

ASSIGNED TO	TELEPHONE NO.	DATE ASSIGNED
ADDRESS (CITY)	(STATE)	(ZIP CODE)

APPLICATION NO.	PERMIT NO.	CERTIFICATION NO.
G2-29208		
DATE AMENDED	DATE CANCELLED	W.R.I.A.
		28

APPLICATION

DATE APPLICATION RECEIVED	INITIAL $10.00 FEE RECEIVED	DATE FEE RECEIVED
3-27-95	☒ YES ☐ NO	3-27-95
STATEMENT OF ADDITIONAL EXAMINATION FEE $	DATE SENT	DATE RECEIVED
DATE RETURNED FOR COMPLETION OR CORRECTION	DATE RECEIVED	

TEMPORARY PERMIT

APPROVED BY	DATE ISSUED

PUBLICATION

APPROVED BY	DATE APPROVED	DATE NOTICE SENT
		3/31/95
PROTESTED BY AND DATE		

DATE AFFIDAVIT RECEIVED	CHECKED BY	TIME EXPIRED	DATE AMENDED NOTICE SENT	DATE AFFIDAVIT RECEIVED	TIME EXPIRED
5/3/95	5/12/95				

DEPARTMENT OF GAME AND FISHERIES REPORT

APPROVED	PROVISO	PROTEST

EXAMINATION

DATE EXAMINATION MADE	MADE BY	DATE REPORT OF EXAM. WRITTEN	WRITTEN BY	CHECKED BY
3/12/96	CV	5/14/96	CV	
DATE PERMIT FEE REQUESTED	AMOUNT DUE		DATE RECEIVED	
7/25/96	$20.00		8/7/96	

PERMIT

PERMIT APPROVED BY	DATE APPROVED	PERMIT NO.	DATE ISSUED
SC	8/9/96	P	9/19/96

BEGINNING OF CONSTRUCTION

DATE NOTICE SENT	DATE FILED	EXTENSION FEE
Started		
EXTENDED TO	EXTENDED TO	

WELL DRILLER'S AND/OR CONSTRUCTION REPORT

DATE SENT	DATE FILED

COMPLETION OF CONSTRUCTION

DATE NOTICE SENT	DATE FILED	EXTENSION FEE
9/19/96 3/2/00		
EXTENDED TO	EXTENDED TO	

PROOF OF APPROPRIATION

DATE SENT	DATE FILED	EXTENSION FEE	EXTENDED TO

DATE CERTIFICATE FEE REQUESTED	AMOUNT DUE	DATE RECEIVED	DATE APPROVED FOR CERTIFICATE	APPROVED BY

CERTIFICATION

PROOF EXAM. REQUIRED	CERTIFICATE NUMBER	DATE ISSUED
☐ YES ☐ NO	(V)	7/11/02

REMARKS

Permit G2-29477(A)P

Well Nos. 7, 8, and 9 – Sand and Gravel Aquifer

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STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
PO Box 47775 • Olympia, Washington 98504-7775 • (360) 407-6300
711 for Washington Relay Service • Persons with a speech disability can call 877-833-6341

January 6, 2021

City of Battle Ground
Attn: Mark Herceg
109 SW 1st St, Suite 122
Battle Ground, WA
Mark.herceg@cityofbg.org

Re: Water Right Permit No. **G2-29477(A)**

Dear Mark Herceg:

In response to your request, the development schedule for the above referenced water right has been adjusted as follows:

Proof of Appropriation: April 1, 2026

Basis of extension approval:

- The delay is justified, given local development patterns and local economic conditions.
- The permit holder requires more time to collect water use data for the purpose of quantifying beneficial use of water.

Ecology will mail you the appropriate form when this date approaches. If you have any questions, please contact Tammy Hall at thal461@ecy.wa.gov or (360) 280-8463.

Sincerely

Tammy Hall, L.HG.
SWRO/Water Resources

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
SUPERSEDING

PERMIT

TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

☐ Surface Water (Issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the Department of Ecology.)

☒ Ground Water (Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology.)

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
August 13, 1986	G2-29477 (A)	G2-29477 (A)	

NAME
City of Battle Ground

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
109 SW 1st Street Ste 122	Battle Ground	Washington	98604

The applicant is pursuant to the Report of Examination which has been accepted by the applicant, hereby granted a permit to appropriate the following public waters of the State of Washington, subject to existing rights and to the limitations and provisions set herein.

PUBLIC WATERS TO BE APPROPRIATED

SOURCE
Wells 7, 8 & 9

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE FEET PER YEAR
	1375	943 (additive) 207 (non-additive)

QUANTITY, TYPE OF USE, PERIOD OF USE		
943 Acre-feet per year (additive)	Municipal supply	Year-round, as needed
207 Acre-feet per year (non-additive)	Municipal supply	Year-round, as needed

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION--WITHDRAWAL
Well 7: 2360 feet West and 2070 feet North of the Southeast corner of Section 4.
Well 8: 2360 feet West and 2096 feet North of the Southeast corner of Section 4.
Well 9: 1964 feet West and 2547 feet North of the Southeast corner of Section 4.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
NW¼ SE¼	4	3	2E	28	Clark

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

The area served by the City of Battle Ground. The place of use of this water right is the service area described in the most recent Water System Plan approved by the Washington State Department of Health, so long as the City of Battle Ground is and remains in compliance with the criteria in RCW 90.03.386(2). RCW 90.03.386 may have the effect of revising the place of use of this water right.

If the criteria in section 90.03.386(2) are not met, the place of use of this water right reverts to the last place of use described by Ecology in a water right authorization.

DESCRIPTION OF PROPOSED WORKS

Well 7: 12-inch casing completed at 432 feet below ground surface (bgs).
Well 8: 12-inch casing to 438 feet bgs
Well 9: 12-inch casing to 425 feet bgs

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	WATER PUT TO FULL USE BY THIS DATE:
Started	Completed	April 1, 2020

PROVISIONS

"This permit supersedes permit of same number issued on July 8, 1999."

"This is a 2-way split of the original ground water permit G2-29477 issued to the City of Battle Ground on July 8, 1999. The City of Battle Ground transferred 625 gpm and 1000 af/yr additive quantities from this permit to Clark Public Utilities Well 35 under permit G2-29477(B). As a result of the transfer the City of Battle Ground shall be issued Superseding Permit G2-29477(A) in the amount of 1,375 gpm and 943 af/yr additive and 207 af/yr non-additive to reflect the transfer of water rights authorized under G2-29477(B). The total amounts authorized under G2-29477(A) and G2-29477(B) shall not exceed 2,000 gpm and 2,150 acre-feet per year (1,943 additive and 207 non-additive)."

"This permit is issued subject to the provisions of the January 1992, Memorandum of Understanding (MOU) between Clark County, Clark Public Utilities, and the Departments of Health and Ecology. The MOU provides that water availability and impact to senior rights will be reassessed for this permit, based on study findings from the Water Resources Plan to be completed under the MOU."

"This permit is issued with the understanding that the City of Battle Ground is an active participant in the Salmon Creek Management Plan, and that continued monitoring and evaluation of Salmon Creek and aquifers in continuity thereto will be conducted by affected parties according to a Monitoring and Management Plan, the provisions of which have been agreed to and approved by the parties to this agreement. If future monitoring and evaluation show that the flow of Salmon Creek has fallen below a threshold level, as defined under the Monitoring and Management Plan, the permittee and Ecology shall take corrective action as prescribed in the Monitoring and Management Plan through water rights enforcement, curtailment of pumping, or otherwise as required to alleviate the adverse effects."

"If future monitoring and evaluation of Salmon Creek and aquifer in continuity thereto, as determined by the Management Team, show that the appropriation of ground water under this permit is adversely affecting the flow of Salmon Creek to the detriment of senior water rights or fishery resources of the stream, Battle Ground has agreed and shall take corrective actions by curtailment of pumping, or otherwise, to alleviate the flow interference. Battle Ground's agreement to this provision, is consistent with the Salmon Creek Basin Water Resources Management Plan identified in the January 15, 1992, MOU between the County, CPU, Ecology and Health."

The quantity authorized by this document for appropriation is considered to be a portion of the amount reserved by the adoption of Chapter 173-592, Reservation of Future Public Water Supply for Clark County. The priority date of this permit is August 13, 1986.

The water appropriated under this application will be used for public water supply. The State Board of Health rules require public water supply owners to obtain written approval from the Office of Water Supply, Department of Health, 1112 SE Quince Street, PO Box 47890, Olympia, Washington 98504-7890, prior to any new construction or alterations of a public water supply system.

"The applicant is advised that the quantity of water allocated by this permit may be reduced at the time of final certification to reflect system capacity and actual usage. This permit specifically authorizes withdrawals from a deep aquifer system. All production wells must be completed within this aquifer system. The applicant is advised that completing these wells at shallower depths will likely require re-application to Ecology, and issuance of a permit prior to use."

(continued on page)

This permit shall be subject to cancellation should the permittee fail to comply with the above development schedule and/or to give notice to the Department of Ecology on forms provided by that Department documenting such compliance.

Given under my hand and the seal of this office at Olympia, Washington,

this _____ *day of* _____, *2005.*

Department of Ecology

OK MD

by Thomas Loranger
Thomas Loranger, Section Manager

Provisions Continued

The permittee is advised that notice of Proof of Appropriation of water (under which the final certificate of water right is issued) should not be filed until the permanent distribution system has been constructed and that quantity of water allocated by the permit to the extent water is required, has been put to full beneficial use.

An approved measuring device shall be installed and maintained for each of the sources identified by this water right in accordance with the rule "Requirements for Measuring and Reporting Water Use", Chapter 173-173 WAC.

Water use data shall be recorded daily. The maximum monthly rate of diversion/withdrawal and the monthly total volume shall be submitted to Ecology by January 31st of each calendar year. Ecology is requiring submittal of daily meter readings to collect seasonal information for water resource planning, management and compliance.

The following information shall be included with each submittal of water use data: owner, contact name if different, mailing address, daytime phone number, WRIA, Permit/Certificate/Claim No., source name, annual quantity used including units, maximum rate of diversion including units, monthly meter readings including units, peak monthly flow including units, Department of Health WFI water system number and source number(s), purpose of use, well tag number, open channel flow or pressurized diversion and period of use. In the future, Ecology may require additional parameters to be reported or more frequent reporting. Ecology prefers web based data entry, but does accept hard copies. Ecology will provide forms and electronic data entry information.

Chapter 173-173 WAC describes the requirements for data accuracy, device installation and operation, and information reporting. It also allows a water user to petition Ecology for modifications to some of the requirements. Installation, operation and maintenance requirements are enclosed as a document entitled "Water Measurement Device Installation and Operation Requirements".

Department of Ecology personnel, upon presentation of proper credentials, shall have access at reasonable times, to the records of water use that are kept to meet the above conditions, and to inspect at reasonable times any measuring device used to meet the above conditions.

All wells constructed in the State shall meet the construction requirements of Chapter 173-160 WAC entitled "Minimum Standards for the Construction and Maintenance of Wells" and Chapter 18-104 RCW entitled "Water Well Construction, Act (1971)."

Installation and maintenance of an access port as described in Chapter 173-160 is required. An air line and gauge may be installed in addition to the access port.

In order to maintain a sustainable supply of water, pumping must be managed so that static water levels do not progressively decline from year to year. Water levels shall be measured and recorded monthly, using a consistent methodology. The length of the pumping period or recovery period prior to each measurement shall be constant, and shall be included in the record. Data shall be submitted annually, in the month of February, to the Department of Ecology.

Issuance of this water right is subject to the implementation of the minimum requirements established in the Conservation Planning Requirements, Guideline and Requirements for Public Water Systems Regarding Water Use Reporting, Demand Forecasting Methodology, and Conservation Programs, July 1994, and as revised.

Under RCW 90.03.005 and 90.54.020(6), conservation and improved water use efficiency must be emphasized in the management of the states water resources, and must be considered as a potential new source of water. Accordingly, as part of the terms of this water right, the applicant shall prepare and implement a water conservation plan approved by Department of Health. The standards for such a plan may be obtained from either the Department of Health or the Department of Ecology.

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

PERMIT

TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

☐ Surface Water (Issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the Department of Ecology.)

☒ Ground Water (Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology.)

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
August 13, 1986	G2-29477	G2-29477	

NAME
City of Battle Ground

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
PO Box 37	Battle Ground	Washington	98604-0037

The applicant is pursuant to the Report of Examination which has been accepted by the applicant, hereby granted a permit to appropriate the following public waters of the State of Washington, subject to existing rights and to the limitations and provisions set herein.

PUBLIC WATERS TO BE APPROPRIATED

SOURCE
Wells 7 & 8

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE FEET PER YEAR
	2000	2150*

QUANTITY, TYPE OF USE, PERIOD OF USE

1943 Acre-feet per year (primary) 207 Acre-feet per year (supplemental) *Partially supplemental to existing rights.	Municipal supply	Year-round, as needed

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION–WITHDRAWAL
Well 7: 2360 feet West and 2070 feet North of the Southeast corner of Section 4.
Well 8: 2360 feet West and 2096 feet North of the Southeast corner of Section 4.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
NW¼ SE¼	4	3	2E	28	Clark

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Area served by City of Battle Ground, as described in a Department of Health Approved Water System Plan.

DESCRIPTION OF PROPOSED WORKS

Well 7: 12-inch casing completed at 432 feet below ground level. Well 8: 12-inch casing to 438 feet bgl.

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	WATER PUT TO FULL USE BY THIS DATE:
Started	April 1, 2000	April 1, 2020

PROVISIONS

"This permit is issued subject to the provisions of the January 1992, Memorandum of Understanding (MOU) between Clark County, Clark Public Utilities, and the Departments of Health and Ecology. The MOU provides that water availability and impact to senior rights will be reassessed for this permit, based on study findings from the Water Resources Plan to be completed under the MOU."

"This permit is issued with the understanding that the City of Battle Ground is an active participant in the Salmon Creek Management Plan, and that continued monitoring and evaluation of Salmon Creek and aquifers in continuity thereto will be conducted by affected parties according to a Monitoring and Management Plan, the provisions of which have been agreed to and approved by the parties to this agreement. If future monitoring and evaluation show that the flow of Salmon Creek has fallen below a threshold level, as defined under the Monitoring and Management Plan, the permittee and Ecology shall take corrective action as prescribed in the Monitoring and Management Plan through water rights enforcement, curtailment of pumping, or otherwise as required to alleviate the adverse effects."

"If future monitoring and evaluation of Salmon Creek and aquifer in continuity thereto, as determined by the Management Team, show that the appropriation of ground water under this permit is adversely affecting the flow of Salmon Creek to the detriment of senior water rights or fishery resources of the stream, Battle Ground has agreed and shall take corrective actions by curtailment of pumping, or otherwise, to alleviate the flow interference. Battle Ground's agreement to this provision, is consistent with the Salmon Creek Basin Water Resources Management Plan identified in the January 15, 1992, MOU between the County, CPU, Ecology and Health."

The quantity authorized by this document for appropriation is considered to be a portion of the amount reserved by the adoption of Chapter 173-592, Reservation of Future Public Water Supply for Clark County. The priority date of this permit is August 13, 1986.

The water appropriated under this application will be used for public water supply. The State Board of Health rules require public water supply owners to obtain written approval from the Office of Water Supply, Department of Health, 1112 SE Quince Street, PO Box 47890, Olympia, Washington 98504-7890, prior to any new construction or alterations of a public water supply system.

"The applicant is advised that the quantity of water allocated by this permit may be reduced at the time of final certification to reflect system capacity and actual usage. This permit specifically authorizes withdrawals from a deep aquifer system. All production wells must be completed within this aquifer system. The applicant is advised that completing these wells at shallower depths will likely require re-application to Ecology, and issuance of a permit prior to use."

A proof inspection will be conducted prior to final certificate issuance. The certificate will reflect the extent of the project perfected within the limitations of the permit. Aspects will include as appropriate the source(s), system instantaneous capacity, beneficial use(s), annual quantity, acreage, home services designed, place of use, and satisfaction of provisions.

Issuance of this water right may be subject to implementation of the minimum requirements established in the Conservation Planning Requirements, Guidelines and Requirements for Public Water Systems Regarding Water Use Reporting, Demand Forecasting Methodology, and Conservation Programs, July 1994, and as revised.

(continued on page 3)

This permit shall be subject to cancellation should the permittee fail to comply with the above development schedule and/or to give notice to the Department of Ecology on forms provided by that Department documenting such compliance.

Given under my hand and the seal of this office at Olympia, Washington,

this 8th *day of* July, *1999.*

Department of Ecology

ENGINEERING DATA
OK W

by _____
J. Mike Harris, Section Supervisor

Provisions Continued

Under RCW 90.03.005 and 90.54.020(6), conservation and improved water use efficiency must be emphasized in the management of the State's water resources, and must be considered as a potential new source of water. Accordingly, as part of the terms of this water right, the applicant shall prepare and implement a water conservation plan approved by Department of Health. The standards for such a plan may be obtained from either the Department of Health or the Department of Ecology. Quantities authorized by this permit may be reduced at the time of issuance of a final water right certificate, to reflect the amount of water saved by conservation measures.

Water-pumpage, well-monitoring, and static-water-level data, along with a summary and analysis of the data, shall be submitted annually, or more frequently upon request, to Ecology's Southwest Regional Office Water Resources Program. The data shall be submitted in digital format (ASCII) and shall include the following elements:

For Water Use Reporting:

1. Measurement method (totaling meter, acoustic meter, etc.) for each well
2. Total volume pumped from each well by month in thousands or millions of gallons
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For Water Level Reporting:

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2. Measurement date and time
3. Measurement method (air line, electric tape, pressure transducer, etc.)
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5. Water level accuracy (to nearest foot, tenth of foot, etc.)
6. Description of the measuring point (top of casing, sounding tube, etc.)
7. Measuring point elevation above or below land surface to the nearest 0.1 foot
8. Land surface elevation at the well head to the nearest foot.
9. Static water level below measuring point to the nearest 0.1 foot

*After construction these wells shall be tagged with a well identification number. This unique well number shall remain attached to the well, please reference this number when submitting data.

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
AMENDED

REPORT OF EXAMINATION

TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

☐ Surface Water (Issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the Department of Ecology.)

☒ Ground Water (Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology.)

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
August 13, 1986	G2-29477		

NAME
City of Battle Ground

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
PO Box 37	Battle Ground	Washington	98604-0037

PUBLIC WATERS TO BE APPROPRIATED

SOURCE
Wells 7 & 8

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE FEET PER YEAR
	2000	2150*

QUANTITY, TYPE OF USE, PERIOD OF USE

1943 Acre-feet per year (primary) 207 Acre-feet per year (supplemental) *Partially supplemental to existing rights.	Municipal supply	Year-round, as needed

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION--WITHDRAWAL
Well 7: 2360 feet West and 2070 feet North of the Southeast corner of Section 4.
Well 8: 2360 feet West and 2096 feet North of the Southeast corner of Section 4.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
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RECORDED PLATTED PROPERTY

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DESCRIPTION OF PROPOSED WORKS

Well 7: 12-inch casing completed at 432 f[redacted]below ground level. Well 8: 12-inch casing to 4[redacted]eet bgl.

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	WATER PUT TO FULL USE BY THIS DATE:
Started	April 1, 2000	April 1, 2020

REPORT

This *Report of Examination* is being to amended to reflect the following: 1) The City has elected to construct two wells under this permit authorization, and not three – the two production wells 7 and 8 are capable of producing the requested 2,000 gpm, and 2) The Water Requirements\Demand Forecasting section has been revised to reflect updated information.

BACKGROUND:

On March 25, 1997, the City of Battle Ground applied for a permit under the provisions of Chapter 90.44 Revised Code of Washington (RCW), to appropriate public ground water from one well in the amount of 500 gallons per minute for municipal supply. The application was accepted and assigned Application Number G2-29477.

Pursuant to Chapter 173-592 Washington Administrative Code (WAC), Reservation of Future Public Water Supply for Clark County, the priority date of this application is August 13, 1986.

A notice of the application was published and no protests or objections were received. The applicant subsequently requested that the application be amended to allow a withdrawal from three wells, at a withdrawal rate of 2,000 gpm. A public notice was republished; no protests or objections were received.

I recommend approval of this application and issuance of a permit, consistent with the provisions of this report of findings.

INVESTIGATION:

Dan Weis conducted a field examination of this project on January 7, 1998, with the assistance of Paul Haines, director of Public Works for the City of Battle Ground. The City's existing well sites and proposed new well sites were visited. Dan and I reviewed relevant hydrogeological reports and Department of Ecology records. Additional reference material included:

McFarland and Morgan, 1996, "Description of the Ground-Water Flow System in the Portland Basin, Oregon and Washington," U. S. Geological Survey, Water Supply Paper 2470-A.

M. J. Mundorff, 1964, "Geology and Ground Water Conditions of Clark County Washington, with a Description of a Major Alluvial Aquifer Along the Columbia River," United States Geological Survey.

Pacific Groundwater Group, 1996, "Salmon Creek Basin Monitoring and Management Implementation Plan, Annual Report."

Swanson, et al., 1993, "A Description of Hydrogeologic Units in the Portland Basin, Oregon and Washington", U. S. Geological Survey, Water-Resources Investigation Report 90-4196.

Synder, D. T., Morgan, D. S., and McGrath, T. S., 1994, "Estimation of Ground-Water Recharge from Precipitation, Runoff into Drywells, and On-site Waste Disposal Systems within the Portland Basin, Oregon and Washington", U. S. Geological Survey, Water-Resources Investigation Report 92-4010.

Wildrick, L. et al, 1998, "Water Resource Inventory Area 28, Salmon-Washougal, Preliminary Watershed Assessment, Open-File Technical Report 98-02."

Carr, James R., Dow, Douglas C., "City of Battle Ground Well 7 Site Selection" and "City of Battle Ground Production Well 6 Construction and Testing Report", AGI Technologies, (1995 and 1996)

Project Site

The City of Battle Ground is located in the Salmon Creek watershed of central Clark County, Washington. The three proposed well sites are situated about a quarter mile apart in an area about two miles southwest of Battle Ground. Battle Ground's Well 6 is situated in this same area. Weaver Creek, a tributary to Salmon Creek, flows about one mile to the east.

Well Construction

The City of Battle Ground has constructed two production wells that are capable of producing a withdrawal rate of 2,000 gpm.

The City's new 12-inch production wells have been constructed within 50 feet of each other at the Horsethief Canyon site that is located in the western portion of the city's service area.

Battle Ground's production well 7 (Unique Well I.D. #ABB112) was drilled to a depth of 437 feet, and is completed in a deep aquifer system comprised of fine to medium sand. This deep system appears to be correlated to the Sandy River Mudstone. The well is screened at depths of 349 to 432 feet below ground surface.

Well 8 (Unique Well I.D. #ABB118) was drilled to a depth of 438 feet, and is completed in the same aquifer as Well 7. Well 8 is screened between the depths of 350 feet to 435 feet.

The pump tests conducted on Wells 7 and 8 indicate that Well 7 is somewhat more efficient than its neighbor, and will be operated at a slightly higher withdrawal rate. The recommended design capacities would be 1,050 gpm for Well 7 and 950 gpm for Well 8. The City will need to treat the water for elevated levels of iron and manganese.

Evaluation of Potential Effects

Surface water features, and shallower wells in the area should not be adversely impacted by the operation of Wells 7 and 8 because there is very limited hydraulic continuity between the surface water system and the deep supply aquifer. A low permeability confining unit separates the shallow Upper Troutdale aquifer from the Sandy River Mudstone and acts to minimize the hydraulic coupling of these systems. Water levels in the supply aquifer occur substantially below the level of Salmon Creek. Discharge from the deep ground water system is most likely to the Columbia River.

These production wells are located approximately 2,500 feet west of the City of Battle Ground's Production Well 6 site, and approximately 6,900 feet northeast of Clark Public Utilities' Well 32 site. The hydrogeological analysis of the pumping test conducted by Pacific Groundwater Group, (1999) indicates that interference drawdown should not adversely affect the performance of most deep wells located in this area. However, Battle Ground's Well 6 may experience some loss in capacity during sustained periods of production.

During the past months, new information has become available concerning the Sandy River Mudstone aquifer. Although water levels in most of the wells completed in the alluvial and Upper and Lower Troutdale aquifers (or Unconsolidated Sedimentary, Troutdale Gravel, and Troutdale Sandstone aquifers, respectively) have remained stable over the recent years, water levels in the Sandy River Mudstone aquifer have declined significantly in the past two years.

Prior to 1994 there were no significant water withdrawals from the Sandy River Mudstone aquifer, but annual water production has steadily increased since 1994 and currently exceeds 3,000 acre-feet per year (ac-ft/y). It appears that the water level declines in the Orchards area and in the deep wells in the Salmon Creek watershed can be attributed to increased pumping of this aquifer system in Clark County and in the Portland area during the past two years.

Long-term water level declines should be carefully evaluated and managed through a comprehensive monitoring program. I strongly recommend that the City of Battle Ground voluntarily enter into an agreement with other users of the deep aquifer system to monitor and manage ground water declines.

Regional Hydrogeology

The southwestern portion of Clark County is blanketed with Pleistocene alluvial deposits exposed as broad plains and terraces. These sediments were deposited by the ancestral Columbia River as a great delta emanating from the Columbia River Gorge. The deposits are generally coarse along the Columbia River but grade to textures of fine sand, silt, and clay along the outer edges of the delta.

At least four aquifers are present in the ground water system in the area around Battle Ground. The uppermost aquifer is in the lower part of the regolith (unlithified sediments), which tends to provide only low production to domestic wells. The next lower aquifer is the Troutdale gravel aquifer (Swanson, et al., 1993), part of the upper member of the Troutdale Formation (Mundorff, 1964). The next lower aquifer may be the Troutdale sandstone aquifer of Swanson, et al., also part of the upper member of the Troutdale Formation. (This zone is commonly referred to as the Lower Troutdale aquifer, although terminology varies greatly depending on the studies reviewed.) The lowermost aquifer may be equivalent to the sand-and-gravel aquifer of Swanson, et al. (Ibid.) and the lower member of the Troutdale Formation of Mundorff. It is in this aquifer zone that Battle Ground has completed its wells. Ground water also flows through the intervening confining units. Together the aquifers and confining units comprise a continuously saturated ground-water flow system.

Recharge to the ground-water system originates as precipitation that falls on the surrounding upland plains and on the hills to the east, as return flow from septic systems, and as storm runoff funneled into dry wells. Water infiltrates through the overlying regolith and gravel aquifers.

Studies done of the nearby CPU wells indicate that the water level in the deep supply aquifer is likely to occur substantially below the level of regional streams such as Salmon Creek. Discharge from the deep ground-water flow system is most likely to the Columbia River.

Neighboring Ground-Water Rights

Eleven ground water certificates, including three issued to the City of Battle Ground, have been issued in the vicinity of the application, and authorize a total withdrawal of 2,094 gpm and 886.4 acre-feet per year. The rights were issued for municipal supply, domestic use, stock water, and irrigation. These wells range in depth of 88 feet to 165 feet below ground surface. Four surface water right certificates, issued for a combined total of 0.5 cubic feet per second and 24 acre-feet per year for irrigation and domestic supply, have also been issued in the vicinity.

Capture of Surface Water

Flow in Salmon Creek derives entirely from local precipitation, including overland runoff and ground water discharge through seeps and springs.

In most areas, ground water discharges to Salmon Creek though this process reverses seasonally along some reaches such that water leaks from the creek into the ground. Wells in the vicinity will capture surface water by intercepting ground water that otherwise would have discharged to Salmon Creek. All water pumped from wells must be derived from some combination of aquifer storage, increased recharge, or decreases in natural discharge to streams and springs.

Because all streams in the area experience low-flow conditions in the dry season, July through October, the Department of Fisheries, (predecessor to Washington State Department of Fish and Wildlife) has, since 1949, recommended repeatedly against new appropriations that would further reduce Salmon Creek low flows, which would reduce the already limited coho salmon rearing habitat by depleting summer stream flows.

While surface water flow in the immediate area may not be directly impaired by the operation of Battle Ground's wells, some water will undoubtedly be captured from lower Salmon Creek and its tributaries, and possibly from the East Fork of the Lewis River, situated to the north. Given the proposed depths of these wells some of the pumped water will likely be captured from the Lake River or the Columbia River.

Salmon Creek is an important stream for endangered salmon and steelhead and the basin plays an important role in statewide recovery efforts. Fish in Salmon Creek suffer from water quality problems, declining instream flows, and from reduced habitat due to human impacts. The withdrawal of ground water, from any depth, affects stream flows as the hydraulic gradients of the overlaying aquifer systems are changed.

In response to these and other concerns from Ecology and the Washington State Department of Fish and Wildlife, Ecology entered into an agreement with Clark County's largest municipal purveyor, Clark Public Utilities (CPU), to look at a Comprehensive Water Management Plan for the basin. The agreement, or Memorandum of Understanding, is addressed below. The primary product of the MOU is the Salmon Creek Water Resource Management Plan, which was designed to offset potential pumping effects with other improved stream health indicators, such as a stream enhancement program to improve and optimize fish habitat in the basin.

Memorandum of Understanding

A Memorandum of Understanding (MOU) between the Departments of Ecology and Health, Clark County, and Clark Public Utilities was developed in 1992. The purpose of the MOU is to design and implement a water management plan for the Salmon Creek Basin. The MOU contains provisions for the protection of instream flows in Salmon Creek and existing senior water rights.

The objective of the Management Plan is to develop, through a cooperative process, a management plan for ground and surface waters in the Salmon Creek Basin. The Management Plan will be used by Ecology as a basis for water allocation decisions in the Salmon Creek Basin. The provisions of the Management Plan allow for other municipal parties such as the City of Battle Ground to enter into agreements with CPU to follow the plan's intent. Approval of this permit is contingent upon the City of Battle Ground and Clark Public Utilities entering into an Interlocal Agreement, that commits Battle Ground to active participation within the management plan.

The Management Plan includes a low-flow "threshold level" that provides for a specific set of actions that will occur should the flows of Salmon Creek fall below a set level of 12 cubic feet per second. The Plan also includes an ongoing program by CPU and participating parties to address and improve Salmon Creek's riparian habitat.

In recent correspondence with WDFW, habitat biologist Hal Beecher (January 1998) commented that WDFW views the Management Plan's habitat-restoration component as suitable mitigation, consistent with WDFW's instream-flow-mitigation policy, when implemented in conjunction with other elements of the Plan, including the 12 cfs threshold. WDFW's determination that the Management Plan provides satisfactory mitigation is contingent upon continuation of the habitat restoration program for the duration of water withdrawals approved under the agreement. Without participation in the management plan, Beecher recommends denial of this application.

Clark County Reservation

Under the provisions of Chapter 173-592 Washington Administrative Code (WAC), Reservation of Future Public Water Supply for Clark County, a certain amount of ground water was reserved for future beneficial use for public water supply in Clark County. Since the enactment of this reservation, water rights issued pursuant to WAC 173-592 have received a priority date of August 13, 1986, the effective date of the regulation. The total reserved quantity of 97,000 gpm and 65,300 acre-feet per year (AF/Y), is prorated by aquifer as follows:

Columbia River Alluvium (1A) and Sandy River Mudstone (1C) 77,000 gpm, 51,800 AF/Y.

Upper Troutdale (1B-2B) 20,000 gpm, 13,500 AF/Y.

To date, ground water permits and certificates totaling 26,135 gallons per minute and 20,453.12 acre-feet per year have been issued against the reservation (3,416.8 acre-feet primary and 17,036.32 acre-feet supplemental).

Battle Ground's wells will be completed within the Lower Troutdale sediments. This appropriation will, when permitted, be debited against the reserved quantity for the Sandy River Mudstone/Alluvium aquifers. In addition, the permit will carry the August 13, 1986, priority date of the reservation.

Existing Water Rights

The City of Battle Ground currently has the following permit and certificates:

WR. #.	Source	GPM	AF/Y – Primary	AF/Y - Supplemental
2608	Well 1 & 2	350	270	
2284	Well #3	375		270
G2-23122	Well 4 & 5	250	269	
G2-29208-P	Well #6	400	430	
Total		1,375	969	270

Wells 1, 2, and 6 are "primary source" supply wells, and Wells 4 and 5 are used for peak demand. Due to peaking shortages, the City of Battle Ground's water supply has historically been augmented by Clark Public Utilities, through an inter-tie. Battle Ground's water system includes four above-ground storage facilities capable of storing approximately 800,000 gallons.

Water Requirements\Demand Forecasting

A forecast of future water demand is required as part of the water right application evaluation. The demand forecast figures should reflect anticipated conservation savings. The City's 1994 Water System Plan (Curran-McLeod, Inc., 1994) includes a water conservation portion with projection goals for reducing per capita water use to about 100 gallons by 2000. The City's October 1998 Water System Plan Update, (Curran-McLeod, Inc.), references the 1994 plan but does not identify any additional conservation measures.

The City of Battle Ground's 1994 Water System Plan, estimates a year 2014 population of approximately 16,000 people. The City's October 1998 Water System Plan Update, uses a higher growth factor rate, and estimates a 2014 population of approximately 26,000 people. (Commercial, industrial, and institutional consumption is assumed to remain constant at 13 percent of the total system demand and has been integrated into the per capita production numbers.)

Battle Ground's future average water demand, therefore is likely to range between 1,792 acre-feet per year (based on an average daily demand of 1,600,000 gallons per day, or approximately 100 gallons per capita), to 2,912 acre-feet per year, (based on a future average daily demand of 2,600,000 gallons per day, or approximately 100 gallons per capita). The 1998 update indicates that given current population patterns, 26,000 people is very near full buildout for the City.

Battle Ground's current population is around 7,000 people, which equates to 2,612 equivalent residential connections. City records indicate that the average production number for 1990 through 1997 is 116 gallons per day per capita, with 1997's average daily demand amounting to 105 gpdpc. It appears that 100 gallons per day per capita is a reasonable conservation goal.

Because of the range in future 20 year demand scenarios, it is difficult to determine how many acre-feet the City will need in twenty years. Currently, the City possesses existing water rights amounting to 969 acre-feet per year. To meet future need they will need an additional primary allocation of 823 acre-feet on the low end, to as much as 1,943 acre-feet to meet a rapid growth situation.

Based on a total of rate of 2,000 gpm, and a 16-hour average production day, these wells should be physically capable of producing 2,150 acre-feet per year.

I recommend that the quantities allocated by this permit be adequate to meet the 26,000 population figure, and authorize the withdrawal of 2,150 acre-feet per year, divided as follows: 1,943 acre-feet as a primary allocation and 207 acre-feet as supplemental supply.

The intent of the Supplemental designation is to provide the purveyor with flexibility in deciding which wells to operate, within the total primary allocation. Supplemental rights are not additive, and it is the responsibility of the purveyor to operate the wells so that the total annual primary allocation is not exceeded.

Conservation Program

Under RCW 90.03.005 and 90.54.020(6), Ecology must emphasize conservation and water-use efficiency in management of the state's water resources and must reduce the waste of water as far as practicable. The City of Battle Ground has an ongoing conservation program detailed in its **1994 Water System Plan (Curran-McLeod, Inc., 1994)** that has been reviewed by both Ecology and the Department of Health. Issuance of this permit will be subject to fulfillment of any conditions specified by the Department of Health for approval of future Conservation Plans and will require implementation of the approved program.

RCW 90.54.030 directs Ecology to be informed with regard to all phases of water resources of the state in order to make sound resource management decisions. This permit will include detailed provisions for the collection and submittal of water production data.

CONCLUSIONS:

In accordance with Chapter 90.44 RCW, I find that water is available from the source in question, that the appropriation is for a beneficial use, and that, under the provisions of the January 15, 1992, MOU between Clark County, Clark Public Utilities, and the Departments of Health and Ecology, the appropriation will not impair senior rights or be detrimental to the public welfare.

RECOMMENDATIONS:

I recommend approval of this application and issuance of a permit for the appropriation of public ground water in the amount of 2,000 gallons per minute, and 2,150 acre-feet per year, of which 1,943 acre-feet per year is considered primary and 207 acre-feet is supplemental to existing rights, continuously, for municipal supply from two wells. The applicant should understand that these quantities may be reduced at the time of certificate issuance to reflect the actual production capacity of the three wells.

Provisions

"Approval of this permit is contingent upon the City of Battle Ground and Clark Public Utilities entering into an Interlocal Agreement, that commits Battle Ground to active participation with the management plan. A permit will not be issued until Ecology receives a signed copy of an agreement outlining Battle Ground's role in the Management Program."

"This permit is issued subject to the provisions of the January 1992, Memorandum of Understanding (MOU) between Clark County, Clark Public Utilities, and the Departments of Health and Ecology. The MOU provides that water availability and impact to senior rights will be reassessed for this permit, based on study findings from the Water Resources Plan to be completed under the MOU."

"This permit is issued with the understanding that the City of Battle Ground is an active participant in the Salmon Creek Management Plan, and that continued monitoring and evaluation of Salmon Creek and aquifers in continuity thereto will be conducted by affected parties according to a Monitoring and Management Plan, the provisions of which have been agreed to and approved by the parties to this agreement. If future monitoring and evaluation show that the flow of Salmon Creek has fallen below a threshold level, as defined under the Monitoring and Management Plan, the permittee and Ecology shall take corrective action as prescribed in the Monitoring and Management Plan through water rights enforcement, curtailment of pumping, or otherwise as required to alleviate the adverse effects."

"If future monitoring and evaluation of Salmon Creek and aquifer in continuity thereto, as determined by the Management Team, show that the appropriation of ground water under this permit is adversely affecting the flow of Salmon Creek to the detriment of senior water rights or fishery resources of the stream, Battle Ground has agreed and shall take corrective actions by curtailment of pumping, or otherwise, to alleviate the flow interference. Battle Ground's agreement to this provision, is consistent with the Salmon Creek Basin Water Resources Management Plan identified in the January 15, 1992, MOU between the County, CPU, Ecology and Health."

The quantity authorized by this document for appropriation is considered to be a portion of the amount reserved by the adoption of Chapter 173-592, Reservation of Future Public Water Supply for Clark County. The priority date of this permit is August 13, 1986.

The water appropriated under this application will be used for public water supply. The State Board of Health rules require public water supply owners to obtain written approval from the Office of Water Supply, Department of Health, 1112 SE Quince Street, PO Box 47890, Olympia, Washington 98504-7890, prior to any new construction or alterations of a public water supply system.

"The applicant is advised that the quantity of water allocated by this permit may be reduced at the time of final certification to reflect system capacity and actual usage. This permit specifically authorizes withdrawals from a deep aquifer system. All production wells must be completed within this aquifer system. The applicant is advised that completing these wells at shallower depths will likely require re-application to Ecology, and issuance of a permit prior to use."

A proof inspection will be conducted prior to final certificate issuance. The certificate will reflect the extent of the project perfected within the limitations of the permit. Aspects will include as appropriate the source(s), system instantaneous capacity, beneficial use(s), annual quantity, acreage, home services designed, place of use, and satisfaction of provisions.

Issuance of this water right may be subject to implementation of the minimum requirements established in the Conservation Planning Requirements, Guidelines and Requirements for Public Water Systems Regarding Water Use Reporting, Demand Forecasting Methodology, and Conservation Programs, July 1994, and as revised.

Under RCW 90.03.005 and 90.54.020(6), conservation and improved water use efficiency must be emphasized in the management of the State's water resources, and must be considered as a potential new source of water. Accordingly, as part of the terms of this water right, the applicant shall prepare and implement a water conservation plan approved by Department of Health. The standards for such a plan may be obtained from either the Department of Health or the Department of Ecology. Quantities authorized by this permit may be reduced at the time of issuance of a final water right certificate, to reflect the amount of water saved by conservation measures.

Water-pumpage, well-monitoring, and static-water-level data, along with a summary and analysis of the data, shall be submitted annually, or more frequently upon request, to Ecology's Southwest Regional Office Water Resources Program. The data shall be submitted in digital format (ASCII) and shall include the following elements:

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2. Total volume pumped from each well by month in thousands or millions of gallons
3. Unique Well ID number

For Water Level Reporting:

1. Unique Well ID Number
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4. Well status (pumping, recently pumped, etc.)
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6. Description of the measuring point (top of casing, sounding tube, etc.)
7. Measuring point elevation above or below land surface to the nearest 0.1 foot
8. Land surface elevation at the well head to the nearest foot.
9. Static water level below measuring point to the nearest 0.1 foot

*After construction these wells shall be tagged with a well identification number. This unique well number shall remain attached to the well, please reference this number when submitting data.

REPORTED BY: Jill E Walsh Date: June 10, 1999

FINDINGS OF FACT AND DECISION

Upon reviewing the above report, I find all facts, relevant and material to the subject application, have been thoroughly investigated. Furthermore, I find water is available for appropriation and the appropriation as recommended is a beneficial use and will not be detrimental to existing rights or the public welfare.

Therefore, I ORDER a permit be issued under Ground Water Application Number G2-29477, subject to existing rights and indicated provisions, to allow appropriation of public ground water for the amount and uses specified in the foregoing report.

Signed at Olympia, Washington, this 10th day of June ,1999.

J. Mike Harris
Water Resources Supervisor
Southwest Regional Office

The Reflector
PO Box 2020
Battle Ground WA 98604
360-687-5151

AFFIDAVIT OF PUBLICATION

WA Dept. of Ecology City of Battle Ground

STATE OF WASHINGTON
COUNTY OF CLARK

Marvin F. Case, being first duly sworn on oath, deposes and says that he is publisher of The Reflector, a weekly newspaper. That said newspaper is a legal newspaper by order of the superior court in the county in which it is published and it is now and has been for more than six months prior to the date of publication hereinafter referred to, published in the English language, continually as a weekly newspaper in Battle Ground, Clark County, Washington, and is now and during all of said time was printed in an office maintained at the aforesaid place of publication of said newspaper. That the annexed is a true copy of

Water Rights

as it was published in regular issues (and not in supplement form) of said newspaper once a week for a period of 2 weeks commencing on the 4th day of March 1998, and ending on the 11th day of March 1998, both dates inclusive and that such newspaper was regularly distributed to its subscribers during all of said period. That the full amount of the fee charged for the foregoing publication is the sum of $ 25.00 which amount has been paid in full at the rate of $ 4.75 per column inch for the first insertion and $ 3.50 per column inch for each subsequent insertion.

NOTICE OF APPLICATION TO APPROPRIATE PUBLIC WATERS
STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

TAKE NOTICE:

That the City of Battle Ground of Battle Ground, Washington on March 25, 1997 under Application No. G2-29477 filed for permit to appropriate public waters, subject to existing rights, from 3 wells located within the N1/2 N1/2 SE1/4 Section 4, T. 3 N., R. 2 E.W.M., NW1/4 SW1/4 Section 3, T. 3 N., R. 2 E.W.M., SW1/4 NW1/4 Section 3, T. 3 N., R. 2 E.W.M. in the amount of 2000 gallons per minute as needed year round each year, for municipal supply in Clark County.

Protests or objections to approval of this application must include a detailed statement of the basis for objections; protests must be accompanied by a two dollar ($2.00) recording fee and filed with the Department of Ecology, at the address shown below, within thirty (30) days from March 11, 1998.

Department of Ecology
P.O. Box 47775
Olympia, WA 98504-7775
Mar4,11

aff dlc 3/27/98 lc

Subscribed and sworn to before me this
11th day of March 1998

Diana L Wilson

Notary Public in and for the State of Washington
Residing at Battle Ground, Washington

SEAL

DIANA L. WILSON
NOTARY PUBLIC
STATE OF WASHINGTON
COMMISSION EXPIRES
DEC. 29, 2001

WASHINGTON STATE DEPARTMENT OF ECOLOGY

APPLICATION FOR PERMIT

TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

RECEIVED

☐ SURFACE WATER ☒ GROUND WATER

'97 MAR 25 A9:52

$10.00 MINIMUM STATUTORY EXAMINATION FEE REQUIRED WITH APPLICATION

(GRAY BOXES FOR OFFICE USE ONLY)

APPLICATION NO.	W.R.I.A.	COUNTY	PRIORITY DATE	TIME	ACCEPTED
G2-29477	27	Clark	3/25/97		SC

APPLICANT'S NAME — PLEASE PRINT

City of Battle Ground
ATTN: Paul Haines, PE

Bus. Tel. 360-687-7131
Home Tel.
Other Tel.

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
P.O. Box 37	Battle Ground	WA	98604-0037

DATE & PLACE OF INCORPORATION IF APPLICANT IS A CORPORATION

1. SOURCE OF SUPPLY

IF SURFACE WATER	IF GROUND WATER
SOURCE (NAME OF STREAM, LAKE, SPRING, ETC.) (IF UNNAMED, SO STATE)	SOURCE (WELL, TUNNEL, INFILTRATION TRENCH, ETC.)
I have examined these as required by SEPA and find that it is: ☐ not an "action". ☒ categorically exempt.	3 Wells
TRIBUTARY	SIZE AND DEPTH
	~~12~~-inch, 300-foot
3/25/97 SC	amended per Paul Haines, 2/10/98 DW
DATE SIGNATURE	

2. USE

USE TO WHICH WATER IS TO BE APPLIED (DOMESTIC SUPPLY, IRRIGATION, MINING, MANUFACTURING, ETC.)

Municipal Supply

ENTER QUANTITY OF WATER REQUESTED USING UNITS OF:	CUBIC FEET PER SECOND (CFS)	OR	GALLONS PER MINUTE (GPM)	ACRE FEET PER YEAR
			~~500~~ 2000	540

TIMES DURING YEAR WATER WILL BE REQUIRED

All year as required

IF IRRIGATION, NUMBER OF ACRES	IF DOMESTIC USE, NUMBER OF UNITS BY TYPE, E.G. 1-HOME, 1-MOBILE HOME, 2-CAMPSITES, ETC.	IF MUNICIPAL USE, ESTIMATED POPULATION 20 YEARS FROM TODAY
		18,000

DATE PROJECT WAS OR WILL BE STARTED	DATE PROJECT WAS OR WILL BE COMPLETED
May 1997	December 1997

3. LOCATION OF POINT OF DIVERSION/WITHDRAWAL

3A. IF IN PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)	SECTION	TOWN	RANGE	ALSO, PLEASE ENCLOSE A COPY OF THE PLAT AND MARK THE POINT(S) OF WITHDRAWAL OR DIVERSION

3B. IF NOT IN PLATTED PROPERTY

ON ACCOMPANYING SECTION MAPS, ACCURATELY MARK AND IDENTIFY EACH POINT OF DIVERSION, SHOW NORTH-SOUTH AND EAST-WEST DISTANCES FROM NEAREST SECTION CORNER OR PROPERTY CORNER

ALSO, ENTER BELOW THE DISTANCES FROM THE NEAREST SECTION OR PROPERTY CORNER TO THE DIVERSION OR WITHDRAWAL.

1000' N + 200' W of the South Quarter Corner of Sec 33

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE (E. OR W.) W.M.	COUNTY
SE4, SW4	33	4	2E	Clark

4. DO YOU OWN THE LAND ON WHICH THIS SOURCE IS LOCATED. IF NOT, INSERT NAME & ADDRESS OF OWNER

Betty J. Prew 10112 NE 219th Street Battle Ground, WA 98604

5. LEGAL DESCRIPTION OF PROPERTY *ON WHICH WATER IS TO BE USED*

ATTACH A COPY OF THE LEGAL DESCRIPTION OF THE PROPERTY (ON WHICH THE WATER WILL BE USED) TAKEN FROM **A REAL ESTATE CONTRACT, PROPERTY DEED OR TITLE INSURANCE POLICY.** OR, COPY CAREFULLY IN THE SPACE BELOW.

Area served by Battle Ground City Water

WHAT IS YOUR INTEREST IN THE PROPERTY ON W[redacted] THE WATER IS TO BE USED (PROPERTY OWNER, LE[redacted] CONTRACT PURCHASER, ETC.)

ARE THERE ANY EXISTING WATER RIGHTS RELATED TO THE LAND ON WHICH THE WATER IS TO BE USED (INCLUDING WATER PROVIDED BY IRRIGATION DISTRICTS OR DITCH COMPANIES.) ☐ YES ☒ NO

IF YES, FROM WHAT SOURCE (i.e. SURFACE OR GROUND WATER) AND UNDER WHAT AUTHORITY

6. DESCRIPTION OF SYSTEM PROPOSED OR INSTALLED

(FOR EXAMPLE: SIZE OF PUMP, CAPACITY OF PUMP, PUMP MOTOR HORSE POWER, PIPE DIAMETER, NUMBER OF SPRINKLERS, ETC.

To be determined

REMARKS

7.

8.

COMPLETE THIS SECTION ONLY IF THIS APPLICATION INCLUDES IRRIGATION AS A USE

IN ORDER TO IMPLEMENT THE PROVISIONS OF INITIATIVE MEASURE NUMBER 59, THE FAMILY FARM WATER ACT WHICH WAS PASSED BY THE VOTERS ON NOVEMBER 3, 1977, WE MUST ASK THE FOLLOWING QUESTIONS:

DOES THE TOTAL NUMBER OF ACRES IN WHICH YOU HAVE CONTROLLING INTEREST IN THE STATE OF WASHINGTON EXCEED 2000 ACRES FOR THE FOLLOWING THREE CATEGORIES:

1. LANDS THAT ARE BEING IRRIGATED UNDER WATER RIGHTS ACQUIRED AFTER DECEMBER 8, 1977. YES ☐ NO ☐
2. LANDS THAT MAY BE IRRIGATED UNDER APPLICATIONS NOW ON FILE WITH THE DEPARTMENT OF ECOLOGY. YES ☐ NO ☐
3. LANDS THAT MAY BE IRRIGATED UNDER THIS APPLICATION. YES ☐ NO ☐

IF 10 ACRE-FEET OR MORE OF WATER IS TO BE STORED AND/OR IF THE WATER DEPTH WILL BE 10 FEET OR MORE AT THE DEEPEST POINT, A STORAGE PERMIT MUST BE FILED IN ADDITION TO THIS PERMIT. THESE FORMS CAN BE SECURED, TOGETHER WITH INSTRUCTIONS, FROM THE DEPARTMENT OF ECOLOGY.

SIGNATURES

Marvin G Brusha Mayor
APPLICANT'S SIGNATURE

Betty J Brew
LEGAL LANDOWNERS NAME (PLEASE PRINT)

Betty J. Brew
LEGAL LANDOWNER'S SIGNATURE (OWNER OF PROPERTY DESCRIBED IN ITEM NUMBER 5)

10112 NE 219th ST
Battle Ground, WA 98604
LEGAL LANDOWNER'S ADDRESS

FOR OFFICE USE ONLY

STATE OF WASHINGTON }
DEPARATMENT OF ECOLOGY } ss.

This is to certify that I have examined this application together with the accompanying maps and data, and am returning it for correction or completion as follows: .....

.....

.....

In order to retain its priority date, this application must be returned to the Department of Ecology, with corrections, on or before ....., 19.....

Witness my hand this ..... *day of* ....., 19.....

.....
Department of Ecology

ECY 040-1-14
Rev. 8/91 F

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

COMPUTER INPUT
- [ ] APPLICATION
- [ ] PERMIT
- [ ] CERTIFICATE
- [ ] OTHER

PROGRESS SHEET

- [ ] SURFACE WATER
- [x] GROUND WATER

NAME: City of Battleground			TELEPHONE NO.: 360 687 7131
ADDRESS: PO Box 37	(CITY): Battle Ground	(STATE): WA	(ZIP CODE): 98604-0037
ASSIGNED TO		TELEPHONE NO.	DATE ASSIGNED
ADDRESS	(CITY)	(STATE)	(ZIP CODE)

APPLICATION NO.: G2-29477	PERMIT NO.	CERTIFICATION NO.
DATE AMENDED	DATE CANCELLED	W.R.I.A.: 28

APPLICATION

DATE APPLICATION RECEIVED: 3/25/97	INITIAL $10.00 FEE RECEIVED: [x] YES [ ] NO	DATE FEE RECEIVED: 3/25/97
STATEMENT OF ADDITIONAL EXAMINATION FEE $	DATE SENT	DATE RECEIVED
DATE RETURNED FOR COMPLETION OR CORRECTION	DATE RECEIVED	

TEMPORARY PERMIT

APPROVED BY	DATE ISSUED

PUBLICATION

APPROVED BY	DATE APPROVED	DATE NOTICE SENT: 4/3/97
PROTESTED BY AND DATE		

DATE AFFIDAVIT RECEIVED: 3/17/98	CHECKED BY: SC	TIME EXPIRED: 4/11/98	DATE AMENDED NOTICE SENT	DATE AFFIDAVIT RECEIVED	TIME EXPIRED

DEPARTMENT OF GAME AND FISHERIES REPORT

APPROVED	PROVISO	PROTEST

EXAMINATION

DATE EXAMINATION MADE	MADE BY	DATE REPORT OF EXAM. WRITTEN	WRITTEN BY	CHECKED BY
DATE PERMIT FEE REQUESTED: 4/27/98	AMOUNT DUE: $20.00		DATE RECEIVED	

PERMIT

PERMIT APPROVED BY	DATE APPROVED	PERMIT NO.	DATE ISSUED: 7/8/99

BEGINNING OF CONSTRUCTION

DATE NOTICE SENT	DATE FILED: Started	EXTENSION FEE
EXTENDED TO	EXTENDED TO	

WELL DRILLER'S AND/OR CONSTRUCTION REPORT

DATE SENT	DATE FILED

COMPLETION OF CONSTRUCTION

DATE NOTICE SENT	DATE FILED: 11-15-00	EXTENSION FEE
EXTENDED TO	EXTENDED TO	

PROOF OF APPROPRIATION

DATE SENT	DATE FILED	EXTENSION FEE	EXTENDED TO

DATE CERTIFICATE FEE REQUESTED	AMOUNT DUE	DATE RECEIVED	DATE APPROVED FOR CERTIFICATE	APPROVED BY

CERTIFICATION

PROOF EXAM. REQUIRED [ ] YES [ ] NO	CERTIFICATE NUMBER	DATE ISSUED

REMARKS

ECY 040-1-80

PROGRESS

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Application G2-30194A

Proposed Well No. 10 – Sand and Gravel Aquifer

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WASHINGTON STATE DEPARTMENT OF ECOLOGY

State of Washington
Application for a Water Right

Please follow the attached instructions to avoid unnecessary delays.

RECEIVED DEPT. OF ECOLOGY MAY 20 10 51

For Ecology Use
Fee Paid _____
Date _____

Section 1. APPLICANT - PERSON, ORGANIZATION, OR WATER SYSTEM

Name: **City of Battle Ground (Rob Charles)** _____ Home Tel: **(360) 342 – 5078**_____

Mailing Address: **109 SW First Street, Suite 122** _____ Work Tel: **(360) 342 – 5078**_____

City: **Battle Ground** _____ State: **WA** Zip: **98064** _____+_____ FAX: **(360) 342 – 5057** _____

Section 2. CONTACT - PERSON TO CALL ABOUT THE APPLICATION
☒ **Same as above**

Name_____ Home Tel:(_____)_____ - _____

Mailing Address_____ Work Tel:(_____)_____ - _____

City_____ State_____ Zip+4_____+_____ FAX:(_____)_____ - _____

Relationship to applicant_____

Section 3. STATEMENT OF INTENT

The applicant requests a permit to use not more than _____**1,200**_____ (☒ gallons per minute or ☐ cubic feet per second) from a ☐ surface water source or ☒ ground water source (check only one) for the purpose(s) of **Municipal Water Supply**_____. **ATTACH A "LEGAL" DESCRIPTION OF THE PLACE OF USE.** (**See instructions**.) *NOTE: A tax parcel number or a plat number is not sufficient.*
Area Served by City of Battle Ground
Estimate a maximum annual quantity to be used in acre-feet per year: **1,000 ac-ft/yr**_____

☐ Check if the water use is proposed for a short-term project. Indicate the period of time that the water will be needed:

From ____/____/____ to _____/____/____

Section 4. WATER SOURCE

If SURFACE WATER	If GROUNDWATER
Name the water source and indicate if stream, spring, lake, etc. If unnamed, write "unnamed spring," "unnamed stream," etc.: Number of diversions: _____	A permit is desired for ___**1**_____ well(s). **Well 10**
Source flows into (name of body of water):	Size & depth of well(s): **12- to 16–inches in diameter; Approximately 500 feet deep**

LOCATION

Enter the north-south and east-west distances in feet from the point of diversion or withdrawal to the nearest section corner:

¼ of	¼ of	Section	Township	Range(E/W)	County	If location of source is platted, complete below:		
						Lot	Block	Subdivision
NE	**NE**	**33**	**4 N**	**2 E**	**Clark**			

For Ecology Use Date Received: 5/20/04 Priority Date: 5/20/04

SEPA: Exempt/Not Exempt FERC License #_____ Dept. Of Health #_____

Date Accepted As Complete 5/20/04 By SC Date Returned_____ By_____ WRIA: 28

Appl. No.: G2-30194

ECY 040-1-14 **APPLICATION**
Rev. 7/97 * * f

Section 5. GENERAL WATER SYSTEM INFORMATION

A. Name of system, if named: **City of Battle Ground**_____

B. Briefly describe your proposed water system. **(See instructions.)**
The City of Battle Ground currently operates seven supply wells to meet its water demand. Wells 1, 2, 4 and 5 are completed within the Upper Troutdale aquifer and Wells 6, 7, and 8 are completed in the deep Sand and Gravel aquifer (SGA). Yields from Wells 7 and 8 have been diminished in recent years due to iron bacteria problems, which have significantly reduced the output of these wells. The City seeks to develop Well 10 to meet future increases in water demand. The existing and future water supply sources will be used to meet municipal needs within the City's service area. Refer to the City's most recent water system plan (WSP) for other related water system information (Curran-McLeod, 1998).

C. Do you already have any water rights or claims associated with this property or system? ☒ YES ☐ NO
PROVIDE DOCUMENTATION. **See list of City water right permits and certificates that are summarized in Table 1.**

Section 6. DOMESTIC / PUBLIC WATER SUPPLY SYSTEM INFORMATION
(Completed for all domestic/public supply uses.)

A. Number of "connections" requested: **10,366***___ Type of connection: **Municipal**_____
***Note: Estimated additional connections over the next 20 years** (Homes, Apartment, Recreational, etc.)

B. Are you within the area of an approved water system? ☒ YES ☐ NO
If yes, explain why you are unable to connect to the system. *Note: Regional water systems are identified by your County Health Department.* **The applicant (City of Battle Ground) is the local water supply provider.**

Complete C. and D. only if the proposed water system will have fifteen or more connections.

C. Do you have a current water system plan approved by the
Washington State Department of Health? ☒ YES ☐ NO
If yes, when was it approved? **December 17, 1998**. Please attach the current approved version of your plan.

D. Do you have an approved conservation plan? ☐ YES ☒ NO
If yes, when was it approved? _____ Please attach the current approved version of your plan.
The 1998 WSP included some conservation analysis. The City is currently working on a revision to the WSP, which will include a complete conservation plan which addresses all of WDOH's current conservation provisions.

Section 7. IRRIGATION/AGRICULTURAL/FARM INFORMATION
(Complete for all irrigation and agriculture uses.)

A. Total number of acres to be irrigated: _____

B. List total number of acres for other specified agricultural uses:

Use_____Acres_____
Use_____Acres_____
Use_____Acres_____

C. Total number of acres to be covered by this application: _____

D. Family Farm Act (Initiative Measure Number 59, November 3, 1977, as amended by Chapter 237, Laws of 2001)
Add up the acreage in which you have a controlling interest, including only:
‡ Acreage irrigated under water rights acquired after December 8, 1977;
‡ Acreage proposed to be irrigated under this application;
‡ Acreage proposed to be irrigated under other pending application(s).

1. Is the combined acreage greater than 6000 acres? ☐ YES ☐ NO
2. Do you have a controlling interest in a Family Farm Development Permit? ☐ YES ☐ NO
If yes, enter permit no:_____

E. Farm uses:
Stockwater - Total # of animals _____ Animal type _____ (If dairy cattle, see below)
Dairy - # Milking _____ # Non-milking _____

Section 8. WATER STORAGE

Will you be using a dam, dike, or other structure to retain or store water? ☐ YES ☒ NO

NOTE: If you will be storing 10 acre-feet or more of water and/or if the water depth will be 10 feet or more at the deepest point, and some portion of the storage will be above grade, you must also apply for a reservoir permit. You can get a reservoir permit application from the Department of Ecology.

Section 9. DRIVING DIRECTIONS

Provide detailed driving instructions to the project site.
From Lacey, go southbound on I-5. Take the Ridgefield exit and proceed east and then south along NW 11th Avenue. Bear right on to 264th Street and continue on to NE 10th Avenue. Proceed southbound on NE 10th Avenue to NE 219th Street (SR-502). Proceed eastbound on NE 219th Street to NE 112th Avenue. Proceed northbound on NE 112th Avenue approximately one mile to the well site, which is located on the northwest corner of NE 112th Avenue and NE 239th Street.

Section 10. REQUIRED MAP

A. Attach a map of the project. **(See instructions.)**
See Figure 1 Location Map

Section 11. PROPERTY OWNERSHIP

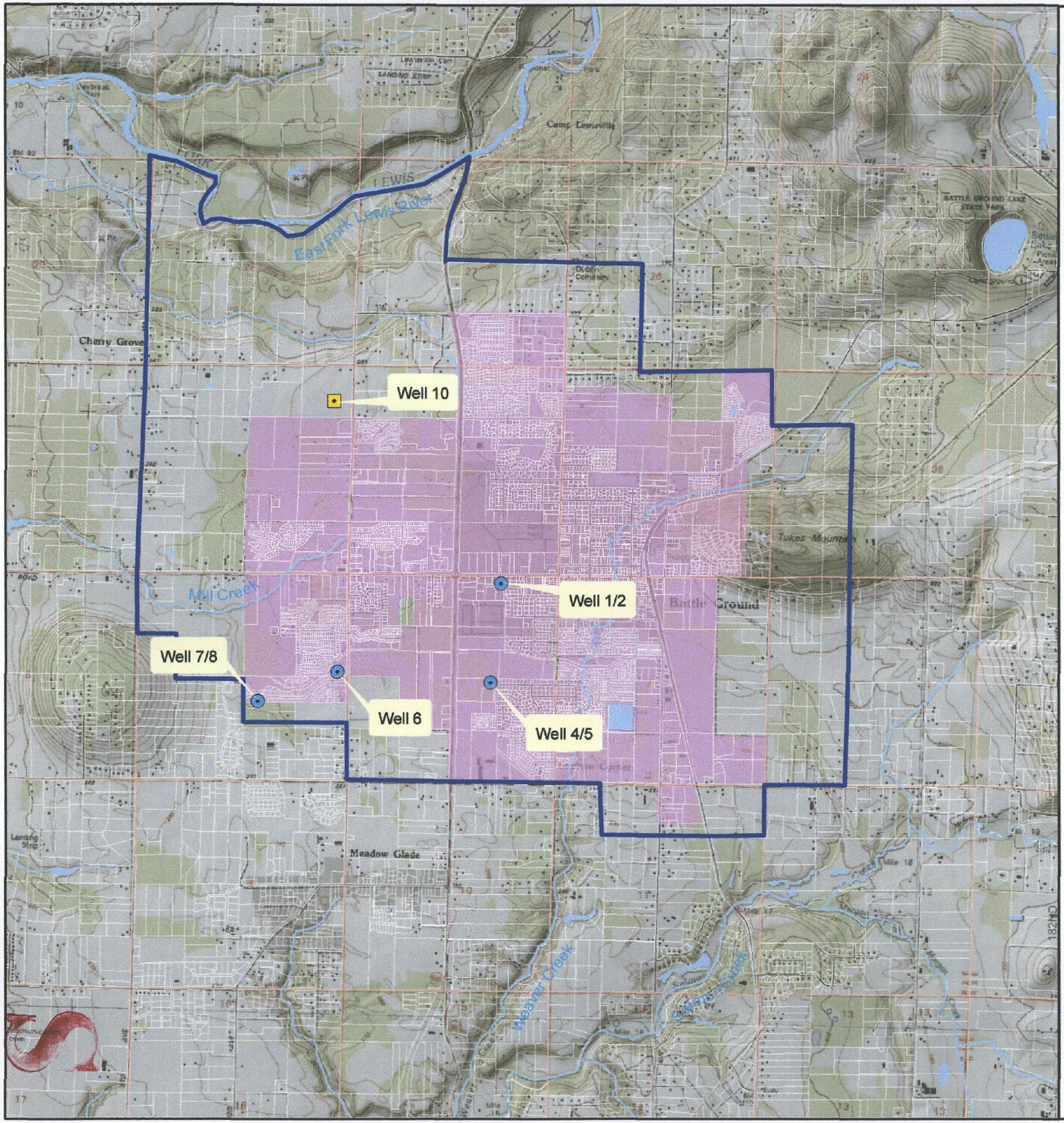
A. Does the applicant own the land on which the water will be used? ☐ YES ☒ NO
If no, explain the applicant's interest in the place of use and provide the name(s) and address(es) of the owner(s):
The City will use the water within their service area (see attached map – Figure 1)

B. Does the applicant own the land on which the water source is located? ☐ YES ☒ NO
If no, submit a copy of agreement:
The City will obtain an easement from the Battle Ground School district for operation of a supply well.

I certify that the information above is true and accurate to the best of my knowledge. I understand that in order to process my application, I grant staff from the Department of Ecology access to the site for inspection and monitoring purposes. Even though I may have been assisted in the preparation of the above application by the employees of the Department of Ecology, all responsibility for the accuracy of the information rests with me.

Applicant (or authorized representative) — DEC. 24, 2003 — Date

Landowner for place of use (if same as applicant, write "same") — Date



Battle Ground Water Supply Development

Vicinity Map Showing Location of Existing and Proposed Water Supply Wells

Prepared for
City of Battle Ground

Prepared by
Pacific Groundwater Group

PgG

Legend

- Existing Battle Ground Supply Well
- Proposed Battle Ground Supply Well
- Water District Boundary
- Major Rivers
- Water Bodies
- Sections
- Parcels
- City of Battle Ground

N
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K:\DANJM990406\GIS\battleground-wr.mxd, 12/8/03

Appendix J

Water Quality Monitoring Plan, Coliform Monitoring Plan, and E. coli Response Plan

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WATER QUALITY MONITORING PLAN/COLIFORM MONITORING PLAN/E. COLI RESPONSE PLAN

Introduction

This Water Quality Monitoring Plan presents the requirements for monitoring water quality at the sources and in the distribution system in accordance with the drinking water regulations contained in Washington Administrative Code (WAC) 246-290-300.

Source Water Quality Monitoring

The City is required to perform water quality monitoring at each of its active sources for inorganic chemicals and physical substances, organic chemicals, unregulated inorganic and organic chemicals, and radionuclides. The monitoring requirements that the City must comply with are specified in WAC 246-290-300. The City must comply with the requirements for groundwater system monitoring. **Table 1** summarizes the source water quality monitoring requirements through 2028. The table is based on information available at the time that this document was prepared and may change in the future.

Table 1
Monitoring Schedule

When	Monitor	Group	Test Method	Upon Violation
		2021		
March	All Active Sources	Nitrate	NIT	Quarterly for 1 Year
May	S03, S04	Iron	IOC	Quarterly for 2 Quarters
June	S01	Volatile Organic Chemicals	VOC	Quarterly for 2 Quarters
August	2 Sites In Distribution System	Stage 2 DBPs	TTHM and HAA5	1 per Site per Quarter
October	S02	Volatile Organic Chemicals	VOC	Quarterly for 2 Quarters
		2022		
March	All Active Sources	Nitrate	NIT	Quarterly for 1 Year
May	S04	Volatile Organic Chemicals	VOC	Quarterly for 2 Quarters
May	S02	Iron	IOC	Quarterly for 2 Quarters
May	S02	Manganese	IOC	Quarterly for 2 Quarters
June	S01	Volatile Organic Chemicals	VOC	Quarterly for 2 Quarters
June	S02	Herbicides	VOC	Quarterly for 2 Quarters
August	2 Sites In Distribution System	Stage 2 DBPs	TTHM and HAA5	1 per Site per Quarter
August	S01, S03	Herbicides	VOC	Quarterly for 2 Quarters
September	S01, S02	Radionuclides	RAD	Quarterly until less than MCL
September	S01	Iron	IOC	Quarterly for 2 Quarters
September	S01	Manganese	IOC	Quarterly for 2 Quarters
October	S02	Volatile Organic Chemicals	VOC	Quarterly for 2 Quarters
		2023		
March	All Active Sources	Nitrate	NIT	Quarterly for 1 Year
April	S04	Herbicides	VOC	Quarterly for 2 Quarters
May	S03	Volatile Organic Chemicals	VOC	Quarterly for 2 Quarters
June	S01	Volatile Organic Chemicals	VOC	Quarterly for 2 Quarters
July	30 Sites In Distribution System	Lead & Copper	LCR	(2) – 6 Mo. Periods
August	2 Sites In Distribution System	Stage 2 DBPs	TTHM and HAA5	1 per Site per Quarter
October	S02	Volatile Organic Chemicals	VOC	Quarterly for 2 Quarters
November	S03, S04	Radionuclides	RAD	Quarterly until less than MCL

Table 1
Monitoring Schedule (Continued)

When	Monitor	Group	Test Method	Upon Violation
		2024		
March	All Active Sources	Nitrate	NIT	Quarterly for 1 Year
April	S12	Herbicides	VOC	Quarterly for 2 Quarters
May	S03, S04	Iron	IOC	Quarterly for 2 Quarters
June	S01	Volatile Organic Chemicals	VOC	Quarterly for 2 Quarters
August	2 Sites In Distribution System	Stage 2 DBPs	TTHM and HAA5	1 per Site per Quarter
October	S02	Volatile Organic Chemicals	VOC	Quarterly for 2 Quarters
		2025		
March	All Active Sources	Nitrate	NIT	Quarterly for 1 Year
April	S01	IOC & Physical	IOC	Quarterly for 2 Quarters
May	S02	Iron	IOC	Quarterly for 2 Quarters
May	S02	Manganese	IOC	Quarterly for 2 Quarters
June	S01	Volatile Organic Chemicals	VOC	Quarterly for 2 Quarters
July	S12	IOC & Physical	IOC	Quarterly for 2 Quarters
August	2 Sites In Distribution System	Stage 2 DBPs	TTHM and HAA5	1 per Site per Quarter
September	S01	Iron	IOC	Quarterly for 2 Quarters
September	S01	Manganese	IOC	Quarterly for 2 Quarters
October	S02	Volatile Organic Chemicals	VOC	Quarterly for 2 Quarters
		2026		
January	S12	Radionuclides	RAD	Quarterly until less than MCL
March	All Active Sources	Nitrate	NIT	Quarterly for 1 Year
April	S12	Volatile Organic Chemicals	VOC	Quarterly for 2 Quarters
May	S03, S04	IOC & Physical	IOC	Quarterly for 2 Quarters
June	S01	Volatile Organic Chemicals	VOC	Quarterly for 2 Quarters
July	30 Sites In Distribution System	Lead & Copper	LCR	(2) – 6 Mo. Periods
August	2 Sites In Distribution System	Stage 2 DBPs	TTHM and HAA5	1 per Site per Quarter
October	S02	Volatile Organic Chemicals	VOC	Quarterly for 2 Quarters
		2027		
March	All Active Sources	Nitrate	NIT	Quarterly for 1 Year
May	S03, S04	Iron	IOC	Quarterly for 2 Quarters
June	S01	Volatile Organic Chemicals	VOC	Quarterly for 2 Quarters
July	30 Sites In Distribution System	Lead & Copper	LCR	(2) – 6 Mo. Periods
August	2 Sites In Distribution System	Stage 2 DBPs	TTHM and HAA5	1 per Site per Quarter
October	S02	Volatile Organic Chemicals	VOC	Quarterly for 2 Quarters
		2028		
March	All Active Sources	Nitrate	NIT	Quarterly for 1 Year
May	S02	IOC & Physical	IOC	Quarterly for 2 Quarters
May	S02	Iron	IOC	Quarterly for 2 Quarters
May	S02	Manganese	IOC	Quarterly for 2 Quarters
June	S01	Volatile Organic Chemicals	VOC	Quarterly for 2 Quarters
July	30 Sites In Distribution System	Lead & Copper	LCR	(2) – 6 Mo. Periods
August	2 Sites In Distribution System	Stage 2 DBPs	TTHM and HAA5	1 per Site per Quarter
September	S01, S02	Radionuclides	RAD	Quarterly until less than MCL
September	S01	Iron	IOC	Quarterly for 2 Quarters
September	S01	Manganese	IOC	Quarterly for 2 Quarters
October	S02	Volatile Organic Chemicals	VOC	Quarterly for 2 Quarters

Monitoring Requirements And Procedures

Inorganic Chemical and Physical – A minimum of one sample shall be taken after treatment at the entry point to the distribution system for each source. If a maximum contaminated level (MCL) is exceeded, quarterly sampling is required for at least two quarters. According to the City's water quality monitoring schedule generated in 2021, the City has a waiver for a nine-year period, during which the City was required to record a single sample at each of its sources.

Monitoring for nitrate shall be accomplished once per year at each source. The repeat monitoring frequency shall be quarterly for at least one year following any one sample in which the concentration is greater than or equal to 50 percent of the MCL for nitrate or nitrite.

Monitoring for asbestos is required once every nine years. Systems not vulnerable to asbestos contamination at the source or in the distribution system (due to asbestos cement pipe) may apply to the state for a waiver of the monitoring requirements. A sample must be taken at a tap served by an asbestos cement pipe where asbestos contamination is most likely to occur. If the MCL is exceeded, quarterly sampling is required for at least two quarters. The City last took an asbestos sample in 1996 and has since received waivers for monitoring requirements.

Monitoring for arsenic is not required at any of the City's sources. However, if the MCL is exceeded, quarterly sampling is required for at least two quarters.

Monitoring for manganese is required once every three years at Wells #1 and #2. If the secondary MCL is exceeded, quarterly sampling is required for at least two quarters.

Monitoring for iron is required once every three years at Wells #1, #2, #4, and #5. If the secondary MCL is exceeded, quarterly sampling is required for at least two quarters.

Volatile Organic Chemicals – A minimum of one sample shall be taken after treatment at the entry point to the distribution system for each source. Monitoring for volatile organic chemicals shall be accomplished once every three years for each compliance period. If an MCL is exceeded, quarterly sampling is required for at least two quarters. The state may then allow annual monitoring if the results are satisfactory. After three consecutive annual samples that comply with the MCLs, a waiver for reduced monitoring (once every three-year compliance period) may be applied for again. The City's sources all currently have a six-year volatile organic chemical (VOC) waiver.

Synthetic Organic Chemicals – A minimum of one sample shall be taken after treatment at the entry point to the distribution system for each source. Monitoring for synthetic organic chemicals (SOCs) shall be accomplished once every three years for each compliance period if a monitoring waiver is not provided by the state. If an MCL is exceeded, quarterly sampling is required for at least two quarters. The state may then allow annual monitoring if the results are satisfactory. After three consecutive annual samples that comply with the MCLs, a waiver for reduced monitoring may be applied for again. The City was granted a monitoring waiver for pesticides and soil fumigants. The next herbicides samples should be collected per the schedule in **Table 1**.

Unregulated Inorganic Chemicals – Sulfate is the only unregulated inorganic chemical that must be monitored under the current State regulations. A minimum of one sample shall be taken after treatment at the entry point to the distribution system for each source. Monitoring is required at least once every five years, unless a waiver is granted by the State. The City monitors for sulfate when monitoring is performed for regulated inorganic compounds.

Unregulated Volatile Organic Chemicals – A minimum of one sample shall be taken after treatment at the entry point to the distribution system for each source. Monitoring is required at least once every five years. The City monitors for unregulated volatile organic chemicals when samples for regulated volatile organic chemicals are taken.

Unregulated Synthetic Organic Chemicals – A minimum of one sample shall be taken after treatment at the entry point to the distribution system for each source. Monitoring is required at least once every five years, unless a waiver is granted by the State. The City monitors for unregulated SOCs when samples for regulated SOCs are taken.

Radionuclides – A minimum of one sample shall be taken after treatment at the entry point to the distribution system for each source. Initial monitoring for gross alpha particle radioactivity, radium-226 and radium-228 required four consecutive quarterly samples. Monitoring thereafter requires four consecutive quarterly samples at least once every 48 months. The analysis for radium-226 and radium-228 may be omitted, if the results from the gross alpha particle radioactivity analysis are less than 5 pCi/L. In addition, if the results of the initial analysis are less than half of the established MCL, the required monitoring may be reduced to a single sample collected every 48 months. The initial radionuclide samples resulted in levels much less than the MCL, if detectable at all, and the City may now monitor for radionuclides once every six years.

Distribution System Water Quality Monitoring

The City is required to perform water quality monitoring within the distribution system for coliform bacteria, disinfectant (chlorine) residual concentration, disinfection byproducts, lead and copper, and asbestos in accordance with Chapter 246-290 WAC.

Monitoring Requirements And Procedures

Coliform Bacteria Routine Sampling – Specific requirements are contained in WAC 246-290-300. The City has been collecting a minimum of 30 samples per month from different locations throughout the system, based on estimates of the population served.

Table 2 lists the addresses and schedule of the City's routine sampling locations. A minimum of 30 samples will be collected each month in accordance with the schedule shown in the table. The sampling sites are rotated throughout the system to achieve a thorough sampling of all parts of the system. The routine sample locations are shown as red dots on the Coliform Sample Sites figure provided in **Attachment A** as part of the City's Coliform Monitoring Plan.

Table 2
Coliform Sampling Sites

Sample Site	Location	Months Sampled Annually											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	Maple Grove School	x	x	x	x	x	x	x	x	x	x	x	x
	Chief Umtuch Middle School	x	x	x	x	x	x	x	x	x	x	x	x
	Captain Strong Primary School	x	x	x	x	x	x	x	x	x	x	x	x
	Battle Ground High School	x	x	x	x	x	x	x	x	x	x	x	x
	Daybreak School	x	x	x	x	x	x	x	x	x	x	x	x
	River HomeLink	x	x	x	x	x	x	x	x	x	x	x	x
X-0	1720 NE 16th Loop	x			x			x			x		
X-0A	815 NW 24th Street	x			x			x			x		
X-1	415 NE 7th Street	x			x			x			x		
X-1A	2306 SW 7th Street	x			x			x			x		

Table 2
Coliform Sampling Sites (Continued)

Sample Site	Location	Months Sampled Annually											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
X-2	111 SW 6th Street	x			x			x			x		
X-2A	215 NW 10th Street	x			x			x			x		
X-3	1204 NE 9th Way	x			x			x			x		
X-3A	1604 NW 13th Street	x			x			x			x		
X-4	306 SE 4th Street	x			x			x			x		
X-4A	312 NW 16th Avenue	x			x			x			x		
X-5	121 SW 19th Avenue		x			x			x			x	
X-5A	712 NW 21st Street		x			x			x			x	
X-6	301 W Main Street, Suite 101		x			x			x			x	
X-6A	1308 SE Grace Avenue (Operations Center)		x			x			x			x	
X-7	708 NW 5th Avenue		x			x			x			x	
X-7A	11 NE 15th Avenue		x			x			x			x	
X-8	405 SW 12th Street		x			x			x			x	
X-8A	1708 NE 12th Street		x			x			x			x	
X-9	212 SW 19th Avenue			x			x			x			x
X-9A	1901 NW 4th Street			x			x			x			x
X-10	619 N Parkway Avenue			x			x			x			x
X-10A	400 NW 14th Street			x			x			x			x
X-11	208 SW 10th Street			x			x			x			x
X-11A	216 NE 16th Avenue			x			x			x			x
X-12	312 NE Grace Avenue			x			x			x			x
X-12A	104 SE 13th Street			x			x			x			x
X-13	2609 NW 15th Street	x			x			x			x		
X-13A	604 SE 2nd Avenue	x			x			x			x		
X-14	2304 SW 4th Street		x			x			x			x	
X-14A	2307 SW 8th Street		x			x			x			x	
X-15	208 NW 28th Avenue		x			x			x			x	
X-15A	1305 NW 13th Street		x			x			x			x	
X-16	402 SW 24th Avenue			x			x			x			x
X-16A	2812 NW 3rd Way			x			x			x			x
X-17	605 SE 5th Street			x			x			x			x
X-17A	219 NE 10th Street			x			x			x			x
X-18	14444 NE 199th Street (Bus Barn)			x			x			x			x
X-18A	201 SW 19th Street			x			x			x			x
X-19	1416 SE 5th Way	x			x			x			x		
X-19A	615 NW 23rd Avenue	x			x			x			x		
X-20	2510 NW 11th Street		x			x			x			x	
X-20A	315 NE Clark Avenue		x			x			x			x	
X-21	109 SW 1st Street (City Hall)	x			x			x			x		
X-21A	912 E Main Street (Community Center)	x			x			x			x		
X-22	1109 NW 12th Way	x			x			x			x		
X-22A	707 NE 3rd Way	x			x			x			x		
X-23	402 SE 5th Circle	x			x			x			x		
X-23A	1804 NW 5th Court	x			x			x			x		
X-24	1720 SE 2nd Avenue	x			x			x			x		
X-24A	1505 NE 15th Avenue (BPS 1)	x			x			x			x		
X-25	400 NW 11th Street	x			x			x			x		
X-25A	1706 NW 7th Court	x			x			x			x		
X-26	116 NE 3rd Avenue (Senior Center)		x			x			x			x	
X-26A	1123 SE 6th Street		x			x			x			x	
X-27	15 NW 12th Street		x			x			x			x	
X-27A	2107 NW 7th Street		x			x			x			x	
X-28	NE 11th Place (Sampling Station)		x			x			x			x	
X-28A	1205 SW 25th Avenue (Sampling Station)		x			x			x			x	
X-29	2513 SW 11th Circle (BPS 2)		x			x			x			x	
X-29A	208 SW 6th Street		x			x			x			x	

Table 2
Coliform Sampling Sites (Continued)

X-30	1507 NE 20th Avenue	x	x	x	x
X-30A	1101 NW 9th Way	x	x	x	x
X-31	1308 SE Grace Avenue (Flex Use Building)	x	x	x	x
X-31A	802 NW 2nd Avenue	x	x	x	x
X-32	1814 NW 16th Street	x	x	x	x
X-32A	1008 SE 5th Avenue	x	x	x	x
X-33	1404 SE 3rd Avenue	x	x	x	x
X-33A	620 SE 11th Avenue	x	x	x	x
X-34	1405 NE 4th Avenue	x	x	x	x
X-34A	1602 NW 2nd Avenue	x	x	x	x
X-35	1701 NW 18th Street	x	x	x	x
X-35A	1704 NW 26th Avenue	x	x	x	x

Coliform Bacteria Repeat Sampling – In the event that a routine sample tests positive for coliform, a repeat sample shall be taken at the same location as the positive sample and two additional samples shall be taken: one within five active service connections upstream and one within five active service connections downstream of the positive sample location. A source sample shall also be taken at each source that was in use at the time of the positive routine sample. The source samples shall be taken from a hose bib that is located on the header after the pump. The repeat and source samples shall be taken within 24 hours of receiving the unsatisfactory result. As a consecutive system, the City will notify and coordinate with Clark Public Utilities within 24 hours after a positive test.

The City must also conduct an assessment of its water system facilities and operations and fix any sanitary defects. Each sample must also be tested for the presence of E. coli. If the results conclude that an E. Coli MCL is exceeded, the City must perform a Level 2 assessment and provide public notification in accordance with WAC 246-290-495 within 24 hours. The City also plans on notifying the Clark County Public Health Center as part of its emergency response call-list. An E. Coli Response Plan is included in the last section of this document. If a positive sample is collected on a consecutive system, the City will also need to collect source samples.

Disinfectant Residual Concentration – The City's chlorination targets are to maintain a 0.5 mg/L residual at the furthest reaches of the distribution system, therefore water is dosed at about 0.8 – 1.0 mg/L at the entry point to meet that target. In 2018, and January through March 18, 2019, free chlorine ranged between 0.300 and 1.93 mg/L and averaged 0.84 mg/L throughout the distribution system.

In the event of an operational emergency, such as a chlorine or fluoride overfeed at one of their facilities, the City plans on notifying the Clark County Public Health Center as part of its emergency response call-list.

Lead and Copper – Specific requirements are contained in Title 40, Parts 141.86, 141.87 and 141.88 of the Code of Federal Regulations (CFR). Based on the City's population the sampling requirement is now 30 samples every three years.

The City has collected samples as required. All lead and copper monitoring completed indicated lead and copper levels were below the action levels at the 90th percentile. Sample sites shall be selected based on the known existence of lead pipes, copper pipes, and copper pipes with lead solder in accordance with 40 CFR 141.86(a). All samples, except for lead service line samples, shall be "first draw tap samples" taken at a cold water tap in which water has not been drawn from the tap for at least six hours, but no more than

12 hours. Sample faucets shall be flushed with cold water the evening prior to collecting the sample. Lead service line samples shall be collected with one of three methods in accordance with 40 CFR 141.86(b). The locations of future sample sites shall be the same as past sample sites, unless unavoidable conditions prevent sampling at the same locations.

Fluoride Concentration – Specific requirements are contained in WAC 246-290-460 for systems that are fluoridating drinking water. All the City's sources are fluoridated. The concentration of fluoride shall be maintained at 0.7 mg/L. Determinations of fluoride concentrations shall be made daily, and reports of the analyses shall be submitted to DOH within 10 days of the end of the reporting month. Monthly check samples shall be taken downstream of each fluoride injection point, at the first sample tap where adequate mixing has occurred.

Disinfection Byproducts – Specific requirements are contained in WAC 246-290-300. Under the Stage II Disinfectants and Disinfection Byproducts Rule (DBPR), the City is required to monitor for total trihalomethanes (TTHM) and five haloacetic acids (HAA5) annually. Based on the City's water service population, two TTHM and two HAA5 samples are required to be taken. The sample locations were established during the City's Stage II DBPR Initial Distribution System Evaluation and sampling is performed according to the City's Stage II DBPR monitoring plan.

E. Coli Response Plan

See attached **Appendix J-1** for E. Coli Response Plan.

Appendix J-1
E. Coli Response Plan

The following checklist includes elements that were considered by the City in developing a response plan in the event that E. Coli is present in the source water or distribution system. The E. Coli response plan includes operation changes or emergency procedures to reduce the effect of E. Coli bacteria on water system customers.

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, low pressure and outage incidents.	☒	☐	☐	☐
We can easily access and review documentation on water main breaks, construction & repair activities, 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 have identified one or more 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 they will be understood by our consumers	☐	☐	☐	☒
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.	☐	☐	☐	☒

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.	☒	☐	☐	☐

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.	☒	☐	☐	☐

***E. coli*-Present Triggered Source Sample Response Checklist – All Sources**				
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 – Sources S01 & S02 – Wells #1 & #2**				
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 our distribution system for an indefinite period.	☐	☐	☐	☒
We can quickly replace our existing source of supply with a more protected new source of supply.	☐	☒	☐	☐
Temporary Treatment	**Yes**	**No**	**N/A**	**To Do List**
This source is continuously chlorinated, and our existing facilities can provide 4-log virus treatment (CT = 6) before the first customer. If yes, at what concentration? > 1.0 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.				

***E. coli-present* Triggered Source Sample Response Checklist – Sources S03 & S04 – Wells #4 & #5**				
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 our distribution system for an indefinite period.	☐	☐	☐	☒
We can quickly replace our existing source of supply with a more protected new source of supply.	☐	☒	☐	☐
Temporary Treatment	**Yes**	**No**	**N/A**	**To Do List**
This source is continuously chlorinated, and our existing facilities can provide 4-log virus treatment (CT = 6) before the first customer. If yes, at what concentration? > 1.0 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.	☒	☐	☐	☐

***E. coli-present* Triggered Source Sample Response Checklist – Source S08 – Well #6**				
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 our distribution system for an indefinite period.	☐	☐	☐	☒

We can quickly replace our existing source of supply with a more protected new source of supply.	☐	☒	☐	☐
Temporary Treatment	**Yes**	**No**	**N/A**	**To Do List**
This source is continuously chlorinated, and our existing facilities can provide 4-log virus treatment (CT = 6) before the first customer. If yes, at what concentration? > 1.0 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.	☒	☐	☐	☐

***E. coli-present* Triggered Source Sample Response Checklist – Sources S09, S10, & S11 – Wells #7, #8, & #9**				
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 our distribution system for an indefinite period.	☐	☐	☐	☒
We can quickly replace our existing source of supply with a more protected new source of supply.	☐	☒	☐	☐
Temporary Treatment	**Yes**	**No**	**N/A**	**To Do List**
This source is continuously chlorinated, and our existing facilities can provide 4-log virus treatment (CT = 6) before the first customer. If yes, at what concentration? > 1.0 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.	☒	☐	☐	☐

E. coli-present **Triggered Source Sample Response Checklist – Source S13 – CPU Intertie**				
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 our distribution system for an indefinite period.	☐	☐	☐	☒
We can quickly replace our existing source of supply with a more protected new source of supply.	☐	☒	☐	☐
Temporary Treatment	**Yes**	**No**	**N/A**	**To Do List**
This source is continuously chlorinated, and our existing facilities can provide 4-log virus treatment (CT = 6) before the first customer. If yes, at what concentration? > 1.0 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.	☒	☐	☐	☐

Distribution System *E. coli* Response Plan

If we have *E. coli* in our distribution system we will immediately:

1. Call DOH.
2. Call Clark Public Utilities and coordinate response with them due to the CPU Intertie.
3. Collect repeat samples as discussed in the Water Quality Monitoring Plan and triggered source samples at all sources. Collect additional investigative samples as necessary.
4. Inspect our water system facilities, including treatment plants for proper operation.
5. Interview staff to determine whether anything unusual was happening in the water system service area, especially since the previous month's sample(s).
6. Review new construction activities, water main breaks, and pressure outages that may have occurred during the previous month.
7. Review Cross-Connection Control Program status.
8. Discuss with DOH whether to issue a Health Advisory based on the findings of steps 4-7.
9. Increase chlorine dose at sources to result in at least 1.5 mg/L at distribution entry.
10. Flush affected portions of the distribution system.
11. Prepare draft news release and website changes.
12. Contact school district & medical facilities about potential action.
13. Collect investigative samples every 12 hours until repeat results are known.
14. Respond appropriately to repeat results:
    - If repeats are all satisfactory, lift HA if one was issued.
    - If any repeat is unsatisfactory, issue HA if not already issued. Host DOH for an inspection and respond accordingly to inspection findings.

E. coli-Present Triggered Source Sample Response Plan – Sources 01 & 02

If we have *E. coli* in Sources 01 and 02 water we will immediately:

1. Call DOH.
2. Shut down source S01 and S02.
3. Distribute required notice to direct service customers. The notice will include water curtailment instructions to stop outdoor watering.
4. Increase chlorine dose to achieve at least 1.5 mg/L at the entry point to the distribution system.
5. Begin compliance monitoring at the entry point to the distribution system.
6. Begin investigation sampling at Wells #1 and #2.
7. Locate a source of bottled water to supply nonresidential customers with a long-term supply of bottled water for individuals who can't boil their water.
8. In concert with DOH, begin work on corrective action plan to provide or confirm 4-log virus treatment of the source.

E. coli-Present Triggered Source Sample Response Plan – Sources 03 & 04

If we have *E. coli* in Sources 03 and 04 water we will immediately:

1. Call DOH.
2. Shut down source S03 and S04.
3. Distribute required notice to direct service customers. The notice will include water curtailment instructions to stop outdoor watering.
4. Increase chlorine dose to achieve at least 1.5 mg/L at the entry point to the distribution system.
5. Begin compliance monitoring at the entry point to the distribution system.

6. Begin investigation sampling at Wells #4 and #5.
7. Locate a source of bottled water to supply nonresidential customers with a long-term supply of bottled water for individuals who can't boil their water.
8. In concert with DOH, begin work on corrective action plan to provide or confirm 4-log virus treatment of the source.

E. coli-Present Triggered Source Sample Response Plan – Source 08

If we have *E. coli* in Source 08 water we will immediately:

1. Call DOH.
2. Shut down source S08.
3. Distribute required notice to direct service customers. The notice will include water curtailment instructions to stop outdoor watering.
4. Increase chlorine dose to achieve at least 1.5 mg/L at the entry point to the distribution system.
5. Begin compliance monitoring at the entry point to the distribution system.
6. Begin investigation sampling at Well #6.
7. Locate a source of bottled water to supply nonresidential customers with a long-term supply of bottled water for individuals who can't boil their water.
8. In concert with DOH, begin work on corrective action plan to provide or confirm 4-log virus treatment of the source.

E. coli-Present Triggered Source Sample Response Plan – Sources 09, 10, & 11

If we have *E. coli* in Sources 09, 10, and 11 water we will immediately:

1. Call DOH.
2. Shut down sources S09, S10, and S11.
3. Distribute required notice to direct service customers. The notice will include water curtailment instructions to stop outdoor watering.
4. Increase chlorine dose to achieve at least 1.5 mg/L at the entry point to the distribution system.
5. Begin compliance monitoring at the entry point to the distribution system.
6. Begin investigation sampling at Wells #7, #8, and #9.
7. Locate a source of bottled water to supply nonresidential customers with a long-term supply of bottled water for individuals who can't boil their water.
8. In concert with DOH, begin work on corrective action plan to provide or confirm 4-log virus treatment of the source.

E. coli-Present Triggered Source Sample Response Plan – Source 13

If we have *E. coli* in Source 13 water we will immediately:

1. Call DOH.
2. Call Clark Public Utilities.
3. Shut down source S13.
4. Distribute required notice to direct service customers. The notice will include water curtailment instructions to stop outdoor watering.
5. Locate a source of bottled water to supply nonresidential customers with a long-term supply of bottled water for individuals who can't boil their water.
6. Wait to receive all clear from DOH and CPU before restarting source.

Attachment A
Coliform Sample Sites Map

Tukes Mountain Res. No. 1
0.25 MG
Overflow Elev: 529'
Height: 35'

Tukes Mountain Res. No. 2
0.18 MG
Overflow Elev: 529'
Height: 50'

Tukes Mountain Res. No. 3
0.17 MG
Overflow Elev: 529'
Height: 45'

Tukes Mountain Res. No. 4
0.15 MG
Overflow Elev: 529'
Height: 40'

Tukes Mountain Res. No. 5
1.03 MG
Overflow Elev: 529'
Height: 38'

CPU Intertie
NE 219th St
(2,000 gpm)

NE 219th St BPS

Tukes Mountain BPS

Well No. 9
(500 gpm)

Well No. 6
(Offline)

Wells No. 1 and No. 2
(190 and 90 gpm)

Wells No. 4 and No. 5
(60-70 gpm each)

Wells No. 7 and No. 8
(Offline)

Horsethief Reservoir
2.06 MG
Overflow Elev: 296'
Height: 31'

Horsethief Pump Station

CPU Intertie
NE 122 Ave
(547 gpm)
(Emergency)

East Fork Lewis River
Mill Creek
Woodin Creek
Salmon Creek

DAYBREAK
CAPTAIN STRONG
CHIEF UMTUCH
BATTLE GROUND HS
MAPLE GROVE
RIVER HOMELINK

NE 249th St
NE 244th St
NE 239th St
NE 219th St
NE 199th St
NE 189th St
NE 159th St
NE 154th St
W Main St
SE Eaton Blvd
SW 40th St
NE 10th St
NW 25th St

NE 147th Ave
NE Axford Rd
NE 152nd Ave
NE 142nd Ave
NE 132nd Ave
NE 122nd Ave
NE 112th Ave
NE 92nd Ave
NE Manley Rd
NE Lewisville Hwy
NW 20th Ave
NW 10th Ave
N Parkway Ave
S Parkway Ave
NE Grace Ave
SE Grace Ave
SW 20th Ave
NE 167th Ave
NE 117th Ave
NE Caples Rd

Legend

- Wells
- Intertie
- Pump Station
- Reservoir

Pressure Zones

- 529 Zone (Main)
- 784 Zone (Tukes Mountain)

Planning Boundaries

- City Limits
- Urban Growth Area
- Retail Service Area
- Future Service Area

LEGEND
- Sampling Site

J:\DATA\BTLG\20-0092\GIS\COLIFORM_SITES.MXD BY: ZSCHREMPP PLOT DATE: NOV 9, 2021 COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON SOUTH FIPS 4602 FEET

RH2

NORTH

1 inch = 1,000 feet

0 500 1,000 2,000 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2”

Coliform Sample Sites Map

City of Battle Ground Water System Plan

Vicinity Map



Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community

This map is a graphic representation derived from the City of Battle Ground Geographic Information System. It was designed and intended for the City of Battle Ground staff use only; it is not guaranteed to survey accuracy. This map is based on the best information available on the date shown on this map.

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Appendix K

Wellhead Protection Plan

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PACIFIC groundwater GROUP

CITY OF BATTLE GROUND
WELLHEAD PROTECTION PLAN
2012 UPDATE

March, 2013

CITY OF BATTLE GROUND
WELLHEAD PROTECTION PLAN
2012 UPDATE

Prepared for:

City of Battle Ground
109 SW 1st ST, STE 122
Battle Ground, WA 98604
http://www.cityofbg.org/

Prepared by:

Pacific Groundwater Group
2377 Eastlake Avenue East, Suite 200
Seattle, Washington 98102
206.329.0141
www.pgwg.com

March 18, 2013
JM9904.15
BG WHP 2012 Final.doc

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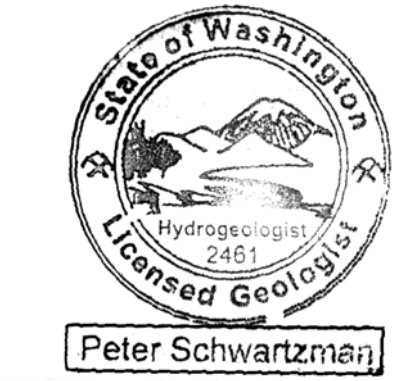
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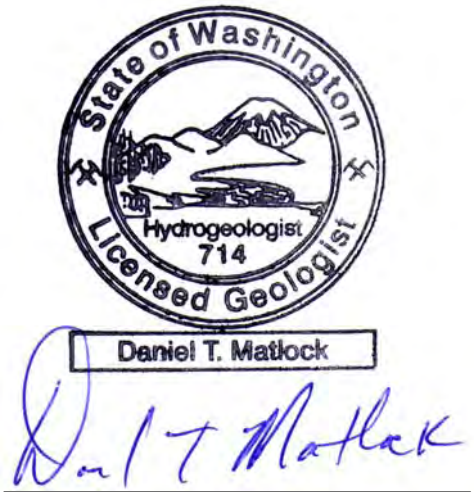
Appendix A: Documentation of Notifications

SIGNATURE

This report, and Pacific Groundwater Group's work contributing to this report, were reviewed by the undersigned and approved for release.



Peter Schwartzman
Principal Hydrogeologist
Washington State Hydrogeologist #2461



Dan Matlock
Principal Hydrogeologist
Washington State Hydrogeologist #714

1.0 EXECUTIVE SUMMARY

The City of Battle Ground has updated its wellhead protection plan (WHPP), which was originally issued in 2000. The purpose of the plan is to help prevent the City's groundwater supply sources from becoming contaminated, and to develop contingency and emergency response procedures in case one or more sources is lost because of contamination. The plan meets the requirements of Washington Administrative Code (WAC) 246-290-135(3). Work for this project included:

- Characterizing the hydrogeology of the Battle Ground area to identify aquifers that supply water to the City's wells and aquitards that protect water supplies from near-surface contamination;
- Updating groundwater quality characterization for the City's supply wells based on data managed by Washington Department of Health (WDOH);
- Updating delineation of wellhead protection area (WHPA) capture zones for select supply wells. WHPA capture zones were previously defined for some wells by the Clark County Water Quality Division;
- Updating inventories of confirmed and potential sources of contamination, particularly those that lie within the wellhead capture zones, and evaluating the risks associated with these sources;
- Updating contingency planning for provision of water supplies in case one or more wells are impacted by contamination and emergency response planning for spills that might affect the well sources; and,
- Updating implementation strategies to educate the public and manage the contaminant sources in the Battle Ground area.

The findings and recommendations of this work are discussed below.

1.1 FINDINGS

The City of Battle Ground currently owns eight wells that supply water to the municipality. Four of these (Wells 1, 2, 4, and 5) produce water from a shallow aquifer and four (Wells 6, 7, 8 and 9) produce water from a deeper aquifer. Groundwater withdrawals from the deep wells are emphasized because their yields are significantly higher than those of the shallow wells. In addition, the City also obtains backup supplies from an intertie with Clark Public Utilities (CPU). Intertie capacity will be increasing over the next 20 years.

1.1.1 Hydrogeology and Existing Water Quality

The major hydrogeologic units in the area include sediments deposited by modern rivers and by the ancient Columbia River. The Upper Troutdale and Sand and Gravel Aquifer (SGA) form the primary aquifers in the region. The SGA, a deep aquifer, is overlain by the fine-grained sediments of the Lower Confining Unit and, in some areas, the Upper Confining Unit. These two aquitards limit the movement of contaminants to the SGA from the surface and overlying aquifers. Consequently, wells completed in this unit are better protected from the threat of contamination.

Groundwater flows in the shallow Upper Troutdale Aquifer (QTu) is to the west-southwest in the study area, which covers 41 square miles surrounding Battle Ground. Groundwater discharges to features such as Salmon Creek and the East Fork of the Lewis River after traveling laterally from the upland areas, where much of the recharge occurs. The Columbia River serves as a primary discharge point for the deeper SGA system.

In general, the quality of groundwater from the City wells is good. In 1998, a few volatile organic compounds (VOCs) were detected in Wells 1 and 2, which are completed in the QTu. However, concentrations were well below drinking-water standards, and these compounds have not been detected in recent analyses. These historical detections may have been related to nearby contaminant sources along Main Street. The City monitors VOCs in these wells annually and biannually in all other wells.

In addition, iron and manganese exceedences have been noted in all of the City's wells, as is common for many areas of Clark County. Iron and manganese concentrations in the City's deeper (SGA) wells are sufficiently high to require treatment. Although these constituents do not threaten public health, they exceed secondary Maximum Contaminant Levels, which are based on aesthetic considerations.

1.1.2 Wellhead Protection Area Delineations

WHPA capture-zone delineations were prepared by Clark County and Pacific Groundwater Group for the City's wells. These delineations represent the extent of the capture zone for each well under average pumping conditions. Capture zones were defined for 0.5, 1, 5 and 10 year travel times within the groundwater flow system. The capture zones are represented in two-dimensions, and additional travel time is required for contaminants to travel from the land surface to the production aquifer, particularly for the City's SGA wells. PGG connected the capture zones for multiple wells to define "extended capture zones" and defined a 1000-foot buffer around the 10-year capture zone to compensate for possible inaccuracies in the locations of sites of potential groundwater contamination.

1.1.3 Contaminant Inventory

A range of potential contaminant sources was inventoried using a Geographic Information Systems (GIS) approach. Potential sources associated with land-use activities and septic system locations were identified based on data from Clark County, and potential sources associated with environmental sites and facilities using/storing hazardous materials were identified based on data from Washington Department of Ecology (Ecology). City staff also performed a windshield survey to identify possible activities on "parcels of concern" where land-use categories could include potential sources of contamination.

PGG ranked the priority of land-use parcels of concern based on contamination potential. The highest ranked parcels were associated with facilities with gasoline pumps and tanks, dry cleaners, car washes and auto parts dealers. Other facilities that could potentially contaminate groundwater but were outside the 5-year capture zone (e.g. car repair, gasoline pumps, etc) were assigned lower priorities. A few septic systems lie within the 1- and 5-year extended capture zones for the SGA wells. These septic systems should not pose a significant risk to these deep groundwater sources.

Ecology's database showed the occurrence of state cleanup sites under the State Model Toxics Control Act (MTCA), hazardous waste generators, underground storage tanks and leaky underground storage tanks (USTs and LUSTs), dairies, enforcement sites and stormwater generating operations within the capture zones. Within the capture zones there are 14 cleanup sites, 11 sites associated with hazardous materials, 14 sites associated with UST, 10 sites associated with LUST, and 1 stormwater site. PGG ranked cleanup sites as highest concern. Among the 14 cleanup sites, 3 are reported as requiring no further action and 2 are reported as cleaned up under MTCA, and 3 are located within defined 1-year capture zones.

Other potential sources of contamination include transportation-related spills along SR-502 and SR-503, and unused and improperly constructed wells.

The City will notify all owners/occupants of parcels and sites of concern that they are within WHPA capture zones and will notify the agencies regulating these parcels/sites of the potential contaminant inventory. Per WDOH wellhead protection guidance, the City should update its contaminant inventory every 2 years.

1.1.4 Source-Loss Analysis

A source-loss analysis completed for the Battle Ground wells indicates that the City has the ability to manage both short and long-term losses to the system. The system would be most impacted if Wells 7, 8 or 9 were taken off line, since they are the City's primary sources. Loss of these sources during high water demand months could lead to short-term rationing to achieve demand reductions of up to 23 percent, while the City either corrects an equipment failure or drills an additional well.

1.2 RECOMMENDATIONS

The following recommendations are based on the results of work completed for wellhead protection planning. These implementation strategies focus on public education, contaminant source management, monitoring, data management, and land use and regulatory controls. Wellhead protection can also be effected by coordination with other regional agencies and by emergency response and contingency planning, as discussed below.

1.2.1 Public Education and Technical Assistance

Strategies for public education include: increasing awareness and providing technical assistance for entities using hazardous materials within WHPAs, developing school programs and other educational materials for City residents (e.g. Annual Water Quality Report).

1.2.2 Contaminant Source Management

Businesses within designated WHPAs should be inventoried every two years to assess potential contaminant sources and waste handling practices. USTs that were not identified through this study should also be inventoried, including residential home heating oil USTs. Other strategies for managing possible contaminant sources include: encouraging Ecology to expedite cleanup actions; encouraging inspection of hazardous waste generators; reviewing stormwater management practices to identify areas of concern for groundwater quality; and encouraging residents to connect to sewer systems where possible. The City should request and/or encourage the cooperation of agencies such as Ecology and the Southwest Washington Health Department (SWWHD).

1.2.3 Monitoring and Data Management

Water-quality and other data that could assist in wellhead protection should be collected via cooperative programs with Clark County, CPU, and SWWHD and reviewed. These data should then be integrated into a database management system.

In addition to continuing with annual sampling for VOCs in Wells 1 and 2, the City may want to identify domestic wells for additional monitoring in high-risk areas.

1.2.4 Land Use and Regulatory Controls

Strategies related to land-use and regulatory controls include encouraging and supporting County ordinances related to wellhead protection and water quality, including Clark County's Critical Aquifer Recharge Areas (CARA) ordinance (Chapter 13.70) and Clark County's Water Quality ordinance (Chapter 13.26A).

1.2.5 Regional Coordination

The City should continue to communicate with other purveyors in Clark County to coordinate WHP planning activities and water-supply planning and development issues such as contingency planning and expansion of interties.

1.2.6 Planning Strategies

Developing strategies for emergency response and contingency planning is essential to wellhead protection. Such strategies include notifying emergency response organizations on the location of WHPAs, establishing communication protocols with first-responders, and preparing a contingency plan that covers short- and long-term responses if one or more sources are lost.

Given that source-loss analysis indicates that there will be times over the next 20 years when existing interties are insufficient to offset impacts to total system capacity if certain well sources are lost, the City may want to consider planning for installation/development of backup wells. Should backup wells be constructed, we recommend targeting the (deep) SGA aquifer due to its greater degree of inherent protection from contamination introduced to the land surface, its consistently higher well yield, and because current capacity is 300 gpm less than existing water-right allocations

2.0 INTRODUCTION

This document provides an update to the City of Battle Ground's Wellhead Protection Plan (WHPP) which was prepared in 2000 (PGG, 2000). The updated WHPP has been prepared to meet requirements of Washington Administrative Code (WAC) 246-290-135, which mandates that purveyors of water systems using groundwater sources shall develop and implement a wellhead protection program. The goal of such a program is to prevent these sources from becoming contaminated. This updated WHPP was prepared according to the Washington State Department of Health's Wellhead Protection Program Guidance Document (WDOH, 2010). The WHPP must contain, at a minimum, the following elements:

- Wellhead capture zone delineations for the 6-month, 1-, 5-, and 10-year times-of-travel for each water-supply source based on a WDOH-approved method;
- An inventory of known and potential contaminant sources ranked for groundwater contamination hazard;
- Documentation that the City has notified owners and operators of known and potential contaminant sources/sites, as well as the regulatory agencies and local governments that regulate these sources/sites;
- Contingency plans for alternative sources of drinking water if any of the primary sources become threatened;
- Documentation that the City has coordinated with emergency spill responders regarding WHP areas, the contingency plans, and other results of this WHP investigation

2.1 SCOPE

This report covers wellhead protection measures for Wells 1, 2, 4, 5, 6, 7, 8 and 9, which supply water for the City of Battle Ground. Work for this WHP assessment included:

- Characterizing the hydrogeology of the Battle Ground area to identify aquifers that supply water to the City's wells and aquitards that protect water supplies from near-surface contamination;
- Updating groundwater quality characterization for the City's supply wells based on data managed by Washington Department of Health (WDOH);
- Updating delineation of wellhead protection area (WHPA) capture zones for select supply wells. WHPA capture zones were previously defined for some wells by the Clark County Water Quality Division;
- Updating inventories of confirmed and potential sources of contamination, particularly those that lie within the wellhead capture zones, and evaluating the risks associated with these sources;
- Updating contingency planning for provision of water supplies in case one or more wells are impacted by contamination and emergency response planning for spills that might affect the well sources; and,
- Updating implementation strategies to educate the public and manage the contaminant sources in the Battle Ground area.

In accordance with WDOH requirements, the City of Battle Ground has completed and submitted wellhead susceptibility forms for all its water supply sources. Some of these forms will be updated in the near future.

2.2 STUDY AREA PHYSIOGRAPHIC FEATURES

The WHP study area is shown on **Figure 1**. It covers about 39 square miles surrounding the City of Battle Ground. The northern portion of the study area lies within the East Fork Lewis River basin and the southern portion lies within the Salmon Creek basin. The major population center is concentrated in Sections 34 and 35 of T.3 N., R.2 E., and Sections 1 and 2 of T.3 N., R.2 E. The study area extends as far south as the community of Meadow Glade.

The central part of the study area slopes gently to the southwest and ranges in elevation from about 260 to 310 feet above mean sea level (msl). Tukes Mountain lies directly to the northeast of the City and attains an elevation of more than 620 feet. Woodin (Weaver) Creek, a tributary of Salmon Creek, is the principal surface-water drainage in the Battle Ground area; its headwaters lie in the northern part of the City. The upper reaches of Mill Creek drain the western portion of the study area.

2.3 CLIMATE

Battle Ground lies in the central portion of Clark County, which has a marine warm-temperate climate, with relatively warm, dry summers, and typically mild, rainy winters. Approximately 75 percent of the total annual precipitation occurs from October through March; the remaining 25 percent occurs from April through September (Mundorff, 1964). Average annual precipitation at Battle Ground was about 52.6 inches for the 30-year period from 1981 through 2010 (http://www.wrcc.dri.edu).

2.4 WATER-SUPPLY SOURCES

The City of Battle Ground depends entirely on groundwater to meet the water demands of approximately 16,710 residential customers and 2,500 non-residential customers at 5,923 connections. Groundwater is withdrawn at an average rate of about 945 gpm (1.36 mgd) from eight water-supply wells based on historic 2004-2011 water use, and the rated capacity of these sources totals 1,660 gpm (2.39 mgd) (**Table 1**). The locations of these supply wells are shown on **Figure 1**. Construction details and other pertinent data for Wells 1, 2, 4, 5, 6, 7, 8, and 9 are presented on **Table 2**.

Wells 1, 2, 4, and 5, the "shallow wells", are less than 150 feet deep. These wells were constructed in the 1950s and 1970s and have limited capacities — less than 200 gpm. Wells 6, 7, 8 and 9, the "deep wells", were constructed between 1995 and 2004 and range from 299 to 438 feet deep. Original testing of the wells showed capacities ranging from 350 to 1000 gpm; however, current well capacities are somewhat lower due to partial clogging of the well screens with iron bacteria. The original well capacity estimates are summarized on **Table 2** whereas current operational capacities are summarized on **Table 1**.

Wells 7, 8 and 9 have the largest capacities and are used the most extensively. In addition to their production wells, the City of Battle Ground obtains water for peaking from a 500-gpm capacity intertie with Clark Public Utilities (CPU). The intertie also functions as an emergency source. The City is developing a new intertie with CPU that will replace the current intertie in 2013 and will have an initial capacity of 1,000 gpm. Improvements to this new intertie are available that would increase its capacity to 1,750 gpm (slated for 2017) and ultimately to 3,000 gpm (estimated for 2021). A summary of the City's interties is presented on **Table 3**.

3.0 HYDROGEOLOGIC FRAMEWORK

The regional geology of Clark County is commonly divided into older rocks and younger sediments (which are semiconsolidated or unconsolidated). The older rocks crop out in the foothills and mountains in the north and east portions of the County but occur at depths greater than 600 feet in the Battle Ground area. The sediments crop out on the terraces and plains that cover most of the study area and contain the principal aquifers. The sedimentary units, from youngest to oldest, consist of:

- Recent alluvial deposits
- Pleistocene alluvial deposits
- Troutdale formation

These units are described below and shown on Hydrogeologic Cross Section A-A′ (**Figure 2**). Surface outcrops for these units are shown on **Figure 1**, along with the location of the cross section. In addition to the sedimentary and older bedrock units, the Boring lava, a relatively young bedrock unit, crops out near Battle Ground.

All of the coarse-grained sedimentary units described below form the prevalent aquifers beneath Clark County.

3.1 RECENT ALLUVIAL DEPOSITS

Alluvial deposits occur in the study area along the rivers and streams. They include:

- Alluvial fans
- Terrace deposits
- Recent alluvium

The alluvial fans, terraces, and basin-fill deposits were deposited by tributaries of the Columbia River, which include the east Fork of the Lewis River and Salmon Creek. These sediments interfinger with the Pleistocene alluvium of the ancestral Columbia River.

The alluvial fans are coarse and gravelly in the terraces and at their apexes, but grade to fine sands and silts at their margins. One of the largest fans in Clark County occurs near Battle Ground.

Terraces occur along the stream channels upstream of the fans. The terraces north of Battle Ground along the East Fork of the Lewis River are generally much coarser than the alluvial fans, comprising very coarse gravel in a sandy matrix.

Within the Battle Ground study area, the Recent alluvium is confined to the floodplains of the East Fork of the Lewis River and Salmon Creek. It forms a thin veneer over the Troutdale formation and Pleistocene alluvial deposits. The alluvium typically consists of coarse sand and gravel along the lower portions of Salmon Creek and the East Fork of the Lewis River.

The Recent Alluvium contains a shallow, highly productive aquifer along streams such as the East Fork of the Lewis River and communicates hydraulically with these streams. Well yields from the aquifer can be relatively high, ranging between 500 and 1,000 gpm, although this aquifer is not a major supply source near Battle Ground.

3.2 PLEISTOCENE ALLUVIAL DEPOSITS

During Pleistocene time, the ancestral Columbia River deposited a great deltaic fan emanating from the Gorge because of a series of catastrophic events known as the "Missoula floods." The resulting alluvium is exposed on broad plains and terraces in the southwestern part of Clark County. It crops out in the southern third of the study area. The deposits are only 20 to 40 feet thick in the Battle Ground area, where they comprise primarily silt and clay according to local driller's logs.

The Pleistocene alluvial deposits form a highly permeable, productive aquifer in the southern part of Clark County, yielding more than 1,000 gpm to wells located in and near the cities of Vancouver, Camas, and Washougal. In the Battle Ground area, the deposits are too fine-grained and thin to yield significant quantities of water, and the aquifer is used solely for domestic purposes. In addition, only the lower few feet of the deposits are saturated in some areas, resulting in small well yields.

3.3 BORING LAVA

The Boring lava consists of fine-grained, vesicular basalt of Pliocene and early Pleistocene ages. The lava generally overlies the Troutdale formation, although evidence suggests simultaneous deposition. It crops out north and east of Battle Ground. Battle Ground Lake, a popular recreational site, lies in the crater of an old lava vent. The Boring lava forms a minor aquifer that can be productive within pyroclastic deposits and vesicular, scoriaceous interflow zones.

3.4 TROUTDALE FORMATION

The Troutdale formation underlies the Pleistocene alluvial deposits and comprises unconsolidated and semiconsolidated clay, silt, sand, and gravel. The unit crops out along the East Fork of the Lewis River, around Tukes Mountain, and in some areas west of town. The Troutdale formation contains three coarse-grained units that are separated by finer-grained confining units. The coarse units are:

- Upper Troutdale
- Lower Troutdale
- A deeper sand and gravel unit known as the "SGA"

These are the principal aquifers in the study area and their geologic characteristics are discussed below. The Upper Confining Unit separates the Upper and Lower Troutdale Aquifers, and the Lower Confining Unit separates the Lower Troutdale Aquifer and the SGA. The Upper Troutdale and SGA supply most of the groundwater in the Battle Ground area.

3.4.1 Upper Troutdale

The Upper Troutdale comprises the upper 100 feet of the Troutdale formation in the Battle Ground area. It consists of gravel in a matrix of coarse sand and silt, and includes sand lenses and stringers. The unit is often cemented. The Upper Troutdale appears to be continuous and underlie all of the study area.

The Upper Troutdale forms what has historically served as the most productive and important aquifer in the study area. The base of the aquifer lies between 80 to 150 feet msl in the Battle Ground vicinity. Despite its cementation, the Upper Troutdale Aquifer is permeable enough to produce high well yields in the

southern part of Clark County. In the Battle Ground area, however, yields from the Upper Troutdale are relatively low. Wells 1, 2, 4, and 5 only produce a few hundred gpm.

3.4.2 Upper Confining Unit

The Upper Confining Unit consists of fine sand, silt, and clay. It is typically about 50 feet thick and separates the Upper and Lower Troutdale in the western half of the study area. The unit may be absent in the eastern portion of the study area.

3.4.3 Lower Troutdale

Like the Upper Confining Unit, the Lower Troutdale is not continuous in the study area. The unit consists mostly of fine sand and typically attains thicknesses of about 50 to 80 feet where it has been penetrated by wells near Battle Ground. The Lower Troutdale occurs in the western portion of the study area but pinches out before reaching Well 6.

The Lower Troutdale Aquifer supplies many wells throughout Clark County, yielding from 300 to 1,000 gpm. The aquifer is not important in the Battle Ground area, however, because it does not contain sufficient coarse-grained zones and it is not continuous enough to produce significant quantities of water.

3.4.4 Lower Confining Unit

The Lower Confining Unit consists of fine sand, silt, and clay. It is typically on the order of about 50 feet thick in the study area, where it appears to be continuous between the Lower Troutdale and the SGA. The surface of the Lower Confining slopes to the west-southwest.

3.4.5 Sand and Gravel (SGA)

A deep sand and gravel unit (the "SGA") lies beneath the Lower Confining Unit. It has been identified along the Sandy River in Oregon, at the City of Portland wellfield, at Ellsworth Springs, at Vancouver's Well Station 7, and at the Vancouver fish hatchery. Logs for deep wells in the Meadow Glade and Pioneer vicinities indicate that the SGA probably extends continuously from the Portland wellfield to the East Fork of the Lewis River (Pacific Groundwater Group, 2008). The unit consists predominantly of fine- and fine-to-medium sand, with local lenses of silty sand and clay. It also contains sand and gravel horizons in the southern part of the county. This unit is on the order of 150 to 200 feet in thick in the Battle Ground vicinity.

The SGA supplies water to Wells 6, 7, 8 and 9, Battle Ground's most productive sources, which have yielded up to 1,000 gpm of water. This aquifer dips to the west-southwest. Its base is estimated to lie at elevations between about 50 feet above msl and 300 feet below msl in the study area.

3.5 UNDIFFERENTIATED FINE-GRAINED UNIT

Undifferentiated fine-grained sediments underlie the SGA. These sediments consist mostly of silt and clay. In the Battle Ground area, the unit ranges in thickness from about 200 to more than 420 feet at Wells 7, 8, and the Keyser Nursery well. The undifferentiated fine-grained sediments overlie the older bedrock.

3.6 BEDROCK

Older bedrock crops out in the foothills and mountains in eastern and northern portions of Clark County and underlies the sedimentary deposits in the Battle Ground area. The rocks range from Miocene to Eocene age. They are primarily igneous in origin and include andesite, basalt, granodiorite, pyroclastics (breccia, tuff, and agglomerate), conglomerate, and shale. The rocks occur at depths of 500 feet or more in the study area and are generally hard and compact because of Miocene deformation.

The older bedrock units generally form poor aquifers because their permeability is low. Small domestic yields can be obtained in many areas where wells intercept fractures. Reasonable yields are possible where fractures are abundant and unobstructed, although such yields are not common or expected.

3.7 GROUNDWATER FLOW

Groundwater in the study area occurs under unconfined, semiconfined, and confined conditions. Unconfined conditions are observed in shallow aquifers such as the Pleistocene and Recent Alluvium. Semiconfined conditions occur in the cemented portions of the Upper Troutdale Aquifer, and confined conditions occur in the Lower Troutdale Aquifer and the SGA.

Groundwater flow patterns in the shallow aquifers are reasonably well defined because water-level data are relatively abundant. Groundwater elevations in the study area range from about 300 feet msl in the eastern portion (along the foothills) to about 200 feet near Meadow Glade. Water-level contours for the Upper Troutdale are presented in **Figure 1**; these contours are based prior wellhead protection characterization performed by Swanson (1995). The illustration shows that groundwater in the aquifer generally flows from the northeast to southwest. Regional groundwater flow patterns are influenced by the major drainages in the area, which include Salmon Creek and the East Fork of the Lewis River.

Water levels and groundwater flow within the SGA are poorly defined since only a few wells are completed in this aquifer. Groundwater elevations within most of the SGA wells are typically around 75 feet msl in the study area, and flow is generally to the west-southwest, based on water levels measured in local wells. Groundwater movement is influenced by regional drainage features such as the Columbia River and the lower portions of the East Fork of the Lewis River. PGG estimated a southwestern groundwater flow direction (-160 degrees relative to east, as shown on **Figure 1**) and a hydraulic gradient of 0.018 ft/ft based on water-level data from Battle Ground Wells 7, 8, TW-1, and TW-2, CPU's Well 32 and the Keyser Nursery well.

4.0 WATER QUALITY

The City of Battle Ground collects samples from its supply wells to ensure compliance with WDOH drinking-water requirements. Sampling frequencies, exceedances, and treatment of water from these wells are discussed below.

4.1 SAMPLING FREQUENCIES

WDOH provides a water-quality monitoring report to the City in October of each year. This report identifies the City's requirements for compliance monitoring. WDOH requires that the City collect inorganic compound (IOC) samples annually. Volatile organic compound (VOC) sampling is required annually in Wells 1 and 2; and every two years in Wells 4, 5, 6, 7, 8, and 9.

The City must test annually for nitrate levels and once every 4 years for radionucleides. Battle Ground is currently operating under a sampling waiver for semivolatile organic compounds (SOCs) which expires in 2013.

4.2 EXCEEDANCES

Water from the City's wells is of good quality and that it meets all primary State and Federal drinking water standards. PGG reviewed reported water-quality standard exceedences reported on the WDOH database and water-quality data from other sources. Exceedences and detects are summarized below:

4.2.1 Iron and Mangenese

The Sentry database indicates that Wells 1, 2, 4, 5, 6, 7 and 8 have exceeded the secondary MCL for iron (0.3 mg/l) and Wells 1, 2, 6, 7 and 8 have exceeded the secondary MCL for manganese (0.05 mg/l). The exceedences in Wells 1 and 2 were noted in 1995, were only slightly above MCL's, and have not continued in recent years. Although these metals do not pose a threat to public health, they are considered "nuisance constituents" since they tend to stain laundry and plumbing fixtures. Although not listed in the Sentry Database, Well 9 also exhibits elevated iron and manganese.

The City treats water from Wells 6, 7, 8 and 9 using a filtration method at Wells 7, 8 and 9 and a sequestering agent at Well 6. The filtration system at Wells 7, 8 and 9 features twelve 4-foot-diameter tanks that are configured into two separate filtration units of six tanks each. Each tank contains 3 feet of pyrolusite media. Depending on the demand for water, one or both of the filtration units may operate. Chlorinated water from Well 6 is treated with sodium silicate, a sequestering agent, to help reduce the effects of high levels of iron and manganese, which discolor water as they are oxidized by air or chlorine. Sequestering agents help prevent iron and manganese from precipitating in the water distribution system.

4.2.2 Volatile Organic Compounds

Annual and semi-annual sampling for VOC's have generally shown no detections; however, detections were encountered for a short duration approximately 15 years ago. Specifically, low concentrations of the following VOCs were detected in Well 1 in June 1998:

- Trichloroethylene (TCE) - 1.1 ppb
- Perchloroethylene (PCE) - 0.8 ppb
- 1,2,3-trichlorobenzene - 4.0 ppb

The Maximum Contaminant Level (MCL) for TCE and PCE is 5 ppb. Since 1,2,3-trichlorobenzene is unregulated, there is no MCL for this compound. These detections were believed to be related to nearby contamination sources along Main Street (PGG, 2000), which are now remediated.

5.0 WELLHEAD PROTECTION AREA DELINEATIONS

This section documents the methods used to delineate wellhead protection areas (WHPA's) and presents the results of the delineation analyses. Analytical modeling methods, developed based on PGG's understanding of the groundwater flow system, were used to delineate WHPA's. These methods are consistent with recommendations in WDOH's Wellhead Protection Guidance and with prior delineations based on existing susceptibility assessments of the City's wells. Also, as recommended in the WDOH Guidance, this section includes consideration of vertical components of potential contaminant transport pathways

WHPA delineations for Battle Ground's older wells (Wells 1, 2, 4 and 5) are based on analytical modeling work completed for a County-wide project by the Clark County Water Quality Division (Swanson, 1995). These delineations are considered to be conservative in that they likely overestimate WHPA sizes, since pumping at the older wells has reduced over recent years and is not expected to increase back to older rates. Analytical modeling was also used to generate new delineations for Wells 6, 7, 8 and 9.

Time-related "capture zones" were estimated for each supply well for 6-month and 1-, 5- and 10-year travel times. A capture zone is the area that supplies groundwater recharge to a pumping well—in other words, its "zone of contribution." In natural systems, capture zones are not circular but elongated, with most capture occurring from areas that lie upgradient of the wellhead. Each capture zone has a stagnation point—the maximum "point of capture" downgradient of the wellhead. A time-related capture zone is the area that supplies groundwater recharge to a pumping well within a specified period. The capture zone encompasses portions of the aquifer that surround the well.

Capture zones are defined in two dimensions within the aquifer in which the well is completed. Mapped capture zones are projections of capture areas defined within the completion aquifer up to the land surface. It should be recognized that additional travel time is often required for contaminants originating at the land surface to reach completion aquifers. This is particularly true for deep aquifers, where downward vertical transport can take decades or centuries.

Time-related capture zones provide a basis for developing monitoring plans, land-use inventories, and data collection plans. They are used in conjunction with the results of the aquifer vulnerability assessment.

5.1 CAPTURE ZONE ANALYSIS METHODS

Wells 1, 2, 4 and 5 are completed in the Upper Troutdale Aquifer. Swanson (1995) developed WHPA delineations with the EPA's "WHPA" model (EPA, 1991). The WHPA model is widely used for this purpose because it suits many hydrogeologic settings. The simpler WHPA module was used, which assumes a confined aquifer of infinite aerial extent, a uniform hydraulic gradient, and uniform transmissivity (i.e. the product of thickness and hydraulic conductivity). PGG updated the WHPA delineations prepared by Swanson by adding 6-month capture zones within the 1-year capture zones. The 6-month capture zones were assumed to have roughly the same shape and orientation as the 1-year capture zones, but were scaled to the volume of water captured over a 6-month pumping period using comparative fixed radius calculations. Given the close proximities between Wells 1 and 2 (60 feet apart) and between Wells 4 and 5 (50 feet apart), Swanson treated each well pair as a single pumping location (or wellfield).

Wells 6, 7, 8 and 9 are completed in the SGA. Capture zones for these wells were delineated using "GFLOW", a two-dimensional analytical element model (Haitjema, 2007). GFLOW also assumes steady-state conditions where flow rates, pumping stresses, and head gradients are in continuous equilibrium. It assumes an aquifer with constant thickness, infinite aerial extent, a uniform head gradient, and a uniform transmissivity. All wells were simulated as pumping simultaneously, such that capture zones are affected by pumping from neighboring wells. Given the close proximity of Wells 7 and 8 (25 feet), these wells were modeled as a single pumping location (wellfield).

Input to the models for the SGA wells included the following parameters:

- Pumping rate
- Aquifer transmissivity
- Aquifer porosity
- Hydraulic gradient and flow direction

Pumping rates modeled for the SGA wells were set to the 2004-2011 average withdrawals (Well 6: 112 gpm; Wells 7 and 8: 397 gpm, Well 9: 147 gpm).

Aquifer transmissivity was set to 10,600 ft^2/day based on an aquifer thickness of 100 feet and a hydraulic conductivity of 106 ft/day. The hydraulic conductivity was derived from values obtained from testing Wells 6, 7, and 8. The aquifer thickness was derived from drillers and/or lithologic logs and hydrogeologic cross-sections, and generally includes all significant water-bearing media encountered in the well while drilling through the aquifer. A constant aquifer porosity of 0.20 was used for the entire modeling analysis.

Since reliable water level data for the SGA are limited, water-level contour maps have not been developed for this system (Section 3.7). Based on water levels in local wells, PGG estimated a flow direction of -160 degrees (relative to east) and a hydraulic gradient of 0.018 ft/ft as input to the model.

GFLOW simulates pumping water levels and drawdowns in the completion aquifer. Based on estimated groundwater flow patterns, GFLOW employs particle tracking routines to trace groundwater flow patterns upgradient from the pumping well. PGG delineated capture zones within GFLOW by plotting out particle traces associated with specified travel times within the aquifer (e.g. 0.5, 1, 5 and 10 years).

5.2 CAPTURE ZONE DELINEATIONS

The results of the capture-zone analysis are shown on **Figure 3** and discussed below. In addition to the calculated capture zones, PGG included supplemental buffers around the capture zones. These buffers add an additional factor of safety to the risk assessment presented in Section 6.

Figure 3 shows calculated capture zones for wells completed in both the Upper Troutdale Aquifer (1, 2, 4 and 5) and the SGA (6, 7, 8, 9). Capture zones for the Upper Troutdale Aquifer Wells were estimated by Swanson (1995), with supplemental 6-month capture zones developed by PGG. Capture zones for each Upper-Troutdale pumping center are mapped with solid fill. Capture zones for the SGA wells were estimated based on particle traces defined with GFLOW. Modeled particle traces are segregated by travel time by color on **Figure 3**.

Buffers were created between wells by expanding the boundaries of calculated capture zones where these capture zones approached one another. **Figure 3** shows how the various calculated 0.5-, 1-, 5- and 10-year capture zones were expanded to create "extended capture zones". In addition, PGG added a 1000-foot buffer around the extended 10-year capture zone to compensate for possible inaccuracies in the locations of sites identified as having potential to contaminate groundwater, as described in Section 6.

It is again worth noting that the capture zones shown on **Figure 3** are defined for the aquifers in which the wells are completed. Actual travel times from the land surface to the capture zones associated with (deep) SGA wells will be significantly longer than travel times defined within the aquifer itself. Although wells completed in the Upper Troutdale Aquifer are shallower than SGA wells, additional travel time is also required for contaminants to migrate from the land surface through the silt/clay Pleistocene Alluvial Deposits to this aquifer.

6.0 RISK ASSESSMENT

Contaminant sources that overlay the capture zones for Battle Ground's wells were investigated and mapped using three databases that were imported into the project GIS. Data regarding land-use and septic system locations (per zoning parcel) were obtained from Clark County and data regarding environmental sites and facilities using/storing hazardous materials were obtained from Department of Ecology. The three databases were plotted in the project GIS was used to assess whether existing and potential contaminant sources were located within the capture zones for Battle Ground's wells.

Once parcels and sites of concern were mapped in the project GIS, PGG provided these maps and associated lookup tables to the City of Battle Ground. City staff performed a windshield survey to confirm the parcels/sites identified by PGG and look for other sites that may not have been included in the databases referenced above (none were identified). Finally, PGG assigned relative priority rankings to potential contamination sites/sources based on the types of activities/contaminants associated with each site and their possible effects on the City's drinking water sources.

6.1 LAND-USE DATABASE & WINDSHIELD SURVEY

Clark County's database contains a description of the current land use within each parcel in the study area. A GIS analysis was used to identify land uses that could pose a risk to groundwater within the capture zone for each supply well. Parcels where such land uses were identified were designated "parcels of concern." (POC's) This approach provides a way to assess potential sources of contamination. The POC's include those where the following activities are practiced:

- Bio-filtration swales/ponds within 6-mo capzone
- Botanical gardens and conservatories
- Convenience stores with pumps & tanks
- Drive through car washes
- Dry cleaners (free standing building)
- Farm buildings for equipment
- Fleet operation centers & storage
- Funeral services & crematories
- General repair & service garages
- Food Manufacturers
- Manufacturers of rubber & plastic products
- Railroad right of way
- Service repair shops
- Service stations with tanks, pumps, card locks
- Tires, batteries, parts & accessories dealers
- Health clinics (if using septic systems)

City staff reviewed health clinics (medical, dental, veterinary) and office buildings, and confirmed that all were on sewer. In addition, City staff assessed activities associated with office buildings, retail buildings, neighborhood "strip centers" (no anchor), community shopping centers (with anchors), and storage warehouses during their windshield survey and did not identify activities posing significant concern for groundwater contamination.

The identified POC's are shown on **Figure 4** and listed on **Table 4**. In addition, PGG reviewed POC's previously identified in the City's 2000 Wellhead Protection Plan (PGG, 2000) and found that all previously listed POC's are still included on **Table 4**; however, one parcel (1716 W Main St) was previously an automotive services site but is now a building supply store.

Clark County's zoning includes parcels zoned for agriculture, golf courses, and parks. These land uses may include the use of fertilizers, pesticides and herbicides; some of which are mobile in the subsurface and can potentially contaminate groundwater. Current zoning does not show any such categories within

the City's capture zones (**Figure 4**), although the City has a "Central Park" on 414 E Main St (listed in the land use database as "botanical gardens and conservatories") (**Table 4**). Zoning documented in the City's 2000 Wellhead Protection Plan shows several parcels in the "agricultural/forestry" category within the City's capture zones, but did not identify associated land uses. Current land uses for these parcels include RC ("regional center intended for commercial development) and mixed use residential. While the City's park was not identified in the 2000 parcel analysis, aerial photography from Google Earth suggests the park has been in existence since at least 1990.

Table 4 includes priority rankings for POC's based on associated land-use activities and capture zone locations. The ratings are relative within a low-medium-high continuum. Because no particularly high risk land uses were identified within the 1-year capture zones, only "medium" ratings were assigned to these POC's . "Medium" ratings were assigned to all the POC's within the 1-year capture zones of the Upper Troutdale wells and "low" ratings were assigned to all POC's within the 1-year capture zones of the (deeper) SGA wells. All POC's within 5-year capture zones were associated with Upper Troutdale wells and their moderate risk land-use activities yielded "medium" ratings. All POC's outside the 5-year capture zones were assigned low ratings due to the relatively high response time available should a spill occur.

The City will notify all owners of parcels of concern identified in **Table 4** that they are located in a well-head protection area. An example letter and a list of contact information for parcel owners is included in **Appendix A**.

6.2 FACILITY/SITE DATABASE

Ecology's Facility/Site Database (http://www.ecy.wa.gov/fs/index.html) includes information about the following environmental sites and activities of concern:

- State Cleanup sites
- Federal Superfund sites
- Hazardous Waste Generators
- Solid Waste Facilities
- Underground Storage Tanks (LUST & UST)
- Dairies
- Enforcement
- Stormwater (Industrial, Municipal & Construction)

The database includes site locations; however, PGG has found that locations can contain slight inaccuracies. Buffers added to the calculated capture zones, discussed above, may compensate for potential location inaccuracies. Information for cleanup sites located within the capture zones was supplemented with more detailed information from Ecology's Cleanup Site Search Database (fortress.wa.gov/ecy/gsp/SiteSearchPage.aspx) and its ISIS database (https://fortress.wa.gov/ecy/tcpwebreporting/). PGG also researched sites within the capture zones associated with the "enforcement" category of the Cleanup Site Search Database and found that all sites were labeled "Non Enforcement Final". PGG contacted Ecology to determine the nature of these sites, all of which pertained to filling of wetlands and were not considered to be pertinent to wellhead protection concerns. Finally, for stormwater sites listed in the Cleanup Site Search Database, only industrial sites and municipal sites within 1-year capture zones were included in the inventory. Construction sites were not included due to their short-term nature.

Figure 5 shows the locations of environmental sites identified by the Facility/Site Database. **Table 5** summarizes the sites identified within the capture zones and notes whether a site is associated with hazardous materials, underground storage tanks (UST), leaky-underground storage tanks (LUST), cleanup activities, or stormwater. **Table 6** provides supplemental information regarding cleanup sites.

Table 5 shows that within the capture zones there are 14 cleanup sites, 11 sites associated with hazardous materials, 14 sites associated with UST, 10 sites associated with LUST, and 1 stormwater site. Cleanup sites can be associated with LUST contamination or other sources of contamination and there is frequent duplication between UST and LUST sites. Cleanup sites are considered to be of highest concern. Among the 14 cleanup sites, 3 are reported as requiring no further action and 2 are reported as cleaned up under MTCA (**Table 6**). Three cleanup sites are located within defined 1-year capture zones:

- The Sholund Family Farm is a cleanup site that requires no further action on MTCA. Metals have been remediated from the soil and groundwater and petroleum product has been remediated from the soil. The site is located within the 6-month capture zone of Well 6.
- The CFM Site is awaiting cleanup under MTCA. LUST notifications were issued in 1991 and 1996, and an initial investigation was performed in 2005. Petroleum contamination is confirmed above cleanup levels in the soil and suspected in groundwater. The site is located within the 6-month capture zone of Wells 1 and 2.
- Battle Ground School District 119 is being cleaned up under MTCA. The cleanup is supervised/conducted by Ecology. A LUST was identified in 1990 with a number of reports received thereafter. A discovery/release report was filed in 2010. Petroleum contamination is confirmed above cleanup levels in the soil and groundwater. The site is located within the 1-year capture zone of Wells 1 and 2.

It should be noted that the WDOH guidance states that "chemicals capable of contaminating groundwater must not be stored or used in Zone 1" (i.e. the 1-year capture zone). Two additional cleanup sites are located within 5-year capture zones. Union 76 is a LUST site that requires no further action. Petroleum products were confirmed in the groundwater and soil. Grace Cleaners is currently being cleaned up under MTCA. Halogenated organics have been remediated from soils, but phenolic compounds have been confirmed above cleanup levels in soils. All other cleanup sites are within the 10-year capture zones or within the 1000-foot buffer to the 10-year capture zone.

Whereas cleanup sites and LUST sites have known or suspected contamination, a number of other site categories included in Ecology's Facility/Site Database are included due to their potential to cause contamination.

- *UST* sites are associated with underground storage tanks; however, having such a tank does not provide evidence of a leak or contamination.
- *Hazardous Materials* sites are associated with the storage of hazardous materials; however, such storage does not provide evidence of a leak or contamination. The Williams Gas Northwest Pipeline crosses over the 0.5- and 1-year capture zone of Well 9, which is completed relatively deep in the SGA.
- *Stormwater* sites were limited in consideration to just industrial and municipal sites within 1-year capture zones. The single stormwater site located in the capture zones is also a dairy, designated in the industrial stormwater category.

PGG compared the environmental sites listed on **Table 5** with sites listed in the City's 2000 Wellhead Protection Plan (PGG, 2000). We found that the sites listed in 2000 are all listed on **Table 5** except for two sites that appear to be incorrectly located[1].

Table 5 includes priority rankings for facilities/sites based on their categories described above and associated capture zone locations. The ratings are relative within a low-medium-high continuum. Of the 3 sites identified within 1-year capture zones, all were cleanup sites, and 2 were assigned "high" risk (due

[1] One site had an address that does not exist in Battle Ground the other is in Elma WA.

to ongoing cleanup) whereas the third was assigned "low" risk (due to "no further action" designation. Within the 5-year capture zones, the two cleanup sites were assigned "medium" and "low" ratings (the low rating associated with no further action), and the remaining 3 sites were assigned "low" ratings due to their association with storage rather than contamination. All facilites/sites outside the 5-year capture zones were assigned low ratings due to the relatively high response time available should a spill occur.

The City will notify all owners/occupants of environmental sites with the delineated capture zones along with the agencies administering cleanup and LUST sites that they are within WHP capture zones. An example letter and a list of contact information for parcel owners is included in **Appendix A**.

6.3 OTHER POTENTIAL SOURCES

A number of other land uses not mentioned above have the potential to contaminate groundwater:

- On-site septic systems
- Unused and improperly constructed wells
- Transportation corridors

On-Site Septic Systems

On-site septic systems pose a risk to a groundwater where they are relatively high in density and/or where hazardous wastes are discharged to them. Potential contaminants from septic systems include pathogenic organisms (bacteria and parasites), toxic substances, and nitrogen compounds. Clark County maintains a GIS coverage of on-site septic system locations based on information provided by the Southwest Washington Health Department. The locations of the septic systems are plotted on **Figures 4** and **5**. In general, very few septic systems are located within the City's WHP capture zones. A few septic systems lie within the 1- and 5-year extended capture zones for the SGA wells. These septic systems should not pose a significant risk to these deep groundwater sources.

The extent to which pathogens are transported in the subsurface away from a septic drain field depends on the type of pathogen and the chemical and physical conditions in the subsurface. In general, if a septic system is properly sited, constructed, and maintained, the transport of microorganisms will be limited. Household hazardous chemicals such as cleaners, polishes, waxes, and paints can be transported to groundwater can via a septic system. Homeowners can improperly apply or dispose of chemicals because they do not understand the threat they pose to groundwater quality. In some areas, business and commercial facilities may still use on-site septic systems for sewage disposal. While businesses and commercial facilities associated with land uses potentially risky to groundwater were identified in Section 6.1, some categories (e.g. office buildings and medical clinics) were considered to be in the "gray zone" as they could pose a risk to groundwater via septic discharge. City staff reviewed associated office and clinic parcels, and confirmed that they are all connected to sewer lines.

Septic systems add nitrate to groundwater. Nitrate is regulated, since ingestion can result in methemoglobinemia, or "blue baby" syndrome. Other sources of nitrate include fertilizers, feedlots, and natural mineral deposits. Background concentrations of nitrates in groundwater are typically less than 1 milligram of nitrogen per liter (mg-N/L). The MCL for nitrate is 10 mg-N/L. In 1990, CPU conducted a nitrate study involving 4,200 private wells to assess the distribution of nitrates in Clark County. As discussed in the City's 2000 Wellhead Protection Plan, nitrate concentrations in the vicinity of the City's WHP capture zones are generally below 5 mg-N/L.

Unused and Improperly Constructed Wells

Well casings can provide a conduit between the ground surface and underlying aquifers. Improperly constructed or abandoned wells pose several potential problems. In wells with no surface seal, contaminants introduced near the wellhead can move downward outside the casing to underlying aquifers. Many older wells that were constructed before the implementation of WAC 173-160 have no surface seal. Unused wells that have not been properly abandoned are left uncapped in many cases, posing a special risk because contaminants can be introduced directly into the aquifer. Unused wells also pose a risk when they are damaged during site redevelopment. Any of these situations can provide a conduit for contaminant movement.

Clark County (1993) estimated that there may be more than 10,000 private wells in the county (Swanson & McCarley, 1993). Since many of these wells were constructed before drilling standards were adopted, the likelihood that some are improperly constructed is high. In addition, since there has been no inventory of the number or location of these wells, some of these wells may have been abandoned properly.

Transportation Corridors

Vehicles transporting hazardous material can be a source of groundwater contamination through accidents and resultant chemical spills. Hazardous materials are transported through Battle Ground on a daily basis via SR-502 (Main Street) and SR-503 (10^{th} Avenue) **(Figure 3)**. These routes are downgradient of the capture zones for the City's shallower wells (1, 2, 4, 5) and but occur within the mapped capture zones of the City's deeper SGA wells (6, 7, 8, 9). The depth of the SGA and overlying aquitards provides some measure of protection to these wells, including additional travel time from the land surface to the completion aquifer.

7.0 CONTINGENCY PLANNING

The purpose of this section is to develop a contingency plan identifying measures to be taken in case the City's largest production well is lost. This section is consistent with WDOH guidance on WHP planning and includes:

- An analysis of system capacity, water rights, and source loss
- Options for expansion within the City's existing sources of supply and water rights
- An analysis of existing and potential interties
- An analysis of potential future water supplies
- A description of emergency procedures to be taken if a source is lost
- A description of emergency notification procedures

7.1 ANALYSIS OF SYSTEM CAPACITY, WATER RIGHTS, AND SOURCE LOSS

7.1.1 System Capacity and Water Rights

In 1994, the City of Battle Ground's water sources consisted of four wells, three interties to CPU, and one supplemental well source from Battle Ground High School. Well 6 was installed in 1995, Wells 7 and 8 were installed in 1999, and Well 9 was installed in 2004. The City no longer receives water from the High School well and currently has only one active intertie with CPU. The rated capacity of all wells combined is currently 1,660 gpm (2.39 mgd), and the sum of water rights is 2,375 gpm (3.42 mgd) instantaneous (Qi) and 1,912 af/yr annual volume (Qa) (**Table 1**). The active intertie has a capacity of 500 gpm (0.72 mgd) (**Table 3**).

7.1.1.1 Wells 1 and 2

As originally constructed, Wells 1 and 2 had individual capacities of approximately 250 gpm. Over the years, the capacity of these wells diminished as water levels and well efficiencies declined. The current capacity of Well 1 is approximately 180 gpm and the current capacity of Well 2 is approximately 80 gpm, resulting in a combined capacity of 260 gpm or (0.37 mgd)[1]. The aquifer is capable of supplying this capacity on a continuous basis.

Water rights for Wells 1 and 2 are 350 gpm Qi and 270 af/yr Qa (Groundwater Certificate 2605C, priority date June 3, 1954). A portion of Qa on this water right (207 af/yr) was listed as a supplemental (non-additive) allocation for Wells 7 and 8 under Permit G2-29477 (priority date August 13, 1986) which was later expanded to include the City's Well 9 and CPU's Well 35 when Permit G2-29477 was divided between Battle Ground (G2-29477(A)) and CPU (G2-29477(B)). The combined Qa for Wells 1 and 2 is subject to reduction if associated non-additive water rights are used at either CPU Well 35 or Battle Ground Wells 7, 8 and 9.

7.1.1.2 Wells 4 and 5

The combined capacity of Wells 4 and 5 is 125 gpm or 0.18 mgd. The aquifer is capable of supplying this capacity on a continuous basis.

Water rights for Wells 4 and 5 are 250 gpm (0.36 mgd) Qi and 269 af/yr Qa (Water Right Certificate G2-23122, dated August 30, 1974).

7.1.1.3 Well 6

The current capacity of the well is 200 gpm or 0.29 mgd. The aquifer is capable of supplying this capacity on a continuous basis. The water right for Well 6 provides 500 gpm (0.72 mgd) Qi and 430 af/yr Qa (Permit G2-29208, priority date August 13, 1986).

7.1.1.4 Wells 7, 8 and 9

The current combined capacity of Wells 7 and 8 is 650 gpm and the current capacity of Well 9 is 425 gpm, resulting in a combined capacity of 1,075 gpm (1.55 mgd). The City's water rights for Wells 7 and 8 were originally issued under water right permit G2-29477, and Well 9 was subsequently added to the permit as an additional point of withdrawal. Water-right permit G2-29477 originally had a Qi of 2,000 gpm and a Qa of 2,150 af/yr, of which 1,943 af/yr was primary and 207 af/yr was non-additive from Wells 1 and 2. The primary Qa was reduced to 943 af/yr (certificate 29477-A) when 1,000 af/yr was transferred to CPU (certificate 29477-B). The combined Qi was also reduced to 1,375 gpm (1.98 mgd) at this time.

7.1.1.5 Interties

A summary of the City's interties is presented on **Table 3**. The City currently uses its sole intertie with CPU as a source of peaking and emergency supply. The intertie was installed in 1995, is 4-inches in diameter and can supply up to 500 gpm. The City is developing a new intertie with CPU that will replace the current intertie in 2013 and will have an initial capacity of 1,000 gpm. Improvements to this new intertie are available that would increase its capacity over time. The source-loss analysis presented below assumes that intertie capacity will be increased to 1,750 gpm in 2017 and to 3,000 gpm in 2021.

7.1.2 Source-Loss Analysis

This source-loss analysis considers what would happen if the City lost supply from any of its wells due to contamination or well failure. The City currently relies on its intertie with CPU for peaking capacity, and as water demand increases, the City will become increasingly reliant on current and future interties. **Figure 6** presents:

- Preliminary estimates of the City's projected annual and maximum daily demand[2];
- The total Qa water right for the City's wells (converted into an average daily pumping rate) and the total Qi water right;
- The City's projected instantaneous water-supply capacity over time based on its total well capacity plus capacity from existing and future interties; and,
- The City's instantaneous capacity with the loss of each of its key well sources (or source pairs, where two wells are located close together such that contamination would affect both)

While the City can meet the projected average daily demand (ADD) with its allocated Qa through 2017, comparison of projected maximum daily demand (MDD) to combined well capacity shows that the City cannot meet its current or future MDD without use of the interties. After 2017 the City will also need to rely on interties to meet portions of both its peaking demand *and* its ADD.

The combined source capacity curve (shown in cyan) can be compared to the projected MDD to evaluate the City's capability to meet MDD with all sources operating. **Figure 6** suggests that MDD can be met with the City's combination of wells and interties (although this comparison suggests a shortfall in 2012, this did not occur accept when Well 9 was temporarily inoperable due to pump outage).

[2] These numbers are from a draft version of the City's 2012 Water System Plan, currently under preparation (personal communication, Ginter, 2012).

Comparison of projected MDD to the City's instantaneous capacity curves with loss of specific well sources suggests that prior to 2017, loss of Well 9 or Wells 7 and 8 (combined) could have a notable affect on the City's ability to meet its MDD. For instance, in 2016, loss of Well 9 would mean that the City could supply only 86 percent of its MDD, and loss of Wells 7 and 8 would mean that the City could supply only 77 percent of its MDD. Between 2017 and 2029, loss of any individual well source (or source pair) would have little or no affect on the City's ability to meet its MDD. This is largely due to the contribution of interties from CPU. After 2029, loss of Well 9 or Wells 7 and 8 would again have a notable affect on the City's ability to meet its MDD.

It should be noted that while Wells 7, 8 and 9 have the largest capacity of all the City's sources, these wells are less vulnerable to contamination than Wells 1, 2, 4, 5 and 6 (Section 6.4). The latter group of wells have shallower completions in the Upper Troutdale Formation (**Table 2**), and are therefore more vulnerable to contamination at the land surface than the deeper SGA wells. It should also be noted that due to the proximity between wells situated in pairs and completed in the same aquifer (i.e. Wells 1 & 2, 4 & 5, 7 & 8), if contamination were to reach one of the paired wells, it would likely affect both wells – either removing them from service or requiring treatment before distribution.

7.2 OPTIONS FOR INCREASED CAPACITY UNDER EXISTING WATER RIGHTS

Current well capacities are sufficient to exceed the City's water-right Qa. However, the rated capacities of all of the City's wells are less than associated water-right Qi allocations (**Table 1** and **Figure 6**). The disparity between well capacity and Qi has increased as many of the City's wells have experienced reduced capacities due to clogging by iron bacteria. Additional wells could be added to the vicinity of each of the City's sources (under Ecology's "Showing of Compliance") to support withdrawals up to the allocated water-right Qi's. This would increase the City's internal capacity to meet its MDD, thus reducing reliance on interties. Specifically:

- An additional 90 gpm could be developed in the vicinity of Wells 1 and 2;
- An additional 125 gpm could be developed in the vicinity of Wells 4 and 5;
- An additional 200 gpm could be developed in the vicinity of Well 6; and
- An additional 300 gpm could be developed in the vicinity of Wells 7, 8 and 9.

In all, the unused capacity of these wells would provide 715 gpm of additional instantaneous capacity. Furthermore, if the City were prepared to drill new wells, it could potentially target the SGA and transfer water rights from its shallow wells to new deeper wells, thus effectively increasing protection from contamination to its well sources. However, because both the Upper Troutdale Aquifer and the SGA have shown a history of clogging due to iron bacteria, the City may prefer to emphasize interties to meet its instantaneous demand requirements.

7.3 EMERGENCY PROCEDURES FOR LOSS OF A SOURCE

Over the 20-year projection period addressed in this Wellhead Protection Plan, the impact of losing a single source (where two wells immediately adjacent are also considered a single source) is unlikely to require reductions in supply of more than 25 percent of MDD. During significant portions of the 20-year time period (i.e. 2018 to 2028), loss of a single source would not impact to the City's ability to meet MDD. Were a source loss to occur during a time when the combined capacity of all the City's wells was needed to meet demand, the City would likely need to institute short-term rationing and pursue drilling additional wells.

As discussed above, the City's well capacity could be increased without exceeding existing water rights by drilling new wells. The decision as to where to drill a new well would depend on the reason for source

loss. If source loss is due to well failure, a replacement well could be drilled near to the original well under "showing of compliance". Showing of compliance does not require water-right processing, and can be performed without significant administrative delay. It is reasonable to expect that several months (or longer) may be needed to contract and drill a new well, and connect the well to the distribution network.

If source loss is due to contamination, we would advise the City to either seek a new well location for the existing water right or increase groundwater development from an existing (different) location. In the first case, moving the point of withdrawal would require water-rights processing which would likely require months to years to complete[3]. However, because the City is not making full use of water rights from all of its sources, it could develop additional capacity at other source locations under showing of compliance and potentially offset lost capacity in a period of months. This is particularly relevant to loss of the City's shallow well sources, where available additional capacity in the deep sources exceeds the current capacity of the shallow sources. However, if the City were to lose a deep source to contamination, available additional capacity from shallow sources is insufficient to replace deep source capacities. In this case, water rights processing would be required for a new well location. Fortunately, the potential for contamination of deep sources is significantly less than the potential for contamination of shallow sources.

Should contamination be detected in one of the City's wells, emergency responses would be conducted, as described below.

7.3.1 Emergency Notification Procedures

In case of a spill of any magnitude within the WHPA, Ecology must be notified at (360) 407-6300. In addition, the following City Personnel should be notified:

- Scott Sawyer, City Engineer, (360) 342-5075
- Cal Newton, Public Works Superintendent, (360) 342-5365

7.3.2 City's Chain-of-Command for Spill Response

The City's Chain-of-Command response team is summarized in **Table 7**.

7.3.3 External Emergency Notification

In case of a spill that cannot be contained, Ecology's should be contacted at its 24-hour number, (360) 407-6300. Safety Kleen, a cleanup contractor, should also be contacted at (503) 655-5798. If a spill can be contained, it should be pumped into a containment tank. If there is no containment tank on site, Baker Tanks should be contacted at (503) 775-7211 to provide one.

7.4 EMERGENCY PHONE NUMBERS

The following is a list of contacts and telephone numbers in case of an emergency:

Police:	911
Ambulance:	911
Fire:	911
Hospital:	(360) 256-2000 (Peace Health Southwest Center)

[3] Months might be required under Ecology's Cost Reimbursement program; otherwise, years are often required.

Fatal injuries and accidents in which two or more employees are hospitalized must be reported immediately to the Washington State Department of Labor and Industries, Division of Consultation and Compliance (800) 423-7233.

8.0 SPILL RESPONSE PLANNING

8.1 RESPONSIBILITIES FOR SPILL PREVENTION AND RESPONSE

Many organizations have responsibilities for spill prevention in Washington State. This section briefly summarizes those responsibilities.

8.1.1 The Responsible Party

The primary responsibility for assessing, responding to, and containing an oil spill or discharge falls upon the individual, agency, and/or company responsible for the spill incident. The Responsible Party (RP) is responsible for containing and cleaning up the spill, disposing of contaminated debris, restoring the environment, and paying damages regardless of whether there is an approved contingency plan. State and federal law specifically require that the removal of a discharge of oil or hazardous substance should be immediate.

If the spiller is unknown or fails to respond, or if the State or Federal On-Site Coordinator (OSC) considers the response inadequate, the agency with jurisdiction may take over the response and recover expenses from the spiller (RCW 90.48.335).

8.1.2 Environmental Protection Agency

The EPA has primary responsibility for land spills and spills that occur on inland U.S. waters that are not under US Coast Guard jurisdiction. In the past, EPA has delegated authority for certain spill-response activities to Ecology.

8.1.3 Department of Ecology

Ecology is the lead agency for environmental pollution response in Washington. As such, it has predesignated the OSC and the Incident Commander (IC) for many spills occurring in the State's jurisdiction. If a spill occurs on a State highway, Ecology coordinates with the Washington State Patrol (WSP). The WSP then assumes responsibility as IC and leads the cleanup. The key responsibilities of Ecology include:

- Providing 24-hour emergency response to reported spill incidents
- Identifying the source, cause, and responsible party
- Assuming responsibilities of RP if a spiller cannot be located or is unresponsive
- Ensuring that containment, cleanup, and disposal are carried out in a timely and adequate manner

8.1.4 State Patrol

The Washington State Patrol (WSP) acts as the designated IC for incidents on Interstate and State highways and on other roads and jurisdictions as delegated. When a spill occurs on a State highway, Ecology joins the Unified Command and leads the cleanup response.

8.1.5 Emergency Management Division of the Washington Military Department

The Emergency Management Division of the Washington Military Department (http://www.emd.wa.gov/) provides disaster assistance for public agencies and recognizes hazards such as chemical (hazardous materials), pipelines, radiological, terrorism and transportation. Their assistance primarily addresses the repair and restoration of public facilities, infrastructure, or services which have been damaged or destroyed.

8.1.6 Local Emergency Planning and Emergency Management

The City of Battle Ground has developed a Local Emergency Planning Committee (LEPC) to facilitate planning efforts. LEPCs are responsible for creating emergency response plans. General requirements for local response plans are contained in Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). Generally, local agencies, particularly fire districts and law enforcement agencies, can be activated to provide emergency response services when there is a threat to life and property. Emergency response services may include:

- Investigating and documenting fire and explosion controls
- Establishing perimeter controls, evacuation routes, and traffic controls
- Containing or removing the spilled material, depending on the nature of the incident

The responsibilities of local government's Emergency Management Unit include:

- Developing and maintaining a hazardous material "annex" (supplement or appendix) to the State Comprehensive Emergency Management Plan. The responsibilities and actions of local, State, and Federal agencies should be defined.
- Assisting local agencies in preparing their standing operation procedures for hazardous materials incidents.
- Coordinating the various local emergency organizations and serving as the local liaison to Washington State EMD when that agency is involved.
- Contacting local landowners (may also be performed by local Health Department)
- Developing training programs and conducting exercises for local response agencies.
- Participating as a member of the Washington Wildlife Rescue Coalition.
- Establishing a Joint Information Center (JIC).
- Coordinating and interfacing with local governmental units (fire, medical, public works, sheriff, and law enforcement).
- Communicating with local government and industry.

8.2 SPILL ASSESSMENT AND RESPONSE PROCEDURES ON CITY PROPERTY

A spill of any magnitude that occurs within the WHPA and is not contained must be reported to Ecology and the City. After the spill is contained to the extent possible using on-site equipment, City personnel, Ecology, and a cleanup contractor should be notified.

8.3 SPILL CONTAINMENT/CLEANUP PROCEDURES ON CITY PROPERTY

If the spill can be contained, the following procedures should be followed:

1. Contain the spill with adsorbent materials. Neutralize with soda ash if the material is an acid.
2. Report the spill according to chain-of-command procedures.
3. Start the cleanup operation.

The spilled material should be pumped into an on-site tank for treatment, if possible. If it cannot be pumped into a tank, a cleanup contractor such as Safety Kleen should be contacted to contain the spill.

8.4 INSPECTIONS AND RECORDS

To the extent possible, the City should inspect the inventoried contaminants annually for proper containment. The facilities should also be checked to insure that the facility owners and operators are properly trained in spill prevention. The City staff should be responsible for inspection and record keeping for the spill prevention procedures. Records should be maintained for reference and recommendations should be made to correct deficiencies found by inspection.

Material Data Safety Sheets (MSDS) should be collected as part of the inspection process. These MSDS sheets must be available at each facility. The fire department also maintains copies of MSDS sheets for many facilities.

8.5 TRAINING

All City engineering, planning, and public works personnel should be trained in spill prevention at appropriate levels. For example:

- Engineering staff should be trained to identify proper spill containment and handling facilities when reviewing plans
- Planning staff should be trained to minimize potential contamination problems through changes in long-term zoning,
- Public works staff should be trained in spill response and field inspection procedures

City staff should be thoroughly familiar with the procedures outlined in this plan. City personnel can significantly impact spill prevention as part of their overall duties. This plan will be revised periodically to ensure that proper techniques are put to the best benefit.

Training should focus on safety, spill prevention, emergency response, evacuation, first aid, and hazardous waste first response.

9.0 IMPLEMENTATION STRATEGIES

Strategies for implementing the City of Battle Ground's WHP plan focus on several key issues:

- Public education and technical assistance
- Contaminant source management
- Monitoring and data management
- Land use and regulatory controls
- Regional coordination
- Planning

Each of these strategies is discussed below.

9.1 PUBLIC EDUCATION/TECHNICAL ASSISTANCE STRATEGIES

Public education and technical assistance strategies are required to teach City residents and businesses about practices that could impact the quality of groundwater in the WHPAs. These strategies include the following:

- Notifying all businesses that store and handle hazardous materials within the designated WHPAs about the importance of proper waste handling and disposal (addressed in **Appendix A**). Performing audits and making technical assistance available for small businesses within designated WHPAs.
- Developing educational materials that can be distributed to City residents to teach them how they can help protect groundwater. The Annual Water Quality Report can be used to inform customers about topics such as the location of WHPA boundaries and the importance of the proper use and disposal of lawn chemicals, household wastes, and other potential contaminants.
- Developing school programs to educate youth on groundwater protection.

9.2 CONTAMINANT SOURCE MANAGEMENT STRATEGIES

Strategies for managing contaminant sources are required to prevent contamination from point sources such as spills and USTs, as well as from regional sources such as septic systems. These strategies include the following:

- Regularly updating inventories of all businesses and potential contaminant sources within designated WHP capture areas. WDOH guidance states that inventories should be updated every two years (WDOH, 2010).
- Inventorying and locating USTs that were not identified through this study, including residential home heating oil USTs.
- Encouraging Ecology to expedite cleanup actions at confirmed contamination sites.
- Encouraging Ecology and the County to inspect the facilities of RCRA hazardous waste generators.
- Reviewing existing and proposed stormwater management practices to identify areas of concern for groundwater quality. The City should coordinate with Clark County as required.
- Requesting that the SWWHD focus its septic maintenance program on designated WHPAs.

- Encouraging residences that are currently served by septic drain fields within WHPAs to connect to the sewer system where possible. The City might consider financial incentives or other means of enticing residents to change.

9.3 MONITORING AND DATA MANAGEMENT STRATEGIES

Groundwater monitoring data provide a method for assessing trends in groundwater quality, on both regional and local scales. Regional data are available from sources such as the County, CPU, and SWWHD. Recommended strategies for monitoring and data management include:

- Collecting and analyzing water-quality, water-level, production, land-use, and other data that could assist in wellhead protection. This could be accomplished through cooperative programs with Clark County, CPU, and SWWHD.
- Integrating this data into a database management system to facilitate future analyses related to wellhead protection and water-resource issues.
- Applying a higher sampling intensity to the shallower, more vulnerable supply wells (wells 1, 2, 4 and 5).
- Reviewing logs for existing wells in high-risk areas to identify possible locations for monitoring.

9.4 LAND-USE CONTROLS AND REGULATION STRATEGIES

Wellhead Protection Guidance (WDOH, 2010) notes that public water systems owned and operated by local governments have clear authority to protect groundwater through zoning decisions, building and operating standards, land use controls, public health ordinances and other measures. The City can adopt zoning ordinances or codes that limit activities around water-supply sources, set design or operating standards for facilities in WHPA's, or other regulatory approaches. The following strategies related to land-use and regulatory controls could be implemented to protect water quality in WHPAs:

- Developing zoning overlays and adding performance standards to conditional use permits. However, because such strategies may be difficult and expensive to implement, it may be more practical to relocate the high-risk sources to areas where land-use conditions are not as critical.
- Encouraging and supporting the implementation of Clark County's Critical Aquifer Recharge Areas (CARA) ordinance (Chapter 13.70), which regulates activities within WHPAs and promotes the use of Best Management Practices (BMPs) to safeguard groundwater. Updated capture zone maps should be submitted periodically to the County for incorporation into the CARA process.
- Encouraging and supporting the implementation of Clark County's Water Quality ordinance (Chapter 13.26A), which is designed to reduce and control discharges of contamination to surface water and groundwater through BMPs and technical assistance programs.

9.5 REGIONAL COORDINATION STRATEGIES

Coordinating with other local purveyors in Clark County could enhance the effectiveness of wellhead protection efforts. Regional coordination strategies would include:

- Establishing a "steering group" with other local water purveyors and Clark County to coordinate WHP planning activities. This group should focus existing and future programs related to water quality and water resources on the designated WHPAs.

- Coordinating with other Clark County purveyors on water-supply planning and development issues. These issues include contingency planning and expansion of interties.

9.6 PLANNING STRATEGIES

Developing strategies for emergency response and contingency planning is essential to wellhead protection. Recommended action items related to such planning include:

- Notifying the appropriate emergency response organizations on the location of WHPAs and establishing formal communication protocols with the first-response emergency units.
- Preparing and distributing an emergency response contingency plan that covers short- and long-term responses if one or more sources is lost.
- Completing a hydraulic assessment of the distribution system to ensure that the contingency plans adequately address major losses of supply or storage capacity.

The City's Community Development Department should ensure that wellhead protection programs are integrated into overall community planning. Declaring a WHPA a critical aquifer recharge area, subject to local regulations and policies, is a useful part of a local Wellhead Protection Program.

Given that source-loss analysis indicates that there will be times over the next 20 years when existing interties are insufficient to offset impacts to total system capacity if certain well sources are lost, the City may want to consider planning for installation/development of backup wells. Should backup wells be constructed, we recommend targeting the (deep) SGA aquifer due to its greater degree of inherent protection from contamination introduced to the land surface and because current capacity is 300 gpm less than existing water-right allocations.

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Table 1
Summary of Source Capacity and Water Rights

Well	Pumping Rate (gpm)			Annual Volume (acre-feet)		
	Historic Average[1]	Rated Capacity[2]	Rights (Qi)	Historic Average	Capacity[4]	Rights (Qa)
#1 and #2	171	260	350	276	420	270[5]
#4 and #5	118	125	250	190	202	269
#6	112	200	400	181	323	430
#7, #8, #9	544	1,075	1,375[3]	878	1,735	943[6]
Total	**945**	**1,660**	**2,375**	**1,525**	**2,680**	**1,912**

[1] Historic average from 2004-2011.

[2] Personal Communication, Cal Newton 2012.

[3] Qi for wells 7, 8 and 9 (combined) was reduced from 2,000 gpm to 1,375 gpm due to a 625 gpm water-right transfer to Clark Public Utilities (CPU) as documented in Certificates 29477-A and 29477-B.

[4] Instantaneous capacity pumped continuously over one year.

[5] Qa for wells 1 and 2 is subject to reduction if associated non-additive water rights are used at either CPU Well 35 or Battle Ground wells 7, 8 and 9.

[6] Original water-right certificate 29477 had a total Qa of 2,150 af/yr of which 1,943 af/yr was primary and 207 af/yr was non-additive from wells 1, 2, 4, 5 and 6. The primary Qa was reduced to 943 af/yr (certificate 29477-A) when 1,000 af/yr was transferred to CPU (certificate 29477-B).

Table 2 - Battle Ground Water Supply Wells

Battle Ground Well Number	WDOE Unique Well ID	WDOH Source ID	Local Number	Completed Aquifer	Well Diameter	Driller	Construct. Date	Altitude (ft-MSL)	Well Depth (ft)	Completion Interval Top (ft-bgs)	Bottom (ft bgs)	WL Depth (ft)	WL Date	Well Yield (gpm)	Specific Capacity (gpm/ft)	Estimated Transmissivity (gpd/ft)
WELL 1	AFP601	1	3N/2E-03AB	QTu	8	Bottner	3/30/1954	284	144	99	136	48.1	3/30/1954	180	7.9	
WELL 2	AFP603	2	3N/2E-03AB	QTu	12	Bottner	9/15/1954	284	152	116	144	54	9/15/1954	80	7.7	
WELL 4	AFP603	3	3N/2E-03DA	QTu	12	Hansen	6/25/1975	280	141	105	135	61.6	8/22/1975	75	3.3	
WELL 5	AFP604	4	3N/2E-03DA	QTu	12	Hansen	8/22/1975	280	140	105	135	59.7	8/22/1975	75	2.2	
WELL 6	ABT804	8	3N/2E-04AD	SGA	10	Hansen	9/17/1995	275	299	259	289	197.2	8/16/1995	350	9	46,000
WELL 7	ABB112	9	3N/2E-04-DB	SGA	12	Holt	1/15/1999	265	437	349	432	205	1/8/1999	1000	28.2	73,800
WELL 8	ABB118	10	3N/2E-04-DB	SGA	12	Holt	2/26/1999	265	438	350	435	202	2/22/1999	1000	23.8	73,800
WELL 9	AKW137	11	NW, SE, Sec 4, T3N/R2	SGA	12/8	Holt	2004	265	425	320	411	213.1	2004	500	21	70,000

NOTES:

Completion aquifers include Upper Troutdale aquifer (QTu) and sand and gravel aquifer (SGA).

Static water levels, well yields and specific capacity based on original driller's reports and represented well condition at time of drilling.

Transmissivity estimates referenced from hydrogeologic reports on file with City of Battle Ground.

Table 3
Battle Ground Interties

Location	Size (inches)	Maximum Capacity (gpm)	Status
NE 199th Street at Maple Grove School	4	500	Installed in 1995. WDOH Source #6. Will be used for emergencies only when 1000 gpm becomes available at NE 219th St.
NE 219th St and NE 92nd Ave	16	1000	Available in 2013.
	16	1750	Likely available in 2017 with installation of additional booster pump.
	18 and 24	3000	Assumed availabble in 2021. Requires installation of larger diameter pipes and larger booster pumps.

Table 4 - Possible Parcels of Concern

Map ID	Owner	Land Use Description	Site Address*	Capture Zone Location	Septic	Priority Ranking
114	City Of Battle Ground	Bio-Filtration Swales/Ponds	n/r	6-Month Zone, Wells 7 & 8		low
115	City Of Battle Ground	Bio-Filtration Swales/Ponds	n/r	6-Month Zone, Wells 7 & 8		low
9	West Main Llc	Drive Through Car Wash	512 W Main St	6-Month Zone, Wells 1 & 2		medium
10	West Main Llc	Tires (includes retread tires), batteries, parts & acces, dealers	510 W Main St	6-Month Zone, Wells 1 & 2		medium
112	City Of Battle Ground	Bio-Filtration Swales/Ponds	2509 SW 11th Circle	6-Month Zone, Well 9		low
108	City Of Battle Ground	Bio-Filtration Swales/Ponds	n/r	6-Month Zone, Well 6		low
55	Song Simon S & Song Renee J	Convenience Store - w/ pumps & tanks	13 E Main St	5-Year Zone, Wells 1 & 2		medium
31	Patel Alkesh R & Patel Bindiya A	Dry Cleaners, laundries (single tenant - free standing bldg.)	100 E Main St	5-Year Zone, Wells 1 & 2		medium
61	Hussey Properties Inc	Tires (includes retread tires), batteries, parts & acces, dealers	213 W Main St	5-Year Zone, Wells 1 & 2		medium
27	Brown Robert P & Brown Ruth I	Convenience Store - w/ pumps & tanks	1912 W Main St	10-Year Zone, Wells 7 & 8		low
43	Washington State	Farm Bldgs for Equipment	2411 W Main St	10-Year Zone, Wells 7 & 8		low
45	Morse Properties Llc	General repair & service garages	1713 W Main St	10-Year Zone, Wells 7 & 8		low
130	Mcnair Richard S & Mcnair Jacquelin	SERVICE REPAIR SHOP	1806 W Main St	10-Year Zone, Wells 7 & 8	Yes	low
48	Les Schwab Tire Centers Wa	Tires (includes retread tires), batteries, parts & acces, dealers	1719 W Main St	10-Year Zone, Wells 7 & 8		low
89	Andersen Ronald A	Fleet Operation Centers & Storage	103 S 3rd Ave	10-Year Zone, Wells 1 & 2		low
66	Ferraro Miguel A	General repair & service garages	403 E Main St	10-Year Zone, Wells 1 & 2		low
64	Andersen Ronald	Mfg - Food	305 E Main St	10-Year Zone, Wells 1 & 2		low
105	Krause Steven R	SERVICE REPAIR SHOP	n/r	10-Year Zone, Wells 1 & 2		low
106	Krause Steven R	SERVICE REPAIR SHOP	303 S Parkway Ave	10-Year Zone, Wells 1 & 2		low
46	Morse Properties Llc	General repair & service garages	n/r	10-Year Zone, Well 9, Wells 7 & 8		low
15	Frontier Equities Llc	Convenience Store - w/ pumps & tanks	16 NW 13th Ave	10-Year Zone, Well 9		low
126	Levy Esther Trustee	Convenience Store - w/ pumps & tanks	907 W Main St	10-Year Zone (Smoothed)		low
3	Jmf Investments Iv Llc	Drive Through Car Wash	105 NW 12th Ave	10-Year Zone (Smoothed)		low
145	Fred Meyer Stores Inc	Service Station w/ Tanks & Pumps or Card Lock Station	1205 NW 1st St	10-Year Zone (Smoothed)		low
20	City Of Battle Ground	Botanical gardens and conservatories.	414 E Main St	1000-foot Buffer		low
35	City Of Battle Ground	Botanical gardens and conservatories.	n/r	1000-foot Buffer		low
141	Dickinson Daniel & Dickinson Annette	Convenience Store - w/ pumps & tanks	409 E Main St	1000-foot Buffer		low
24	Laynes Funeral Home Inc	Funeral services and crematories.	16 NE Clark Ave	1000-foot Buffer		low
29	Laynes Funeral Home Inc	Funeral services and crematories.	n/r	1000-foot Buffer		low
2	Punks Mufflers Llc	General repair & service garages	212 NE Grace Ave	1000-foot Buffer		low
86	Bertsch Robert G	General repair & service garages	715 SE 1st St	1000-foot Buffer		low
140	Ek Properties Llc	General repair & service garages	508 SE 1st St	1000-foot Buffer		low
142	Ek Properties Llc	General repair & service garages	n/r	1000-foot Buffer		low
16	Andersen Ronald A	Mfg - Rubber & Plastic Products	15 NE Grace Ave	1000-foot Buffer		low
146	Clark County General Services - Railroad	Railroad right-of-way	215 S Grace Ave	1000-foot Buffer		low
23	Laynes Funeral Home	Small retail building (<10,000 s.f.)	n/r	1000-foot Buffer		low

See **Figure 4** for parcel locations. *All parcel addresses are in Battle Ground, WA 98604.

Table 5 - Summary of Environmental Sites within Wellhead Protection Capture Zones

Map ID	Facility Site ID	Cleanup Site ID	Facility Name	Cleanup Site	Hazardous Materials	UST	LUST	Storm Water	Capture Zone Location	Priority Ranking
35	71217895	3703	Sholund Family Farm	Y					6-Month Zone. Well 6	low
36	73713224	7120	CFM Site	Y		Y	Y		6-Month Zone, Wells 1 & 2	high
37	81695495	10621	Battle Ground School District 119	Y		Y			1-Year Zone, Wells 1 & 2	high
39	86416754	578	Graces Cleaners	Y	Y				5-Year Zone, Wells 1 & 2 AND 10-Year Zone, Well 6	medium
1	1051	4980	Union 76	Y		Y	Y		5-Year Zone, Wells 1 & 2	low
25	7256537		Andersen Dairy Inc		Y			Y	5-Year Zone, Wells 1 & 2	low
32	37223232		Cenex Harvest States Old Station		Y	Y			5-Year Zone, Wells 1 & 2	low
43	99375277		QWEST Communications Battleground CDO		Y	Y			5-Year Zone, Wells 1 & 2	low
30	31157289		Village Mart			Y			10-Year Zone. Well 9	low
4	4282	11627	Vancouver Clinic Battle Ground	Y	Y				10-Year Zone, Wells 7 & 8	low
19	1577475		Williams Gas Pipelines Northwest Pipeline		Y				10-Year Zone, Wells 4 & 5	low
24	7134825		Battle Ground School District 119		Y		Y		10-Year Zone, Wells 1 & 2	low
31	32749129	5875	Battle Ground Farm & Home	Y		Y	Y		10-Year Zone, Wells 1 & 2	low
34	64531412		Parkway North Health Care Nurs		Y				10-Year Zone, Wells 1 & 2	low
38	82713854	10658	Draper Cf Dba Drapers City Cleaners	Y		Y	Y		10-Year Zone, Wells 1 & 2	low
33	58523474	9812	Jacksons Food Stores 500	Y	Y		Y		10-Year Zone (Smoothed)	low
17	23782	5228	Battle Ground Chevron	Y		Y	Y		1000-foot Buffer	low
21	3506334		Albertsons 592		Y				1000-foot Buffer	low
27	9977600	5509	Battle Ground Mini Mart 805	Y		Y	Y		1000-foot Buffer	low
28	15491331	5582	Battle Ground Utility Trench Scott Bros	Y		Y	Y		1000-foot Buffer	low
29	25875197		Lewis Rock & Redi Mix Inc Main St			Y			1000-foot Buffer	low
40	89645195	3708	WA DOT Battle Ground	Y					1000-foot Buffer	low
41	90426683	11004	Battle Ground Inn	Y		Y	Y		1000-foot Buffer	low
42	92132423		Dorsey Bus Service Inc Main St E		Y	Y			1000-foot Buffer	low

See **Figure 5** for site locations. See Table 6 for supplemental information about cleanup sites. "No further action" (NFA) cleanup sites receive low priority rankings for risk of contamination

Table 6 - Summary of Cleanup Sites within Wellhead Protection Capture Zones

Map ID	Facility Site ID	Cleanup Site ID	Facility Name	ISIS Site Summary Report
1	1051	4980	Union 76	This site requires no further action under MTCA. Petroleum products are reported as confirmed in the groundwater and soil.
4	4282	11627	Vancouver Clinic Battle Ground	This site requires no further action under MTCA based on an initial investigation. Petroleum products in the soil were remediated to below cleanup levels.
17	23782	5228	Battle Ground Chevron	The site is being cleaned up under MTCA, an Ecology supervised/conducted cleanup has been started. A routine cleanup was performed in 1995-96, but the site was reopened in 2000 due to LUST contamination. Halogenated organics and PAH's have been remediated in the soil, but petroleum products are currently confirmed above cleanup level in the soil and groundwater.
27	9977600	5509	Battle Ground Mini Mart 805	The site is being cleaned up under MTCA, an Ecology supervised/conducted cleanup has been started. A LUST was identified in 2001, a site characterization perforemed in 2003. Petroleum contamination is confirmed above cleanup levels in the soil and groundwater, and PAH contamination is confirmed in the groundwater and suspected in the soil.
28	15491331	5582	Battle Ground Utility Trench Scott Bros	The site is being cleaned up under MTCA, an Ecology supervised/conducted cleanup has been started. A LUST was identified in 1996 and notice of a cleanup site issued in 2005. Petroleum contamination is confirmed above cleanup levels in the soil and groundwater.
31	32749129	5875	Battle Ground Farm & Home	The site is being cleaned up under MTCA, an Ecology supervised/conducted cleanup has been started. Priority pollutant metals and petroleum products are currently confirmed above cleanup level in the soil and groundwater.
33	58523474	9812	Jacksons Food Stores 500	This site is reported cleaned up under MTCA. The site has a history of LUST reports received between 1993 and 2009. Ecology performed an initial investigation in late 2011. Petroleum products were detected below cleanup levels in groundwater and soil. Non-halogenated organics were confirmed above cleanup levels in groundwater. A no further action notice has not been issued for this site.
35	71217895	3703	Sholund Family Farm	This site requires no further action under MTCA. Metals have been remediated in the soil and groundwater, and petroleum product has been remediated from the soil.
36	73713224	7120	CFM Site	The site is awaiting cleanup under MTCA. LUST notifications were issued in 1991 and 1996, and an initial investigation was performed in 2005. Petroleum contamination is confirmed above cleanup levels in the soil and suspected in groundwater.
37	81695495	10621	Battle Ground School District 119	The site is being cleaned up under MTCA, an Ecology supervised/conducted cleanup has been started. A LUST was identified in 1990 with a number of reports received thereafter. A discovery/release report was filed in 2010. Petroleum contamination is confirmed above cleanup levels in the soil and groundwater.
38	82713854	10658	Draper CF DBA / Drapers City Cleaners	This site is reported as cleaned up under MTCA. Petroleum (gasoline and other) products are below cleanup levels in the soil, and diesel contamination is reported as suspected inthe soil. A no further action notice has not been reported for this site.
39	86416754	578	Graces Cleaners	This site is being cleaned up under MTCA and the voluntary cleanup program. Contamination occurs in the soil. Halogenated organics are reported as remediated and phenolic compounds have been confirmed above cleanup levels.
40	89645195	3708	WA DOT Battle Ground	The site is being cleaned up under MTCA, an Ecology supervised/conducted cleanup has been started. Metals and petroleum products are confirmed above cleanup levels in the soil.
41	90426683	11004	Battle Ground Inn	This site is reported as cleaned up under MTCA. Diesel and other petroleum products were remediated below cleanup levels from the soil. A no further action notice has not been issued for this site.

Table 7
City's Chain-of-Command for Spill Response

Title	Name	Email	Phone	Cell/Pager
1. On Duty Battalion Chief (Clark Co. Fire & Rescue)	Variable	n/a	360-887-4609 (CCF&R)	360-607-3255
2. City Engineer & Public Works Director	Scott Sawyer	scott.sawyer@cityofbg.org	360-342-5075	360-608-0567
3. Public Works Foremen	Cal Newton	cal.newton@cityofbg.org	360-342-5365	360-798-7044
4. Maintenance Worker	Shawn Scott	shawn.scott@cityofbg.org	360-342-5364	360-798-7822

R 2 E

T 4 N

T 3 N

East Fork Lewis River

Mill Creek

Tukes Mountain

Morgan Creek

Salmon Creek

Morgan Creek

150

175

200

225

250

275

300

A

A'

CPU Well 35

Keyser's Nursery

Well 6

Well 9

Wells 7 & 8

Wells 1 & 2

Wells 4 & 5

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Figure 1
Surficial Geologic Map and Cross Section Alignments

Prepared for
City of Battle Ground

Prepared by
Pacific Groundwater Group

- Battle Ground Supply Well
- Other Wells
- Cross Section Allignment
- Water Service Area Boundary
- Taxlot Outlines
- Water Feature

Groundwater Levels

- Upper Troutdale Aquifer Water Level Contours*
- Estimated SGA Groundwater Flow Direction

Surficial Geology**

- Recent Alluvial Deposits
- Pleistocene Alluvial Deposits
- Upper Troutdale Formation
- SGA (Sand & Gravel Aquifer)
- Boring Lava
- Bedrock

* From Swanson et al, 1993

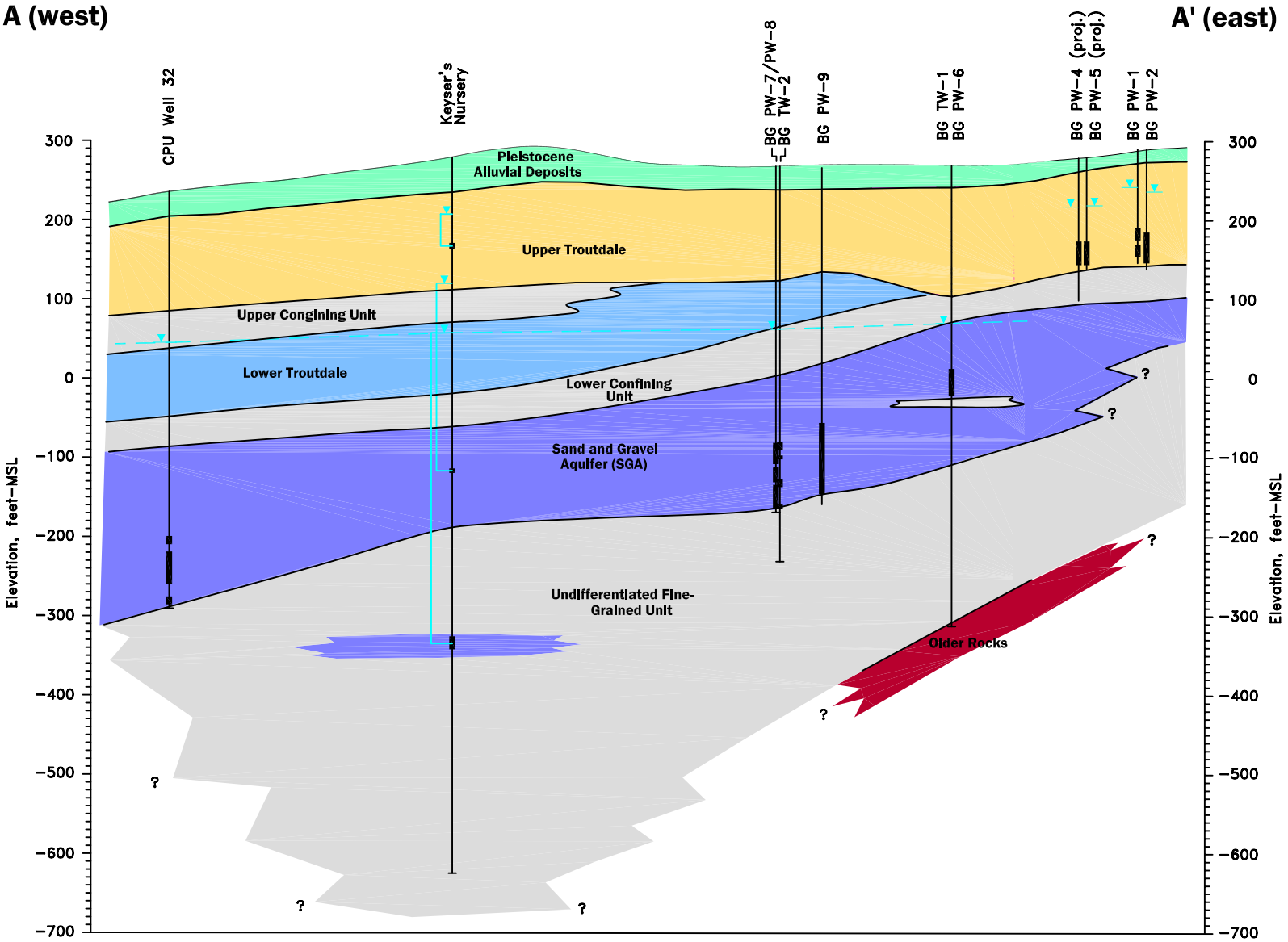
**Modified from Howard 2002, Geologic Map of the Battle Ground Quadrangle, USGS MF-2395

N W E S

0 2,000 Feet

Map Projected in Washington State Plane, South Zone, NAD83 Datum

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LEGEND

- Pleistocene Alluvial Deposits
- Upper Troutdale Aquifer
- Lower Troutdale Aquifer
- Sand and Gravel Aquifer (SGA)
- Confining Units
- Older Rocks

Well Completion Details

- Static Water Level
- Open Interval

Piezometric Surface for Sand and Gravel Aquifer

Vertical Scale in Feet
0 100 200
0 1000 2000
Horizontal Scale in Feet

Figure 2
Hydrogeologic Profile A-A'

Battle Ground
Wellhead Protection Plan - 2012

JM9904.08, xseca1.DWG, June/2004

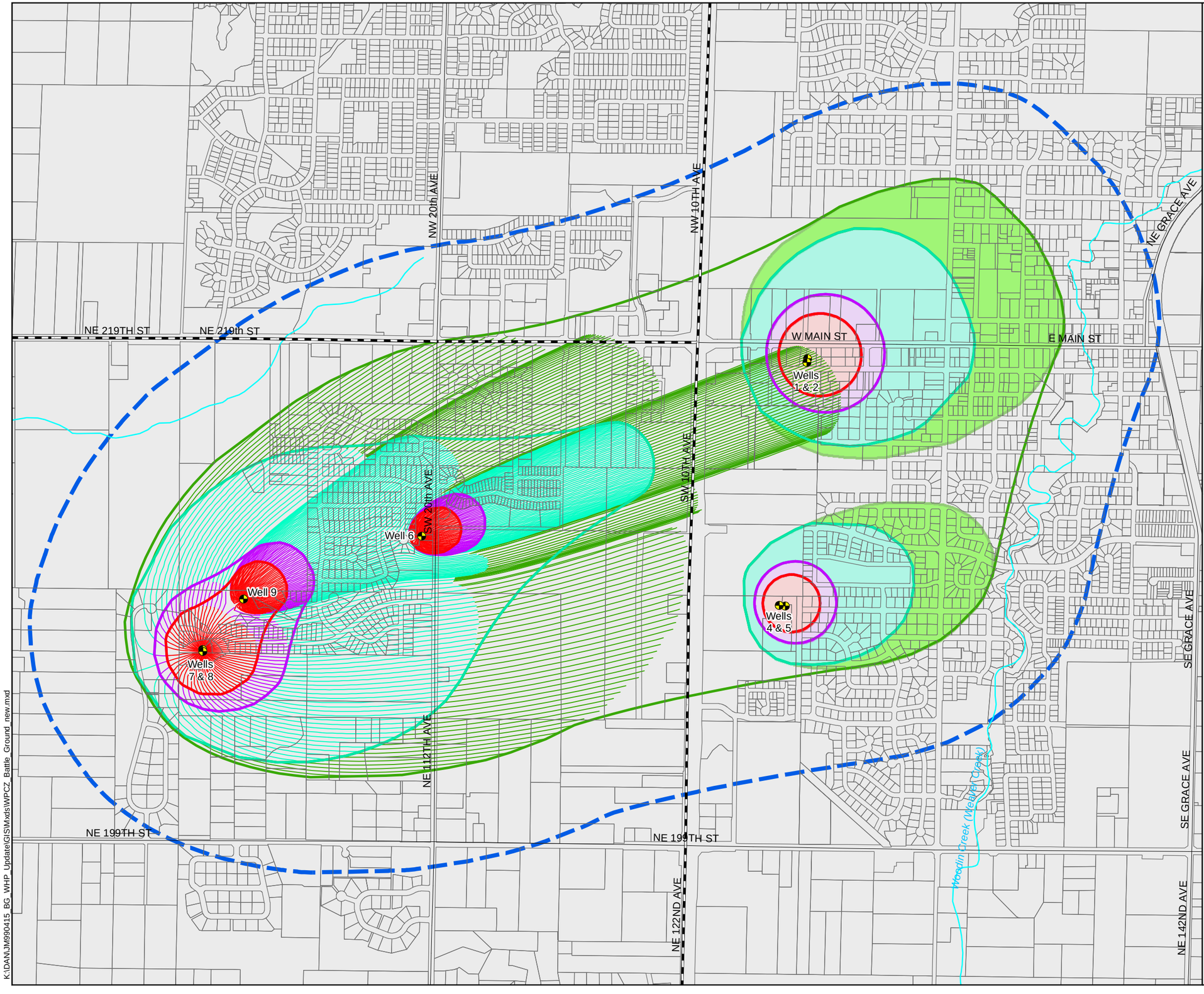
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Figure 3
Wellhead Protection Capture Zones

Prepared for
City of Battle Ground

Prepared by
Pacific Groundwater Group



- Battle Ground Supply Well
- Taxlots

SGA Capture Zone Modeling

- 0 to 6 Month Particle Trace
- 6 to 12-Month Particle Trace
- 1 to 5-Year Particle Trace
- 5 to 10-Year Particle Trace

Upper Troutdale Aquifer Modeling (Swanson, 1993)

- 6 Month Capture Zone
- 1 Year Capture Zone
- 5 Year Capture Zone
- 10 Year Capture Zone

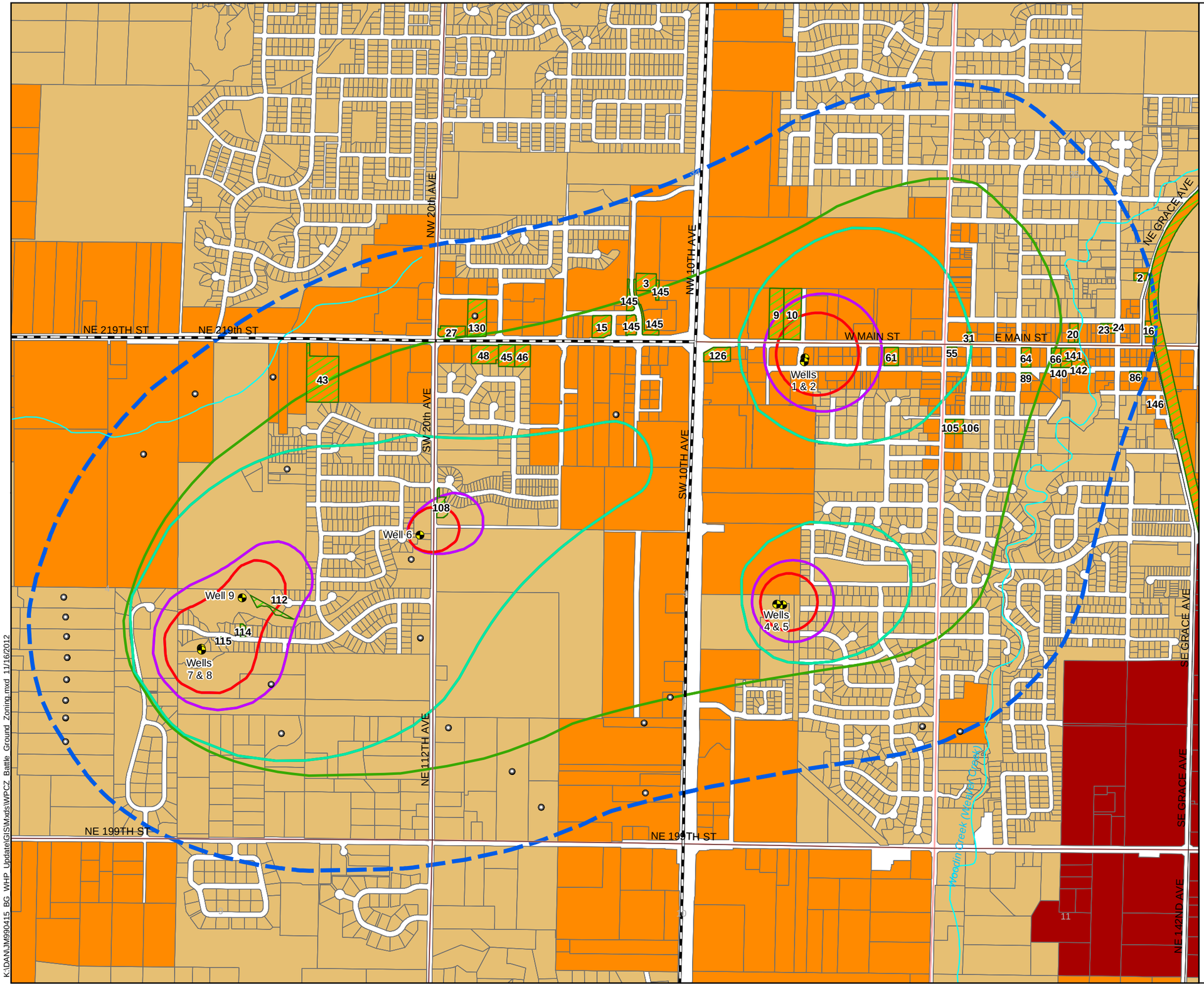
Extended Wellhead Protection Capture Zones

- 6 Month Capture Zone
- 1 Year Capture Zone
- 5 Year Capture Zone
- 10 Year Capture Zone
- 1000-foot Buffer

N W E S

0 1,000 Feet

Map Projected in Washington State Plane, South Zone, NAD83 Datum



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Figure 4

Zoning and Parcels of Concern

Prepared for
City of Battle Ground

Prepared by
Pacific Groundwater Group

- Battle Ground Supply Well
- 86 Parcels of Concern
- Septic Systems (from County)

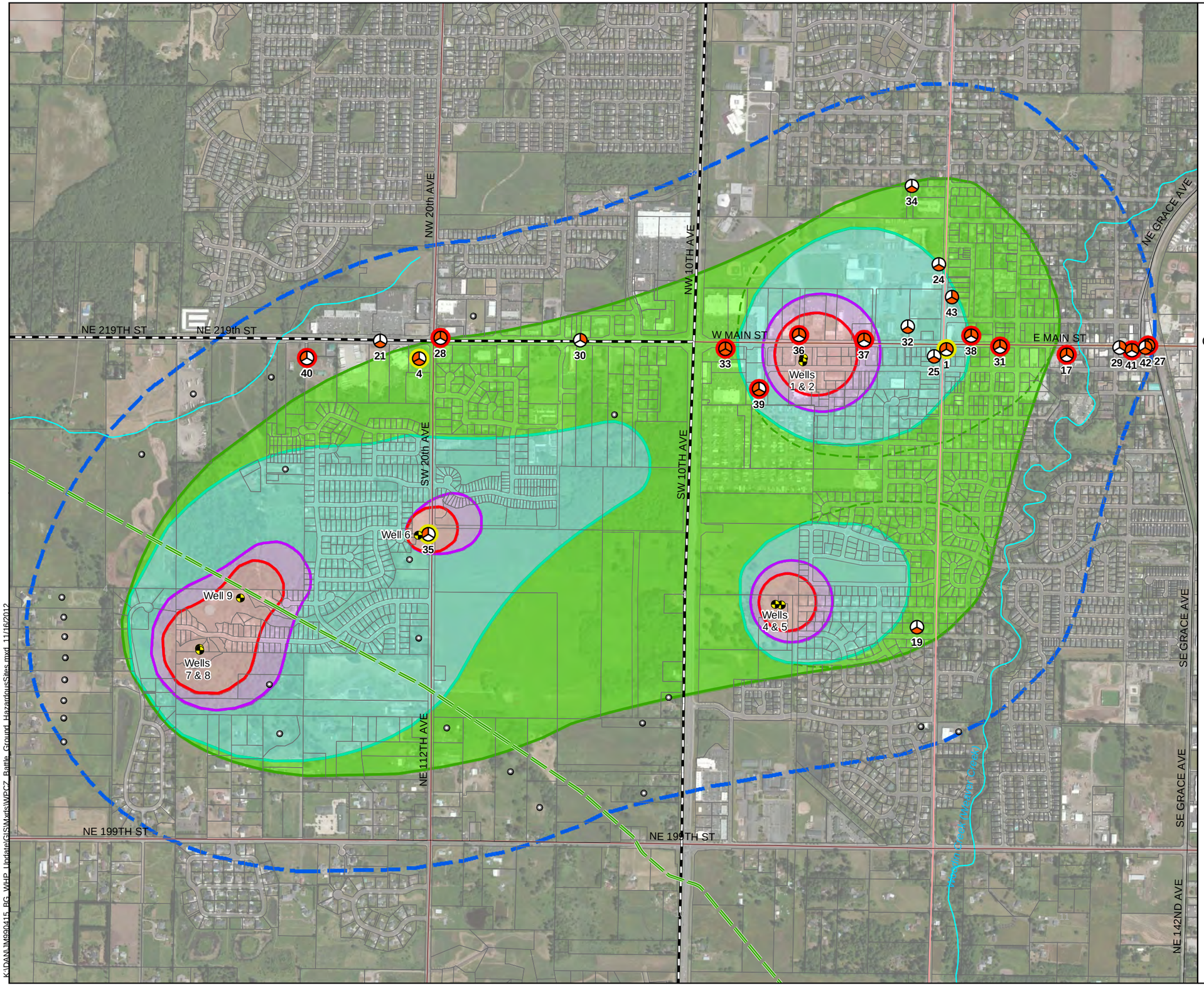
Zoning Categories
- Industrial
- Residential
- Commercial
- Park/OS/Public

Extended Wellhead Protection Capture Zones
- 6 Month Capture Zone
- 1 Year Capture Zone
- 5 Year Capture Zone
- 10 Year Capture Zone
- 1000-foot Buffer

N, W, E, S

0 1,000 Feet

Map Projected in Washington State Plane, South Zone, NAD83 Datum



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Figure 5

Environmental Sites within Wellhead Protection Capture Zones

Prepared for
City of Battle Ground

Prepared by
Pacific Groundwater Group

DOE Sites of Concern

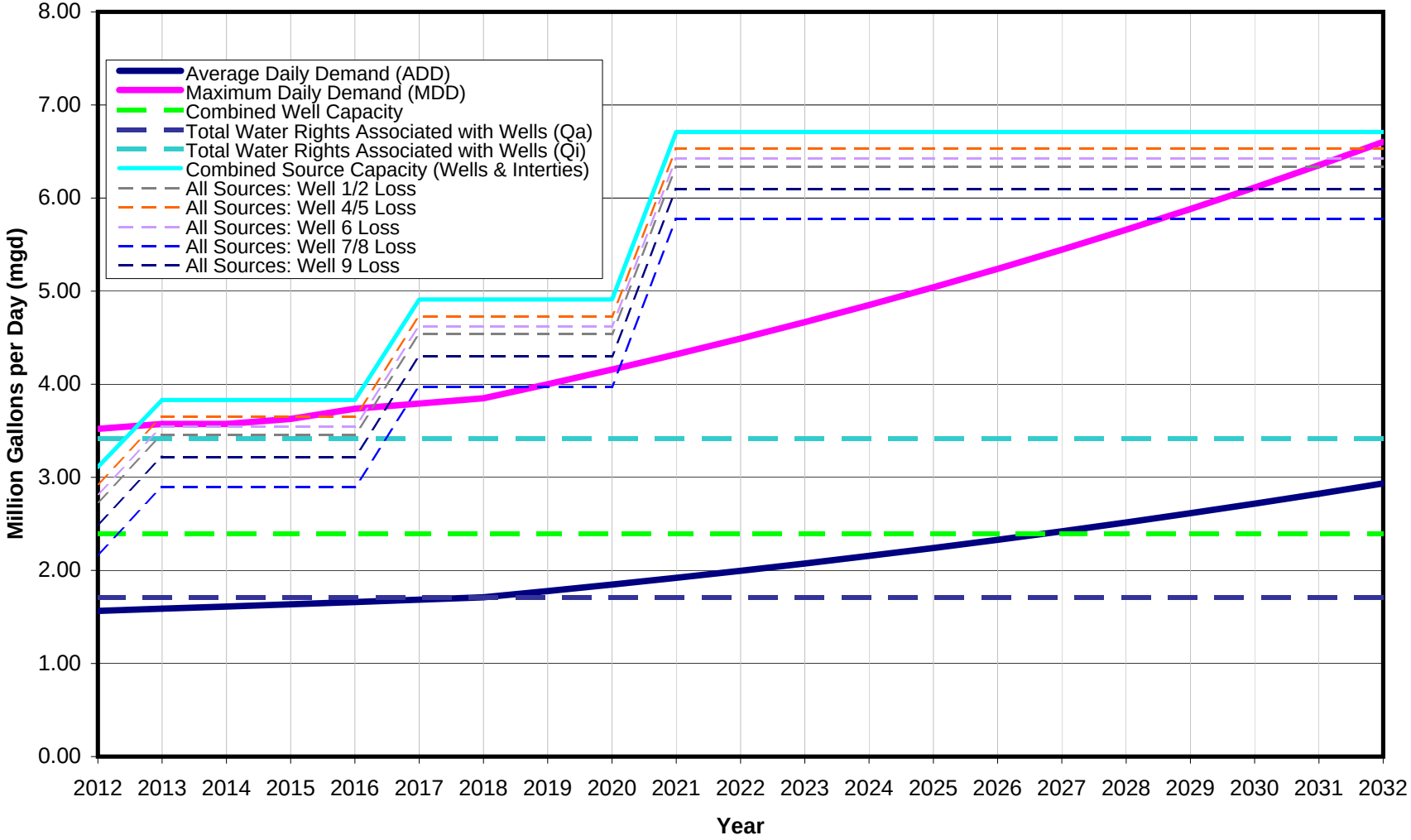
Refer to Section 4.3 and Table 5 for description.

Wellhead Protection Capture Zones

Map Projected in Washington State Plane, South Zone, NAD83 Datum

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Figure 6
City of Battle Ground
Source of Supply Scenarios vs. Demand



APPENDIX A
DOCUMENTATION OF WELLHEAD PROTECTION PROGRAM NOTIFICATIONS

[

Wellhead Protection Guidance (WDOH, 2010) states that within one year after defining the wellhead protection area boundaries, the water system must notify the identified potential contaminant sources—and the agencies or jurisdictions that regulate them—that they are in the wellhead protection area. Notification must be in writing. The water system must maintain documentation of the required notifications.

PGG recommends that the City send letters out to all "parcels of concern" listed on **Table 4** (addresses are included on the Table), all environmental sites listed on **Table 3** (addresses are listed on **Table A-1**), and relevant agencies. A sample letter for the parcels of concern and the environmental sites is included below, followed by sample letters for Ecology, the Police Department and the Fire Department. Letters to these three agencies should be accompanied by the map of environmental sites (**Figure A-1**). The letter to Ecology should also be accompanied by **Table A-1**.

Sample Letter to Potential Source Owners/Operators:

Date

Address of local business (*see Table 4 or Table A-1*)

Re: City of Battle Ground Wellhead Protection Plan

To Whom It May Concern:

The City of Battle Ground has developed a Wellhead Protection Plan to help maintain drinking water quality for our city residents. The Plan is based on Washington Department of Health WAC 246-290-135(3) regulations. As part of the Plan, maps were prepared that show the areas around each city drinking water well where a chemical spill on the ground may cause contamination of the well/aquifer. These areas are Wellhead Protection Areas (WHPA). The Plan also requires an inventory of potential sources of groundwater contamination within these wellhead protection areas.

The primary purpose of this letter is to notify you that your facility is located within our WHPA. Since your business or the activities conducted at your facility may involve the use of chemicals (e.g., gasoline, underground storage tanks, hazardous waste, etc.), and the potential exists that a chemical spill from your facility may adversely impact the city drinking water supply, please notify the City of Battle Ground immediately if a chemical spill occurs at your facility. All spills should be reported by dialing 911 and requesting that the City of Battle Ground Fire Department and Southwest Washington Health Department be contacted.

Thank you for assisting us in protecting our water supply and groundwater resources. If you have any questions, please contact me at (360) 772-1283.

Sincerely,

Elaine Huber, P.E.
Operations Manager
City of Battle Ground

Sample Letter to Ecology:

Date

Department of Ecology
Southwest Regional Office
PO Box 47775
Olympia, WA 98504-7775

Re: City of Washougal Wellhead Protection Plan

Dear Department of Ecology:

The City of Battle Ground has developed a Wellhead Protection Plan to help maintain the drinking water quality for our city residents. The Plan is based on Washington Department of Health WAC 246-290-135(3) regulations. As part of the Plan, maps were prepared that show the areas around each city drinking water well where a chemical spill on the ground may cause contamination of the well/aquifer. These areas are Wellhead Protection Areas (WHPA).

The enclosed map depicts the WHPA boundary, source wells, and identified potential contaminant sources. Also enclosed is a table with names and location information for each site. Please review the map and use it as a reference when inspecting and permitting the storage, use, and disposal of hazardous material within our WHPA.

Please note that the City of Battle Ground has sent notices to each of these properties informing them of their location within the WHPA boundary. The City has also sent similar letters to properties with land uses that could contaminate groundwater quality.

Thank you for your attention in this matter. If you have any questions or would like a copy of the wellhead protection plan, please contact me at (360) 772-1283.

Sincerely,

Elaine Huber, P.E.
Operations Manager
City of Battle Ground

Sample Letter to Police Department:

Date

Bob Richardson, Police Chief
Battle Ground Police Department
507 S.W. 1st St.
Battle Ground, WA 98604

Re: City of Battle Ground Wellhead Protection Plan

Dear Chief Richardson:

The City of Battle Ground has developed a Wellhead Protection Plan to help maintain the drinking water quality for our city residents. The Plan is based on Washington Department of Health WAC 246-290-135(3) regulations. As part of the Plan, maps were prepared that show the areas around each city drinking water well where a chemical spill on the ground may cause contamination of the well/aquifer. These areas are Wellhead Protection Areas (WHPA).

As part of this Plan, the city must provide wellhead protection information to agencies responsible for incident/spill response procedures. It is important that you are aware of where potential contaminant releases could adversely impact the quality of our communities drinking water supply.

A map of the wellhead protection areas and adjacent transportation routes is enclosed for your review. An acknowledgement of receipt of this information or a response from your office as part of our wellhead protection plan documentation would be appreciated.

In the event of a spill or contaminant release, we would ask that you notify immediately us and the Department of Ecology, so that we can take appropriate measures to deal with the problem.

Thank you for your attention in this matter. If you have any questions or would like a copy of the wellhead protection plan, please contact me at (360) 772-1283.

Sincerely,

Elaine Huber, P.E.
Operations Manager
City of Battle Ground

Sample Letter to Fire Department:

Date

Chief Dennis Mason
Clark County Fire District No. 11
21609 NE 72 AVE
Battle Ground, WA

Re: City of Battle Ground Wellhead Protection Plan

Dear Chief Mason:

The City of Battle Ground has developed a Wellhead Protection Plan to help maintain the drinking water quality for our city residents. The Plan is based on Washington Department of Health WAC 246-290-135(3) regulations. As part of the Plan, maps were prepared that show the areas around each city drinking water well where a chemical spill on the ground may cause contamination of the well/aquifer. These areas are Wellhead Protection Areas (WHPA).

As part of this Plan, the city must provide wellhead protection information to agencies responsible for incident/spill response procedures. It is important that you are aware of where potential contaminant releases could adversely impact the quality of our communities drinking water supply.

A map of the wellhead protection areas and adjacent transportation routes is enclosed for your review. An acknowledgement of receipt of this information or a response from your office as part of our wellhead protection plan documentation would be appreciated.

In the event of a spill or contaminant release, we would ask that you notify immediately us and the Department of Ecology, so that we can take appropriate measures to deal with the problem.

Thank you for your attention in this matter. If you have any questions or would like a copy of the wellhead protection plan, please contact me at (360) 772-1283.

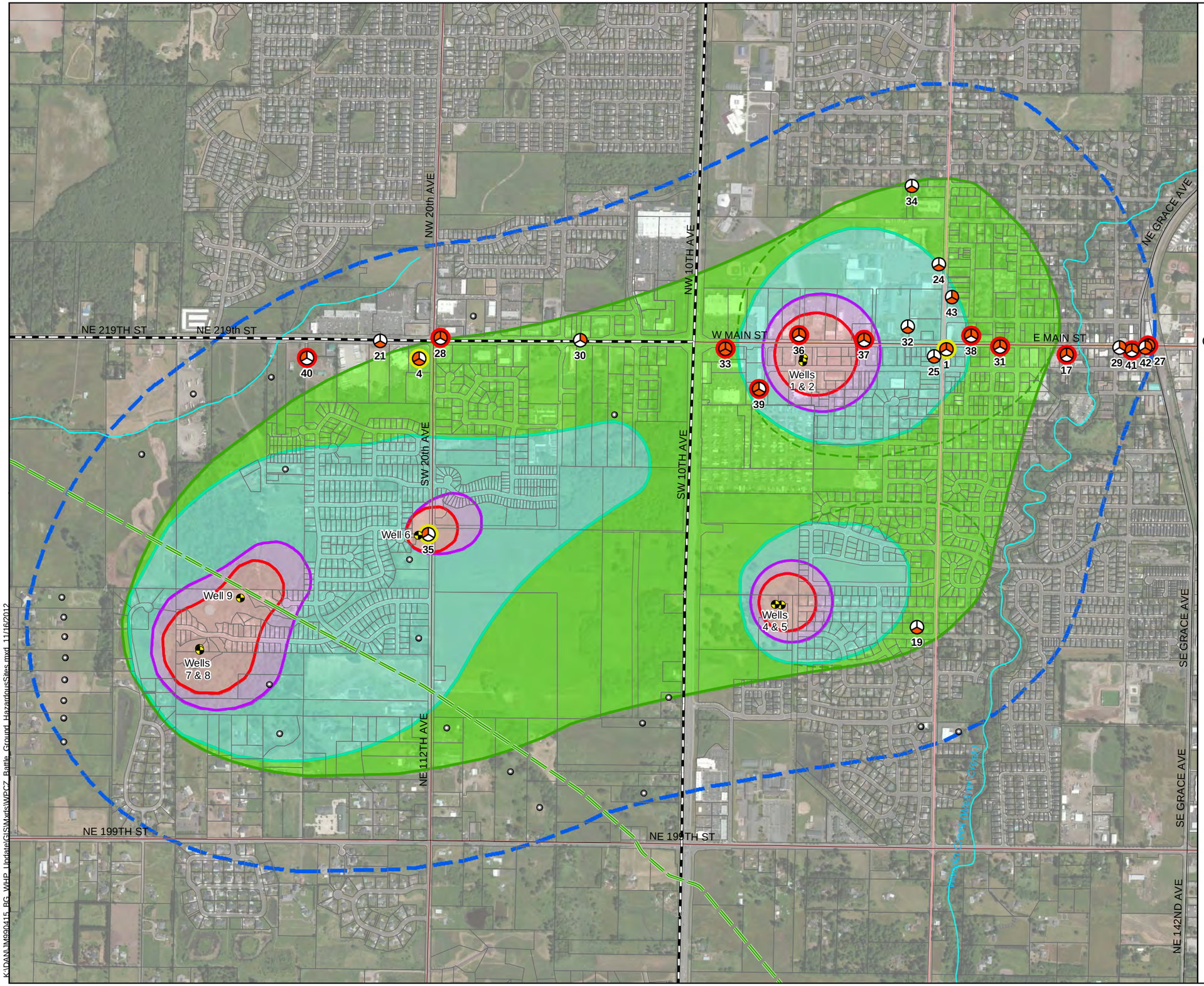
Sincerely,

Elaine Huber, P.E.
Operations Manager
City of Battle Ground

Table A-1: Environmental Site Mailing List for Wellhead Protection Area Notification

Map ID	Facility/Site ID	Cleanup Site ID	Facility/Site Name	Address	City	State	Zip Code	Latitude	Longitude
21	3506334		Albertsons 592	2108 W MAIN ST	BATTLE GROUND	WA	98604	45.780538	-122.560522
25	7256537		Andersen Dairy Inc	305 E MAIN ST	BATTLE GROUND	WA	98604-4501	45.780508	-122.537692
17	23782	5228	Battle Ground Chevron	409 E MAIN ST	BATTLE GROUND	WA	98604	45.780648	-122.53223
31	32749129	5875	Battle Ground Farm & Home	106 MAIN ST E	BATTLE GROUND	WA	98604-4516	45.78084	-122.53499
41	90426683	11004	Battle Ground Inn	711 E MAIN ST	BATTLE GROUND	WA	98604	45.78083	-122.52955
27	9977600	5509	Battle Ground Mini Mart 805	813 W MAIN ST	BATTLE GROUND	WA	98604	45.780972	-122.528889
24	7134825		Battle Ground School District 119	300 NORTH PARKWAY	BATTLE GROUND	WA	98604	45.783163	-122.537596
37	81695495	10621	Battle Ground School District 119	204 MAIN ST W	BATTLE GROUND	WA	98604-9109	45.78093	-122.54059
28	15491331	5582	Battle Ground Utility Trench Scott Bros	1912 W MAIN	BATTLE GROUND	WA	98604	45.78067	-122.55804
32	37223232		Cenex Harvest States Old Station	210 SE 1ST ST	BATTLE GROUND	WA	98604-8316	45.781343	-122.538806
36	73713224	7120	CFM Site	510 W MAIN	BATTLE GROUND	WA	98604-0458	45.78102	-122.54328
42	92132423		Dorsey Bus Service Inc Main St E	1017 MAIN ST E	BATTLE GROUND	WA	98604-4549	45.780917	-122.528998
38	82713854	10658	Draper Cf Dba Drapers City Cleaners	114 MAIN ST E	BATTLE GROUND	WA	98604-0417	45.78113	-122.53619
39	86416754	578	Graces Cleaners	717 W MAIN	BATTLE GROUND	WA	98604	45.780563	-122.545009
33	58523474	9812	Jacksons Food Stores 500	917 W MAIN	BATTLE GROUND	WA	98604	45.78057	-122.5463
29	25875197		Lewis Rock & Redi Mix Inc Main St	915 MAIN ST E	BATTLE GROUND	WA	98604-0100	45.780897	-122.530058
34	64531412		Parkway North Health Care Nurs	404 N PARKWAY	BATTLE GROUND	WA	98604	45.7854	-122.53879
43	99375277		QWEST Communications Battleground CDO	BEACH ST BTWN 1ST & MAIN	BATTLE GROUND	WA	98604	45.78223	-122.53702
35	71217895	3703	Sholund Family Farm	20806 NE 112TH AVE	BATTLE GROUND	WA	98604-7409	45.774999	-122.558333
1	1051	4980	Union 76	13 E MAIN ST	BATTLE GROUND	WA	98604-4522	45.78072	-122.53719
4	4282	11627	Vancouver Clinic Battle Ground	2005 W MAIN ST	BATTLE GROUND	WA	98604	45.780055	-122.558897
30	31157289		Village Mart	16 NW 13TH AVE	BATTLE GROUND	WA	98604-4379	45.780707	-122.552288
40	89645195	3708	WA DOT Battle Ground	10707 NE 219TH ST	BATTLE GROUND	WA	98604	45.77999	-122.56352
19	1577475		Williams Gas Pipelines Northwest Pipeline	2513 SW 11TH ST	BATTLE GROUND	WA	98604	45.77269	-122.53811

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Figure A-1

Environmental Sites within Wellhead Protection Capture Zones

Prepared for
City of Battle Ground

Prepared by
Pacific Groundwater Group

Battle Ground Supply Well

DOE Sites of Concern
- Known Release
- Known Release (No Further Action)

Table 5 ID → Cleanup Site: 11 → UST/LUST; Hazardous Materials

Refer to Section 4.3 and Table 5 for description.

Septic Systems (from County)

Gas Transmission Pipelines

Wellhead Protection Capture Zones
- 6 Month Capture Zone
- 1 Year Capture Zone
- 5 Year Capture Zone
- 10 Year Capture Zone
- 1000-foot Buffer

N
W E
S

0 1,000
Feet

Map Projected in Washington State Plane, South Zone, NAD83 Datum

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WELLHEAD PROTECTION PLAN ADDENDUM



CITY OF BATTLE GROUND
OCTOBER 2022

WELLHEAD PROTECTION PLAN (ADDENDUM TO 2012 PLAN)

Introduction

In 2012, the City adopted an updated Wellhead Protection Plan. As part of the City's 2021 update to its Water System Plan, the City is completing a minor update to the Wellhead Protection Plan to address items that have changed since the 2012 update. The 2012 plan remains in effect except for what is amended within this addendum.

7.3.1 – Emergency Notification Procedures

The following are the new contacts for this section:

- Mark Herceg, Public Works Director, (360) 342-5075
- Don Risto, Operations Supervisor, (360) 342-5361

Table 3 – Battle Ground Interties

Table 3 has been updated with the current information about the City's interties and is attached to this addendum.

Table 4 – Possible Parcels Of Concern

Table 4 has been updated to add some parcels of concern and remove others. **Table 4** is attached to this addendum.

Table 5 – Summary Of Environmental Sites Within Wellhead Protection Capture Zones

Table 5 has been updated to add some environmental sites within wellhead protection capture zones. **Table 5** is attached to this addendum.

Table 6 – Summary Of Cleanup Sites Within Wellhead Protection Capture Zones

Table 6 has been updated to give the current status of cleanup sites within wellhead protection capture zones. **Table 6** is attached to this addendum.

Table 7 – City's Chain-Of-Command For Spill Response

Table 7 has been updated to list current staff for the City's spill response chain-of-command. **Table 7** is attached to this addendum.

Figure 4 – Zoning And Parcels Of Concern

Figure 4 has been updated to add some parcels of concern and remove others. **Figure 4** is attached to this addendum.

Figure 5 – Environmental Sites Within Wellhead Protection Capture Zones

Figure 5 has been updated to add some Ecology Environmental Sites. **Figure 5** is attached to this addendum.

Appendix A – Documentation Of Wellhead Protection Program Notifications

Appendix A is replaced in its entirety with **Appendix A** attached to this addendum.

Table 3
Battle Ground Interties

Location	Size (inches)	Maximum Capacity (gpm)	Status
SW Eaton Boulevard at Maple Grove School	4	500	Intertie is set for emergencies only.
W Main Street (NE 219th Street) and NE 92nd Avenue	16	2000	Available in 2021.
	24	4000	Should be available by 2029. Will require upgrades at the intertie and additional transmission line work.

Table 4
Possible Parcels Of Concern

Map ID	Owner	Land Use Description	Site Address*	Capture Zone Location	Septic	Priority Ranking
114	City of Battle Ground	Bio-Filtration Swales/Ponds	No Address	6-Month Zone, Wells 7 & 8	No	Low
115	City of Battle Ground	Sanitary Pump Station	2807 SW 11th St	6-Month Zone, Wells 7 & 8	No	Low
9	West Main LLC	Drive Through Car Wash	512 W Main St	6-Month Zone, Wells 1 & 2	No	Medium
10	West Main LLC	Tires, Batteries, Parts	510 W Main St	6-Month Zone, Wells 1 & 2	No	Medium
201	City of Battle Ground	Bio-Filtration Swales/Ponds	No Address	6-Month Zone, Wells 4 & 5	No	Low
112	City of Battle Ground	Bio-Filtration Swales/Ponds	2509 SW 11th Cir	6-Month Zone, Well 9	No	Low
108	City of Battle Ground	Bio-Filtration Swales/Ponds	No Address	6-Month Zone, Well 6	No	Low
200	City of Battle Ground	Sanitary Pump Station	505 W 24th Ave	5-Year Zone, Wells 7 & 8	No	Low
61	Hussey Properties Inc	Tires, Batteries, Parts	213 W Main St	5-Year Zone, Wells 1 & 2	No	Medium
43	Washington State Dept Of Transportation	Equipment Storage	2411 W Main St	10-Year Zone, Wells 7 & 8	No	Low
45	Morse Properties LLC	Service Repair Shop	1713 W Main St	10-Year Zone, Wells 7 & 8	No	Low
48	LS Propdrop LLC	Tires, Batteries, Parts	1719 W Main St	10-Year Zone, Wells 7 & 8	No	Low
89	RAA 2010 LLC	Fleet Operation Center & Storage	103 SE 3rd Ave	10-Year Zone, Wells 1 & 2	No	Low
66	Keep America Beautiful LLC	General Repair & Service Garages	403 E Main St	10-Year Zone, Wells 1 & 2	No	Low
64	RAA 2010 LLC	Manufacturing - Food	305 E Main St	10-Year Zone, Wells 1 & 2	No	Low
105	Krause Steven R	Service Repair Shop	303 S Parkway Ave	10-Year Zone, Wells 1 & 2	No	Low
106	Krause Steven R	Service Repair Shop	Part of Above	10-Year Zone, Wells 1 & 2	No	Low
46	Morse Properties LLC	General Repair & Service Garages	1701 W Main St	10-Year Zone, Wells 7, 8, & 9	No	Low
15	Minhas Petroleum Inc	Convenience Store W/ Fuel	16 NW 13th Ave	10-Year Zone, Well 9	No	Low
126	Pacwest Energy LLC	Convenience Store W/ Fuel	907 W Main St	10-Year Zone (Smoothed)	No	Low
3	Apex Properties BG LLC	Drive Through Car Wash	105 NW 12th Ave	10-Year Zone (Smoothed)	No	Low
145	Fred Meyer Stores Inc	Gas Station	1205 NW 1st St	10-Year Zone (Smoothed)	No	Low
202	Maj BG WA LLC	Convenience Store W/ Fuel	970 SW Scotton Way	10-Year Zone (Smoothed)	No	Low
20	City of Battle Ground	Park	414 E Main St	1000-Foot Buffer	No	Low
141	D.E.A.L. Properties LLC	Convenience Store W/ Fuel	409 E Main St	1000-Foot Buffer	No	Low
24	Laynes Funeral Home	Funeral Services & Crematories	16 NE Clark Ave	1000-Foot Buffer	No	Low
23	Laynes Funeral Home	Funeral Services & Crematories	Part of Above	1000-Foot Buffer	No	Low
2	Squires Kasey & Katrina L	General Repair & Service Garages	212 NE Grace Ave	1000-Foot Buffer	No	Low
86	Winders Eugene L	General Repair & Service Garages	715 SE 1st St	1000-Foot Buffer	No	Low
16	RAA 2010 LLC	Manufacturing - Plastics	15 NE Grace Ave	1000-Foot Buffer	No	Low
146	Clark County General Services	Railroad Right-Of-Way	No Address	1000-Foot Buffer	No	Low
203	Bergman Rodney K & Jill K Trustees	Service Repair Shop	1509 SW 12th Ave	1000-Foot Buffer	No	Low
204	2G Property Holdings LLC	Tires, Batteries, Parts	18 NW 18th Ave	1000-Foot Buffer	No	Low
205	Paint The Rainbow LLC	Paint Store	1808 W Main St	1000-Foot Buffer	No	Low
206	Battle Ground Market Center	Paint Store	2312 W Main St	1000-Foot Buffer	No	Low

See Figure 4 for parcel locations. *All parcel addresses are in Battle Ground, WA 98604.

Table 5

Summary Of Environmental Sites Within Wellhead Protection Capture Zones

Map ID	Facility Site ID	Cleanup Site ID	Facility Name	Cleanup Site	Hazardous Materials	UST	LUST	Storm Water	Capture Zone Location Capture Zone Location	Priority Ranking
35	71217895	3703	Sholund Family Farm	Y					6-Month Zone, Well 6	Low
36	73713224	7120	CFM Site	Y		Y	Y		6-Month Zone, Wells 1 & 2	Low
37	81695495	10621	Battle Ground School District 119			Y	Y		1-Year Zone, Wells 1 & 2	Medium
39	86416754	578	Graces Cleaners	Y	Y				5-Year Zone, Wells 1 & 2 AND 10-Year Zone, Well 6	Medium
1	1051	4980	Union 76	Y		Y	Y		5-Year Zone, Wells 1 & 2	Low
25	7256537		Andersen Dairy Inc		Y			Y	5-Year Zone, Wells 1 & 2	Low
32	37223232		Cenex Harvest States Old Station		Y	Y			5-Year Zone, Wells 1 & 2	Low
43	99375277		QWEST Communications Battleground CDO		Y	Y			5-Year Zone, Wells 1 & 2	Low
30	31157289		Village Mart			Y			10-Year Zone, Well 9	Medium
4	4282	11627	Vancouver Clinic Battle Ground	Y	Y				10-Year Zone, Wells 7 & 8	Low
19	1577475		Williams Gas Pipelines Northwest Pipeline		Y				10-Year Zone, Wells 4 & 5	Low
24	7134825		Battle Ground School District 119		Y		Y		10-Year Zone, Wells 1 & 2	Low
31	32749129	5875	Battle Ground Farm & Home	Y		Y	Y		10-Year Zone, Wells 1 & 2	Low
34	64531412		Parkway North Health Care Nurs		Y				10-Year Zone, Wells 1 & 2	Low
38	82713854	10658	Draper Cf DBA Drapers City Cleaners	Y		Y	Y		10-Year Zone, Wells 1 & 2	Low
33	58523474	9812	Jacksons Food Stores 500	Y	Y		Y		10-Year Zone (Smoothed)	Low
101	18357		Wal Mart Battle Ground		Y				10-Year Zone (Smoothed)	Low
102	20772		Safeway Store 4313		Y				10-Year Zone (Smoothed)	Low
17	23782	5228	Battle Ground Chevron	Y		Y	Y		1000-Foot Buffer	Low
21	3506334		Albertsons 592		Y				1000-Foot Buffer	Low
27	9977600	5509	Battle Ground Mini Mart 805	Y		Y	Y		1000-Foot Buffer	Low
28	15491331	5582	Battle Ground Scott Bros	Y		Y	Y		1000-Foot Buffer	Low
29	25875197		Lewis Rock & Redi Mix Inc Main St			Y			1000-Foot Buffer	Low
40	89645195	3708	WA DOT Battle Ground	Y					1000-Foot Buffer	Low
41	90426683	11004	Battle Ground Inn	Y		Y	Y		1000-Foot Buffer	Low
42	92132423		Dorsey Bus Service Inc Main St E		Y	Y			1000-Foot Buffer	Low
100	61465		Blue Star Cleaners		Y				1000-Foot Buffer	Low

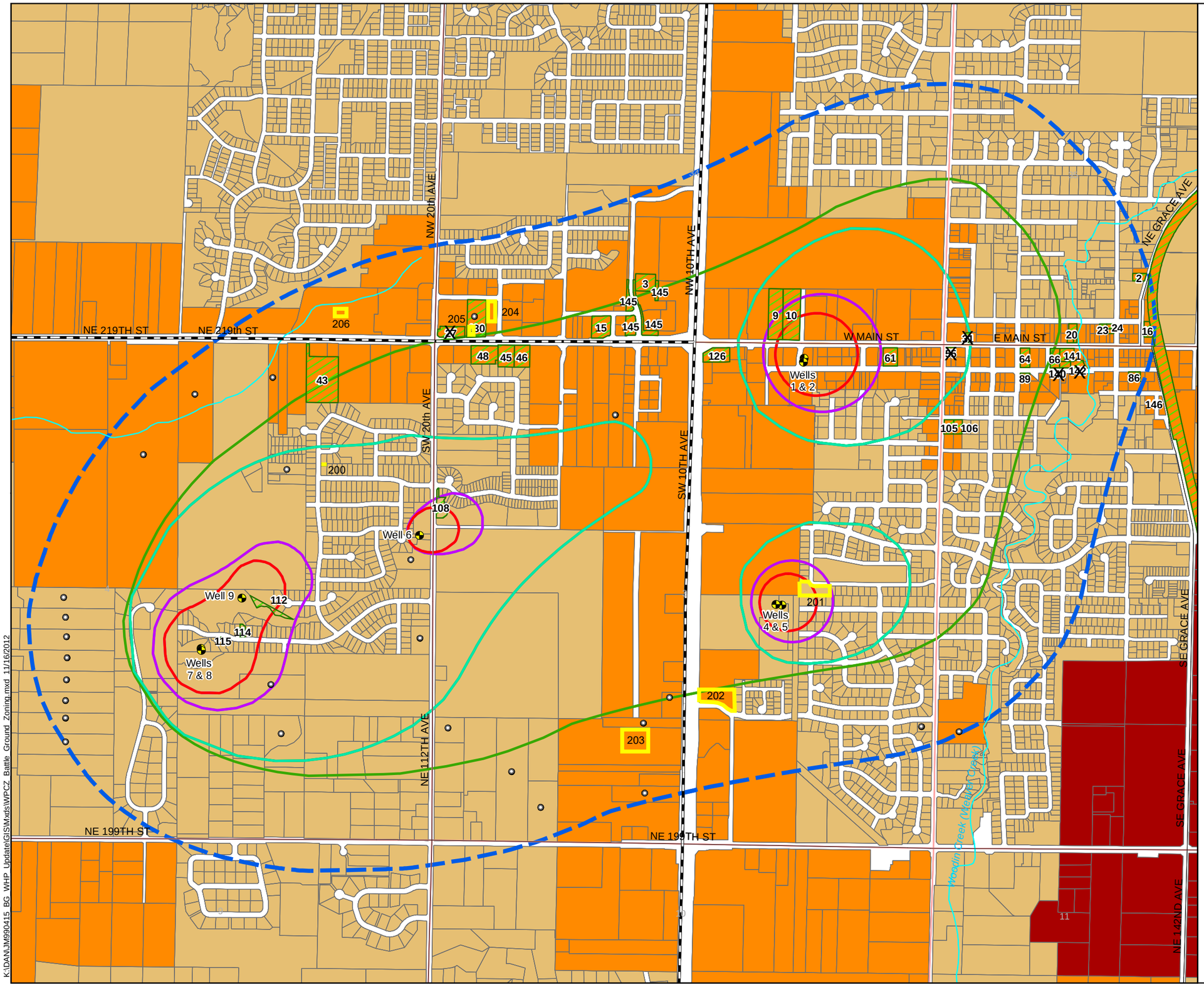
See Figure 5 for site locations. See Table 6 for supplemental information about cleanup sites. "No further action" (NFA) cleanup sites receive low priority rankings for risk of contamination

Table 6
Summary Of Cleanup Sites Within Wellhead Protection Capture Zones

Map ID	Facility Site ID	Cleanup Site ID	Facility Name	ISIS Site Summary Report
1	1051	4980	Union 76	This site had petroleum contaminated soil and groundwater and was cleaned up through the Voluntary Cleanup Program. This site was removed from the Hazardous Sites List in August 2017.
4	4282	11627	Vancouver Clinic Battle Ground	This site has been cleaned up and complies with the standards in the state's environmental cleanup law, the Model Toxics Control Act.
17	23782	5228	Battle Ground Chevron	The site is being cleaned up under MTCA, an Ecology supervised/conducted cleanup has been started. A routine cleanup was performed in 1995-96, but the site was reopened in 2000 due to LUST contamination. Halogenated organics and PAH's have been remediated in the soil, but petroleum products are currently confirmed above cleanup level in the soil and groundwater.
27	9977600	5509	Battle Ground Mini Mart 805	This site has confirmed or suspected contamination that could potentially harm people and the environment. It is in the state cleanup process under the Model Toxics Control Act.
28	15491331	5582	Battle Ground Scott Bros	The site is being cleaned up under MTCA, an Ecology supervised/conducted cleanup has been started. A LUST was identified in 1996 and notice of a cleanup site issued in 2005. Petroleum contamination is confirmed above cleanup levels in the soil and groundwater.
31	32749129	5875	Battle Ground Farm & Home	This site has confirmed or suspected contamination that could potentially harm people and the environment. It is in the state cleanup process under the Model Toxics Control Act.
33	58523474	9812	Jacksons Food Stores 500	This site has been cleaned up and complies with the standards in the state's environmental cleanup law, the Model Toxics Control Act.
35	71217895	3703	Sholund Family Farm	This site has been cleaned up and complies with the standards in the state's environmental cleanup law, the Model Toxics Control Act.
36	73713224	7120	CFM Site	The site is awaiting cleanup under MTCA. LUST notifications were issued in 1991 and 1996, and an initial investigation was performed in 2005. Petroleum contamination is confirmed above cleanup levels in the soil and suspected in groundwater.
37	81695495	10621	Battle Ground School District 119	This site has confirmed or suspected contamination that could potentially harm people and the environment. It is in the state cleanup process under the Model Toxics Control Act.
38	82713854	10658	Draper Cf DBA Drapers City Cleaners	This site has confirmed or suspected contamination that could potentially harm people and the environment. It is in the state cleanup process under the Model Toxics Control Act.
39	86416754	578	Graces Cleaners	This site has confirmed or suspected contamination that could potentially harm people and the environment. It is in the state cleanup process under the Model Toxics Control Act.
40	89645195	3708	WA DOT Battle Ground	This site has confirmed or suspected contamination that could potentially harm people and the environment. It is in the state cleanup process under the Model Toxics Control Act.
41	90426683	11004	Battle Ground Inn	This site has been cleaned up and complies with the standards in the state's environmental cleanup law, the Model Toxics Control Act.

Table 7
City's Chain-Of-Command For Spill Response

Title	Name	E-Mail	Phone
1. On Duty Battalion Chief	Variable	n/a	(360) 892-2331
2. Stormwater Program Coordinator	Chad Schwatka	chad.schwatka@cityofbg.org	(360) 342-5068
3. Public Works Director	Mark Herceg	mark.herceg@cityofbg.org	(360) 342-5075
4. Public Works Supervisor	Don Risto	don.risto@cityofbg.org	(360) 342-5361
5. Lead Maintenance Worker	Bobby Miller	bobby.miller@cityofbg.org	(360) 342-5365



K:\DAN\JM990415_BG_WHP_Update\GIS\MXDs\WPCZ_Battle_Ground_Zoning.mxd 11/16/2012

Figure 4

Zoning and Parcels of Concern

Prepared for
City of Battle Ground

Prepared by
Pacific Groundwater Group

Battle Ground Supply Well

86 Parcels of Concern

Septic Systems (from County)

Zoning Categories

- Industrial
- Residential
- Commercial
- Park/OS/Public

Extended Wellhead Protection Capture Zones

- 6 Month Capture Zone
- 1 Year Capture Zone
- 5 Year Capture Zone
- 10 Year Capture Zone
- 1000-foot Buffer

2022 Addendum

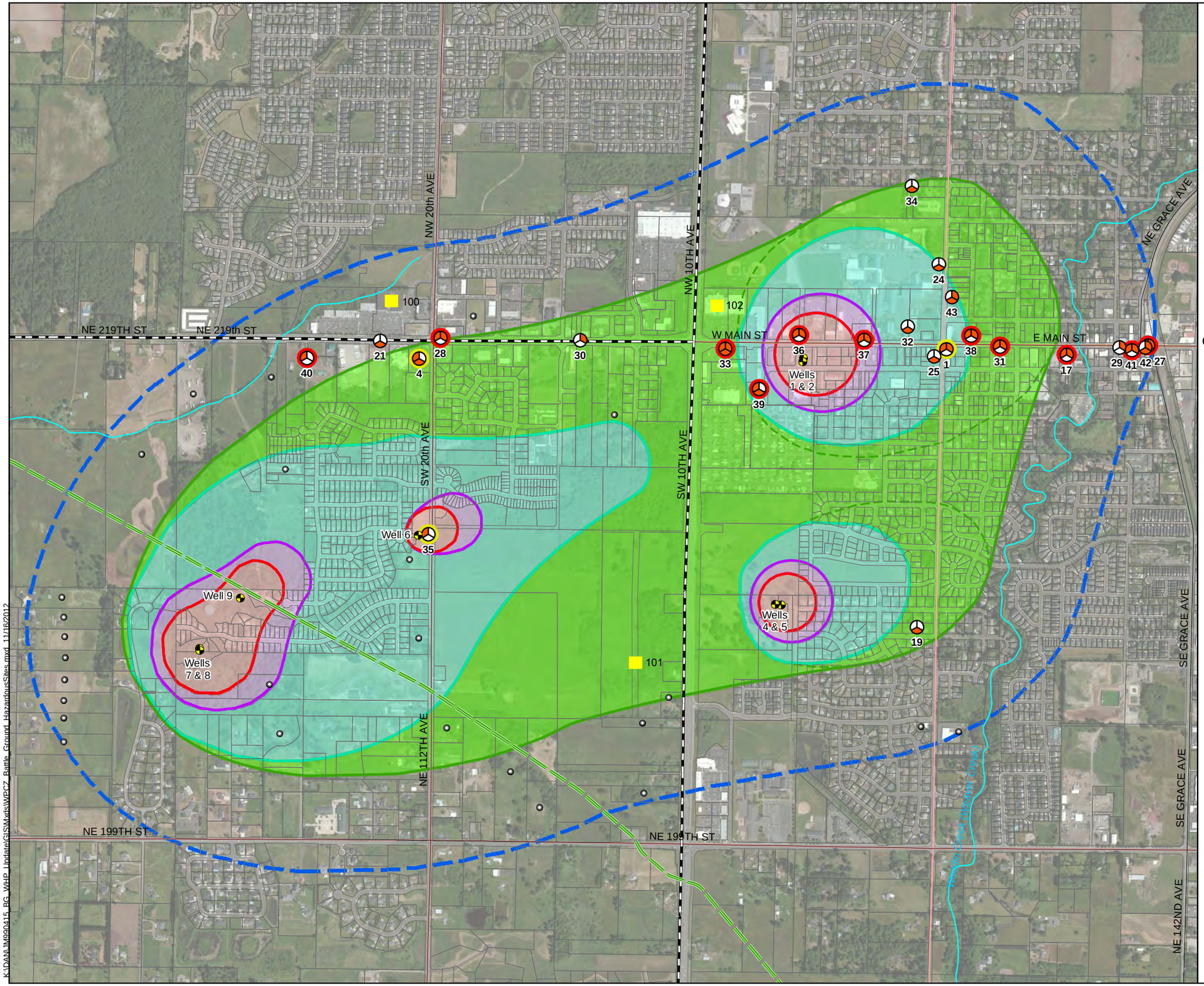
Prepared By The City of Battle Ground

200 Parcels of Concern (Updated)

X Eliminated From Table

0 1,000 Feet

Map Projected in Washington State Plane, South Zone, NAD83 Datum



K:\DAN\JM990415_BG_WHP_Update\GIS\MXDs\WPCZ_Battle_Ground_HazardousSites.mxd 11/16/2012

Figure 5

Environmental Sites within Wellhead Protection Capture Zones

Prepared for
City of Battle Ground

Prepared by
Pacific Groundwater Group

Battle Ground Supply Well

DOE Sites of Concern
- Known Release
- Known Release (No Further Action)

Table 5 ID → Cleanup Site: 11 → UST/LUST; Hazardous Materials

Refer to Section 4.3 and Table 5 for description.

Septic Systems (from County)

Gas Transmission Pipelines

Wellhead Protection Capture Zones
- 6 Month Capture Zone
- 1 Year Capture Zone
- 5 Year Capture Zone
- 10 Year Capture Zone
- 1000-foot Buffer

2022 Addendum
Prepared By The City of Battle Ground

ECY Site of Concern - Hazardous Materials

N W E S

0 1,000 Feet

Map Projected in Washington State Plane, South Zone, NAD83 Datum

Appendix A
Documentation Of Wellhead Protection Program Notifications

Sample Letter to Potential Source Owners/Operators:

Date

Address of Local Business (see Table 4)

RE: City of Battle Ground Wellhead Protection Plan

To Whom It May Concern:

The City of Battle Ground has developed a Wellhead Protection Plan to help maintain drinking water quality for our city residents. The Plan is based on Washington Department of Health WAC 246-290-135(3) regulations. As part of the Plan, maps were prepared that show the areas around each city drinking water well where a chemical spill on the ground may cause contamination of the well/aquifer. These areas are Wellhead Protection Areas (WHPA). The Plan also requires an inventory of potential sources of groundwater contamination within these wellhead protection areas.

The primary purpose of this letter is to notify you that your facility is located within our WHPA. Since your business or the activities conducted at your facility may involve the use of chemicals (e.g. gasoline, underground storage tanks, hazardous waste, etc.), and the potential exists that a chemical spill from your facility may adversely impact the city drinking water supply, please notify the City of Battle Ground immediately if a chemical spill occurs at your facility. All spills should be reported by dialing 911 and requesting that the City of Battle Ground Fire Department and Southwest Washington Health Department be contacted.

Thank you for assisting us in protecting our water supply and groundwater resources. If you have any questions, please contact me at (360) 342-5075.

Sincerely,

Mark Herceg, PE
Public Works Director
City of Battle Ground

Sample Letter to Ecology:

Date

Department of Ecology
Southwest Regional Office
PO Box 47775
Olympia, WA 98504-7775

RE: City of Battle Ground Wellhead Protection Plan

Dear Department of Ecology:

The City of Battle Ground has developed a Wellhead Protection Plan to help maintain the drinking water quality for our city residents. The Plan is based on Washington Department of Health WAC 246-290-135(3) regulations. As part of the Plan, maps were prepared that show the areas around each city drinking water well where a chemical spill on the ground may cause contamination of the well/aquifer. These areas are Wellhead Protection Areas (WHPA).

The enclosed map depicts the WHPA boundary, source wells, and identified potential contaminant sources. Also enclosed is a table with names and location information for each site. Please review the map and use it as a reference when inspecting and permitting the storage, use, and disposal of hazardous material within our WHPA.

Please note that the City of Battle Ground has sent notices to each of these properties informing them of their location within the WHPA boundary. The City has also sent similar letters to properties with land uses that could contaminate groundwater quality.

Thank you for your attention in this matter. If you have any questions or would like a copy of the wellhead protection plan, please contact me at (360) 342-5075.

Sincerely,

Mark Herceg, PE
Public Works Director
City of Battle Ground

Sample Letter to Police Department:

Date

Mike Fort, Police Chief
Battle Ground Police Department
507 SW 1st Street
Battle Ground, WA 98604

RE: City of Battle Ground Wellhead Protection Plan

Dear Chief Fort:

The City of Battle Ground has developed a Wellhead Protection Plan to help maintain the drinking water quality for our city residents. The Plan is based on Washington Department of Health WAC 246-290-135(3) regulations. As part of the Plan, maps were prepared that show the areas around each city drinking water well where a chemical spill on the ground may cause contamination of the well/aquifer. These areas are Wellhead Protection Areas (WHPA).

As part of this Plan, the city must provide wellhead protection information to agencies responsible for incident/spill response procedures. It is important that you are aware of where potential contaminant releases could adversely impact the quality of our communities drinking water supply.

A map of the wellhead protection areas and adjacent transportation routes is enclosed for your review. An acknowledgement of receipt of this information or a response from your office as part of our wellhead protection plan documentation would be appreciated.

In the event of a spill or contaminant release, we would ask that you notify immediately us and the Department of Ecology, so that we can take appropriate measures to deal with the problem.

Thank you for your attention in this matter. If you have any questions or would like a copy of the wellhead protection plan, please contact me at (360) 342-5075.

Sincerely,

Mark Herceg, PE
Public Works Director
City of Battle Ground

Sample Letter to Fire Department:

Date

Chief Scott Sorenson
Clark County Fire District No. 3
17718 NE 159th Street
Brush Prairie, WA 98606

RE: City of Battle Ground Wellhead Protection Plan

Dear Chief Sorenson:

The City of Battle Ground has developed a Wellhead Protection Plan to help maintain the drinking water quality for our city residents. The Plan is based on Washington Department of Health WAC 246-290-135(3) regulations. As part of the Plan, maps were prepared that show the areas around each city drinking water well where a chemical spill on the ground may cause contamination of the well/aquifer. These areas are Wellhead Protection Areas (WHPA).

As part of this Plan, the city must provide wellhead protection information to agencies responsible for incident/spill response procedures. It is important that you are aware of where potential contaminant releases could adversely impact the quality of our communities drinking water supply.

A map of the wellhead protection areas and adjacent transportation routes is enclosed for your review. An acknowledgement of receipt of this information or a response from your office as part of our wellhead protection plan documentation would be appreciated.

In the event of a spill or contaminant release, we would ask that you notify immediately us and the Department of Ecology, so that we can take appropriate measures to deal with the problem.

Thank you for your attention in this matter. If you have any questions or would like a copy of the wellhead protection plan, please contact me at (360) 342-5075.

Sincerely,

Mark Herceg, PE
Public Works Director
City of Battle Ground

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Appendix L

Consumer Confidence Report

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Water Quality Report

for water testing perfomed in 2020







Our Commitment to You
Safe Drinking Water

Each year we publish a water quality report to inform you – our valued customers – of where your water comes from, how it is delivered and the practices we employ to ensure we are providing safe, high quality water. As you will see in this report, we meet every water quality requirement.

Please let us know if you have any questions or concerns. You may reach us at 360-342-5350 or online at **www.cityofbg.org/ask-utilities**.

Where does your water come from?

In 2020, the city of Battle Ground provided over 581 million gallons of high-quality tap water to more than 6,000 customers. Your water comes from local underground aquifers and is delivered through a system of wells, pump stations, covered reservoirs, and an intertie with Clark Public Utilities.

Water quality is monitored and tested regularly throughout the distribution system.

The city meets all standards for safe drinking water.

Backflow Prevention

Backflow is the reverse flow of water from its "normal" direction of flow in a piping system. It can happen when a change of pressure occurs. Backflow can cause unwanted contaminants to get into the water system. To control this, a backflow prevention device is placed on all irrigation lines. The City requires this device to be tested annually. To learn more, please visit **www.cityofbg.org/BackflowPrevention**.

Building for the Future - CPU Intertie Upgrade

In 2020, the city finalized an agreement and upgraded the water intertie system with Clark Public Utilities. The new upgrade provides up to 2,000 gallons of water per minute as needed. The additional water system capacity will serve the city for years to come.

The project was paid for by new development. Water System Development Charges are assessed and collected at the time of new development to offset the cost its share of water system capacity.

Being Water Smart

Efficient Water Use Benefits Everyone

We all play a role in using water efficiently. Being water smart can cut your summer water usage and costs appreciably.

The city is required to build and maintain a water system that meets peak customer demand. When water use during the hot summer season spikes, it affects the cost of the entire system year-round. That is why smart, efficient use of water is so important during the months of June through September.

We encourage you to participate in this summer's Odd/Even Watering Program. It's easy and effective. It helps distribute water demand, reducing costly high demand spikes on the system.

Odd/Even Watering Program

Simple. Effective.

123 Your Street

Address ends in <u>odd</u> number?

Irrigate your lawn and garden on **Sunday, Tuesday, & Thursday**

122 Your Street

Address ends in an <u>even</u> number?

Irrigate your lawn and garden on **Saturday, Monday, & Wednesday**

Friday is a non-watering day for everyone.

You can maintain a lawn & garden *and* conserve water. It's simply a matter of efficient use. For tips and resources, visit **www.cityofbg.org/conserve-water.**

Monitoring Your Water

To ensure that water is safe to drink, the Environmental Protection Agency (EPA) and the WA State Department of Health prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. To meet these standards the city contracts with a state-certified laboratory to conduct water quality analyses. Analyses are performed on water samples that are regularly taken from the source wells and distribution system. The wells are tested for chemical, physical, radioactive, and bacteriological parameters as required by Federal and State regulations.

In addition to well testing, the water quality is monitored throughout the distribution system. Several key locations within the distribution system have been selected for this purpose. Each location is tested for bacteria, color, turbidity, odor, and disinfectant level to assure that you receive safe and high quality drinking water.

The city's water system is currently supported by 8 wells, 6 reservoirs, 2 booster pump stations and a water intertie with Clark Public Utilities. Water is pumped from underground aquifers via the wells where it is then disinfected. The water then passes through a filter, for purification, before it travels to the reservoirs for storage and distribution. The booster pumps are used to sustain water flow to ensure adequate water pressure to support the functionality of the system.

Clark Public Utilities Water Quality Report can be viewed by visiting **www.clarkpublicutilities.com/about-cpu/public-documents/water-quality-reports**.

Water and your Health

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants doesn't necessarily indicate that water poses health risks. Some people may be more vulnerable to contaminants in drinking water than the general population.

An immunocompromised person such as person with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or with other immune system disorders, and some elderly and infants can be particularly at risk from infections. These people should seek advice about drinking water from their healthcare providers.

Our Water Treatment Process

Step #1 - Disinfection: A small amount of chlorine is added to eliminate bacteria and micro organisms that may be in the water.

Step #2 - Filtration: Water passes through filters containing a granular material that removes very small particles from the water.

Step #3 - Fluoridation: Fluoride is added to promote dental health.

Routine tests are conducted to ensure your water meets all of the Environmental Protection Agency's standards for healthy water.

EPA Regulated Compounds

Trihalomethanes

Chemical	Results	Units	SRL	MCL	MCLG
Trihalomethanes (7)	2.1	pCi/L	.50	80	N/A
Bromodichloromethane (7)	1.5	ug/L	0.5	N/A	N/A
Bromoform (7)	0-.95	ug/L	0.6	N/A	N/A
Dibromochloromethane (7)	1.6	ug/L	0.5	N/A	N/A

Volatile Organic Chemicals

Chemical	Results	Units	SRL	MCL	MCLG
Tetrachlorothene (6)	.0-.62	ug/L	.5	5.0	0

Inorganic Chemicals

Chemical	Results	Units	SRL	MCL	MCLG
Fluoride (2)	.81	Mg/L	.05	4	4
Nitrate-N (3)	0-1.4	Mg/L	0.5	10	10
Chloride (4)	26	ug/L	20	250	N/A

EPA Unregulated

Chemical	Results	Units	SRL	MCL	MCLG
Copper (5)	.57	Mg/L	.02	1.3	N/A
Lead (5)	.015	Mg/L	.001	.015	2

EPA Regulated (Secondary)

Chemical	Results	Units	SRL	MCL	MCLG
Iron (4)	.16	Mg/L	.1	.30	N/A
Manganese (4)	.018	Mg/L	.01	0.05	N/A
Sodium (1)	0-13	Mg/L	5.0	N/A	N/A

Radionuclides

Chemical	Results	Units	SRL	MCL	MCLG
Gross Alpha	4.8	pCi/L	3.015	50	0

What do the tables above mean?

The tables show the results of our water quality analysis for 2015-2020. Every regulated contaminant that we detect in the water, even in the most minute traces, is listed here. The table contains the name of each substance, the findings, the highest level allowed by regulation (MCL), the ideal goals for public health (MCLG), and in the notes below, common sources of the contaminants detected.

NOTES:

(1) Erosion of natural deposits

(2) Fluoride: Water additive that promotes strong teeth

(3) Nitrate-N: Erosion of natural deposits, septic systems, sewage and pesticides

(4) Chloride: Natural occurring by-product

(5) Natural erosion of copper plumbing

(6) Discharge from industrial and/or commercial sites

(7) Chlorine by-products

Highest level tested is indicated and is not indicative of consistent testing on this element. All results are from treated water samples.

Acronyms:

SRL - State Reporting Level
MCL - Maximum Contaminant Level
MCLG - Maximum Contaminant Level Goal

Units:

ug/L = Micrograms/ Liter
ppb = Parts per Billion
mg/L = Milligrams per Liter
ppm = Parts per Million

- Información será traducida al español a petición de cityclerk.info@cityofbg.org.
- Информация имеется на русском языке по запросу на cityclerk.info@cityofbg.org. 如需相关信息的中文版本，请来函索取：cityclerk.info@cityofbg.org
- Za informacije na bosanskom jeziku obratite se na adresu cityclerk.info@cityofbg.org
- Ang impormasyon ay makukuha sa Tagalog sa pamamagitan ng kahilingan sa cityclerk.info@cityofbg.org
- Gửi yêu cầu nhận thông tin sẵn có bằng tiếng Việt đến cityclerk.info@cityofbg.org

Appendix M
Hydraulic Model Node Diagram

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Tukes Mountain Res. No. 1
0.25 MG
Overflow Elev: 529'
Height: 35'

Tukes Mountain Res. No. 2
0.18 MG
Overflow Elev: 529'
Height: 50'

Tukes Mountain Res. No. 3
0.17 MG
Overflow Elev: 529'
Height: 45'

Tukes Mountain Res. No. 4
0.15 MG
Overflow Elev: 529'
Height: 40'

Tukes Mountain Res. No. 5
1.03 MG
Overflow Elev: 529'
Height: 38'

CPU Intertie
NE 219th St
(2,000 gpm)

NE 219th St BPS

Tukes Mountain BPS

Well No. 9
(500 gpm)

Well No. 6
(Offline)

Wells No. 1 and No. 2
(190 and 90 gpm)

Wells No. 4 and No. 5
(60-70 gpm each)

Wells No. 7 and No. 8
(Offline)

Horsethief Reservoir
2.06 MG
Overflow Elev: 296'
Height: 31'

Horsethief Pump Station

CPU Intertie
NE 122 Ave
(547 gpm)
(Emergency)

East Fork Lewis River
Mill Creek
Woodin Creek
Salmon Creek
NE Manley Rd
NE Lewisville Hwy
NE Axford Rd
NE 147th Ave
NE 152nd Ave
NE 249th St
NE 244th St
NE 239th St
NE 92nd Ave
NE 112th Ave
NW 25th St
NE 122nd Ave
NE 132nd Ave
NE 142nd Ave
NW 10th Ave
NW 20th Ave
N Parkway Ave
NE Grace Ave
W Main St
NE 219th St
SW 20th Ave
NE 167th Ave
SE Eaton Blvd
NE 199th St
NE 189th St
SW 40th St
SE Grace Ave
NE 142nd Ave
NE 159th St
NE 117th Ave
NE 154th St
NE Caples Rd
NE 152nd Ave

Legend

- Wells
- Intertie
- Pump Station
- Reservoir

Pressure Zones

- 529 Zone (Main)
- 784 Zone (Tukes Mountain)

Planning Boundaries

- City Limits
- Urban Growth Area
- Retail Service Area
- Future Service Area

C:\DWG\COPY_OF_APP_M_HYDRAULIC_NODE_DIAGRAM.MXD BY: SPERKINS PLOT DATE: DEC 29, 2021 COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON SOUTH FIPS 4602 FEET

RH2 NORTH

1 inch = 1,000 feet

0 500 1,000 2,000 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2”

THE CITY OF BATTLE GROUND

Appendix M
Hydraulic Model Node Diagram
City of Battle Ground Water System Plan

Vicinity Map



This map is a graphic representation derived from the City of Battle Ground Geographic Information System. It was designed and intended for the City of Battle Ground staff use only; it is not guaranteed to survey accuracy. This map is based on the best information available on the date shown on this map.

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Appendix N

Water Resolutions and Ordinances

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Title 13
WATER AND SEWERS

Chapters:

13.102 Definitions

13.103 General Provisions

13.105 Utility Rates and Billing Procedure

13.110 Water Service—Connection

13.112 Water Use Regulations

13.113 Water Conservation

13.120 Sewer System—Connection

13.125 Storm Drainage Utility

13.126 Storm Drainage System

13.127 Street Lighting

13.137 Pretreatment of Industrial and Commercial Wastewater

13.140 Wastewater Utility System Franchises

The Battle Ground Municipal Code is current through Ordinance 21-17, passed July 6, 2021.

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Chapter 13.102
DEFINITIONS

Sections:

13.102.010 Definitions.

13.102.010 Definitions.

The following words, when used in this title, shall have the following meanings unless defined differently in another chapter or section, in which case the definitions imposed in such other chapter or section will apply only to that chapter or section, unless the context clearly indicates otherwise:

“City” means the city of Battle Ground, Washington, a municipal corporation created and existing under the laws of the state of Washington.

“Commercial unit” means any building or facility used for any purpose other than dwelling, except industrial.

“Developed” means that condition of real property altered from its natural state by the addition to or construction of such property of impervious ground cover or other manmade physical improvements such that the hydrology of the property or portion thereof is affected.

“Dwelling unit” means one room or a suite of two or more rooms designed for or used by one family or housekeeping unit for living and sleeping purposes and having one kitchen. Each unit shall provide a complete independent living space for one or more persons, including permanent facilities for living, sleeping, eating, cooking and sanitation.

“Equivalent dwelling unit (EDU)” means any residential or nonresidential use which has been found to place a demand on the city’s sewerage system or water system approximately equal to the demand thereon by a single-family dwelling.

“House connection” is defined as the pipe from the meter to the point of use.

“Impervious groundcover” means those hard-surfaced areas either which prevent or retard the entry of water into the soil in the manner that such water entered the soil under natural conditions preexistent to development, or which cause water to run off the surface in greater quantities or at an increased rate of flow than that present under natural conditions preexistent to development, including without limitation such surfaces as rooftops, asphalt or concrete sidewalks, paving, driveways and parking

lots, walkways, patio areas, storage areas, and gravel, oiled macadam or other surfaces which similarly affect the natural infiltration or runoff patterns existing prior to development.

“Industrial user” means a nonresidential user of the public sewer which discharges a waste that is distinct from sanitary sewage, resulting in an industrial waste.

“Industrial waste” means any liquid, solid or gaseous material or combination thereof resulting from any process of industry, manufacturing, commercial, food processing, business, agriculture, trade or research, including, but not limited to, development, recovering or processing of natural resources and:

1. Has a concentration of biochemical oxygen demand (BOD) and suspended solids (SS) in excess of two hundred milligrams per liter per average work day; or

2. Has a discharge containing cadmium, chromium, copper, lead, zinc, silver or similar toxic substances; or

3. Is found by the city, State Department of Ecology or United States Environmental Protection Agency to have a significant impact on the wastewater treatment system; or

4. Has a discharge flow of ten thousand gallons or more per average work day.

“Multiple-family (multifamily) dwelling” means a building or portion thereof designed or used as a residence two or more families and containing two or more dwelling units.

“Plan” means the storm drainage utility plan created by Section 3 of Ordinance No. 467 of the city, passed by the city council on November 1, 1982.

“Service connection” is defined as the pipe, meter and water facilities from the city main or branch line to the outlet side of the meter.

“Single-family dwelling” means a building designed or used for residential purposes by not more than one family and containing one dwelling unit only, including mobile homes when not located in a mobile home park and including condominium units subject to fee simple ownership, and excluding multiple-family dwellings, apartments and motels.

“System” means the entire system of storm drainage facilities owned by the utility or over which the utility has control or right of use for the movement and retention of storm and surface waters, including both naturally occurring and manmade facilities. (Ord. 00-028 § 2, 2000: Ord. 99-025 § 1 (part), 1999: Ord. 95-769 § 2 (part), 1995)

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Chapter 13.103
GENERAL PROVISIONS*

Sections:

13.103.010 Applicability.

13.103.020 Utility connections—Applications.

13.103.030 Utility connections—Linkage to specific building permit.

13.103.040 Utility connections—Expiration.

13.103.050 Connection to utilities.

* Prior ordinance history: Ord. 99-019.

13.103.010 Applicability.

The provisions of this chapter shall apply to all new connections to the utilities of the city of Battle Ground as addressed in this title. (Ord. 00-028 § 3 (part), 2000: Ord. 99-025 § 1 (part), 1999)

13.103.020 Utility connections—Applications.

A. All persons, firms and prospective users desiring to purchase capacity from the city of Battle Ground water, sewer, drainage and lighting utility systems shall first make application therefor on forms to be furnished by the city.

B. The applicant shall state the purposes for which the utility capacity may be required and shall agree, as a condition for the use of the utility, to conform to the rules and regulations provided in this title and to such other rules and regulations as the council may adopt from time to time.

C. No service shall be rendered until a prospective customer has signed the prescribed application. (Ord. 00-028 § 3 (part), 2000: Ord. 99-025 § 1 (part), 1999)

13.103.030 Utility connections—Linkage to specific building permit.

No new connection to any utility addressed this title shall be issued unless it is:

A. Specifically for and in conjunction with a building permit application in accordance with the Battle Ground development code; or

B. Specifically for service to an existing structure necessitating service under any provision of this title; or

C. Necessary to abate any specific health threat or to alleviate any general threat to the health, safety or general welfare of the community. (Ord. 00-028 § 3 (part), 2000: Ord. 99-025 § 1 (part), 1999)

13.103.040 Utility connections—Expiration.

A. Any connection to any utility governed by this title shall expire six months from the date of approval unless:

1. It has been activated and is a currently maintained utility account with the city; or

2. Was issued in conjunction with a building permit that is still active and valid under the provisions of BGMC Title 15.

B. If an active utility account is not kept current under the city's utility billing practices for a period of one year, it shall be considered abandoned and any system capacity attributed to such a connection shall revert to the city.

C. The provisions of subsection B of this section shall not apply to residences subject to foreclosure proceedings, bankruptcies and/or short sales. (Ord. 11-10 § 3, 2011: Ord. 00-028 § 3 (part), 2000: Ord. 99-025 § 1 (part), 1999)

13.103.050 Connection to utilities.

A. No buildings or structures in the city of Battle Ground shall be occupied or used for dwellings or residential purposes unless such buildings or structures are provided with adequate water and sanitation facilities. Any buildings or structures shall be deemed to have adequate water facilities if the same are connected with the Battle Ground water system, and shall be deemed to have adequate sanitation facilities if the same are connected to the city sewer system. Any other water or sanitation facilities must be approved by the public works director or by the council of the city of Battle Ground.

B. It is unlawful for any person, firm, organization or corporation to operate or conduct any business, shop, store or establishment where members of the public, customers, shoppers or purchasers enter in or upon the premises, shop, place of business, or business establishment used in the conduct or operation of such business, without having available upon and at the premises or place of business, water, lavatory and adequate sanitary and sewage facilities. (Ord. 00-028 § 3 (part), 2000: Ord. 99-025 § 1 (part), 1999)

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Chapter 13.105
UTILITY RATES AND BILLING PROCEDURE*

Sections:

13.105.010 Establishing of rates—Review.

13.105.020 Rate information.

13.105.030 Billing.

13.105.035 Enterprise funds.

13.105.040 Responsibility for billing.

13.105.045 Application of payments.

13.105.050 Minimum monthly charge.

13.105.055 Deposits.

13.105.060 Proration.

13.105.070 Meter reading.

13.105.080 Budget payment plan.

13.105.090 Multiple real property ownership.

13.105.100 Adjustment of utility bills.

13.105.110 Lien on property for delinquent accounts.

13.105.120 Termination of water service.

13.105.125 Service calls.

* Prior ordinance history: Ords. 95-769, 98-003, 98-008 and 99-025.

13.105.010 Establishing of rates—Review.

The city shall establish the rates to be charged for each utility. The city staff shall review the utility rates on an annual basis and submit recommendations to city council. Recommendations shall be reviewed and the rate may be amended by the city council on all utility rates to allow for inflation, change costs or any other lawful consideration if it deems advisable. (Ord. 00-028 § 4 (part), 2000)

13.105.020 Rate information.

Rates and connection charges and systems development charges shall be kept on file by the city finance director at City Hall and made available to the public upon request. (Ord. 11-10 § 1 (part), 2011: Ord. 02-009 § 66, 2002: Ord. 00-028 § 4 (part), 2000)

13.105.030 Billing.

A. All utility bills for water, sewage, and storm drainage shall be rendered monthly and shall be called city utilities in this title. The city shall charge a service fee, set by resolution, for setting up each utility account when it is established and when changed from time to time.

B. All utility bills are due and payable on the twentieth day of the following month of the billing and if the twentieth falls on a weekend or holiday the bills are due and payable the following work day. If payment is not received in a timely manner, the unpaid bill shall become delinquent and a termination notice shall be given, informing the customer that termination of service shall occur no sooner than ten days from the date of mailing of the notice of termination of service. Water service may be terminated when any portion of the utility bill is unpaid and delinquent. A late charge shall be levied against any customer who becomes delinquent, which shall be ten percent of the delinquent amount but not less than ten dollars.

C. A notice of hearing shall be included on the termination notice given to the customer, as required by BGMC 13.105.120. In those cases where billing is sent to an occupant not a property owner, termination notice shall be sent to the property owner as well as the tenant. If a hearing is requested by the utility customer within five business days of mailing of the notice, the hearing shall be arranged in accordance with BGMC 13.105.120. Service shall not be terminated until after the date of any hearing. A service charge as set by resolution shall be levied for termination notices which must be paid, prior to reconnection. If service personnel are required to go to the premises for the purpose of reconnecting the service for nonpayment after hours, a fee shall be assessed in accordance with the fee schedule adopted by resolution.

D. Utility services will not be made available to any person or property for which delinquent payments are owed until said payments are made or arrangements satisfactory to the city are documented in writing.

E. If only sewer service is provided to a customer, the service may be terminated if notice of termination is given as provided in this section and notice of hearing is given as provided, upon breach of ordinance or agreement. (Ord. 11-10 § 1 (part), 2011: Ord. 03-004 § 1, 2003; Ord. 00-028 § 4 (part), 2000)

13.105.035 Enterprise funds.

A separate special fund shall be maintained for each utility and designated as an “enterprise fund” for each of said utilities. Such utilities consist of water, sewer, and storm drainage. (Ord. 11-10 § 1 (part), 2011: Ord. 00-028 § 4 (part), 2000)

13.105.040 Responsibility for billing.

All utility bills, including water, sewer, and storm drainage billings, shall be the responsibility of the property owner for purposes of liens which may be assessed by the city of Battle Ground as provided in this chapter. However, duplicate utility billings may be sent to the tenants or residents of commercial or residential property under the following conditions but do not relieve the property owner from liability for charges incurred:

A. Upon the request of the owner of the real property, billing may be sent to the tenant or to an agent of the owner; provided, that a current address of the owner of real property is maintained with the city of Battle Ground, which is the responsibility of the owner, and any changes in the residents or tenants of the property are made known to the city by the owner.

B. Such billing, once sent to the tenant or agent, will become the responsibility of the tenant or agent as well as the property owner, and each can be held jointly and severally liable for such billing.

C. The owner and tenant, or agent, shall sign an application form, giving their consents for the utility service to be billed as provided in this section, and giving the address of each. A copy of such form shall be provided to both the owner of the real property and the tenant or resident of the real property, and such form shall also contain notification of the right of hearing on termination of utilities. (Ord. 11-10 § 1 (part), 2011: Ord. 00-028 § 4 (part), 2000)

13.105.045 Application of payments.

Payments, when received, shall be applied by date in the following sequence: penalties, fees, storm drainage, sewer, water. (Ord. 11-10 § 1 (part), 2011: Ord. 00-028 § 4 (part), 2000)

13.105.050 Minimum monthly charge.

Unless a utility is abandoned under BGMC 13.103.040, the minimum monthly charges for all services will apply. A minimum monthly fee will be charged for each utility. The minimum monthly charge is

designed to pay for the overall city utility infrastructure with consumption charges funding use of the infrastructure. (Ord. 11-10 § 1 (part), 2011: Ord. 00-028 § 4 (part), 2000)

13.105.055 Deposits.

The city may require a deposit for the purpose of guaranteeing payment in case of delinquency or an outstanding balance at time of account closure.

A. Customer/Owners. Applications for water, sewer or storm drainage service by a customer who is the owner or owner's agent of the service property and who has previously been delinquent in paying for such service shall be accompanied by deposit equal to twice the largest bill at the service address applied for the prior two years.

B. Rental Tenants. Applications for service made by the tenant of a rented or leased residential or commercial premises who has previously been delinquent in paying for such service shall be accompanied by a deposit equal to twice the amount of the largest bill at the service address applied for or at the tenant's previous service address for the prior two years unless the tenant can provide satisfactory payment history as required by the city.

Deposits shall not bear interest. Upon termination of service to the customer/owner or rental tenant, the amount of the deposit shall be applied against any water, sewer, storm drainage or other utility charges then due or to become due from the customer/owner or rental tenant, including any late penalties or fees, and shall be remitted to the appropriate fund. If the amount of the deposit is not sufficient to pay the total unpaid charges, remittance shall be made to the appropriate fund or funds pursuant to BGMC 13.105.060. If there is a balance remaining on the deposit after all charges, such balance shall be refunded, less a city processing fee as adopted by resolution.

In the event the finance director determines based on rules and criteria that a deposit is no longer needed to ensure payment prior to termination of services to the customer, the deposit may, with customer consent, be applied to current utility charges.

Nothing in this section shall prevent the city from requiring new or additional deposits should the condition so warrant. (Ord. 11-10 § 1 (part), 2011)

13.105.060 Proration.

If a total period of service of utilities is less than one month for opening and closing bills, opening and closing bills will be prorated on a daily basis. Water meters will be read by the city on the day a notice of change of tenancy or ownership is delivered to the city or as close as possible to such day. Each customer about to vacate any premises with water service by the city shall give notice of their intended removal at least two days prior thereto, specifying the date change in ownership actually

occurred; otherwise, they will be responsible for all water supplied to the premises until the city has notice of such removal. (Ord. 11-10 § 1 (part), 2011: Ord. 00-028 § 4 (part), 2000)

13.105.070 Meter reading.

Meters will be read at appropriate intervals for the preparation of regular bills and at intermediate dates as required for the preparation of opening, closing or special bills. For customers who request for meter reads not resulting from the sale or transfer of property, there is an initial charge for the first read and an additional charge for each additional meter read as adopted by resolution. (Ord. 11-10 § 1 (part), 2011: Ord. 00-028 § 4 (part), 2000)

13.105.080 Budget payment plan.

The finance director is authorized to create and implement a budget plan in accordance with state law for low income customers eligible under the state's program for low income home energy assistance. Such plan shall permit the authorized customer to make payments of utility charges on an annual averaged basis rather than on a per billing cycle basis with at least one annual adjustment to ensure that the amount paid by the customer on an annual basis reflects the actual amount incurred. (Ord. 11-10 § 2 (part), 2011)

13.105.090 Multiple real property ownership.

In the case of multiple real property ownership, one person shall be designated by the property owners to receive the water, sewer and storm drainage bill. Such person may be an association or managing group. If the owners do not make a designation, the city may do so. (Ord. 11-10 § 1 (part), 2011: Ord. 00-028 § 4 (part), 2000)

13.105.100 Adjustment of utility bills.

A. The city manager, or his designee, is empowered to resolve billing disputes upon receipt of request to do so from a city utility customer. Upon receipt of such notice from the customer, the city manager, or his designee, shall review the bill with the customer to see if the amount is justly owed. The customer shall have the right to have a meeting to bring forth reasons and evidence why such bill should not be due and owing.

B. When any customer, in any given billing period, has used according to the water meter a quantity of water which is more than double the average amount of water used on such premises in similar billing periods in prior years, and the water consumption is solely caused by a broken water pipe on the user's premises, then the customer may make an application to the finance director in writing for reduction of the billing. If the application states there was a broken pipe on the customer's premises which caused a large consumption of water, the existence of a broken pipe shall be verified by inspection by public works employees. If it is established by receiving documentation that such broken

pipe has been repaired and approved by the city, a reduction of the bill to an amount that is one-half of the difference between the monthly average for a similar time period and the existing disputed bill. The reduction provided for in this section shall not be allowed if such excess water consumption is due to a customer's neglect or failure to repair the broken pipe. A reduction in billing shall not be permitted if such excess consumption is due simply to leaky faucets or other plumbing fixtures. The city may discontinue service to any premises if the owner refuses to make necessary repairs to avoid waste of water. If after reasonable efforts to contact the owner it is observable that water is being lost through leakage, the city at its option may terminate water service and shall leave a written notice as to its action and the reason therefor.

C. The application by the customer shall be on the forms provided by the city. (Ord. 11-10 § 1 (part), 2011: Ord. 02-009 § 67, 2002: Ord. 00-028 § 4 (part), 2000)

13.105.110 Lien on property for delinquent accounts.

A. All delinquent rates and charges for sanitary sewage disposal service furnished and for a connection with the sewerage system, including the penalties thereon as provided in BGMC 13.105.030, shall become a lien upon the property to which such sewerage service is furnished or such connection is made, superior to all other liens or encumbrances except those for general taxes and special assessments. Enforcement of such lien or liens shall be in the manner provided by law for enforcement of the same and for delinquent sewerage service charges, as provided in RCW 35A.21.150 and Chapter 35.67 RCW. The sewerage lien provided in this section shall be effective for a total not to exceed one year's delinquent service charges without the necessity of any writing or recording of the lien with the county auditor.

B. The city shall have a lien for all delinquent and unpaid charges and fees for storm drainage purposes, including without limitation service charges and system development charges, assessed against all premises to which service was furnished, which lien shall have the superiority established by RCW 35.67.200 and shall be foreclosed in the manner provided in RCW 35.67.220 et seq.

As an additional and concurrent method of enforcing its lien upon any premises for delinquent storm drainage charges, the utility is authorized, in accordance with law and in the manner provided by BGMC 13.105.030, to terminate water service to such premises for so long as any delinquent fees or charges remain unpaid.

C. All delinquent rates and charges for water furnished and for a connection to the water system together with the penalties and interest thereon as provided in BGMC 13.105.030 shall become a lien upon the property to which such water service is furnished or such connection made, superior to all other liens or encumbrances except those for general taxes and special assessments. Enforcement of

such lien or liens shall be in a manner authorized under RCW 35A.21.100 and 35A.21.300. (Ord. 11-10 § 1 (part), 2011: Ord. 00-028 § 4 (part), 2000)

13.105.120 Termination of water service.

As an additional and concurrent method of enforcing the lien of the city for the charges referred to in BGMC 13.105.110(A) or any other sewer charges, the city may terminate the water service from the premises to which such services were furnished or remove that water meter thereon, and such water service shall remain terminated until all such charges plus penalties and fees thereon, together with the charges provided for in the water rate schedule, for turning the water off and turning the water on or reinstalling such water meter shall have been paid.

A. Termination of Water Service to Rental Dwellings. Except in cases involving public health or safety, or as otherwise provided in this chapter, the city will terminate water service to a residential tenant occupying a rented dwelling pursuant to RCW 35.21.290 and 35.21.300 for a delinquent bill only when (1) the bill was incurred by a current occupant; or (2) the dwelling is vacant. When a rented dwelling is occupied by a tenant who has opened an account in their name, no termination or threat of termination will occur because of the tenant's landlord or the obligation of the prior occupant of the premises not currently residing therein; provided, however, the term "threat of termination" shall not include the notices authorized by this chapter.

B. Customer Disputes. Customers disputing their utility services termination shall use the following procedure:

1. If requested by the customer as provided in BGMC 13.105.030, a hearing by the city manager or his designee shall be held not more than five business days after receipt of the request from the customer. The customer shall have the right to come to said hearing and evidence why such utilities should not be terminated.

2. Any hearing under this chapter shall be conducted during normal business hours, on an informal basis. A record of the hearing, including the date of hearing, who was present, and the findings made as to whether or not the bill was justly owing and the reasons therefor shall be made in writing. The written findings shall be filed with the finance director.

3. Whenever notice of termination is required under this chapter for utility termination, such notice shall inform the customer of his or her right to a hearing, the current phone number and address of City Hall where a hearing may be requested, the normal business hours to phone in for a hearing, and the time periods involved if the hearing is requested as to utility termination.

C. Tampered Meter. If the meter had been tampered with and/or the lock removed, the charge for resumption of service shall be increased by an additional fee. If the service is found wrongfully or illegally reconnected after being disconnected for nonpayment, the charge for resumption of service shall be increased by an additional fee.

D. Voluntary or Temporary Termination. Customers may request a discontinuation of utility services when it is anticipated no one will be occupying their residence for an extended period of time. The monthly minimum bill is still required while the service is turned off as well as the city requires the meter be locked during the period of time and will charge a one-time fee for locking the meter and restoring the service. (Ord. 11-10 § 1 (part), 2011: Ord. 02-009 § 68, 2002: Ord. 00-028 § 4 (part), 2000)

13.105.125 Service calls.

For starting or restoring service at the customer's request, the charge shall be no charge for the first such request during regular working hours, and a fee for each request outside of regular office hours.

There shall be a fee for customers who miss an appointment for which a city employee is dispatched to the service address unless the service call is cancelled by the customer twenty-four hours prior to the appointment.

For emergency services, no termination charge shall be made if service is cut off to meet an actual emergency. (Ord. 11-10 § 2 (part), 2011)

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Chapter 13.110
WATER SERVICE—CONNECTION*

Sections:

13.110.010 Service connections.

13.110.015 Water service—Connection.

13.110.017 Conditions required for making connections.

13.110.019 Water extensions and upsizing.

13.110.020 Installation and maintenance responsibilities of customer.

13.110.030 Metered services.

13.110.040 System development charges.

13.110.045 System development charge credits for existing and prior uses.

13.110.046 System development charge credits for system improvements.

13.110.047 Use and transfer of system development charge credits.

13.110.050 Service outside city limits.

13.110.060 Water improvements—Accepted by the city.

13.110.070 Easements.

13.110.100 Acquiring water during emergency—Metering requirements—Billing.

* Prior ordinance history: Ords. 95-769, 98-023, 99-016 and 99-025.

13.110.010 Service connections.

A. It is the desire of the city of Battle Ground to achieve to the maximum extent possible the use of the city's water system by all users within the city of Battle Ground city limits. All premises upon which any portion of a building is situated within the city limits of the city of Battle Ground shall be deemed to be within the area served by the water system and, when the building or structure is used for any purpose requiring a water system, the owner shall cause a separate connection to be made between

the city's water system (or other public water systems as approved by the public works director) and each building or structure. This connection requirement may be waived by the public works director if the building or structure is being built on an existing lot and is more than six hundred feet from the nearest water line.

B. All connections shall be made to the water system in a permanent manner, in conformity with all applicable plumbing laws and codes, subject to the approval of the public works director and the city's standard details and construction requirements.

C. If any such connection is not made within the time provided in this chapter, the public works director or such other employee of the city as the city manager may hereafter designate is authorized and directed to cause the same to be made and to file a statement of the cost thereof with the city treasurer/finance director, which cost shall in no event be less than the water connection charges fixed for the various classes of buildings and applicable to the building to which the connection is made, and thereupon payment of such cost will be made by the water fund. The amount of the charges, together with a penalty of ten percent, plus interest at the rate of ten percent per year upon the total amount of the warrant and penalty, shall be assessed against the property upon which the building or structure is situated, and shall become a lien thereon as provided in BGMC 13.105.110. The total amount when collected shall be paid into the water fund.

D. As a result of anticipated near-term water capacity issues, the city of Battle Ground does not guarantee, or set aside, water service capacity for any new development, redevelopment, or expansion, which increases water usage within the city of Battle Ground service area until such time as additional water capacity becomes available as outlined in the Battle Ground water master plan. (Ord. 19-20 § 1 (part), 2019; Ord. 18-07 § 1 (part), 2018: Ord. 17-07 § 1 (part), 2017: Ord. 16-13 § 1 (part), 2016: Ord. 00-028 § 5 (part), 2000)

13.110.015 Water service—Connection.

The city will maintain all existing service connections, including the meter facilities, subject to the regulations hereinafter included. The house connection shall be installed and maintained by the customer at his own expense and in accordance with the standards established by the city public works department. (Ord. 18-07 § 1 (part), 2018: Ord. 17-07 § 1 (part), 2017: Ord. 00-028 § 5 (part), 2000)

13.110.017 Conditions required for making connections.

Water lines shall be located in city right-of-way to the maximum extent feasible. Any lines placed outside of city right-of-way must be approved by the city engineer. Any lines placed outside of city

right-of-way will be privately maintained unless accepted by the city engineer. (Ord. 18-07 § 1 (part), 2018: Ord. 17-07 § 1 (part), 2017)

13.110.019 Water extensions and upsizing.

Water extensions shall be in the minimum pipe size as required by the city's water design standards. Where water extensions are shown in the city's water system plan the required pipe size will be based on the size called out in the plan. If a developer is required to upsize an existing water line, the new line will be based on the size called out in the plan. (Ord. 19-20 § 1 (part), 2019)

13.110.020 Installation and maintenance responsibilities of customer.

A. The customer shall, at his own risk and expense, furnish, install and maintain in safe condition all equipment that may be required for receiving, controlling and utilizing water at the house connection. The public works department shall not be responsible for any loss or damage caused by the improper installation, maintenance, wrong acts, or negligence of the customer or any of his tenants, agents, employees, contractors or licensees, in installing, maintaining, using or operating such equipment.

B. The city shall not be responsible for any damage to property caused by spigots, faucets, valves, and other equipment that may be opened when service is turned on at the meter in the original installation, or when restoration of service is made after a temporary shutdown. (Ord. 18-07 § 1 (part), 2018: Ord. 17-07 § 1 (part), 2017: Ord. 00-028 § 5 (part), 2000)

13.110.030 Metered services.

A. Each service shall be separately metered. Charges for all water use shall be on a metered rate basis as determined by the classification of the service and the applicable rate schedule.

B. The public works department will furnish, install and maintain a service of such size and location as the applicant may reasonably request from its water distribution main to the property line, or to the easement right-of-way line. Cost of a new service connection shall be as provided in the rate schedule.

C. The meters, whether installed on city or private property, shall be the property of the city. The applicant, as a condition of his contract for water service, guarantees access to the meter for purposes of reading and maintenance thereof.

D. No rent or other charges will be paid by the city for a meter and appurtenant facilities located on a customer's premises.

E. The meters shall register within accepted ranges of accuracy.

F. No service shall be turned on or off except by an authorized agent of the public works department. (Ord. 18-07 § 1 (part), 2018: Ord. 17-07 § 1 (part), 2017: Ord. 00-028 § 5 (part), 2000)

13.110.040 System development charges.

A. A system development charge shall be levied and collected by the city for any development, expansion of use, change of occupancy, or increase in meter size that is found to place additional demand on the city's water system. The system development charge shall be determined by multiplying the base charge per equivalent dwelling unit (EDU), which is established by resolution of the city council, times the number of EDUs of additional demand placed on the system.

B. Persons or firms connecting to water mains or lines or related facilities which have been specially constructed at a cost paid by the city, but not pursuant to local improvement district bonds or through developer funding, which connection shall go to the improvement of the property of the person or firm's connection to said water line, shall pay a cost reimbursement fee to the city based on said person or firm's proportionate share of the costs incurred by the city. (Ord. 18-07 § 1 (part), 2018: Ord. 17-07 § 1 (part), 2017: Ord. 04-013 § 1, 2004: Ord. 00-028 § 5 (part), 2000)

13.110.045 System development charge credits for existing and prior uses.

A credit against the system development charge (SDC) associated with a specific parcel may be granted by the director of public works for the elimination or conversion of existing water services in conjunction with improvement, expansion of use, or redevelopment on such parcel. The credit shall be calculated using the prevailing SDC rate schedule and is subject to the following limitations:

A. A system development credit charge for existing and prior water use shall be granted if the public works director finds that water capacity is available in the service area and the existing or prior use has paid monthly water fees, respectively, for the entirety of the one-year period immediately prior to the date of application for connection. If these two conditions are met, the applicant may apply for a one hundred percent credit against any new SDCs associated with the new use.

B. The credit against the SDC shall apply only to the parcel that the existing or prior water service connection serves.

C. No refunds shall be allowed for credits which exceed the amount of the SDC for which an application for connection is made.

D. In the event a structure is destroyed due to an occurrence outside of the applicant's control, such as destruction by fire, tornado, earthquake, or other "act of God," then the applicant may request to have their services removed such as to not be charged the base monthly service fee. Once the structure has been replaced, in order for the applicant to not be responsible for applicable SDC fees

upon reconnection of service, the reconnection shall occur within one year of the removal of their service, at which time the monthly billing for services will resume. In such a circumstance, the applicable meter removal and installation fees shall still apply. (Ord. 21-08 § 1, 2021)

13.110.046 System development charge credits for system improvements.

A. A credit against the applicable system development charge (SDC) may be granted by the director of public works for the present fair market value of any construction costs incurred in association with the improvement to or new construction of any system improvements provided by the credit applicant (or the credit applicant's predecessor in interest) to facilities that are identified in the capital facilities plan for which system development charges are assessed and required by the city as a condition of approval for the immediate development proposal.

B. The applicability and maximum amount of the potential credits shall be identified by the development approval authority during the applicable permitting process.

C. Credits recognized by the city may be utilized in lieu of cash payment of system development charges for the subject development and/or another development within the incorporated boundaries of the city as further outlined in BGMC 13.110.047.

D. The amount of credit given shall not exceed the system development charge funded portion of the costs identified in the water system plan.

E. Any credits recognized by the city and not utilized within a period of ten years from the date of issuance shall be deemed to have expired and be of no further utilization in lieu of cash payment of system development charges.

F. Prior to receiving system development charge credits, an applicant shall first submit all necessary documentation as determined by the city engineer to ensure the appropriate amount and type of system development charge credits are credited to the applicant. (Ord. 21-08 § 1, 2021)

13.110.047 Use and transfer of system development charge credits.

System development charge credits accrued pursuant to BGMC 13.110.045 and 13.110.046 may be used for the subject development for which they were earned or they may be used instead to offset future system development charge assessments within the incorporated boundaries of the city. System development charge credits may additionally be transferred to another entity for use within the incorporated boundaries of the city. A credit holder may elect to transfer all of their system development charge credits or just a portion thereof.

A. To apply a system development charge credit, the credit holder shall submit a formal letter authorizing the use of their system development charge credits simultaneously with submission of their building permit application. The letter shall specifically include the amount of credits authorized to be applied and the type of credit to be applied. Prior to reducing the system development charge assessment for the accompanying building permit application by the amount of credit set forth in the authorizing letter, the finance director shall verify that the credit account holder has the amount of available credits authorized and the type of credit authorized in the letter. Upon such verification, the city shall then debit the credit account of the credit holder by the amount of system development charge credits applied. The amount of system development charge credits applied shall not exceed the amount of the system development charge assessment.

B. To transfer system development charge credits, the original credit holder shall submit a formal letter to the finance director requesting to transfer credit to another entity for use within the incorporated boundaries of the city. It shall be up to the discretion of the finance director to permit or deny any requested transfer. The finance director shall have the authority to request any additional documentation as may be necessary to determine whether or not said transfer should be permitted. Prior to authorization for any such transfer, the finance director shall verify the availability of the proposed system development charge credits to be transferred. (Ord. 21-08 § 1, 2021)

13.110.050 Service outside city limits.

The public works department, upon approval of the city council, may furnish water service to applicants adjacent to or within normal distance from existing water mains. (Ord. 18-07 § 1 (part), 2018: Ord. 17-07 § 1 (part), 2017: Ord. 00-028 § 5 (part), 2000)

13.110.060 Water improvements—Accepted by the city.

Water improvements will be accepted for provisional maintenance by the city upon recommendation of the city engineer; provided, prior to such acceptance, bonding shall be provided per BGMC 15.136.060. Final acceptance will be made within two years of the date of provisional acceptance when, in the city engineer’s opinion, all specifications have been fully met. The owner and/or his contractor and the utilities must repair any failure within a period specified by the city engineer at the expense of the owner or his contractor or the utilities responsible. (Ord. 18-07 § 1 (part), 2018: Ord. 17-07 § 1 (part), 2017: Ord. 15-04 § 14, 2015)

13.110.070 Easements.

Easements shall be provided pursuant to BGMC 15.136.080. (Ord. 18-07 § 1 (part), 2018: Ord. 17-07 § 1 (part), 2017: Ord. 16-13 § 1 (part), 2016)

13.110.100 Acquiring water during emergency—Metering requirements—Billing.

The city manager or public works director shall be authorized to purchase on a temporary emergency basis from any other water district, water association, or utility, water as required; all such water so purchased shall be metered. All water sold or purchased on any emergency exchange basis shall be metered both ways and the net water consumed shall be billed at the regular billing interval. (Ord. 18-07 § 1 (part), 2018: Ord. 17-07 § 1 (part), 2017: Ord. 00-028 § 5 (part), 2000)

The Battle Ground Municipal Code is current through Ordinance 21-17, passed July 6, 2021.

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City Website: https://www.cityofbg.org/
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Chapter 13.112
WATER USE REGULATIONS*

Sections:

13.112.010 Purpose.

13.112.015 Application approval—Availability of water.

13.112.020 Refusal of service upon use of unsafe or unlawful apparatus.

13.112.030 Inspection of apparatus—Public works department's right of access.

13.112.040 Refusal of service upon excessive demand by customer.

13.112.045 Increase in use.

13.112.050 Right of public works department to terminate service.

13.112.060 Tampering with public water system.

13.112.070 Approval required for abnormal use of water.

13.112.075 Reselling by customers prohibited—Delivery only to customer's premises permitted.

13.112.090 Equipment and property—Customer's liability for damage.

13.112.100 Shutoff valve required.

13.112.110 Cross-connections prohibited when.

13.112.120 Nonliability of city for interruption of service.

13.112.130 Wellhead protection.

* Prior ordinance history: Ords. 95-769 and 99-025.

13.112.010 Purpose.

In order to provide for the public health and safety, water service is furnished to customers subject to the general restrictions set out in Sections 13.112.020 through 13.112.130. (Ord. 00-028 § 6 (part),

2000)

13.112.015 Application approval—Availability of water.

Application approval shall be conditional upon the availability of water as determined by the city, and upon the payment in full of systems development charges set forth in this code. (Ord. 00-028 § 6 (part), 2000)

13.112.020 Refusal of service upon use of unsafe or unlawful apparatus.

The public works department may refuse to furnish water or may discontinue service to any premises where apparatus, appliances or equipment using water is dangerous, unsafe or unlawful. (Ord. 00-028 § 6 (part), 2000)

13.112.030 Inspection of apparatus—Public works department's right of access.

The public works department does not assume liability for inspecting apparatus on the customer's property. The authorized representative of the public works department shall have access to private premises for the purpose of determining compliance with Section 13.112.020. (Ord. 00-028 § 6 (part), 2000)

13.112.040 Refusal of service upon excessive demand by customer.

The public works department may, in the public interest, refuse to furnish water or may discontinue service where excessive demand by one customer may be detrimental to the service which may be furnished to other customers. (Ord. 00-028 § 6 (part), 2000)

13.112.045 Increase in use.

No person, firm, association or corporation may increase its use of service as stated in the application without giving due notice of such increase. In the event of such increase, the customer will be required to pay the city's regular rates for such increased service from the date of connection with and use of the same. (Ord. 00-028 § 6 (part), 2000)

13.112.050 Right of public works department to terminate service.

The public works department shall have the right to refuse or to terminate service to any premises to safeguard against fraud or abuse. (Ord. 00-028 § 6 (part), 2000)

13.112.060 Tampering with public water system.

Whenever the public works director, or his designee, has reasonable grounds to believe that a person, firm or corporation is using water from a fire hydrant without authority, or has otherwise tampered with a water meter, connected to the city water system without authority or is taking water without authority in an egregious or repeated manner, the city manager, public works director, or his designee at their

discretion, is authorized to initiate code enforcement action per Chapter 20.102 BGMC. (Ord. 16-13 § 2, 2016: Ord. 07-01 § 1, 2007: Ord. 00-028 § 6 (part), 2000)

13.112.070 Approval required for abnormal use of water.

Abnormal use of water for filling swimming pools or for similar purposes shall be subject to prior approval of the public works department with regard to the quantity involved and to the time of taking such water. (Ord. 00-028 § 6 (part), 2000)

13.112.075 Reselling by customers prohibited—Delivery only to customer's premises permitted.

No customer shall resell water received through his service connection, nor shall such water be delivered to premises other than specified in the application for service. (Ord. 00-028 § 6 (part), 2000)

13.112.090 Equipment and property—Customer's liability for damage.

The customer shall be liable for any damage to the meter or other equipment or property owned by the public works department which results from an overt or negligent act of the customer, his tenants, agents, employees, contractors or licensees. The public works department shall be reimbursed by the customers for any such damage promptly on presentation of a bill. (Ord. 00-028 § 6 (part), 2000)

13.112.100 Shutoff valve required.

The customer shall install, as close to the meter location as practicable, a suitable shutoff valve in his house connection to the meter that will shut off all service to his premises. (Ord. 00-028 § 6 (part), 2000)

13.112.110 Cross-connections prohibited when.

Regulations of the Washington State Department of Health prohibit cross-connections between the public water supply and unapproved sources. No cross-connections of any type shall be permitted with other sources of supply, or where the circumstances are such that there is danger of backflow of sewer water from unapproved sources or other contaminated liquids through plumbing fixtures, while using or treating equipment, storage tanks and reservoirs, unless prior evidence of compliance with the state plumbing code and approval of the State Health Department are presented.

A. Any and all cross-connections between the city water system and any other water source shall be controlled (or eliminated) under the direction and supervision of the public works director or his/her authorized designee. All such connections shall include backflow prevention assemblies approved by the Clark County health district or the Washington State Department of Health or air-gap separations in lieu thereof. Such installations shall be inspected and tested by a Washington State certified backflow assembly tester (B.A.T.) not less than once each year and may be inspected more often in the discretion of the public works director or his/her designee.

B. Inspections shall be conducted at the user's expense by a qualified B.A.T. to be approved by the public works director. Results of the inspection and testing shall be certified to the city within thirty days of the date the inspection is ordered and notice given to the user.

C. Persons authorized by the public works director shall have access to any premises where such cross-connection exists or is hereafter installed for the purpose of inspecting said installation. Failure of the user to cooperate in the installation, maintenance, repair, inspection or testing of backflow prevention assemblies shall be subject to termination of water service in addition to any other penalties provided by law.

D. The public works director, and/or his/her designee, shall be guided by Chapter 10, Uniform Plumbing Code, state of Washington, and the current edition of the Cross-Connection Control Manual —Accepted Procedure and Practice, published by the Pacific Northwest Section, American Waterworks Association, or as it may hereafter be amended.

E. The owner and/or user of any property where a cross-connection now or hereafter exists shall be liable to third parties for any and all damages sustained as a result of said cross-connection. This liability shall include indemnification of the city of Battle Ground for any such damages suffered by it, including attorneys' fees and costs of defense.

F. The minimum backflow protection on an irrigation or any other system shall be a double-check valve assembly (DCVA). Atmospheric vacuum breakers (AVB) shall not be used as the sole backflow preventer in any type of system. Residential hose bibs are excluded. Irrigation systems or any other system with chemical injection of any kind shall have a minimum of a reduced pressure backflow preventer (RPBA) installed. (Ord. 13-07 § 8, 2013: Ord. 07-02 § 1, 2007: Ord. 00-028 § 6 (part), 2000)

13.112.120 Nonliability of city for interruption of service.

The city shall not be liable for damages resulting from interruption of service. Temporary shutdown may be made for the purpose of repairs and improvements. The city shall not be liable for interruptions, shortage or insufficiency of service, or for any loss or damage occasioned thereby, or resulting from accident, act of God, fire, strikes, or other cause beyond its control. (Ord. 00-028 § 6 (part), 2000)

13.112.130 Wellhead protection.

Any person, firm or corporation causing damage to any well, wellhead or related capital facilities belonging to or used by the city of Battle Ground for obtaining or providing of public water shall be liable for any actual damages incurred in repairing such facilities or restoring the public water supply or any replacement thereof. All uses identified by the Washington State Department of Health not to

be near an established wellhead are prohibited within a one-hundred-foot radius of such wellhead. (Ord. 00-028 § 6 (part), 2000)

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Chapter 13.113
WATER CONSERVATION

Sections:

13.113.010 Purpose.

13.113.020 Authority.

13.113.030 Policies and procedures.

13.113.040 Variances.

13.113.050 Penalties.

13.113.060 Enforcement.

13.113.070 Severability.

13.113.080 Effective date.

13.113.010 Purpose.

It is in the public interest to promote the conservation of the city's water supply in order to protect the health, welfare and safety of water users. To accomplish this declared purpose, the city reserves the right to exercise its police powers through emergency measures as set forth in this chapter. (Ord. 10-09 § 1, 2010)

13.113.020 Authority.

The public works director, when necessary for the protection of the public health, safety and welfare, shall have the authority to declare various stages of water emergencies and to implement the water conservation measures set forth in this chapter. The public works director shall also have authority to determine whether the various stages of water emergencies and water conservation measures apply to the entire city water service area or to such portions as the declared stage shall apply, and to determine the duration for which the declared stage and its limitations and restrictions shall be in effect. (Ord. 10-09 § 2, 2010)

13.113.030 Policies and procedures.

The following policies and procedures shall apply during the various stages of water emergencies as set forth in this section:

A. Stage I—Anticipated Water Shortage—Internal Preparations. The public works director may declare a Stage I water emergency when a water shortage is anticipated but not immediate. From June 1st through October 31st, the public works director shall conduct public education efforts regarding the benefits and necessity of conservation by the public.

B. Stage II—Serious Water Shortage—Voluntary Conservation. The public works director may declare a Stage II water emergency when a water shortage exists such that immediate voluntary reductions in consumption are necessary due to an unforeseen reduction in water supply and/or weather forecasts predict an extended high temperature event of ninety degrees or higher lasting five or more days. The public works director shall conduct an intensified public information campaign and shall institute a voluntary odd/even residential, commercial, industrial, and governmental alternate-day irrigation program. The city shall reduce usage for designated park irrigation systems that do not affect sports fields.

C. Stage III—Critical Water Shortage—Limited Outdoor Restrictions. The public works director may declare a Stage III water emergency when a water shortage exists such that water supplies are insufficient to meet demand resulting in the inability to replenish water storage reservoirs to an acceptable level. The public works director may, with the city manager's authorization, institute mandatory water usage such that residential, commercial, industrial, irrigation and governmental customers shall water lawns and landscaping on alternate days only, as follows:

1. All such customers with a street address ending in an even number shall water on even-number days, and all such customers with a street address ending in an odd number shall water on odd-number days.

a. The limitations set forth in this section shall not apply to hand watering of flower pots and baskets and vegetable gardens.

b. Upon written request from the customer, the public works director may grant an exemption from the alternate-day watering restrictions for new lawns or landscaping, or other special circumstances such as the use of SMART irrigation controllers.

c. For any initial violation of this section, the customer shall be given a written notice of violation and shall have ten days to make corrections to its watering schedule. Subsequent violations shall be punished in accordance with BGMC 13.113.050.

2. Upon the declaration of a Stage III water shortage emergency, the finance director may impose a rate surcharge of ten percent on all water used by customers with stand-alone irrigation meters and on residential consumption of greater than two thousand one hundred cubic feet per

month, without further city council action. All appeals shall be processed in accordance with Chapter 13.105 BGMC. If the surcharge is not sufficient to resolve the crises, the public works director has the authority to declare that the following nonessential uses of water may be regulated on all properties connected to the city's water system, whether inside or outside of the city:

a. Prohibition of washing sidewalks, walkways, driveways, parking lots, patios, and other exterior paved areas by direct hosing, except as may be necessary to prevent or eliminate materials dangerous to the public health and safety;

b. Escape of water through breaks or leaks within the customer's plumbing or private distribution system for any period of time beyond which such break or leak should reasonably have been discovered and corrected. It shall be presumed that a period of forty-eight hours after the customer discovers a leak or break, or receives notice from the city of such leak or break, whichever occurs first, is a reasonable time in which to correct the same;

c. Noncommercial washing of privately owned motor vehicles, trailers, and boats, except from a bucket or hose using a shutoff nozzle for quick rinses. Commercial washing of motor vehicles, trailers, and boats, etc., will only be allowed with the use of recycled water systems in place;

d. Prohibition of lawn sprinkling and irrigation which allows water to run off or overspray the lawn area. Every customer is deemed to have knowledge of and control over his or her lawn sprinkling and irrigation at all times;

e. Prohibition of sprinkling and irrigation of lawns, ground cover, or other plants, between the hours of 9:00 a.m. and 6:00 p.m. or on any day not authorized by the established rotation schedule;

f. Such other uses as the public works director deems appropriate.

D. Stage IV—Emergency Water Shortage—Mandatory Outdoor Restrictions and Indoor Conservation. The public works director, with the city manager's authorization, may declare a Stage IV water emergency when a water shortage exists such that water levels within water storage reservoirs drop down below the level of adequate fire flow. Water available to the city is insufficient to permit any irrigation, watering or sprinkling, and all available water is needed solely for human consumption, sanitation and fire protection. The public works director may prohibit all nonessential uses of water, including, but not limited to, all vehicle washing, all lawn watering, and all of the uses that may be prohibited for a Stage III water emergency. The public works director shall disseminate information

using every available means to encourage customers to reduce indoor water usage to the maximum extent possible. Upon the public works director's declaration of a Stage IV water shortage emergency, the finance director may impose a rate surcharge of ten percent on residential consumption of greater than one thousand three hundred cubic feet per month and a rate surcharge of fifteen percent on residential consumption of greater than one thousand five hundred cubic feet per month, without further city council action. All appeals shall be processed in accordance with Chapter 13.105 BGMC.

E. Stage V—Regional Disaster—Water Rationing. In the event of a major catastrophe affecting the regional water supply, the city manager, in conjunction with Chapter 2.74 BGMC and the city of Battle Ground emergency management plan, may declare a Stage V regional disaster water emergency when a water shortage exists such that water rationing must be implemented and emergency water distribution may be necessary for customers without water. The public works director is authorized to restrict water use by rationing the amount of water used by residential users to a certain number of gallons per day per person residing within the dwelling unit, by rationing the amount of water used by nonresidential users based on a percentage of their historical usage as calculated by the city, and by any other type of rationing as the public works director deems necessary and appropriate in the circumstances.

F. Implementation Requirements. Prior to the implementation and enforcement of any of the above stages, the public works director shall take reasonable efforts to have information disseminated to affected customers and city council regarding the rationing plan, which shall include, at a minimum, publication in the official newspaper of the city at least once, not less than one week in advance of the effective date of the declaration, information of the declaration of the applicable stage, a description of the limitations and restrictions that would apply, and identification of the effective date of the declared stage and limitations and restrictions. Notwithstanding the publication requirements set forth in this chapter, if it is determined by the public works director that exigent circumstances exist that necessitate immediate implementation and enforcement of any particular stages of water emergency, notice to affected customers may be provided by personal service of the notice on such customers, or by posting notices at the customers' residences (if the customers' residences are the affected sites), or by posting notices at the locations where the customers' utility services are received (if the affected sites are not their residences). (Ord. 10-09 § 3, 2010)

13.113.040 Variances.

The public works director may grant temporary variances for the prospective use of water otherwise prohibited by this chapter. Such temporary variances shall be in writing and shall be based on a determination by the public works director that, due to unusual circumstances, application of this chapter would cause an extraordinary hardship adversely affecting the health, sanitation, or fire protection of the applicant or the public. The public works director's determination shall be final unless

appealed as follows: a party adversely affected by the public works director's determination may appeal the determination to the city manager within twenty-four hours of the public works director's determination or such later time as the city manager may designate. The city manager's determination shall be final and nonappealable. The twenty-four-hour period shall exclude Saturdays, Sundays and legal holidays. (Ord. 10-09 § 4, 2010)

13.113.050 Penalties.

Violations of this chapter shall be punishable as follows:

A. During a Stage III through Stage V water shortage declaration, a violation of any provision of this chapter shall be a civil infraction as provided for by RCW 7.80.120(1)(a). The monetary penalty for each violation per day or portion thereof shall be as follows:

1. First Violation. The public works director will issue a written warning and deliver a copy of this chapter by mail;

2. Second Violation. A second violation within the preceding twelve calendar months is punishable by a fine as follows: for residential not to exceed fifty dollars; for commercial and industrial not to exceed one hundred dollars;

3. Third Violation. A third violation within the preceding twelve calendar months is punishable by a fine as follows: for residential not to exceed one hundred dollars; for commercial and industrial not to exceed two hundred dollars;

4. Fourth Violation. A fourth violation within the preceding twelve calendar months is punishable by a fine as follows: for residential not to exceed two hundred dollars; for commercial and industrial not to exceed four hundred dollars;

5. Each additional violation beyond four violations within the preceding twelve calendar months is punishable by a fine as follows: for residential not to exceed four hundred dollars; for commercial and industrial not to exceed eight hundred dollars;

6. Discontinuing Service. In addition to any fines, the city may disconnect a customer's water service for willful violations of mandatory restrictions in this chapter.

B. During a Stage IV and/or Stage V water shortage declaration, a gross violation may be charged as a misdemeanor punishable by imprisonment in jail for a maximum term fixed by the court of not more than ninety days, or a fine in an amount fixed by the court of not more than one thousand dollars, or both such imprisonment and fine. Using any lawful means, the city may enter upon the

subject property and may remove or correct the condition which is subject to abatement. The city may seek such judicial process as it deems necessary to effect the removal or correction of such condition.

C. Recovery of Costs and Expenses. The costs, including incidental expenses, of correcting the violation shall be billed to the person responsible for the violation and/or the owner, leaser, tenant or other person entitled to control, use and/or occupy the property and shall become due and payable to the city within ten calendar days. The term “incidental expenses” includes but shall not be limited to personnel costs, both direct and indirect, including attorney’s fees; costs incurred in documenting the violation; hauling, storage and disposal expenses; and actual expenses and costs of the city in preparing notices, specifications and contracts, and in accomplishing and/or contracting and inspecting the work; and the costs of any required printing and mailing. (Ord. 10-09 § 5, 2010)

13.113.060 Enforcement.

The public works director or designee, code enforcement officers of the building division of the planning department, finance director, and sworn law enforcement officers of the city shall have the authority to enforce the appropriate provisions of this chapter. (Ord. 10-09 § 6, 2010)

13.113.070 Severability.

If any section, sentence, clause or phrase of this chapter is ruled invalid by a court of competent jurisdiction, the remaining portion of this chapter shall remain valid and in full force and effect. (Ord. 10-09 § 7, 2010)

13.113.080 Effective date.

The effective date shall be thirty days after passage by the city council and shall be published according to law. (Ord. 10-09 § 8, 2010)

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WATER SHORTAGE RESPONSE PLAN

Introduction

City ordinances, BGMC Chapter 13.113, have been created that allow the City to impose restrictions during a water shortage. They define five stages of water emergencies:

- Stage I – Anticipated Water Shortage
- Stage II – Serious Water Shortage – Voluntary Conservation
- Stage III - Critical Water Shortage – Limited Outdoor Restrictions
- Stage IV – Emergency Water Shortage – Mandatory Outdoor Restrictions and Indoor Conservation
- Stage V – Regional Disaster – Water Rationing

The Public Works Director is responsible for declaring and implementing the water shortage plans. Stages I or II implement voluntary reductions in water use for customers and some City watering reductions. Stages III and IV further regulate or prohibit nonessential uses of water. Up-to-date details on the restrictions can be found in BGMC Chapter 13.113.

Ordinance #10-09, which authorized said rules can be found as **Attachment A**.

Attachment A
Authorizing Ordinance

ORDINANCE NO. 10-09

AN ORDINANCE AUTHORIZING THE PUBLIC WORKS DIRECTOR TO IMPLEMENT WATER CONSERVATION MEASURES AND ESTABLISHING POLICIES AND PROCEDURES FOR WATER CONSERVATION MEASURES BY ADDING TO BATTLE GROUND MUNICIPAL CODE A NEW CHAPTER

WHEREAS, the supply of water to the City of Battle Ground has historically been difficult because of an uncertain water table, difficulty in locating quality water wells, and as yet undeveloped intertie system with Clark Public Utilities; and

WHEREAS, the City of Battle Ground has grown exponentially to a size approaching 18,000 in population, which puts increasingly severe demands for water consumption on the City's system; and

WHEREAS, extended hot weather during summer months and lack of snow pack in the adjacent mountains and inadequate rain fall to replenish the aquifer have caused the staff and City Council to be concerned about the impact of water consumption on the availability of adequate potable water; and

WHEREAS, voluntary conservation of water consumption has not always been adequate or timely; and

WHEREAS, the City Council believes it is in the best interest of all of the citizens of the City and necessary for the protection of public health, safety and welfare of said citizens that conservation measures be implemented in a timely fashion and by experts employed by the City of Battle Ground;

NOW THEREFORE, the City Council of the City of Battle Ground does hereby ordain as follows:

There is hereby added to Title 13 of the Battle Ground Municipal Code the following Chapter:

Chapter 13.113 WATER CONSERVATION

Section 1. 13.113.010 Purpose.

It is in the public interest to promote the conservation of the city's water supply in order to protect the health, welfare and safety of water users. To accomplish this declared purpose, the city reserves the right to exercise its police powers through emergency measures as set forth in this chapter.

Section 2. 13.113.020 Authority.

The Public Works Director, when necessary for the protection of the public health, safety and welfare, shall have the authority to declare various stages of water

emergencies and to implement the water conservation measures set forth in this chapter. The Public Works Director shall also have authority to determine whether the various stages of water emergencies and water conservation measures apply to the entire city water service area or to such portions as the declared stage shall apply, and to determine the duration for which the declared stage and its limitations and restrictions shall be in effect.

Section 3. 13.113.030 Policies and Procedures.

The following policies and procedures shall apply during the various stages of water emergencies as set forth in this section:

A. Stage I - Anticipated Water Shortage--Internal Preparations. The Public Works Director may declare a Stage I water emergency when a water shortage is anticipated but not immediate. From June 1st through October 31st, the Public Works Director shall conduct public education efforts regarding the benefits and necessity of conservation by the public.

B. Stage II - Serious Water Shortage--Voluntary Conservation. The Public Works Director may declare a Stage II water emergency when a water shortage exists such that immediate voluntary reductions in consumption are necessary due to an unforeseen reduction in water supply and/or weather forecasts predict an extended high temperature event of 90 degrees or higher lasting 5 or more days. The Public Works Director shall conduct an intensified public information campaign and shall institute a voluntary odd/even residential, commercial, industrial, and governmental alternate day irrigation program. The city shall reduce usage for designated park irrigation systems that do not affect sports fields.

C. Stage III - Critical Water Shortage--Limited Outdoor Restrictions. The Public Works Director may declare a Stage III water emergency when a water shortage exists such that water supplies are insufficient to meet demand resulting in the inability to replenish water storage reservoirs to an acceptable level. The Public Works Director may, with the City Manager authorization, institute mandatory water usage such that residential, commercial, industrial, irrigation and governmental customers shall water lawns and landscaping on alternate days only as follows:

1. All such customers with a street address ending in an even number shall water on even number days, and all such customers with a street address ending in an odd number shall water on odd number days.

a. The limitations set forth in this section shall not apply to hand watering of flower pots and baskets and vegetable gardens.

b. Upon written request from the customer, the Public Works Director may grant an exemption from the alternate day watering restrictions for new lawns or landscaping, or other special circumstances such as the use of SMART irrigation controllers.

c. For any initial violation of this section, the customer shall be given a written notice of violation and shall have ten days to make corrections to its watering schedule. Subsequent violations shall be punished in accordance with Section 13.113.050.

2. Upon the declaration of a Stage III water shortage emergency, the Finance Director may impose a rate surcharge of 10 percent on all water used by customers with stand-alone irrigation meters and on residential consumption of greater than 2,100 cubic feet per month, without further city council action. All appeals shall be processed in accordance with BGMC 13.105. If the surcharge is not sufficient to resolve the crises, the Public Works Director has the authority to declare that the following nonessential uses of water may be regulated on all properties connected to the city's water system, whether inside or outside of the city:

a. Prohibition of washing sidewalks, walkways, driveways, parking lots, patios, and other exterior paved areas by direct hosing, except as may be necessary to prevent or eliminate materials dangerous to the public health and safety;

b. Escape of water through breaks or leaks within the customer's plumbing or private distribution system for any period of time beyond which such break or leak should reasonably have been discovered and corrected. It shall be presumed that a period of forty-eight hours after the customer discovers a leak or break, or receives notice from the city of such leak or break, whichever occurs first, is a reasonable time in which to correct the same;

c. Noncommercial washing of privately owned motor vehicles, trailers, and boats, except from a bucket or hose using a shutoff nozzle for quick rinses. Commercial washing of motor vehicles, trailers, and boats, etc. will only be allowed with the use of recycled water systems in place;

d. Prohibition of lawn sprinkling and irrigation which allows water to run off or overspray the lawn area. Every customer is deemed to have knowledge of and control over his or her lawn sprinkling and irrigation at all times;

e. Prohibition of sprinkling and irrigation of lawns, ground cover, or other plants, between the hours of nine a.m. and six p.m. or on any day not authorized by the established rotation schedule;

f. Such other uses as the Public Works Director deems appropriate.

D. Stage IV - Emergency Water Shortage--Mandatory Outdoor Restrictions and Indoor Conservation. The Public Works Director, with the City Manager authorization, may declare a Stage IV water emergency when a water shortage exists such that water levels within water storage reservoirs drop down below the level of adequate fire flow. Water available to the city is insufficient to permit any irrigation, watering or sprinkling, and

all available water is needed solely for human consumption, sanitation and fire protection. The Public Works Director may prohibit all nonessential uses of water, including, but not limited to, all vehicle washing, all lawn watering, and all of the uses that may be prohibited for a Stage III water emergency. The Public Works Director shall disseminate information using every available means to encourage customers to reduce indoor water usage to the maximum extent possible. Upon the Public Work Director's declaration of a Stage IV water shortage emergency, the Finance Director may impose a rate surcharge of 10 percent on residential consumption of greater than 1,300 cubic feet per month and a rate surcharge of 15 percent on residential consumption of greater than 1,500 cubic feet per month, without further city council action. All appeals shall be processed in accordance with BGMC 13.105.

E. Stage V - Regional Disaster--Water Rationing. In the event of a major catastrophe affecting the regional water supply, the City Manager, in conjunction with Battle Ground Municipal Code 2.74 and the City of Battle Ground Emergency Management Plan, may declare a Stage V regional disaster water emergency when a water shortage exists such that water rationing must be implemented and emergency water distribution may be necessary for customers without water. The Public Works Director is authorized to restrict water use by rationing the amount of water used by residential users to a certain number of gallons per day per person residing within the dwelling unit, by rationing the amount of water used by nonresidential users based on a percentage of their historical usage as calculated by the city, and by any other type of rationing as the Public Works Director deems necessary and appropriate in the circumstances.

F. Implementation Requirements. Prior to the implementation and enforcement of any of the above stages, the Public Works Director shall take reasonable efforts to have information disseminated to affected customers and City Council regarding the rationing plan, which shall include, at a minimum, publication in the official newspaper of the city at least once, not less than one week in advance of the effective date of the declaration, information of the declaration of the applicable stage, a description of the limitations and restrictions that would apply, and identification of the effective date of the declared stage and limitations and restrictions. Notwithstanding the publication requirements set forth in this chapter, if it is determined by the Public Works Director that exigent circumstances exist that necessitate immediate implementation and enforcement of any particular stages of water emergency, notice to affected customers may be provided by personal service of the notice on such customers, or by posting notices at the customers' residences (if the customers' residences are the affected sites), or by posting notices at the locations where the customers' utility services are received (if the affected sites are not their residences).

Section 4. 13.113.040 Variances.

The Public Works Director may grant temporary variances for the prospective use of water otherwise prohibited by this chapter. Such temporary variances shall be in writing and shall be based on a determination by the Public Works Director that, due to unusual circumstances, application of this chapter would cause an extraordinary hardship adversely affecting the health, sanitation, or fire protection of the applicant or the public. The Public Works Director's determination shall be final unless appealed as

follows: a party adversely affected by the Public Works Director's determination may appeal the determination to the City Manager within twenty-four hours of the Public Works Director's determination or such later time as the City Manager may designate. The City Manager's determination shall be final and nonappealable. The twenty-four-hour periods shall exclude Saturdays, Sundays and legal holidays.

Section 5. 13.113.050 Penalties.

Violations of this chapter shall be punishable as follows:

A. During a Stage III thru Stage V water shortage declaration, a violation of any provision of this chapter shall be a civil infraction as provided for by RCW 7.80.120(1)(a). The monetary penalty for each violation per day or portion thereof shall be as follows:

a. First Violation: The Public Works Director will issue a written warning and deliver a copy of this ordinance by mail;
b. Second Violation: A second violation within the preceding twelve (12) calendar months is punishable by a fine as follows: for Residential not to exceed fifty dollars ($50.00); for Commercial and Industrial not to exceed one hundred dollars ($100.00);
c. Third Violation: A third violation within the preceding twelve (12) calendar months is punishable by a fine as follows: for Residential not to exceed one hundred dollars ($100.00); for Commercial and Industrial not to exceed two hundred dollars ($200.00);
d. Fourth Violation: A fourth violation within the preceding twelve (12) calendar months is punishable by a fine as follows: for Residential not to exceed two hundred dollars ($200.00); for Commercial and Industrial not to exceed four hundred dollars ($400.00);
e. Each additional violation beyond four violations within the preceding twelve (12) calendar months is punishable by a as follows: for Residential not to exceed four hundred dollars ($400.00); for Commercial and Industrial not to exceed eight hundred dollars ($800.00);
f. Discontinuing Service: In addition to any fines, the City may disconnect a customer's water service for willful violations of mandatory restrictions in this chapter.

B. During a Stage IV and/or Stage V water shortage declaration, a gross violation may be charged as a misdemeanor punishable by imprisonment in jail for a maximum term fixed by the court of not more than ninety days, or a fine in an amount fixed by the court of not more than one thousand dollars, or both such imprisonment and fine. Using any lawful means, the City may enter upon the subject property and may remove or correct the condition which is subject to abatement. The City may seek such judicial process as it deems necessary to effect the removal or correction of such condition.

C. Recovery of Costs and Expenses. The costs, including incidental expenses, of correcting the violation shall be billed to the person responsible for the violation and/or

the owner, leaser, tenant or other person entitled to control, use and/or occupy the property and shall become due and payable to the City within 10 calendar days. The term "incidental expenses" includes but shall not be limited to personnel costs, both direct and indirect, including attorney's fees; costs incurred in documenting the violation; hauling, storage and disposal expenses; and actual expenses and costs of the city in preparing notices, specifications and contracts, and in accomplishing and/or contracting and inspecting the work; and the costs of any required printing and mailing.

Section 6. 13.113.060 Enforcement.

The Public Works Director or designee, Code Enforcement Officers of the Building Division of the Planning Department, Finance Director, and sworn Law Enforcement Officers of the City shall have the authority to enforce the appropriate provisions of this chapter.

Section 7. 13.113.070 Severability.

If any section, sentence, clause or phrase of this ordinance is ruled invalid by a court of competent jurisdiction, the remaining portion of this ordinance shall remain valid and in full force and effect.

Section 8. 113.113.080 Effective Date.

The effective date shall be thirty (30) days after passage by City Council and shall be published according to law.

ADOPTED AT THE REGULAR SESSION OF THE CITY COUNCIL OF THE CITY OF BATTLE GROUND, WASHINGTON, THIS 21st DAY OF JUNE, 2010.

Michael J. Ciraulo, Mayor

Attested to by:

Claire Lider, City Clerk

Approved as to form:

Brian H. Wolfe, City Attorney

BATTLE GROUND CITY COUNCIL STUDY SESSION
NOVEMBER 15, 2021

The study session of the Battle Ground City Council was called to order at 6:00 p.m. by Mayor Cortes via Zoom meeting, meeting ID 85045983572.

COUNCIL:	Mayor Adrian Cortes, Deputy Mayor Philip Johnson, and Council members Cherish DesRochers, Shane Bowman, Brian Munson, Shauna Walters and Tricia Davis.
STAFF:	City Manager Erin Erdman, Community Development Director Sam Crummett, Public Works Director Mark Herceg, Police Chief Mike Fort, Finance and Information Services Director Meagan Lowery, Communications Manager/PIO Bonnie Gilberti, City Attorney Christine Hayes, and City Clerk Kay Kammer.

TOPIC: 2022 Budget

Presented by Finance and Information Services Director Meagan Lowery.
Summary: Council was presented information regarding the proposed 2022 budget.

ADJOURNMENT
The meeting adjourned at 6:51 P.M.

Adrian Cortes
Mayor

Kay Kammer
City Clerk

Date of approval by the City Council: December 6, 2021.

BATTLE GROUND CITY COUNCIL MEETING MINUTES

NOVEMBER 15, 2021

The regular meeting of the Battle Ground City Council was called to order at 7:00 p.m. by Mayor Cortes via Zoom meeting, Meeting ID 9030851775.

City Clerk Kay Kammer called the roll. The following were:

COUNCIL PRESENT: Mayor Adrian Cortes, Deputy Mayor Philip Johnson, Council members Cherish DesRochers, Shane Bowman, Brian Munson, Shauna Walters and Tricia Davis.

STAFF PRESENT: City Manager Erin Erdman, Finance and Information Services Director Meagan Lowery, Police Chief Mike Fort, Public Works Director Mark Herceg, Community Development Director Sam Crummett, Fire District No. 3 Chief Scott Sorenson, City Attorney Christine Hayes, and City Clerk Kay Kammer.

SUMMARY REPORTS AND PRESENTATIONS

Council member(s) reported on the following: **7:01p.m.**

Council member Walters

- Mosquito Control District board meeting

Mayor's Report

- Proclamation: World Aid's Day
- Proclamation: International Day of Persons with Disabilities

Presentations

Connect Washington NW 5th Street design

CITIZEN'S COMMUNICATIONS **7:20 p.m.**

Battle Ground Center Master Association

Keith Stewart, President, Matt Wiard, Vice President and Camden Spiller, Treasurer/Secretary

- Letter requesting Council decline authorization of a Development Agreement for the proposed apartment complex om the Downtown Commercial zoned area of Battle Ground Village

CONSENT AGENDA **7:23 p.m.**

A. City Council study session and meeting minutes from November 1, 2021.

B. Payroll vouchers dated 10/08/2021, #28910 through #28914 in the amount of $3,662.74 and direct deposits in the amount of $207,146.65.

C. Payroll vouchers dated 10/25/2021, #28915 through #28917 in the amount of $2,117.94 and direct deposits in the amount of $221,623.67.
D. Payroll vouchers dated 11/10/2021, #28918 through #28921in the amount of $2,2450.50 and direct deposits in the amount of $286,295.687.
E. Claim Vouchers dated 10/29/2021, #89300 through #89344 and bank drafts in the amount of $454,391.58.
F. Claim Vouchers dated 11/04/2021, #89345 through #89393 and bank drafts in the amount of $426,447.03.
G. Interlocal agreement: City of Ridgefield for Court, Prosecution, and Work Crew services.

MOTION: Deputy Mayor Johnson moved to approve the consent agenda as presented.
SECOND: Council member Bowman.
AYES: Bowman, Munson, DesRochers, Walters, Davis, Johnson and Cortes.
NAYS: None.
VOTE: Motion carried.

PUBLIC HEARING

2022 Preliminary Budget: Presentation/Public Hearing **7:24 p.m.**

Presented by Director of Finance and Information Services Meagan Lowery.
Summary: Council was presented information and accepted public testimony on the proposed 2022 budget.

Mayor Cortes opened the public hearing at 7:25 p.m.
- No testimony was received.

Mayor Cortes closed the public hearing at 7:26 p.m.

7:27 p.m.

Fire District No. 3 Capital Facilities Plan (CFP) and Impact Fees: Presentation/Public Hearing

Presented by Community Development Director Sam Crummett and Fire Marshal/Building Official Chris Drone.
Summary: Council was presented information and accepted public testimony on the proposed CFP and related impact fees.

Mayor Cortes opened the public hearing at 7:27 p.m.
- No testimony was received.

Mayor Cortes closed the public hearing at 7:27 p.m.

Mayor Cortes reopened the public hearing at 7:30 p.m. due to person sending a message through the chat feature that they had testimony to present but did not unmute to speak in time.

Justin Wood, representing the Building Industry Association (BIA)
- Requested council to consider costs of impact fees on home prices

Mayor Cortes closed the public hearing at 7:32 p.m.

Transportation System Plan: Presentation/Public Hearing **7:34 p.m.**

Presented by Public Works Director Mark Herceg.
Summary: Council was presented information and accepted public testimony on the proposed plan.

Mayor Cortes opened the public hearing at 7:35 p.m.

Emails were received from the following citizens opposing the NW 5th Street project and read into the record:

- Rose Rooney
- James Rooney
- Sandra Caterby
- Crystal Smith
- John and Gwen Furqueron
- Valerie Faith
- Andrea Parker
- Kelsey Deacon
- David Palmer
- Doug Shannon
- Carolyn
- Christina Higdon & family
- Jeff Ramos
- Nolan Hostetler
- Connie Shean
- Shannon Corbin
- Carl Mullen
- Kristin Parkin
- Kara Mcghee
- Holly Lushin
- Rachel Fleming
- David Fleming
- Kristal Drake
- Jeff Courtney
- Kyle Fanning
- Richard Kent
- Cathy Courtney

Mayor Cortes closed the public hearing at 8:18 p.m.

MOTION: Council member Walters moved to remove the NW 5th Street project from the transportation System Plan (TSP).
SECOND: Council member Munson.
AYES: Walters, Davis, Munson.
NAYS: Bowman, Johnson, Cortes, DesRochers.
VOTE: Motion failed.

Water System Plan: Presentation/Public Hearing **8:31 p.m.**
Presented by Public Works Director Mark Herceg.
Summary: Council was presented information and accepted public testimony on the proposed plan.

Mayor Cortes opened the public hearing at 8:32 p.m.
- No testimony was received.

Mayor Cortes closed the public hearing at 8:33 p.m.

MOTION: Deputy Mayor Johnson moved to remove fluoride from the water system effective January 1, 2022.
SECOND: Council member DesRochers.

Deputy Mayor Johnson withdrew motion.
Council member DesRochers withdrew second.

Water Use Efficiencies Goals: Presentation/Public Hearing **8:41 p.m.**
Presented by Public Works Director Mark Herceg.
Summary: Council was presented information and accepted public testimony on the proposed goals.

Mayor Cortes opened the public hearing at 8:41 p.m.
- No testimony was received.

Mayor Cortes closed the public hearing at 8:41 p.m.

Annual Code Update: Presentation/Public Hearing **8:42 p.m.**
Presented by Community Development Director Sam Crummett.
Summary: Council was presented information and accepted public testimony on Section 1. General code updates (Title 2 Administration and Personnel, Title 12 Streets and Sidewalks, Title 16 Land Divisions, Title 17 Zoning, and Title 18 Environmental Protection), Section 2. West Employment District (Title 17 Zoning), and Section 3. Code Enforcement (Title 5 Business Taxes, Licenses and Regulations, Title 6 Animals, Title 8 Health and Safety, Title 12 Streets and Sidewalks, Title 15 Building and Construction, Title 17 Zoning, and Title 18 Environmental Protection).

Mayor Cortes opened the public hearing at 9:04 p.m.
- No testimony was received.

Mayor Cortes closed the public hearing at 9:04 p.m.

BUSINESS

Ordinance No. 2021-21, Property Tax Levy: Motion **9:05 p.m.**
Presented by Director of Finance and Information Services Meagan Lowery.
Summary: Council considered approval of a 1.6404% property tax increase over the 2021 levy that is a $.07 decrease in the levy rate.

MOTION: Council member Bowman moved to adopt Ordinance No. 2021-21, 2022 Property Tax as presented.
SECOND: Deputy Mayor Johnson.
AYES: Bowman, DesRochers, Johnson, Cortes.
NAYS: Munson, Davis, Walters.
VOTE: Motion carried.

Resolution No, 21-09, 2022 Fee Schedule: Motion **9:10 p.m.**
Presented by Director of Finance and Information Services Meagan Lowery, 360-342-5025.
Summary: Council considered approval of the 2022 proposed fee schedule.

MOTION: Council member Bowman moved to adopt Resolution No. 21-09, 2022 Fee Schedule as presented.
SECOND: Deputy Mayor Johnson.
AYES: Bowman, Munson, DesRochers, Walters, Davis, Johnson and Cortes.
NAYS: None.
VOTE: Motion carried.

2022-2027 Six-year Transportation Improvement Program (TIP) amendment: Presentation
Presented by Public Works Director Mark Herceg. **9:12 p.m.**
Summary: Council was presented information regarding an amendment to the TIP.

ADMINISTRATIVE REPORTS **9:16 p.m.**
No reports received.

COUNCIL COMMUNICATIONS **9:16 p.m.**
Council member DesRochers
- Senior Lunch invitation

CLOSED DOOR SESSION **9:19 p.m.**
Mayor Cortes announced that at 9:22 p.m., pursuant to RCW 42.30.140(4), City Council would adjourn into a closed-door session for contract negotiations for approximately 15 minutes with action to be taken.

Mayor Cortes reconvened the regular meeting at 9:29 p.m.

MOTION: Council member Bowman moved to ratify and authorize the City Manager to sign and execute the collective bargaining agreement with the Battle Ground Police Officers Association (BGPOA) Non-Sworn Commission.
SECOND: Council member DesRochers.
AYES: Bowman, Munson, DesRochers, Walters, Davis, Johnson and Cortes.
NAYS: None.
VOTE: Motion carried.

ADJOURNMENT
The meeting adjourned at 9:31 p.m.

Adrian Cortes
Mayor

Kay Kammer
City Clerk

Date of approval by the City Council: December 6, 2021

Regular council meetings of the Battle Ground City Council are recorded digitally. These recordings are kept on file in the office of the City Clerk for a period of six (6) years.

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- 如需相关信息的中文版本，请来函索取：*cityclerk.info@cityofbg.org*
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BATTLE GROUND CITY COUNCIL STUDY SESSION
DECEMBER 6, 2021

The study session of the Battle Ground City Council was called to order at 6:00 p.m. by Mayor Cortes via Zoom meeting, meeting ID 85045983572.

COUNCIL: Mayor Adrian Cortes, Deputy Mayor Philip Johnson, and Council members Cherish DesRochers, Shane Bowman, Shauna Walters and Tricia Davis.

STAFF: City Manager Erin Erdman, Community Development Director Sam Crummett, Public Works Director Mark Herceg, Police Chief Mike Fort, Finance and Information Services Director Meagan Lowery, Communications Manager/PIO Bonnie Gilberti, City Attorney Christine Hayes, City Clerk Kay Kammer and Executive Assistant Rhonda Kay Calkins.

TOPIC: Americans with Disabilities Act (ADA) Transition Plan

Presented by Public Works Director Mark Herceg.
Summary: Council was presented information regarding the ADA Transition Plan.

ADJOURNMENT
The meeting adjourned at 6:27 P.M.

Adrian Cortes
Mayor

Kay Kammer
City Clerk

Date of approval by the City Council: December 20, 2021.

BATTLE GROUND CITY COUNCIL MEETING MINUTES

DECEMBER 6, 2021

The regular meeting of the Battle Ground City Council was called to order at 7:00 p.m. by Mayor Cortes via Zoom meeting, Meeting ID 9030851775.

City Clerk Kay Kammer called the roll. The following were:

COUNCIL PRESENT: Mayor Adrian Cortes, Deputy Mayor Philip Johnson, Council members Cherish DesRochers, Shane Bowman, Brian Munson, Shauna Walters and Tricia Davis.

STAFF PRESENT: City Manager Erin Erdman, Finance and Information Services Director Meagan Lowery, Police Chief Mike Fort, Public Works Director Mark Herceg, Community Development Director Sam Crummett, Fire District No. 3 Chief Scott Sorenson, City Attorney Christine Hayes, and City Clerk Kay Kammer.

SUMMARY REPORTS AND PRESENTATIONS

Council member(s) reported on the following: **7:01 p.m.**

Deputy Mayor Johnson
Conducted annual business visits.

Mayor's Report **7:05 p.m.**

- Proclamation: Bill of Rights Day
- Salary Commission

MOTION: Council member Bowman moved to adopt Ordinance No. 2021-40 with the removal of the reference to the July 1 date section 2.83.030 in the proposed ordinance for the Salary Commission.
SECOND: council member DesRochers.
AYES: Walters, Johnson, Cortes, Bowman, Davis, DesRochers.
NAYS: Munson.
VOTE: Motion Carried.

MOTION: Mayor Cortes moved to add a business item regarding the SR 502/SR503 Right-of-Way acquisition.
SECOND: Council member Bowman.
AYES: Munson, Johnson, Cortes, Bowman, Davis, DesRochers.
NAYS: Walters.
VOTE: Motion Carried.

MOTION: Mayor Cortes moved to move the Executive Session to before the Consent Agenda.
SECOND: Council member DesRochers.
AYES: Walters, Johnson, Cortes, Bowman, Davis, DesRochers.
NAYS: Munson.
VOTE: Motion Carried.

Presentations **7:29 p.m.**

- New hire introductions: Keegan Frazier-Maintenance Worker
- Fluoride

Comments were received from the following requesting that the city maintain fluoride in the water system.

- Dr. Kurt Ferre
- Dr. Gary Waldron
- Dr. Steven Hokett
- Emily Lovell
- Dr. Karl Rose
- Dr. Jensen
- Dr. Hsu

Council consensus was not to move forward to remove fluoride from the water system.

CITIZEN'S COMMUNICATIONS **7:55 p.m.**

Doug Shannon
Outreach efforts for citizens regarding Project BG11-08d and the steps to acquire the land.

EXECUTIVE SESSION

Mayor Cortes announced at 7:58 p.m. that pursuant to RCW 42.30.110(g) the City Council will adjourn into executive session at 8:00 p.m.to evaluate the qualifications of an applicant for public employment or to review the performance of a public employee. Any final action on hiring or setting or salary or wages will take place in a meeting open to the public. The executive session is anticipated to last approximately 30 minutes with possible action to follow.

Council member Bowman announced at 8:30 p.m. that council would need approximately another 30 minutes for the executive session.

Mayor Cortes reconvened the regular meeting at 8:42 p.m. and no action was taken.

CONSENT AGENDA **8:45 p.m.**

A. City Council study session and meeting minutes from November 15, 2021.
B. Payroll vouchers dated 11/14/2021, #28922 through #28923 in the amount of $1,689.53 and direct deposits in the amount of $243,435.15.
C. Claim Vouchers dated 11/12/2021, #89394 through #89472 and bank drafts in the amount of $643,355.87.
D. Claim Vouchers dated 11/19/2021, #89473 through #89497 and bank drafts in the amount of $283,419.49.

E. Claim Vouchers dated 11/24/2021, #89498 through #89516 and bank drafts in the amount of $53,210.23.
F. Interlocal agreement: Hockinson School District Impact Fees.
G. Interlocal agreement: Fire District No. 3 Impact Fees.
H. Professional Service Agreement MacKay Sposito for SE Grace Ave Phase II.
I. Interlocal agreement: City of La Center for Court, Prosecution, and Work Crew services.

MOTION: Council member Bowman moved to approve the consent agenda as presented.
SECOND: Council member Munson.
AYES: Munson, Cortes, Johnson, Bowman, DesRochers, Davis, Walters.
NAYS: None.
VOTE: Motion carried.

PUBLIC HEARING

Ordinance No. 2021-26 Budget: Public Hearing/Motion **8:44 p.m.**

Presented by Director of Finance and Information Services Meagan Lowery.
Summary: Council accepted public testimony and considered approval of the 2022 Budget.

Mayor Cortes opened the public hearing at 8:45 p.m.
- No testimony was received.

Mayor Cortes closed the public hearing at 8:45 p.m.

MOTION: Council member Bowman moved to adopt Ordinance No. 2021-26 for the 2022 Budget as presented.
SECOND: Council member DesRochers.
AYES: Munson, Cortes, Bowman, DesRochers, Davis.
NAYS: Walters, Johnson.
VOTE: Motion carried.

Resolution 21-10, 2022-2027 Six-year Transportation Improvement Plan (TIP) Amendment: Public Hearing/Motion **8:48 p.m.**

Presented by Public Works Director Mark Herceg.
Summary: Council accepted public testimony and considered approval of the proposed amendment.

Mayor Cortes opened the public hearing at 8:48 p.m.
- No testimony was received.

Mayor Cortes closed the public hearing at 8:48 p.m.

MOTION: Council member Bowman moved to adopt Resolution No. 21-10 regarding the 2022-2027 Six year TIP amendment as presented.
SECOND: Council member DesRochers.
AYES: Bowman, Johnson, Cortes, DesRochers.
NAYS: Walters, Davis, Munson.
VOTE: Vote carried.

BUSINESS

Resolution 21-11, American Rescue Plan Act (ARPA) Funding: Motion **8:50 p.m.**
Presented by Director of Finance and Information Services Meagan Lowery.
Summary: Council considered approval of the American Rescue Plan Act (ARPA) Funding.

MOTION: Council member Walters moved to adopt Resolution No. 21-11 for the ARPA funds as presented.
SECOND: Council member DesRochers.
AYES: Munson, Cortes, Johnson, Bowman, DesRochers, Davis, Walters.
NAYS: None.
VOTE: Motion carried.

Resolution 21-12, Water Use Efficiency: Motion **8:52 p.m.**
Presented by Public Works Director Mark Herceg.
Summary: Council considered approval of the water use efficiency goals.

MOTION: Council member Bowman moved to adopt Resolution No. 21-12 regarding the Water Use Efficiency Goals as presented.
SECOND: Council member DesRochers.
AYES: Munson, Cortes, Johnson, Bowman, DesRochers, Davis, Walters.
NAYS: None.
VOTE: Motion carried.

Ordinance No. 2021-22, Comprehensive Plan and Zoning Amendment: Motion **8:53 p.m.**
Presented by Community Development Director Sam Crummett.
Summary: Council considered approval of the proposed Comprehensive Plan and Zoning amendments.

MOTION: Council member Bowman moved to adopt Ordinance No. 2021-22 regarding the Comprehensive Plan and Zoning amendments as presented.
SECOND: Council member DesRochers.
AYES: Munson, Cortes, Johnson, Bowman, DesRochers, Davis.
NAYS: Walters.
VOTE: Motion carried.

Ordinance No. 2021-23, Parks Plan Amendment: Motion **8:57 p.m.**
Presented by Community Development Director Sam Crummett.
Summary: Council considered approval of the proposed Parks Plan Amendment.

MOTION: Council member Bowman moved to adopt Ordinance No. 2021-23 regarding the Parks Plan amendment as presented.
SECOND: Council member DesRochers.
AYES: Cortes, Johnson, Bowman, DesRochers, Davis, Walters.
NAYS: Munson.
VOTE: Motion carried.

Ordinance No. 2021-24, Transportation System Plan: Motion **8:59 p.m.**
Presented by Public Works Director Mark Herceg.
Summary: Council considered approval of the proposed Transportation System Plan.

MOTION: Council member Bowman moved to adopt Ordinance No. 2021-24 regarding the Transportation System Plan as presented.
SECOND: Council member DesRochers.
AYES: Bowman, Johnson, Cortes, DesRochers, Munson.
NAYS: Walters, Davis.
VOTE: Motion carried.

Ordinance No. 2021-25, Water System Plan: Motion **9:01 p.m.**
Presented by Public Works Director Mark Herceg.
Summary: Council considered approval of the proposed Water System Plan.

MOTION: Council member Bowman moved to adopt Ordinance No. 2021-25 regarding the Water System Plan as presented.
SECOND: Council member Walters.
AYES: Munson, Cortes, Johnson, Bowman, DesRochers, Davis, Walters.
NAYS: None.
VOTE: Motion carried.

Ordinance No. 2021-39, Title 17, Westside Employment District: Motion **9:02 p.m.**
Presented by City Manager Erin Erdman.
Summary: Council considered approval of the proposed Westside Employment District.

MOTION: Council member Bowman moved to adopt Ordinance No. 2021-39 regarding the Westside Employment District as presented.
SECOND: Council member DesRochers.
AYES: Munson, Cortes, Johnson, Bowman, DesRochers, Davis, Walters.
NAYS: None.
VOTE: Motion carried.

SR502/SR 503 Right-of-Way Acquisition: Motion **9:04 p.m.**
Presented by Public Works Director Mark Herceg.
Summary: Council considered approval of the acquisition of property for the improvements to the intersection.

MOTION: Council member Bowman moved to authorize the City to purchase the necessary right-of-way and easements needed from Safeway Stores 98, INC to complete the SR 503/SR 502 Intersection Improvement Project for the purchase price of $60,400 and to authorize the City Manager to execute the Warranty Deed and Temporary Easement for the 503/502 Intersection project.
SECOND: Council member DesRochers.
AYES: Munson, Cortes, Johnson, Bowman, DesRochers, Davis, Walters.

NAYS: None.
VOTE: Motion carried.

ADMINISTRATIVE REPORTS
No reports received.

COUNCIL COMMUNICATIONS **9:07 p.m.**

Council member Bowman
Requests council members provide explanation on votes so that ideas are understood

Council member DesRochers
Provided information regarding the invitation to the BG Seniors Annual Holiday Luncheon.

ADJOURNMENT
The meeting adjourned at 9:23 p.m.

Adrian Cortes
Mayor

Kay Kammer
Kay Kammer
City Clerk

Date of approval by the City Council: December 20, 2021

Regular council meetings of the Battle Ground City Council are recorded digitally. These recordings are kept on file in the office of the City Clerk for a period of six (6) years.

- This institution is an equal opportunity provider and employer.
- Información será traducida al español a petición de *cityclerk.info@cityofbg.org*.
- Информация имеется на русском языке по запросу на *cityclerk.info@cityofbg.org*.
- 如需相关信息的中文版本，请来函索取：*cityclerk.info@cityofbg.org*
- Za informacije na bosanskom jeziku obratite se na adresu *cityclerk.info@cityofbg.org*
- Ang impormasyon ay makukuha sa Tagalog sa pamamagitan ng kahilingan sa *cityclerk.info@cityofbg.org*
- Gửi yêu cầu nhận thông tin sẵn có bằng tiếng Việt đến *cityclerk.info@cityofbg.org*

Appendix O
Agency Coordination

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STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
PO Box 47775 • Olympia, Washington 98504-7775 • (360) 407-6300
711 for Washington Relay Service • Persons with a speech disability can call 877-833-6341

March 23, 2022

Department of Health
Southwest Drinking Water Regional Operations
Attn: Fern Schultz
PO Box 47823
Olympia, WA 98504-7823

City of Battle Ground
109 SW 1st Street
Battle Ground, WA 98604

Re: Battle Ground Water Dept City of Water System, ID #04700, Clark County; Water System Plan, ODW Project #22-0105

Thank you for the opportunity to review the Water System Plan (WSP) for the above water system. Consistent with the Memorandum of Understanding between the Department of Health, Office of Drink Water (ODW) and Department of Ecology (Ecology), I reviewed the relevant portions of the above document and have the following comments:

The **Water Right Self-Assessment Form** shows the Current, 10-Year, and 20-Year Source Production for Wells No. 1 and No. 2 is exceeding the annual quantity (Qa) authorized of GWC 2605-A. To address this deficiency, the City of Battle Ground (Battle Ground) should adjust pumping rates to ensure the Qa pumped at Wells No. 1 and No. 2 is within the limits allowed under GWC 2605-A. Additionally, the **Water Right Self-Assessment Form** shows the Qa is currently being exceeded for G2-29477 (A) P.

The *Preferred Alternatives* presented in **Chapter 6 – Water Source and Quality – Long Term Water Supply Planning** may require Battle Ground to file a *Showing of Compliance* or an *Application for Change of Water Right*. If Battle Ground intends to pursue the Preferred Alternatives, Battle Ground should request a Water Right Pre-Application Consultation to discuss options to move forward.

Thank you for the opportunity to review the above document. Please contact me at (360) 280-2983 or matthew.kogle@ecy.wa.gov if you have questions or need additional information.

Sincerely,

Matthew Kogle
Staff Hydrogeologist – Permit Writer
SWRO Water Resources Program

cc: Zach Schrempp, PE - RH2 Engineering, Inc.
Clark County Public Health – Drinking Water Program

Stephanie Perkins

From: Kogle, Matthew (ECY) <mkog461@ECY.WA.GOV>
Sent: Thursday, September 1, 2022 2:31 PM
To: Andy Dunn
Cc: Schultz, Fern M (DOH); Zach Schrempp
Subject: RE: City of Battle Ground comments on draft water system plan

Hi All,

After review, it is determined the City of Battle Ground's draft Water System Plan is *not inconsistent* with the approved Watershed Management Plan and adopted Instream Flow Rule with respect to modifying the place of use of the service area.

Thanks,
Matthew

Matthew Kogle
Staff Hydrogeologist - Permit Writer
Office: ~~360.407.7659~~ | Cell: 360.280.2983
Email: matthew.kogle@ecy.wa.gov

Water Resources | Technical & Permitting Unit
Southwest Region Office

DEPARTMENT OF ECOLOGY
State of Washington

From: Andy Dunn <adunn@rh2.com>
Sent: Wednesday, August 24, 2022 5:39 PM
To: Kogle, Matthew (ECY) <mkog461@ECY.WA.GOV>
Cc: Schultz, Fern M (DOH) <fern.schultz@doh.wa.gov>; Zach Schrempp <zschrempp@rh2.com>
Subject: City of Battle Ground comments on draft water system plan

Hi Matthew,

I wanted to provide some responses/replies to your Ecology comment letter on the City of Battle Ground's water system plan update that you recently reviewed as well as a follow-up request from DOH.

Ecology Comment 1 - The Water Right Self-Assessment Form shows the Current, 10 Year, and 20-Year source production for Well Nos. 1 and 2 is exceeding the annual volume under GWC 2605-A.

Response 1 - This is true. The City inadvertently exceeded the water right annual volume water right limit of 270 afy by 69 afy in 2019. As suggested, the City will pay closer attention to the annual volume pumped and not exceed the water right limit in future years. The 10-Year and 20-Year source production numbers for GWC 2605-A will be reduced to the water right limit of 270 afy and the additional needed production to meet demand will be shifted to the intertie from CPU.

Ecology Comment 2 - The Water Right Self-Assessment Form shows the annual volume is currently being exceeded for G2-29477(A)P.

Response 2 – This is not exactly correct. G2-29477(A)P authorizes the withdrawal of 1,150 afy with 943 afy being additive and 207 afy being non-additive. The use in 2019 was 950 afy, since this exceeds the additive volume it shows as a negative (following the directions on the form to use the formula B-D), but it is still less than the total authorized annual volume of 1,150 afy. Since other water rights have additional unused additive volume, the non-additive volume can be used under this water right. No changes will be made to the Water Right Self-Assessment form.

Ecology Comment 3 – The Preferred Alternatives presented in Chapter 6 – Water Source and Quality – Long Term Water Supply Planning may require Battle Ground to file a Showing of Compliance or an Application for Change of Water Right.

Response 3 – Agreed. The City will follow applicable water rights law if any changes to its water rights are to be made.

DOH Comment for Ecology:
Fern Schultz from DOH Office of Drinking Water has provided the following comment:

> Matthew Kogle of ECY provided comments on March 23, 2022. Please cc the Office of Drinking Water with all correspondence that address his concerns or provide explanation of how they are being addressed. We will need a determination of 'not inconsistent' from ECY to approve this plan.

All existing City wells tap water in WRIA 28 Salmon-Washougal.
https://apps.leg.wa.gov/wac/default.aspx?cite=173-528&full=true&pdf=true

Consistent with the MOU between Ecology and Health, can you reply all to this email and confirm that the City of Battle Ground Water System Plan Update is not-inconsistent with any local watershed plans?

> Ecology will:
>
> 1. Designate an interagency coordination liaison. The liaison will coordinate on any emerging statewide water resources issue affecting water systems and assist with consistency and coordination between regions in implementation. The liaison will also coordinate joint procedures and outreach.
>
> 2. Review and submit comments on planning documents within 60 days and engineering documents within 30 days as resources permit. Comments on planning or engineering documents will be sent to the water system and to DOH. Comments will focus on water rights and watershed consistency issues. Ecology may provide other comments on water resources related topics where there is a statutory requirement.
>
> 3. Determine whether planning and applicable engineering documents are "not inconsistent" with any watershed plan approved under chapter 90.82 RCW or adopted under chapter 90.54 RCW for purposes of modifying a municipal water supplier's water rights place of use to the service area under RCW 90.03.386(2).

Thanks, and let me know if you have any questions,

Andrew Dunn LG, LHG, CWRE
Water Rights/Hydrogeologist | RH2 Engineering, Inc.

22722 29th Drive SE, STE 210
Bothell, WA 98021
O: 425.951.5448
C: 425.780.8619
adunn@rh2.com
www.rh2.com

Washington State Department of Health

WASHINGTON STATE DEPARTMENT OF ECOLOGY

DOH Contract #_____

MEMORANDUM OF UNDERSTANDING
between
STATE OF WASHINGTON
DEPARTMENT OF HEALTH
and
DEPARTMENT OF ECOLOGY

Related to the
COORDINATION BETWEEN PLANNING, ENGINEERING, PUBLIC HEALTH AND SAFETY PROCESSES, AND WATER RESOURCES

THIS MEMORANDUM OF UNDERSTANDING (MOU) is made and entered into by and between the DEPARTMENT OF HEALTH (DOH) and the DEPARTMENT OF ECOLOGY (Ecology). This MOU replaces the following:

- October 6, 1992: Review Coordination Process (original MOU)
- July 1, 1994: Letter of Agreement
- December 20, 1994: Revision to the original MOU by Appendix
- June 14, 1999: Revision to original MOU by Appendix
- February 11, 2002: Update of the June 14, 1999 Appendix

THEREFORE, IT IS MUTUALLY AGREED THAT:

AUTHORITY

This MOU is made and entered into by DOH and Ecology under the authority granted by chapters 18.104, 43.20, 43.21A, 43.27A, 43.70, 70.116, 70.119A, 90.03, 90.14, 90.22, 90.44, 90.54, and 90.82 RCW.

PURPOSE AND SCOPE

The purpose of this MOU is to facilitate coordination and cooperation between DOH and Ecology on planning, engineering, and public health and safety matters relating to water systems and water resources. In some instances, additional coordination may be necessary to protect public health and safety, the environment, or meet statutory requirements. This MOU establishes the following:

1. Coordination procedures for water rights administration in the review and approval of:

   - Water systems plans and water system updates.
   - Water system plan amendments.
   - Small water system management programs.
   - Intertie proposals.
   - Engineering documents requesting new source approval.
   - Engineering documents requesting an increase in approved number of connections from DOH's existing records.
   - Engineering documents requesting a new water system approval.

   These procedures apply to all Group A water systems and Group B water systems where there is an instream flow water reservation (i.e. an instream flow rule that establishes a reservation allowing limited water use).

2. Procedures for expanding a municipal water supplier's water rights place of use through a planning or engineering document.

3. Coordination procedures between Ecology's Water Resources Program, Ecology's Shorelands and Environmental Assistance Program, and DOH in the "not inconsistent" review of planning and engineering documents with any watershed plan approved under chapter 90.82 RCW and adopted under chapter 90.54 RCW.

4. Procedures for determining compliance with the terms of a water system plan or small water system management program.

5. Procedures for determining when a water system is considered failing because of public health and safety concerns and for expediting the review of water right approvals and transfers for those water systems.

6. Procedures for how water use efficiency requirements will be considered when reviewing water right applications filed by water systems.

7. Procedures for determining and documenting which water systems are considered municipal water suppliers and which water rights held by such water systems are considered water rights for municipal supply purposes.

8. Procedures for determining sufficient reliability for water systems proposing the use of interruptible water rights.

AGENCY RESPONSIBILITIES RELATED TO THE MOU

DOH is responsible for ensuring safe and reliable drinking water for the people of Washington State under chapters 70.119A and 43.20 RCW. DOH reviews and approves planning and engineering documents for water systems.

Ecology's Water Resource Program administers Washington State's water resource program, including water rights administration under chapters 90.03 and 90.44 RCW and watershed planning under chapter 90.54 RCW. Ecology's Shorelands and Environmental Assistance Program in conjunction with local planning groups, conducts watershed planning under chapter 90.82 RCW.

AGENCY ROLES

DOH will:

1. Designate an interagency coordination liaison. The liaison will coordinate on any emerging statewide water resources issue affecting water systems and assist with consistency and coordination between regions in implementation. The liaison will coordinate joint procedures and outreach.

2. Provide an opportunity for Ecology to comment on planning and certain engineering documents. DOH will forward water system plans, small water system management programs, source approval projects, documents proposing an increase in a water system's number of approved connections, new water system approvals, and intertie proposals to Ecology. DOH will require the public water system to respond to Ecology's comments pertaining to water rights and watershed planning. DOH will provide the final approval to Ecology.

3. Determine whether the planning and engineering document is "not inconsistent" with local plans and regulations for purposes of modifying a municipal water supplier's water rights place of use, under RCW 90.03.386(2), to the water system's service area.

4. Under RCW 90.03.386(2) and 90.03.570, determine a municipal water supplier's compliance with its approved water system plan or small water system management program regarding the following elements:

   - Plan approval date.
   - Water use efficiency.
   - Service area identification.
   - Local government consistency.
   - Water systems with 1,000 or more connections – reclaimed water evaluation.

   Compliance with these elements will be determined when approving water system plans, small water system management programs, engineering documents that affect one of the above listed elements. DOH will also determine compliance with the above listed elements upon receipt of any verifiable reasonable concern from any external source.

5. Support appealable enforcement actions taken by Ecology against water systems when evaluating the water system's capacity. When there is insufficient capacity or a limited place of use, DOH will not require a water system to disconnect existing customers.

6. Determine if a water system is failing under RCW 90.03.580 and WAC 173-152-050 and notify Ecology.

7. Annually consult with the following agencies per RCW 90.82.048(3), to identify if additional coordination is needed between watershed planning and water system planning:

   - Ecology.
   - Department of Community, Trade, and Economic Development.
   - Department of Fish and Wildlife.

8. Annually compile a list of water systems required to update their water system plan in the coming year and any others known who may develop a new water system plan. Share this information with Ecology electronically.

9. Provide Ecology access to water system data, including population and connection information, to use when determining whether a water system is a municipal water supplier and other data as appropriate and available.

Ecology will:

1. Designate an interagency coordination liaison. The liaison will coordinate on any emerging statewide water resources issue affecting water systems and assist with consistency and coordination between regions in implementation. The liaison will also coordinate joint procedures and outreach.

2. Review and submit comments on planning documents within 60 days and engineering documents within 30 days as resources permit. Comments on planning or engineering documents will be sent to the water system and to DOH. Comments will focus on water rights and watershed consistency issues. Ecology may provide other comments on water resources related topics where there is a statutory requirement.

3. Determine whether planning and applicable engineering documents are "not inconsistent" with any watershed plan approved under chapter 90.82 RCW or adopted under chapter 90.54 RCW for purposes of modifying a municipal water supplier's water rights place of use to the service area under RCW 90.03.386(2)

4. Under RCW 90.03.386(2) and 90.03.570, determine a municipal water supplier's compliance with its approved water system plan or small water system management program regarding water rights.

   Compliance will be determined when reviewing water system plans, small water system management programs, engineering documents related to water rights, requests to change water rights to municipal water supply purpose rights. Ecology will also determine compliance upon receipt of any verifiable reasonable concern from any external source.

5. Expedite the review of water right applications or transfers for water systems determined to be failing by DOH, in accordance with RCW 90.03.580 and WAC 173-152-050.

6. Consult with and request comments from DOH when developing or updating water resources or watershed planning rules affecting water systems.

7. When making water right decisions, use water use efficiency plans developed under chapter 246-290 WAC and other water system data available in DOH's planning and engineering documents. If a water use efficiency plan has not been approved by DOH, Ecology may require a water use efficiency plan be developed that is consistent with DOH's rules and guidance. In certain situations, water rights may be conditioned on water use efficiency requirements more stringent than chapter 246-290 WAC. In those situations, Ecology will consult with DOH and explain the rationale.

8. Ecology, including both the Water Resources Program and the Shorelands and Environmental Assistance Program, will participate in DOH's annual watershed consultation to identify if additional coordination is needed between watershed planning and water system planning.

9. Make evaluations as to what water rights are considered to be for municipal water supply purposes under RCW 90.03.015 and provide those evaluations to DOH and the water system.

10. Work with local entities to maintain place of use service area maps for municipal water suppliers who expand their place of use under RCW 90.03.386(2).

GENERAL COORDINATION AND APPLICABILITY

Ecology and DOH will develop or modify guidance documents in order to implement this MOU. Staff will consider these guidance documents operating procedures. When modifying documents that affect both agencies, both agencies must agree to the changes. The following list includes guidance documents that may be developed:

1. Joint Review Guidance for Planning and Engineering Documents (DOH and Ecology):

   - List of documents on which DOH and Ecology coordinate review (DOH and Ecology).
   - Ecology and DOH Transmittal Letter Templates (DOH and Ecology).
   - Ecology's Review Checklist for Plans (Ecology).
   - Water Right Disclaimer for Planning and Engineering Document Approval Letters (DOH).

2. Water Rights Self-Assessment Form (DOH and Ecology).

3. How to Determine who is a Failing Water System and how to Expedite the Water Rights Process Guidance (DOH and Ecology).

4. Service Area Fact Sheet (DOH and Ecology).

5. Determining and Documenting who is a Municipal Water Supplier and What Water Rights Qualify as Rights for Municipal Water Supply Procedures (DOH and Ecology).

6. Local Government Consistency Checklist (DOH).

7. Watershed Planning Consistency Procedure and Checklist (Ecology).

8. Ecology's Review Prioritization for Planning and Engineering Documents (Ecology).

9. Ecology's Review Checklist for Source Approval (Ecology).

GENERAL PROVISIONS

This MOU shall take effect and be fully implemented by both agencies when signed by both parties.

This MOU may be amended or terminated at any time by written approval by Ecology's Water Resources Manager and DOH's Office of Drinking Water's Director.

MOU MANAGEMENT

The interagency coordination liaisons for Ecology and DOH will be responsible for and will be the contact person for all communications regarding the performance of this MOU. Either Ecology or DOH may change its liaison by giving written notice to the other party.

The Liaison for Ecology is:	The Liaison for DOH is:
Doug Rushton Department of Ecology Water Resources Program PO Box 47600 Olympia, WA 98504-7600 Phone: 360-407-6513 FAX: 360-407-6574 E-mail: drus461@ecy.wa.gov	Mike Dexel Department of Health Office of Drinking Water PO Box 47822 Olympia, WA 98504-7822 Phone: 360-236-3154 FAX: 360-236-2252 E-mail: michael.dexel@doh.wa.gov

ALL WRITINGS CONTAINED HEREIN

This MOU contains all the terms and conditions agreed upon by DOH and Ecology. No other understandings, oral or otherwise, regarding the subject matter of this MOU shall be deemed to exist or to bind any of the parties hereto.

IN WITNESS WHEREOF, the parties have executed this MOU.

Department of Ecology

Ken Slattery
Water Resources Program Manager

Date: 4/25/07

Department of Health

Denise Addotta Clifford, Director
Office of Drinking Water

Date: 5/01/07

Department of Health

Contracts Office

Date: _____

STATE OF WASHINGTON
DEPARTMENT OF HEALTH
SOUTHWEST DRINKING WATER OPERATIONS
P.O. Box 47823 Olympia, Washington 98504-7823
PHONE (360) 236-3030 FAX (360) 236-3029

May 2, 2022

Donald Risto
Battle Ground Water Dept City Of
1308 Se Grace Ave
Battle Ground, Washington 98604

Subject: Battle Ground Water Dept City Of Water System, ID #04700, Clark County; Water System Plan, ODW Project #22-0105

Dear Donald Risto:

Thank you for submitting the Water System Plan (WSP) for the City of Battle Ground Water Department Water System, received by the Office of Drinking Water (ODW) on January 18, 2022. The following comments must be addressed prior to our approval.

GENERAL

1. Demands used in analysis are not consistent throughout the Plan. Please assure that demands such as ERU_MDD are consistent throughout and that tables containing them are correctly referenced in text.
2. Design and construction standards. Please assure that standards explicitly require applicable elements of WAC 246-290-220 for materials requirements, such as ANSI/NSF 61 and lead-free requirements.
3. It is ODW's policy to only approve a system with an intertie as unspecified for the intertie agreements time period. Please provide communications indicating good faith intention to renew agreement with CPU or you will only be approved unspecified until 2029.
4. Please provide an updated WFI.

5. Please confirm all neighboring water systems have been notified that the City is updating its WSP and have had a chance to review and comment, if desired.
6. Please confirm that a meeting of the consumer's has occurred.

EXECUTIVE SUMMARY

8. Page E-7, Water System Evaluation. This section states that additional source and storage capacity will be required by 2030 to meet projected demands. This plan will only be approved through the time period that future demands can be met.

CHAPTER 1 – INTRODUCTION

9. Page 1-4, Definition of Terms. This states that Future Service Area is a specific area within the retail service area. This is incorrect. There is a duty to serve within the retail service area, there is not within the future service area. The future service area is where the water system can grow into as per the Coordinated Water System Plan of Clark County. Additionally, the future service area of the City of Battle Ground should align with what is designated in the 2011 Coordinated Water System Plan. Please update definition and confirm that it aligns with the CWSP.
10. Page 1-5, Definition of Terms. The Retail Service Area definition mentions "duty to serve" but nowhere is it defined. Please address the four duty to serve threshold factors as described in Publication 331-366. If the City uses the duty to serve definition as defined by Clark County's CWSP, please reference that somewhere in plan.

CHAPTER 4 - WATER DEMANDS

11. Page 4-1, Water Use Classifications. Please provide explanation of why churches are in their own class.
12. Page 4-1, Certificate of Water Availability. Please update to reflect service area. "may furnish water service to applicants outside the City limits, and within the service area, if they are adjacent..."

CHAPTER 5 – POLICIES AND DESIGN CRITERIA

13. Page 5-3, Policies and Requirements for Outside Parties. Water line extension only projects without Office of Drinking Water review are only allowed during life of this approved WSP.

CHAPTER 6 – WATER SOURCE AND QUALITY

14. Your wellhead protection program is from 2012. Elements, such as a contaminant inventory and notification letters must be updated every 2 years. Please provide these updated sections of your wellhead protection program.

CHAPTER 8 – OPERATIONS AND MAINTENANCE

15. Table 8-3. The ODW Regional Engineer contact phone number is incorrect. Please revise or use the Regional Office main line.
16. Page 8 -16, Asset Management. From prior discussions and this description, it looks like the City of Battle Ground is moving forward with an asset management program. Even though the City may be transitioning software, this WSP should include an asset inventory. If this isn't possible, the last print out of your old Asset Management data sheet will suffice with explanation of how the City is moving forward.

CHAPTER 9 – FINANCIAL ANALYSIS

15. General. This chapter does not include an affordability analysis. Please include.
16. General. This chapter does not discuss what the average residential rate is based off the ERU. Please include.

APPENDIX D – CONSISTENCY STATEMENT CHECKLISTS

17. The Local Government Consistency statements are not signed. Please provide a signed copy from Clark County's planning department as well as the City of Battle Ground's planning department.

APPENDIX J – COLIFORM MONITORING PLAN

18. Appendix J. The coliform monitoring plan does not outline the required triggered source monitoring samples required following an unsatisfactory routine sample. Please edit the plan to outline the City's plan for meeting the triggered source monitoring requirement.
19. Appendix J. The CMP mentions that City may need to collect source samples if one of their consecutive systems has a positive coliform sample. The plan lacks mentioning, coordination, and communication necessary to notify Clark Public Utilities as a consecutive system of CPU. Please edit the plan to address.
20. Appendix J. Routine sample location X-28A is located at the same location of Well 7 & Well 8. It is unlikely that this location adequately represents the water quality in the distribution. Please explain how this sample location meets the requirement to represent the distribution system or revise the sample location to do so.

DEPARTMENT OF ECOLOGY

ODW's review of your WSP does not confer or guarantee any right to a specific quantity of water. Our Ecology, a local planning agency, or other authority responsible for determining water rights and water system adequacy determines that you have use of less water than you represent, the number of approved connections may be reduced commensurate with the actual amount of water and your legal right to use it.

Matthew Kogle of ECY provided comments on March 23, 2022. Please cc the Office of Drinking Water with all correspondence that address his concerns or provide explanation of how they are being addressed. We will need a determination of 'not inconsistent' from ECY to approve this plan.

CONCLUSION

Please submit an electronic copy of the revised pages of the WSP and respond to all comments. Please submit them to swro.admin@doh.wa.gov. To expedite our review, please provide a summary of your responses and where each response is located, include page numbers and appendices.

Regulations establishing a schedule of fees for review of planning, engineering, and construction documents were adopted April 30, 2012 (WAC 246-290-990). An itemized invoice for the $3705 fee is enclosed.

If you have any questions, please contact Fern Schultz at (360) 236-3031 or by e-mail at fern.schultz@doh.wa.gov or Scott Pollock at (360) 236-3018 or by e-mail at rscott.pollock@doh.wa.gov.

Sincerely,

Fern Schultz
Office of Drinking Water, Regional Planner

R. Scott Pollock, P.E.
Office of Drinking Water, Regional Engineer

cc: Zach Shrempp, Murraysmith, Inc.
Clark County Public Health
Matthew Kogel, Department of Ecology

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: ACCOUNTS PAYABLE
DONALD RISTO
BATTLE GROUND WATER DEPT CITY OF
1308 SE GRACE AVE
BATTLE GROUND WA 98604

Invoice Number	SW3025
Invoice Date	May 2, 2022
Billing Period	30 days SW

DATE	DESCRIPTION	QTY	COST	AMOUNT
1/18/22	REVIEW AND/OR APPROVAL OF PROJECT REPORT BATTLE GROUND WATER DEPT CITY OF CLARK COUNTY WATER SYSTEM PLAN SUBMITTAL #: 22-0105	1	1	$3705.00
	Total			$3705.00
	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	BATTLE GROUND WATER DEPT CITY OF
INVOICE NUMBER	SW3025
INVOICE DATE	5/2/2022 22-0105 SW
AMOUNT	$3705.00

DOH Form #331-332

Return to:
Department of Health
Revenue Section
PO Box 1099
Olympia, WA 98507-1099

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

DOH Staff Name: Fern Schultz **System Name:** City of Battleground Water Department

Sublog Number: 22-0105 **County:** Clark

Water System ID: 04700

Fixed Fee for Service

WATER SYSTEM PLANS

Project Type	Fee 1st Review	Fee 2nd Review	Approved? Number Hr 1st Review	Number Hr 2nd Review
(a)(1) Water system plan (new and updated plans) 1,000 to 9,999 Sevices	$3,705			
Total Water system plans	$3,705	$0	0	0

SATELLITE MANAGEMENT AGENCY (SMA) PLANS

Project Type	Fee 1st Review	Fee 2nd Review	Approved? Number Hr 1st Review	Number Hr 2nd Review
Total SMA	$0	$0	0	0

PROJECT REPORTS

Project Type	Fee 1st Review	Fee 2nd Review	Approved? Number Hr 1st Review	Number Hr 2nd Review
Total Project Reports	$0	$0	0	0

CONSTRUCTION DOCUMENTS

Project Type	Fee 1st Review	Fee 2nd Review	Approved? Number Hr 1st Review	Number Hr 2nd Review
Total Construction documents	$0	$0	0	0

EXISTING SYSTEM APPROVAL

Project Type	Fee 1st Review	Fee 2nd Review	Approved? Number Hr 1st Review	Number Hr 2nd Review
Total of Existing System approval	$0	$0	0	0

GROUP B AND OTHER EVALUATIONS AND APPROVALS

Project Type	Fee 1st Review	Fee 2nd Review	Approved? Number Hr 1st Review	No Number Hr 2nd Review
Total of Other evaluations and approvals	$0	$0	0	0
Total Fixed Fee for Service	**$3,705**	**$0**	**0**	**0**

Hourly fee for service	Fee	# Hr	System Size

Pay This Invoice Amount For This Review	**$3,705**	**0.0**	**0**	**0**

	Total for All Project Invoices	Total for All Project Hours
Summary	$3,705	0

RH2 ENGINEERING
Bothell
22722 29th Drive SE, Suite 210
Bothell, WA 98021
1.800.720.8052 / rh2.com

December 28, 2022

Ms. Fern Schultz
Regional Planner
Department of Health
Southwest Drinking Water Regional Operations
P.O. Box 47823
Olympia, WA 98504-7823

Sent via: *Email*

Subject: **Submittal #22-0105, City of Battle Ground Water System Plan Response to DOH Comments**

Dear Ms. Schultz:

On behalf of the City of Battle Ground (City), RH2 Engineering, Inc., (RH2) is submitting one revised electronic copy of the City's Water System Plan (WSP). The review comments from the Washington State Department of Health's (DOH) letter dated May 2, 2022 are addressed below. DOH comments are provided below in **bold** text, with RH2 responses in normal text.

General

1) **Demands used in analysis are not consistent throughout the Plan. Please assure that demands such as ERU_MDD are consistent throughout and that tables containing them are correctly referenced in text.**

   RH2 has reviewed these numbers and do not believe that there is any inconsistency in the document. ERU_{MDD} is presented in Chapter 4 on both a consumption basis (Table 4-8) and a demand basis (Table 4-9). Chapter 4 describes that, to be conservative, the demand basis ERU_{MDD} is utilized for the system capacity calculations in Chapter 7. If DOH has further concerns, please let us know the specific tables/text where you have observed inconsistencies.

2) **Design and construction standards. Please assure that standards explicitly require applicable elements of WAC 246-290-220 for materials requirements, such as ANSI/NSF 61 and lead-free requirements.**

WASHINGTON LOCATIONS
Bellingham
Bothell (Corporate)
East Wenatchee
Issaquah
Richland
Tacoma

OREGON LOCATIONS
Medford
Portland

IDAHO LOCATIONS
Nampa

A description has been added in Chapter 5 stating that all drinking water materials and additives shall conform to the requirements specified in Washington Administrative Code (WAC) 246-290-220.

3) **It is ODW's policy to only approve a system with an intertie as unspecified for the intertie agreements time period. Please provide communications indicating good faith intention to renew agreement with CPU or you will only be approved unspecified until 2029.**

E-mail correspondence demonstrating CPU's intention to renew the agreement has been included in Appendix C.

4) **Please provide an updated WFI.**

An updated Water Facilities Inventory (WFI) form has been obtained from the DOH Sentry database and included in Appendix A.

5) **Please confirm all neighboring water systems have been notified that the City is updating its WSP and have had a chance to review and comment, if desired.**

Clark Public Utilities and the Cities of Ridgefield and Vancouver have been notified that the WSP is being updated and were provided the opportunity to review and comment. No comments from these systems have been received.

6) **Please confirm that a meeting of the consumers has occurred.**

Public testimony on the Water Use Efficiency goals and Water System Plan was accepted at the November 15, 2021 City Council meeting. Minutes for this meeting have been included in Appendix N.

7) ***Note – DOH did not provide a Comment No. 7. This placeholder is included for clarity.***

<u>Executive Summary</u>

8) Page E-7, Water System Evaluation. This section states that additional source and storage capacity will be required by 2030 to meet projected demands. This plan will only be approved through the time period that future demands can be met.

The WSP includes a Capital Improvement Program and schedule that will implement the required improvements commensurate with projected demands. The City requests a 10-year WSP approval on this basis, or clarification of the additional WSP elements that would be required by DOH to obtain a 10-year plan approval.

<u>Chapter 1 – Introduction</u>

9) **Page 1-4, Definition of Terms. This states that Future Service Area is a specific area within the retail service area. This is incorrect. There is a duty to serve within the retail service area, there is not within the future service area. The future service area is where the water system can grow into as per the Coordinated Water System Plan of Clark County. Additionally, the future service area of the City of**

Battle Ground should align with what is designated in the 2011 Coordinated Water System Plan [CWSP]. Please update definition and confirm that it aligns with the CWSP.

These revisions have been completed.

10) **Page 1-5, Definition of Terms. The Retail Service Area definition mentions "duty to serve" but nowhere is it defined. Please address the four duty to serve threshold factors as described in Publication 331-336. If the City uses the duty to serve definition as defined by Clark County's CWSP, please reference that somewhere in plan.**

These revisions have been completed.

Chapter 4 – Water Demands

11) **Page 4-1, Water Use Classifications. Please provide explanation of why churches are in their own class.**

Churches are currently charged the same as commercial. The City however has tracked them separately in order to identify them for a future cost of service analysis.

12) **Page 4-1, Certificate of Water Availability. Please update to reflect service area. "may furnish water service to applicants outside the City limits, and within the service area, if they are adjacent…"**

This revision has been completed.

Chapter 5 – Policies and Design Criteria

13) **Page 5-3, Policies and Requirements for Outside Parties. Water line extension only projects without Office of Drinking Water [ODW] review are only allowed during life of this approved WSP.**

This revision has been completed.

Chapter 6 – Water Source and Quality

14) **Your wellhead protection program is from 2012. Elements, such as a contaminant inventory and notification letters must be updated every 2 years. Please provide these updated sections of your wellhead protection program.**

The City has prepared an addendum to the Wellhead Protection Plan that addresses these elements; it has been included in Appendix K.

Chapter 8 – Operations and Maintenance

15) **Table 8-3. The ODW Regional Engineer contact phone number is incorrect. Please revise or use the Regional Office main line.**

This revision has been completed.

16) **Page 8-16, Asset Management. From prior discussions and this description, it looks like the City of Battle Ground is moving forward with an asset management program. Even though the City may be transitioning software, this WSP should include an asset inventory. If this isn't possible, the last print out of your old Asset Management data will suffice with explanation of how the City is moving forward.**

The description in this chapter has been updated and the City's asset inventory sheets are included in **Appendix P**.

Chapter 10 – Financial Analysis

17) ***(Note, this comment was labeled No. 15 by DOH. RH2 has re-numbered for clarity.)***

General. This chapter does not include an affordability analysis. Please include.

An affordability analysis has been added to this chapter.

18) ***(Note, this comment was labeled No. 16 by DOH. RH2 has re-numbered for clarity.)***

General. This chapter does not discuss what the average residential rate is based off the ERU. Please include.

Table 10-4 has been added to the chapter which includes the average rate in the third row.

Appendix D – Consistency Statement Checklists

19) ***(Note, this comment was labeled No. 17 by DOH. RH2 has re-numbered for clarity.)***

The Local Government Consistency statements are not signed. Please provide a signed copy from Clark County's planning department as well as the City of Battle Ground's planning department.

These have been included in Appendix D.

Appendix J – Coliform Monitoring Plan

20) ***(Note, this comment was labeled No. 18 by DOH. RH2 has re-numbered for clarity.)***

Appendix J. The coliform monitoring plan does not outline the required triggered source monitoring samples required following an unsatisfactory routine sample. Please edit the plan to outline the City's plan for meeting the triggered source monitoring requirement.

The City has updated Appendix J to address this comment.

21) ***(Note, this comment was labeled No. 19 by DOH. RH2 has re-numbered for clarity.)***

Appendix J. The CMP mentions that City may need to collect source samples if one of their consecutive systems has a positive coliform sample. The plan lacks mentioning, coordination, and communication necessary to notify Clark Public Utilities as a consecutive system of CPU. Please edit the plan to address.

The City has updated Appendix J to address this comment.

22) ***(Note, this comment was labeled No. 20 by DOH. RH2 has re-numbered for clarity.)***

Appendix J. Routine sample location X-28A is located at the same location of Well 7 & Well 8. It is unlikely that this location adequately represents the water quality in the distribution. Please explain how this sample location meets the requirement to represent the distribution system or revise the sample location to do so.

This sample location has been changed; the table and map in Appendix J were updated accordingly.

Department of Ecology

Matthew Kogle of ECY provided comments on March 23, 2022. Please cc the Office of Drinking Water with all correspondence that address his concerns or provide explanation of how they are being addressed. We will need a determination of 'not inconsistent' from ECY to approve this plan.

Ecology's comments have been addressed and the determination of "not inconsistent" is included in Appendix O.

RH2 has enclosed an updated electronic copy of the WSP. If this submittal of information meets your needs for WSP approval, RH2 requests, on behalf of the City, that the WSP be approved. If you have any questions, please contact me at (425) 951-5319 or via email at zschrempp@rh2.com.

Sincerely,

Zachary W. Schrempp

Zach Schrempp, PE
Project Engineer

ZS/re/sp

Enclosures: 2022 City of Battle Ground Water System Plan (electronic transmittal)

cc: Mr. Mark Herceg, PE, City of Battle Ground
Mr. Don Risto, City of Battle Ground

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Appendix P

Asset Inventory Sheets

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Battle Ground, WA

Asset Auditor Report

Active Assets

Fiscal Year: 01/01/2021 - 12/31/2021

Asset ID	Description	Acquired Date	Life	Beginning Year Asset Cost	Partial Disposals	Additions & Improvements	Adjusted Asset Cost	Salvage Value	Prior Accum Depr	Current Depreciation	Net Asset Value
Department: WATER - WATER											
00000106	Tukes Reservoir Fencing	01/01/2015	240 Mo	32,883.90	0.00	0.00	32,883.90	0.00	9,864.72	1,644.24	21,374.94
00000272	Water - Pump Station	01/01/2001	480 Mo	195,785.00	0.00	0.00	195,785.00	0.00	97,892.60	4,894.62	92,997.78
00000273	Water- Water Mains	01/01/2001	480 Mo	462,384.00	0.00	0.00	462,384.00	0.00	231,192.00	11,559.60	219,632.40
00000274	Water- Water Mains	01/01/2002	480 Mo	1,085,040.00	0.00	0.00	1,085,040.00	0.00	515,394.00	27,126.00	542,520.00
00000275	Water- Water Mains	01/01/2003	480 Mo	298,302.00	0.00	0.00	298,302.00	0.00	134,235.81	7,457.52	156,608.67
00000276	Water- Water Mains	01/01/2004	480 Mo	358,139.00	0.00	0.00	358,139.00	0.00	152,208.97	8,953.44	196,976.59
00000277	Water- Water Mains	01/01/2005	480 Mo	665,869.00	0.00	0.00	665,869.00	0.00	266,347.71	16,646.76	382,874.53
00000278	Water- Water Mains	01/01/2006	480 Mo	310,949.00	0.00	0.00	310,949.00	0.00	116,605.86	7,773.72	186,569.42
00000279	Water- Water Mains	01/01/2007	480 Mo	1,026,958.00	0.00	0.00	1,026,958.00	0.00	359,435.45	25,674.00	641,848.55
00000280	Water-Dublin Meadows	01/01/2007	480 Mo	62,312.00	0.00	0.00	62,312.00	0.00	21,809.32	1,557.84	38,944.84
00000281	Water- BG Village Ph 2 Th...	01/01/2007	480 Mo	81,850.00	0.00	0.00	81,850.00	0.00	28,647.47	2,046.24	51,156.29
00000282	Water- BG Corporate Sou...	01/01/2008	480 Mo	113,650.00	0.00	0.00	113,650.00	0.00	36,936.22	2,841.24	73,872.54
00000283	Water- BG Village Parcels ...	01/01/2008	480 Mo	50,780.00	0.00	0.00	50,780.00	0.00	16,503.44	1,269.48	33,007.08
00000284	Water- Bloomquist	01/01/2008	480 Mo	271,458.00	0.00	0.00	271,458.00	0.00	88,223.94	6,786.48	176,447.58
00000285	Water- Copperleaf (Cotto...	01/01/2008	480 Mo	345,024.00	0.00	0.00	345,024.00	0.00	112,132.80	8,625.60	224,265.60
00000286	Water- Cottages at Robin...	01/01/2008	480 Mo	31,858.00	0.00	0.00	31,858.00	0.00	10,353.82	796.44	20,707.74
00000287	Water- Four-D North	01/01/2008	480 Mo	38,833.00	0.00	0.00	38,833.00	0.00	12,620.65	970.80	25,241.55
00000288	Water- Gardner Center E-1	01/01/2008	480 Mo	7,200.00	0.00	0.00	7,200.00	0.00	2,340.00	180.00	4,680.00
00000289	Water- Goodwill	01/01/2008	480 Mo	29,036.00	0.00	0.00	29,036.00	0.00	9,436.64	725.88	18,873.48
00000290	Water- JRT Mechanical	01/01/2008	480 Mo	57,516.00	0.00	0.00	57,516.00	0.00	18,692.70	1,437.90	37,385.40
00000291	Water- Kate's Corner	01/01/2008	480 Mo	8,100.00	0.00	0.00	8,100.00	0.00	2,632.50	202.50	5,265.00
00000292	Water- Kid's Country Cam...	01/01/2008	480 Mo	1,391.00	0.00	0.00	1,391.00	0.00	452.15	34.80	904.05
00000293	Water- Mason SHP	01/01/2008	480 Mo	6,200.00	0.00	0.00	6,200.00	0.00	2,015.12	155.04	4,029.84
00000294	Water- Pacific Developme...	01/01/2008	480 Mo	12,431.00	0.00	0.00	12,431.00	0.00	4,040.15	310.80	8,080.05
00000295	Water- Parkview Terrace ...	01/01/2008	480 Mo	285,411.00	0.00	0.00	285,411.00	0.00	92,758.71	7,135.32	185,516.97
00000296	Water- Premier	01/01/2008	480 Mo	4,496.00	0.00	0.00	4,496.00	0.00	1,461.32	112.44	2,922.24
00000297	Water- Wingate Crossing ...	01/01/2008	480 Mo	72,187.00	0.00	0.00	72,187.00	0.00	23,460.79	1,804.68	46,921.53
00000298	Aldercreek Vet Clinic	01/01/2009	480 Mo	11,800.00	0.00	0.00	11,800.00	0.00	3,539.88	294.96	7,965.16
00000299	BG Village Parcel 7	01/01/2009	480 Mo	36,925.00	0.00	0.00	36,925.00	0.00	11,077.61	923.16	24,924.23
00000300	BG Village Parcels 8 & 9	01/01/2009	480 Mo	84,022.00	0.00	0.00	84,022.00	0.00	25,206.75	2,100.60	56,714.65
00000301	Filton Crowne Heights	01/01/2009	480 Mo	66,250.00	0.00	0.00	66,250.00	0.00	19,874.97	1,656.24	44,718.79
00000302	Mason Infill Short Plat	01/01/2009	480 Mo	5,197.00	0.00	0.00	5,197.00	0.00	1,559.21	129.96	3,507.83
00000303	Tiffany Meadows	01/01/2009	480 Mo	6,195.00	0.00	0.00	6,195.00	0.00	1,858.64	154.92	4,181.44
00000304	Westwood Apartments	01/01/2009	480 Mo	117,329.00	0.00	0.00	117,329.00	0.00	35,198.84	2,933.22	79,196.94
00000305	Bertsch SHP	01/01/2009	480 Mo	1,885.00	0.00	0.00	1,885.00	0.00	565.61	47.16	1,272.23
00000306	Delta Computer	01/01/2009	480 Mo	4,055.00	0.00	0.00	4,055.00	0.00	1,216.58	101.40	2,737.02

Asset ID	Description	Acquired Date	Life	Beginning Year Asset Cost	Partial Disposals	Additions & Improvements	Adjusted Asset Cost	Salvage Value	Prior Accum Depr	Current Depreciation	Net Asset Value
Department: WATER - WATER											
00000307	Crystal Springs	01/01/2010	480 Mo	50,468.00	0.00	0.00	50,468.00	0.00	13,878.64	1,261.68	35,327.68
00000308	Telemark	01/01/2011	480 Mo	10,659.86	0.00	0.00	10,659.86	0.00	2,665.04	266.52	7,728.30
00000309	Vancouver Clinic	01/01/2011	480 Mo	53,957.15	0.00	0.00	53,957.15	0.00	13,489.26	1,348.92	39,118.97
00000310	Season's on the Park Phas...	01/01/2012	480 Mo	13,229.00	0.00	0.00	13,229.00	0.00	2,976.51	330.72	9,921.77
00000311	Wal-Mart	01/01/2014	480 Mo	149,548.00	0.00	0.00	149,548.00	0.00	26,170.96	3,738.72	119,638.32
00000312	Wingate Crossing Ph1A	01/01/2014	480 Mo	113,927.00	0.00	0.00	113,927.00	0.00	19,937.30	2,848.20	91,141.50
00000313	Meadow View Apartment	01/01/2014	480 Mo	64,582.00	0.00	0.00	64,582.00	0.00	11,302.00	1,614.60	51,665.40
00000314	Season's on the Park Phas...	01/01/2014	480 Mo	26,917.00	0.00	0.00	26,917.00	0.00	4,710.58	672.96	21,533.46
00000315	Oak Meadows Phase II	01/01/2014	480 Mo	80,040.00	0.00	0.00	80,040.00	0.00	14,007.00	2,001.00	64,032.00
00000316	Progress Industrial Park	01/01/2015	480 Mo	57,829.00	0.00	0.00	57,829.00	0.00	8,674.46	1,445.76	47,708.78
00000317	Wingate Crossing Ph 1B	01/01/2015	480 Mo	129,072.00	0.00	0.00	129,072.00	0.00	19,360.80	3,226.80	106,484.40
00000318	Hummingbird Lane	01/01/2015	480 Mo	76,041.00	0.00	0.00	76,041.00	0.00	11,406.20	1,901.04	62,733.76
00000319	Barrel Mountain Brewing	01/01/2015	480 Mo	813.00	0.00	0.00	813.00	0.00	121.82	20.28	670.90
00000320	Battle Ground Main St C...	01/01/2015	480 Mo	30,416.00	0.00	0.00	30,416.00	0.00	4,562.52	760.44	25,093.04
00000321	CopperLeaf Ph II	01/01/2015	480 Mo	14,276.00	0.00	0.00	14,276.00	0.00	2,141.34	356.88	11,777.78
00000322	Panda Express	01/01/2015	480 Mo	12,145.00	0.00	0.00	12,145.00	0.00	1,821.68	303.60	10,019.72
00000323	North Parkway Mall (one ...	01/01/2015	480 Mo	7,046.00	0.00	0.00	7,046.00	0.00	1,056.93	176.16	5,812.91
00000324	Autozone	01/01/2015	480 Mo	14,080.00	0.00	0.00	14,080.00	0.00	2,111.88	351.96	11,616.16
00000325	Wendy's	01/01/2015	480 Mo	2,472.00	0.00	0.00	2,472.00	0.00	370.80	61.80	2,039.40
00000326	New Heights North	01/01/2016	480 Mo	120,606.00	0.00	0.00	120,606.00	0.00	15,075.66	3,015.12	102,515.22
00000327	Grace Ave and 3rd Street	01/01/2016	480 Mo	10,255.00	0.00	0.00	10,255.00	0.00	1,281.71	256.37	8,716.92
00000328	CDK Holdings	01/01/2016	480 Mo	9,593.00	0.00	0.00	9,593.00	0.00	1,199.29	239.83	8,153.88
00000329	BG Main St Commercial P...	01/01/2016	480 Mo	21,425.00	0.00	0.00	21,425.00	0.00	2,678.29	535.63	18,211.08
00000330	Alder Pointe Apts	01/01/2017	480 Mo	201,099.89	0.00	0.00	201,099.89	0.00	20,110.06	5,027.52	175,962.31
00000331	KBL Enterprises	01/01/2017	480 Mo	30,361.76	0.00	0.00	30,361.76	0.00	3,036.04	759.00	26,566.72
00000332	Oak Meadows PH 3	01/01/2017	480 Mo	43,810.18	0.00	0.00	43,810.18	0.00	4,380.97	1,095.24	38,333.97
00000333	Rosewood Court	01/01/2017	480 Mo	33,375.19	0.00	0.00	33,375.19	0.00	3,337.46	834.36	29,203.37
00000334	Tapani Enterprises/SE 22...	01/01/2017	480 Mo	49,738.44	0.00	0.00	49,738.44	0.00	4,973.77	1,243.44	43,521.23
00000381	Water - Telemetry	01/01/2000	480 Mo	14,792.00	0.00	0.00	14,792.00	0.00	14,792.00	0.00	0.00
00000382	Water - Telemetry	01/01/2001	480 Mo	15,554.00	0.00	0.00	15,554.00	0.00	15,554.00	0.00	0.00
00000383	Water- Water Mains	01/01/2001	480 Mo	67,368.86	0.00	0.00	67,368.86	0.00	33,684.37	1,684.20	32,000.29
00000384	Water - Infrastructure	01/01/2001	480 Mo	553,224.53	0.00	0.00	553,224.53	0.00	276,612.23	13,830.60	262,781.70
00000385	Water - Telemetry	01/01/2002	480 Mo	14,486.00	0.00	0.00	14,486.00	0.00	14,486.00	0.00	0.00
00000386	Water- Water Mains	01/01/2002	480 Mo	548,985.00	0.00	0.00	548,985.00	0.00	260,767.92	13,724.64	274,492.44
00000387	Water - Telemetry	01/01/2003	480 Mo	16,468.00	0.00	0.00	16,468.00	0.00	16,468.00	0.00	0.00
00000388	Water - Water Mains	01/01/2003	480 Mo	946,078.00	0.00	0.00	946,078.00	0.00	425,735.25	23,652.00	496,690.75
00000389	Water - 1 Million Storage ...	01/01/1999	480 Mo	1,040,000.00	0.00	0.00	1,040,000.00	0.00	572,000.12	26,000.04	441,999.84
00000390	Water - 3,000 Connections	01/01/1990	480 Mo	2,694,330.00	0.00	0.00	2,694,330.00	0.00	2,088,105.84	67,358.28	538,865.88
00000391	Water - 220,800 ft Pipe	01/01/1990	480 Mo	5,405,184.00	0.00	0.00	5,405,184.00	0.00	4,189,017.80	135,129.60	1,081,036.60
00000392	Water - Telemetry	01/01/2004	480 Mo	18,965.00	0.00	0.00	18,965.00	0.00	18,965.00	0.00	0.00
00000393	Water - Lines	01/01/2004	480 Mo	206,852.00	0.00	0.00	206,852.00	0.00	87,912.04	5,171.28	113,768.68
00000394	Water - Wells 9	01/01/2004	480 Mo	313,320.00	0.00	0.00	313,320.00	0.00	133,161.00	7,833.00	172,326.00

Asset ID	Description	Acquired Date	Life	Beginning Year Asset Cost	Partial Disposals	Additions & Improvements	Adjusted Asset Cost	Salvage Value	Prior Accum Depr	Current Depreciation	Net Asset Value
Department: WATER - WATER											
00000395	Water Reservoir-Horse Th..	01/01/2004	480 Mo	1,530,866.00	0.00	0.00	1,530,866.00	0.00	650,617.90	38,271.60	841,976.50
00000396	Water - Booster Station	01/01/2004	480 Mo	18,662.00	0.00	0.00	18,662.00	0.00	18,662.00	0.00	0.00
00000397	Water - Reservoir	01/01/2005	480 Mo	64,284.00	0.00	0.00	64,284.00	0.00	64,284.00	0.00	0.00
00000398	Water - Telemetry	01/01/2005	480 Mo	10,840.00	0.00	0.00	10,840.00	0.00	10,840.00	0.00	0.00
00000399	Water - Water Line	01/01/2005	480 Mo	26,975.00	0.00	0.00	26,975.00	0.00	26,975.00	0.00	0.00
00000400	Water - Water Lines 585lf	01/01/2008	120 Mo	19,183.00	0.00	0.00	19,183.00	0.00	19,183.00	0.00	0.00
00000401	Water - Water Lines	01/01/2010	480 Mo	192,326.00	0.00	0.00	192,326.00	0.00	52,889.68	4,808.16	134,628.16
00000402	Water - Infrastructure	01/01/2013	480 Mo	442,851.00	0.00	0.00	442,851.00	0.00	88,570.34	11,071.32	343,209.34
00000403	Water - Infrastructure	01/01/2013	480 Mo	162,314.00	0.00	0.00	162,314.00	0.00	32,462.65	4,057.80	125,793.55
00000404	Water - Infrastructure	01/01/2014	480 Mo	1,481,279.00	0.00	0.00	1,481,279.00	0.00	259,223.90	37,032.00	1,185,023.10
00000405	Water - Infrastructure	01/01/2015	228 Mo	2,550,125.00	0.00	0.00	2,550,125.00	0.00	741,135.93	139,152.96	1,669,836.11
00000406	Water - Infrastructure	01/01/2015	480 Mo	138,918.00	0.00	0.00	138,918.00	0.00	20,837.61	3,472.92	114,607.47
00000407	Water - Infrastructure	01/01/2016	480 Mo	95,982.00	0.00	0.00	95,982.00	0.00	11,997.66	2,399.52	81,584.82
00000408	Water - Infrastructure	01/01/2016	480 Mo	64,937.00	0.00	0.00	64,937.00	0.00	8,117.29	1,623.43	55,196.28
00000409	Water - Infrastructure	10/01/2017	480 Mo	430,707.07	0.00	0.00	430,707.07	0.00	34,995.08	10,767.72	384,944.27
00000410	Well 1	01/01/1954	480 Mo	193,200.00	0.00	0.00	193,200.00	0.00	193,200.00	0.00	0.00
00000411	Well 2	01/01/1954	480 Mo	193,200.00	0.00	0.00	193,200.00	0.00	193,200.00	0.00	0.00
00000412	Well 3	01/01/1954	480 Mo	193,200.00	0.00	0.00	193,200.00	0.00	193,200.00	0.00	0.00
00000413	Well 4	01/01/1974	480 Mo	354,000.00	0.00	0.00	354,000.00	0.00	354,000.00	0.00	0.00
00000414	Well 5	01/01/1974	480 Mo	354,000.00	0.00	0.00	354,000.00	0.00	354,000.00	0.00	0.00
00000415	Well 6	01/01/1995	480 Mo	1,095,600.00	0.00	0.00	1,095,600.00	0.00	712,140.00	27,390.00	356,070.00
00000416	Well 7&8	01/01/1999	480 Mo	1,200,000.00	0.00	0.00	1,200,000.00	0.00	660,000.00	30,000.00	510,000.00
00000417	Well 9	01/01/2002	480 Mo	3,545.09	0.00	0.00	3,545.09	0.00	1,684.08	88.61	1,772.40
00000418	Reservoir 1	01/01/1972	480 Mo	1.00	0.00	0.00	1.00	0.00	1.00	0.00	0.00
00000419	Reservoir 2	01/01/1980	480 Mo	92,291.88	0.00	0.00	92,291.88	0.00	92,291.88	0.00	0.00
00000420	Reservoir 3	01/01/1980	480 Mo	92,291.88	0.00	0.00	92,291.88	0.00	92,291.88	0.00	0.00
00000421	Reservoir 4	01/01/1970	480 Mo	43,556.00	0.00	0.00	43,556.00	0.00	43,556.00	0.00	0.00
00000522	99 - Telemetry Equipment...	01/01/1999	96 Mo	31,956.00	0.00	0.00	31,956.00	0.00	31,956.00	0.00	0.00
00000523	L & E SECURITY GATE	01/01/2004	96 Mo	7,737.00	0.00	0.00	7,737.00	0.00	7,737.00	0.00	0.00
00000524	John Deere Z Track 757 M...	01/01/2004	96 Mo	3,984.00	0.00	0.00	3,984.00	0.00	3,984.00	0.00	0.00
00000525	1/2 John Deere Tractor/B...	01/01/2005	96 Mo	44,167.00	0.00	0.00	44,167.00	0.00	44,167.00	0.00	0.00
00000526	85% Pacific Tek Valve Exer..	01/01/2007	96 Mo	36,543.00	0.00	0.00	36,543.00	0.00	36,543.00	0.00	0.00
00000527	1/3 TOYOTA FORK LIFT	01/01/2007	96 Mo	8,993.00	0.00	0.00	8,993.00	0.00	8,993.00	0.00	0.00
00000528	GMS-2 Handheld GNSS Un..	01/01/2008	96 Mo	2,269.00	0.00	0.00	2,269.00	0.00	2,269.00	0.00	0.00
00000539	2010 Ford Escape	01/01/2010	60 Mo	21,625.00	0.00	0.00	21,625.00	0.00	21,625.00	0.00	0.00
00000572	06 F250 PU	01/01/2005	60 Mo	24,330.00	0.00	0.00	24,330.00	0.00	24,330.00	0.00	0.00
00000587	00 GMC Sonoma Pickup	01/01/2000	60 Mo	15,835.00	0.00	0.00	15,835.00	0.00	15,835.00	0.00	0.00
00000589	1/2 04FORD F1PU	01/01/2004	60 Mo	8,215.00	0.00	0.00	8,215.00	0.00	8,215.00	0.00	0.00
00000590	Ford 3/4 Ton PU	01/01/2005	60 Mo	20,452.00	0.00	0.00	20,452.00	0.00	20,452.00	0.00	0.00
00000592	09 Int'l 75 SBA 6X4 Dump...	01/01/2008	60 Mo	55,814.00	0.00	0.00	55,814.00	0.00	55,814.00	0.00	0.00
00000593	Equipment enhancements..	01/01/2008	60 Mo	6,631.00	0.00	0.00	6,631.00	0.00	6,631.00	0.00	0.00
00000609	Ford F350	01/01/2015	96 Mo	57,786.00	0.00	0.00	57,786.00	0.00	43,339.56	7,223.22	7,223.22

Asset ID	Description	Acquired Date	Life	Beginning Year Asset Cost	Partial Disposals	Additions & Improvements	Adjusted Asset Cost	Salvage Value	Prior Accum Depr	Current Depreciation	Net Asset Value
Department: WATER - WATER											
00000688	00416 W MAIN ST BATTL...	01/01/1954	0 Mo	500.00	0.00	0.00	500.00	0.00	0.00	0.00	500.00
00000689	#141 SEC 3 T3N R2EWM ...	01/01/1974	0 Mo	2,400.00	0.00	0.00	2,400.00	0.00	0.00	0.00	2,400.00
00000690	BATTLE GROUND MEAD...	01/01/1996	0 Mo	6,277.00	0.00	0.00	6,277.00	0.00	0.00	0.00	6,277.00
00000691	WINCHESTER RANCH PH...	01/01/1995	0 Mo	14,076.00	0.00	0.00	14,076.00	0.00	0.00	0.00	14,076.00
00000692	Well 7&8 Property - Cotti...	01/01/2000	0 Mo	55,158.00	0.00	0.00	55,158.00	0.00	0.00	0.00	55,158.00
00000693	Horsethief Canyon Ph 2 TT..	01/01/2000	0 Mo	160,000.00	0.00	0.00	160,000.00	0.00	0.00	0.00	160,000.00
00000694	Horsethief Canyon Ph 2 Lo..	01/01/2000	0 Mo	60,220.00	0.00	0.00	60,220.00	0.00	0.00	0.00	60,220.00
00000695	Horsethief Canyon Ph 2 TT..	01/01/2000	0 Mo	247,189.00	0.00	0.00	247,189.00	0.00	0.00	0.00	247,189.00
00000696	Tukes Reservoirs Direct Tr...	01/01/2017	0 Mo	188,427.81	0.00	0.00	188,427.81	0.00	0.00	0.00	188,427.81
00000697	Horsethief Canyon Ph 2 TT..	01/01/2000	480 Mo	104,157.00	0.00	0.00	104,157.00	0.00	54,682.29	2,603.88	46,870.83
00000698	Wells 1 & 2 Building Impr...	01/01/2008	480 Mo	16,328.00	0.00	0.00	16,328.00	0.00	5,306.72	408.24	10,613.04
00000699	STORAGE SHED (2001) - p...	01/01/2001	480 Mo	15,444.00	0.00	0.00	15,444.00	0.00	7,722.00	386.10	7,335.90
00000700	Well house roof improve...	01/01/2011	480 Mo	64,356.00	0.00	0.00	64,356.00	0.00	16,089.00	1,608.90	46,658.10
00000753	WAREHOUSES PUBLIC W...	01/01/1994	480 Mo	23,606.00	0.00	0.00	23,606.00	0.00	15,934.08	590.16	7,081.76
00000757	WAREHOUSES PUBLIC W...	01/01/2002	480 Mo	5,303.35	0.00	0.00	5,303.35	0.00	3,237.81	98.40	1,967.14
00000800	WATER INFRASTRUCTURE...	01/01/2018	480 Mo	15,262.72	0.00	0.00	15,262.72	0.00	1,144.80	381.60	13,736.32
00000801	WATER INFRASTRUCTURE...	01/01/2018	480 Mo	317,116.61	0.00	0.00	317,116.61	0.00	23,783.76	7,927.92	285,404.93
00000802	WATER INFRASTRUCTURE...	01/01/2018	480 Mo	233,758.65	0.00	0.00	233,758.65	0.00	17,532.00	5,844.00	210,382.65
00000803	WATER INFRASTRUCTURE...	01/01/2018	480 Mo	235,626.92	0.00	0.00	235,626.92	0.00	17,672.04	5,890.68	212,064.20
00000804	WATER INFRASTRUCTURE...	01/01/2018	480 Mo	140,547.65	0.00	0.00	140,547.65	0.00	10,541.16	3,513.72	126,492.77
00000805	WATER INFRASTRUCTURE...	01/01/2018	480 Mo	2,880.00	0.00	0.00	2,880.00	0.00	216.00	72.00	2,592.00
00000806	WATER INFRASTRUCTURE...	01/01/2018	480 Mo	204,626.68	0.00	0.00	204,626.68	0.00	15,347.16	5,115.72	184,163.80
00000807	WATER INFRASTRUCTURE...	01/01/2018	480 Mo	1,300.80	0.00	0.00	1,300.80	0.00	97.56	32.52	1,170.72
00000812	WELL 6 IMPROVEMENTS (...	12/31/2018	0 Mo	45,242.49	0.00	0.00	45,242.49	0.00	0.00	0.00	45,242.49
00000813	WELL 7 REHAB (PW1808)	06/26/2018	240 Mo	50,456.31	0.00	0.00	50,456.31	0.00	6,517.19	2,522.82	41,416.30
00000814	WELL 9 REHAB (PW1809)	06/26/2018	240 Mo	50,456.30	0.00	0.00	50,456.30	0.00	6,517.19	2,522.81	41,416.30
00000815	WELL 1&2 REHAB (PW18...	06/26/2018	240 Mo	50,116.94	0.00	0.00	50,116.94	0.00	6,473.42	2,505.84	41,137.68
00000830	WATER INFRASTRUCTURE...	01/01/2019	480 Mo	24,258.84	0.00	0.00	24,258.84	0.00	1,212.96	606.48	22,439.40
00000831	WATER INFRASTRUCTURE...	01/01/2019	480 Mo	80,454.81	0.00	0.00	80,454.81	0.00	4,022.64	2,011.32	74,420.85
00000832	WATER INFRASTRUCTURE...	01/01/2019	480 Mo	22,259.72	0.00	0.00	22,259.72	0.00	1,112.88	556.44	20,590.40
00000833	WATER INFRASTRUCTURE...	01/01/2019	480 Mo	7,804.80	0.00	0.00	7,804.80	0.00	390.24	195.12	7,219.44
00000837	NE 219TH INTERTIE UPGR...	09/21/2021	480 Mo	214,858.51	0.00	42,494.74	257,353.25	0.00	0.00	2,144.60	255,208.65
00000851	2020 FORD RANGER	07/16/2020	60 Mo	29,472.48	0.00	0.00	29,472.48	0.00	2,947.26	5,894.52	20,630.70
00000893	WATER INFRASTRUCTURE ..	01/01/2020	480 Mo	7,588.00	0.00	0.00	7,588.00	0.00	189.72	189.72	7,208.56
00000894	WATER INFRASTRUCTURE ..	01/01/2020	480 Mo	91,916.39	0.00	0.00	91,916.39	0.00	2,297.88	2,297.88	87,320.63
00000895	WATER INFRASTRUCTURE ..	01/01/2020	480 Mo	19,332.27	0.00	0.00	19,332.27	0.00	483.36	483.36	18,365.55
00000896	WATER INFRASTRUCTURE ..	01/01/2020	480 Mo	8,140.84	0.00	0.00	8,140.84	0.00	203.52	203.52	7,733.80
00000897	WATER INFRASTRUCTURE ..	01/01/2020	480 Mo	21,839.35	0.00	0.00	21,839.35	0.00	546.00	546.00	20,747.35
00000898	WATER INFRASTRUCTURE ..	01/01/2020	480 Mo	114,977.17	0.00	0.00	114,977.17	0.00	2,874.48	2,874.48	109,228.21
00000899	WATER INFRASTRUCTURE ..	01/01/2020	480 Mo	11,056.80	0.00	0.00	11,056.80	0.00	276.42	276.42	10,503.96
00000900	1/2 2021 FORD RANGER 4...	05/20/2021	60 Mo	0.00	0.00	14,304.55	14,304.55	0.00	0.00	1,907.28	12,397.27
00000904	2021 FORD F-150 4X4	07/30/2021	60 Mo	0.00	0.00	32,063.17	32,063.17	0.00	0.00	3,206.34	28,856.83

Asset ID	Description	Acquired Date	Life	Beginning Year Asset Cost	Partial Disposals	Additions & Improvements	Adjusted Asset Cost	Salvage Value	Prior Accum Depr	Current Depreciation	Net Asset Value
Department: WATER - WATER											
00000956	WATER INFRASTRUCTURE ..	01/01/2021	480 Mo	0.00	0.00	2,000.00	2,000.00	0.00	0.00	50.04	1,949.96
00000957	WATER INFRASTRUCTURE ..	01/01/2021	480 Mo	0.00	0.00	6,739.95	6,739.95	0.00	0.00	168.48	6,571.47
00000958	WATER INFRASTRUCTURE ..	01/01/2021	480 Mo	0.00	0.00	73,166.75	73,166.75	0.00	0.00	1,829.16	71,337.59
00000959	WATER INFRASTRUCTURE ..	01/01/2021	480 Mo	0.00	0.00	343,659.44	343,659.44	0.00	0.00	8,591.52	335,067.92
00000960	WATER INFRASTRUCTURE ..	01/01/2021	480 Mo	0.00	0.00	243,380.76	243,380.76	0.00	0.00	6,084.48	237,296.28
00000961	WATER INFRASTRUCTURE ..	01/01/2021	480 Mo	0.00	0.00	2,000.00	2,000.00	0.00	0.00	50.04	1,949.96
00000962	WATER INFRASTRUCTURE ..	01/01/2021	480 Mo	0.00	0.00	2,500.00	2,500.00	0.00	0.00	62.52	2,437.48
00000963	WATER INFRASTRUCTURE ..	01/01/2021	480 Mo	0.00	0.00	2,710.00	2,710.00	0.00	0.00	67.80	2,642.20
00000964	WATER INFRASTRUCTURE ..	01/01/2021	480 Mo	0.00	0.00	142,479.52	142,479.52	0.00	0.00	3,561.96	138,917.56
00000965	WATER INFRASTRUCTURE ..	01/01/2021	480 Mo	0.00	0.00	82,980.20	82,980.20	0.00	0.00	2,074.56	80,905.64
00000966	WATER INFRASTRUCTURE ..	01/01/2021	480 Mo	0.00	0.00	42,505.81	42,505.81	0.00	0.00	1,062.60	41,443.21
00000967	WATER INFRASTRUCTURE ..	01/01/2021	480 Mo	0.00	0.00	64,980.38	64,980.38	0.00	0.00	1,624.56	63,355.82
00000968	WATER INFRASTRUCTURE ..	01/01/2021	480 Mo	0.00	0.00	173,743.72	173,743.72	0.00	0.00	4,343.64	169,400.08
00000969	WATER INFRASTRUCTURE ..	01/01/2021	480 Mo	0.00	0.00	282,306.49	282,306.49	0.00	0.00	7,057.68	275,248.81
00000970	WATER INFRASTRUCTURE ..	01/01/2021	480 Mo	0.00	0.00	72,595.48	72,595.48	0.00	0.00	1,814.88	70,780.60
00000971	WATER INFRASTRUCTURE ..	01/01/2021	480 Mo	0.00	0.00	55,987.52	55,987.52	0.00	0.00	1,399.68	54,587.84
00000972	WATER INFRASTRUCTURE ..	01/01/2021	480 Mo	0.00	0.00	34,893.96	34,893.96	0.00	0.00	872.40	34,021.56
	Total Department: WATER - WATER:			**33,889,356.89**	**0.00**	**1,717,492.44**	**35,606,849.33**	**0.00**	**16,319,512.47**	**910,637.24**	**18,376,699.62**
	Active Asset Count: 179	**Report Total:**		**33,889,356.89**	**0.00**	**1,717,492.44**	**35,606,849.33**	**0.00**	**16,319,512.47**	**910,637.24**	**18,376,699.62**

Disposed Assets

Asset ID	Description	Acquired Date	Beginning Year Asset Cost	Partial Disposals	Additions & Improvements	Adjusted Asset Cost	Prior Accum Depr	Current Depreciation	Net Asset Value	Full Disposal	Current Asset Value
Department: WATER - WATER											
00000595	1/2 - '02 Chev Impala	01/01/2002	12,691.50	0.00	0.00	12,691.50	12,691.50	0.00	0.00	0.00	0.00
00000600	01 Ford F350 Pickup	01/01/2001	32,479.00	0.00	0.00	32,479.00	32,479.00	0.00	0.00	0.00	0.00
	Total Department: WATER - WATER:		**45,170.50**	**0.00**	**0.00**	**45,170.50**	**45,170.50**	**0.00**	**0.00**	**0.00**	**0.00**
	Disposed Asset Count: 2	**Report Total:**	**45,170.50**	**0.00**	**0.00**	**45,170.50**	**45,170.50**	**0.00**	**0.00**	**0.00**	**0.00**

Department Summary

Active Assets

Department	Count	Beginning Year Asset Cost	Partial Disposals	Additions & Improvements	Adjusted Asset Cost	Salvage Value	Depreciation	Net Asset Value
WATER - Straight Line	179	33,889,356.89	0.00	1,717,492.44	35,606,849.33	0.00	17,230,149.71	18,376,699.62
Active Assets Report Total:	**179**	**33,889,356.89**	**0.00**	**1,717,492.44**	**35,606,849.33**	**0.00**	**17,230,149.71**	**18,376,699.62**

Disposed Assets

Department	Count	Beginning Year Asset Cost	Partial Disposals	Additions & Improvements	Adjusted Asset Cost	Depreciation	Net Asset Value	Full Disposal	Current Asset Value
WATER - Straight Line	2	45,170.50	0.00	0.00	45,170.50	45,170.50	0.00	0.00	0.00
Disposed Assets Report Total:	**2**	**45,170.50**	**0.00**	**0.00**	**45,170.50**	**45,170.50**	**0.00**	**0.00**	**0.00**

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